



Tobacco Control and Public Health in Eastern Europe

Krasovsky, K. S. (2015). Reduced Ignition Propensity cigarette regulations and decline in fires, fire injuries and fatalities in Canada. *Tobacco Control and Public Health in Eastern Europe*, 5(1), 13-19. doi: 10.6084/m9.figshare.1528188

Reduced Ignition Propensity cigarette regulations and decline in fires, fire injuries and fatalities in Canada

Konstantin S Krasovsky

BACKGROUND: On October 1, 2005, Canada became the first country to implement a nationwide cigarette fire-safety standard for Reduced Ignition Propensity (RIP) cigarettes. The aim of the paper is to estimate the impact of the RIP cigarette regulations on the number of smoking-related fires (SRF), fire injuries (SRFI), and fatalities (SRFF) in Canada.

METHODS: As there are no national fire statistics data, the data from Canadian provinces were studied. The data with smoking mentioned as the source of ignition were found for four provinces and grouped into two time periods: pre-implementation (2000–2004) and post-implementation (2005–2009). Average annual indicators for each period were compared.

RESULTS: In Alberta, the number of home SRF and SRFF did not change much, while small (14%) reduction was observed in SRFI. In British Columbia, the percentage of SRF in all fires decreased by 15% and the number of SRFI and SRFF declined by 41% and 49% respectively. In Ontario, the average number of SRF and SRFI per year slightly

decreased; however, the number of SRFF increased. In Saskatchewan, fires caused by smokers' materials decreased almost by half while number of fatalities and injuries decreased even to a larger extent. Most prominent was the reduction of fatalities and injuries in fires with cigarettes as the source of ignition: they decreased more than three-fold in Saskatchewan.

CONCLUSION: Canadian fire statistics do not allow estimating fire loss reduction as a result of the implemented RIP cigarette regulations for the whole country. Two Canadian provinces (British Columbia and Saskatchewan) experienced substantial reduction in fires ignited by manufactured cigarettes, and a corresponding reduction in the associated fire fatalities and injuries. In Alberta, only the number of smoking fire injuries has shown some decrease. No substantial changes were observed in Ontario, probably due to high level of cigarette smuggling.

KEYWORDS: Reduced Ignition Propensity (RIP) cigarettes; Canada; fire injuries; fire-safe cigarettes.

INTRODUCTION

Cigarettes and other combustible tobacco products are a leading cause of fire deaths and fire-related injuries throughout the world (Alpert, O'Connor, Spalletta, & Connolly, 2010). Since November 2010, the fire-safety requirements for Reduced Ignition Propensity (RIP) cigarettes, i.e. cigarettes that self-extinguish when not actively

smoked, are covered by a new European Standard, EN 16156 (European Committee for Standardization (CEN), 2010, November 18). Manufacturers were given 12 months to meet this standard and it was implemented since November 2011.

On October 1, 2005, Canada became the first country to implement a nationwide cigarette fire-safety

standard (Seidenberg, Rees, Alpert, O'Connor, & Connolly, 2011). Australia, South Africa and Finland have also recently implemented national RIP cigarette requirements. Since July 2011, all 50 US states have implemented fire-safe cigarette laws (Coalition for Fire Safe Cigarettes, 2011, August 26). WHO Study Group has recommended

that RIP cigarettes be mandatory in all WHO member countries (WHO Study Group, 2008).

However, some experts oppose RIP cigarette regulations. Hemant Goswami, a public health activist from India, asked the global scientific community to be more vigilant and alert before embracing the concepts like “Fire Safe Cigarettes.” He stated that “the analysis of the structural fire related fatalities in NY shows that there has been no reduction in the fire-related deaths as was initially claimed” (Goswami, 2007, Nov 03). Rebecca Brooks opposed the argument that fire-safe cigarettes (FSC) prevent fires. She wrote that “smoking-related fire deaths had been trending downward for many years, mainly because the smoking rate had also been falling” (Brooks, 2010, March 31). Frazier et al. (2011) examined the effect of reduced ignition propensity cigarettes on cigarette-ignited and smoking material fire incidence with three case studies: in Canadian provinces Alberta and Ontario, and New York State. The reported results of all case studies indicated that the implementation of reduced ignition propensity cigarettes did not result in the predicted decrease of fires and deaths related to 'smoking material'. However, recent research (Yau & Marshall, 2014) indicated that the implementation of FSC legislation was associated with a 19% reduction in overall residential fire mortality rates in the United States.

