ASSOCIATION BETWEEN SMOKEFREE LEGISLATION AND HOSPITALIZATIONS FOR CARDIAC, CEREBROVASCULAR, AND RESPIRATORY DISEASES: A META-ANALYSIS

SUPPLEMENTAL MATERIAL

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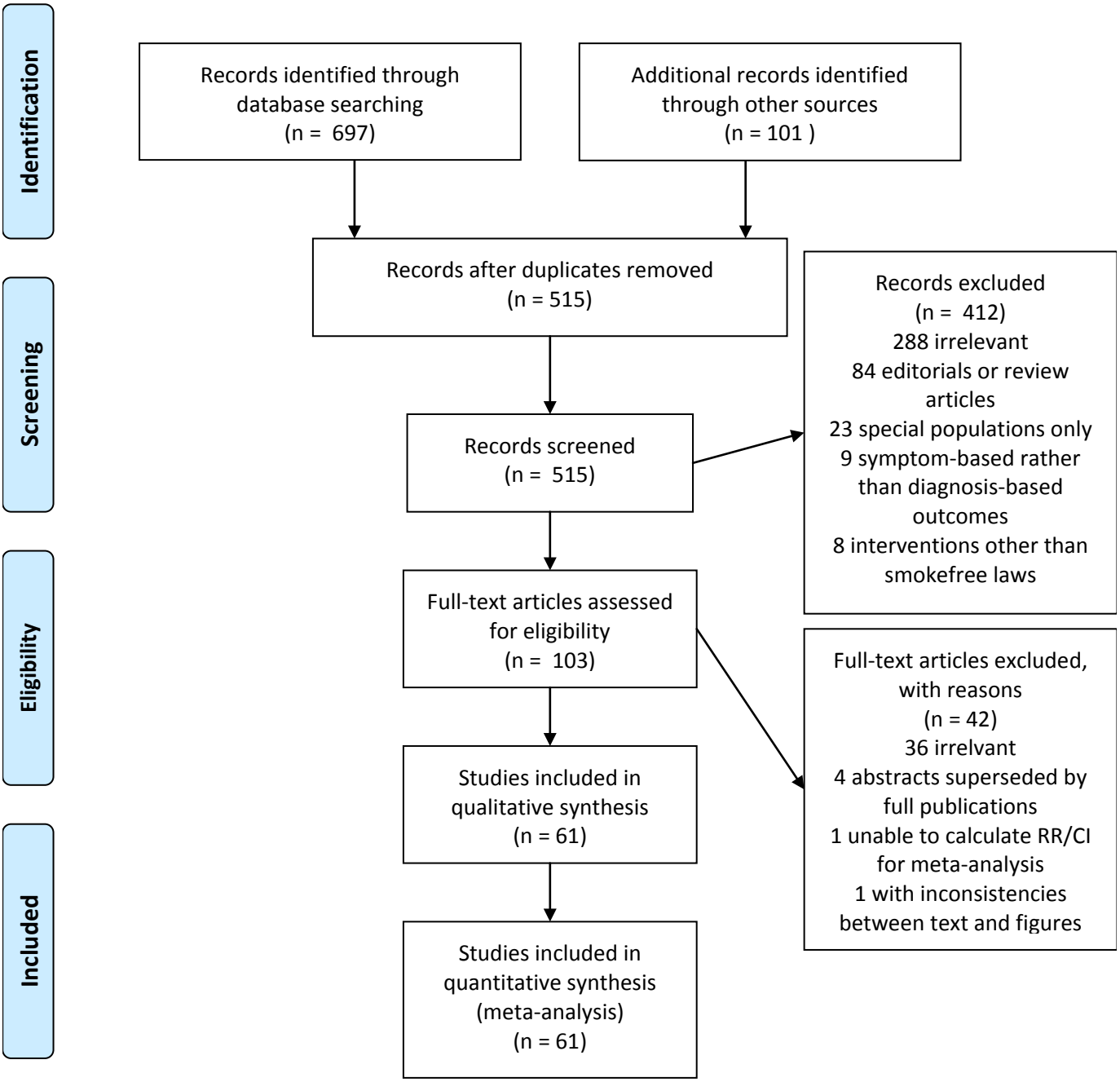
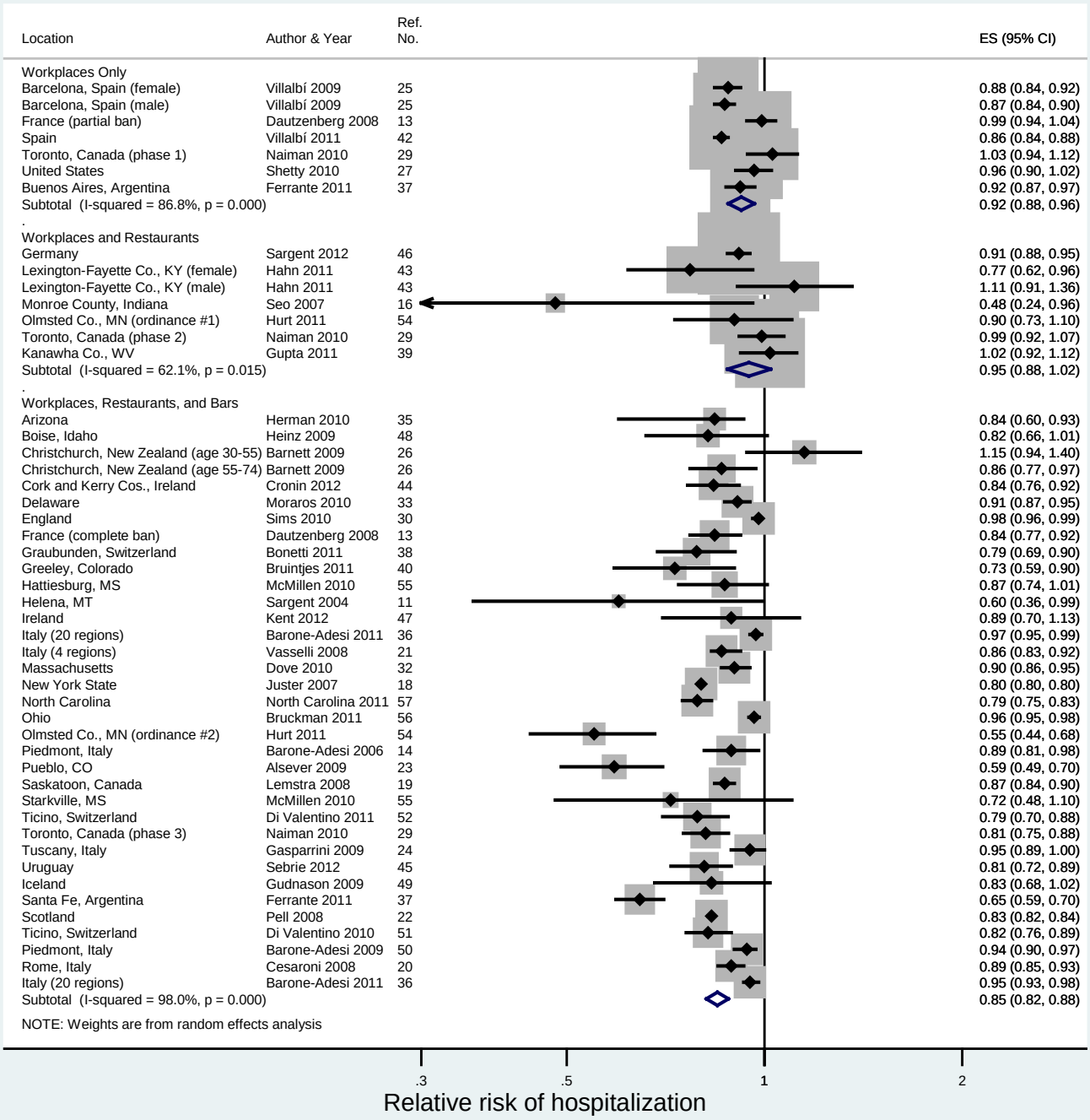
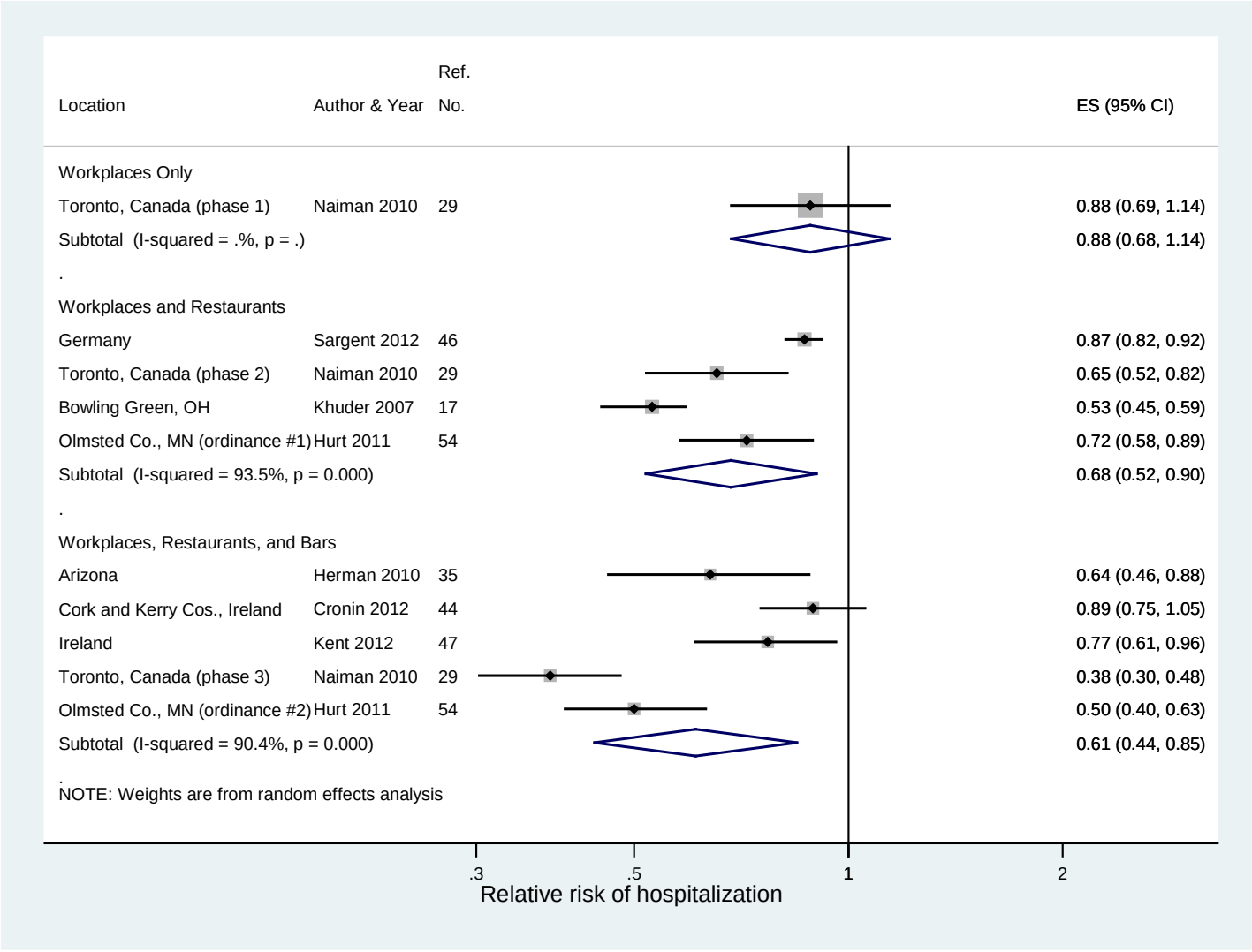
Table of Contents



