





# Compliance with the smoking ban in enclosed, semiopen and open areas of workplaces and public places in Chile

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## ABSTRACT

**Objective** To assess the national level of compliance with the Chilean comprehensive smoke-free legislation by observing healthcare facilities, education centres, government offices, hospitality venues and private workplaces, by type of area within workplaces and public places: enclosed, semiopen and open.

**Methodology** In this cross-sectional observational study, we studied a national representative sample of 3253 venues obtained through a two-stage cluster sampling design. First, 57 municipalities were randomly selected, proportionally to the total number of venues of interest. Second, within each selected municipality, a maximum of 12 venues of each sector was selected systematically from a list of existing sites. We determined the non-compliance level by estimating the percentage of the visited venues where smoking was observed or suspected in banned areas of the premises.

**Results** Smoking or suspicion thereof was not observed in any enclosed area of any establishment. However, smoking violations were observed in semiopen areas ranging from less than 0.5% of schools and healthcare centres to around 10% of hospitality venues or 23.0% of higher education centres. Smoking violations were also observed in outdoor areas of 6.7% and 1.6% of the health centres and schools, respectively.

**Discussion** The stark contrast in compliance with the smoking ban between the enclosed areas and the semiopen areas may be a consequence of the complex definition of semiopen areas in the regulations. The study also reflects the need to improve the overall enforcement of the smoke-free law, particularly in universities and hospitality venues.

any of the two previous definitions. They include all uncovered spaces and any space covered but not completely isolated from the outside by walls, provided that the roof or cover has no physical contact with an architectural wall of the establishment. Typically, these areas include bar and restaurant terraces covered with sun shades that rest directly on the floor and are in no contact with any architectural feature of a building.<sup>2</sup>

The purpose of this study is to assess the national level of compliance with the Chilean smoke-free legislation within workplaces and public places by type of area: enclosed, semiopen and open. The compliance with the 2013 smoke-free legislation has never been measured in Chile, except for the biennial WHO assessment for their report on the global tobacco epidemic,<sup>3</sup> which has significant limitations and does not allow to distinguish compliance by type of area of venues.

## METHODOLOGY

### Study population

In this cross-sectional observational study, we studied a national representative probability sample of workplace and public place venues in the same seven sectors as the WHO report on the global epidemic<sup>3</sup>: (1) healthcare facilities, (2) primary and secondary schools, (3) higher education centres, (4) central, regional and municipal government offices, (5) hospitality venues serving primarily drinks such as cafes, bars and pubs, (6) hospitality venues serving primarily meals such as restaurants and (7) private workplaces not considered in the previous categories, such as privately owned banks, offices, stores or factories. We obtained the list of all existing venues in 2017 in Chile from official sources, including from the authority in charge of collecting taxes.

### Sampling

A sample of 3253 venues was obtained through a two-stage cluster sampling design.<sup>4</sup> First, 57 municipalities were randomly selected proportionally to the total number of venues of interest out of the 346 municipalities existing in Chile, excluding 22 small rural ones of difficult access, representing 0.2% of the national population. More specifically, we determined that the sum of all venues of interest in Chile was 89 670. From an initial intention to sample 60 municipalities, we calculated the sample interval and proceeded to select the municipalities using systematic sampling. Since some large municipalities were sampled more than once, the total number of municipalities selected was 57.

## INTRODUCTION

A comprehensive smoke-free law entered into force in Chile in 2013. It banned smoking in enclosed and semiopen areas of public places and workplaces and open areas of health facilities and schools.<sup>1</sup> Health regulations define enclosed areas as any place covered by a permanent or temporary roof of any material under which the space is completely isolated from the outside by walls, independently of any opening. Semiopen areas are any place that is not entirely isolated from the outside by permanent or temporary walls and is covered by a permanent or temporary roof of any material that has at least one point of support on an architectural wall of the establishment. Semiopen areas may include some covered bar and restaurant terraces, and building entrances under a ledge. Open areas do not fulfil



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Second, within each selected municipality, a list of addresses of all venues was obtained, randomly ordered, stratified according to the seven types of venues described above. For each type of venue, a maximum of 12 venues was selected by means of systematic sampling from the list, to be representative of the whole municipality. The national target sample size for each type of venue was calculated, assuming a 95% margin of error of 0.05, an expected compliance rate of 0.5, an intraclass correlation for compliance within municipalities of 0.10, and a 20% sampling frame error<sup>5</sup> and non-participation for selected venues with no substitution.

