Analytical Approaches to Public Fire Protection
Term Paper
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Topic: Will a fire safe cigarette have a significant impact on fire deaths and fire losses?

The study of fire trends, issues, and statistics can be seen as an essential process in determining the fire related risks within any city, province, state, or nation. Upon discovering specific fire hazards, the fire prevention and protection community can then construct and implement preventative measures leading toward drastically decreasing the impact of that fires risks, and in doing so ameliorate its associated losses, deaths, and injuries. Such is evident within the irresponsible use of cigarettes, which has been labeled "the leading cause of residential fire-related fatalities and loss in Canada each year. The Canadian Association of Fire Chiefs reported for the period 1995-1999 that at least 14,030 fires were started by smokers' materials. These fires killed 356 people, injured 1,615 and cost more than $200 million in property damage."[1] In response to the staggering negative statistics of fire losses attributed to cigarette caused fires, fire departments and governmental agencies such as Health Canada began to carry out preventative measures in order to decrease and abolish these conditions in the form of "stringent standards for fire-resistive mattresses and upholstered furniture, increased public education, and regulating ignition sources such as marches and lighters."[2] "Despite these efforts, fires started by smoker's materials continued to exact a significant toll on the Canadian"[3] and American society, and eventually led to new laws and a relatively fire safe cigarette.

[1] Health Canada (2005).*First Nation to Reduce the Risk of Fire Cigarettes.* Retrieved March 20, 2008 from: http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2005/2005_61_e.html

[2] Coalition for Fire Safe Cigarettes (2006). *Cigarette fire loss statistics.* March 20, 2008 from: http://www.pfa.org/firesafe/CFSC_facts.pdf

[3] Health Canada (2008). *Cigarette Ignition Propensity Regulations.* Retrieved March 20, 2008 from: http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/ignition-incend/index_e.html

In December 2003, the New York Secretary of State "Randy A. Daniels announced the adoption of a fire safety standard for cigarettes that will require all cigarettes sold in New York State to be low ignition strength, making them less likely to cause fires if left unattended. The cigarette fire safety standard became effective June 28, 2004"[4], and was the first law of its kind. These low ignition propensity cigarettes "are designed to extinguish more quickly if the person stops puffing on them, meaning they are less likely to smolder among bedclothes or furniture upholstery if a smoker falls asleep or accidentally drops one while it is lit."[5] In order to ensure that these cigarettes were meeting low ignition propensity standards, politicians put into action stringent testing procedures backed by legislation requiring "every manufacturer shall ensure that the cigarettes of every brand that it manufactures burn their full length no more than 25% of the time when tested on 10 layers of filter paper using ASTM International method."[6] In recognition of New York States model legislation, Canadian politicians jumped on board, and on "October 1, 2005, Canada became the first country to implement a nationwide cigarette fire-safety standard."[7] Following suit and mimicking the actions of both New York State and Canada, nine states enacted fire safe cigarette laws, fourteen

[4]Coalition for Fire Safe Cigarettes (2006). *New York State Adopts First Fire Safety Standard*. Retrieved March 20, 2008 from: http://www.firesafecigarettes.org/itemDetail.asp?categoryID=78&itemID=1030&URL=Legislative%20updates/Adoptions/New%20York%20State

[5] CBC News (2004). *Fire Safe Cigarettes Finally On the Way*. Retrieved March 20, 2008 from: http://www.cbc.ca/canada/story/2004/04/02/firesafe_cigarettes040402.html

[6]Canadian Council for Tobacco Control (2005). *Cigarette Ignition Propensity Regulations*. Retrieved March 20, 2008 from:http://www.cctc.ca/cctc/EN/lawandtobacco/byregion/federal/cigarette%20ignition%20propensity%20regulations

[7]Coalition for Fire Safe Cigarettes (2005). *Canada is First Country to Require Fire-Safe Cigarettes.* Retrieved March 20, 2008 from: http://www.firesafecigarettes.org/itemDetail.asp?categoryID=81&itemID=1033&URL=Legislative%20updates/Adoptions/Canada%20the%20first%20nation%20to%20enact%20a%20fire-safe%20cigarette%20law

states passed fire cigarette laws and three states have passed fire cigarette laws during the past three years.

