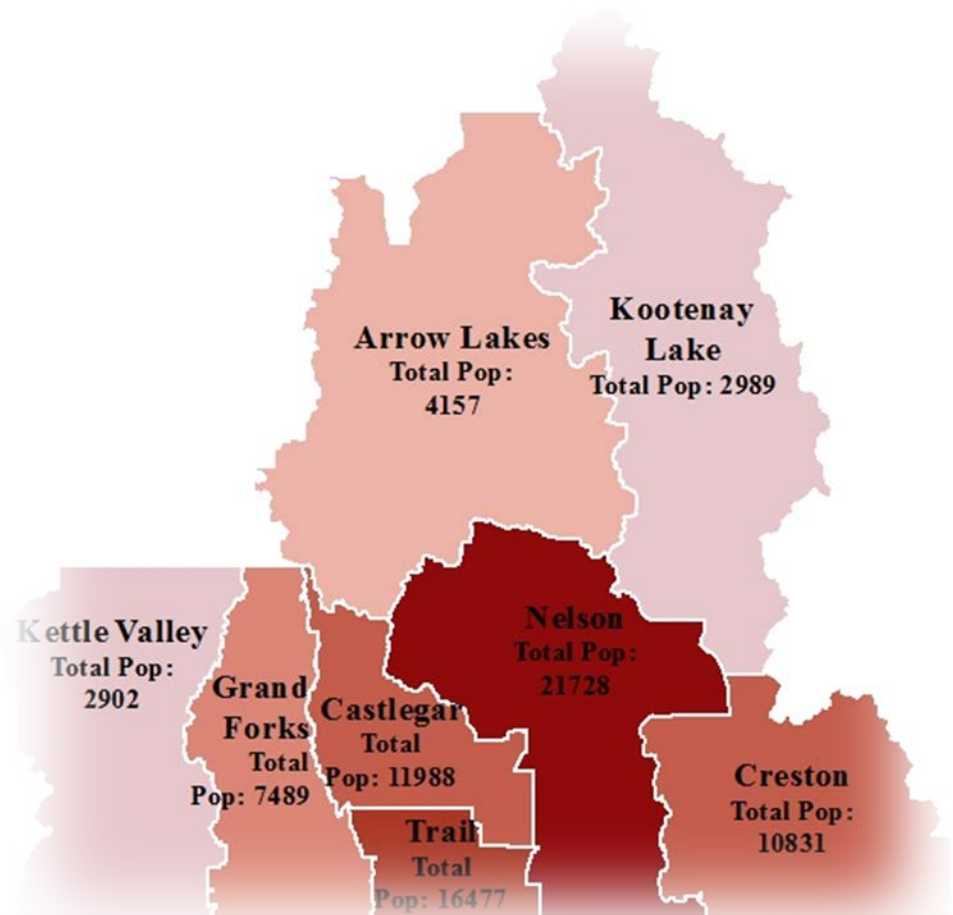


Aging Populations and Health Services in the West Kootenay Boundary Regional Hospital District



05 August 2015

A preliminary analysis of changing demographics, select available health service facilities and transportation options within the WKBRHD

Prepared for: Walter Popoff, Ramona Faust, Garry Jackman
Regional District of the Central Kootenay, Regional Directors

Prepared By: Kailee Woodbeck, GIS Developer
Ian Parfitt, SGRC Coordinator
Selkirk Geospatial Research Centre



Table of Contents

List of Tables	3
List of Figures	4
Introduction	5
Overview	5
Project Scope	5
Analysis	6
Population Projections	6
Service Areas	9
Ground Ambulance/ Emergency Room	9
Diagnostic Facilities	10
Care Beds	12
Hospital Care	12
Long Term Care	14
Transportation	17
Conclusion	20
Discussion	20
Recommendations	22
Literature Cited	24

List of Tables

Table 1. Cities, towns and communities in each LHA within the WKBRHD.....	6
---	---

