



Short Communication

The prevalence of fire and CO safety amenities in Airbnb venues that permit smoking – Findings from 17 countries



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ABSTRACT

Airbnb hosts rent their homes to guests as an alternative to traditional hospitality settings. Airbnb venues are not uniformly regulated for allowing smoking or requiring fire-safety amenities. This study quantified the reported prevalence of fire-safety amenities in 413,339 Airbnb venues that allow smoking in 43 cities in 17 countries. Proportions of host-reported smoke detectors and carbon monoxide (CO) alarms, and those that allow smoking were calculated. Across the entire sample 9.3% ($n = 38,525$) allowed smoking. An overall evaluation of those venues shows that 46% ($n = 17,569$) had smoke detectors compared to 64% of the 374,814 venues that do not allow smoking, a statistically significant difference ($X^2 = 5277$, $p < 0.01$). A similar difference is found between venues that allow smoking and had CO alarms (19%, $n = 7176$) and the 33% of venues that prohibit smoking ($X^2 = 3442$, $p < 0.01$). Among this sample, most Airbnb venues that allow smoking are less likely to have safety amenities.

1. Introduction

The World Health Organization estimates that 5% of worldwide injury-related deaths are from fire-related burns (World Health Organization, 2015). Similar estimates for carbon monoxide (CO) poisoning deaths worldwide are not available, but several country-level sources document a problem (Huang et al., 2017; Center for Disease Control and Prevention, 2014; Office for National Statistics, 2017). Most fire deaths and fatal CO poisonings occur in homes (Sircar et al., 2015; Mukhopadhyay et al., 2018). Cigarettes are consistently reported as the leading cause of residential fire death (Xiong et al., 2017). The burden from cigarettes and fire hazard is often poorly counted into the overall global health impact of tobacco (Drope and Schluger, 2018).

Smoke detectors are an effective way to drastically reduce the number of deaths; in some jurisdictions, there is evidence smoke detectors have reduced fire-related deaths by half (Runyan et al., 2005; Ahrens, 2014). Similarly, CO alarms have been proven to reduce deaths associated with CO leaks from appliances or buildup of CO from combustible materials (Iqbal et al., 2012). In the United States, smoking-related fires have declined over the last several decades, which has been credited to decreasing smoking prevalence and improved fire safety

regulations including required installation of smoke detectors (National Fire Protection Agency, 2010). Policies requiring the installation of fire and CO safety features differ across jurisdictions (World Health Organization, 2015; Iqbal et al., 2012; National Conference of State Legislatures, 2018; Parachute, 2015), and may differ by housing type. These regulations vary by country, for example UK law specifies that CO alarms are placed in rooms with a fuel burning appliance (Parachute, 2015). In addition to differences across countries, local jurisdictions may also vary, such as by requiring sprinkler systems or handicapped access in commercial rental housing, but not in private residences (Parachute, 2015).

Short-term housing is an important sector of the housing market. In recent years, this sector has undergone tremendous change driven by the development of web-based platforms that connect short-term renters to hosts that either share space in their home or rent an entire property such as an apartment or house.

The peer-to-peer (P2P) website Airbnb.com (Airbnb), is the largest P2P service in the world with millions of venues in 191 countries (Povich, 2018). Airbnb venues are typically private homes, and therefore fire safety requirements are likely to be aligned with requirements for residential settings rather than with hospitality settings such as

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hotels. Hotels require numerous safety features including smoke detectors, sprinkler systems, emergency exit directions, emergency lighting, and fire doors (National Conference of State Legislatures, 2018; Parachute, 2015). In recent years, many global hotel chains have gone 100% smoke-free, in part to reduce the risk of fire (Ahrens, 2014). Smoke detectors and CO alarms are not ubiquitous in Airbnb venues in many cities in the US, and the availability of smoke-free Airbnb venues varies widely across cities in Canada (Kennedy et al., 2018a; Kennedy et al., 2018b). Little is known about smoking or fire safety features among Airbnb venues in other countries.