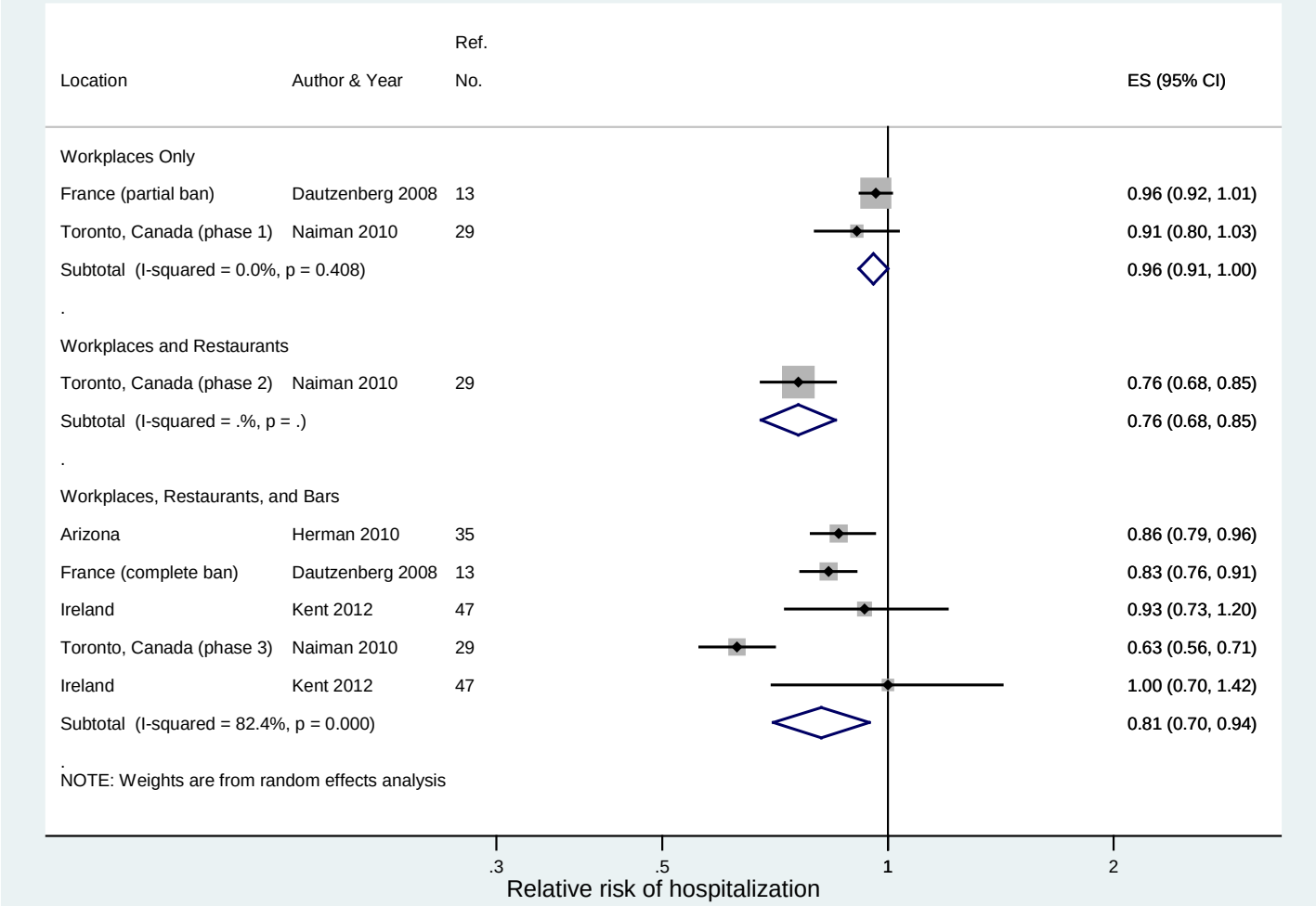
Supplementary Figure 1. PRISMA chart for for study selection. Note: If an individual paper presented results for two more outcomes it was counted as that number of studies



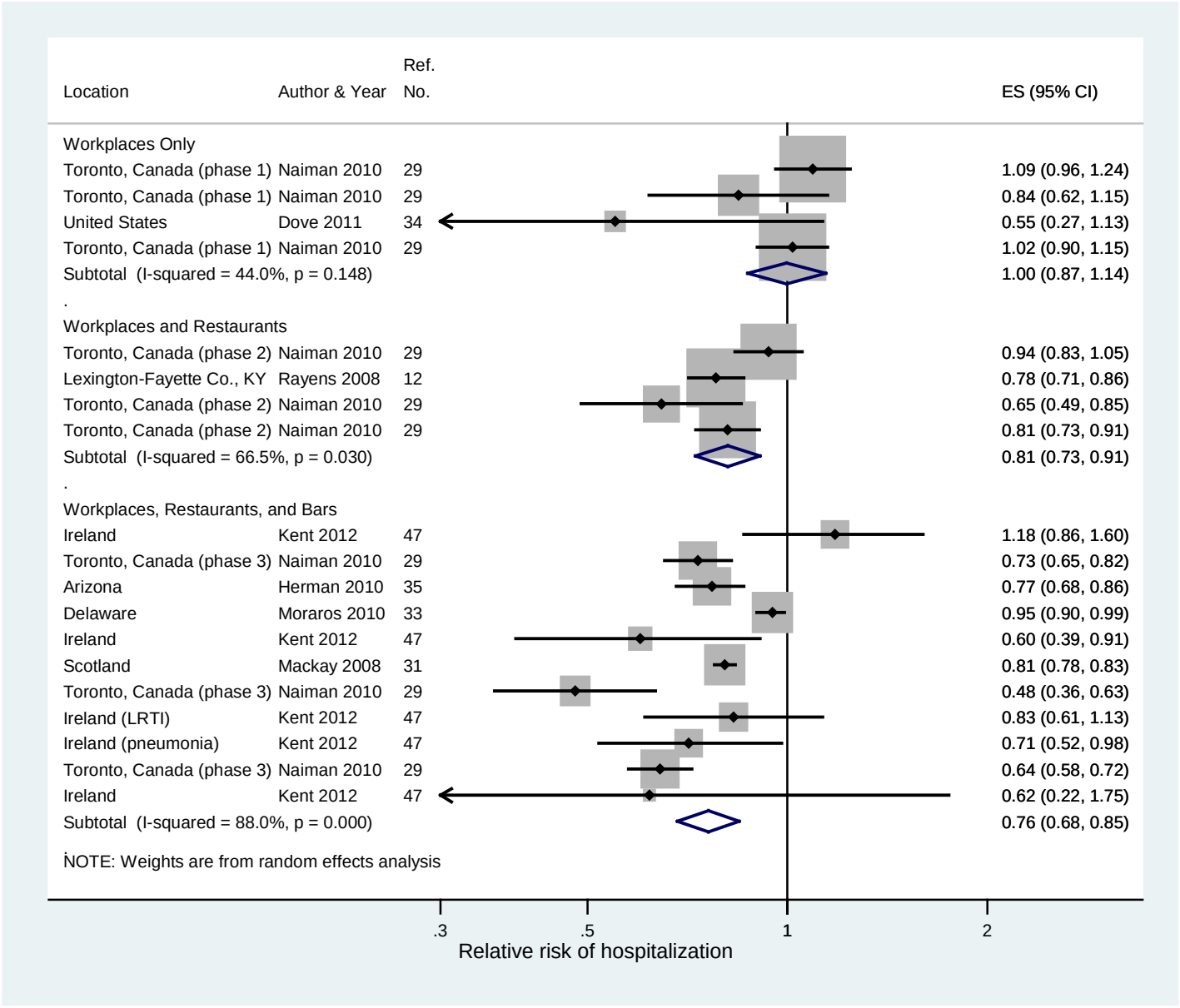
Supplementary Figure 2. Forest Plot for Coronary Events. ES = effect size (relative risk) and 95% confidence interval for each study. The size of the shaded area around each point is proportional to the weight in the random effects meta-analysis. Error bars indicate 95% confidence intervals for each study. Reference numbers are shown in square brackets. Refer to Tables S1-S4 for further details about each risk estimate or study.



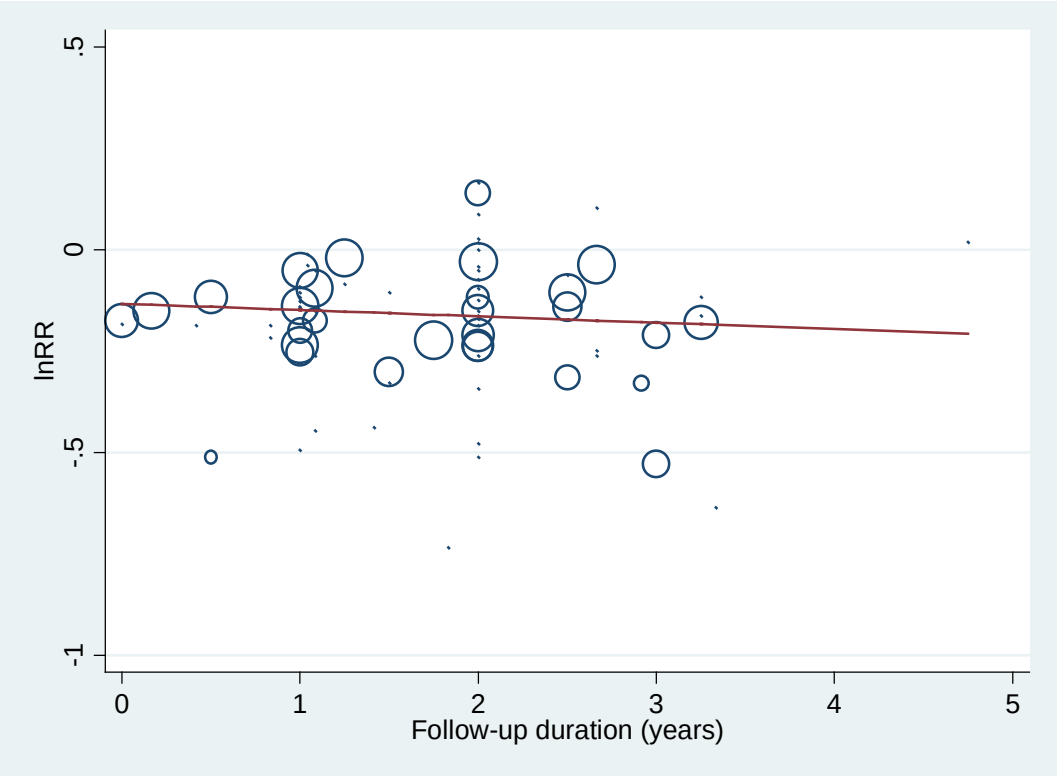
Supplementary Figure 3. Forest Plot for Other Heart Disease. ES = effect size (relative risk) and 95% confidence interval for each study. The size of the shaded area around each point is proportional to the weight in the random effects meta-analysis. Error bars indicate 95% confidence intervals for each study. Reference numbers are shown in square brackets. Refer to Tables S1-S4 for further details about each risk estimate or study.



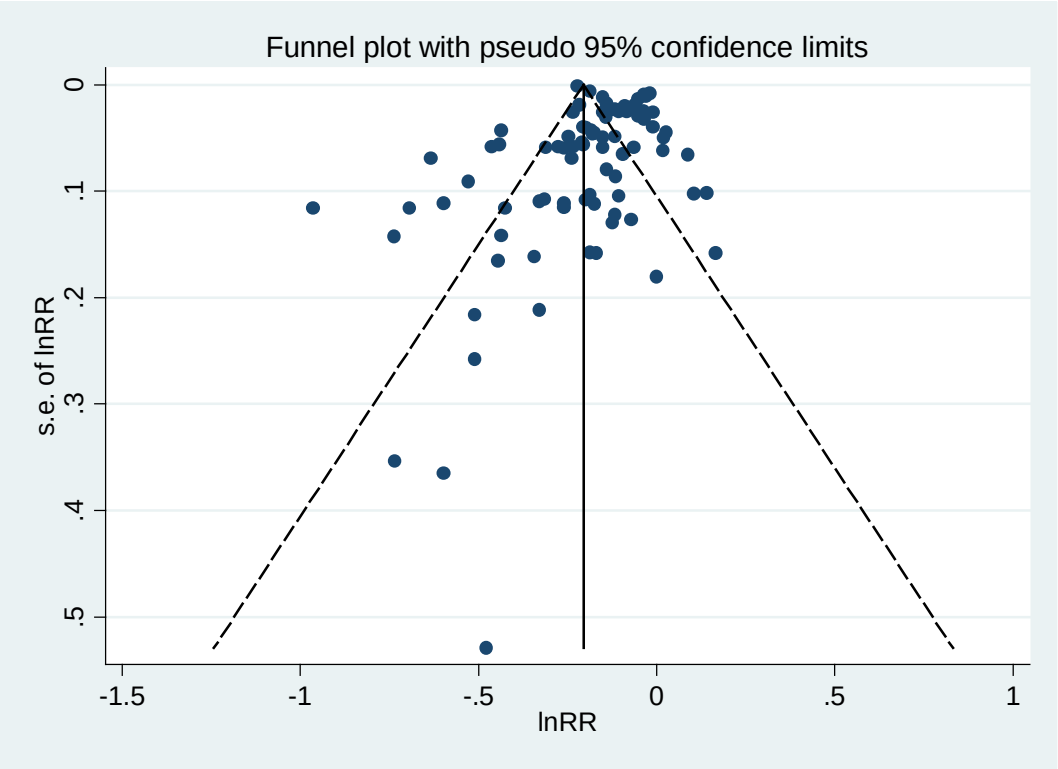
Supplementary Figure 4. Forest Plot for Cerebrovascular Accidents. ES = effect size (relative risk) and 95% confidence interval for each study. The size of the shaded area around each point is proportional to the weight in the random effects meta-analysis. Error bars indicate 95% confidence intervals for each study. Reference numbers are shown in square brackets. Refer to Tables S1-S4 for further details about each risk estimate or study.



Supplementary Figure 5. Forest Plot for Respiratory Disease. ES = effect size (relative risk) and 95% confidence interval for each study. The size of the shaded area around each point is proportional to the weight in the random effects meta-analysis. Error bars indicate 95% confidence intervals for each study. Reference numbers are shown in square brackets. Refer to Tables S1-S4 for further details about each risk estimate or study.



Supplementary Figure 6. Metaregression for Reduction in Risk of Hospitalization (or Death) associated with Comprehensive Laws for Acute Myocardial Infarction based on 31 Risk Estimates. The size of the points is proportional to the weight in a random effects metaregression. Each locality studied for a smokefree law was associated with one follow-up time per outcome.



Supplementary Figure 7. Funnel Plot for 86 Risk Estimates Used in the Meta-analysis. Solid vertical line represents the summary estimate of the effect of all ordinances on hospital admissions (assuming a fixed effects meta-analysis), and the dashed lines represent the 95% confidence interval.