Before the nationwide cigarette ignition propensity standard was adopted in Canada, the Health Canada published the report called “Economic Evaluation of Health Canada's Regulatory Proposal for Reducing Fire Risks from Cigarettes” (Tobacco Control Programme, 2005). It assumed a 34 to

68 percent reduction in fires ignited by manufactured cigarettes, and a corresponding reduction in the associated fire losses. This was considered the best estimate of fire and fire loss reduction as a result of the proposed regulations. Later it was misinterpreted by the media, stating that “in Canada, where cigarettes are by law required to put themselves out if nobody is drawing on them, the number of fires caused by cigarettes has been reduced by two-thirds” (Woolf, 2006, Dec 17).

The aim of the paper is to explore the impact of the RIP cigarette regulations on the number of cigarette-related fires, fire injuries and fatalities in Canada, a country, which has the longest national experience of such regulations.

METHODS

The study is based on the secondary analysis of official fire statistics in Canada. Online search on such terms as RIP cigarette, FSC (means both “Fire Safe Cigarettes” and “Fire Standards Compliant”), fire statistics and others relevant terms on Canadian and other sites, with special attention to official fire authorities' sites in Canadian provinces.

Fire statistics data, where smoking was mentioned as a source of ignition, were grouped into two time periods: data for 2000–2004 were considered as pre-implementation and data for 2005–2009 were considered as post-implementation. Thus the study design is quasi-experimental pre-post measurement without control, based on short time series. While the RIP cigarettes were introduced only in October 2005, we consider 2005 as intervention year as the media campaign before the introduction could

also have had impact on smokers' behavior. Comparison of pre- and post-intervention data was used to estimate RIP cigarette regulations effect.

The main challenge for evaluating the impact of FSC regulations in Canada is the lack of national organization or agency with the mandate and the resources to collect, analyze, and disseminate complete fire service statistics (IAFF Canada, 2011). In the past, there was an attempt to compile national fire loss statistics through a group called the Council of Canadian Fire Marshals and Fire Commissioners, or CCFM&FC. However, in 2011 the latest information available from the CCFM&FC was dated 2002.

Sean Tracey, Canadian regional manager of NFPA International, commented: “One of the greatest hurdles in effecting change in fire safety in Canada is the lack of reliable statistics. Anyone who attempts to use the available statistics is dealing with little information, out-of-date data and data of little value in comparing performance among the provinces.” (“The Challenge of Accumulating Fire Statistics in Canada,” 2010, May 27).

We have found relevant fire statistics data only in four Canadian provinces: Alberta, British Columbia, Ontario and Saskatchewan. The Fire Commissioner's reports were available online and some of them had data on numbers of cigarette or smoking-related fires, injuries and fatalities. Each province had its peculiarities in reporting fire statistics and reporting was changing during the years under consideration, for some years data were not available. As the RIP regulations is expected to affect only some kinds of fires, we tried to find indicators of ciga-

Table 1. Smoking-related fires in Alberta

	2000	2003	2004	Average 2000, 2003, 2004	2005	2006	2007	2008	2009	Average 2005-2008
Number of fires by source of ignition: Smoker's Material and 'Open' Flames	1602	1391	1157	1383	1312	1168	1173	1279	942	1233
Causes of Fire Injuries: Cigarette/smoker's material igniting upholstered furniture, bedding, etc.		32	26	29	27	28	22	24	23	25
Number of home fires by smoking	179	176	182	179	180	179	178	197	203	187
Number of home fires injuries by smoking	22	23	24	23	18	18	21	15	27	20
Number of home fires deaths by smoking	6	3	4	4.3	4	3	5	6	3	4.2

rette-related fires, while in some cases we had to use broader indicators, which comprise cigarette-related fires and other kinds of fires.