Airbnb hosts detail 'house rules' including if smoking is permitted, as well as describe property amenities including smoke detectors and CO alarms (Airbnb, n.d.-a; Airbnb, n.d.-b). Given the risk of fire from smoking, and the widespread availability of Airbnb hospitality services in residential settings, it is important to determine the proportion of Airbnb venues that permit smoking and that have smoke detectors and/or CO alarms (Kennedy et al., 2018b). This is the first step in informing policy decisions about how best to oversee the growing industry of peer-to-peer rentals and to assure the available evidence on fire and CO poisoning prevention are reflected in those policies.

2. Methods

2.1. Sample

This study did not involve human subjects. Data were used with permission from InsideAirbnb.com (Inside Airbnb) – a website that compiles publicly available information about Airbnb listings posted by Airbnb hosts (Inside Airbnb, n.d.). Data were compiled through scraping, a process of downloading rental data at a fixed time point from Airbnb website pages. InsideAirbnb is not associated with or endorsed by Airbnb or any of Airbnb's competitors. At the time of the study, InsideAirbnb.com was collecting data related to Airbnb listings in 43 cities in 17 countries/jurisdictions (Inside Airbnb, n.d.). Data were collected from venues in each city from July 17, 2015 to February 18, 2017.

2.2. Analysis

Proportions of Airbnb venues that permitted smoking and reported having smoke detectors and/or CO alarms were calculated and reported for each country. Chi-squared comparisons of venues that allow smoking and have smoke detectors and CO alarms were conducted with an alpha of 0.05. Stata version 14.1 was used for analysis (StataCorp College Station, TX).

3. Results

The sample included 413,339 Airbnb venues from 17 countries/jurisdictions. Airbnb rentals that allow smoking vary among these countries from 17% in Denmark to 53% in Greece. Smoke-free laws have been passed in all of the included countries either at the national or sub-national level; however, these laws do not generally regulate behavior in private spaces such as homes. Across the entire sample 9% ($n = 38,525$) allowed smoking, ranging from 40% ($n = 849$) in Greece to 3% in Denmark ($n = 427$) and Scotland ($n = 180$). The percentage of venues allowing smoking for the other jurisdictions are included in Table 1.

Overall 63% ($n = 258,965$) of included venues reported in their online Airbnb profile that they had smoke detectors. The lowest prevalence of smoke detectors was 2% ($n = 114$) in Italy, and the highest was 83% ($n = 5173$) in Scotland. For CO alarms, the overall prevalence was approximately half of smoke detectors at 32% ($n = 131,826$). This ranged from 1% ($n = 55$) in Italy to 59% ($n = 3671$) in Scotland, see Table 1.

Fig. 1 provides more detail about the fire safety amenities in the

Table 1

Airbnb venues that allow smoking, provide smoker detectors, provide CO alarms in 17 countries.

Country	Total N (%)	Smoking allowed n (%)	Smoke alarms n (%)	CO alarms n (%)
United States	120,692 (29.2)	5552 (4.6)	96,164 (79.7)	69,396 (57.5)
France	52,753 (12.8)	7330 (13.9)	28,202 (53.5)	6911 (13.1)
England	50,213 (12.1)	2495 (5.0)	37,418 (74.5)	21,183 (42.2)
Australia	38,139 (9.2)	3180 (8.3)	30,456 (79.9)	5243 (13.8)
Spain	36,086 (8.7)	10,148 (28.1)	3444 (9.5)	1748 (4.8)
Canada	30,499 (7.4)	1383 (4.5)	24,895 (81.6)	13,064 (42.8)
Denmark	16,178 (3.9)	427 (2.6)	8758 (54.1)	850 (5.3)
Germany	15,373 (3.7)	2496 (16.2)	2458 (16.0)	359 (2.3)
Netherlands	13,849 (3.4)	1354 (9.8)	10,110 (73.0)	4462 (32.2)
Ireland	6729 (1.6)	416 (6.2)	5311 (78.9)	2851 (42.4)
Hong Kong	6474 (1.6)	549 (8.5)	2293 (35.4)	925 (14.3)
Scotland	6272 (1.5)	180 (2.9)	5173 (82.5)	3671 (58.5)
Belgium	5650 (1.4)	1082 (19.2)	3024 (53.5)	628 (11.1)
Italy	4975 (1.2)	396 (8.0)	114 (2.3)	55 (1.1)
Austria	4961 (1.2)	393 (7.9)	643 (13.0)	232 (4.7)
Switzerland	2380 (0.6)	295 (12.4)	370 (15.5)	175 (7.4)
Greece	2116 (0.5)	849 (40.1)	132 (6.2)	73 (3.5)
Overall	413,339 (100)	38,525 (9.3)	258,965 (62.7)	131,826 (31.9)