Supplementary Table 1. Detailed Description of Studies of Coronary Events											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
AMI – Workplace Only Laws											
Villalbí 2009[25]	Barcelona, Spain	January 1, 2006	January 2004-December 2005 vs. January 2006-December 2006	Pre: 24 Post: 12	Acute myocardial infarction (ICD-9 410.x1)	>24	Comparison of age- and gender-specific annual hospitalization rates	Age, gender	F: .88 (.84, .92) *[a] M: .87 (.84, .90) *[a] Adjusted rates for men were 185.6 (179.2, 192.1) per 100,000 population in 2004, 175.0 (168.9, 181.2) in 2005, and 156.4 (150.6, 162.1) in 2006 post-law. Adjusted rates for women were 81.2 (77.1, 85.3) in 2004, 75.6 (71.7, 79.6) in 2005, and 69.0 (65.3, 72.7) in 2006 post-law.	13,317	Law in workplaces, but not cafés, bars, restaurants, night clubs, or discotheques. Antismoking legislation also included law on advertising and reduction in sales outlets. In men, the decline in 2006 (-10.68%) was much greater than in 2005 (-5.69%); in women, it was only slightly greater (-8.76% vs. -6.85%). This decline is apparent in all age groups except men aged <45.
Dautzenberg 2008[13]	France	February 1 2007; restaurants, bars, and casinos added January 1, 2008	January 2006-February 15, 2008	Partial law: Pre: 13 Post: 12.5	Acute myocardial infarction	<65	Rate per 100,000 admissions		Partial law: .99 (.94, 1.04) *[b]	N/A	Smoking ended in public places in February 2007, but restaurants, bars, and casinos were given exceptions until January 2008. Law permits ventilated smoking rooms under strict conditions. Between January 2007 (before law) and January 2008 (after law), SHS exposure dropped from 57% to 14%. $PM_{2.5}$ levels also dropped. Also report substantial drops in respiratory symptoms among hospitality workers.
Villalbí 2011[42]	Spain	January 1, 2006	January 2006 – December 2007 vs. January 2004-December 2005	Pre: 24 Post: 24	Acute myocardial infarction deaths (ICD-10 CM 055)	34+	Comparison of age- and sex-specific mortality rates; Poisson regression to calculate annual relative risk	Age, sex	First post-law year: .90 (.88, .92) F: .90 (.87, .92) M: .90 (.88, .93) Second post- law year: .86 (.84, .88) * F: .86 (.84, .89) M: .86 (.83, .88) Significant reduction in the relative risks of AMI death in both men and	90,382	Law in workplaces, but not cafés, bars, restaurants, night clubs, or discotheques. Antismoking legislation also included law on advertising and reduction in sales outlets. A population-based surveillance system showed that the percentage of employed workers reporting smoke-free jobs rose from 54-91% after implementation.

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									women. Magnitude of reduction appears greater among the elderly.		
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 1: 24	Acute myocardial infarction (ICD-9 410, ICD-10 I21)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 1 vs. pre-law: 1.03 (.94, 1.12) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. The largest declines were seen after the phase of the law affecting restaurants came into effect, including a 17% (14%, 19%) decrease in AMI. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Shetty 2010[27]	United States	Varies; study uses American Nonsmokers' Rights Foundation smoking law database and national health outcomes datasets to analyze effect of smokefree laws in various places.			Acute myocardial infarction (ICD-9 and ICD-10)	All	Region-level fixed effects multivariate linear regression model	Stratified by age. Regression model included hospital beds/person, county population, physicians/person, percent population in labor force, cigarette taxes Compared trends in regions where smoking laws were implemented to control regions with no laws.	Deaths in 18-64: .964 (.904, 1.025) *	Nationwide inpatient sample: 673,631 Multiple cause of death dataset: 2,018,548 Medicare patients: 2,382,387	Does not differentiate between weak and strong laws Assumes that county-level laws apply in cities and unincorporated places (varies by county), causing significant misclassification. No statistically significant reduction of hip fracture admissions (control condition).
AMI – Workplace and Restaurant Laws											
Sargent	Germany	Nationwide:	January 2004-	Pre: varies	Acute myocardial	30+	Rate of	Age, sex,	.914 (.878, .950) *	39,224	Legislation addressed smoking in

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2012[46]		September 1, 2007 Statewide: varies	December 2008	Post: 12	infarction (ICD-10 I21.0-I21.9) excluding recurrent AMI within 28 days of the initial event		hospitalization for AMI; logistic regression and interrupted time series linear regression model	occupation	In the first year after implementation, 449 AMI hospitalizations were prevented.		federal buildings and the transportation system. Private employers were allowed to introduce a total or partial smoking law in workplaces. States were permitted to decide how to limit smoking in the hospitality sector (hotels, restaurants, bars). Nonsignificant trend toward decreasing rate of admissions after law. Hospitality smoking laws were passed in all states in implemented between August 1, 2007 and July 1, 2008. Most states continued to allow smoking in small bars without any food delivery and in separate rooms in large restaurants. A population-based survey revealed a significant decrease of cigarettes smoked in Germany after the law. Hospital admissions for control condition fractures increased slightly from 65100 in 2007 to 66954 in 2009. Bronchitis cases, which might be affected by smoke-free laws, declined from 16900 in 2007 to 15391 in 2009. Hospitalization costs for AMI decreased significantly by 20.1 (16.0, 24.2)% or about 5.2 million euros.
Hahn 2011[43]	Lexington-Fayette County, Kentucky	April 27, 2004	May 2004-December 2006 vs. January 2001-April 2004	Pre: 40 Post: 32	Acute myocardial infarction (primary discharge diagnosis ICD-9 410)	35+	Age-adjusted rates for AMI hospitalizations; Poisson regression and first-order autoregressive time-series model	Age, gender, county-level smoking rate, secular trend, seasonal variation	F: .77 (.62, .96) * M: 1.11 (.91, 1.36) *	2692	Smokefree enclosed public places law prohibited smoking in restaurants, bars, bowling alleys, bingo halls, convenience stores, laundry facilities, and other businesses open to the public. Buildings not open to the public, including government office buildings or workplaces, were excluded. Manufacturing facilities were also excluded. Rates for men and women were

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											relatively stable during the 32-month post-law period. There was a dramatic improvement in air quality in hospitality venues and immediate reduction in hair nicotine among bar and restaurant workers following implementation of the law. Within 3 months of implementation, there was a 56% decline in hair nicotine. Among AMI hospitalizations, there was an overrepresentation of women in the hospitality industry and a disproportionate number of men working in manufacturing facilities and government worksites on mandated by the law. AMI prevalence and hospitalization rate for CVD showed a steady upward trend from 2001 to 2006 in Kentucky.
Seo 2007[16]	Monroe County, Indiana	1 Aug 2003, bars added 1 Jan 2005	August 2001-May 2003 vs. August 2003-May 2005 (same months selected to control for seasonality)	Pre: 22 Post: 22	Acute myocardial infarction (ICD-9 410), confirmed with troponin or CPK excluding past cardiac procedures, no cardiac risk factors (e.g., hypertension or hypercholesterolemia)	All	Poisson test	Comparison with Delaware County (no law). No significant decrease in admissions observed in Delaware County.	.48 (.24, .96) *[c] Drop in admissions in the number of nonsmoking patients from pre- to post-law period of -12 (-21.29, -2.81) from 17 to 5 cases	37	Public smoking law in effect for all restaurants, retail stores, and workplaces since August 2003; bar provisions only in effect since January 2005 (last 5 months of study period). There was a 69% reduction in AMIs (16 vs. 5) among documented nonsmokers before and after the law. No significant change in number of smokers admitted. The study is limited by unrealistically stringent exclusionary criteria and small sample size.
Hurt 2011[54]	Olmsted County, Minnesota	January 1, 2002 (Ordinance 1: smokefree restaurants) October 1, 2007	October 2007-March 2009 vs. July 2000-December 2001	Pre ordinance 1: 18 Post ordinance 1: 18	Acute myocardial infarction validated using biomarkers, cardiac pain, and Minnesota coding	All	Age and sex-adjusted rate per 100,000; adjusted hazard ratio	Age, sex	Ordinance 1 vs. no law: .90 (.73, 1.10) *	N/A	Law was initiated in two steps, smokefree restaurants in January 2002, and smokefree workplaces in 2007. AMI rate per 100,000 dropped from 212.3 to 168.7 following the restaurant

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		(Ordinance 2: smokefree workplaces)			of the ECG						law (HR .90; .73, .1.10; *p*=.30) and from 130.0 to 102.9 following the workplace law (.79; .63, .98; *p*=.04). During this period, the prevalence of hypertension, diabetes, hypercholesterolemia, and obesity either remained constant or increased while the prevalence of smoking among the adults declined by 23%.
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 2: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Acute myocardial infarction (ICD-9 410, ICD-10 I21)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 2 vs. pre-law: .99 (.92, 1.07) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. The largest declines were seen after the phase of the law affecting restaurants came into effect, including a 17% (14%, 19%) decrease in AMI. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
AMI – Workplace and Restaurant and Bar Laws											
Herman 2011[35]	Arizona	May 1, 2007	May 2007-May 2008 vs. January 2004-April 2007	Pre: 40 Post: 13	Acute myocardial infarction (primary diagnosis ICD-9 410.x0)	All	Rate of admissions per 100,000 annually; Poisson regression	Seasonality, population, annual linear trend Separate analyses for counties with pre-existing smoke-free laws vs. those without	.84 (.60, .93) *[d] Estimated 159 fewer cases of hospital admissions (-13%) for AMI than expected for counties with no pre-existing law	5025 (counties without previous laws)	Law ended smoking in all enclosed workplaces including bars and restaurants. Cost-savings analysis estimates $16.8 million in savings for AMI, unstable angina, acute stroke, and acute asthma in 13 months after law in non-law counties ($7.2 million for AMI alone).

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											No change in rates of control diseases (acute appendicitis, kidney stones, acute cholecystitis, and ulcers) pre and post law.
Heinz 2007[48]	Boise, Idaho	July 1, 2004	July 1, 2004-June 30, 2005 vs. July 1, 2002-June 30, 2004	Pre: 24 Post: 12	Acute myocardial infarction (primary diagnosis using ICD-9 classification)	All	Poisson test	Weather, outdoor air quality, time	All patients: .82 (.66, 1.01) *[e] Nonsmokers: .68 (.53, .87) [e] Significant 32% decrease in MI rate among nonsmokers (*p*=.002) and nonsignificant 18% decrease in MI rate among all patients (*p*=.068).	1197	Law on smoking in public buildings, including restaurants. Control condition (urinary tract infection) demonstrated nonsignificant increase during study period.
Barnett 2009[26]	Christchurch, New Zealand	December 2004	February 2005-December 2006 vs. February 2003-December 2004 (bimonthly intervals)	Pre: 24 Post: 24	Acute myocardial infarction (principal diagnosis code ICD-10 I21.0-I22.9), excluding repeat admissions	30+	Poisson regression	Sex, age, smoking status, neighborhood social deprivation	.92 (.86, .99) F: .94 (.84, 1.05) M: .90 (.82, .99) 30-55: 1.15 (.94, 1.40) * 55-74: .86 (.77, .97) * 75+: .89 (.81, .98)	3079	2004 law covered all workplaces, including bars and restaurants. Earlier restrictions in 1990 prohibited smoking in most workplaces, public interiors (i.e. shops), and half of seating in restaurants. Higher rates of AMI reduction observed in affluent neighborhoods.
Cronin 2012[44]	Cork and Kerry Counties, Ireland	March 29, 2004	Primary data set: April 2004-March 2007 vs. March 2003-March 2004 Secondary data set: July 2003-March 2004 vs. April 2004-June 2007	Pre: 13 Post: 36 Pre: 9 Post: 39	Acute myocardial infarction, diagnosed in hospital by physician using troponin T or I, allowing repeat admissions Primary analysis was for overall acute coronary syndrome.	18+	AMI admissions and rate per 100,000; Poisson regression	Linear time trend Sensitivity analyses were undertaken by gender, smoking status, and type of ACS. According to mortality data, there was no change in all cause mortality and overall 6.5% decrease in deaths from circulatory	All AMI: .84 (.76, .91) *[b] NSTEMI: .80 (.71, .90) [b] STEMI: .92 (.78, 1.07) [b] Estimates derived from secondary data set.	Primary data set: 3041 Secondary data set: 3195	See description of law in entry for Ireland. The first year's reduction in admissions for ACS was due to fewer cases among men and current smokers. The third year's reduction in admissions for ACS was due to fewer cases among men, current smokers, and never smokers. Increased effect on ACS over time evidenced by 12% decrease in year 1 and 13% decrease in year 3. This paper supersedes an abstract of the same study used in the 2009 meta-

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								causes in Cork and Kerry counties, so results were not attributable to changes in coronary death patterns outside of hospital.			analysis.
Moraros 2010[33]	Delaware	Nov 1, 2002	Jan 2003-Dec 2004 vs. Jan 1999-Sep 2002	Pre: 45 Post: 24	Acute myocardial infarction (primary discharge diagnosis ICD-9 410)	18+	Quarterly rates of events; Poisson regression	Seasonal effects Compared with non-Delaware residents admitted in Delaware for AMI. AMI relative risk in non-Delaware residents was similar pre-ordinance and post-ordinance period (.98; .90, 1.08).	.91 (.87, .95) * Estimated 169 AMI cases prevented in 2 year post-ordinance period.	10,210	*Delaware Clean Indoor Air Act* of 1994 became comprehensive in 2002 with an amendment to include all enclosed indoor areas accessible to the general public, including restaurants, bars, and casinos. A model including ordinance, season, and linear trend using pre and post ordinance data showed that the linear trend is not significant (p=0.557) Delaware DPH reported 99.6% compliance in bars and restaurants, and the Delaware Department of Labor reported 100% compliance in other workplaces in first year.
Sims 2010[30]	England	July 1, 2007	July 2007-Sept 2008 vs. July 2002-May 2007	Pre: 60 Post: 15	Acute myocardial infarction (primary diagnosis code ICD-10 I21) excluding repeat admissions within 28 days	18+	Interrupted time series design with hospital episode statistics data; segmented Poisson regression	Long-term trend, temporal fluctuations (temperature, week of year, holidays), population size Stratified by age and sex	.98 (.96, .99) * < 60: F: .98 (.92, 1.03) M: .97 (.94, .99) ≥ 60: F: .96 (.94, .99) M: .96 (.95, .99) Around 1600 emergency admissions for AMI prevented in 12 months.	342,361	Law affected bars and restaurants most; some of these venues went smokefree *before* July 1 in preparation for the law, which may create a less marked decrease. No evidence of a change in the slope of the AMI trend line after the legislation. Prior to the law, many public places and workplaces were already smokefree. In the year before implementation, 55% of employed adults already worked in smoke-free environments. Subgroup analysis shows significant 3.07% drop in admissions in 60+ (p=0.001) and 3.46% drop in men <60 (p<0.01).

