

Science & Society

Science and Health Policies to Tackle Chronic Diseases in Chile

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Chile has experienced rapid epidemiological transitions characterized by decreasing infant mortality, population aging, and a shift towards obesity with an increase in noncommunicable diseases (NCDs). Today, tobacco, alcohol, and ultraprocessed foods are the main risk factors for these diseases. Based on Chile's experience in tobacco control, we discuss paths to make progress in population evidence-based strategies to improve overall community health.

Located in the Southern Cone of South America, Chile is a democratic nation with over 18 million people. Since the 1970s, economic development and improvement of living conditions have led to rapid epidemiological and nutritional transitions, characterized by decreasing infant mortality and population aging [1]. Since the 1990s, Chile has reduced its poverty rates by more than half, and the gross domestic product (GDP) per capita increased from USD 2500 in 1990 to USD 5000 in 2000, and to USD 15 923 in 2018 (World Bank, World Development Indicators). However, income inequality has also increased, and has become a major concern for Chilean society, as the incomes of the 10% richest are about 20 times higher than those of the 10% poorest. Nowadays, these inequalities are driving civil unrest in our country. Apart from inequality, economic growth was accompanied by the adoption of

western lifestyles, including low physical activity and a diet rich in saturated fat, sugar, and salt, and low in fiber. This has led to epidemic rates of obesity, which are particularly high within the lower socioeconomic segment [2].

In 2010, Chile became the only South American country to join the Organization for Economic Co-operation and Development (OECD), sharing with their members the predominance of chronic NCDs as the main health burden [3]. In the past decade, cardiovascular diseases, neoplasms, neurological disorders, digestive diseases, diabetes, and chronic kidney disease have been the leading causes of death in Chile; while musculoskeletal and mental disorders have become the main causes of disability [4]. In 2017, the National Health Survey confirmed an epidemic of NCDs and their risk factors in Chile, with high prevalence of low consumption of fruits and vegetables (85%), obesity (34.4%), smoking (33.4%), and high-risk alcohol consumption (12%) [2].

While one third of Chilean adults are currently obese (over 40% in lower socioeconomic strata), 44.5% of children are overweight or obese at the age of 13 years, and over 50% of preschool children are already overweight, thus ranking Chile first in excess malnutrition among OECD countries [3]. Chileans' consumption of ultraprocessed foods is among the highest worldwide, contributing to about one-third of total energy intake [5], and sales of sugar-sweetened beverages (SSBs) are the highest worldwide [6]. Regulation of these foods is essential, especially when the association of ultraprocessed foods with all-cause mortality and some types of cancer has become clear in recent years [7].

Unfortunately, alcohol intake among Chileans remains on the rise, contrary

to other developed countries [3]. This is a major health issue, as 13% of deaths in our country can be attributed to alcohol consumption. Teens start drinking alcohol at the age of 13 years, and 40% of school-aged children report that for them it would be easy or very easy to get access to alcohol [8]. Among high-school students who report having consumed alcohol in the past 30 days, 61% of women and 63% of men had a pattern of binge drinking (five or more drinks on one occasion) [8].

The Chilean Approach

A variety of public health efforts has been implemented to tackle this worrisome scenario. First, Chile has established tobacco control policies since 2005, following the Framework Convention on Tobacco Control (FCTC) guidelines, in particular by protecting smoke-free environments, regulating advertising, labeling, and increasing taxes on tobacco products (Figure 1). Of note, a significant tax increase on tobacco products was imposed after the Chilean earthquake of 2010, due to the urgency to collect funds to rebuild devastated areas. The '2010 earthquake effect' was evident on Chile's tobacco taxation, which since 2014 exceeds 75% of the pretax price of the most-sold brands of cigarettes [9]. In terms of its efficacy, a recent study by Guindon showed that both higher prices and other tobacco control policies enacted by the Ministry of Health in 2006 are associated with a lower risk of starting smoking among Chilean adolescents [10]. Furthermore, a public space nonsmoking law was passed and implemented in 2013. Taken together, these population-wide interventions contributed to economic, social, and cultural changes from 2010 to 2017 that resulted in a decrease in cigarette smoking from 40% to 33% in the general population, and from 60% to 41%



(A) Chilean tobacco warning signs and restrictions, Law 20.660, Chile 2013**(B) Chilean food warning signs and restrictions, Law 20.606, Chile 2016–2019**

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Figure 1. Chilean Laws on Tobacco and Food Warnings and Restrictions.