Subsequent to the enactment of the New York State law, requiring cigarette manufacturers to produce low propensity cigarettes, the television corporation ABC news published a report "Fire Safe Cigarette Law Yields Results". This report included the cigarette related fire deaths in New York from 2000 to 2003 prior to legislation, and the cigarette fire related deaths following the legislation in 2004. This study provided evidence concluding that the introduction and enforcement of low propensity cigarette laws within the state of New York resulted in a decline of cigarette fire related deaths. The following is a chart, which outlines the results of the ABC report.

Smoking Related Deaths in New York[8]

Fatalities in Smoking Related Fires	Year	Percentage difference in relation to 2004
43	2000	34%
44	2001	36%
38	2002	26%
30 (Incomplete data)	2003	18%
28	**2004**	**-**

As it is evident, the of year interest being 2004, in relation to prior years 2000-2002, excluding 2003 due to incomplete data, displays a dramatic decrease in cigarette fire related deaths. From the various percentage differences we are able to establish a mean percentage variance of 32 %[9], thus concluding that low propensity cigarettes can lead to an average of a 32% decrease in fatalities in smoking related fires. While this data

[8]ABC News (2006). *"Fire Safe" Cigarette Law Yields Results*. Retrieved March 20, 2008 from:http://firesafecigarettes.org/assets/files/nyresults.pdf

[9] Percentage differences (34+36+26/3) = mean of 32% difference

only displays the decreases specific to the State of New York, we are able to use this established mean and apply it within not only statistics relating to fatalities, but those associated with injuries, and dollar losses within both Canada and the United States.

As previously mentioned Canada mandated fire-safe cigarettes nationwide in October of 2005, using the New York state standard.[10] In comparison to New York State, Canadian statistics regarding any form of change concerning the cigarette related fire losses following its 2005 legislation is unavailable to the public. This inconvenience only leads to possible assumptions or projections that can be calculated, which reveal the possible effects of cigarette propensity regulations within Canadian fire statistics. Such can be achieved by using the New York effect (32 % cigarette fire related loss decrease) as a standard. Also, when applying the New York Effect (NYE) to Canadian fire statistics, we must consider a variety of possibilities and options due to the evident disparity of the two geographical regions. The following is a list of options or scenarios, which account for these possible differences, followed by their description and application leading to various possible impacts of fire safe cigarettes on cigarette related fire deaths, injuries, and losses within Canada:

- **Option One** - Application of NYE on Canadian cigarette fire loss statistics. This option assumes 100% fire safe cigarette effectiveness and results in a 32% decrease across the board.

[10] Coalition for Fire Safe Cigarettes (n.d.). *What is a Fire Safe Cigarette*. Retrieved March 20, 2008 from: http://www.firesafecigarettes.org/itemDetail.asp?categoryID=48&itemID=1190&URL=About%20fire-safe%20cigarettes/What%20is%20a%20fire-safe%20cigarette?

- **Option Two** - Utilizes the NYE, while factoring in use of illegal cigarettes in Canada. It has been determined that 22% of the cigarettes in Canadian circulation are illegal[11], compared to 11% in New York[12], all of which do not contain low ignition propensity and are not fire safe. Option two decreases the NYE effectiveness by 11% (22%-11%). Therefore, this option outlines Canadian cigarette fire loss statistics when faced a 28.48% decrease (32 – (32 x .11).

- **Option Three** - Combined use of NYE with 25% chance of faulty fire safe cigarette. This option includes chance of a cigarette burning its full length 25% percent of the time, which outlined by legislation is acceptable.[13] Option three decreases positive influence of the NYE by 25%, creating a decrease in Canadian fire loss statistics of 24% (32 – (32 x .25).