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Dautzenberg 2008[13]	France	February 1 2007; restaurants, bars, and casinos added January 1, 2008	January 2006-February 15, 2008	Complete law: Pre: 24 Post: 1.5; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Acute myocardial infarction	<65	Rate per 100,000 admissions		Complete law: .84 (.77, .92) *[b]	N/A	Smoking ended in public places in February 2007, but restaurants, bars, and casinos were given exceptions until January 2008. Law permits ventilated smoking rooms under strict conditions. Between January 2007 (before law) and January 2008 (after law), SHS exposure dropped from 57% to 14%. $PM_{2.5}$ levels also dropped. Also report substantial drops in respiratory symptoms among hospitality workers.
Bonetti 2011[38]	Graubünden, Switzerland	March 1, 2008	March 2006-February 2008 vs. March 2008-February 2010	Pre: 24 Post: 24	Acute myocardial infarction (defined as detectable troponin in a clinical setting consistent w/ myocardial ischemia, identified by ICD-10 codes) undergoing coronary angiography (may be viewed as representative of overall incidence in the region)	All	AMI incidence	Air quality (PM_{10} and NO_2), sales of lipid lowering drugs Separate analyses based on resident status, gender, smoking status, medical history Compared to Lucerne, a nearby region without smoke-free law. AMI incidence increased in Lucerne during the post-law period in Graubünden.	.79 (.69, .90) *[b] The number of AMI patients decreased 21% in the 2 years before vs. 2 years after law. For each of the 4 years of the study, incidence rate of AMI was 89.4 (pre), 93.8 (pre), 69.8 (1 year post), and 68.8 (2 years post) per 100,000 residents.	842	Smoking law in public places, including cafes, bars, and restaurants. Based on the large number of visitors, the population of the Canton of Graubuenden may almost double during the holiday season, hence the resident vs. nonresident analysis. The most pronounced reduction in AMI was in patients with documented coronary artery disease. Female AMI patients showed a more pronounced drop in the second year of the law compared to the first, while male patients experience a diminished magnitude of decrease. Changes in outdoor air pollution or use of lipid-lowering drugs (potential confounders) did not substantially contribute to the decrease in the incidence of AMI.
Bruintjes 2011[40]	Greeley, Colorado	December 2003	Jan 2004-Jun 2006 vs. Jul 2002-Nov 2003	Pre: 17 Post: 30	Acute myocardial infarction (primary diagnosis ICD-9 410) and	All	Population-adjusted monthly hospitalization	Seasonality (nonsignificant), linear trends (nonsignfiicant),	.73 (.59, .90) *	706	Law prohibits smoking in all places of public assembly, including restaurants, bars, bowling alleys, bingo halls, and outdoor public gathering places where

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					biomarker confirmation (troponin I or CKMB)		rates; Poisson regression	smoking status, type of MI Compared to adjacent area immediately surrounding Greeley. A smaller, nonsignificant decreased was noted in the area immediately surrounding Greeley (0.83; 0.61, 1.14). Comparison of relative risk reductions between Greeley and the control area was not significant (*p*=.48).			seating is provided. Smoking law underwent various legal challenges through November 2004, during which compliance was variable. Significant reductions in AMI among smokers (.44; .29, .65); nonsignificant reduction among nonsmokers (.86; .67, 1.09). Smokers from control area also experienced a significant decrease (.58; .35, .97) that was not significantly different from Greeley smokers (*p=.38*). Reduction in events was similar in patients with STEMI (.79; .34, 1.83) and NSTEMI (0.66; .37, 1.17). Linear trends were tested and not significant.
McMillen 2010[55]	Hattiesburg, Mississippi	January 1, 2007	January 1, 2007-June 30, 2009 vs. April 21, 2005-December 31, 2006	Pre: 20 Post: 30	Acute myocardial infarction (primary diagnosis ICD-9 410)	All	AMI admissions per day compared to standardized rate prior to implementation	Compared the number of heart attack admissions among people living outside of city limits and not protected by smoke-free ordinance. A 3.8% reduction was observed in the Hattiesburg-adjacent control region compared to a 13.4% reduction in Hattiesburg.	.87 (.74, 1.01) *[c] There were 299 heart attack admissions compared to a standardized rate of 345 admissions before law	1754	Smoking law in enclosed workplaces, including restaurants and bars. Reductions in AMI admissions resulted in cost savings of $2,367,909 in 2010 dollars.
Sargent 2004[11]	Helena, Montana	June 5, 2002 - December 3, 2002	December 1997-November 2003	Pre: same 6 months for 4 pre years and 1 year after	Acute myocardial infarction (primary and secondary diagnoses of ICD-9	All	Number of admissions during 6 month period the law	Comparison with number of admissions from surrounding area	.60 (.36, .99) *[c] Drop in number of admissions -16 (-31.7, -	304	Law prohibited smoking in public and in workplaces but was suspended by a court order after 6 months.

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				law suspended Post: 6	410, some validated with troponin or CPK)		was in effect compared to the average for the same 6 months in other years by Poisson test	(not covered by law). No significant change in control area outside Helena.	.03) from 40 cases to 24.		Analysis did not consider fact that admissions were increasing with time, which biases comparison toward null.
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Acute myocardial infarction	20-70	Change in emergency hospital admissions for acute myocardial infarction Stratified by age and gender.	Population, weather, pollution, and influenza	.89 (.70, 1.13) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Barone-Adesi 2011[36]	Italy (20 regions)	January 10, 2005	January 2005-November 2006 vs. January 2002-December 2004	Pre: 36 Post: 24	Acute myocardial infarction (ICD-9 410) Primary analysis was for acute coronary events (AMI and other acute and sub-acute ischemic heart disease).	All	Admission rates; Poisson test with mixed effect regression models with fixed coefficients describing the national trend and random coefficients describing region-specific deviations.	Seasonality, long term trends Separate analyses conducted based on age, gender	<70: .97 (.95, .99) * F: .98 (.94, 1.02) M: .97 (.95, .99) 70+: 1.01 (.99, 1.04) F: 1.02 (.99, 1.04) M: 1.00 (.98, 1.03)	936,519 (all acute coronary events)	See entry for Italy (4 regions). The observed reduction was stable over the study period, similar in different geographic areas, and stronger among young people. No evidence of a gradual effect over time, as there was no change in the underlying trend in admissions for ACEs after law.
Vasselli 2008[21]	Italy (4 regions)	January 10, 2005	January 10-March 10, 2005 (after law) vs. January-March 2001-2004 (before law)	Pre: 12 (over 4 years) Post: 2	Acute myocardial infarction (primary discharge diagnosis ICD-9 410)	40-64	Age-standardized rates (using European standard population) Comparison of observed rate	Age, gender, region	.86 (.83, .92) * F: .98 (.87, 1.11) M: .85 (.81, .91) 40-44: .98 (.82, 1.19) 45-49: .77 (.68, .89) 50-54: .74 (.67, .85) 55-59: .92 (.84, 1.02) 60-64: .99 (.88, 1.06)	7305	National law prohibited smoking in all indoor public places, including cafes, bars, restaurants, and discotheques. Effect largest among young men and people 45-54. Some regional variation. Small decreases in smoking prevalence (30.0 to 29.3% in men and 22.5% to

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Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
							after law with expected value based on linear secular trend for same months during the 4 years before the law went into effect.				22.1% in women) and consumption (16.7 to 16.3 cig/day for men and 13.7 to 12.4 cig/day for women) led to 7.6% decline in cigarette consumption. Fewer than 100 violations in 6000 checks by police. 90-95% reduction in air nicotine in pubs and discos. 8.9% decline in cigarette sales in 2005.
Dove 2010[32]	Massachusetts	July 5, 2004	July 2004-December 2006 vs. January 1999-June 2004	Pre: 66 Post: 30	Death due to acute myocardial infarction (ICD-10 I21)	35+	Daily number of deaths from AMI by city or town; Poisson regression	Long-term trend, season, air particulate matter, influenza, city/town-specific demographic data, prior local smoking law, gender, age Separate analyses for cities and towns with vs. without prior comprehensive local laws.	No prior local law: .90 (.86, .95) * With prior local law: 1.01 (.92, 1.11) Effect of local law: .95 (.86, 1.05) Overall: .93 (.89, .97) F: .90 (.85, .96) M: .95 (.89, 1.01) 35-64: .92 (.82,1.04) 65-74: .99 (.89,1.11) 75+:.91 (.86,.96)	26,982	State law prohibited smoking in all workplaces, including restaurants and bars. Prior to the state-wide smoking law, about 25% of the Massachusetts population was covered by a local law. In cities and towns without prior local laws, there was a significant 9.2% decrease in AMI mortality. Estimated 270 fewer AMI deaths per year associated with the state law. For cities and towns with no prior local laws, AMI mortality rates decreased by 1.6% (-4.0%, 7.0%) in the first 12 months and 18.6% (13.6%, 23.3%) thereafter. Compliance ranged from 88-96.3% in bars and restaurants. 93% reduction in environmental tobacco smoke exposure. Study reports a BRFSS finding of a 5.2% relative reduction in smoking rate (19.1% in the year preceding law vs. 18.1% the year after).
Juster 2007[18]	New York State	July 24, 2003	January 1995 -	Pre: 99	Acute myocardial	35+	Multiple	Age-adjusted (NY	In absence of pre-existing	462,396	July 2003 law prohibited smoking in all

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			December 2004	Post: 21	infarction (primary diagnosis code ICD-9 410)		regression time series	population in 2000) Existence of strong local ordinance, time (linear secular trend), seasonality, county Analyzed comprehensive laws (smoking prohibited in restaurants, bars, and other hospitality venues) vs. moderate laws (smoking permitting in hospitality venues)	local laws: .8004 (.7985, .8023) *[f] In 2004, there were 3813 fewer hospital admissions for AMI than expected in the absence of the comprehensive smoking law.		workplaces including restaurants and bars. Limited statewide restrictions since 1989 limited smoking in many public places, including schools, hospitals, public buildings, and retail stores. Local laws varied by county. By 2002, 75% of New Yorkers were subject to strong local laws, as well as limited restrictions at the state level implemented in 1989; authors performed analysis to compare effects assuming hypothetical case of no pre-existing local laws. No sudden change with law; rate of decline in AMI admissions increased significantly over moderate or no local laws. Enactment of a moderate smoking restriction in a county would reduce monthly trend rate in AMI hospital admissions by 0.15 per 100,000 per month in that county, and a statewide comprehensive smoking law would reduce AMI hospitalizations by 0.32 per 100,000 per month in all counties. After implementation of the state law, exposure to SHS declined by nearly 50%; saliva cotinine dropped from 0.078 to 0.041 ng/mL. Direct health care cost savings of $56 million in 2004.
North Carolina 2011[57]	North Carolina	January 1, 2010	January 2010-December 2010 vs. January 2008-December 2009	Pre: 24 Post: 12	Acute myocardial infarction (diagnosis code ICD-9 410.x1 to 410.x0)	18+	Rate of emergency visits for AMI; Poisson regression	Age, gender, Christmas holidays, time, average weekly temperature, log-transformed weekly flu rates, week of year	.79 (.75, .83) *	24,848	Law prohibits smoking in bars, restaurants, government buildings, and vehicles. Projected cost savings $3.3-4.8 million from AMIs prevented.