(A) Smoking and marketing tobacco in public spaces is forbidden, as well as selling tobacco products near schools and smoking in restaurants and bars. Fifty percent of the package surface of tobacco products must have a warning sign indicating a health risk of consuming tobacco, accompanied with an explicit image of such risk. (B) All processed foods with high content of calories, sugars, saturated fats, or sodium should have a warning in the front part of the package. Foods bearing these warnings cannot be sold, distributed or promoted in schools, and cannot be marketed to children. Prepackaged foods should bear a warning sign for each one of those four contents that exceed the normal range.

among young adults [2]. A new tobacco bill under review, aiming to introduce plain packaging for tobacco products, will forbid smoking in open public places, and ban menthol cigarettes, which are highly consumed by young Chilean women. Besides these regulations, it is necessary to foster smoking cessation programs especially targeted to high-risk groups, such as patients with chronic obstructive pulmonary disease or diabetes, or survivors of cardiovascular events (Figure 2).

In terms of nutrition, in 2016 Chile implemented law 20.606, which introduced warning signs on the front-of-package labels of processed food; restricted the marketing and advertising of unhealthy foods for children under 14 years of age; and restricted unhealthy food sales, distribution and promotion at schools (Figure 1) [11]. This law was, without a doubt, a firm step in the direction of creating healthier food environments for children and

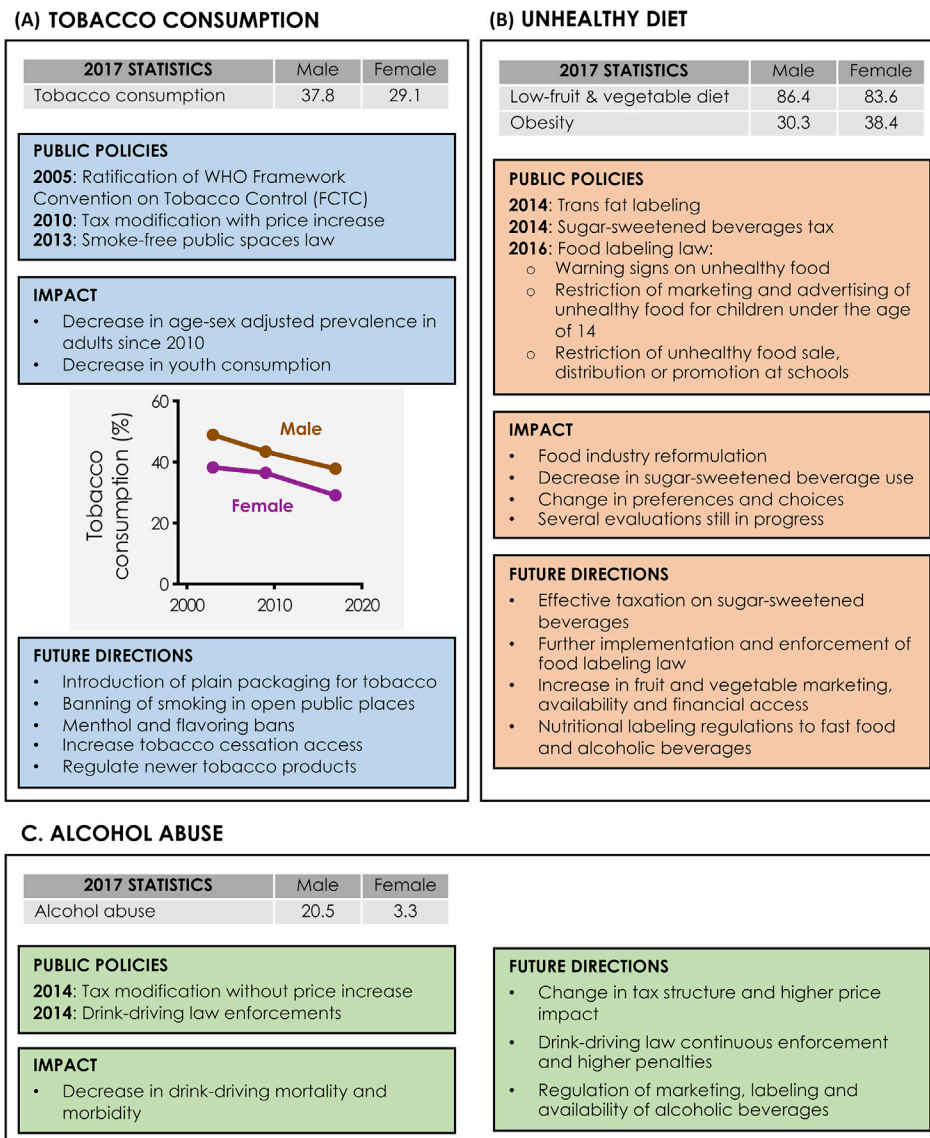
the population as a whole. Moreover, a trans-fat labeling law and a taxation on SSBs were implemented in 2014. However, the modification of SSB tax was insufficient to reduce their purchase [12]. Current labeling regulations need to be extended to fast food and alcoholic beverages. Hopefully, these measures will contribute to educate people about the nutrient and calorie profile of these products, as well as promote changes in the formulation of such products by companies, as has already occurred with processed food (Figure 2).