List of Figures

Figure 1. Map of study area.	5
Figure 2. Percent population by age group of combined LHAs.....	6
Figure 3. Projection of percent population of 'baby boomers' in WKBRHD LHAs.....	7
Figure 4 Projection of percent population over 65 in WKBRHD.....	8
Figure 5. Percent change in population by LHA from 2004 to 2034.....	8
Figure 6. Service areas for BC Ambulance Service in the WKBRHD.	9
Figure 7. Map displaying previous and current emergency room service areas.	10
Figure 8. Percentage of houses from 2002 and 2015	10
Figure 9. Diagnostic facility by service type. From top left to right: Pulmonary Function, Radiology and Diagnostic Ultrasound service areas. From bottom left to right: Nuclear Medicine, Electroencephalography and Electromyography service areas.	12
Figure 10. Comparison of number of beds per 1000 people.....	12
Figure 11. Number of beds/ 1000 people by hospital in WKBRHD.	13
Figure 12. Hospital beds by functional centre in central Kootenay region.....	13
Figure 13. Number of Long Term Care Beds by Town from 2002 to 2015	14
Figure 14. Change in Long Term Care Beds.	14
Figure 15. From left to right: Long term care beds vs. percent population age 65 and over, 50- 64 and under 50 years.....	15
Figure 16. Long term care beds per 1000 people.....	16
Figure 17 Estimate of population over 85 years requiring care vs. number of long term care beds.....	16
Figure 18. BC Transit Bus schedule for RDCK and Trail.	18
Figure 19. From left to right: HandyDart, Health Connections and Paratransit service routes.	19

Introduction

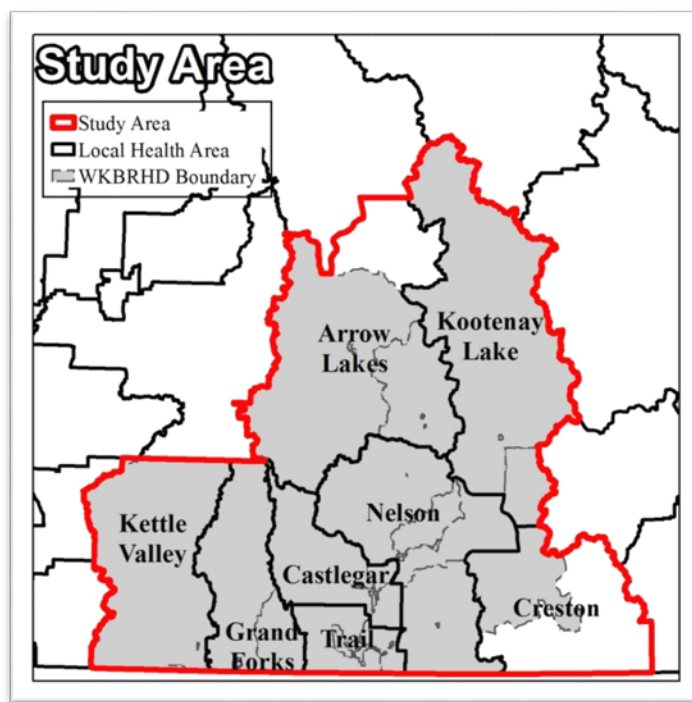
Overview

The West Kootenay Boundary Regional Hospital District (WKBHRD) is an area that encompasses 78 000 km² with a population of approximately 78 000 residents. This relatively remote region is characterized by rugged terrain, winding roads and challenging weather conditions. Low populations, geographic remoteness and long travelling times contribute to the challenges of providing appropriate access to health care in the communities within the WKBHRD.

These challenges have been compounded by the closure and/ or transfer of diagnostic services and decreasing hours of operation of existing services. The movement of services to urban areas can reduce health delivery costs to the provincial government through centralization of services, but this strategy results in longer travelling times for residents requiring health care in rural and remote communities. Rural Health Service BC classifies 7 communities within the WKBHRD as rural or remote including; Grand Forks, Creston, Nelson, Castlegar, Nakusp, Kaslo and New Denver¹. Aging people typically require more health services, and approximately 37% of the population within the WKBHRD's local health areas are projected to be over the age of 65 by 2025. With a significant percentage of the population aging in the WKBHRD, it is important to review existing health care services to make informed decisions based on the District's health care needs.

Project Scope

The purpose of this project was to analyze the population demographics and health services within the WKBHRD to help evaluate the infrastructure in place to accommodate the changing population demographic. Populations, health facility service areas, as well as hospital and long term care bed counts in the region were analyzed. Transportation options within the Regional District of the Central Kootenay (RDCK) were evaluated as a pilot for future research opportunities for the district. Analysis for this project was performed using geographic information system (GIS) technologies, a system designed to analyze data with a geographic component².