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Bruckman 2011[56]	Ohio	May 2007	January 2005-April 2007vs. May 2007-Dec 2009	Pre: 28 Post: 32	Acute myocardial infarction (principal discharge diagnosis ICD-9 410)	All	Age- and sex-adjusted discharge rate per 1000 (converted to per 100,000); mixed linear models with a varying covariance structure to determine if rates decreased yearly; spline polynomial functions to determine inflection point in monthly rate data	Age, gender, linear trend, seasonality	.96 (.95, .98) *[b] AMI discharge rates dropped from 198 per 100,000 in 2005 to 168 per 100,000 in 2009.	N/A	Law prohibits smoking in a public place or a place of employment. Inflection point identified as June 2007, one month after implementation. Average decrease in MI discharge of 7 per 100,000 each year from 2005-2009. Conservative estimate of $737,782 in hospital stay costs in first year after law (estimate does not account for physician fees). Direct system savings of $1.1 million from 69 cases prevented by smoking law.
Hurt 2011[54]	Olmsted County, Minnesota	January 1, 2002 (Ordinance 1: smokefree restaurants) October 1, 2007 (Ordinance 2: smokefree workplaces)	October 2007-March 2009 vs. July 2000-December 2001	Pre ordinance 2: 18 Post ordinance 2: 18; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Acute myocardial infarction validated using biomarkers, cardiac pain, and Minnesota coding of the ECG	All	Age and sex-adjusted rate per 100,000; adjusted hazard ratio	Age, sex	Ordinance 2 vs. no law: .55 (.44, .68) *	N/A	Though the law was initiated in two steps (smokefree restaurants in January 2002 and smokefree workplaces in 2007), this study was included in the meta-analysis because authors compared the period before any law to the period after full implementation, thus capturing the true effect of the law. AMI rate per 100,000 dropped from 212.3 to 168.7 following the restaurant law (HR .90; .73, .1.10; *p*=.30) and from 130.0 to 102.9 following the workplace law (.79; .63, .98; *p*=.04). During this period, the prevalence of hypertension, diabetes, hypercholesterolemia, and obesity either remained constant or increased while the prevalence of smoking among the adults declined by 23%.
Barone-Adesi	Piedmont, Italy	January 10, 2005	Compared	Pre: 3	Acute myocardial	All	Age-	Age	1.01 (.97, 1.06)	17,153	See entry for Italy (4 regions).

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2006[14]			October-December 2004 (before law) and February-June 2005 (after law) with same periods 1 year earlier	Post: 6	infarction (primary discharge diagnosis ICD-9 410) and hospital deaths due to AMI		standardized rates (European)		<60: .89 (.81, .98) * F: .75 (.58-.96) M: .91 (.82, 1.01) ≥ 60: 1.05 (1.00, 1.11) F: 1.05 (.97-1.14) M: 1.03 (.96-1.11)		No changes from one year before for pre-law period; change compared to one year earlier for post-law period. Estimated that 1% out of the 11% reduction in AMI is attributable to reduced smoking among smokers, rather than passive smoking.
Alsever 2009[23]	Pueblo, Colorado	July 1, 2003	January 2005 – June 2006 ("Phase II") vs. July 2003 – December 2004 ("Phase I") vs. January 2002 – June 2003 (pre-law)	Pre: 18 Post: 36	Acute myocardial infarction (primary diagnosis code ICD-9 410)	All	Comparison of rate ratios with chi square test	Comparison with people living in surrounding Pueblo County (not covered by ordinance) and with nearly El Paso County (which did not have an ordinance). No significant change in surrounding area (1.03; .68, 1.39) or El Paso County (.95; .87, 1.03)	Phase II vs. pre-law: .59 (.49, .70) * F: .48 (.36, .60) M: .67 (.52, .82) Phase II vs. Phase I: .81 (.67, .96)	4954	Municipal ordinance ended smoking in enclosed workplaces, including restaurants and bars. Assuming all fatal AMI's reached hospital reduced risk estimate to .66 (.55, .77) from pre-law to Phase II. Rate of AMI hospitalizations decreased from 257 per 100,000 person-years before law to 187 in Phase I and 152 in Phase II.
Lemstra 2008[19]	Saskatoon, Canada	July 1, 2004	July 2004-June 2005 vs. July 2000-June 2004	Pre: 48 Post: 12	Acute myocardial infarction (ICD-10)	All	Incidence ratio and confidence interval post-law compared to pre-law. Age-standardized AMI incidence rate	Stratification was used to test for confounding by age, gender, and previous MI in the unadjusted rates, which were then directly age-standardized to the 2001 Canadian population.	Age-adjusted: .87 (.84, .90) * Age-standardized incidence rate fell from 176.1 (165.3, 186.8) cases per 100,000 to 152.4 (135.3-169.3) cases per 100,000	1689	City-wide smoking law prohibited smoking or holding lighted tobacco products in any enclosed public that is open to the public or to which the public is customarily admitted or invited; also applied to outdoor seating areas for restaurants and licensed premises. A previous bylaw prohibited smoking in enclosed government buildings only. 914 of 924 eligible businesses establishments were inspected by a public health inspector within the first 6 months of the law; only 13 required an initial warning for non-compliance. Re-inspection only required 1 citation being issued during the first year of the

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											law. Smoking prevalence in Saskatoon fell from 24.1% in 2003 (95% CI 20.4-27.7) to 18.2% in 2005 (15.7-20.9); smoking in the rest of Saskatchewan Province (which includes Saskatoon) remained stable from 2003 to 2005 at 23.8% (22.6-25.3). One year after implementation (July 2005), 79% responded that the "smoking law was a good idea."
McMillen 2010[55]	Starkville, Mississippi	May 20, 2006	May 20, 2006-April 7, 2009 vs. July 29, 2004-May 19, 2006	Pre: 22 Post: 35	Acute myocardial infarction (primary diagnosis ICD-9 410)	All	AMI admissions per day compared to standardized rate prior to implementation	Compared the number of heart attack admissions among people living outside of city limits and not protected by smoke-free ordinance. A 14.8% reduction was observed in the Starkville-adjacent control region compared to at 27.7% reduction in Starkville.	.72 (.48, 1.10) *[c] There were 38 heart attack admissions compared to a standardized rate of 52.57 admissions before law	100	Smoking law in indoor public places, including restaurants and bars. Reductions in AMI admissions resulted in cost savings of $288,270 in 2010 dollars.
Di Valentino 2011[52]	Ticino, Switzerland	April 2007	2007-2008 vs. 2004-2006	Pre: 36 Post: 24	ST-elevation myocardial infarction (ICD-10)	All	Comparison of annual frequency of hospitalizations due to STEMI		.79 (.70, .88) *[a] 22.4% (p<.0001) and 20.6% (P<.0002) reduction in hospitalizations during first and second post-law years, respectively.	1272	Smokefree public places, including restaurants, bars, and discos. Smoking rooms permitted. This study population overlaps with that of another study[52] also conducted in Ticino examining rates of STEMI (a subset of ACS) following the law.
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3	January 1996-May 2006	Pre: 36 Post phase 3: 36; not included in length of	Acute myocardial infarction (ICD-9 410, ICD-10 I21)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of	Subgroup analyses by age, sex. Comparison with Durham Region	Phase 3 vs. pre: .81 (.75, .88) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. The largest declines were seen after the

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		phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.		follow-up analysis because the pre-law period did not immediately precede the post-law phase			hospital admission	and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.			phase of the law affecting restaurants came into effect, including a 17% (14%, 19%) decrease in AMI. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Gasparrini 2009[24]	Tuscany, Italy	January 10, 2005	January 2000-December 2004 vs. January 2005-December 2005	Pre: 48 Post:12	Acute myocardial infarction as principal discharge diagnosis (ICD-9 410) or principal death diagnosis (ICD-9 410-414)	30-64	Age-standardized rates of annual AMI episodes using European population as reference; Poisson regression analysis of the time series	Age, sex, seasonality, and long-term trend	Linear trend model: .95 (.89, 1.00) * F: .94 (.82, 1.09) M: .95 (.89, 1.01) Non-linear trend model: 1.01 (.93,1.10) F:1.05 (.87-1.27) M:1.01 (.92,1.10)	13,456	See entry for Italy (4 regions).
Sebrie 2012[45]	Uruguay	March 2006	March 2006-February 2008 vs. March 2004-February 2006	Pre: 24 Post: 24	Acute myocardial infarction (primary diagnosis code ICD-10 I21.0-I21.9); non-country residents and patients with AMI after a coronary angioplasty or bypass, or as a complication of another disease (secondary diagnosis) were	All	Number of AMI hospitalizations per month; multiple linear regression and negative binomial regression	Seasonal variation, population changes, time trend Stratified by public vs. private hospital, gender, age.	.81 (.72, .89) * Two years after the smokefree policy adoption in enclosed public places and workplaces, hospital admissions for AMI were reduced by 22%. Reductions in monthly AMI admissions between 15% and 22% were observed for private hospitals, men, women,	7949	Law prohibited smoking in all indoor public places and workplaces including restaurants and bars. No evidence that overall effect grew or fell over time following the law. In public hospitals only, AMI trend increased before the law and decreased after the law. Study covered 37 hospitals, capturing 79% of the Uruguay population. Air particulate matter ($PM_{2.5}$) decreased dramatically (210 to 18 $\mu m/m^3$) and

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					excluded				and people aged 40-65 and over 65. There was a nonsignificant trend toward fewer monthly AMIs in people under 40.		adults reported decreased exposure to SHS 1 year after implementation, suggesting a high level of compliance.
ACS – Workplace Only Laws											
Ferrante 2011[37]	Buenos Aires, Argentina	October 2006	October 2006-December 2008 vs. January 2004-September 2006	Pre: 33 Post: 15	Acute coronary syndrome (ICD10-I20-I25)	18+	Monthly age-adjusted admission rates; multiple linear regression analysis using standard methods for interrupted time series analysis	Age, secular trends, seasonality	.92 (.87, .97) *[b] 5.3% reduction in admissions in year before vs. year after law. Implementation not significantly associated with immediate change: increase of 1.74 admissions per 100,000 (-1.42, 4.92).	3307	Law ended smoking in workplaces but allowed for designated smoking areas up to 30% in bars and restaurants if > 100 m^2. No significant change in trend after law: increase of .01 admissions per 100,000 per month (-.12, .14). Buenos Aires served as a control for Santa Fe, to compare partial smoking laws with comprehensive smoking laws; data from Buenos Aires suggest the ineffectiveness of the implementation of partial smoke-free legislation. Nonsignificant decrease in smoking prevalence from 27.4% 1 year before law to 26.1% 3 years after law. Self-reported SHS exposure decreased from 52.9% to 31.7%.
ACS – Workplace and Restaurant Laws											
Gupta 2011[39]	Kanawha County, West Virginia	January 1, 2004	January 2004-September 2008 vs. January 2000-December 2003	Pre: 48 Post: 57	Acute coronary syndrome (primary diagnostic code ICD9-410, 411.1, 411.81, 411.89, 413.0, 413.1, 413.9. An analysis performed for AMI yielded similar results but were not shown.	18+	Age-adjusted ACS hospital admission rates; Poisson regression	Age, gender, year, season, tobacco use, diabetes	1.02 (.92, 1.12) * Age-adjusted ACS hospitalization rates decreased 37% during entire study period. No additional significant change due to removal of smoking areas in restaurants after accounting for the sustainable decline of ACS hospitalizations since the 2002 revision.	14,245	Effective May 22, 1995, a modest smoking regulation was enacted prohibiting smoking in all enclosed public places. Restaurants were allowed to designate up to 50% of their seating capacity as smoking areas. On July 20, 2000 the law was modified to increase penalties for violations. On April 3, 2003, a revised regulation prohibited smoking in all restaurants and at most worksites. However, to come into compliance, the regulation allowed several businesses an exemption until January 1, 2004.

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									Stratification showed that the observed decline was significant only among nonsmokers.		The likelihood of hospital admissions for ACS was significantly lower among nonsmokers, people without diabetes, and women. Incidence of hospital admissions for ACS decreased significantly by 6% per year (CI 4-8%) throughout the study; among male smokers, there was a significant decline in time trend (7%; 0.4%, 12%) in admission rates after the 2004. Smoking rate decreased from 32% to 24% from 2002 to 2008, a nonsignificant change. In conjunction with steady tobacco sales, authors dismiss the notion that changes in ACS can be attributed to a decline in smoking.
ACS – Workplace and Restaurant and Bar Laws											
Gudnason 2009[49]	Iceland	June 1, 2007	June 2007-October 2007 vs. January 2007-May 2007	Pre: 5 Post: 5	Patients undergoing coronary angiography for acute coronary syndrome, defined as clinical symptoms of unstable coronary artery disease (chest pain at rest) as well as at least one of the following: 1) elevated cardiac enzymes, 2) ischemic changes on the EKG at rest, or 3) an abnormal exercise stress test during the same unstable episode	All	Comparison of ACS incidence before vs. after smoking law		.83 (.68, 1.02) *[c] Number of events before vs. after law, given in powerpoint presentation based on abstract: http://spo.escardio.org/eslides/view.aspx?eevtid=33&id=978 Nonsmokers demonstrated 21% reduction in ACS incidence among men (p<0.05) and no significant effect observed among women; in the total population, there was a trend toward a 20% reduction in ACS (p=0.08)	535	Legislation prohibited smoking in public places. Initial analysis considered only non-smoking patients; numbers for overall population obtained by personal communication with Dr. Gudnason.

