

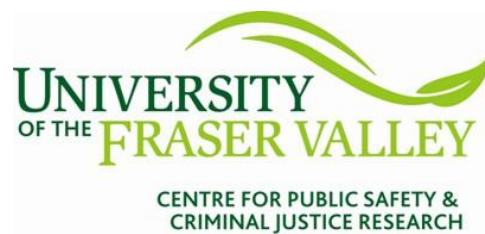
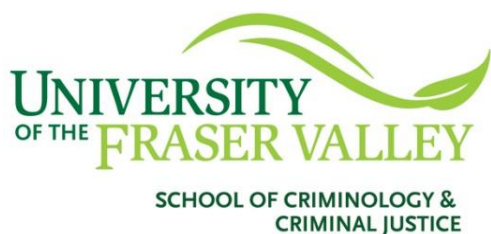
Journey of HomeSafe: Community Risk Reduction in Surrey

Analyses from Surrey Historical Data



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Executive Summary

The aim of this research is to provide a comprehensive picture of different initiatives within the City of Surrey, British Columbia's HomeSafe fire prevention program implemented over more than 12 years, and then conduct a longitudinal analysis of its effectiveness by measuring each initiative against several fire-related outcome measures.

The winner of a 2013 Community Health and Safety Program Excellence Award from the International City/Country Management Association, HomeSafe was based on international best practices, including a United Kingdom fire prevention program that achieved a 40% decline in fire-related fatalities over 15 years through interventions that included home visits by firefighters with a focus on fire safety information and working smoke alarms.

After researching this and other successful programs, Surrey Fire Service studied 20 years of fire incident data to identify insights to develop a similar home visitation program for the City of Surrey. The evidence showed that consistent non-random population characteristics represent a higher risk of fires and casualties; in Surrey, these included homes with occupants ages six and under or over 64, single-parent families, residents who move frequently, low income or unemployed residents, and those living in an older building. This data was overlaid with historic City of Surrey fire data to identify the city's most at-risk neighbourhoods, and then clustered into temporal cohorts.

Surrey Fire Service implemented HomeSafe in 2008 with a door-to-door campaign by on-duty firefighters who provided packages of fire prevention information (left at the door if no one was home) and offered to test and install free smoke alarms in the community's identified fire hotspots.

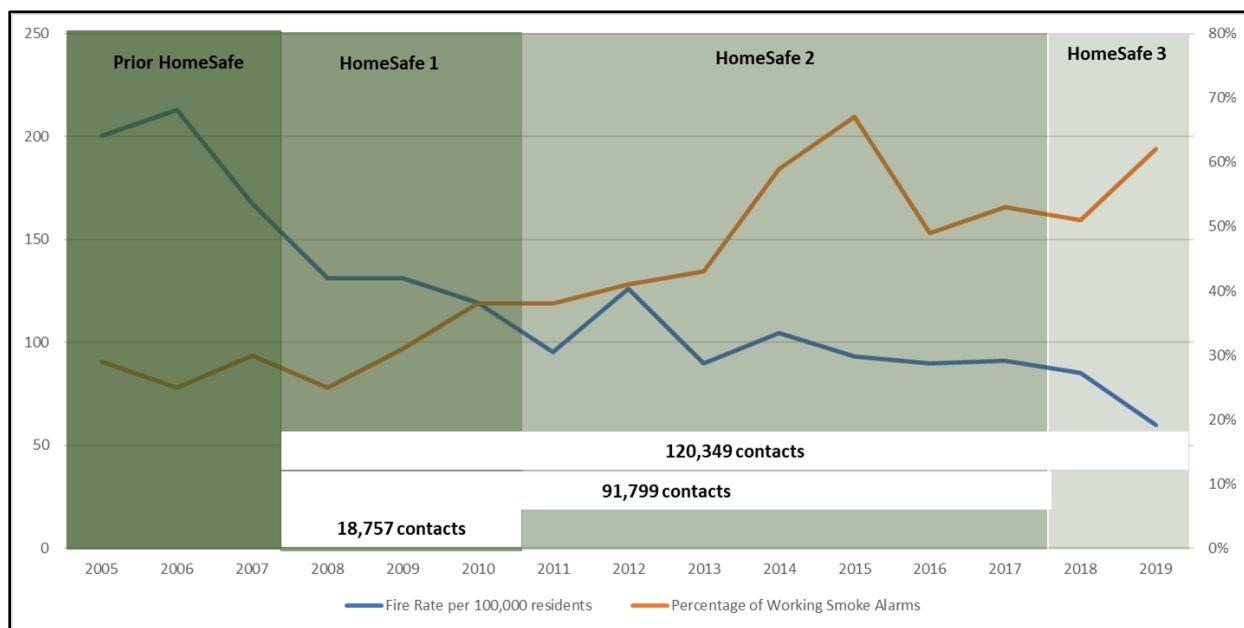
A year later, in 2009, HomeSafe was expanded to encourage residents to request fire inspections and/or smoke alarms installations. Additionally, at every residence where fire crews responded to an incident, they began to verify working smoke alarms and install alarms where needed.

Further initiatives were introduced over the years. In 2015, Surrey Crime Prevention volunteers began to provide residents with fire safety educational messages and the benefits of working smoke alarms. Door hangers were also distributed with information about fire safety and Surrey fire prevention contact details. As well, in 2017, Surrey Fire Service onboarded community engagement volunteers to conduct telemarketing and door-to-door HomeSafe visits to deliver fire safety messaging, including testing/installing smoke alarms, at homes pre-identified as a higher risk.

The number of contacts increased as new initiatives were implemented. In the first three years of the program, nearly 19,000 individuals were contacted. Within the next seven years, the number of contacts increased to nearly 92,000. In total, nearly 121,000 contacts were made over the first 12 years of the HomeSafe program.

The result of this extensive effort can be observed in various fire-related outcomes. For example, the City of Surrey has achieved a 70% reduction of fire rates over the 12 years HomeSafe has been in place, from an annual average of over 200 fires per 100,000 residential units before the program

began to 60 fires per 100,000 residential units afterwards. Simultaneously, the presence of functioning smoke alarms at residential structure fires has also significantly increased, from less than 30% before the program began to 60% in 2019.



The program's success underscores earlier research proving the importance of an evidence-based, systematic and ongoing commitment to bringing fire safety information to residences and to providing them with smoke alarm testing and installations.

The results also show that not every HomeSafe initiative gained a similar success rate. The three most effective initiatives in reducing the frequency of fires and increasing fire safety were the cohort visits by on-duty firefighters, HomeSafe inspections/smoke alarm installations by request, and fire crew alarm verification at incidents. However, the information package and door hanger initiatives, which lacked personal contact and dialogue, were less successful.

As the program has evolved, the same non-random population characteristics used to identify at-risk neighbourhoods in 2008 continue to represent higher risks of fires and casualties in Surrey. To continue to be successful over the long-term, the HomeSafe program must constantly locate geographic areas where residents fit those population characteristics. This will ensure the program targets areas where education is needed most.

The program should be supported with an integrated data repository of up-to-date population demographics, as well as city planning and development information, to allow for nearly real-time monitoring. Other improvements could include integrating resident data collection into the social interaction opportunities provided by HomeSafe initiatives.

Additionally, the program will need to adapt to new protocols related to the coronavirus pandemic of 2020, and address the challenge continuing to operate the program effectively while protecting the health and safety of crews, volunteers and residents.

Purpose of this Research

The research aims to evaluate the HomeSafe fire prevention program introduced in the City of Surrey in 2008. Many initiatives have been implemented within the course of the program. Evaluations have been conducted to assess their effectiveness in reducing the fire rates and fire-related deaths and injuries. This research provides a comprehensive and longitudinal perspective of what initiatives have been implemented since the inception of the program and how they affected the fire-related outcomes and increased fire safety for the residents of the City of Surrey.

Background

There has been much evidence showing the effectiveness of consistent community-based fire-safety campaigns and the presence of functioning smoke alarms in reducing residential fire rates and fire-related fatalities and casualties over time [1],[2],[3],[4].

A study by L. Garis and J. Clare [1] found it is possible to increase the likelihood that a functioning smoke alarm would be present in the event of a residential fire by ensuring a systematic and ongoing commitment to communicating fire safety information to residents and to supporting smoke alarm installations. The study also recommends ongoing monitoring and evaluation of all strategies implemented in the program. Analysis of a community's risk areas helps with prioritizing action, monitoring the coverage of functioning smoke alarms, and providing insight into the longitudinal effectiveness of these efforts.

On the basis of the above-mentioned study, other research conducted by L. Garis, J. Clare and S. Hugan [2] also provided evidence that a comprehensive, whole-government commitment to ensuring every dwelling in a community has a functioning smoke alarm can decrease fire rates and increase residential fire safety in a larger community. This was demonstrated by the B.C. Smoke Alarm Movement, which was launched in October 2012 and distributed and installed over 41,000 smoke alarms across B.C. over the three-year period. The movement included commitments from many agencies across the province including fire services, police, BC Ambulance, municipal and provincial government, and non-government agencies. Over half-a-million dollars has been contributed to support the movement. Over the three-year period, the annual number of residential structure fires in B.C. declined by 4%, while the percentage of fires with a present functioning smoke alarm increased by 12%. The death rate fell by 42% to 8.9 deaths per 1,000 residential structure fires in 2014.