- **Option Four** - NYE combined with factoring in the laboratory analysis of cigarette ignition propensity. Since October 2005, Health Canada, has conducted laboratory analysis of cigarette ignition propensity, which display the cigarette manufacturers and brands adherence or non compliance to the propensity legislation.[14] From October 2005 to June 2007, these tests concluded that on

[11] Interviewee Funk, Ron. Employee of Rothmans, Benson and Hedges Inc. Personal Interview. March 19, 2008.

[12] Bloomberg (n.d.). *Governments Trying to Battle Illegal Tobacco Trade*. Retrieved March 20, 2008 from: http://www.bloomberg.com/apps/news?pid=20601101&sid=aj_diBAyv3vs&refer=japan

[13]Canadian Council for Tobacco Control (2005). *Cigarette Ignition Propensity Regulations*. Retrieved March 20, 2008 from: http://www.cctc.ca/cctc/EN/lawandtobacco/byregion/federal/cigarette%20ignition%20propensity%20regulations

[14] Health Canada (2007). *Laboratory Analysis of Cigarette Ignition Propensity*. Retrieved March 20, 2008 from: http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/legislation/reg/ignition-alllumage/analys_e.html

average, all cigarettes (brands and manufactures) tested burned to their full length exactly 21.25% of the time. Option four will take this into account and decrease the positive effects of the NYE by 21.25%, creating a decrease of 25.2% [32-(32 x .2125)] on Canadian fire loss statistics.

- **Option Five** - NYE combined with laboratory analysis of cigarette ignition propensity, using only the three of the major cigarette manufactures in Canada; Rothmans, Benson and Hedges Inc., Imperial Tobacco Ltd., and JTI-MacDonald Corp. Option five will yield the most plausible and applicable results because the overwhelming majority of Canadian smoke cigarettes manufactured by these companies. Through laboratory analysis conducted by Health Canada, it was determined that these three major companies cigarettes burned to their full length only 10.96% of the time[15]. Option five will take this into account as it will decrease the positive effect of the NYE by 10.96%, created a decrease in Canadian fire losses of 28.49% (32-(32 x .1096).

[15] Ibid.

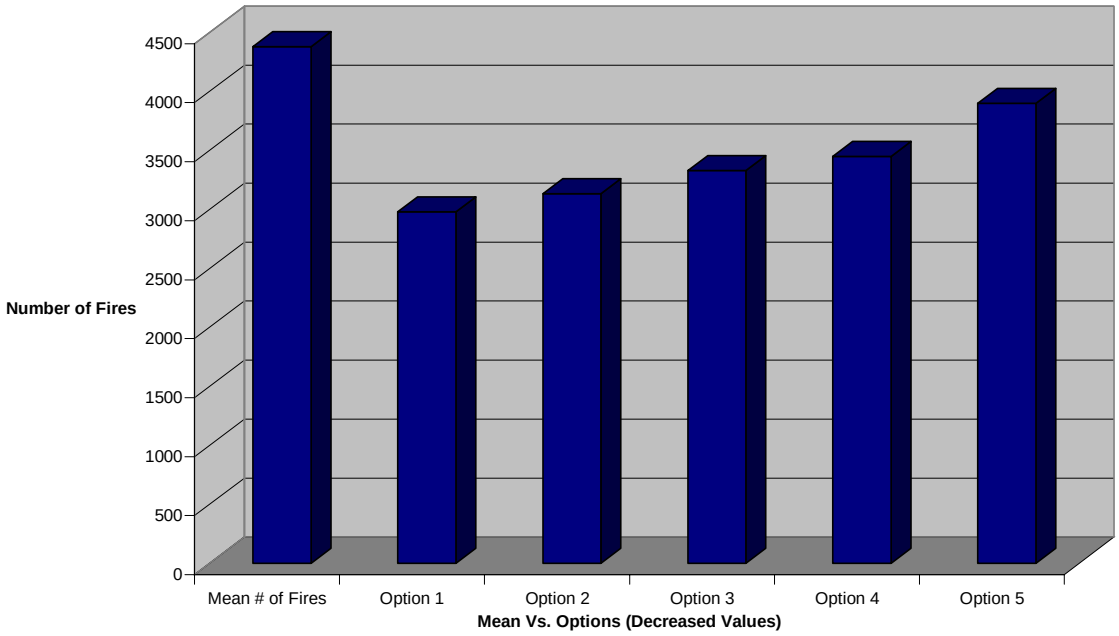
In order to conduct a meaningful study, Canadian cigarette related fire material statistics within residential occupancies were compiled and include the years 1995 through 1999. This specific study only includes statistics relating to cigarette related fires within residencies because of their overwhelming prevalence and devastating effects. Each option will be applied to a determined mean of fire related losses, upon which subsequent calculated estimates will be produced, resulting in the ultimate final conclusion of weather or not fire safe cigarettes can have a significant impact on fire deaths and fire losses within Canada. The following is a chart that outlines the compiled statistics regarding Canadian cigarette related residential fire statistics from 1995-1999:

Canadian Smoking Material Residential Fire Statistics[16]

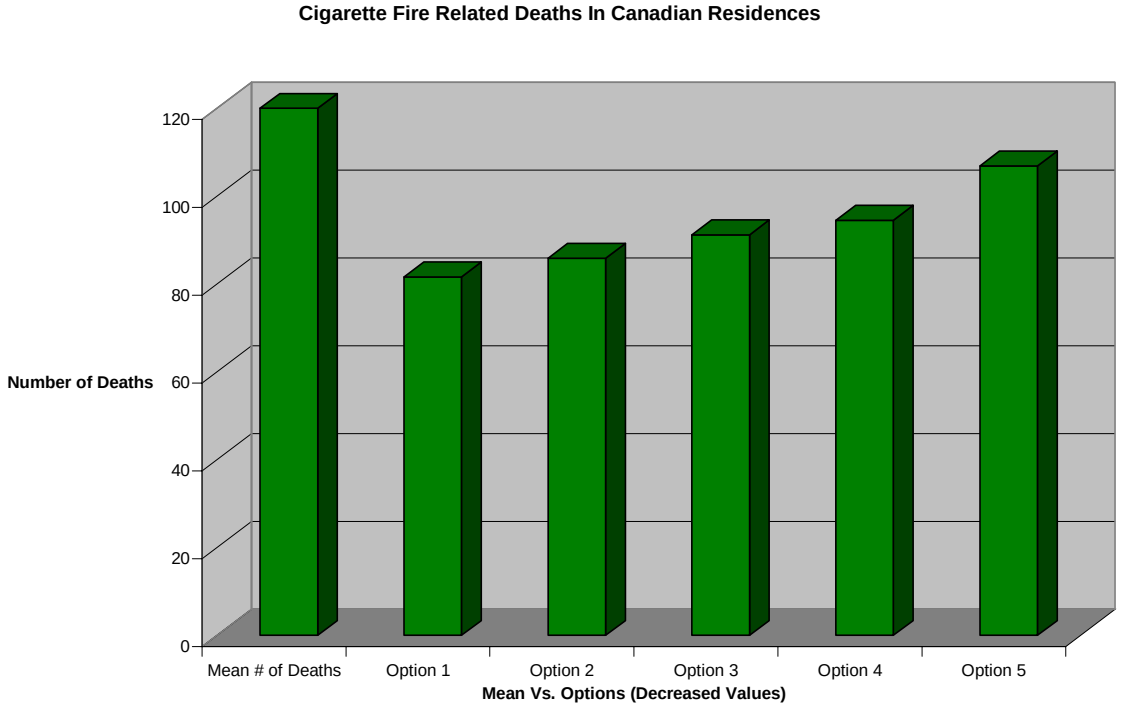
Year	Number of Fires	Deaths	Injuries	Dollar Loss in U.S. Millions
1995	5,000	100	380	$ 45
1996	4,700	140	350	$ 46
1997	4,300	130	320	$ 47
1998	4,100	110	260	$ 37
1999	3,800	120	260	$ 39
Mean Year (x)	**4,380**	**120**	**314**	**$ 43**

Note: This chart also includes year (x), which lists the mean (average) of fires, deaths, injuries, and dollar loss of years 1995-1999. Use of (x) and its respective statistics will be applied to each option to ensure consistency.