smoking-permitted venues ($n = 38,525$). Overall, 54% ($n = 20,745$) of these venues do not have a smoke detector or CO alarm, 28% ($n = 10,604$) have only a smoke detector, under 1% ($n = 211$) have only a CO alarm. Eighteen percent ($n = 6965$) have both a smoke detector and CO alarm.

An overall evaluation of the 38,525 venues that allow smoking shows that 46% ($n = 17,569$) had smoke detectors compared to 64% of the 374,814 venues that do not allow smoking, a statistically significant difference ($X^2 = 5277 p < 0.01$). In an analysis of individual countries, 6 of the 17 countries (Greece, Spain, Netherlands, Germany, Denmark, and France) showed a similar pattern and were statistically significant when comparing venues that had smoke detectors and do not allow smoking.

Similarly, a statistically significant difference is found in the overall sample when comparing the proportion of venues that allow smoking and report the presence of CO alarms. The proportion of venues that allowed smoking, 19% ($n = 7176$) with CO alarms compared to 33% of non-smoking venues with CO alarms ($X^2 = 3442, p < 0.01$). As with smoke detectors, analysis of individual countries identified jurisdictions that showed the same pattern with CO alarms and were statistically significant (Spain, Italy, France, Netherlands, Canada, Australia, and England). Note that the pattern for CO alarms included some different countries than what emerged from the smoke detector analysis.

4. Discussion

The findings from this study highlight the wide range of smoking allowed (3% to 40%) in Airbnb accommodations across countries with similarly varied rates of smoking. Smoke detectors are a low-cost life-saving strategy recommended to reduce fire-related injuries and deaths (Runyan et al., 2005). This study highlights that on average 63% of Airbnb venues included in the sample reported having smoke detectors and only one-third report providing CO alarms in their rental accommodations. Furthermore, the Airbnb venues that permit smoking are less likely than those that prohibit smoking to have either smoke detectors or CO alarms. It is conceivable that hosts who permit smoking are less likely to have households with smoke detectors because they believe that cigarette smoke can trigger smoke detectors and CO alarms.

Most CO injuries commonly occur in residential dwellings and although smoke inhalation as a source of CO poisoning from house fires is on the decline, it still contributes to the overall burden of CO poisoning