RESULTS

Alberta

Alberta Fire Commissioner's statistical reports were available for 2000 ("Alberta Fire Statistics, 1986–2000," 2011) and 2003–2009 (Alberta Fire Commissioner, 2011, Nov. 10). Data on smoking-related fires from these reports are presented in Table 1.

Comparison of average data for 2000, 2003 and 2004 with average data for 2005–2009 reveals reduction of number of fires by source of ignition "Smoker's Material and open flames" by 12%, while number of home smoking fires did not change much. Numbers of home smoking fire deaths were also rather stable, while small (14%) reduction is observed for fire injuries.

British Columbia

Annual Statistical Reports of the Office of the Fire Commissioner in

British Columbia (Office of the Fire Commissioner, British Columbia, 2009) have comparable data for 2001–2006 (Table 2). Report for 2007–2008 only informs that cigarettes were causes of 475 fires in 2007 and 277 fires in 2008.

There was no reduction in number of fires by source of ignition "Smoker's Material and Open Flames", while the percentage of smoking-related fires within all fires decreased by 15%. Reductions of injuries and deaths were quite substantial: from 78 to 46 (by 41%) and from 7.8 to 4 (by 49%) respec-

Table 2. Smoking related fires in British Columbia. Source of ignition: Smoker's Material and 'Open' Flames

	2001	2002	2003	2004	Average 2001-2004	2005	2006	Average 2005-2006
Number of fires	1238	1344	1370	1447	1350	1239	1468	1353
% of all fires		20	22	19	20.3	17	18	17.7
Injuries	109	91	61	49	78	45	47	46
Deaths	13	7	7	4	7.8	5	3	4

Table 3. Smoking related fires in Saskatchewan

	2002	2003	2004	Average 2002-2004	2005	2006	2007	2008	Average 2005-2008
Fires by act or omission: smoker's materials									
Fatalities	8	3	8	6.3	0	0	4	6	2.5
Injuries	7	9	5	7	2	1	3	8	3.5
Number	107	79	57	81	54	44	39		46
Fire loss by source of ignition: cigarettes									
Fatalities	7	2	7	5.3	0	1	5	1	1.8
Injuries	9	11	5	8.3	2	3	3		2.7
Number	120	69	50	80	42	40	54		45
Fire loss by source of ignition: smoker's material – cannot be determined									
Fatalities	0	1	2	1.0	0	0	0	5	1.25
Injuries	0	3	2	1.7	4	1	0		1.7
Number	2	135	140	92	143	31	17		64
Fire loss by source of ignition: smoker's materials (cigar, lighter, match, ashtray, open flame)									
Fatalities	1	0	0		0	0	0	1	
Injuries	0	0	2	0.7	0	5	0		1.7
Number	14	20	32	22	30	37	20		29

tively. Number of fires caused by cigarettes only declined in 2007–2008.

Ontario

According to O'Connor et al. (2010), over the period of 2004–2008, residential fires caused by smoking materials in Ontario have been relatively stable with some evidence of decline (a decline of 3.4% between 2006 and 2008); however, referenced report is no more available.

As to mid-2011, the Office of the Fire Marshal in Ontario reports only summary data on fire statistics (Office of the Fire Marshal, Ontario, 2011). For smoking-related fires, it compares two periods: 2000–2004 and 2005–2009. Average number of structure fires per year with ignition source including cigarettes, cigars, pipes, etc. slightly decreased: from 576 to 556, as well as civilian injuries in such fires: from 48 to 46. However, the average number of smoking-related fire fatalities in residential preventable fires increased from 11 per

year in 2000–2004 to 16 in 2005–2009. Within 2005–2009 there were no clear trends in number of lit smoking materials fires, injuries and deaths.

