

A Review of Fire First Responder Responses to Lift Assist and Traumatic Fall Incidents

Analysis on City of Surrey Medical Incident Response



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Executive Summary

This study reviews the increasing demand for fire first responder response for non-emergency patient lift assists as well as requests to traumatic fall/back injuries within the City of Surrey, British Columbia. The purpose of this analysis is to understand the incident volumes, trends, frequency, and resources required to meet the current demands.

In 2017, British Columbia Emergency Health Service (BCEHS) policy changed to reduce ambulance responses to lift assists. Further policy changes to the triage model and incident acuity level for traumatic incidents, titled Clinical Response Model were implemented in 2018. It is observed, the significant increases in fire first responder time commitments to lift assists and falls/back injury call types corresponds with the BCEHS policy changes and may be perceived by the fire service as a shifting of response workload from the ambulance crews to the fire crews.

The data also demonstrates fire first responder incident volume increases are attributed to an increase in requests from the same or repeat locations. A plotting of incident locations consequently shows an unequal distribution of these incident requests across the City. This indicates only a relatively few locations have a significant number of the demands and dominate the number of incidents.

The demand for responses to lift assists has consistently increased over the last 10 years. Most notably starting in 2016, a significant annual increase of 15% per year occurred. Most lift assist responses, (96%), took place in residential and senior living locations. Residential locations (17%) dominated 50% of all lift assist responses over the last 10 years, and nearly 100% of all lift assists occurring in senior living occurred at repeat locations.

The demand for responses to fall/back injuries consistently increased until 2017, before significant declines occurred in 2018 and 2019. Fall/back injury responses took place in commercial, residential, and senior living locations. Repeated calls for service from the same locations have been less apparent in fall/back injury incidents.

The data shows consistent average and median committed time that fire crews spent for each lift assist or fall/back injury incident. Furthermore, the growing number of repeat incidents for both incident types contributed to the significant increase of total committed time. The data shows that City of Surrey fire crews have spent an average just under 1,000 hours (39 days) each year responding to lift assist and falls/back injury incidents. This is equivalent to 6% of the availability on one apparatus used to fight fires. The proportion of repeat incidents for these incident types have increased from 6% in 2010 to 32% in 2019.

Providing help to patients who require lift assistance or are suffering from a traumatic fall/back injury is an important service. In locations such as senior living with repeated demands for service, initiatives to address senior fall prevention through education, training and provision of on-site lift equipment are potential solutions to reduce the shifting workload on fire crews for lift assists.

Purpose of this Research

This report reviews the increasing demand for fire first responder response to BC Emergency Health Services (BCEHS) requests for non-emergency patient lift assists as well as requests to traumatic fall/back injuries within the City of Surrey, British Columbia. The analysis is to understand the incident volumes, trends, frequency of locations and resources required to meet the current request needs.

Lift assist and fall/back injuries are two types of medical incidents that fire first responders have been responding to at the request of BCEHS. Within the context of an aging population, social isolation, and to meet community needs, there has been a noticeable impact related to a surge of these incident types in recent years. Despite the importance of citizens receiving help at these incidents, the current response solution may not be the most efficient model from the perspective of utilizing resources that potentially can delay first responders to attend to more urgent incidents.

This research has analyzed data on first responder response requests to lift assist and fall/back injuries within the City of Surrey, British Columbia (BC), with the emphasis of understanding the incident volumes, the trends, the frequency of repeat locations, and the resources needed to respond. Understanding these elements will help form recommendations and a direction where efforts could be made to address the increase in demand for these incident types.

Background

Medical non-emergency lift assist request incidents are created when a person dials an emergency number (9-1-1) because of their inability to mobilize on their own, typically fallen and can not get up. BCEHS receives the 9-1-1 call and through triage determines the patient to be uninjured and has no need to be transported for medical care.

Fall/back injury medical incidents, unlike lift assist incidents, are the result of an injury which could possibly cause a person to be transported to hospital for further medical attention. Although lift assist incidents can potentially show a subtle onset of a disease process or decline in physical/cognitive functions of a person, such incidents are less urgent than other medical incidents.

BCEHS implemented a response change of policy March 1, 2017, titled “Lift Assists at Licensed Long Term Residential Care Facilities” (Appendix A), citing BCEHS would no longer respond to requests from licensed long term care facilities requesting lift assist support where no emergency medical care is required and that their primary responsibility is to provide emergency medical services. When paramedics are dispatched to these types of events, communities are often left without paramedics available to respond to other medical emergencies. As of this date, anytime a BCEHS call-taker receives a lift assist request from a licensed long term residential care facility, the request is passed on to the local municipal fire service.

On May 30, 2018, BCEHS began implementing a new triage and acuity response model, the “Clinical Response Model” (CRM). The new model allows BCEHS dispatch centres to review, prioritize and

assign incidents based on patient acuity, and provide patients with the most appropriate clinical care. This new model shifts from a time-based response model to a clinically based model. The changing of response priority by BCEHS for incidents to a less urgent acuity, may be impacting the amount of fire department responses to traumatic fall/back injuries medical incidents. The fire service has experienced a drop in overall medical incident demand by approximately 25% after the CRM policy change.

With an aging BC population, there are challenges for BCEHS in meeting the population health needs for timely response. An increase of incident workload to lift assist and fall/back injury incidents, due to shifting of workload from paramedics to fire crews, may also negatively impact the resources and ability of fire first responders in attendance to more urgent emergency incidents.

Quatman, et.al. [1] has conducted a retrospective study on 10-years of Emergency Medical Services (EMS) data related to falls to determine whether fall and lift assists incidents have altered aligned with the demographic changes in the population and to estimate health-care cost for lift-assists. The study examined retrospectively all EMS fall related care data for patients 60 years or older from March 2007 to March 2017 in a suburban community. The result showed an increase of fall incidents by two and half times over the past 10 years and nearly doubled for the lift assists. High frequencies of those incidents were for lesser acuity needs. The utilization of EMS for lift assists brought substantial financial consequences and diverted care from incidents that need immediate triage and transport to care.

Schierholtz, et.al. [2] examined 1-year EMS data of 1,121 lift assist incidents of patients aged 65 and older in Middlesex-London in 2015. The study shows that 32% of 611 individuals that generated those incidents called more than once and each incident lasted 43 minutes on average. In total, first responders spent 801 hours or equivalent to 33 days solely to conduct lift-assists for older adults. These incidents consumed the time of fire first responders preventing them to be released and respond to more urgent emergency incidents.

A similar study has also been conducted by Cone, EC et.al. [3]. The study retrospectively reviewed the computer-aided-dispatch (CAD) data of lift-assists from 2004 to 2009 and examined the number and nature of return visits to the same addresses within 30 days. Over that period, there were over 1,000 lift assist incidents to 535 unique addresses of which one-third contributed to two-thirds of total number of incidents and nearly 80% of those return incidents to the same addresses occurred within 30 days. The study concluded that lift assist incidents are associated with substantial subsequent utilization of EMS and should trigger fall prevention initiatives. These incidents are associated with short-term morbidity and mortality and may be early indicators of medical problems that require more aggressive evaluation according to the study by Leggat, et. al. [4].

In BC, falls are the leading cause of injury-related deaths and hospitalization for its seniors. Approximately one third of BC older adults will experience one or more falls each year resulting in more than 10,000 hospitalizations and more than 800 direct and indirect fatalities [5]. Furthermore, those responding to these incidents put themselves at risk for musculoskeletal injury. The recent

study by Thomas L, et.al. on the Canadian firefighter injury claims data determined the musculoskeletal injury as the third most 'nature of injury' that firefighters have claimed over 13 years [6]. An approximately 2% of total claims resulted in over 33 time-loss injury claims per 100,000 firefighters per year. In view of protecting the safety for patients, first responders and health care workers during patient handling and movement, several studies had been conducted to compare the effectiveness of training and equipment to reduce injuries [7],[8]. The studies suggested the combined training with assured availability of mechanical and other assistive patient handling equipment is needed to achieve positive impact on work related injuries.

Methodology

For this research, several datasets were collected and used for the analysis: Surrey Fire incident data from 2010 to 2019; Surrey Fire property data; and a public list of senior living locations. The first two datasets have been collected by the Surrey Fire Service through its Record Management System whereas the last dataset has been published by BC Ministry of Health [9], Fraser Health Authority [10], and BC Housing [11]. For senior living locations that cannot be found in the lists, a Google search was conducted using the following keywords: "Surrey Assisted Living"; "Surrey Residential Care"; "Surrey Long-Term Care"; "Surrey Senior Living"; "Independent Living", or the addresses identified from the incidents data were typed in the Google search field to determine the category of the properties.

Actual incident types of Medical Emergency Service Assist (MESA)-*Lift Assist* and *MESA 17 Fall/Back Injuries (Trauma)* have been used to collect lift assist and fall/back injury incidents from the Surrey Fire incident data. For this analysis, the data should at least provide the date/time when the incident took place, the actual incident type, the address where the incidents occurred, the on-scene date/time, and the return to service date/time. For each address, the property usage type can be derived from the property data. Furthermore, the lists of senior living from the BC Ministry of Health, Fraser Health Authority, and BC Housing and the results from Google search are used as additional datasets to determine senior living locations.