### Outcomes

(1) Direct observation of smoking and (2) suspicion of smoking by finding at least one ashtray or more than one butt.

### Data collection

The fieldwork happened between September and December of 2018. Professional fieldworkers recorded whether they observed smoking, ashtrays and similar containers, as well as butts in enclosed, semiopen or open areas of each venue, as defined by the Chilean regulation.<sup>2</sup> The fieldworkers visited each study venue from Monday to Friday from 8:00 till 17:00, except in the hospitality sector where observations happened from Wednesday till Saturday from 13:00 to 15:00 and from 20:00 till 23:00 coinciding with peak hours of patronising. In each visited venue, the fieldworkers followed a standard itinerary and evaluated a pre-specified number of study locations (online supplementary table 1).

The observation took place incognito except in schools where permission to enter was needed. In the rest of the venues, the undercover observation was performed in all areas accessible to the public, and only then the fieldworkers identified themselves with a letter provided by the Ministry of Health and asked permission to enter without a previous appointment into the private areas of the venues.

### Data analysis

We determined non-compliance by estimating the percentage of the visited venues with a completed observation where smoking was observed, and suspicion of noncompliance as said percentage where at least one ashtray or more than one butt was observed. We present the percentage of noncompliance, or suspicion thereof, by type of establishment and area of the venue with their 95% CIs, which are corrected for the sampling design effect. Data were analysed using the STATA (version 13) survey data module.<sup>6</sup>

### RESULTS

The observation was completed in 3132 or 96.3% of the 3253 sampled venues. In 116 venues, the survey was completed partially, usually for lack of permission to enter the private areas of a venue, and in five the survey was not completed at all due to refusal to enter any part of the venue. Only complete observations are analysed.

Table 1 shows that smoking, ashtrays and butts were not observed in any enclosed area of any establishment. However, smoking violations were observed in semiopen areas, in a percentage of venues ranging from 0.2% (95% CI 0.0% to 1.7%) and 0.5% (95% CI 0.1% to 1.9%) in schools and healthcare facilities, respectively, to 9.2% (95% CI 5.8% to 14.2%) and 10.0% (95% CI 6.8% to 14.4%) in hospitality venues where mostly foods or drinks are served, respectively, and 23.0% (95% CI 16.1% to 31.9%) in higher

education centres. For each venue where we observed smoking, there was at least another one where we suspected smoking in all types of venues, except in higher education centres. We observed smoking violations in outdoor areas of 6.7% of health venues and 1.6% of primary and secondary schools, with an additional 16.1% and 10.9%, respectively, where violations were suspected but not directly observed.

Our study reveals that the odds of finding a violation of the law in the hospitality sector outside the enforcement inspectors' workday (8:00–17:00 hours) are 2.5 times higher (95% CI 1.1 to 5.6) than during their office hours. When considering smoking in all areas banned by law, including open areas, violation of the law was observed in 1.8% and 7.1% of schools and healthcare centres, respectively. The national non-compliance figure for all types of venues combined was 4.1% (95% CI 2.1% to 7.7%).

### DISCUSSION

Compliance with the smoke-free law in Chile seems high in all enclosed areas of the types of venues investigated across the country. We did not observe or suspect smoking in any of the enclosed areas of the venues we visited. However, compliance is suboptimal in semiopen areas, especially in universities and the hospitality sector. If we consider the sum of observation and suspicion of smoking in semiopen areas, violations of the law could be happening in more than 20% of the hospitality venues and more than 30% of the higher education centres.