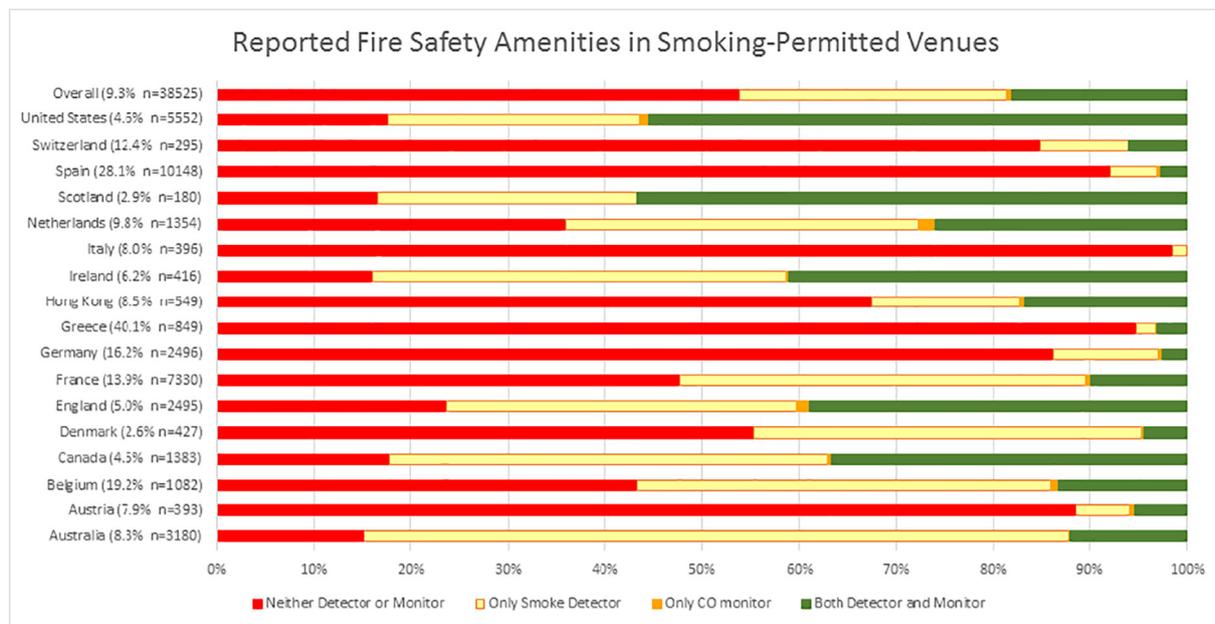


Fig. 1. Proportion of Airbnb venues in each country/jurisdiction that allow smoking and report having a smoke detector and CO alarm.

(Sircar et al., 2015). The current study highlights the need to improve the number of smoke detectors in P2P accommodations. The differences in smoke detector and CO alarm safety amenities reported by hosts may be highlighting the differences in regulation for those safety amenities by country, or variance in local jurisdictions (Iqbal et al., 2012; National Conference of State Legislatures, 2018; Parachute, 2015). Legislation is important for increasing the presence of safety amenities. Lack of local, state, or national regulations do not reduce the importance of an Airbnb host providing these lifesaving amenities. These differences underscore the importance of Airbnb ensuring that safety amenities are clearly highlighted on their website and installed in their homes. Airbnb has conducted fire safety campaigns and distributed free, smoke detectors and CO alarms to hosts. It is unclear if these efforts are effective at increasing correct installation and maintenance of alarms among hosts, especially in low- and middle-income countries. These findings highlight the risk to personal injury and property damage that threaten both Airbnb hosts and guests alike.

There are some limitations to consider in interpreting these findings. The data only present a snapshot of the venues from InsideAirbnb.com, there is no validation of the accuracy of the host's reporting of the presence of the selected amenities or if they are in working order. The countries that were included in this analysis were the only ones available from InsideAirbnb.com. Data on low- and middle-income countries were not available. Future research should monitor the prevalence of these amenities over time, particularly as cities enact regulations for P2P accommodations and focus on the emerging markets in low- and middle-income countries. Here we report on an analysis of data about Airbnb amenities postings for allowing smoking, and for smoke detector and CO alarm coverage. Airbnb has provided free-of-cost safety amenities to some hosts in some cities, however, they do not provide data on which cities and how that may change the safety amenities among their hosts. It is important to note that Airbnb encourages hosts to report safety amenities on their rental listings, highlighting the importance of the Airbnb listing for an accurate description of the rental accommodation (Airbnb, n.d.-b).

5. Conclusion

This study uniquely examines Airbnb venues in different countries, where smoking, fire, and CO safety standards vary. Unlike licensed

hotels and other similar hospitality settings that are required to have safety amenities such as smoke detectors and CO alarms, international travelers should consider the safety accommodations provided in P2P accommodations wherever they travel.

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