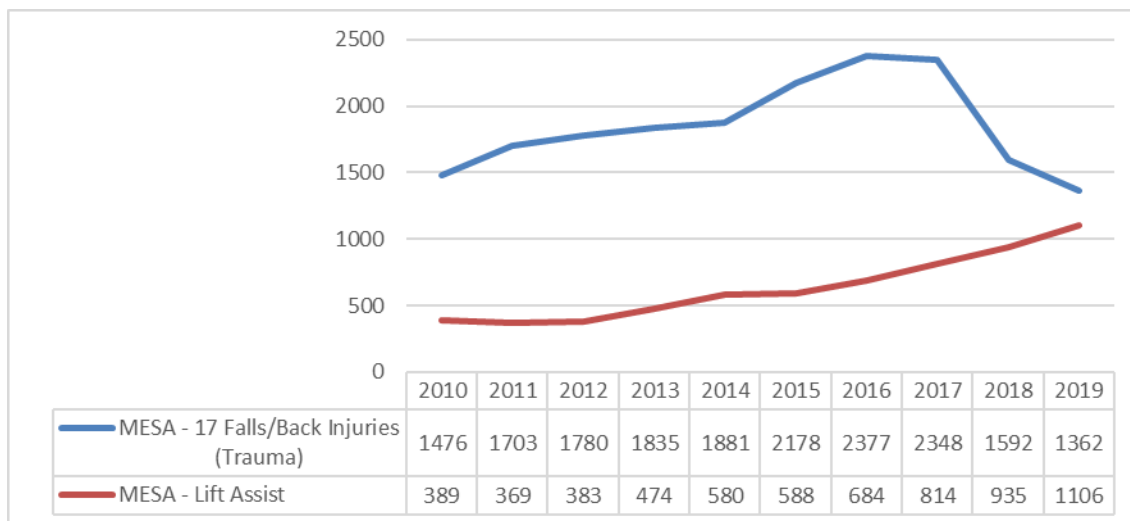
The locations are then categorized into the following groups: Residential, Commercial, Senior Living, Park/Street, Community Health Centre and Boarding/Recovery House. Residential locations include single family dwellings, duplex, triplex four-plex, townhomes, apartments, high-rise and mobile homes. Further, Appendix B shows the mapping of property usage into the given groups. The categorization is simply based on the property usage types that are attached to the addresses and not on the demographics of individuals living in the addresses as no such information is available. This certainly brings limitations to the analysis as population demographics likely trigger the demand of the incidents. Seniors or people with disabilities who likely prompt the demand for such incidents but live outside senior living locations will likely not be captured in the senior living category.

Incident Volumes and Trend Analysis

Fall/back injury (Trauma) medical incidents have experienced a modest increase from 2010 to 2014. In 2015, the data starts showing a significant jump to an average of 2200 - 2300 incidents every year (around 6 incidents daily) until 2017. Incident volume saw a significant decline in the last two years of 2018 and 2019 to a level lower than 2010 (decrease of 32% and 15% respectively to the previous year).

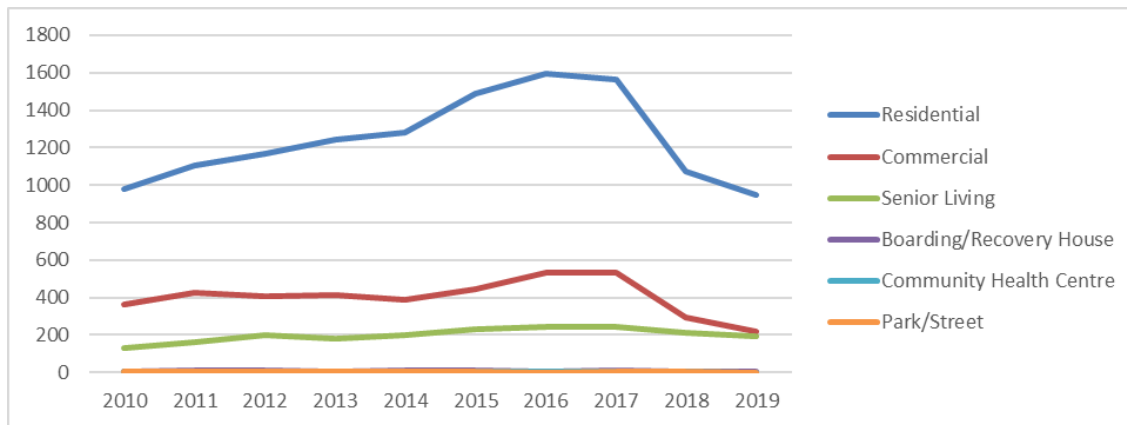
In comparison, Lift Assist incidents demonstrated a steady increase to almost triple over the last 10 years. The data shows a substantial growth that occurred in 2016 onwards with over 15% increase annually to the year before. This translates to a declining change in the ratio of falls to lift assist from 2.9 falls to every lift assist incident in 2017 to only 1.2 falls to every lift assist in 2019. See Graph 1 for details.

Graph 1. Number of Responses for MESA 17 Falls/Back Injuries (Trauma) and Lift Assist (2010 – 2019)



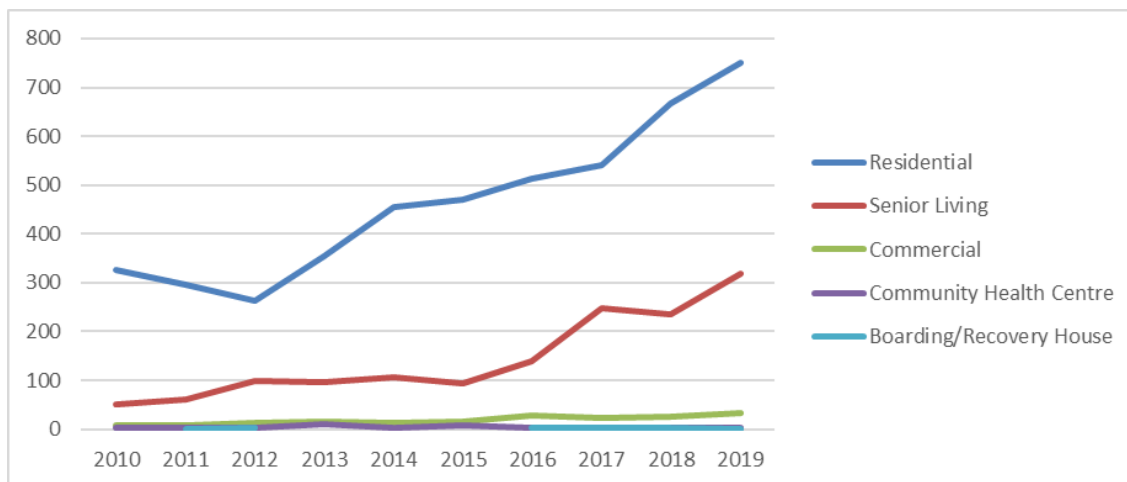
When the analysis for *MESA 17 Fall/Back Injuries (Trauma)* incidents over the last 3 years is broken down by the category of locations, the data shows approximately 85% of those incidents occurred in residential (66%) and commercial locations (19%) on average. Senior living only contributed to over 12% of the incidents over the last 3 years, although the proportion increased from 10% in 2017 to 14% in 2019. See Graph 2 for details on the number of responses by years.

Graph 2. Number of Responses for MESA 17 Fall/Back Injuries (Trauma) by Location type (2010 – 2019)



When the analysis for MESA lift assists is broken down by the category of locations, the data shows approximately 96% of these incidents occurred in the residential (68%) and senior living (28%) locations on average over the last 3 years. The proportion of lift assist incidents occurring in senior living increased from 13% in 2010 to nearly 30% over the last 3 years (2017 – 2019), whereas the proportion of incidents in the residential category represented 84% of workload in 2010 changed to represent 68% of the workload in 2019, while the overall workload in the residential category increased by 230% over the period. See Graph 3 for details of number of responses by years.

Graph 3. Number of Responses for Lift Assist by Location type (2010 – 2019)



By looking at the data particularly for the incidents that occurred in the senior living locations, it shows the workload for lift assists is significantly increased over the years. The ratio of 2.5 incidents per day for fall/back injury to one incident for lift assist per day in 2010 changed to 0.6 fall/back injury per day to one incident for lift assist per day in 2019. More incidents for lift assist occurred than incidents for fall/back injury in the senior living category. This could indicate more requests being triaged as lift assists with lesser acuity needs than previous experience and other studies have

shown. The evidence on incident volume and trends indicates further analysis should focus on residential and senior living locations in which most of lift assist incidents occurred.

Frequency of Incidents from Unique Locations Analysis

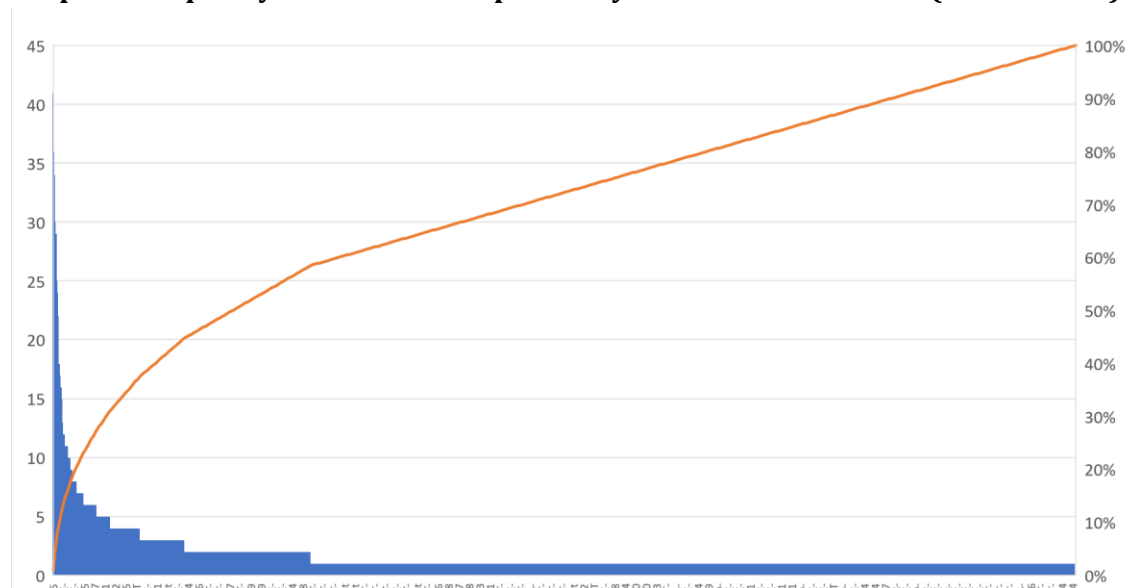
The analysis examines the relationship between the frequency of fall/back injury and lift assist incidents and the addresses where the incidents originated. The relationship shows the distribution is not equal among address locations in the city. This finding prompts further observation in what causes a select few address locations to generate a higher proportion in the number of fall/back injury and lift assist incidents.

Furthermore, analysis has also been performed to look at the frequencies in different communities across the city. The analysis shows how different population demographics across the communities reflect the differences of their incident profiles. However, there are limitations in understanding the demographics of individuals living in those addresses as there is not complete demographic information available.