With respect to alcohol consumption, in 2014 Chile introduced a tax increase for alcoholic drinks, but the effect of this effort to decrease their negative impact on health and economy is yet to be seen. For instance, the direct health costs of alcohol consumption during 2015 more than doubled the revenue obtained from alcohol products taxes [13]. This can be attributed to the

aggressive marketing of alcohol products targeted to young people and the lack of regulation concerning advertising and sponsorship of alcohol products. Moreover, alcohol is readily available and its price is low compared with other countries. For example, an equivalent volume of a typical spirit in Iceland costs around USD 84, but only USD 4 in Chile. Therefore, the regulation of price, marketing, and availability of alcohol is urgent and a necessary step to create a healthier environment (Figure 2).

The Role of Science and Society

In 2013, the Chilean government established the Advanced Center for Chronic Diseases (ACCDiS, www.accdiis.cl), as part of a national program to potentiate research in priority areas. This initiative assembles basic scientists, clinicians, and experts in epidemiology and public health, all contributing to start the MAUCO study, the first population-based



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Figure 2. Chilean Policies on Main Risk Factors.

(A) Chile has a high prevalence of tobacco consumption; however, public policies implemented since 2005 have led to a steady decrease in this risk factor. Further policies are required to continue this trend. (B) The consumption of unhealthy fruits and vegetables is highly prevalent in Chile, a trend associated with the highest obesity rate among Organization for Economic Cooperation and Development (OECD) countries (Body mass index >30, in adults). Although many restrictions have been implemented, their impact remains to be evaluated. (C) The Chilean population displays a high prevalence of alcohol abuse. Public policies on this matter have been scarce, and require a more aggressive approach. Abbreviation: WHO, World Health Organization.

cohort study of NCDs in Maule, Central Chile [14]. Nowadays, most NCD research arises from Europe and the USA, whose characteristics hardly match those of the rest of the world. Therefore, studies such as MAUCO are required to provide

knowledge on NCDs specific to Chile. For instance, Maule is a community dedicated mainly to agricultural activities, like many other populations of the region. Importantly, the MAUCO study will allow understanding of, not only the specific

health issues of Chile, but also of other countries in South America, because of the shared genetic and sociocultural heritage. Thereby, ACCDiS and the MAUCO study have emerged as a natural laboratory to foster exchange between

health policies and science, as a platform to advocate the prevention of NCDs with population-wide strategies. These pending tasks will face a difficult scenario of conflicts of interests and aggressive lobbying by the tobacco, alcohol, and food industries. Thus, today it is more important than ever that health professionals, scientists, and the community, as a whole, become empowered and trained to support both individual and population-wide systemic changes.

Finally, considering that healthy lifestyles need to be fostered in the context of daily life, Chile needs to move beyond models based on individual choice and responsibility, to the implementation and evaluation of new policies to create and shape environments for general wellbeing and healthy living. Local governments play an important role in monitoring and regulating the tobacco, alcohol, and food markets, as well as in generating incentives to improve access to healthier food and lifestyles across the population. This seems particularly relevant in developing countries, where poverty can hinder the implementation of individual preventive care strategies, which are costly. In fact, investments in prevention and control of NCDs have been identified for their potential to offer a high return for countries at all income levels, thereby contributing to economic growth aligned with sustainable development goals [15]. The case of tobacco control provides an important lesson: countries like Chile are not immune to public health efforts.

The higher burden of NCDs observed in lower educational and socioeconomic status groups also needs urgent policies with three simultaneous characteristics: highly cost-effective, shorter delay impact, and pro-equality. Policies with

these three characteristics are mostly related to population-wide regulations to markets with big negative externalities to society, not only considering tobacco, alcohol, and ultraprocessed food, but also polluting industry. The current social crisis is an opportunity to improve these types of health and social policies which will hopefully have positive effects on reducing the rates of NCDs and inequalities in Chile.

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