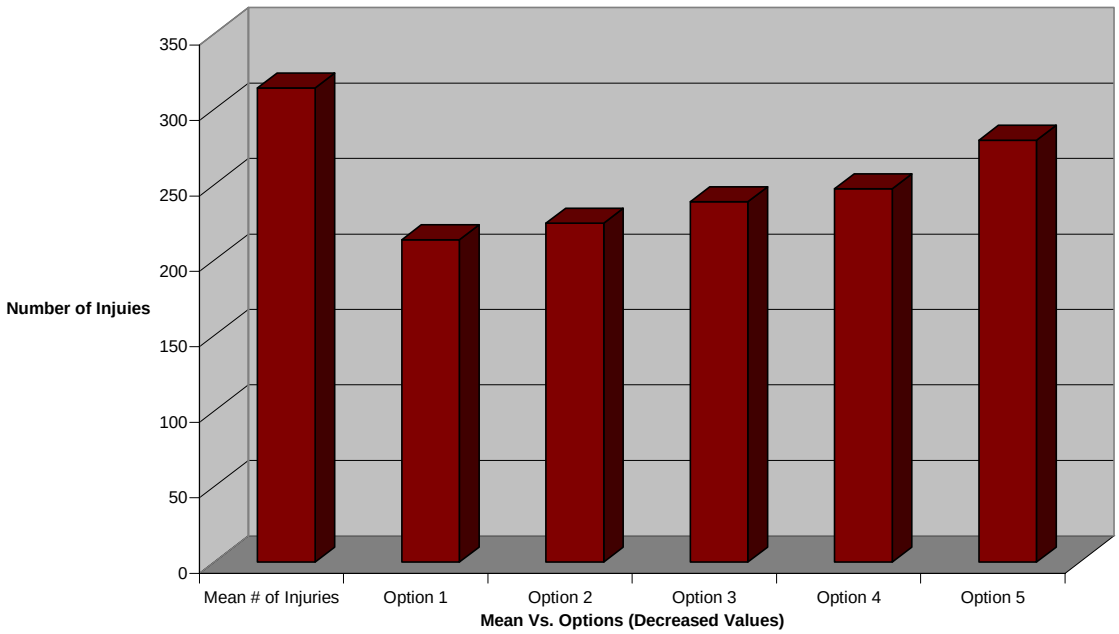
[16] NFPA (2004). *The smoking-material fire problem.* Retrieved March 20, 2008 from: http://www.nfpa.org/assets/files/MbrSecurePDF/OSSmoking.pdf