Number of Lift Assists by Unique Locations (considering the unit number of each location if available)

Overall, there are over 2,500 individual residential addresses identified to have had a lift assist demand over the period of 2010 to 2019, with nearly 60% of the demand taken place at a repeat location. By reviewing those responses to the same individual addresses, it is found that 3.6% of locations contributed to 25% of all lift assist responses and 17% of locations contributed to 50% of all lift assist responses respectively over the period of 2010 to 2019. See Graph 4 for the pareto chart of lift assist responses by individual residential addresses.

Graph 4. Frequency of Lift Assist responses by residential addresses (2010 – 2019)



With respect to senior living, nearly 100% of all lift assists occurred at repeat locations. There are nearly 700 individual addresses identified to have lift assist demands over the period of 2010 to 2019, with 4% of locations contributing to 25% of responses and 17% of locations contributing to 50% of all responses. See Graph 5 for the pareto chart of lift assists responses by individual senior living addresses.

Graph 5. Number of Lift Assist responses by senior living addresses (2010 – 2019)

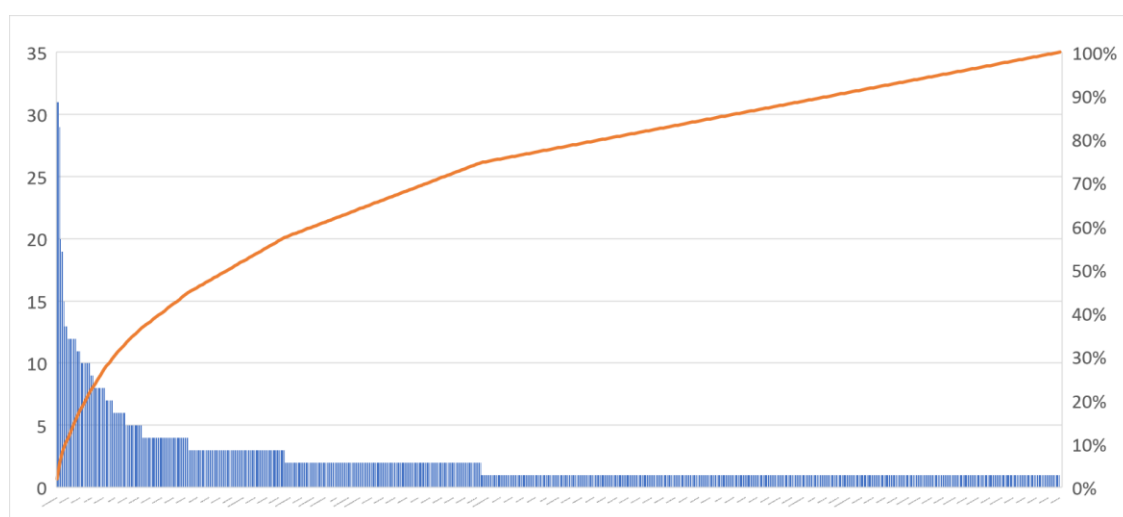


Table 1 shows the percentage of repeat incidents for lift assists in different communities across the city. It shows that four of seven residential communities have 48% to 50% or more of their lift assist incidents at repeat locations. At senior living locations, City Centre and South Surrey have the highest percentage of repeat lift assist incidents at over 60%. Appendix C and D display the counts of those incidents and repeat incidents.

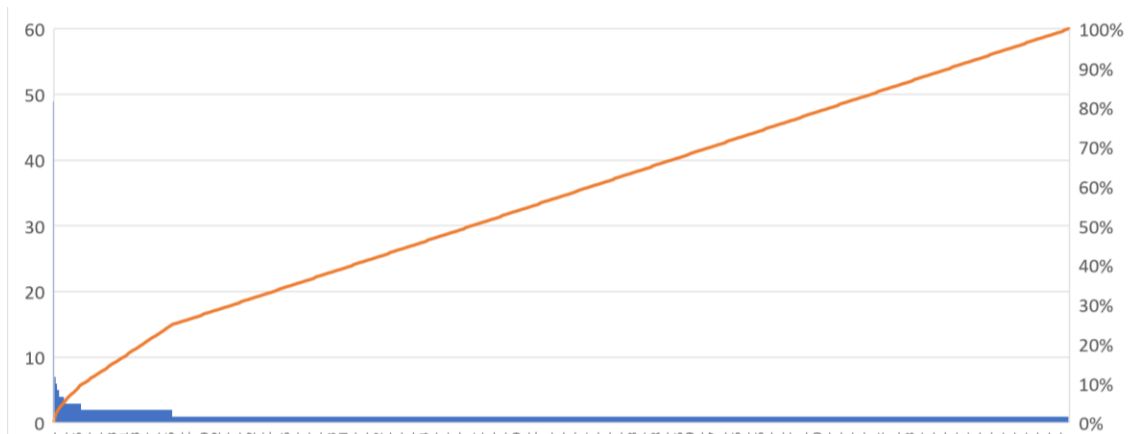
Table 1. Percentage of repeat Lift Assists responses by communities

Communities	Pct of Repeat Lift Assist Incidents at Residential locations	Pct of Repeat Lift Assist Incidents at Senior Living locations
City Centre	55.4%	71.6%
Cloverdale	44.5%	17.9%
Fleetwood	42.4%	54.8%
Guildford	52.5%	36.4%
Newton	48.2%	51.3%
South Surrey	49.1%	60.7%
Whalley (without City Centre)	39.4%	0.0%

Number of Fall/Back Injuries Incidents by Unique Locations (considering the unit number of each location if available)

Approximately over 9,000 residential addresses required the emergency response of *MESA - 17 Fall/Back Injuries* over the 10 years-period with 12% and 41% locations contributing to 25% and 50% of total responses, respectively. Over 1,100 senior living addresses are identified with 5.4% and 22% of locations contributing to 25% and 50% of total responses, respectively. See Graph 6 and 7 for the pareto chart of *MESA - 17 Fall/Back Injuries* responses.

Graph 6. Frequency of Fall/Back Injuries (Trauma) responses by residential addresses (2010 – 2019)



Graph 7. Frequency of Fall/Back Injuries (Trauma) responses by senior living addresses (2010 – 2019)

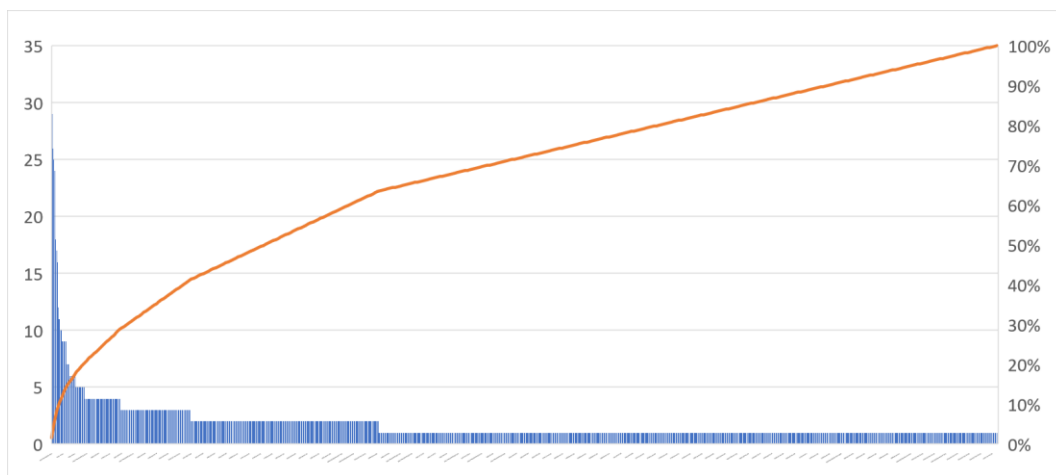


Table 2 shows the percentage of repeat incident locations for fall/back injuries in different communities across the city and that City Centre has the highest percentage of repeat fall/back injury incidents at residential locations with nearly 30%. For senior living, City Centre, Newton, and South Surrey have the highest percentage of repeat location incidents for fall/back injury with over 45%. Appendix E and F display the counts of those incidents and repeat location incidents in different communities for details.

Table 2. Percentage of repeat Fall/Back Injury responses by communities

Communities	Pct of Repeat Fall/Back Injury Incidents at Residential locations	Pct of Repeat Fall/Back Injury Incidents at Senior Living locations
City Centre	28.2%	48.8%
Cloverdale	10.5%	39.4%
Fleetwood	15.0%	27.4%
Guildford	13.3%	31.1%
Newton	12.8%	47.4%
South Surrey	18.8%	46.4%
Whalley (without City Centre)	13.5%	40.0%

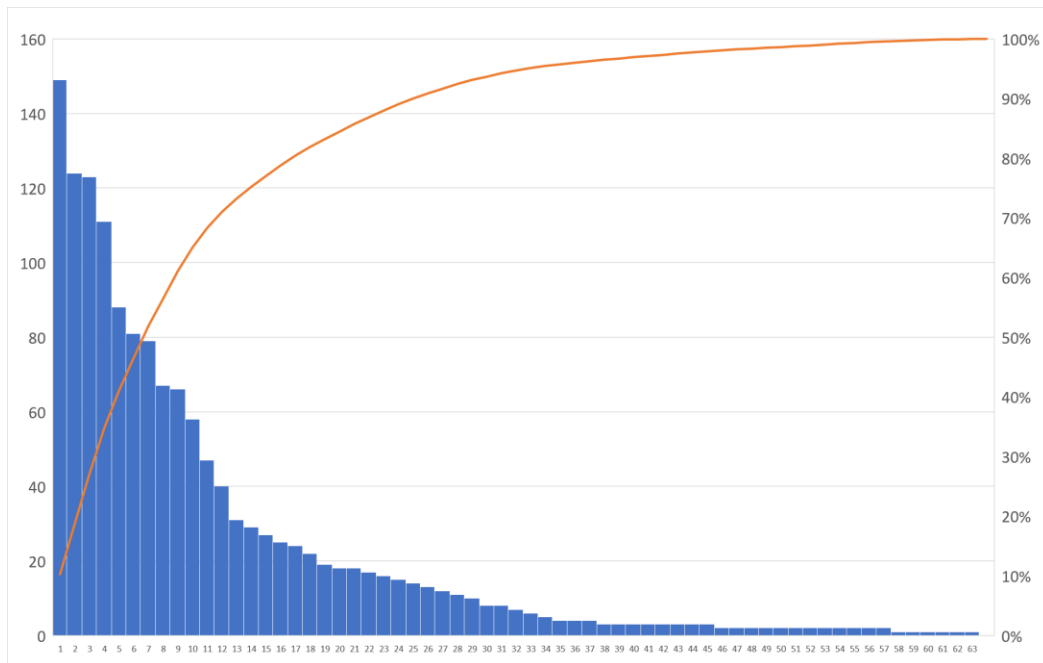
The evidence shows consistently that both residential and senior living locations have most of their lift assist responses triggered by a few locations. It also shows no equal distribution of those responses among the locations. This is less apparent in the *MESA 17 Fall/Back Injuries* responses.