Non-compliance with the law in semiopen areas may have important health consequences. Secondhand smoke (SHS) levels in semiopen areas can be significant,<sup>7,8</sup> and SHS has been shown to drift into adjacent enclosed areas via open windows and doors.<sup>9,10</sup> Therefore, non-compliance in these areas may expose bystanders to significant levels of SHS both in the semi-open areas and the adjacent enclosed areas.

The stark contrast in compliance with the smoking ban between the enclosed areas and the semiopen areas may be a consequence of the complex regulatory definition of semi-open areas. The difference between a semiopen area—where smoking is banned—and an open area—where it is not—is merely the fact that the structure serving as a ceiling has a 'point of contact' with an architectural wall of the building. The difference, therefore, between a legal and illegal structure is not easily spotted without a thorough inspection by a trained enforcement officer and can be abused to push the limits of where patrons can smoke. Some authors point to complicated and unclear definitions of semi-open and open areas as a cause for noncompliance with the law.<sup>11</sup>

It is also troubling the compliance with the law in schools. Most violations happen in the outdoor areas of the education premises, and it is not known if these are caused by children or adults smoking. Even if most of the violations come from adults, the concern is the negative impact on minors seeing adults smoking in possibly almost 15% of the schools when adding observed and suspected violations.

To improve compliance in non-enclosed areas, Chile should simplify the definition of semi-open areas by dropping the requirement that the cover should be in contact with an architectural wall. It should also include all outdoor areas immediately adjacent to or attached to indoor areas and where there are open doors and windows or intake vents.

Our study, moreover, shows enforcement limitations. Enforcement of the smoke-free law in Chile is carried out by health inspectors. In 2018, they carried out 8157 tobacco control inspections targeting compliance with the smoke-free law only in the hospitality sector.<sup>12</sup> However, our data show the frequent violation of the smoke-free law in the hospitality sector, despite existing

**Table 1** Percentage of venues where smoking was observed or suspected according to type of establishment and area of the venue, Chile 2018

		Types of establishments							
		Healthcare centres * N=3733 n=436	Primary secondary schools† N=5651 n=441	Higher education centres‡ N=582 n=193	Government facilities§ N=4128 n=445	Restaurants and similar venues¶ N=20 103 n=404	Bars, cafes and similar venues** N=19 559 n=491	Private workplaces†† N=695 879 n=722	All types N=749 635 n=3132
Smoking in	Enclosed areas	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Suspected‡‡	0.0%–0.0%	0.0%–0.0%	0.0%–0.0%	0.0%–0.0%	0.0%–0.0%	0.0%–0.0%	0.0%–0.0%	0.0%–0.0%
Semiopen areas	Observed	0.0%	0.2%	23.0%	3.8%	9.2%	10.0%	3.8%	4.0%
	Suspected	0.1%–1.9%	0.0%–1.7%	16.1%–31.9%	2.3%–6.3%	5.8%–14.2%	6.8%–14.4%	1.8%–7.7%	2.1%–7.6%
Open areas	Observed	3.2%	0.7%	13.0%	10.8%	11.6%	12.8%	8.9%	9.0%
	Suspected	1.8%–5.7%	0.2%–2.1%	8.0%–20.2%	7.4%–15.4%	7.9%–16.8%	8.5%–18.9%	5.8%–13.2%	6.0%–13.2%
All banned areas§§	Observed	6.7%	1.6%	15.7%	4.3%	8.5%	11.0%	4.7%	5.0%
	Suspected	3.4%–12.5%	0.6%–3.9%	10.3%–23.2%	2.4%–7.5%	4.9%–14.2%	6.4%–18.3%	2.5%–8.9%	2.7%–9.1%
All banned areas§§§	Observed	7.1%	1.8%	23.0%	3.8%	9.2%	10.0%	3.8%	4.1%
	Suspected	3.9%–12.9%	0.8%–4.1%	16.1%–31.9%	2.3%–6.3%	5.8%–14.2%	6.8%–14.4%	1.8%–7.7%	2.1%–7.7%
All banned areas§§§§	Observed	14.3%–24.8%	7.7%–17.0%	8.0%–20.2%	7.4%–15.4%	7.9%–16.8%	8.5%–18.9%	5.8%–13.3%	9.1%
	Suspected	19.0%	11.6%	13.0%	10.8%	11.6%	12.8%	8.9%	9.1%