In a later report (Office of the Fire Marshal, Ontario, 2012), average numbers of fire fatalities by ignition source over 5 year period from 2003 to 2007 with the 5 year period from 2008 to 2012 were compared. It shows that structure fires ignited by cigarettes have declined by 5%: in 2003–2007, 565 fires occurred per year; in 2008–2012 – 539 fires per year. The number of fatalities in fires started by lit smoking between 2008 and 2012 was rather stable, in a range of 12 to 22 fatalities.

Saskatchewan

The Office of the Saskatchewan Fire Commissioner (Province of Saskatchewan, Ministry of Corrections, 2011) provided data for 2002–2008 (Table 3).

Fire statistics from Saskatchewan was the most comprehensive. Fires

caused by smoker's materials decreased almost twice in 2005–2007 in comparison with numbers of such fires in 2002–2004. Number of fatalities and injuries decreased even more. Most prominent was the reduction of fatalities and injuries in fires where the source of ignition was just cigarettes: they decreased more than three-fold. This result is highlighted by the fact that in fires where source of ignition was smoker's materials other than cigarettes (cigar, lighter, match, ashtray, open flame) the number of fires and injuries even increased in 2005–2007. There was no reduction in fatalities and injuries in fires where the source of ignition was undetermined smoker's material, while the exact kind of the material could not be determined, while number of such fires decreased by 30%.

DISCUSSION

Currently it is not possible to estimate fire loss reduction as a result of the implemented regulations for the whole Canada. No reduction of

fires caused by smoking materials was observed in Ontario. In Alberta, only the number of smoking fire injuries has shown some decline. In British Columbia, reductions of such injuries and deaths were quite substantial: by 41% and 49% respectively. In Saskatchewan, number of such fatalities and injuries decreased more than twice.

It is worth noting that the study of Frazier et al. (2011), which was commissioned by Philip Morris International, used data only from two Canadian provinces (Ontario and Alberta) where almost no reduction of fire losses was registered. However, the authors ignored data from two other Canadian provinces, which also have robust fire incident collection systems before and after the implementation of reduced ignition propensity legislation (British Columbia and Saskatchewan), and where large reductions in smoking-related fire injuries and deaths were observed.

The differences between provinces can be partly caused by smuggling of cigarettes, which are not RIP. According to estimates (Physicians for a Smoke-Free Canada, 2010), 33% of cigarettes smoked in Ontario in 2007 were smuggled, while in Western Canada only 4% of consumed cigarettes were smuggled.

The report commissioned by Philip Morris International (Frazier et al., 2011), based on data from Ontario and Alberta claimed that “*while the evidence to support the effectiveness of the implementation of RIP cigarettes in reducing cigarette fires is not seen in the three case studies, there are other, proven and effective measures that do reduce fires and fire losses*”. In the past, tobacco companies, facing growing pressure to produce fire-safe cigarettes, mounted a surreptitious

campaign for flame retardant furniture, rather than safe cigarettes, as the best way to reduce house fires. The documents show that cigarette lobbyists secretly organized the National Association of State Fire Marshals and then guided its agenda so that it pushed for flame retardants in furniture (Callahan & Roe, 2012, May 8). However, the experience of British Columbia and Saskatchewan revealed that introduction of RIP cigarettes was accompanied with reduction of cigarette fires. Research conducted in Massachusetts (Alpert, Christiani, Orav, Dockery, & Connolly, 2014) showed that Fire Safe Cigarette Law has decreased the likelihood of cigarette-caused residential fires, particularly in scenarios for which the ignition propensity standard was developed.

The study bears certain limitations. First, it is based on limited data with imperfect registration. Not all the provinces register fires with clear distinction of ignition sources. It should be taken into account that new regulations reduced ignition propensity for cigarettes only, while most fire statistics combine data for all kinds of smoker’s materials, often including “open flame”. In Alberta and British Columbia, cigarette fires were a minor part of fires by source of ignition “smoker’s material and open flames” (see Tables 1 and 2). In 2005–2007, cigarettes were the identified source of ignition of 33% Saskatchewan smoking fires, while other smoker’s materials (cigar, lighter, match, ashtray, open flame) caused 21% of such fires. For other 46% of fires the exact kind of the smoker’s material could not be determined. When comparing two kinds of smoking fires (cigarette and non-cigarette), it occurred that after RIP regulations were imple-

mented, number of cigarette fires decreased almost twice and cigarette fires fatalities and injuries decreased three-fold. At the same time, number of non-cigarette smoking-related fires and injuries even increased in 2005–2007. Statistics for fires where the source of ignition was a non-determined smoker’s material (which could be cigarettes or not) are just in the middle. Mixing-up the sources of ignition leads to possible type 2 errors.