Nonetheless, there is limited information on residents living in those residential and senior living locations to determine whether the same individuals requested the response. This limits the analysis especially if it spans over the long period of time such as 10 years in this case.

Frequency of Incidents from Senior Living (no unique locations)

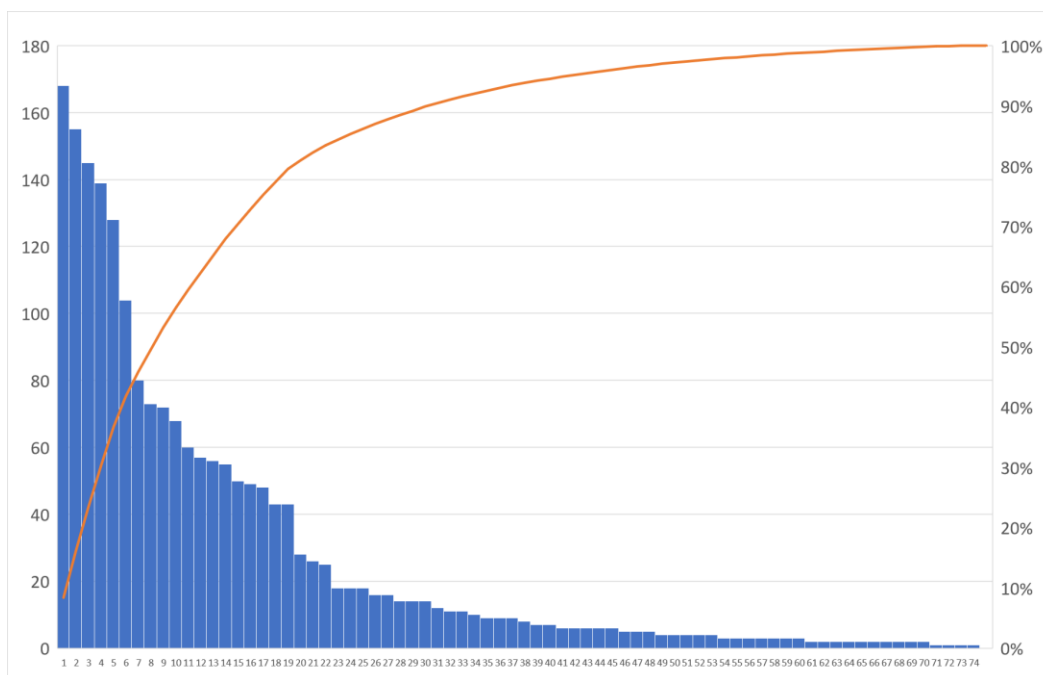
Unlike the previous analysis which considered unique locations as indicated by unit numbers, Graph 8 indicates the number of responses by senior living locations with no consideration of unit numbers as unique identifiers for each location. The rationale for the analysis is that most of these locations are providing care for more than one individual and managed by health authorities and/or private for profit and non-profit organizations. Thus, these locations likely trigger multiple incidents and would benefit from fall prevention campaigns and the provision of lift assistance equipment. There are approximately 63 senior living addresses identified to have requested response for lift assistance with 10% and 27% of locations contributing to 50% and 80% of all lift assist responses, respectively. Please see Graph 8 for the number of lift assist responses by senior living addresses.

Graph 8. Number of Lift Assist responses by senior living addresses – no unit numbers (2010 – 2019)



Seventy-four (74) senior living addresses are identified as having demand for *MESA - 17 Fall/Back Injuries* responses with over 10% and 26% of locations contributing to 50% and 80% of all responses, respectively. See Graph 9 for details.

Graph 9. Number of MESA - 17 Fall/Back Injuries responses by senior living addresses – no unit numbers (2010 – 2019)



When the unit numbers are stripped out from the senior living addresses, the evidence even more clearly demonstrates that only few locations in the senior living category dominate the *MESA -Lift Assist* and *MESA - 17 Fall/Back Injuries* responses.

Frequency of Multiple Lift Assists and Fall/Back Injuries Incidents within 30 Days

With no complete information on residents living in locations where the incidents took place, the analysis faces limitations in explaining whether the same individuals made the request for service. Nevertheless, an analysis of incident frequency can be conducted for incidents occurring in the same location address within a short period of time, such as a 30-day period. The findings of the study by Cone, EC et al. [3] support the probability of the same individuals making repeat requests for service is higher, with a shorter period in-between the incidents from the same addresses.

Frequency of Lift Assists in individual locations within the span of 30 days

This analysis focuses on the frequency of lift assists in the individual locations in which unit numbers are present within the span of 30 days, 30-60 days, 60-90 days, and over 90 days. The frequency is determined by calculating the number of days in-between responses at the same addresses.

Over the 10-year period of analysis, approximately 46% of all lift assists in residential locations (over 2,100 incidents) are repeat incidents to the same 665 unique residential addresses. Of those repeat incidents, nearly 45% (over 950 incidents) are triggered from 331 residential addresses within a range of 30 days. The evidence also demonstrates an increase in the frequency of incidents from the same addresses within the span of 30 days.

In 2012, only 22% of lift assists contributed to the incidents from the same residential addresses within a span of 30 days. This percentage increased to 56% in 2019 (see Table 3) indicating there was an increase in repeat incidents that occurred within a shorter time span and may have come from the same individuals.

Table 3. Percentage of Lift Assists responses at the same residential address in different time-span (2010 – 2019)

Year	up to 30d	30-60d	60-90d	90+d
2010	42.0%	10.2%	3.8%	43.9%
2011	28.8%	11.0%	9.3%	50.8%
2012	22.3%	11.7%	11.7%	54.3%
2013	38.8%	8.8%	4.4%	48.1%
2014	37.8%	14.7%	7.6%	40.0%
2015	42.7%	13.2%	7.5%	36.6%
2016	38.6%	11.2%	7.5%	42.7%
2017	43.2%	13.1%	7.7%	35.9%
2018	49.3%	11.3%	9.0%	30.4%
2019	56.0%	16.7%	11.7%	15.6%

With respect to senior living locations, there are nearly 60% of all lift-assists (870 incidents), considered repeat incidents to the same 293 unique addresses over 10 years (2010 – 2019). Of those senior living lift assist incidents, one-third (290 incidents) are triggered from 123 senior living locations within a range of 30 days. Table 4 shows the increasing frequency of those repeat incidents within 30 days time span over the last 7 years. In 2013, only 10% of repeat lift assists took place within that 30 days span, but this percentage is increased to over 47% in 2019.

Table 4. Percentage of Lift Assists responses at the same senior living address in different time-span (2010 – 2019)

Year	up to 30d	30-60d	60-90d	90+d
2010	16.0%	4.0%	4.0%	76.0%
2011	32.4%	11.8%	2.9%	52.9%
2012	41.3%	12.7%	6.3%	39.7%
2013	10.0%	10.0%	4.0%	76.0%
2014	13.1%	11.5%	3.3%	72.1%
2015	18.2%	9.1%	3.6%	69.1%
2016	20.5%	13.6%	5.7%	60.2%
2017	35.3%	14.7%	3.8%	46.2%
2018	34.8%	8.5%	8.5%	48.2%
2019	47.2%	22.6%	8.8%	21.4%

Tables 3 and 4, demonstrate a trend of increased lift assist frequency occurring at the same residential and senior living locations within the short time span of 30 days which could possibly be made by the same individuals.

Frequency of Fall/Back Injuries (Trauma) in individual locations within the span of 30 days

The analysis on repeat incidents for fall/back injuries demonstrates a much longer time span occurring between the fall/back injuries incidents than the lift assists. On average, 11% of repeat incidents from residential and senior living occurs within the 30-day time window compared to 76% of incident that fall within the 90 day or over time frame. Table 5 and 6 show the percentages of repeat fall/back injury incidents by various time spans between-the-incidents, at residential and senior living, respectively. The analysis shows increasing trends in repeat incidents, within a 30-day time span for residential and senior living locations.