By comparing the period prior to and after the movement, the following outcomes were achieved:

- Deaths per 100,000 citizens declined by 65%
- Deaths per 1,000 fires declined by 37%
- Present, functioning smoke alarms per 1,000 fires increased by 26%
- Fires without any smoke alarms decreased by 17%

Methodology

The research for this paper was conducted by reviewing various initiatives implemented through the City of Surrey's HomeSafe program and measuring their effectiveness by means of fire-related outcomes. For that purpose, several time periods have been created to align the initiatives with the fire-related outcomes:

1. Period 1: Period Prior to HomeSafe (before 2008)
2. Period 2: HomeSafe1 Period from 2008 to 2010
3. Period 3: HomeSafe2 Period from 2011 to 2017
4. Period 4: HomeSafe3 Period from 2018 to 2019

The following essential measures of fire-related outcomes have been analyzed to determine the effectiveness of each initiative implemented in each period:

- Number of fires at inspected properties within the HomeSafe program
- Number of residential fires in the whole City of Surrey
- Number of casualties (injuries and fatalities)
- Number of working smoke alarms at residential fires
- Percentage of fires contained to the object or room of origin, as proxies of fire severity levels

The comparisons of those measures at every period needed to be conducted in relation to the previous periods to determine the effectiveness of initiatives implemented.

Some inspected properties over time experienced disrepair, continued to deteriorate, and eventually became abandoned. In this stage, properties are no longer effective for further HomeSafe interventions. Abandoned properties present different challenges and require unique interventions which are outside the scope of this study. To prevent abandoned properties from affecting the analysis of the program's effectiveness, they are excluded in the evaluation.

Period 1: Prior to HomeSafe

The HomeSafe program in the City of Surrey was triggered by a similar success story in the United Kingdom, according to the study conducted by P. Schaenman [3]. Based on that study, the British fire service visited large numbers of high-risk households to perform fire safety inspections and risk reduction for the purpose of reducing fire casualties and ensuring they had a working smoke detector. This approach is thought by the British to be a major factor in the 40% drop in fire deaths in the United Kingdom over the last 15 years. The best practices of this prevention strategy fall into eight categories:

- Risk identification of high-risk households,
- Increased staffing/training of prevention programs,
- Home safety visits,
- National and local fire safety campaign,
- Implementation of school and youth programs,
- Programs for the high-risk elderly population,
- Development of safer consumer products, and
- Increasing the use of fire stations for community fire safety programs.

Prior to introducing HomeSafe, Surrey Fire Service had attempted to increase public awareness regarding fire risk, fire safety, and the importance of smoke alarms throughout the community. When the successes of the United Kingdom program became known to Surrey, its fire service recognized that opportunities existed to achieve similar results through a new risk-reduction program. For that purpose, Surrey Fire Service worked with the University of Fraser Valley to evaluate city residential fire data over 20 years (1988-2007) to identify trends that may affect the likelihood of fire-related casualties or the effect of working smoke alarm on fire outcomes [5].

The study of the fire data highlighted essential fire-related measures that were used as evidence to support the HomeSafe program implementation. Over the study period,

- Surrey's fire rate had steadily increased up to 80-88 fires per year per 100,000 people.
- 75.5% out of 4,758 fires were in homes, and 87.5% of the residential fires occurred in single-family dwellings.
- Of the ignition sources, 39.9% were cooking and 17% were match/open flame, while the percentage of smoker's materials as an ignition source increased from 9.8% in 2003 to 13.4% in 2007.
- 36% of residential fires did not have smoke alarms installed and 49.5% had a non-functioning smoke alarm. The trend had been declining to the point where less than 33% had a functioning smoke alarm.
- The severity of the fire was measured by the extent of spread throughout the residence. Nearly 50% of all fires had spread beyond the room of origin, while 40.5% were contained to the room of origin. Only a few cases were contained within the object of origin (15%).
- Approximately one in 10 residential fires (9.8%) resulted in an injury, while 0.8% resulted in a death. Of the 244 fires resulting in injury, a significantly higher percentage occurred in fires with no functioning smoke alarms (58.2%), and eight of 10 fires resulting in fatality (83.3%) had been found with no working smoke alarms.

Period 2: HomeSafe1 Covering 2008 - 2010

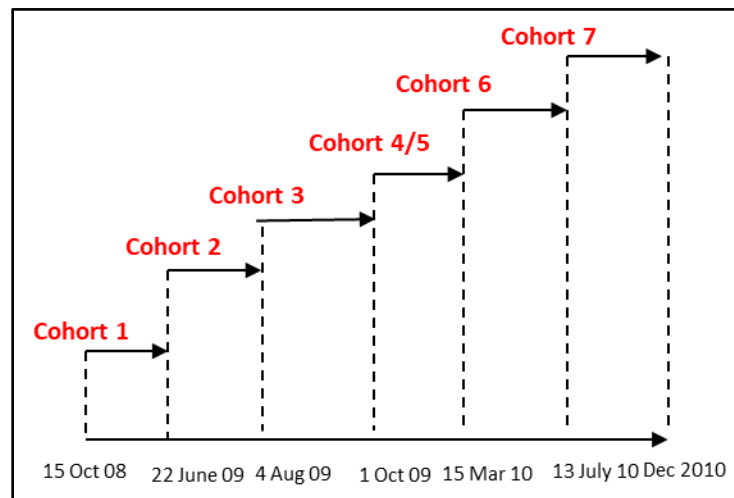
HomeSafe Program – Door-to-Door Visits by Crew

The study by McCormick [5] provided evidence of a growing rate of fires in the City of Surrey prior to the introduction of HomeSafe, and highlighted a need for more public fire safety education. As a result, a firefighter-delivered, door-to-door fire prevention education and smoke alarm examination/installation initiative called HomeSafe was conducted in 2008. The purpose of the initiative was to reduce the frequency and severity of residential structure fires in the city.

To implement the HomeSafe initiative effectively, Surrey Fire Service needed to generate a target area based on fire-related risk (see Appendix D). Geographic areas with a relatively higher propensity for fire incidents were identified and formed the basis of the broad catchment area targeted for HomeSafe visits. The approximate street addresses were then identified within these catchment areas and sampled to generate the specific distribution of targeted areas. Sets of addresses were clustered geographically to minimize the amount of unnecessary driving by the on-duty career firefighters.

A total of 18,473 residential homes were identified within the high-risk areas which were then visited across seven temporal delivery cohorts and across response zones of the 17 fire halls between the year of 2008 and 2010 (please see Figure 1 for the timeline and Figure 2 for the map).

Figure 1. Timeline and Distribution for Each Cohort (Cohort 1 to Cohort 7)



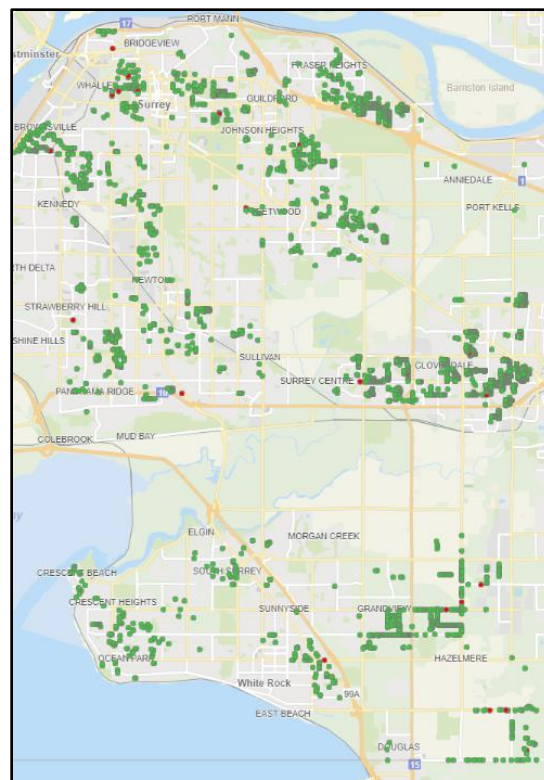
Each cohort was visited over a one-week period, during which time the regularly scheduled training for firefighters was suspended. Firefighters were advised that the goal was to visit homes in a direct and public attempt to prevent and reduce number of fires and injuries. Each allocated dwelling was visited once during that one-week period with five minutes allocated for delivering fire-safety information at front doors. The message was to emphasize that residential fires account for 75% of all fires in the city, provide fire-safety material and ask residents to review them. Residents were also asked when they had last tested their smoke alarms, and to test them if they had not done so recently. If the residents indicated they had no functioning smoke alarms, firefighters were instructed to offer a free install before completing their visit. Residents who accepted this offer needed to sign a waiver

form before the install. All residents were also informed that they could contact the Fire Prevention Branch of the Surrey Fire Services to arrange a complimentary follow-up home safety inspection. If no one was home, the firefighters were told to leave the package of information for residents to review upon their return.