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Ferrante 2011[37]	Santa Fe, Argentina	August 2006	August 2006-December 2008 vs. January 2004-July 2006	Pre: 31 Post: 17	Acute coronary syndrome (ICD-10 I20-I25)	18+	Monthly age-adjusted admission rates; multiple linear regression analysis using standard methods for interrupted time series analysis	Age, secular trends, seasonality	.65 (.59, .70) *[b] 20.8% reduction in admissions in year before vs. year after law. Implementation resulted in immediate change of -2.5 admissions per 100,000 (-4.74, -.26).	2889	100% smokefree law in all enclosed public places. Law also ended tobacco ads, promotion, and sponsorship. Persistent change after law of 0.26 fewer admissions per 100,000 per month (-.39, -.13). Buenos Aires served as a control for Santa Fe, to compare partial smoking laws with comprehensive smoking laws; data from Buenos Aires suggest the ineffectiveness of the implementation of partial smoke-free legislation. High levels of compliance, per National Tobacco Control Program. Nonsignificant decrease in smoking prevalence from 27.3% 1 year before law to 26.6% 3 years after law. Self-reported SHS exposure decreased from 51.6% to 31.7%.
Pell 2008[22]	Scotland	April 2006	April 2006-March 2007 vs. June 2005-March 2006	Pre: 10 Post: 10	Acute coronary syndrome (detectable troponin after emergency admission for chest pain, ICD-10 I21)	All	Chi-square and test for trend	Stratified on gender and age (men≤55; women≤65) Used data from England as historical control; admissions for ACS in England dropped 4% during a similar period compared to 17% in Scotland.	.83 (.82, .84) *	5919	Legislation prohibited smoking in all enclosed public places. 17% drop overall, 14% among smokers, 19% among former smokers, 21% among nonsmokers. 67% of the decrease in ACS involved nonsmokers. Larger risk reductions in older people. Decrease in monthly admissions became more pronounced over time after implementation of legislation (p=0.02) Percentage of people who had never smoked who reported no exposure to secondhand smoke increased from 57% to 78% (p<.001); there was a reduction in geometric mean serum

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											cotinine from 0.68 to 0.56 ng/mL (p<.001).
Di Valentino 2010[51]	Ticino, Switzerland	April 2007	2007-2008 vs. 2005-2006	Pre: 24 Post: 24	Acute coronary syndrome (ICD-10)	All	Comparison of annual frequency of hospitalizations due to ACS		.82 (.76, .89) *[a] 15.5% (p<.001) and 14.7% (p<.001) reduction in hospitalizations during first and second post-law years, respectively.	2426	Smokefree public places, including restaurants, bars, and discos. Smoking rooms permitted. This study population overlaps with that of another study[52] also conducted in Ticino examining rates of STEMI (a subset of ACS) following the law.
ACE – Workplace and Restaurant and Bar Laws											
Barone-Adesi 2009[50]	Piedmont, Italy	January 2005	January 2005-June 2007 vs. January 2001-December 2004	Pre: 48 Post: 30	Acute coronary events (ICD-9 410, 411)		Poisson regression; standard methods for interrupted time-series adopted to assess the role of immediate and gradual effects of the smokefree law	Long term trends, seasonality, age, day of the week	<70: .94 (.90, .97) * ≥70: 1.00 (.97, 1.03) Weekends: .87 (.80, .93) Weekdays: .96 (.92, 1.00)	N/A	See entry for Italy (4 regions). The observed reduction in the number of admissions for acute coronary events started in the same month in which the law came into effect and remained evident for the entire study period. No change (p=.51) in the underlying trend was found. This study population overlaps with that of another study[14] also conducted in Piedmont examining rates of AMI (a subset of ACE) following the Italian national law.
Cesaroni 2008[20]	Rome, Italy	January 10, 2005	January 2005-December 2005 vs. January 2000-December 2004	Pre: 48 Post: 12	Acute coronary events, including AMI (ICD-9 410) and "other acute and subacute forms of ischemic heart disease" (ICD-9 411). Cases were included with principal diagnosis of AMI or secondary diagnosis of AMI when principal diagnosis indicated AMI complications	35-84	Age standardized rates (European) Poisson regression on number of daily events after January 10, 2005 compared to before Separate analyses done for out-of-hospital deaths and hospitalizations	Age, gender, PM_{10} air pollution, flu epidemics, holidays, temperature, secular trend, all-cause hospitalizations, socioeconomic status	35-64: .89 (.85, .93) * 65-74: .92 (.88, .97) 75-84: 1.02 (.98, 1.07) Adjusted for time trends and all-cause hospitalization rates: 35-64: .94 (.88, 1.01) 65-74: .90 (.84, .96)	2136	See entry for Italy (4 regions). No effect in 75-84 year olds. Protective effect of law seemed stronger in low SES areas. Prevalence of smoking decreased from 34.9% to 30.5% in men and from 20.6% to 20.4% in women. Cigarette sales decreased in Rome by 5.5% in 2005 compared to 2004. Estimated reduction in coronary events attributable to changes in active smoking habits was <2%.

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					(ICD-9 427.1, 427.41, 427.42, 427.5, 428.1, 429.5, 429.6, 429.71, 429.79, 429.81, 518.4, 780.2, 785.5, 414.10, 423.0). Out-of-hospital deaths from ischemic heart diseases (ICD-9 410-414) if no evidence of hospitalization for coronary causes in the previous 28 days or any cause in the last 2 days.		and an analysis of incident cases only.				Concentrations of urinary cotinine among non-smoking workers decreased from 17.8 to 5.5 mg/ml at 3 months post-law and 3.7 mg/mL 12 months post-law.
IHD – Workplace and Restaurant and Bar Laws											
Barone-Adesi 2011[36]	Italy (20 regions)	January 10, 2005	January 2005-November 2006 vs. January 2002-December 2004	Pre: 36 Post: 24	Non-AMI acute and subacute forms of ischemic heart disease (ICD-9 411) Primary analysis was for acute coronary events (AMI and other acute and sub-acute ischemic heart disease).	All	Admission rates; Poisson test with mixed effect regression models with fixed coefficients describing the national trend and random coefficients describing region-specific deviations.	Seasonality, long term trends Separate analyses conducted based on age, gender	<70: .95 (.93, .98) * F: .92 (.88, .98) M: .96 (.93, .99) 70+: .98 (.96, 1.00) F: .98 (.95, 1.01) M: .97 (.94, 1.01)	936,519 (all acute coronary events)	See entry for Italy (4 regions). The observed reduction was stable over the study period, similar in different geographic areas, and stronger among young people. No evidence of a gradual effect of the law, as there was no change in the underlying trend in admissions for ACEs after law.

* Estimate used in meta-analysis
[a] RR and CI calculated by Monte Carlo simulation run 100,000 times; rate ratio calculated by dividing post-law rates with mean pre-law rates
[b] RR and CI calculated using negative binomial regression with model including effect of law and seasonality (if applicable)
[c] RR and CI calculating using number of events before vs. after law
[d] RR and CI computed using Poisson regression with model described in paper for counties with no prior law
[e] CI calculated from p-value presented in paper
[f] CI obtained from communication with author of paper
Notes: Observed risk is presented as a risk ratio unless otherwise specified. If number of events is N/A, then events were recorded as rates and absolute counts are not available.

Supplementary Table 2. Detailed Description of Studies of Other Heart Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
Angina – Workplace Only Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 1: 24	Angina (ICD9-411, 413; ICD10-I20)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 1 vs. pre-law: .88 (.69, 1.14) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Angina – Workplace and Restaurant Laws											
Sargent 2012[46]	Germany	Nationwide: September 1, 2007 Statewide: varies	January 2004-December 2008	Pre: varies Post: 12	Stable or unstable angina pectoris (ICD10-I20.0-I20.9)	30+	Rate of hospitalization for AMI; logistic regression and interrupted time series linear regression model	Age, sex, occupation	.87 (.82, .92) * In the first year after implementation, 1431 angina hospitalizations were prevented.	39,224	Legislation addressed smoking in federal buildings and the transportation system. Private employers were allowed to introduce a total or partial smoking law in workplaces. States were permitted to decide how to limit smoking in the hospitality sector (hotels, restaurants, bars). Hospitality smoking laws were passed in all states in implemented between August 1, 2007 and July 1, 2008. Most states continued to allow smoking in small bars without any food delivery and in separate rooms in large restaurants. A population-based survey revealed a significant decrease of cigarettes smoked in Germany after the

Supplementary Table 2. Detailed Description of Studies of Other Heart Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
											law. After the law, there was a statistically significant downward trend, with slope resulting in a decline of 5.33 (7.18, 3.48) hospitalizations per month. Hospital admissions for control condition fractures increased slightly from 65100 in 2007 to 66954 in 2009. Bronchitis cases, which might be affected by smoke-free laws, declined from 16900 in 2007 to 15391 in 2009. Hospitalization costs for angina decreased significantly by 9.6 (2.5, 16.6)% or about 2.5 million euros.
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 2: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Angina (ICD9-411, 413; ICD10-I20)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 2 vs. pre-law: .65 (.52, .82) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Angina – Workplace and Restaurant and Bar Laws											
Naiman 2010[29]	Arizona	May 1, 2007	May 2007-May 2008 vs. January 2004-	Pre: 40 Post: 13	Unstable angina (ICD9-411.1x)	All	Rate of admissions per 100,000	Seasonality, population, annual linear trend	.64 (.46, .88) *[d]	670 (counties without	Law ended smoking in all enclosed workplaces including bars and restaurants.

Supplementary Table 2. Detailed Description of Studies of Other Heart Disease

Study	Location	Effective Date	Study Period	Pre/Post Duration (months)	Endpoint	Eligible Age (years)	Measure / Statistical Method	Confounders	Observed Risk / 95% Confidence Interval	N (events)	Notes
			April 2007				annually; Poisson regression	Separate analyses for counties with pre-existing smoke-free laws vs. those without		previous laws)	Cost-savings analysis estimates $16.8 million in savings for AMI, unstable angina, acute stroke, and acute asthma in 13 months after law in non-law counties ($.9 million for angina alone). No change in rates of control diseases (acute appendicitis, kidney stones, acute cholecystitis, and ulcers) pre and post law.
Cronin 2012[44]	Cork and Kerry Counties, Ireland	March 29, 2004	Primary data set: April 2004-March 2007 vs. March 2003-March 2004 Secondary data set: July 2003-March 2004 vs. April 2004-June 2007	Pre: 13 Post: 36 Pre: 9 Post: 39	Unstable angina, diagnosed in hospital by physician using troponin T or I, allowing repeat admissions (Primary analysis was for overall acute coronary syndrome.)	18+	Unstable angina admissions and rate per 100,000; Poisson regression	Linear time trend Sensitivity analyses were undertaken by gender, smoking status, and type of ACS. According to mortality data, there was no change in all cause mortality and overall 6.5% decrease in deaths from circulatory causes in Cork and Kerry counties, so results were not attributable to changes in coronary death patterns outside of hospital.	.89 (.75, 1.06) *[b] Estimates derived from secondary data set.	Primary data set: 1236 Secondary data set: 1314	See description of law in entry for Ireland. The first year's reduction in admissions for ACS was due to fewer cases among men and current smokers. The third year's reduction in admissions for ACS was due to fewer cases among men, current smokers, and never smokers. Increased effect on ACS over time evidenced by 12% decrease in year 1 and 13% decrease in year 3. This paper supersedes an abstract of the same study used in the 2009 meta-analysis.
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Unstable angina	20-70	Change in emergency hospital admissions for unstable angina	Population, weather, pollution, and influenza Stratified by age and gender.	.77 (.61, .96) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains.

Supplementary Table 2. Detailed Description of Studies of Other Heart Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
											Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 3: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Angina (ICD9-411, 413; ICD10-I20)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 3 vs. pre-law: .38 (.30, .48) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
CHD – Workplace and Restaurant Laws											
Khuder 2007[17]	Bowling Green, Ohio	March 2002	January 1999-February 2002 vs. March 2002-June 2005	Pre: 38 Post: 40	Coronary heart disease (ICD-9 410-414, 428)	18+	Age-standardized rates ARIMA Ordinance effect assumed to start in Oct 2002	Comparison with control community Kent, OH (not covered by law). No significant change in Kent.	12 months post-law: .61 (.55, .67) 40 months post-law: .53 (.45, .59) *	N/A	Smoking was prohibited in all public places within the city, except for bars and restaurants with bars, provided that the bar area was isolated within a separate smoking room. Smoking was allowed in bars and bowling alleys at the discretion of the owners. 39% reduction in CHD in 12 months and 47% reduction in 40 months. Projected that 17% of reduction may be due to decreased SHS exposure, while the remaining 21% is due to decreased smoking prevalence and cigarette consumption.

Supplementary Table 2. Detailed Description of Studies of Other Heart Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
											No differences in admissions for unspecified non-smoking related conditions.
SCD – Workplace and Restaurant Laws											
Hurt 2011[54]	Olmsted County, Minnesota	January 1, 2002 (Ordinance 1: smokefree restaurants) October 1, 2007 (Ordinance 2: smokefree workplaces)	October 2007-March 2009 vs. July 2000-December 2001	Pre ordinance 1: 18 Post ordinance 1: 18	Sudden cardiac death defined as out-of-hospital deaths assigned to coronary heart disease (ICD9-410-414)	All	Age and sex-adjusted rate per 100,000; adjusted hazard ratio	Age, sex	Ordinance 1 vs. no law, hazard ratio: .72 (.58, .89) *	N/A	Though the law was initiated in two steps (smokefree restaurants in January 2002 and smokefree workplaces in 2007), this study was included in the meta-analysis because authors compared the period before any law to the period after full implementation, thus capturing the true effect of the law. SCD rate per 100,000 dropped from 152.5 to 112.2 following the restaurant law (HR: .72, .58, .89; p<.01) and from 78.0 to 76.6 following the workplace law (HR: .99; .76, 1.28; p=.91). During this period, the prevalence of hypertension, diabetes, hypercholesterolemia, and obesity either remained constant or increased while the prevalence of smoking among the adults declined by 23%.
SCD – Workplace and Restaurant and Bar Laws											
Hurt 2011[54]	Olmsted County, Minnesota	January 1, 2002 (Ordinance 1: smokefree restaurants) October 1, 2007 (Ordinance 2: smokefree workplaces)	October 2007-March 2009 vs. July 2000-December 2001	Pre ordinance 2: 18 Post ordinance 2: 18; not included in length of follow-up analysis because the pre-law period did not immediately precede the	Sudden cardiac death defined as out-of-hospital deaths assigned to coronary heart disease (ICD9-410-414)	All	Age and sex-adjusted rate per 100,000; adjusted hazard ratio	Age, sex	Ordinance 2 vs. no law, hazard ratio: .50 (.40, .63) *	N/A	Though the law was initiated in two steps (smokefree restaurants in January 2002 and smokefree workplaces in 2007), this study was included in the meta-analysis because authors compared the period before any law to the period after full implementation, thus capturing the true effect of the law. SCD rate per 100,000 dropped from 152.5 to 112.2 following the restaurant law (HR: .72, .58, .89; p<.01) and from 78.0 to 76.6 following the workplace law (HR: .99; .76, 1.28; p=.91).