Table 5. Percentage of Fall/Back Injuries (Trauma) responses at repeat residential address in different time-span (2010 – 2019)

Year	up to 30d	30-60d	60-90d	90+d
2010	4.1%	2.7%	2.1%	91.1%
2011	6.8%	1.9%	2.5%	88.9%
2012	6.3%	5.3%	3.9%	84.5%
2013	11.5%	6.5%	5.5%	76.5%
2014	7.5%	8.6%	3.2%	80.6%
2015	10.3%	8.8%	5.9%	75.0%
2016	9.2%	4.4%	8.3%	78.2%
2017	21.3%	10.1%	2.2%	66.3%
2018	26.0%	6.3%	7.3%	60.4%
2019	9.6%	9.6%	11.5%	69.2%

Table 6. Percentage of Fall/Back Injuries (Trauma) responses at repeat senior living address in different time-span (2010 – 2019)

Year	up to 30d	30-60d	60-90d	90+d
2010	10.0%	6.3%	0.0%	83.8%
2011	13.4%	4.9%	4.9%	76.8%
2012	9.0%	7.0%	8.0%	76.0%
2013	11.0%	8.0%	7.0%	74.0%
2014	10.5%	8.6%	6.7%	74.3%
2015	13.6%	10.2%	5.9%	70.3%
2016	8.3%	9.3%	11.1%	71.3%
2017	7.7%	12.1%	12.1%	68.1%
2018	30.9%	8.8%	4.4%	55.9%
2019	35.3%	20.6%	11.8%	32.4%

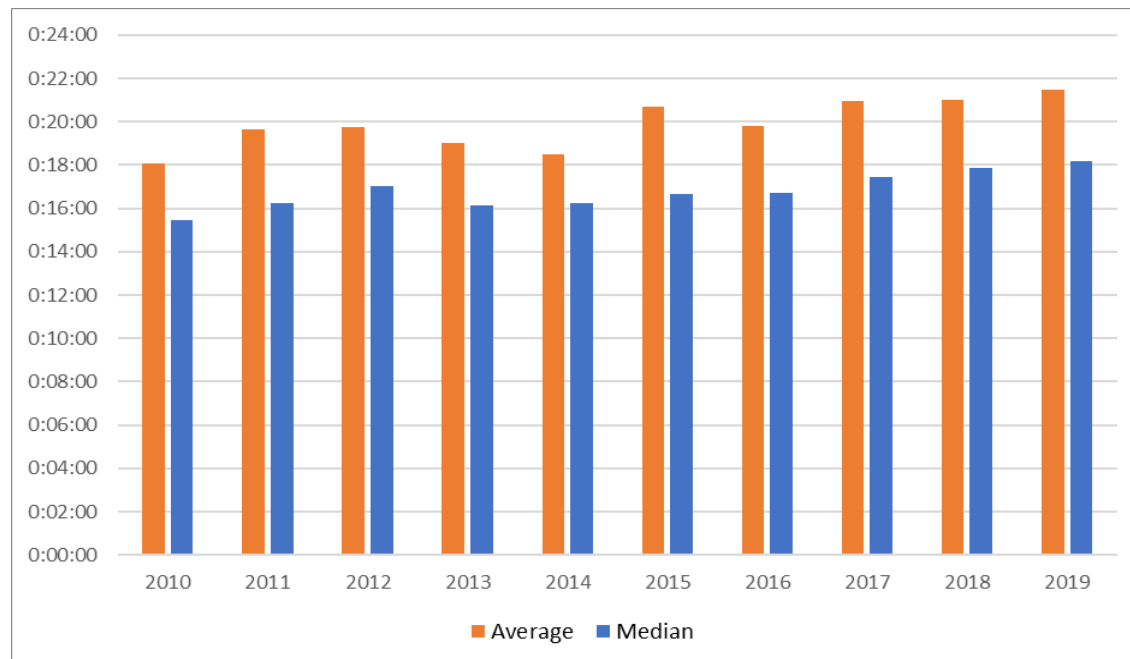
Total Committed Time by Fire Crews

The previous analysis not only demonstrates the steady increase of lift assists and fall/back injury incidents over the years, but also shows the unequal distributions of those incidents among the locations. A small number of locations dominated the majority of lift assists with repeat incidents. The evidence also displays the increase of repeat incidents from the same locations within the short timespan of 30 days which could strongly indicate that those incidents could have been made by the same individuals. This finding is consistent with the analysis shown in previous studies [1], [2], [3] which refer to the consequences of increasing repeated incidents in overloading the limited resources of first responders. This analysis demonstrates the impact of increasing repeat lift assists and fall/back injury responses on the workload of fire crews in the City of Surrey. The analysis displays the total committed time fire crews spent in responding to repeat location incidents, their proportions to all lift assist and fall/back injury incidents, and their proportions to total apparatus' utilization.

Total Committed Time for Lift Assists

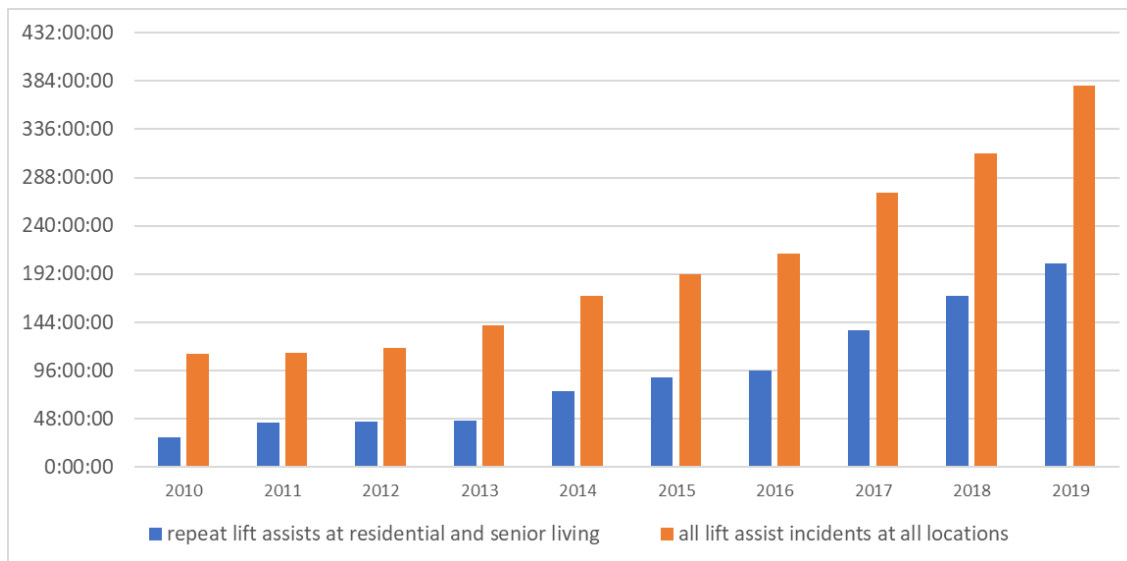
50% of the time, fire crews consistently spent between 16 and 17 minutes for each lift assist at residential and at senior living locations, from which 95% of incidents were originated (see Graph 10). No significant changes of total committed time per lift assist have been displayed over the years.

Graph 10. Average and Median Time Fire Crews spent for Lift Assist incidents at residential and senior living locations (2010 – 2019)



Despite the relatively short average times spent at lift assist incidents, the increasing incident volume for lift assists has impacted the significant growth in the total time fire crews committed to these incidents. Graph 11 indicates the growing proportions of repeat lift assist incidents in the total committed time fire crews spent for lift assists at residential and senior living locations (from 26% in 2010 to 53% in 2019). Across all locations, the total committed time for lift assists has been growing significantly from 116 hours in 2010 to nearly 400 hours in 2019 (over 16 days or 2.5% of total apparatus' utilization).

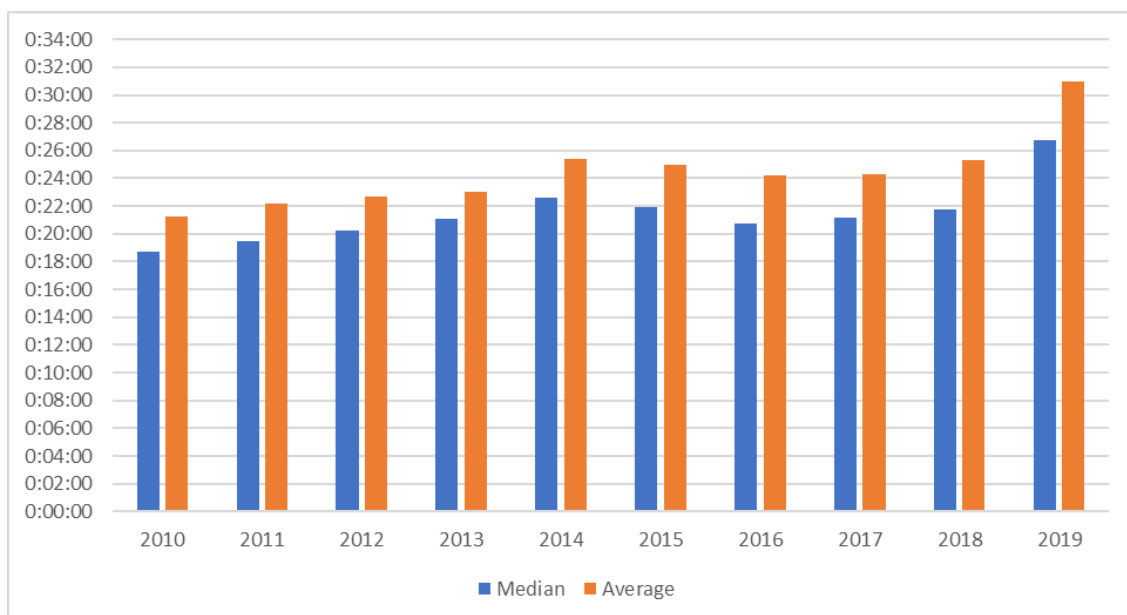
Graph 11. Total Committed Time by Fire Crews for Lift Assists (2010 – 2019)



Total Committed Time for Fall/Back Injuries incidents

50% of the time, fire crews spent consistently on average between 19 and 20 minutes for each fall/back injury response for residential and senior living locations from which 70% of those incidents originated. A significant increase of total committed time occurred in 2019 to over 26 minutes (see Graph 12).