Source: GIS data of LHA and electoral boundaries obtained through BC Stats, WKBHRD boundary approved by RDCK district managers.

Figure 1. Map of study area.

¹ Ministry of Health. 2015. Rural Health Services in BC: A Policy Framework to Provide a System of Quality Care. <http://www.health.gov.bc.ca/library/publications/year/2015/rural-health-policy-paper.pdf>. 03/26/2015.

² ESRI. 2015. What is GIS? <http://www.esri.com/what-is-gis>. 03/27/2015.

Local Health Area	City	Town/ Village	Community
Arrow Lakes		Nakusp	Edgewood
		New Denver	Fauquier
		Silverton	Burton
			Trout Lake Hills
Castlegar	Castlegar		Robson Deer Park
Creston		Creston	Yahk
			Kitchener
			Boswell
			Wyndel
Grand Forks	Grand Forks		Christina Lake
Kettle Valley	Greenwood	Midway	Rock Creek
			Bridesville
			Westbridge
			Beaverdell
Kootenay Lake		Kaslo	Crawford Bay
			Riondel
		Meadow Creek	Ainsworth Hot Springs
			Argenta
			Gray Creek
Nelson	Nelson	Slocan	Winlaw
		Salmo	Ymir
		Balfour	
		Warfield	Genelle
Trail	Trail		
	Rossland	Montrose	
		Fruitvale	

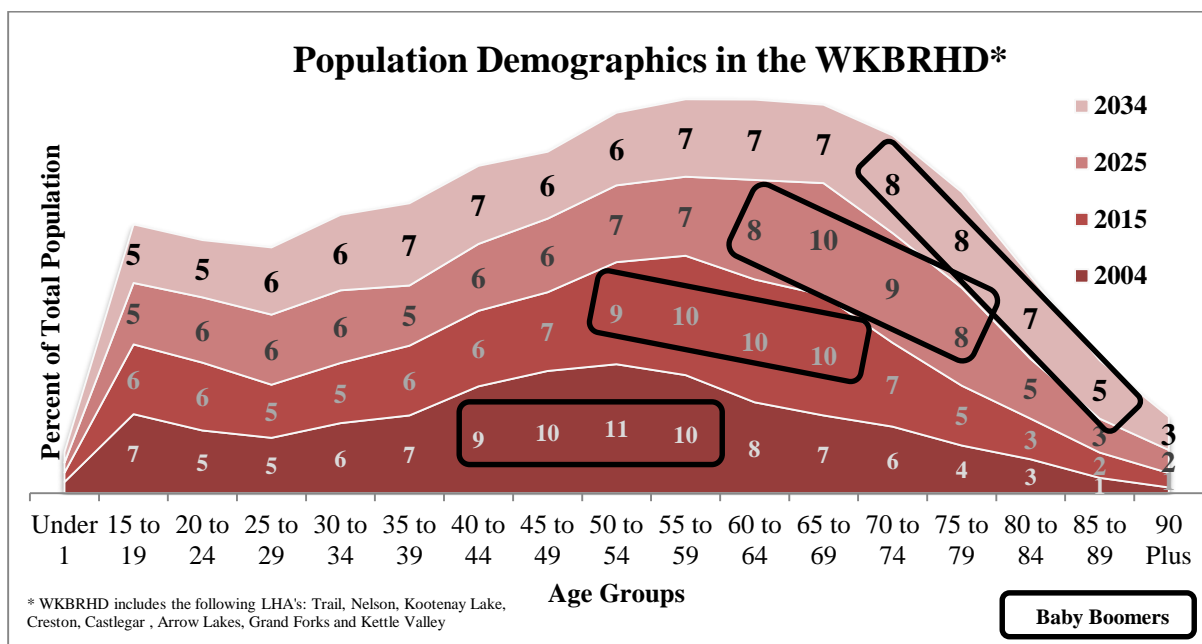
Source: BC Stats, Data BC.

Table 1. Cities, towns and communities in each LHA within the WKBRHD.