Supplementary Table 2. Detailed Description of Studies of Other Heart Disease

Study	Location	Effective Date	Study Period	Pre/Post Duration (months)	Endpoint	Eligible Age (years)	Measure / Statistical Method	Confounders	Observed Risk / 95% Confidence Interval	N (events)	Notes
				post-law phase							During this period, the prevalence of hypertension, diabetes, hypercholesterolemia, and obesity either remained constant or increased while the prevalence of smoking among the adults declined by 23%.

* Estimate used in meta-analysis
[a] RR and CI calculated by Monte Carlo simulation run 100,000 times; rate ratio calculated by dividing post-law rates with mean pre-law rates
[b] RR and CI calculated using negative binomial regression with model including effect of law and seasonality (if applicable)
[c] RR and CI calculating using number of events before vs. after law
[d] RR and CI computed using Poisson regression with model described in paper for counties with no prior law
[e] CI calculated from p-value presented in paper
[f] CI obtained from communication with author of paper
Notes: Observed risk is presented as a risk ratio unless otherwise specified. If number of events is N/A, then events were recorded as rates and absolute counts are not available.

Supplementary Table 3. Detailed Description of Studies of Cerebrovascular Accidents											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
Stroke – Workplace Only Laws											
Dautzenberg 2008[13]	France	February 1 2007; restaurants, bars, and casinos added January 1, 2008	January 2006-February 15, 2008	Partial law: Pre: 13 Post: 12.5	Stroke	<66	Rate per 100,000 admissions		Partial law: .96 (.8, 1.03) *[b]	N/A	Smoking ended in public places in February 2007, but restaurants, bars, and casinos were given exceptions until January 2008. Law permits ventilated smoking rooms under strict conditions. Between January 2007 (before law) and January 2008 (after law), SHS exposure dropped from 57% to 14%. $PM_{2.5}$ levels also dropped. Also report substantial drops in respiratory symptoms among hospitality workers.
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 1: 24	Stroke (ICD9-433, 434, 435, 436; ICD10-I63, I64, I65, I66, G45, G46)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 1 vs. pre-law: .91 (.80, 1.03) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Stroke – Workplace and Restaurant Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3	January 1996-May 2006	Pre: 36 Post phase 2: 36; not included in length of	Stroke (ICD9-433, 434, 435, 436; ICD10-I63, I64, I65, I66, G45, G46)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of	Subgroup analyses by age, sex. Comparison with Durham Region	Phase 2 vs. pre: .76 (.68, .85) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions

Supplementary Table 3. Detailed Description of Studies of Cerebrovascular Accidents											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
		phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.		follow-up analysis because the pre-law period did not immediately precede the post-law phase			hospital admission	and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.			decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Stroke – Workplace and Restaurant and Bar Laws											
Herman 2011[35]	Arizona	May 1, 2007	May 2007-May 2008 vs. January 2004-April 2007	Pre: 40 Post: 13	Acute stroke (ICD9-430-434.xx, 436.xx, 437.1x)	All	Rate of admissions per 100,000 annually; Poisson regression	Seasonality, population, annual linear trend Separate analyses for counties with pre-existing smoke-free laws vs. those without	.86 (.79, .96) *[d]	6018 (counties without previous laws)	Law ended smoking in all enclosed workplaces including bars and restaurants. Cost-savings analysis estimates $16.8 million in savings for AMI, unstable angina, acute stroke, and acute asthma in 13 months after law in non-law counties ($4.9 million for acute stroke alone). No change in rates of control diseases (acute appendicitis, kidney stones, acute cholecystitis, and ulcers) pre and post law.
Dautzenberg 2008[13]	France	February 1 2007; restaurants, bars, and casinos added January 1, 2008	January 2006-February 15, 2008	Complete law: Pre: 24 Post: 1.5; not included in length of follow-up analysis because the pre-law	Stroke	<66	Rate per 100,000 admissions		Complete law: .83 (.77, .91) *[b]	N/A	Smoking ended in public places in February 2007, but restaurants, bars, and casinos were given exceptions until January 2008. Law permits ventilated smoking rooms under strict conditions. Between January 2007 (before law) and January 2008 (after law), SHS exposure dropped from 57% to 14%. $PM_{2.5}$ levels also dropped.

Supplementary Table 3. Detailed Description of Studies of Cerebrovascular Accidents											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
				period did not immediately precede the post-law phase							Also report substantial drops in respiratory symptoms among hospitality workers.
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Stroke	20-70	Change in emergency hospital admissions for stroke Stratified by age and gender.	Population, weather, pollution, and influenza	.93 (.73, 1.20) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Juster 2007[18]	New York State	24 Jul 2003	January 1995-December 2004	Post: 21 Pre: 99	Stroke (primary diagnosis code ICD9-410.00-410.99)	35+	Multiple regression time series	Age-adjusted (NY population in 2000) Existence of strong local ordinance, time (linear secular trend), seasonality, county Analyzed comprehensive laws (smoking prohibited in restaurants, bars, and other hospitality venues) vs. moderate laws (smoking permitting in hospitality venues)	No significant negative association between the stroke admission rate and moderate or comprehensive restrictions on smoking. No estimate was available for stroke rates in places without local smokefree laws prior to the state law, so this study was excluded from the analysis for stroke.	584833	July 2003 law prohibited smoking in all workplaces including restaurants and bars. Limited statewide restrictions since 1989 limited smoking in many public places, including schools, hospitals, public buildings, and retail stores. Local laws varied by county. By 2002, 75% of New Yorkers were subject to strong local laws, as well as limited restrictions at the state level implemented in 1989; authors performed analysis to compare effects assuming hypothetical case of no pre-existing local laws. Change in monthly admission trend rate not significantly different from null. After implementation of the state law, exposure to SHS declined by nearly 50%; saliva cotinine dropped from 0.078 to 0.041 ng/mL.
Naiman	Toronto,	May 2006	January 1996-	Pre: 36	Stroke (ICD9-433,	45+	Autoregressive	Subgroup analyses	Phase 3 vs. pre:	N/A	Legislation required all public places

Supplementary Table 3. Detailed Description of Studies of Cerebrovascular Accidents

Study	Location	Effective Date	Study Period	Pre/Post Duration (months)	Endpoint	Eligible Age (years)	Measure / Statistical Method	Confounders	Observed Risk / 95% Confidence Interval	N (events)	Notes
2010[29]	Canada	Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	May 2006	Post phase 3: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	434, 435, 436; ICD10-I63, I64, I65, I66, G45, G46)		integrated moving-average (ARIMA) on crude rates of hospital admission	by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	.63 (.56, .71) *[c]		and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 39% (38%, 40%) for cardiovascular conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
TIA – Workplace and Restaurant and Bar Laws											
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Transient ischemic attack	20-70	Change in emergency hospital admissions for transient ischemic attack	Population, weather, pollution, and influenza Stratified by age and gender.	1.00 (.70, 1.42) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).

* Estimate used in meta-analysis
[a] RR and CI calculated by Monte Carlo simulation run 100,000 times; rate ratio calculated by dividing post-law rates with mean pre-law rates
[b] RR and CI calculated using negative binomial regression with model including effect of law and seasonality (if applicable)
[c] RR and CI calculating using number of events before vs. after law
[d] RR and CI computed using Poisson regression with model described in paper for counties with no prior law
[e] CI calculated from p-value presented in paper
[f] CI obtained from communication with author of paper
Notes: Observed risk is presented as a risk ratio unless otherwise specified. If number of events is N/A, then events were recorded as rates and absolute counts are not available.

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
COPD – Workplace Only Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 1: 24	COPD (ICD9-490, 491, 492, 496; ICD10-J40, J41, J32, J43, J44)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 1 vs. pre-law: 1.09 (.96, 1.24) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
COPD – Workplace and Restaurant Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks	January 1996-May 2006	Pre: 36 Post phase 2: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	COPD (ICD9-490, 491, 492, 496; ICD10-J40, J41, J32, J43, J44)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 2 vs. pre-law: .94 (.83, 1.05) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
		except designated smoking rooms in June 2004.									
COPD – Workplace and Restaurant and Bar Laws											
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Exacerbation of chronic obstruction pulmonary disease	20-70	Change in emergency hospital admissions for exacerbation of COPD	Population, weather, pollution, and influenza Stratified by age and gender.	1.18 (.86, 1.60) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 3: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	COPD (ICD9-490, 491, 492, 496; ICD10-J40, J41, J32, J43, J44)	45+	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 3 vs. pre-law: .73 (.65, .82) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Asthma – Workplace Only Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free	January 1996-May 2006	Pre: 36 Post phase 1: 24	Asthma (ICD9-493; ICD10-J45, J46)	<65	Autoregressive integrated moving-average	Subgroup analyses by age, sex.	Phase 1 vs. pre-law: .84 (.62, 1.15) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases.

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
		legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.					(ARIMA) on crude rates of hospital admission	Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.			Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Dove 2011[34]	United States	Not a pre-post study; study uses American Nonsmokers' Rights Foundation smoking law database and NHANES data to compare asthma outcomes in places with at least 1 smokefree workplace, restaurant, or bar law to those that do not from 1999-2006.			Emergency department visits for asthma among nonsmoking youth	3-15	Weighted logistic regression to calculate ORs and CIs	Age, gender, race/ethnicity, ratio of family income to poverty, 2-year survey cycle, region, household size, health insurance status, BMI, mother's age at birth, mother's smoking status during pregnancy, low birth weight Stratified by exposure to SHS in home.	Odds ratio: .55 (.27 1.13) *	N/A	Locations classified as having a smokefree law completely ended smoking and did not allow for separately ventilated smoking rooms, size exemptions, or allowed smoking in bars attached to restaurants. Smokefree laws found to be associated with significantly lower odds of asthmatic symptoms (OR: .67; .48, .93). Smokefree laws trended toward lower odds of ever having asthma with current symptoms (OR: .74; .53, 1.03), and asthma attacks (OR: .66; .28, 1.56). Smokefree laws that targeted exposures to SHS outside the home had more effect on children and adolescents without concomitant exposure at home.
Asthma – Workplace and Restaurant Laws											
Rayens 2008[12]	Lexington-Fayette County,	April 27, 2004	May 2004-December	Pre: 40 Post: 32	Asthma (primary or secondary	All	Age-adjusted rates; Poisson	Age, sex, population,	.78 (.71, .86) * 0-19: .82(.71-.96)	14839	Smokefree enclosed public places law prohibited smoking in restaurants, bars,

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
	Kentucky		2006 vs. January 2001-April 2004		discharge diagnosis ICD9-493)		regression and first-order autoregressive time-series model	seasonality, secular trends, demographic variables	20+: .76 (.69-.84)		bowling alleys, bingo halls, convenience stores, laundry facilities, and other businesses open to the public. Buildings not open to the public, including government office buildings or workplaces, were excluded. Manufacturing facilities were also excluded. There was a dramatic improvement in air quality in hospitality venues and immediate reduction in hair nicotine among bar and restaurant workers following implementation of the law. Within 3 months of implementation, there was a 56% decline in hair nicotine.
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 2: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Asthma (ICD9-493; ICD10-J45, J46)	<65	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 2 vs. pre-law: .65 (.49, .85) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Asthma – Workplace and Restaurant and Bar Laws											
Herman 2011[35]	Arizona	May 1, 2007	May 2007-May 2008 vs.	Pre: 40 Post: 13	Acute asthma (ICD9-493.xx)	All	Rate of admissions per	Seasonality, population, annual	.77 (.68, .86) *[d]	4125 (counties	Law ended smoking in all enclosed workplaces including bars and

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
			January 2004-April 2007				100,000 annually; Poisson regression	linear trend Separate analyses for counties with pre-existing smoke-free laws vs. those without		without previous laws)	restaurants. Cost-savings analysis estimates $16.8 million in savings for AMI, unstable angina, acute stroke, and acute asthma in 13 months after law in non-law counties ($3.8 million for acute asthma alone). No change in rates of control diseases (acute appendicitis, kidney stones, acute cholecystitis, and ulcers) pre and post law.
Moraros 2010[33]	Delaware	Nov 1, 2002	Jan 2003-Dec 2004 vs. Jan 1999-Sep 2002	Pre: 45 Post: 24	Asthma (primary discharge diagnosis ICD9-493)	18+	Quarterly rates of events; Poisson regression	Age, seasonal effects, resident status Compared with non-Delaware residents admitted for asthma. Asthma relative risk in non-Delaware residents increased significantly from pre-ordinance to post-ordinance (1.62; 1.41, 1.86).	.95 (.90, .99) *	6370	*Delaware Clean Indoor Air Act* of 1994 became comprehensive in 2002 with an amendment to include all enclosed indoor areas accessible to the general public, including restaurants, bars, and casinos. Relative risk for linear trend is 0.95 (.92, .97), showing a 5% decrease per year after law. Delaware DPH reported 99.6% compliance in bars and restaurants, and the Delaware Department of Labor reported 100% compliance in other workplaces in first year.
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Asthma	20-70	Change in emergency hospital admissions for asthma	Population, weather, pollution, and influenza Stratified by age and gender.	.60 (.39, .91) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Mackay	Scotland	March 26, 2006	April 2006-	Pre: 10	Asthma (principal	<15	Negative	Sex, age group,	.81 (.78, .84) *	21415	Legislation prohibited smoking in all

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
2010[31]			October 2009 vs. January 2000- March 2006	Post: 10	diagnosis ICD10-J45, J46)		binomial regression model	urlaw/rural, socioeconomic status, region			enclosed public places. The reduction was apparent among both preschool and school-age children. There were no significant interactions between hospital admissions for asthma and age group, sex, urlaw or rural resident, region, or socioeconomic status. Net reduction in admissions for asthma of 15.1% per year (12.9, 17.2).
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 3: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Asthma (ICD9-493; ICD10-J45, J46)	<65	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 3 vs. pre-law: .48 (.36, .63) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Lung Infections – Workplace Only Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in	January 1996-May 2006	Pre: 36 Post phase 1: 24	Pneumonia/bronchitis (ICD9-466, 480-486; ICD10-J12-J18, J20)	All	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with	Phase 1 vs. pre: 1.02 (.90, 1.15) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions.