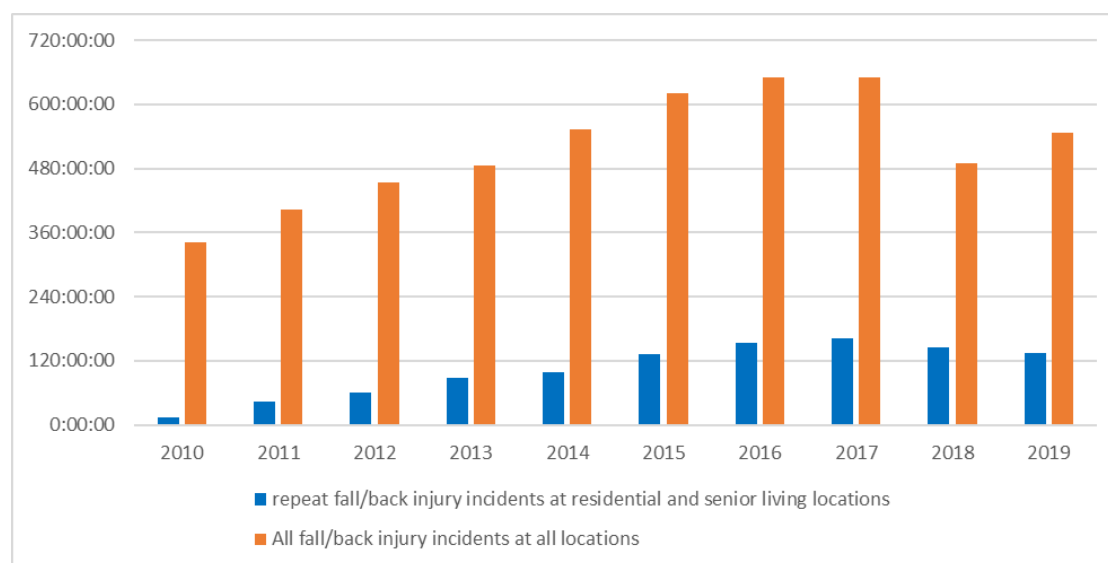
Graph 12. Average and Median Time Fire Crews spent for Fall/Back Injuries (Trauma) at residential and senior living (2010 - 2019)



During the period 2010 to 2017, increasing incident volumes, have impacted the significant growth in the total time fire crews spent for fall/back injury related incidents (see Graph 13). With the major downturn of fall/back injury incident volumes in 2018 and 2019, the total committed time

leveled with the times in 2012 and 2013. Graph 13 also indicates the growing proportions of repeat fall/back injury incidents to the total committed time the fire crews spent at residential and senior living locations (from only 4% in 2010 to 25% in 2019). Across all locations, the total committed time for falls responses have been steady in 2018 and 2019 to nearly 660 hours, (over 28 days or 4.3% of total apparatus utilizations).

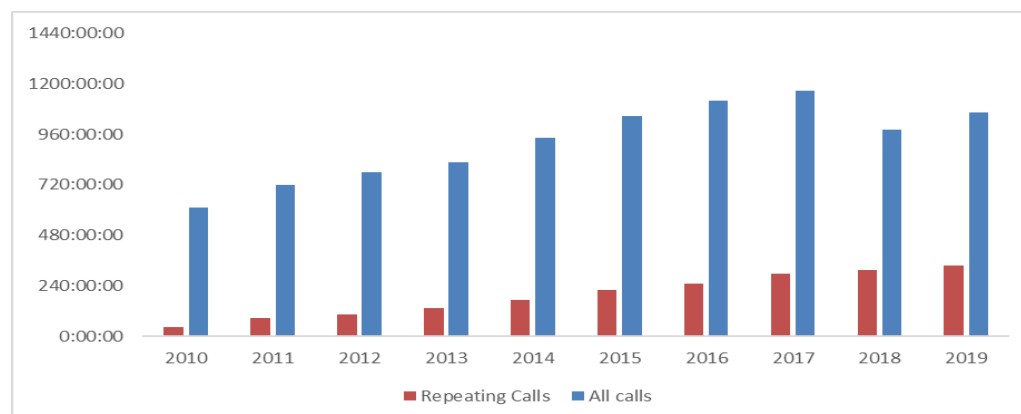
Graph 13. Total Committed Time by Fire Crews for Fall/Back Injuries (2010 – 2019)



Total Committed Time for both Lift Assists and Fall/Back Injuries

During the ten-year period of 2010 to 2019, fire crews spent in total approximately 9,200 hours (385 days) in response to both lift assist and fall/back injury incidents. This represented an average of 39 days every year (see Graph 14) and reflects approximately 6% of total utilization of all apparatus time spent during a year. The analysis also shows steady growth in the proportions of the committed time that fire crews spent to respond to repeat incidents for both incident types, from only 7% in 2010 to 32% in 2019 (see Graph 14).

Graph 14. Total Committed Time by Fire Crews for Fall/Back Injuries and Lift Assists



Conclusions

Previous studies have shown the growing proportions of lift assist and fall/back injury related incidents in emergency medical services which have been influenced by an aging population. The evidence shows the same trend has occurred in the City of Surrey over the last 10 years. From 2010 to 2016, the data shows a consistent increase in the number of lift assist incidents, however, starting in 2017, a 15% annual increase occurred from the previous years. Most of those incidents (over 96%) took place in residential and senior living locations. Between 2010 to 2017, this same trend occurred with fall responses in which significant increases took place before notable declines in 2018 and 2019. Around 85% of fall incidents took place in residential and commercial locations although the proportion of incidents in senior living has increased closer to the same proportion in commercial locations over the past 2 years.

These significant response changes occurred at or around, the same time BCEHS changed its policies for responding to lift assist incidents (2017) and implemented a new Clinical Response Model (2018) based on initial incident triage acuity. By way of this research, there is a strong correlation between fire crew utilization increases for incidents related to lift assists and the shifting policies, priorities and workload assigned by BCEHS.

Further, the analysis shows an increase in repeat incidents from the same locations as previous studies findings also support. The data shows no equal distribution of the incidents among the locations and indicates that only a few of those locations contribute a significant amount to repeated incidents and dominate the total number of incidents. Only 17% of over 2,500 residential locations have contributed to 50% of all lift assist responses over the last 10 years (2010 to 2019), and nearly 100% of all lift assists in senior living occurred at repeat locations.

Locations in City Centre have dominated repeat lift assist incidents at residential and senior living with over 55% and over 70% of all lift assists, respectively. Repeat incidents from the same locations have been less apparent in fall/back injury incidents. Approximately 41% of over 9,000 residential locations contributed to 50% of all incidents related to fall/back injury at residential locations, and 22% of over 1,100 senior living locations contributed to 50% of all fall/back injury incidents at senior living. City Centre still dominated the repeat incidents at residential and senior living with over 28% and nearly 50% of all fall incidents at the respective locations.

Since there is limited information on the residents living in those locations, a short time span between incidents was used to mitigate issues in determining repeated incidents made by the same individuals. A short time span of 30 days between repeat incidents has been selected to determine whether repeat incident requests have been made by the same individual. The analysis demonstrates an increase of repeat incidents for lift assists and fall/back injury responses within the short time window in both residential and senior living locations.

Although the data shows consistent time committed by fire crews at each lift assist or fall/back injury incident, the growing number of repeat incidents for both incident types are a contributing factor to the significant increases of total time committed by the Surrey Fire Service. The data shows that fire crews have spent an average of 39 days each year to respond to lift assist and fall/back injury

incidents. This represents approximately 6% of total apparatus' utilization. The proportion of repeat incidents have increased from 6% in 2010 to 32% in 2019.

Although this study has taken place in the City of Surrey, similar phenomenon is suspected to be occurring in other cities in Metro Vancouver and Canada as the population is getting older. Statistics Canada has reported an average increase of 3.6% per year for the senior population (65 years old and over) since 2010 and projected to increase by at least 34% and 49% in the next 10 and 20 years, respectively [12], [13].

This research identifies an opportunity for health care providers and senior living locations to partner on education, training, and systems to provide on-site lift assistance equipment to support residents who may be prone to falls. Emergency service first responders are experiencing consistent annual growth in the responses for all emergency medical service incidents. With an aging population in Canada forecast over the next 20 years, prioritizing emergency responses over non-emergency responses will continue to put pressure on BCEHS and local government first responder response systems. To prepare for this aging population growth and response system pressure, now is the time for public health to find more efficient solutions in addressing the non-emergent needs of patients requiring non-emergency lift assistance.

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- [10] https://www.healthspace.ca/Clients/FHA/FHA_Website.nsf/CCFL-Adult-Frameset-Facilities
- [11] <https://www.bchousing.org/housing-assistance/housing-with-support/assisted-living-residences>
- [12] Statistics Canada, Population estimates on July 1st, by age and sex. Table: 17-10-0005-01
- [13] Statistics Canada, Projected population, by projection scenario, age and sex, as of July 1. Table 17-10-0057-01

Author Biographical Information

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Chris Biantoro, Ph.D, is the strategic planning analyst for the City of Surrey Fire Service, BC. He has a background of operations research and extensive working experiences in advanced analytics, data science, and statistical modeling. He possesses a Doctorate degree in Operations Engineering from Technical University of Berlin. Contact him at chris.biantoro@surrey.ca

Appendix A



Date: February 2017

File:
Cliff:

To: All Health Authorities and Licensed Long Term Care Residential Facilities

RE: LIFT ASSISTS AT LICENSED LONG TERM RESIDENTIAL CARE FACILITIES

Long term care facilities licensed under the *Community Care and Assisted Living Act* and extended care units and private hospitals designated under the *Hospital Act* are required to ensure that patient admission screening processes consider staffing levels and training, and to provide the necessary equipment to ensure safe and adequate care. Many organizations have established "No Manual Lift" policies to protect both patients and staff, requiring the use and availability of mechanical or other safe lifting techniques *on site*.

Effective March 1, 2017, BCEHS will no longer respond to requests from licensed long term care facilities requesting lift assist support where no emergency medical care is required.

BCEHS' primary responsibility is to provide emergency medical services. When paramedics are dispatched to these types of events, communities are often left without paramedics available to respond to local medical emergencies.

As of this date, this policy will be reinforced anytime a BCEHS call-taker receives a lift assist request from a licensed long term residential care facility.

Paramedics who arrive at a licensed long term residential care facility and determine, on assessment, that the call is for a lift assist with no emergency medical services required, will be instructed to notify dispatch and clear the call.

BCEHS will continue to monitor the number of calls for lift assists and will engage directly with local facilities and/or licensing offices to ensure the needs of patients are being appropriately met.

We want to emphasize BCEHS has not withdrawn support for patients needing emergency medical care and transport to the hospital from residential facilities.

We look forward to continuing to work with our health care partners to develop and implement strategies that best support patient care across the continuum.

If you have any further questions or need clarification, please contact Emily Hamilton, Stakeholder Engagement Lead at bcehs.ca.

Sincerely
Original signed by

Barb Fitzsimmons
Chief Operating Officer
British Columbia Emergency Health Services
(BCEHS)

Original signed by

Linda Lupini
Executive Vice President
PHSA and British Columbia Emergency Health
Services (BCEHS)

BCEHS Changes To Service – Teleforum Summary

February 24, 2017 | News

What is Changing?

Effective March 1st, 2017, the BC Emergency Health Services (BCEHS) will no longer respond to requests from licensed long term care facilities for lift assist support where no emergency medical care is required. This does not apply to Assisted Living Facilities.