Analysis

Population Projections

The projected change in population demographics were analyzed for the Trail, Nelson, Kootenay Lake, Creston, Castlegar, Arrow Lakes, Grand Forks and Kettle Valley LHAs. Figure 2 shows the population projection for the LHAs listed above, with the ‘baby boomer’ demographic highlighted. The ‘baby boomers’ demographic refers to the population born from 1946 to 1964.

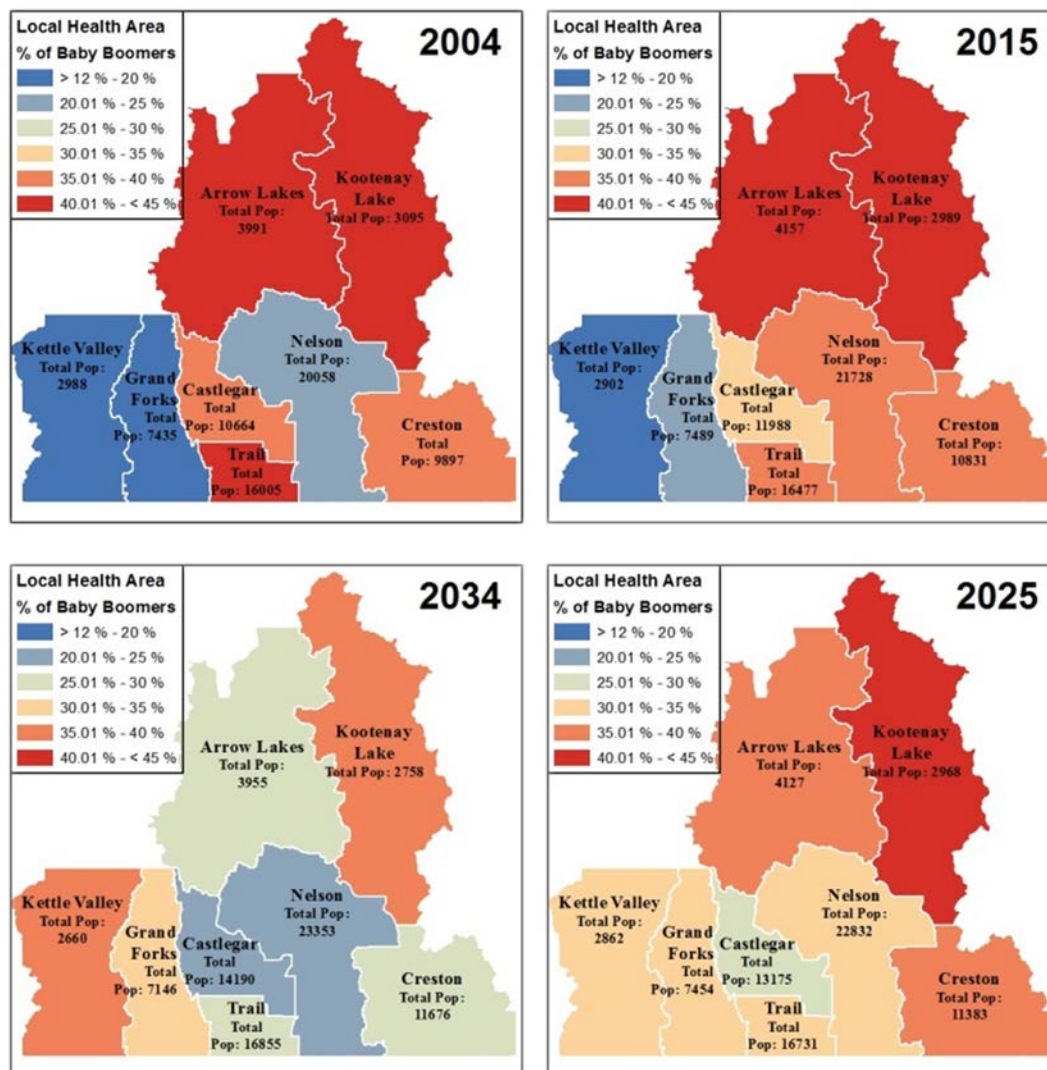


Source: Population projection data obtained through Statistics Canada.

Figure 2. Percent population by age group of combined LHAs.

It is evident from Figure 2 that an increase in the percent population over 65 will occur from 2015 through to 2025. By 2034 that increase will move to the 75 years and older age categories. This increase in the aging population is a result of the aging “baby boomer” demographic.