The information package covered a range of prevention topics [6] – see Appendix A and B:

- Smoke alarms: purpose, types, locations, strategies, and maintenance
- Home fire escape plans: need and purpose, the realities of fire, what to do in case of fire, individuals and locations with the greatest fire risks
- Children and fire: curiosity about fire, parenting strategies to prevent fire-setting, safe use of fire, setting a good example
- Senior fire safety: fire survival and prevention strategies, home fire escape plans, what to do in case of fire
- Kitchen fire safety: prevention strategies, what to do in case of kitchen fire, ignition sources, how to respond to burns and burning clothing, and children in the kitchen
- A letter from the Fire Chief to outline the purpose of this initiative and emphasize the availability of free home safe inspection and free install of smoke alarms

Figure 2. Area Distribution of 7 Temporal Cohorts (Cohort 1 – Cohort 7)



HomeSafe Program – Inspection/Smoke Alarms Installations by Request

This HomeSafe initiative offered residents the opportunity to request free home safety inspections or smoke alarm installations. Requests could be submitted either by phone or online, after which fire

inspectors followed up to schedule an appointment. During a HomeSafe inspection, the fire inspectors would do a detailed inspection around the property of over 30 items, depending upon the relevancy of each item. When a resident requested only a smoke alarm installation without an inspection, the fire inspector would only install the alarm without any detailed inspection. Nearly 200 residential properties requested HomeSafe inspections and smoke alarm installations within the period of three years (2008-2010).

HomeSafe Program – Alarm Verifications by Crews at Incidents

Between 2009 and 2010, the fire crews also provided smoke alarm testing/validation at any residential properties at which they were responding to low-acuity medical or non-emergency incidents. For these two years, crews completed 91 smoke alarm verifications.

Cohort-related Outcomes

To measure the impact of this initiative, an evaluation using a randomized high-risk cluster control was designed [2]. The evaluation was intended to test the hypothesis that the door-to-door information campaign and smoke alarm initiative would result in fewer residential structure fires in the targeted areas. Furthermore, it needed to demonstrate qualitative differences between homes in a control group and those with the intervention.

For that purpose, it was necessary to identify a randomized control group that had equivalent fire risk but had not received any fire prevention information or smoke alarm inspection/installation home visits. The identification of the randomized control group worked as follows:

1. First, specific addresses with high propensity fires were identified.
2. Then, census information was used to identify areas with elevated likelihood of experiencing fires and fire-related fatalities based on individual characteristics such as age (under six years of age or over 64 years), single parent families, residents who moved frequently, unemployed residents, and building characteristics such as age (built pre-1991).
3. The results from those two assessments were then blended to create a new set of high-risk zones.
4. The addresses within these zones were sampled and any with previous HomeSafe visits were removed.
5. The remaining addresses were randomly sampled to construct high-risk control cohorts that should match the cohort size of the intervention group.

Two fire-related measures were identified to compare the outcome between the properties in the intervention and control groups: frequency of fires experienced pre- and post-visits, and severity of fires experienced pre- and post-visits.

Frequency of Fires Pre- and Post-intervention

The pre-visit period was defined as the two years prior to commencing the intervention for each cohort. The relevant structure fires for that time period were then searched to identify any incidents that had happened in any of the addresses in the intervention or control groups. The rate of fires per 1,000 dwellings per year were then computed for each group. The rates are displayed in Table 1.

Table 1. Fire rate per 1,000 dwellings per year across intervention and control groups [2]

Cohort	Addresses	Years Pre-	Years Post-	Intervention		Control	
				Fire Rate Pre-	Fire Rate Post-	Fire Rate Pre-	Fire Rate Post-
1	2,747	2	2.07	2.18	1.23	3.64	3.34
2	2,716	2.68	1.38	1.23	0	2.61	1.33
3	2,690	2.8	1.27	1.19	0.59	2.65	1.47
4	2,627	2.99	1.08	0.76	0.71	2.04	2.12
5	2,803	3.41	0.65	1.05	1.09	1.99	0
6	2,407	3.74	0.33	0.56	0	1	1.27
7	2,483	3.97	0.1	3.04	0	2.03	4.08
Total	18,473	3.09	0.98	1.43	0.52	2.28	1.95

An Analysis of Variance (ANOVA) was conducted on these rates and it determined a significant between-groups effect for fire rates in home visits, $F(1,12) = 8.31$, $p < .02$. Post-hoc analysis determined no significant difference in the fire rate of pre-visit between the intervention and control groups, $F(1,12) = 3.52$, $p > .05$. In contrast, the post-visit comparison did produce a significant result, $F(1,12) = 6.56$, $p < .03$.

A nearly 64% reduction in fire rates for the post-visit period is observed in the intervention group, while the control group only experienced a 14.6% reduction over the same period. With respect to the frequency of fires, properties in the intervention group experienced a residential structure fire every 97.3 days in the pre-visit period, compared to one fire every 193.1 days in the post-visit period, a nearly doubling of time between fires. By comparison, in the control groups, the frequency was one residential structure fire every 64.1 days in the pre-visit period and one fire every 68.8 days in the post-visit period.

Severity of Fires Pre- and Post-intervention

Table 2 below shows the analyses of the severity of fires pre- and post-visits for the intervention and control groups by looking at the percentage of fires confined to object of origin and its relationship with functioning smoke alarms.

In the intervention group, functioning smoke alarms were identified more often following the home visits, $X^2(1, N=94) = 5.57$, $p < .05$, whereas the control group did not experience a significant increase in functioning smoke alarms, $X^2(1, N=160) = 1.18$, $p > .05$. A similar pattern also happened in the intervention group, with a significant increase in the percentage of fires confined to object of origin post-visit, $X^2(1, N=94) = 6.61$, $p < .02$, but no change for the control group, $X^2(1, N=160) = 0.57$, $p > .05$.

Table 2. Severity and response to fires pre- and post-visits for intervention and control groups [2]

Home visit	Timing	Number of fires	Working Smoke Alarms	Confined to object of origin
Control	Pre-visit	123	21.1%	16.3%
	Post-visit	37	29.7%	21.6%
Intervention	Pre-visit	81	17.2%	11.0%
	Post-visit	13	46.2%	38.6%

Further Initiatives - Related Outcomes

Table 3 shows the various outcomes resulting from the HomeSafe initiatives involving inspections and smoke alarm installations by citizen request, and fire crew smoke alarm verifications while attending incidents. In the period when over 193 residents requested HomeSafe inspections and smoke alarm installations, a 91% decrease of annual fire rates is demonstrated, with 50% of those fires occurring within five years. However, none of those post-intervention fires occurred at properties with functioning smoke alarms and were confined to the object of origin. Furthermore, two out of 91 occupied properties (2.2%) at which smoke alarms were verified by fire crews at incidents had post-visit fires, with 100% having functioning smoke alarms and none of the fires contained to the object of origin.

Table 3. Fire rate per 1,000 occupied dwellings per year

Initiative	Addresses	Intervention (Fire Rate per 1,000 occupied properties per Year)		Rate Change	Pct of Fires			
		Pre-	Post-		Post 1 Yr	Post 3Yrs	Post 5 Yrs	Post 10 Yrs
HS Inspections/Smoke Alarm Installation by request	193	5.2	0.47	-91%	0.0%	0.0%	50.0%	100.0%
Smoke Alarm Verification at Incidents	91	0.0	1.8		0.0%	50.0%	100.0%	100.0%

Cohort	Addresses	Pct of Working Smoke Alarms		Rate Change
		Pre-	Post-	
HS Inspections/Smoke Alarm Installation by request	193	50%	0%	-100%
Smoke Alarm Verification at Incidents	91	N/A	100%	

Cohort	Addresses	Pct of Fires within Object of Origin		Rate Change
		Pre-	Post-	
HS Inspections/Smoke Alarm Installation by request	193	50%	0%	-100%
Smoke Alarm Verification at Incidents	91	N/A	0%	

City-wide Related Outcomes

Since the purpose of the HomeSafe program is to create fire-safety awareness not only to those residents in the targeted areas, but to all city residents, the effectiveness of the program should also be evaluated using city-wide fire-related outcome measures. This would include fire rates per 100,000 residential structures, casualty rates per 100,000 city population, percentage of functioning smoke alarms at residential fires, and percentage of fire extent within the room of origin.

Residential fire data reported to the British Columbia Office of Fire Commissioner (OFC) have been used to compare the measures between the periods of before and after the HomeSafe program. The data from the last three years before the onset of HomeSafe (2005, 2006, and 2007) have been selected to represent the measures prior to the HomeSafe program.

The residential properties are defined within the Property Classification (PC) category codes 3100 for row, garden, town housing, condominium; 3200 for apartment; 3400 for single detached; 3500 for duplex/triplex/fourplex; 3800 for mobile home/trailer park; and 3900 for residential with business/mercantile up to three stories.

Fire Rates

The city-wide fire rate in Surrey averaged 194 fires per 100,000 residential units per year for the three years prior to the HomeSafe program, compared to an average of 127 fires per 100,000 residential units per year for the three years after HomeSafe began. This is 34% reduction of fires within the first three years of the HomeSafe program implementation.

Casualty Rates

With respect to fire-related casualties that occurred in residential properties, the evidence shows an average of 8.6 casualties per 100,000 population prior to the HomeSafe program. Within the first three years of implementing the HomeSafe program, it resulted in an average of 3.6 casualties per 100,000 population – a 58% reduction of the casualty rate. While the number of fatalities decreased by one between the period before and after the HomeSafe program, the number of injuries decreased by 62 injuries in the three years after HomeSafe began.