SUMMARY OF TELEFORUM

SafeCare BC hosted a teleforum on February 24th regarding the changes to the BCEHS recent changes to service. The purpose of the discussion was to clarify BCEHS' position on lift assist calls, how this change will be rolled out, how the Workers Compensation Act and Occupational Health and Safety Regulations tie-in with the issue of resident transfers, what solutions may be available for certain transfer scenarios, and to provide participants with the opportunity to ask questions.

We have developed a short survey to assess the sector's readiness for this change, please take a couple of minutes to complete the survey [here](#).

QUESTIONS AND ANSWERS

Will the BCEHS still respond to calls made by care homes?

Yes, the BCEHS is not withdrawing support to care homes. The BCEHS has not withdrawn support for patients needing emergency medical care and transport to the hospital from care homes.

Will there be a transition period for this change? (i.e. If a long-term care home requires assistance on March 2nd, will services not be provided?)

There will be no transition period, the changes will come into effect on March 1st 2017.

What happens if a resident's condition results in a medical emergency resulting from them being manually transferred by one of our care staff?

In any situation that a person requires emergency medical care, the BCEHS will respond.

What if a family member calls 911 because one of their family members has fallen outside and requires assistance?

BCEHS would respond to all calls from the public; the paramedics would arrive on scene and assist and then notify dispatch that a lift was required. The BCEHS would then follow up directly with the care home.

Why is the BCEHS still supporting assisted living sites for lift assists but not residential care sites?

The admission requirements for Assisted Living are different from those for Residential Care, BCEHS is still providing support to Assisted Living because they aren't required to have lift equipment onsite for their clients. However, all care homes should have lift equipment for their residents, because they admit people who can't ambulate or transfer independently.

What if the care home calls dispatch and insists on having the ambulance services arrive on site?

The caller will be transferred to a BCEHS Manager who will then explain the change in policy.

What if the caller does not indicate that a lift assist is required when they call for an ambulance?

Ambulance services will arrive on site and assist with the lift. Paramedics will inform dispatch that a lift assist took place, and the BCEHS will follow up directly with the care home.

What if the care home does not have appropriate equipment that can be used outside to assist with the lift?

The paramedics will arrive on scene to assist and then follow up directly with the care home to ensure the needs of the patients are being appropriately met.

Is there someone at the BCEHS that I can talk to directly about these changes?

Yes, you can contact Emily Hamilton, Stakeholder Engagement Lead at BCEHS

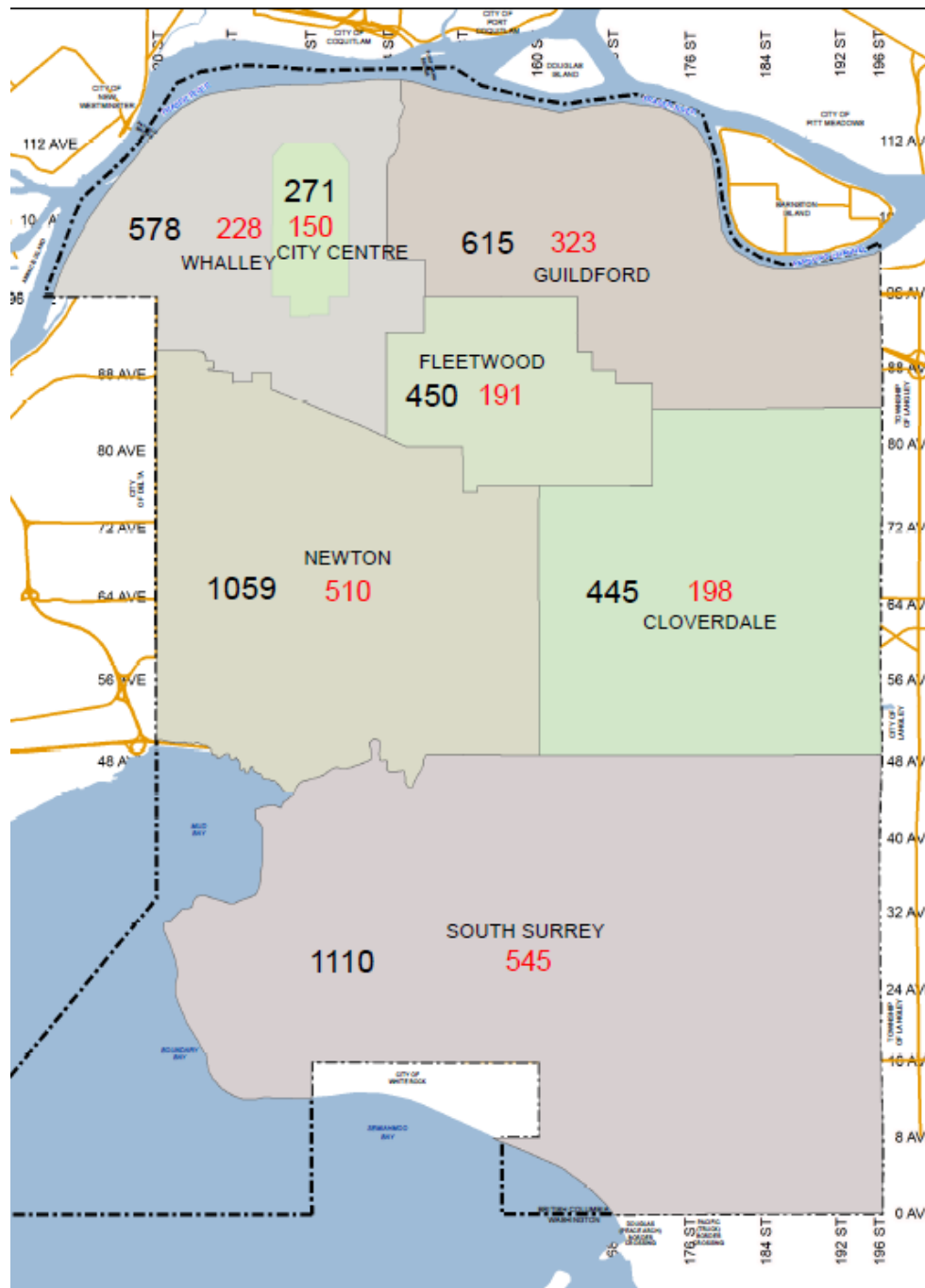
Appendix B

MAPPING OF PROPERTY USAGE INTO CATEGORIES FOR FURTHER ANALYSIS

CATEGORY	PROPERTY USAGE TYPE
RESIDENTIAL	SINGLE FAMILY DWELLING, DUPLEX/TRIPLEX/4-PLEX, TOWNHOMES, APARTMENTS, HIGH-RISE, MOBILE HOMES
SENIOR LIVING	ASSISTED LIVING, RESIDENTIAL SHORT/LONG-TERM CARE, SENIOR HOUSING, SENIOR INDEPENDENT LIVING
COMMERCIAL	OFFICES, STORES, CHILD CARE, WAREHOUSES, RESTAURANTS, SCHOOLS, RELIGIOUS FACILITIES, RECREATION/SPORT FACILITIES, SCHOOLS, FACTORIES, THEATRES/ARENAS, WORKSHOPS, GARAGES, HOTEL/MOTELS, TRANSIT FACILITIES, MEDICAL OFFICES, BANK, PUBLIC FACILITIES
PARK/STREET	N/A
COMMUNITY HEALTH CENTRE	HOSPITAL, URGENT/EMERGENCY CARE
BOARDING/RECOVERY HOUSE	BOARDING HOUSE, RECOVERY HOUSE

Appendix C

SURREY COMMUNITIES WITH COUNTS OF LIFT ASSIST INCIDENTS AND REPEAT INCIDENTS AT RESIDENTIAL



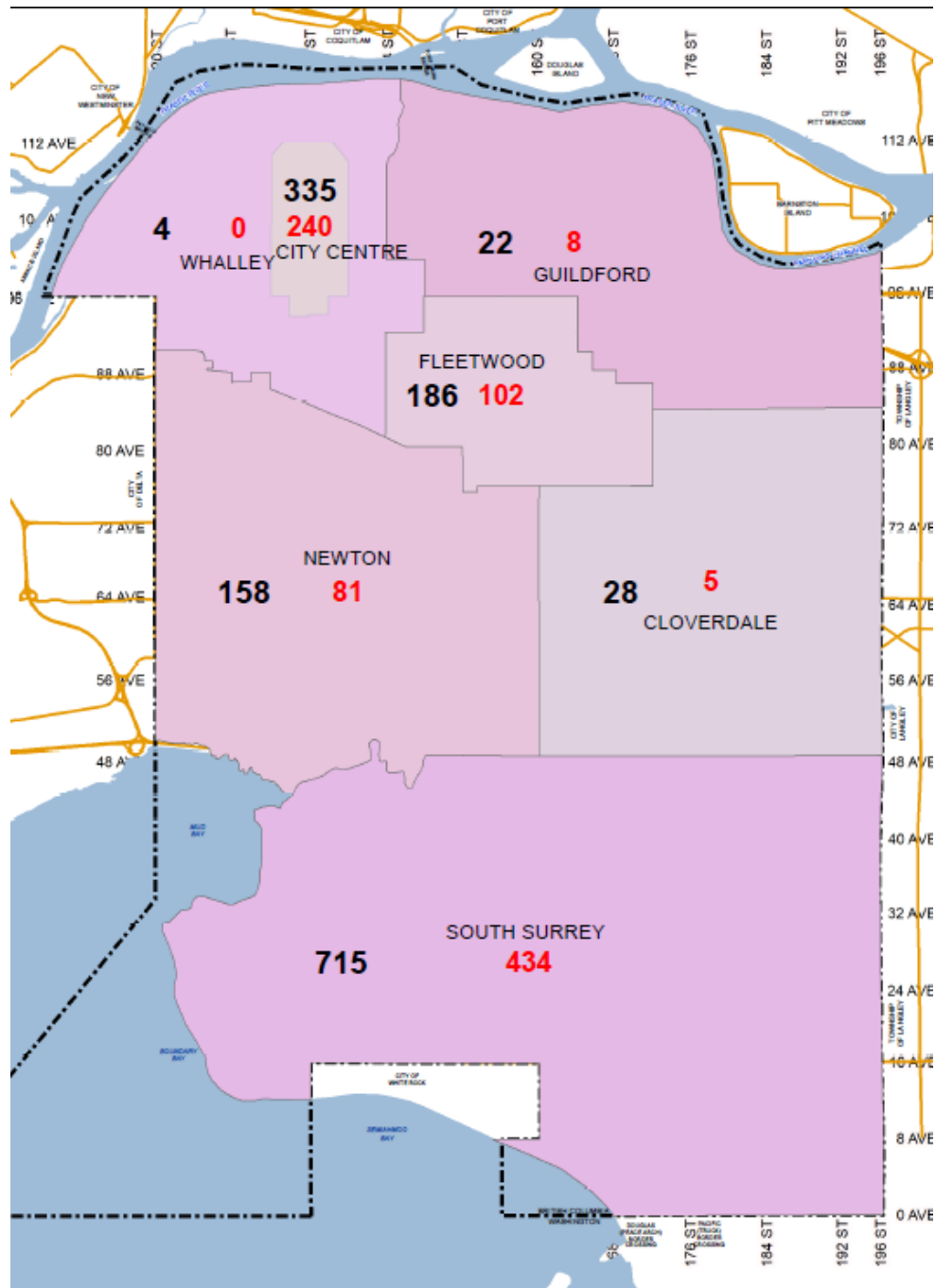
Black Font: count of lift assists incidents.