\*Except private practices.

†All public and private primary and secondary level schools.

‡All public and private universities and technical institutes.

§All central, regional and municipal government offices and facilities, except prisons as well as police and armed forces centres.

¶Such as restaurants, fast food restaurants, diners, bistros or eateries.

\*\*Such as bars, cafes, pubs, discos or soda fountains.

††All private workplaces not included in the previous categories, except those whose activity is usually developed in open spaces, such as in the construction, agriculture, cattle raising or fishing sectors.

‡‡Smoking suspected because more than one butt at least one was ashtray were found in venue areas where smoking was not observed.

§§This includes the areas of health centres and primary/secondary schools. It also includes the areas of healthcare centres and primary/secondary schools.

enforcement efforts. Part of the problem might be that inspections are carried out during regular office hours, and the hospitality sector serves customers beyond those hours. Also, our study shows that the hospitality sector is not the only concern. Universities require prompt attention from the authorities. The same can be said of violation of the law in open areas of health and education centres.

Our study is one of two to assess national compliance at the venue level with the smoke-free law of 2013 after it entered into force. WHO has evaluated compliance in Chile during this period. However, its assessment is based on the opinion of a convenience sample of three to five key informants, generally residing in the country capital and based on their experience of attendance to venues of interest.<sup>13</sup> Ours is a more rigorous assessment based on the direct observation of a nationally representative probability sample of venues during a definite time period.

Nevertheless, the results of our study should be interpreted with caution. First, visiting a venue for 20–30 min offers a short window of opportunity to witness a smoking violation. Therefore, non-compliance figures based on direct observation of smoking provide a conservative estimate. We considered signs of possible smoking violations in the absence of direct evidence. However, although such signals provide clues for suspecting a violation, they are not definite proof that it happened. Second, our results are based on point prevalence estimates. They give an idea of the scope of non-compliance, but they do not allow for gauging how frequent violations of the law are. Therefore, it provides limited evidence of how to prioritise enforcement efforts towards venue types where violations may lead to more sustained exposure to SHS instead of venues with occasional exposure.

Our study, in conclusion, points to the need to have simple operational definitions of non-enclosed areas of venues for ease of enforcement and to the need to improve overall enforcement efforts in Chile.

### What this paper adds

- ▶ Compliance with smoke-free laws, although frequently satisfactory in most countries, is inadequate in some settings of some countries, particularly in the hospitality sector.
- ▶ Traditionally, comprehensive smoke-free laws ban smoking in indoor workplaces and public places, but an increasing number of countries are banning smoking also in outdoor and quasi outdoor workplaces and public places.
- ▶ The differential compliance by type of location within workplaces and public places: enclosed, semienclosed and outdoors is not well known.
- ▶ The study shows that compliance with the law seems high in all enclosed areas of workplaces and public places but suboptimal in non-enclosed areas of these venues, especially in semiopen areas, probably due to the complex regulatory definition of these areas.
- ▶ It exposes the shortcomings of existing enforcement efforts in the hospitality sector, in part because inspections are carried out during regular office hours while the hospitality sector serves customers beyond those hours. It also reveals the need focus enforcement efforts in the education sector, particularly to curtail the violation of the law in open spaces of primary and secondary schools and semiopen spaces of higher education centres.

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