Percentage of Working Smoke Alarms

Prior to the HomeSafe program, nearly 28 of 100 residential properties that experienced fires had working smoke alarms. In the first three years of HomeSafe program, there was an increase of 11% to 31 of 100 residential properties with working smoke alarms.

Percentage of Fire Extent within Room of Origin

Over 48% of residential fires were confined within the room of origin prior to HomeSafe program. This number increased by 12.5%, to nearly 54% of residential fires confined within the room of origin.

Period 3: HomeSafe2 Covering 2011 - 2017

HomeSafe Program – Door-to-Door Visit by Crews

Within the period of 2011 to 2015, another seven HomeSafe cohorts had been created to target over 21,000 high-risk residential areas with door-to-door crew visits (see Figure 3 for timeline). Surrey firefighters continued to provide the residents with specific fire prevention information as well as coaching them on the benefits of working smoke alarms.

Figure 3. Timeline and Distribution for Each Cohort (Cohort 8 to Cohort 14)

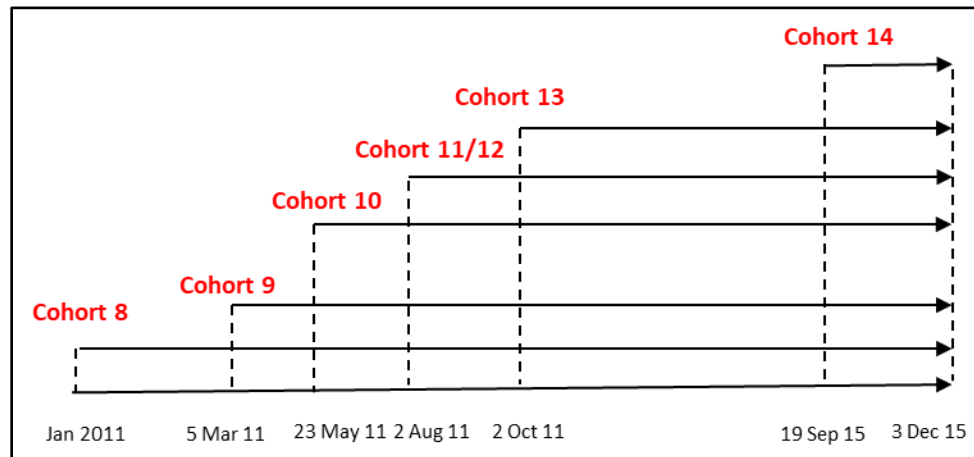
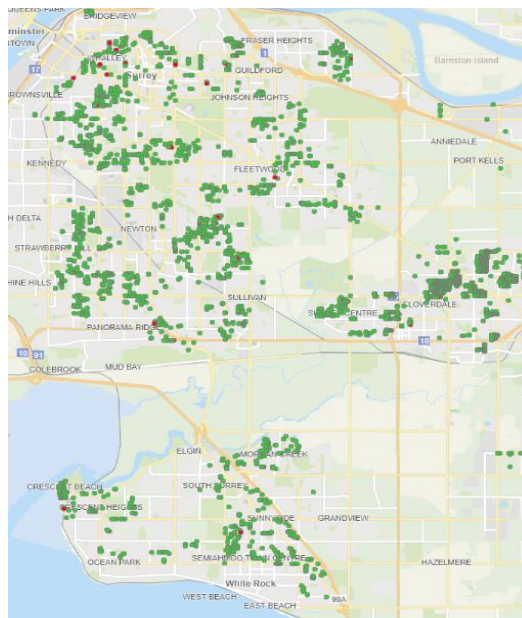


Figure 4. Area Distribution of Seven Temporal Cohorts (Cohort 8 – Cohort 14)



In September 2015, a multi-faceted treatment strategy was conducted in which Surrey firefighters as well as Surrey's crime prevention volunteers provided fire prevention material to the public at residences that warranted special attention. The plan of action had three corresponding treatments, and launched simultaneously with outcomes evaluated thereafter:

- Treatment 1 (Cohort 14): Surrey firefighters visited over 500 residential properties that had fires and provided them with specific fire prevention information. The crews also offered to perform an install or test existing smoke alarms.
- Treatment 2 (Packages): Over 4,600 residential properties in hall areas 1, 2, and 10 (within Cohort 13) that saw statistically significant increases in the rate of fire were visited by Surrey Crime Prevention volunteers and provided with educational messages related to fire safety and the benefits of working smoke alarms. Material was printed in various languages as appropriate.
- Treatment 3 (Door Hangers): The treatment involved the placement of door hangers at 8,740 residential properties. Spatial clustering and outlier analysis were used to determine which residential properties should get door hangers as an educational reference. Door hangers provided information to residents to install, test, and replace smoke alarms older than 10 years of age, and included Surrey Fire Prevention contact details along with information to a website to book a free alarm installation.

HomeSafe Program – Inspection/Smoke Alarms installations by Requests

Within the period of seven years (2011 – 2017), 885 residents requested HomeSafe inspections and 2,530 requested smoke alarms installations.

HomeSafe Program – Verifications by Crews at Incidents

In this period, in addition to door-to-door visits to promote the HomeSafe program, fire crews also provided smoke alarm testing/installation to any residential property at which they responded to an incident. Since 2016, a threshold of 4,800 smoke alarms verifications has been set each year as one of the key performance indicators for the department. Over the period of 2011 to 2017, there were 21,501 smoke alarms verifications at 15,814 residential properties, which resulted in over 1,674 smoke alarms installations. Over 63% of those verifications occurred in 2016 and 2017 after the initiative started, becoming one of the key success indicators for the department performance.

B.C. Smoke Alarm Movement

The B.C. Smoke Alarm Movement was launched in October 2012 shortly after the publication of the 2012 report [1] by the Justice Minister and Attorney General of B.C. at the time, the Honourable Shirley Bond, and the Minister of Children and Family Development, the Honourable Stephanie Cadieux. The movement distributed and installed over 41,000 smoke alarms across B.C. with a focus on the most vulnerable members of the community. Sixty fire departments in B.C. were engaged as well as commitments from interagency partnerships with provincial and local governments including Royal Canadian Mounted Police (RCMP), BC Ambulance, BC Hydro, United Way, the BC Real Estate Association, Aboriginal Affairs and Northern Development, the Red Cross, and local health services. In 2014, targeted home visits were conducted to test smoke alarms in senior residential living with mobility limitations and other chronic health issues, and over 20,000 smoke alarms were distributed and provided to First Nation communities in B.C.

HomeSafe Program – Community Tax Lineup

Another HomeSafe initiative promoted smoke alarm awareness to homeowners who visited City Hall during the annual property tax season. Between 2015 and 2017, around 15,666 individual households were reached through this initiative.

HomeSafe Program – Surrey Food Bank

A different initiative within the program conducted outreach at the Surrey Food Bank, providing opportunities to educate at-risk members of the community on the importance of a working smoke alarm. From 2015 to 2017, Surrey Fire have reached out to over 3,500 individual households accessed in food bank lineups.

Cohort-related Outcomes

The evaluation of the subsequent cohorts (Cohort 8 to Cohort 14), information packages, and door hangers was conducted by measuring the fire-related outcomes for targeted properties within the period before and after the HomeSafe visits. Two years was selected as the time range for the period before the interventions. No time constraint was used for the post-intervention period, in order to measure the time length when the interventions start to lose their effectiveness.

Frequency of fires at pre- and post-interventions

Table 4. Fire rate per 1,000 occupied dwellings per year across Cohort 8 to Cohort 14

Cohort	Addresses	Intervention (Fire Rate per 1,000 occupied properties)		Rate Change	Pct of Fires			
		Pre-	Post-		Post 1 Yr	Post 3Yrs	Post 5 Yrs	Post 10 Yrs
8	2,789	3.76	0.8	-79%	24.0%	48.1%	64.0%	100%
9	2,672	2.25	0.82	-64%	11.5%	42.3%	61.5%	100%
10	2,772	2.17	1.12	-48%	20.7%	48.3%	76.0%	100%
11	1,918	1.82	0.87	-52%	5.0%	30.0%	60.0%	100%
12	2,359	4.03	1.28	-68%	35.3%	73.5%	79.4%	100%
13	8,387	3.3	1.27	-62%	29.1%	76.4%	93.7%	100%
14	511	0	0		0.0%	0.0%	0.0%	0.0%
Total	21,408	2.94	1.26	-57%	25.0%	63.2%	81.2%	100%

The data demonstrates a significant reduction of 57% in the frequency of fires after the interventions for over 21,000 targeted properties in the seven cohorts. Variances in reductions can be seen across different cohorts, with Cohort 8 have the greatest reductions and Cohort 10 having the least reduction. Cohort 14 experienced no fires pre- and post-intervention (see Table 4).

Table 4 also shows that over 63% of all post-visit fires happened within three years, and over 81% of all post-visit fires happened within five years. Differences among the cohorts can also be seen, with Cohort 11 taking the longest to experience fire after the interventions (30% taking place within three years and 60% within five years). Properties in Cohort 13 suffered the shortest time length to experience fires after the interventions (over 75% taking place within three years and nearly 95% within five years).