Red font: count of repeated location lift assist incidents.

Incidents from properties with no latitudes and longitudes are excluded from map.

Appendix D

SURREY COMMUNITIES WITH COUNTS OF LIFT ASSIST INCIDENTS AND REPEAT INCIDENTS AT SENIOR LIVING



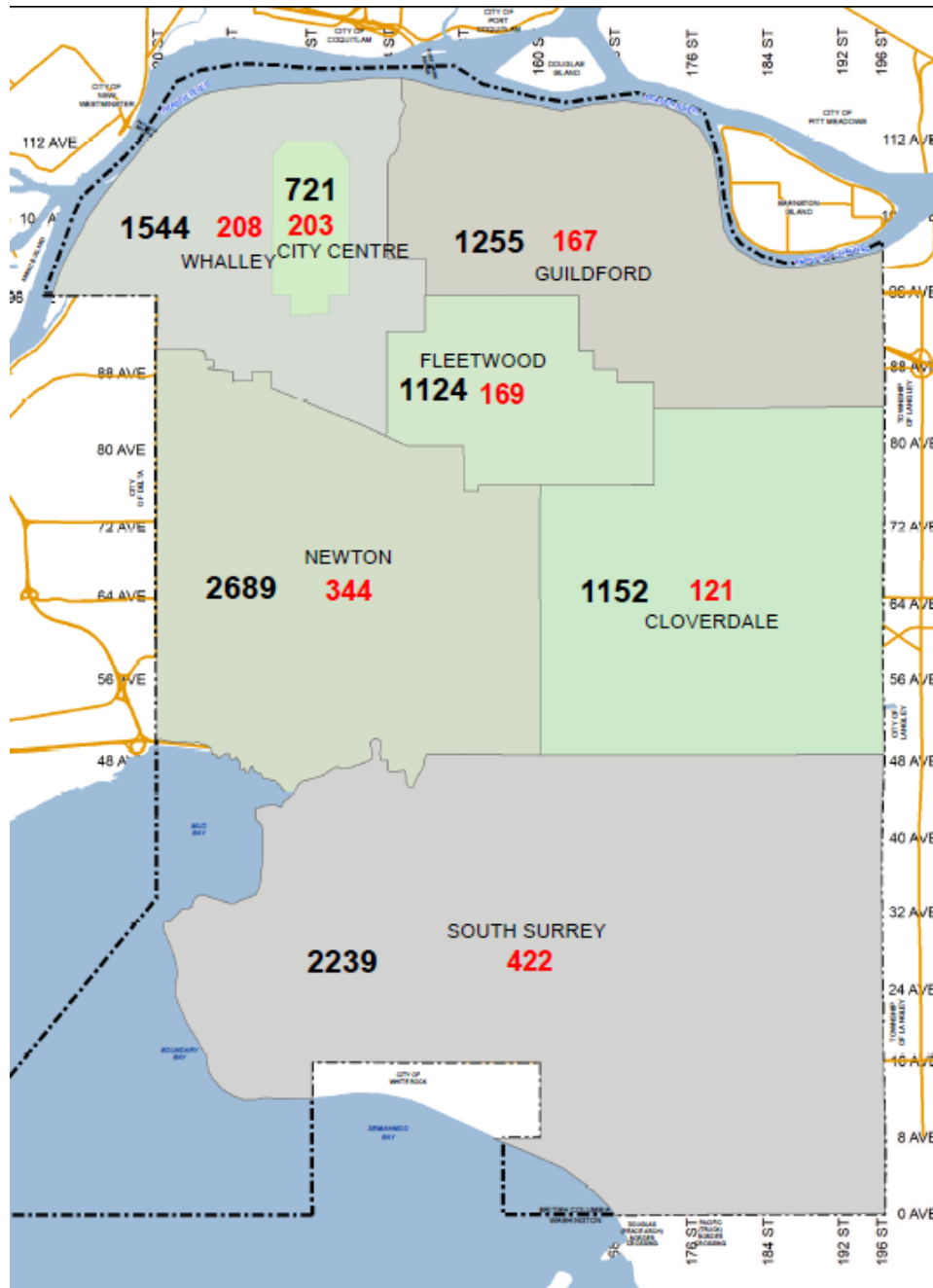
Black Font: count of lift assists incidents.

Red font: count of repeated location lift assist incidents.

Incidents from properties with no latitudes and longitudes are excluded from map.

Appendix E

SURREY COMMUNITIES WITH COUNTS OF FALLS/BACK INJURIES INCIDENTS AND REPEAT INCIDENTS AT RESIDENTIAL



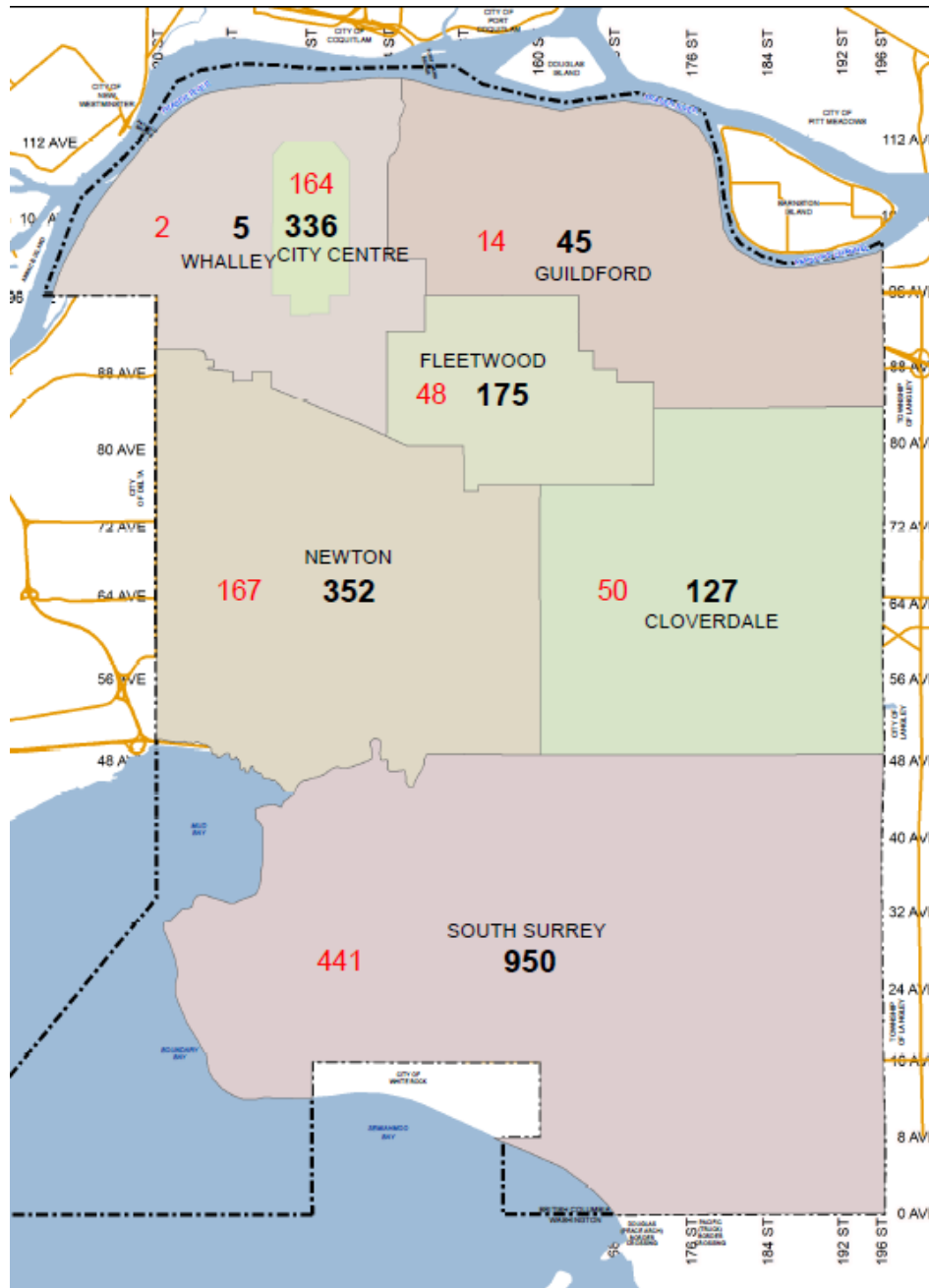
Black Font: count of lift assists incidents.

Red font: count of repeated location lift assist incidents.

Incidents from properties with no latitudes and longitudes are excluded from map.

Appendix F

SURREY COMMUNITIES WITH COUNTS OF FALLS/BACK INJURIES INCIDENTS AND REPEAT INCIDENTS AT SENIOR LIVING



Black Font: count of lift assists incidents.

Red font: count of repeated location lift assist incidents.

Incidents from properties with no latitudes and longitudes are excluded from map.

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