Second, being a longitudinal study without a comparison group, it can bear internal validity problems due to history and interaction. As was stated by Rebecca Brooks (Brooks, 2010, March 31) cigarette-related fires and associated fatalities might decline partly due to other causes, and the existing data does not allow teasing out these different influences.

Rebecca Brooks was also arguing that smoking-related fire deaths have been dropping over the years because smoking prevalence has been falling as well. However, the Canadian Tobacco Use Monitoring Survey does show that smoking prevalence in Saskatchewan has remained relatively stable over the years (21% in 2002 and 22% in 2009). Yet, the reduction of fatalities and injuries in fires where source of ignition were just cigarettes decreased by more than three-fold. This would essentially refute the argument made by Brooks.

Nevertheless, although the present study does not prove the causal role of RIP regulation in fire reduction, it also does not extinguish that. Thus it provides evidence to recommend RIP cigarettes as a potential means to reduce human and economic losses.

Another practical implication is related to observation that when fire statistics distinguish fires caused by cigarettes from the fires caused by other smoker's materials, the reduction becomes more prominent. Countries and other jurisdictions which are implementing RIP cigarette regulations should require detailed statistics from fire authorities (separating cigarette-induced fires) to properly estimate impact of the regulations.

CONCLUSIONS

Canadian fire statistics is inconsistent and it is not possible to estimate fire loss reduction as a result of the implemented RIP cigarette regulations for the whole country.

Two Canadian provinces (British Columbia and Saskatchewan) experienced substantial reduction in fires ignited by manufactured cigarettes, and a corresponding reduction in the associated fire fatalities and injuries. No substantial changes were observed in two other Canadian provinces (Ontario and Alberta), partly due to high level of cigarette smuggling in Ontario.

ABOUT THE AUTHOR

Konstantin S Krasovsky is the Head of Tobacco Control Unit, Ukrainian Institute for strategic Research of the Ministry of Health of Ukraine, Kiev, Ukraine; ORCID 0000-0003-4167-0150
Email: krasovskyk@gmail.com .

This paper was received: June 11, 2014; accepted: July 5, 2014; published: August 30, 2015.