Functioning Smoke Alarms at Fires Pre- and Post-intervention

A 23% increase in working smoke alarms at all post-visit fires can be found across the seven cohorts (55.6% of working smoke alarms at post-visit fires, relative to 45.2% pre-visit). Cohort 13 is the only cohort that saw a decrease (by 3%) in the percentage of working smoke alarms after the interventions. Properties in Cohort 9 experienced the highest increase of working smoke alarms at fires post-visit (nearly 1.5 times, from 25% to 61.5%). Please see Table 5 for other cohorts.

Table 5. Percentage of Working Smoke Alarms at Fires (Pre-/Post-Interventions) Across Cohort 8 to Cohort 14

Cohort	Addresses	Pct of Working Smoke Alarms		Rate Change
		Pre-	Post-	
8	2,789	33.3%	48.0%	44%
9	2,672	25.0%	61.5%	146%
10	2,772	33.3%	48.3%	45%
11	1,918	57.1%	60.0%	5%
12	2,359	36.8%	56.0%	52%
13	8,387	58.2%	56.7%	-3%
14	511	0	0	
Total	21,408	45.2%	55.6%	23%

Severity of Fires Pre- and Post-intervention

Table 6. Percentage of Fire Extent Within Object of Origin (Pre-/Post-Interventions) Across Cohort 8 to Cohort 14

Cohort	Addresses	Pct of Fires within Object of Origin		Rate Change
		Pre-	Post-	
8	2,789	71.4%	92.0%	29%
9	2,672	83.3%	100.0%	20%
10	2,772	91.7%	93.1%	2%
11	1,918	100.0%	90.0%	-10%
12	2,359	68.4%	91.2%	33%
13	8,387	92.7%	97.6%	5%
14	511	0	0	
Total	21,408	84.9%	95.4%	12%

Using the percentage of fires contained to the object of origin as proxy for fire severity, lower severity of fires is demonstrated after the interventions, with a 12% increase of fires confined to the object of origin (from 84.9% before the interventions to nearly 96% afterward). Properties in Cohort 12 saw the biggest increase, with 33% (from 68% of fires confined to the object of origin before the interventions to 91% afterward). Conversely, properties in Cohort 11 experienced more severity, with the decrease of 10% (from 100% to 90%). See Table 6 for details.

Further Initiatives – Related Outcomes

Fire Rates

The HomeSafe initiatives of inspections/smoke alarm installations by request and fire crew smoke alarm verifications at incidents have clearly shown a tremendous impact in reducing the annual fire rates, with 75% and 66% reductions, respectively. On the other hand, the drop-off of door hangers or information packages have not shown any effectiveness in reducing the fire rates. In those evaluations, the fire rates have been increasing by 12% for door hangers and 15% for information packages.

Table 7. Fire Rate per 1,000 Occupied Dwellings for HS Initiatives

Initiative	Addresses	Intervention (Fire Rate per 1,000 occupied properties per Year)		Rate Change	Pct of Fires			
		Pre-	Post-		Post 1 Yr	Post 3Yrs	Post 5 Yrs	Post 10 Yrs
HS Inspections/Smoke Alarm Installation by request	3,284	3.20	0.79	-75%	19.2%	65.4%	100.0%	100.0%
DOOR HANGER	8,740	2.00	2.24	12%	21.6%	78.4%	100.0%	100.0%
PACKAGE	4,630	2.05	2.35	15%	22.4%	67.3%	100.0%	100.0%
Smoke Alarm Verification at Incidents	15,814	1.77	0.61	-66%	40.6%	81.3%	98%	100.0%

Percentage of Working Smoke Alarms

The HomeSafe initiatives of inspections/smoke alarm installations by request and fire crew smoke alarm verification at incidents also demonstrate the positive impact on the presence of working smoke alarms at fires, with the increase of nearly 62% and over 6%, respectively. The drop-off of door hangers and information packages show negative impacts, with the decline of 46% and 16.5%, respectively.

Table 8. Percentage of Working Smoke Alarms for HS Initiatives

Initiative	Addresses	Pct of Working Smoke		Rate Change
		Pre-	Post-	
HS Inspections/Smoke Alarm Installation by request	3,284	38.1%	61.5%	61.5%
DOOR HANGERS	8,740	65.7%	35.2%	-46.4%
PACKAGE	4,630	68.4%	57.1%	-16.5%
Smoke Alarm Verification at Incidents	15,814	58.9%	62.5%	6.1%

Percentage of Fire Extent Within Object of Origin

The residents who requested HomeSafe inspections/smoke alarms installations have experienced a positive impact. Fires on their properties are 62% more likely to be contained to the object of origin compared to those who received door hangers, information packages, and fire crew smoke alarm verification at incidents.

Table 9. Percentage of Fires Within Object of Origin for HS Initiatives

Cohort	Addresses	Pct of Fires within Object of Origin		Rate Change
		Pre-	Post-	
HS Inspections/Smoke Alarm Installation by request	3,284	4.8%	7.7%	62%
DOOR HANGERS	8,740	14.3%	2.3%	-84%
PACKAGE	4,630	0%	4%	N/A
Smoke Alarm Verification at Incidents	15,814	16.1%	8.3%	-48%

City-wide Related Outcomes

Fire Rates

Over the seven years after the first period of HomeSafe (2011 – 2017), Surrey experienced an annual average of 98 fires per 100,000 residential properties. This is 22% reduction relative to the three years before HomeSafe started in 2008, and is despite a significant spike in Surrey's fire rate in 2012 (126 fires per 100,000 residential properties).

Casualty Rates

From 2011 to 2017, the City of Surrey experienced an increase of 24% in the number of casualties per 100,000 population per year (average of 4.4 casualties per 100,000 population per year). Nevertheless, that rate declined by 0.1 fatality per 100,000 population per year between the first and the second periods of the HomeSafe program.

Percentage of Working Smoke Alarms

In the third period, there was a 39% increase of the percentage of working smoke alarms at residential fires (from 31% in the second period to 43% in the third period). The year 2015 marks the year with the highest percentage of working smoke alarms at residential fires (66.7%).

Percentage of Fire Extent within Room of Origin

Forty-three per cent of residential fires were confined within room of origin in the third period. This is a reduction by 20% relative to the second period.

Period 4: HomeSafe3 Covering 2018 - 2019

In this period, the HomeSafe program began to utilize community volunteers to promote fire safety education and/or smoke alarm testing and installation to targeted residential properties through telemarketing and door-to-door visits. For this purpose, the volunteers were equipped with a mobile Geographical Information System (GIS) application to collect data related to the visits for further analysis (see Appendix C). In addition, the fire crews still provided HomeSafe inspections and smoke alarms testing/installation to any residential properties they responded to during an incident.

HomeSafe Program – Door-to-Door Visit by Volunteers

During the period of 2018 and 2019, four temporal delivery cohorts have been generated – Cohorts 15, 16, 17, and 18 – to target fire prevention education and smoke alarm examination/installation in nearly 4,900 high-risk residential areas (see Figure 5 for timeline and Figure 6 for map).

Figure 5. Timeline and Distribution for Each Cohort (Cohort 15 to Cohort 18)

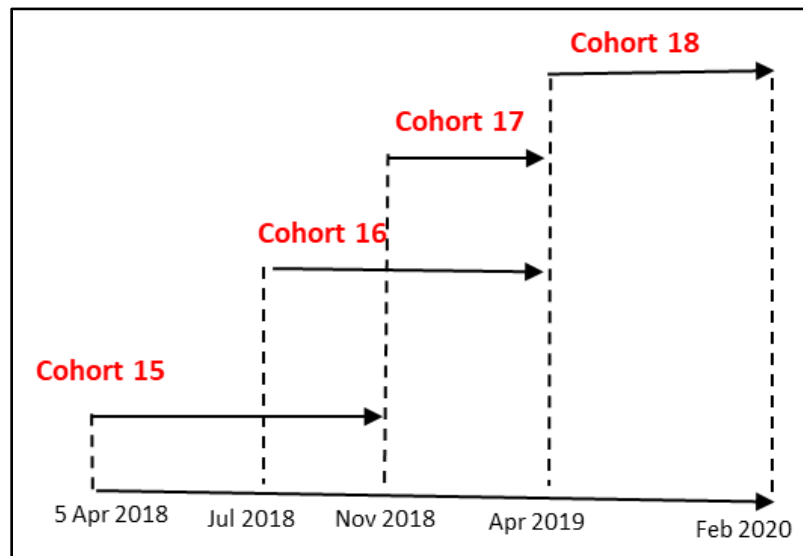
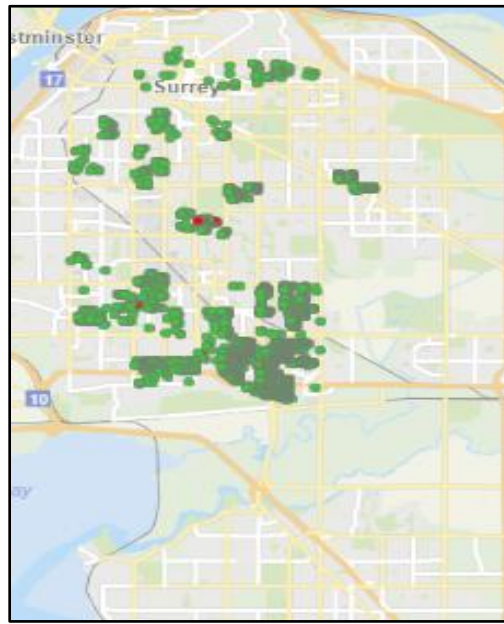


Figure 6. Area Distribution of 4 Temporal Cohorts (Cohort 15 – Cohort 18)



HomeSafe Program – Inspection/Smoke Alarms installations by Request

Within the period of two years (2018 – 2019), 326 residents requested HomeSafe inspections and 449 requested HomeSafe inspections and smoke alarms installations.