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
		Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.						no smoke-free laws. No significant reductions were observed in control cities.			No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Lung Infections – Workplace and Restaurant Laws											
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 2: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Pneumonia/bronchitis (ICD9-466, 480-486; ICD10-J12-J18, J20)	All	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 2 vs. pre: .81 (.73, .91) *[c]	N/A	Legislation required all public places and workplaces to be smokefree and was implemented in 3 phases. Crude rates of hospital admissions decreased 33% (32%, 34%) for respiratory conditions. No significant reductions were observed in number of hospital admissions attributable to control conditions (cholecystitis, appendicitis, bowel obstruction) in Toronto.
Lung Infections – Workplace and Restaurant and Bar Laws											
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Pneumonia	20-70	Change in emergency hospital admissions for pneumonia	Population, weather, pollution, and influenza Stratified by age	.71 (.52, .98) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls,

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease											
Study	**Location**	**Effective Date**	**Study Period**	**Pre/Post Duration (months)**	**Endpoint**	**Eligible Age (years)**	**Measure / Statistical Method**	**Confounders**	**Observed Risk / 95% Confidence Interval**	**N (events)**	**Notes**
								and gender.			cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Lower respiratory tract infection	20-70	Change in emergency hospital admissions for lower respiratory tract infection	Population, weather, pollution, and influenza Stratified by age and gender.	.83 (.61, 1.13) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).
Naiman 2010[29]	Toronto, Canada	May 2006 Smoke-free legislation occurred in 3 phases: smoke-free public places and workplaces in Oct. 1999, smoke-free restaurants, dinner theaters, and bowling centers except designated smoking rooms in June 2001, smoke-free bars, billiard halls, bingo halls, casinos, racetracks except designated smoking rooms in June 2004.	January 1996-May 2006	Pre: 36 Post phase 3: 36; not included in length of follow-up analysis because the pre-law period did not immediately precede the post-law phase	Pneumonia/bronchitis (ICD9-466, 480-486; ICD10-J12-J18, J20)	All	Autoregressive integrated moving-average (ARIMA) on crude rates of hospital admission	Subgroup analyses by age, sex. Comparison with Durham Region and Thunder Bay, two Ontario municipalities with no smoke-free laws. No significant reductions were observed in control cities.	Phase 3 vs. pre: .64 (.58, .72) *[c]	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).

Supplementary Table 4. Detailed Description of Studies of Respiratory Disease

Study	Location	Effective Date	Study Period	Pre/Post Duration (months)	Endpoint	Eligible Age (years)	Measure / Statistical Method	Confounders	Observed Risk / 95% Confidence Interval	N (events)	Notes
Spontaneous Pneumothorax – Workplace and Restaurant and Bar Laws											
Kent 2012[47]	Ireland	March 29, 2004	April 2004-March 2006 vs. April 2002-March 2004	Pre: 24 Post: 24	Spontaneous pneumothorax	20-70	Change in emergency hospital admissions for spontaneous pneumothorax Stratified by age and gender.	Population, weather, pollution, and influenza	.62 (.22, 1.75) *	N/A	March 2004 law applied to workplaces (including bars and restaurants); prior to this law, smoking had been outlawed in public buildings, hospitals, public pharmacies, schools, lawking halls, cinemas, restaurant kitchens, part of all restaurants, public transport aircraft and buses, and some trains. Significant reduction in emergency cardiopulmonary admissions in the two years following the smoking law (RR: .87; .78, .98).

* Estimate used in meta-analysis
[a] RR and CI calculated by Monte Carlo simulation run 100,000 times; rate ratio calculated by dividing post-law rates with mean pre-law rates
[b] RR and CI calculated using negative binomial regression with model including effect of law and seasonality (if applicable)
[c] RR and CI calculating using number of events before vs. after law
[d] RR and CI computed using Poisson regression with model described in paper for counties with no prior law
[e] CI calculated from p-value presented in paper
[f] CI obtained from communication with author of paper
Notes: Observed risk is presented as a risk ratio unless otherwise specified. If number of events is N/A, then events were recorded as rates and absolute counts are not available.

Supplementary Table 5. Summary of 47 Studies Containing 94 Risk Estimates Considered for Inclusion in Meta-analysis

	Risk Estimates (n)			Studies (n)
Coronary events	56			
Acute myocardial infarction		46		
Workplace only			12	
RR published			2	2
RR calculated			4	3
Unreliable results, excluded[41]			6	1
Workplace and restaurant			6	
RR published			4	3
RR calculated			2	2
Workplace and restaurant and bar			28	
RR published			16	15
RR calculated			11	10
RR provided by author[18]			1	1
Acute coronary syndrome		7		
Workplace only			1	
RR calculated			1	1
Workplace and restaurant			1	
RR published			1	1
Workplace and restaurant and bar			5	
RR published			1	1
RR calculated			3	3
Data inconsistencies, excluded[53]			1	1
Acute coronary events		2		
Workplace and restaurant and bar			2	
RR published			2	2
Ischemic heart disease		1		
Workplace and restaurant and bar			1	
RR published			1	1
Other heart disease	10			
Angina		7		
Workplace only			1	
RR calculated			1	1
Workplace and restaurant			2	
RR published			1	1
RR calculated			1	1
Workplace and restaurant and bar			4	
RR published			1	1
RR calculated			3	3
Coronary heart disease		1		
Workplace and restaurant			1	
RR published			1	1
Sudden cardiac death		2		
Workplace and restaurant			1	
RR published			1	1
Workplace and restaurant and bar			1	
RR published			1	1

Supplementary Table 5. Summary of 47 Studies Containing 94 Risk Estimates Considered for Inclusion in Meta-analysis

	Risk Estimates (n)			Studies (n)
Cerebrovascular accident	9			
Stroke		8		
Workplace only			2	
RR calculated				2
Workplace and restaurant			1	
RR calculated				1
Workplace and restaurant and bar			5	
RR published				1
RR calculated				3
RR not calculable, excluded[18]				1
Transient ischemic attack		1		
Workplace and restaurant and bar			1	
RR published				1
Respiratory Disease	19			
Chronic obstructive pulmonary disease		4		
Workplace only			1	
RR calculated				1
Workplace and restaurant			1	
RR calculated				1
Workplace and restaurant and bar			2	
RR published				1
RR calculated				1
Asthma		9		
Workplace only			2	
RR published				1
RR calculated				1
Workplace and restaurant			2	
RR published				1
RR calculated				1
Workplace and restaurant and bar			5	
RR published				3
RR calculated				2
Lung infections		5		
Workplace only			1	
RR calculated				1
Workplace and restaurant			1	
RR calculated				1
Workplace and restaurant and bar			3	
RR published				2
RR calculated				1
Spontaneous pneumothorax		1		
Workplace and restaurant and bar			1	
RR published				1

Supplementary Table 6. Follow-up Duration for All Studies Used in Meta-analysis (Months)						
Outcome	**Workplace Law**		**Workplace and Restaurant Law**		**Workplace, Restaurant, and Bar Law**	
	Median	**Range**	**Median**	**Range**	**Median**	**Range**
AMI[11, 13-16, 18, 19, 21, 23-30, 32, 33, 35, 38, 40, 42-48, 52, 54-57]	12.5	12-24	22	12-32	24	2-39
ACS[22, 37, 39, 49, 51]	15		57		13.5	5-24
ACE[20, 50]					21	12-30
IHD[36]					24	
Angina[29, 35, 44, 46, 47]	24		12		24	13-39
CHD[17]			40			
SCD[54]			18		18	
Stroke[13, 29, 35, 47]	18.25	12.5-24			18.5	13-24
TIA[47]					24	
COPD[29, 47]	24				24	
Asthma[12, 29, 31, 33-35, 47]	24		32		13	10-24
Lung Infections[29, 47]	24	24*			24	
Spontaneous Pneumothorax[47]					24	

Follow-up times for Phase 2 (adding restaurants to workplaces) and Phase 3 (adding bars to restaurants and workplaces) of the Toronto, Canada law,[29] Ordinance #2 of Olmsted County, Minnesota[54] (adding workplaces to restaurants), and the comprehensive law in France[13] (adding restaurants, bars, and casinos to other public places) were not used because the post-law period did not immediate follow a time with no restrictions. Though the effect of some laws were examined at multiple time points (Bowling Green, OH,[17] Pueblo, CO.,[15, 23] Graubünden, Switzerland,[28, 38] and Spain[42]), only the latest estimate is included on this table. Due to study design, follow-up length could not be determined for the two analyses that looked at multiple smokefree laws across the United States[27, 34] These studies were excluded from the length of follow-up analysis and do not appear in this table. For number of studies in each category, see Table 1. For details, see notes in Tables S1-S4.
* Risk estimates in this category all had same follow-up duration

Supplementary Table 7. Results of Dummy Variable Metaregressions Comparing Natural Log of Risk Ratios to Determine Grouping Order of Disease Outcomes*

Outcome	p-value	N	Outcome	p-value	N
Cardiac (reference = AMI)		40	**Coronary Events (reference = AMI)**		40
ACS	.307	6	ACS	.173	6
ACE	.455	2	ACE	.375	2
IHD	.425	1	IHD	.330	1
Angina	.015	7	**Other Heart Disease (reference = Angina)***		7
CHD	†	1	CHD	.378	1
SCD	.010	2	SCD	.518	2
Cerebrovascular Accident (reference = Stroke)		7	**Respiratory Disease (reference = COPD)**		4
TIA	.430	1	Asthma	.367	9
			Lung Infections	.358	5
			Spontaneous Pneumothorax	.563	1

* For all categories, estimates are calculated from studies of comprehensive smokefree laws (smokefree workplaces, restaurants, and bars) except for Other Heart Disease, which used all smokefree laws because there were not enough data points.
†Too few studies to calculate

Sensitivity Analysis for Coding of Ordinal Variable for Comprehensiveness of Law in Metaregressions

We treated comprehensiveness of law as an ordinal, not an interval (continuous) variable, which is why we only reported the P value for law comprehensiveness and not an effect size. While this is a standard approach for integrating ordinal variables into regression analyses, we investigated use of this procedure to ensure that our conclusions were not sensitive to this technique in two ways:

First, we conducted the analysis treating law comprehensiveness as a categorical variable (together with dummy variables for the different outcome groups, as we do in the analysis in the paper that treats law comprehensiveness as an interval variable), taking workplace only law as the reference condition. This analysis yielded

Workplace + restaurant: RR = .948 (95% CI .842, 1.068)
Workplace + restaurant + bar RR = .864 (95% CI .787, .948)

The square of the point estimate for the risk change associated with workplace + restaurant laws, 0.948, is .899, which is well within the confidence interval for the point estimate for workplace + restaurant + bar laws, .864, suggesting that the way that we coded the laws as an interval variable (0, 1, 2) is a reasonable description of the dose-response.

Doing the analysis using dummy variables for the four outcome groups comes even closer:

Workplace + restaurant: RR = .928 (95% CI .823, 1.046)
Workplace + restaurant + bar RR = .865 (95% CI .788 .951)

The square of the point estimate for the risk change associated with workplace + restaurant laws, 0.928, is .861, which is very close to the point estimate for workplace + restaurant + bar laws, .865.

Second, we tried recoding the law comprehensiveness using alternative codings (0, 1, 3) and (0, 1, 4), which effectively allowed for larger incremental changes between workplace + restaurant + bar laws than between workplace + restaurant and workplace only laws. The P values for the law comprehensiveness variable was .002 for the original coding (0, 1, 2) compared to .002 for the (0, 1, 3) and .003 for the (0, 1, 4 coding), respectively.

Based on these additional sensitivity analyses, we believe that the approach we use in the paper produces robust evidence for a dose-response effect of the law, treating law comprehensiveness as an ordinal variable