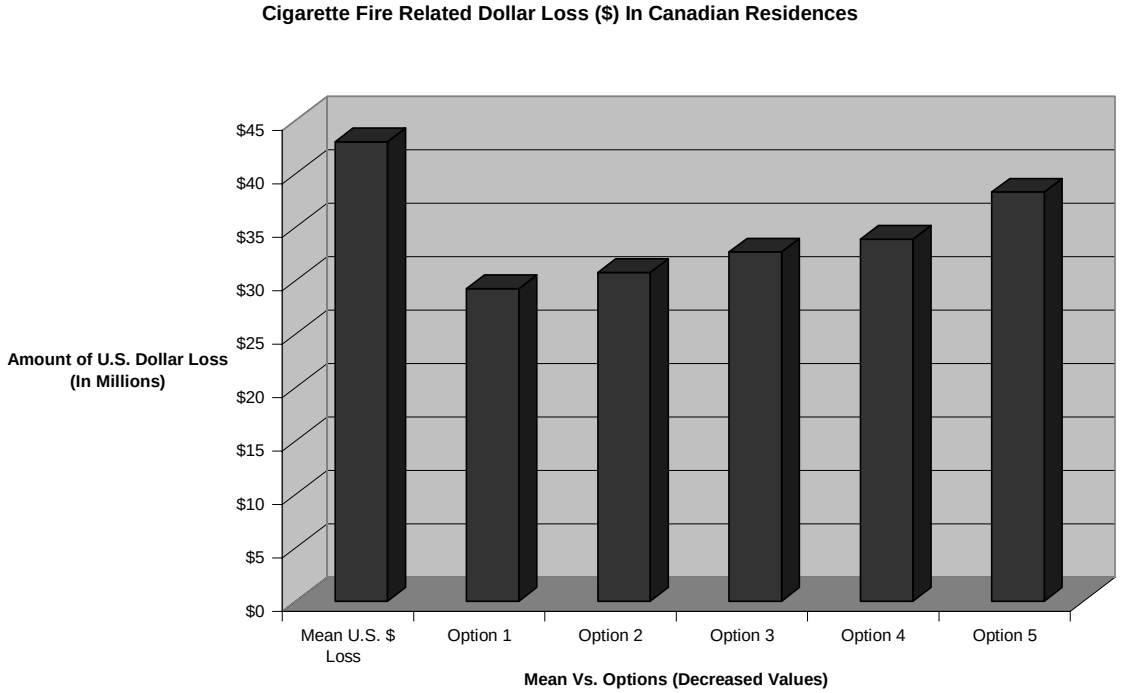
	Decreased # of fires
Option 1	1402
Option 2	1247
Option 3	1051
Option 4	931
Option 5	480



	Decreased # of deaths
Option 1	38
Option 2	34
Option 3	29
Option 4	26
Option 5	13



	Decreased # of injuries
Option 1	100
Option 2	89
Option 3	75
Option 4	67
Option 5	34



	Decrease $ Loss (U.S. Millions)
Option 1	$ 14
Option 2	$ 12
Option 3	$ 10
Option 4	$ 9
Option 5	$ 5

In attempting to maintain an accurate, conservative, and significant study, various options, which have been provided must be ruled out or accepted based upon their various probabilities. Although history tends to repeat itself, the likelihood of decreases in cigarette related fire statistics within Canada reciprocating those of the New York State are very improbable. This is attributed to variations in each geographical area's percentage of legal and illegal cigarette use, as well as the percentage discrepancies of smokers per area, therefore option one and two can be ruled out, while options three through five cannot. Option three factors in the real world examples of faulty fire safe cigarettes and the use of illegal contraband (which do no contain low ignition propensity), while options four and five include precise studies conducted by Health Canada. In determining the most likely series of options, we can also establish the most expected annual impact that the 2005 legislation of low ignition propensity cigarettes has had on Canadian fire losses. The following range (option 5 to option 3) outlines the most plausible annual decreases in cigarette related household fire losses in Canada, due the inception of fire safe cigarettes. All of which I believe has been analytically proven and can be considered to be very similar to present "real world" statistics:

- Decrease in amount of annual cigarette related fires in the range of 480-1051
- Decrease in amount of annual cigarette related fire deaths in the range of 13-29
- Decrease in amount of annual cigarette related fire injuries in the range of 34-75
- Decrease in amount of annual cigarette related monetary loses in the rage of $5-10 U.S. dollars

In conclusion, while the cigarette related fire statistics of New York following legislation does not necessarily represent that of Canada's, it allows us to use it as standard or base in combination with its specific characteristics. These characteristics can range from the percentage of smokers per population, to the percentage of illegal cigarettes in circulation, or even the most popular brand of cigarettes, which may or may not meet ignition propensity standards. In applying the benefits reaped by the State of New York and amalgamating them with the specific characteristics of Canadian society, we were able accurately, and numerically determine the impact of fire safe cigarettes on Canadian cigarette related fire deaths and losses using an analytical approach. In doing so, it has been determined that the creation and inception of laws resulting in a fire safe cigarette will have significant impacts on fire deaths and losses within the United States, Canada, and whoever acquires their use within the present or near future.

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Interviewee

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