HomeSafe Program – Verifications by Crews at Incidents

Within the period of two years, there were 19,354 smoke alarms verifications at 13,175 residential properties, which resulted in over 955 smoke alarm installations. This is a significant increase of 42% in alarm verifications, compared to the last two years of the previous period.

HomeSafe Program – Telemarketing

Another HomeSafe initiative during this period was a telemarketing campaign. Community volunteers phoned city residents within targeted areas to promote fire prevention education and inform them about free HomeSafe inspections and smoke alarm installations. Over 900 residents have been reached through this telemarketing initiative.

HomeSafe Program – Community Tax Lineup

In the period of two years, Surrey Fire Service has reached out to nearly 8,000 homeowners who visited City Hall during the annual property tax season.

HomeSafe Program – Surrey Food Bank

Between 2018 and 2019, over 850 individual households have been reached out through Surrey Food Bank, providing opportunities to educate the at-risk members of the community on the importance of a working smoke alarm.

Cohort-related Outcomes

Frequency of Fires Pre- and Post-intervention

The evaluation of post-intervention fire rates for Cohort 15, 16, 17 and 18 demonstrated HomeSafe's positive impact on reducing the frequency of fires per 1,000 dwellings. In total, a significant decline of 80% in fire rates was seen at the nearly 5,000 residential addresses visited by volunteers (see Table 10 for details). Only properties in Cohort 16 experienced a slight increase (5%) in fire rates.

Table 10. Fire Rate per Occupied 1,000 Dwellings for Cohort 15 – Cohort 18

Cohort	Addresses	Intervention (Fire Rate per 1,000 occupied properties per Year)		Rate Change	Pct of Fires			
		Pre-	Post-		Post 1 Yr	Post 3Yrs	Post 5 Yrs	Post 10 Yrs
15	833	3.00	0.54	-82%	100.0%	100.0%	100.0%	100.0%
16	1,491	1.01	1.06	5%	66.7%	100.0%	100.0%	100.0%
17	906	1.10	0	-100%				
18	1,626	1.54	0	-100%				
Total	4,856	1.54	0.31	-80%	75.0%	100.0%	100.0%	100.0%

Functioning Smoke Alarms at Fires Pre- and Post-intervention

The HomeSafe visits by volunteers also demonstrated a positive influence in the rate of functioning smoke alarms found at residential fires, with almost double the rate (a 183% increase), from 35% to 100%, of working smoke alarms found at residential fires after visits. See Table 11 for details.

Table 11. Percentage of Working Smoke Alarms for Cohort 15 – Cohort 18

Cohort	Addresses	Pct of Working Smoke Alarms		Rate Change
		Pre-	Post-	
15	833	67%	100%	50%
16	1,491	0%	100%	100%
17	906	50%	N/A	N/A
18	1,626	17%	N/A	N/A
Total	4,856	35.3%	100%	183%

Severity of Fires Pre- and Post-intervention

With respect to the extent of fires, 67% of fires occurring post-intervention were contained to the object of origin. See Table 12 for details.

Table 12. Percentage of Fire Extent within Object of Origin for Cohort 15 – Cohort 18

Cohort	Addresses	Pct of Fires within Object of Origin		Rate Change
		Pre-	Post-	
15	833	100.0%	0%	-100%
16	1,491	100.0%	100%	0%
17	906	100.0%	N/A	N/A
18	1,626	100.0%	N/A	N/A
Total	4,856	100.0%	67%	-33%

Further initiatives -related Outcomes*Frequency of Fires Pre- and Post-intervention*

Both HomeSafe initiatives of inspections/smoke alarm installations by request and fire crew smoke alarm verification at incidents also proved to have positive impacts on fire rates, with a reduction per 1,000 occupied dwellings of 33% and 87%, respectively. See Table 13 for details.

Table 13. Fire Rate for HS Inspections/Smoke Alarm Verifications at Incidents

Initiative	Addresses	Intervention (Fire Rate per 1,000 occupied properties per Year)		Rate Change	Pct of Fires			
		Pre-	Post-		Post 1 Yr	Post 3Yrs	Post 5 Yrs	Post 10 Yrs
HS Inspections/Smoke Alarm Installation by request	769	1.95	1.30	-33%	100.0%	100.0%	100.0%	100.0%
Smoke Alarm Verification at Incidents	13,175	1.10	0.14	-87%	89.5%	100.0%	100.0%	100.0%

Functioning Smoke Alarms at Fires Pre- and Post-intervention

The initiatives of HomeSafe inspections/smoke alarm installation by request and crew smoke alarm verification at incidents showed a positive influence in ensuring functioning smoke alarms were found at residential fires, with the increase of 50% and nearly 7% post visits, respectively (see Table 14 below).

Table 14. Pct of Working Smoke Alarms for HS Inspections and SA Verification at Incidents

Initiative	Addresses	Pct of Working Smoke Alarms		Rate Change
		Pre-	Post-	
HS Inspections/Smoke Alarm Installation by request	769	33.3%	50.0%	50.0%
Smoke Alarm Verification at Incidents	13,175	69.0%	73.7%	6.8%

Percentage of Fire Extent Within Object of Origin

The HomeSafe inspection/smoke alarm installations by request has demonstrated no changes in the severity level of fires, whereas a positive impact can be found in the properties that had crew smoke alarm verification at incidents (over 5% of fires were contained to object of origin afterward, relative to none before the initiative).

Table 15. Percentage of Fire Extent Within Object of Origin for HS Inspections and Smoke Alarm Verification at Incidents

Cohort	Addresses	Pct of Fires within Object of Origin		Rate Change
		Pre-	Post-	
HS Inspections/Smoke Alarm Installation by request	769	0.0%	0.0%	N/A
Smoke Alarm Verification at Incidents	13,175	0.0%	5.3%	

City-wide related outcomes

Fire Rates

In this period of the HomeSafe program (2018 – 2019), the City of Surrey continued to experience a significant decline in fire frequency (an annual average of 72 fires per 100,000 residential properties) relative to the previous periods. This is a 26% reduction from the previous period of 2011 and 2017, and a 43% reduction since HomeSafe started in 2008.

Casualty Rates

The City of Surrey experienced a steady trend in the number of casualties per 100,000 population per year (average of 4.8 casualties per 100,000 population per year). Nevertheless, a decline of 0.4 casualties per 100,000 population occurred in the last year of 2019.

Percentage of Working Smoke Alarms

In this period, there was an 13% increase in the percentage of working smoke alarms at residential fires (from 31% in the second period, 43% in the third period, and 56% in the last period). The year 2019 marks the year with the second highest percentage of working smoke alarms at residential fires (61.7%).

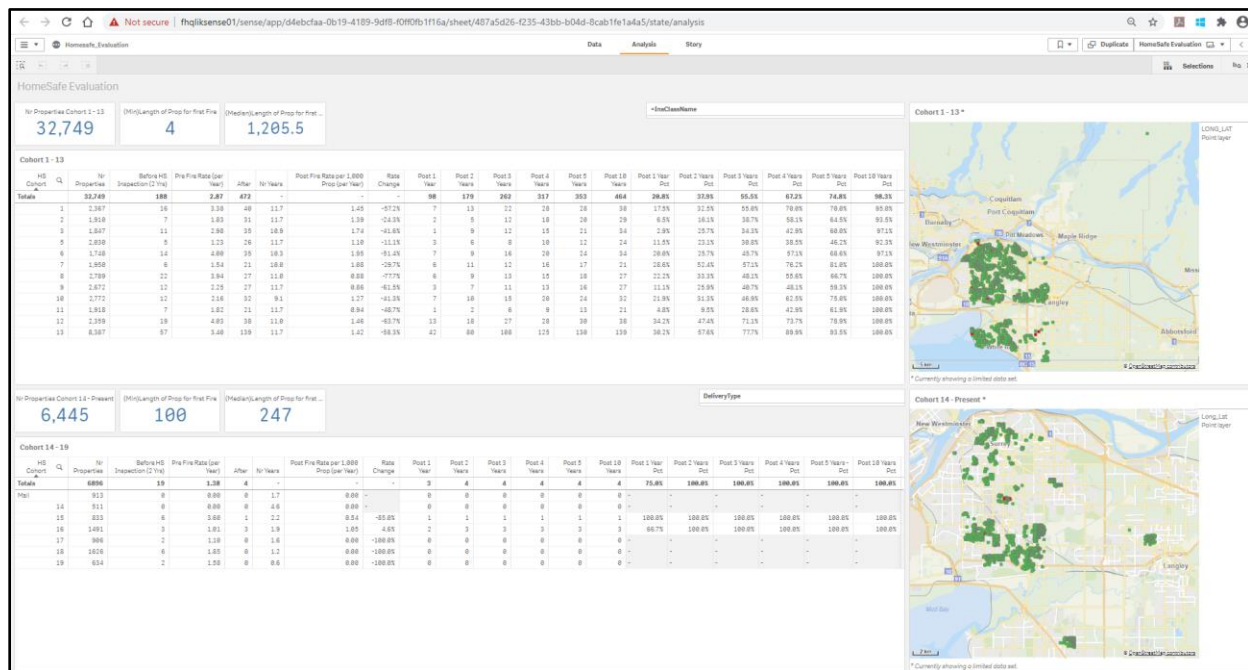
Percentage of Fire Extent Within Room of Origin

Forty-three per cent of residential fires were confined to the room of origin in the fourth period. No changes in the severity of fires was displayed in this period compared to the previous period.