REFERENCES

- Alberta Fire Commissioner. (2011, Nov. 10). Alberta Fire Commissioner's Annual Statistical Reports. from http://aema.alberta.ca/se_statistics_reports.cfm
- Alberta Fire Statistics. 1986–2000. (2011). from <http://www.ccfmfc.ca/stats/Province/Alberta/2001firetables.pdf>
- Alpert, H. R., Christiani, D. C., Orav, E. J., Dockery, D. W., & Connolly, G. N. (2014). Effectiveness of the cigarette ignition propensity standard in preventing unintentional residential fires in Massachusetts. *Am J Public Health*, 104(4), e56-61. doi: 10.2105/ajph.2013.301837
- Alpert, H. R., O'Connor, R. J., Spalletta, R., & Connolly, G. N. (2010). Recent Advances in Cigarette Ignition Propensity Research and Development. *Fire Technol*, 46(2), 275–289. doi: 10.1007/s10694-008-0070-8
- Brooks, R. (2010, March 31). Fire Safe Cigarette Laws: More Harm than Good. from http://www.huffingtonpost.com/rebecca-brooks/fire-safe-cigarette-laws_b_519867.html
- Callahan, P., & Roe, S. (2012, May 8). Big Tobacco wins fire marshals as allies in flame retardant push. *Chicago Tribune*. Retrieved from <http://www.chicagotribune.com/news/watchdog/flames/ct-met-flames-tobacco-20120508,0,6090419,full.story>
- Canadian Tobacco Use Monitoring Survey (CTUMS). Smoking prevalence 1999–2012, http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/research-recherche/stat/_ctums-esutc_prevalence/prevalence-eng.php
- The Challenge of Accumulating Fire Statistics in Canada. (2010, May 27). from <http://www.fireandlifesafety.com/articles/firestatistics01.html>
- Coalition for Fire Safe Cigarettes. (2011, August 26). States that have passed fire-safe cigarette laws. from <http://www.firesafecigarettes.org/categoryList.asp?categoryID=77&URL=Legislative%20updates/Adoptions>
- European Committee for Standardization (CEN). (2010, November 18). New standard for self-extinguishing cigarettes. from <http://www.cen.eu/cen/News/PressReleases/Pages/RIPcigarettes.aspx>
- Frazier, P., Schaenman, P., & Jones, E. (2011). Initial Evaluation of the Effectiveness of Reduced Ignition Propensity Cigarettes in Reducing Cigarette-Ignited Fires: Case Studies of the North American Experience. from http://203.167.35.161/html/life/yobou_contents/info/pdf/tabaco/kentou01/sanko04.pdf
- Goswami, H. (2007, Nov 03). Science and Public Health duped on RIP cigarettes. from <http://www.prlog.org/10036553-science-and-public-health-duped-on-r-ip-cigarettes-hemant-goswami.html>
- IAFF Canada. (2011). 2011 Legislative Fact Sheet. The Need to Establish a National Office for Fire Service Statistics. from http://www.iaff.org/canada/factsheets/IAFF_2011_Stats_Office_Fact_Sheet.pdf
- O'Connor, R. J., Fix, B. V., Hammond, D., Giovino, G. A., Hyland, A., Fong, G. T., & Cummings, K. M. (2010). The impact of reduced ignition propensity cigarette regulation on smoking behaviour in a cohort of Ontario smokers. *Inj Prev*, 16(6), 420–422. doi: 10.1136/ip.2009.025114
- Office of the Fire Commissioner. British Columbia. (2009). Annual Statistical Reports. from <http://www.embc.gov.bc.ca/ofc/fire-reporting/stats/index.htm>
- Office of the Fire Marshal. Ontario. (2011). Fire statistics. from <http://www.ofm.gov.on.ca/en/Media%20Relations%20and%20Resources/Statistics/default.asp>
- Office of the Fire Marshal. Ontario. (2012). Fire Loss in Ontario 2008–2012. Causes, Trends and Issues.
- Physicians for a Smoke-Free Canada. (2010). Estimating the volume of contraband sales of tobacco in Canada. from http://www.smoke-free.ca/pdf_1/2010/Estimating%20the%20volume%20of%20Contraband%20Sales%20of%20Tobacco%20in%20Canada-2009.pdf
- Province of Saskatchewan. Ministry of Corrections. (2011). Public safety

- and Policing. Office of the Fire Commissioner. Annual Reports. from <http://www.cpsp.gov.sk.ca/Annual-Reports>
- Seidenberg, A. B., Rees, V. W., Alpert, H. R., O'Connor, R. J., & Connolly, G. N. (2011). Ignition strength of 25 international cigarette brands. *Tob Control*, 20(1), 77–80. doi: 10.1136/tc.2010.036392
- Tobacco Control Programme. (2005). Economic evaluation of health Canada's regulatory proposal for reducing fire risks from cigarettes. from <http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/evaluation-risks-risques/index-eng.php>
- WHO Study Group. (2008). Second Report of a WHO Study Group *The Scientific Basis of Tobacco Product Regulation. WHO Technical Report Series 951*: World Health Organization.
- Woolf, M. (2006, Dec 17). The cigarette that puts itself out. *The Independent*. Retrieved from <http://www.independent.co.uk/news/uk/politics/the-cigarette-that-puts-itself-out-428839.html>
- Yau, R. K., & Marshall, S. W. (2014). Association between fire-safe cigarette legislation and residential fire deaths in the United States. *Injury epidemiology*, 1, e10–e10.