Monitoring Tool

Previous studies have shown that systematic and consistent approaches, as well as continuous monitoring and evaluation of the initiatives, are key success factors for the HomeSafe program. The evaluation is useful in assessing and prioritizing the fire-related risks for targeted areas. For that purpose, a web-based business intelligence (BI) tool was created to help monitor the non-random targeted cohorts, from Cohort 1 to the latest Cohort 19 (established in 2020) (see Figure 7).

Figure 7: Business Intelligence Tool for HomeSafe Cohorts Monitoring System



The tool has three applications with respect to different fire-related measures:

1. Fire Rates per 1,000 residential properties
2. Percentage of working smoke alarms
3. Percentage of fires contained to the object of origin

In each application, the comparisons for each cohort before and after the HomeSafe interventions are displayed along with the percentage changes. The tool also maps all the properties in each cohort and filters the types of interventions, whether personal contact or delivery only, so comparisons can be performed. Furthermore, the tool can display the addresses of properties for each cohort as well as the dates of visits and any fire incidents at the location.

Conclusion

Over the course of more than 12 years since the HomeSafe program was introduced in 2008, the evidence shows it is effective in reducing the frequency of fires at residential properties, increasing fire-related safety, and decreasing the likelihood of fire-related fatalities in the City of Surrey. The positive impacts are consistently shown not only in properties that were visited, but throughout the entire city as well. A consistent, systematic, and ongoing approach for outreach to residents for a fire-safety campaign and smoke alarm verifications and installations has been the contributing factor of HomeSafe's success.

In the first period of the HomeSafe implementation (Period 2: 2008-2010), approximately 7,500 properties each year were reached through cohort visits, HomeSafe inspections, smoke alarm installations by request, and crew alarm verification at incidents. Over the next period of seven years (Period 3: 2010-2017), nearly 7,200 properties received interventions each year in addition to the over 19,000 individuals reached through the City tax lineup and Surrey Food Bank initiatives. In its third period (Period 4: 2018-2019), HomeSafe was able to significantly increase the frequency of home visits by 30% (to around 9,400 visits per year,) in addition to reaching nearly 10,000 individuals through the telemarketing, tax lineup, and Surrey Food Bank initiatives. In total, over 91,000 properties were visited and nearly 30,000 individuals reached through various HomeSafe initiatives over its 12 years.

As result of this extensive effort, the fire rate per 100,000 population at the City of Surrey has been significantly reduced by nearly 80% since HomeSafe was implemented (from 80-88 fires per 100,000 population prior to HomeSafe to only 20-21 fires per 100,000 population in 2019). With respect to percentage of functioning smoke alarms at residential fires, a significant jump of almost double has occurred during the HomeSafe implementation (from less than 30% prior to HomeSafe to around 60% in 2019). The severity of fires has also been reduced by almost double, as the percentage of fires contained to the room of origin has increased from 15% prior to HomeSafe to over 40% in 2019. The program also resulted in a reduction of casualties by at least 40%, from 8.6 casualties per 100,000 population every year prior to HomeSafe to around 4.8 casualties in the last two years of 2018 and 2019.

Despite the overall success, not all initiatives within the program have shown similar positive impacts. The data shows that some initiatives delivered more positive impacts than others in specific outcomes. Consistently, the cohort visits by on duty firefighters or community engagement volunteers, inspections/smoke alarm installations by request, and crew visits at incidents have proven to be more effective in reducing fire rates than other HomeSafe initiatives. In general, these three interventions cut the fire rates at their visited properties by 73%, 79%, and 74% respectively. By comparison, the drop-off of door hangers and information packages resulted in an increase in fire rates by 12% and 15%. Furthermore, the analysis found that between 55% and 98% of the targeted properties in the cohort groups experienced post-fire incidents within three and 10 years of the intervention, respectively. It is also determined that properties belonging to cohorts in Period 2 (2008-2010) have post-visit fires occurring much later than those belonging to cohorts in Period 3 (2011 – 2017). Over 40% of the properties in Period 2 experienced post-visit fires within three years compared to over 60% in Period 3.

In terms of the telemarketing outreach, no fire incidents occurred in the targeted properties prior to and after their implementation. In addition, the difficulties in collecting property information during the tax lineup and Surrey Food Bank initiatives limited the analysis of their outcomes and effectiveness.

With respect to increasing the presence of functioning smoke alarms, the initiatives of cohort visits, HomeSafe inspections/smoke alarm installation by request and crew verifications at incidents showed to be more effective than the other initiatives. The three interventions increased the presence of functioning smoke alarms at residential fires by 24%, 47%, and 6%, respectively. Moreover, the cohort visits demonstrated their effectiveness in reducing fire severity by increasing the percentage of fires contained to the object of origin to 94% of the time from 75% prior to the intervention (24% increase). Unfortunately, the door hangers and information package drop-offs did not prove to be effective in bringing positive impacts.

As the program continues to evolve with new initiatives and targeted areas for interventions, consistent population characteristics can be found to carry more risks than others, such as those with ages under six or over 64 years, single-parent families, residents who move frequently, low income or unemployed residents, and those living in an older building (see Appendix E).

The characteristic of older buildings also presents a further risk if the condition of those properties continues to deteriorate and they eventually become abandoned. Abandoned properties are no longer effective for HomeSafe interventions and are therefore excluded in the monitoring of its outcomes. Abandoned properties introduce different challenges and interventions that are outside the scope of this study.

Furthermore, the program faces a constant challenge in locating residents that fit the target population characteristics within the dynamic context of city planning and development as well as the socio-economic situation of their residents. It also lacks more recent and updated population demographics data that would help to inform a more accurate depiction of city population for use in prioritizing targeted areas. The coronavirus pandemic that started in spring 2020 also presents a new challenge in how to operate the HomeSafe program effectively without jeopardizing the health and safety of residents, fire crews, and community volunteers. The pandemic situation significantly limits the possible social interaction among residents and thus creates obstacles in directly promoting fire safety campaigns to residents at risk. The existing initiatives must be updated to adapt and align with the health and safety protocols and guidelines.

The pandemic challenges also present opportunities for program improvements that can be discussed for future works. A nearly real-time monitoring system for each initiative, integrated with a data repository of recent population demographics and city planning and development, can provide answers to the present task in locating residents at risk. Moreover, a process to collect resident demographics data can also be developed in every HomeSafe initiative where there is an opportunity for social interaction with residents.

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Appendix A

FIGURE 1A: HOMESAFE MATERIAL

We care about your safety!

Surrey Fire Services started HomeSafe in 2008 to reduce residential fires. Since then, HomeSafe has significantly reduced fires and fire losses, and has won a prestigious international award.



Is your home safe?

How HomeSafe works

We target areas in Surrey with the highest fire rates and help make them safer by:

- Providing or installing free smoke alarms
- Providing fire safety information
- Conducting free visits to identify potential fire risks

What happens at a HomeSafe visit

- A firefighter or HomeSafe volunteer will identify fire risks such as lack of working smoke alarms, inappropriate use of extension cords, heating appliances or candles located too close to combustibles, and obvious cooking and smoking hazards.
- Existing smoke alarms will be checked, and a free battery-powered smoke alarm may be installed if required.
- Residents will receive educational materials and a checklist with recommendations. These are only suggestions and will not be enforced or result in any liability.

Homes today burn much quicker than they used to. If your home catches fire, you only have a matter of minutes to safely escape. **Every second counts. A working smoke alarm could make all the difference.**

HomeSafe is a Surrey Fire Services program that installs free smoke alarms and helps reduce household fire hazards in neighbourhoods with high fire rates. The program is delivered through firefighters and volunteers.



Request a free smoke alarm (installation optional) and/or a confidential HomeSafe visit today:

Info & online form: surrey.ca/homesafe Phone: **604-543-6780**

You only have A MATTER OF MINUTES to get out alive



WORKING SMOKE ALARMS SAVE LIVES

Get a free alarm – details inside

HomeSafe
fire safety and prevention
SURREY FIRE SERVICES

surrey.ca/homesafe

HomeSafe visits are confidential and free. See back panel to book yours today.

Appendix B

FIGURE 1B: HOMESAFE MATERIAL

A working smoke alarm could save your life

It's a fact – smoke alarms save lives, but *only* if they work.

Here's how to make sure your alarm will work when you need it to.

- Smoke alarms don't last forever. Change them every 10 years, whether hard-wired or battery type.
- Smoke alarms should be tested monthly. Use a broom handle or stick to push the test button. It should sound and go into alarm mode if it is working properly.
- Batteries should be replaced at least once per year.
- If you see your alarm is getting dusty, vacuum or dust it.
- Make sure you have a smoke alarm outside all sleeping areas. It's the law. *If your rental home doesn't have working alarms, show your landlord this brochure or ask him/her to call 604-543-6780 for information.*

A working smoke alarm reduces the death rate from fire by 74%

The biggest risk: cooking

More than half of all residential fires are caused by cooking – mostly from leaving food unattended and from grease fires.

Make sure everyone who cooks in your home follows these tips to reduce your risk.

- Stay in the kitchen when cooking with open pans and pots.
- Turn the stove off if you have to leave the room for more than a few minutes.
- Check food regularly and use a timer to remind you when your food is cooked.
- Keep cooking areas clean and grease-free.
- Keep combustible items – towels, paper, packaging, etc. – away from heat sources.
- Never pour water on a grease fire. Use a lid to smother it.



Are you at higher risk?

The risk of fire death or injury is higher in homes:

- **without a working smoke alarm**
- with young children or senior citizens
- with people with disabilities
- with smokers
- with people of First Nation heritage



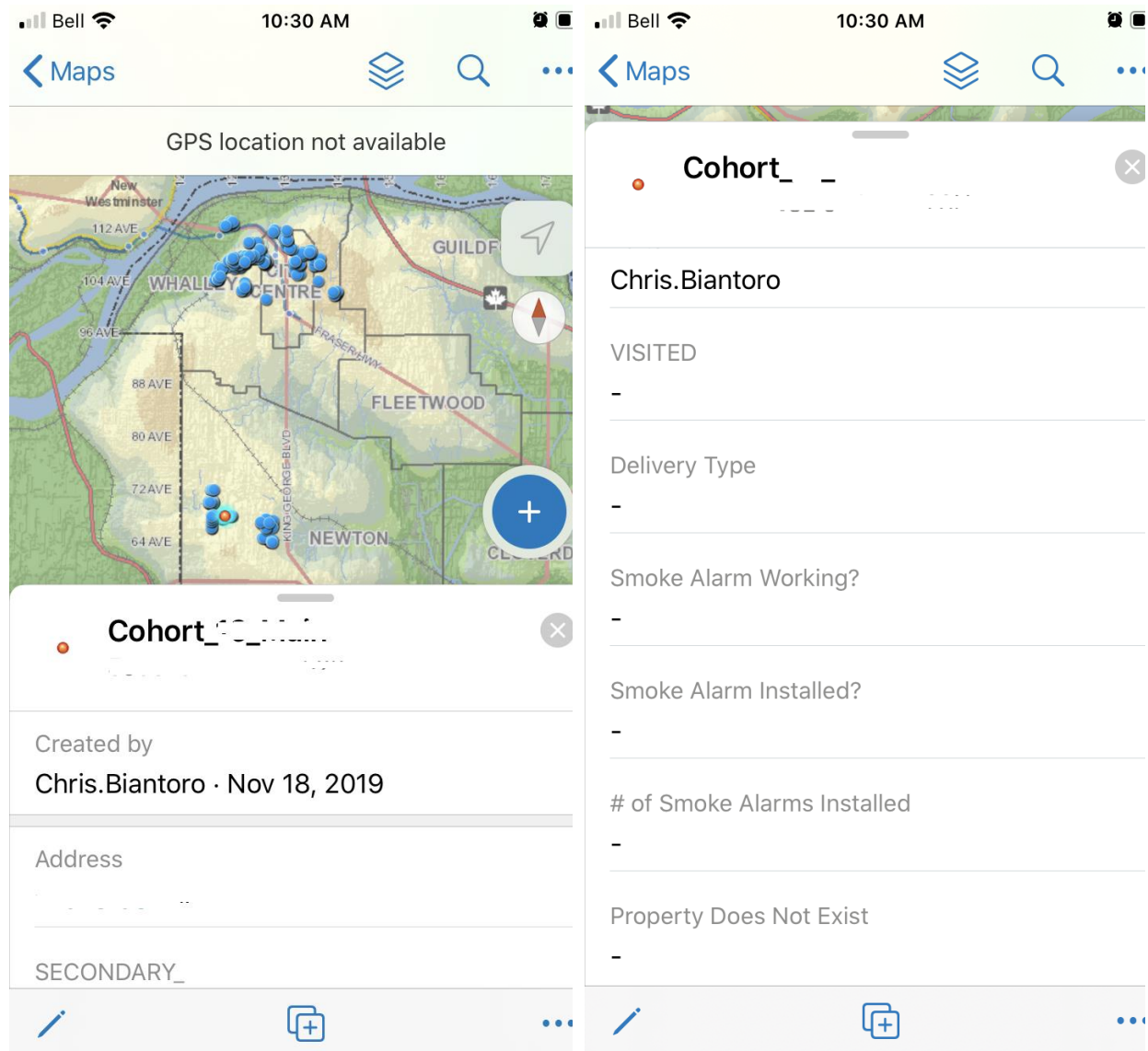
fire safety and prevention
SURREY FIRE SERVICES

surrey.ca/homesafe

Single-family homes are the most common building in Surrey to become involved in fires. More than two-thirds of all structure fires in Surrey occur in people's homes.

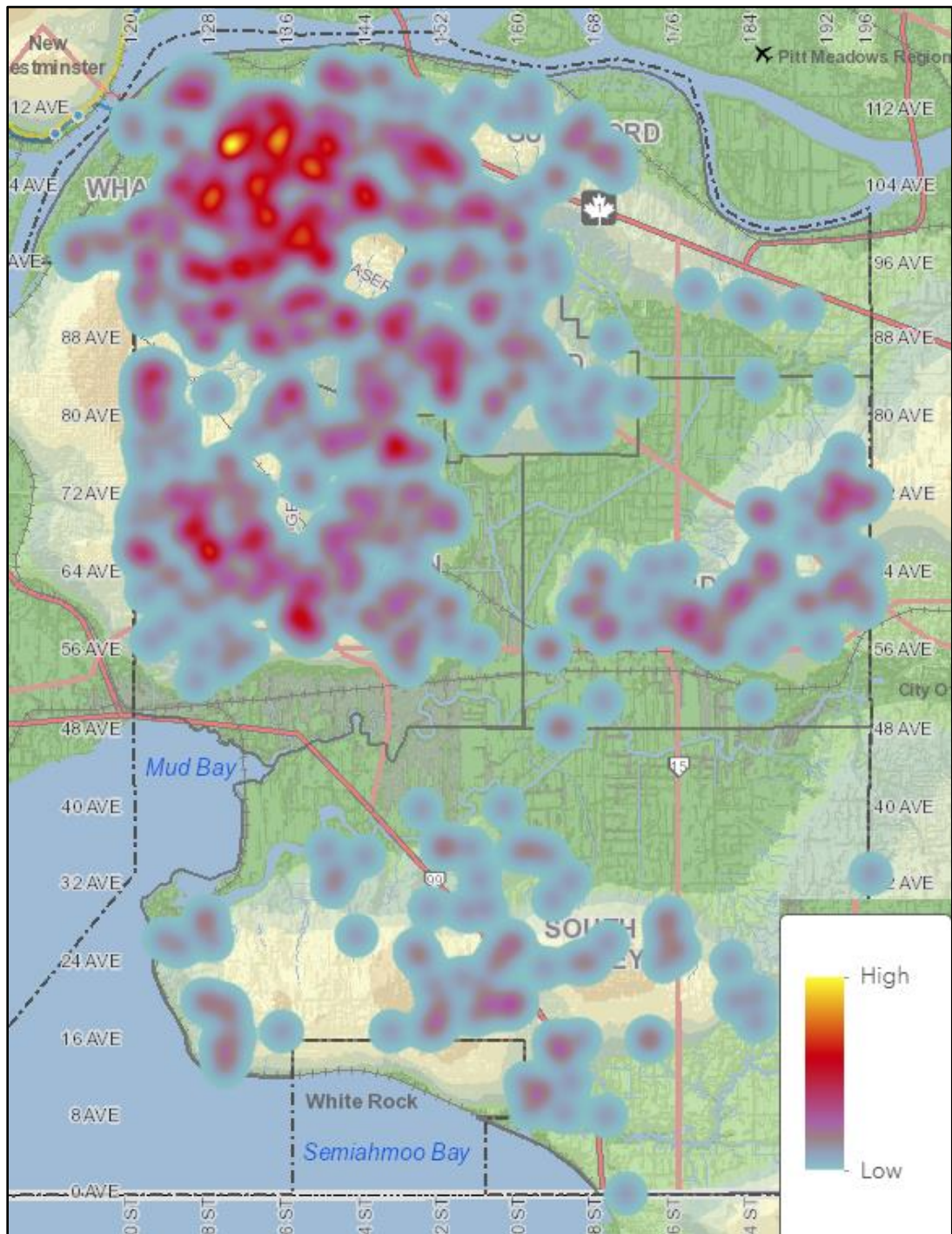
Appendix C

FIGURE 2: HOMESAFE COLLECTOR APPLICATION



Appendix D

FIGURE 3: DENSITY OF FIRE INCIDENTS OVER THE LAST 5 YEARS AT THE CITY OF SURREY



Appendix E

FIGURE 4: AREAS WITH HIGHER RISK OF POPULATION CHARACTERISTICS ACROSS THE CITY OF SURREY