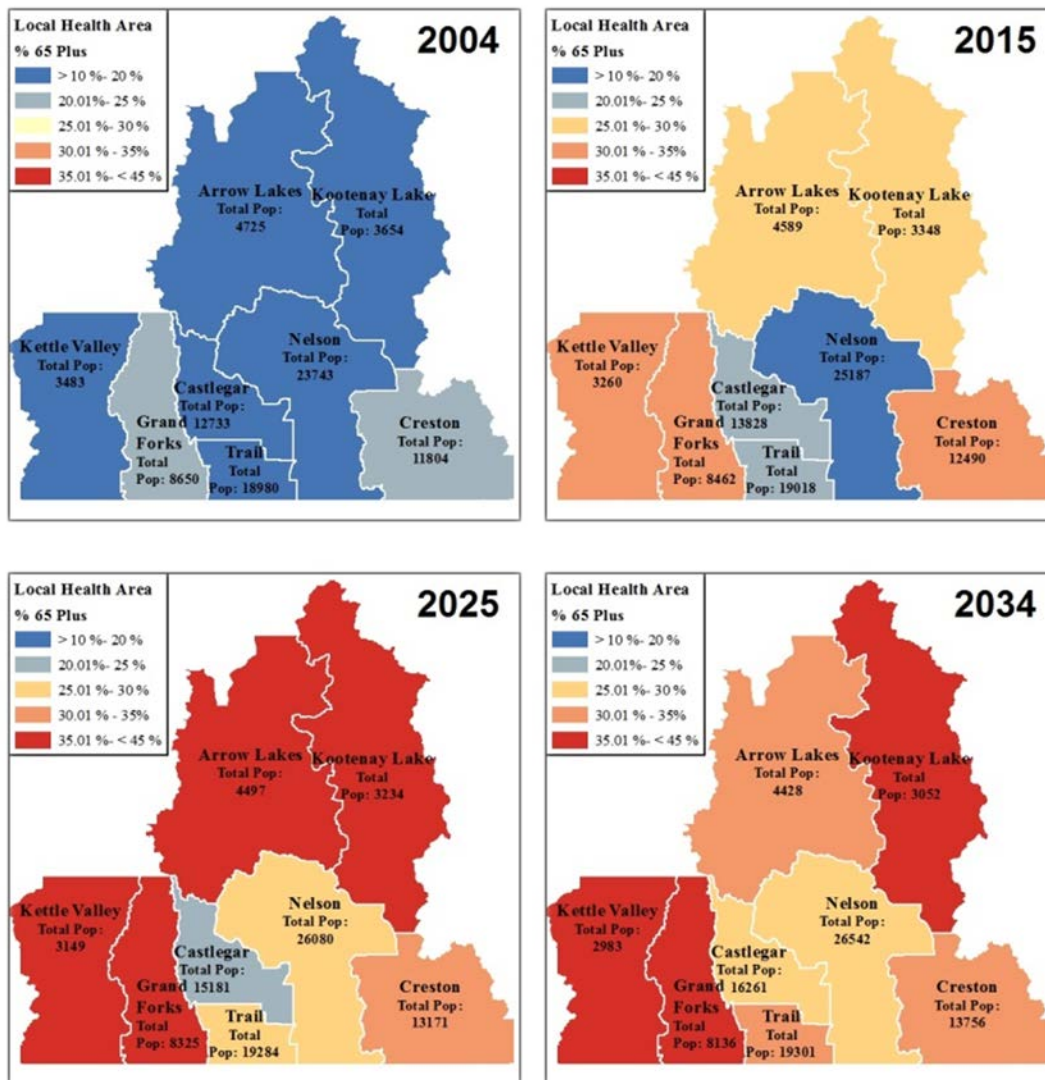
The ‘baby boomer’ demographic contributes to a significant percentage of the population in many LHAs as shown in Figure 3. The Arrow Lakes and Kootenay Lake LHAs in particular currently have over 40% of their population within the ‘baby boomers’ demographic. Baby boomers will continue to dominate the population for the next 20 years, with varying changes to the total population.



Source: Population projection data obtained through Statistics Canada, LHA boundaries obtained from BC Stats.

Figure 3. Projection of percent population of 'baby boomers' in WKBHRD LHAs.

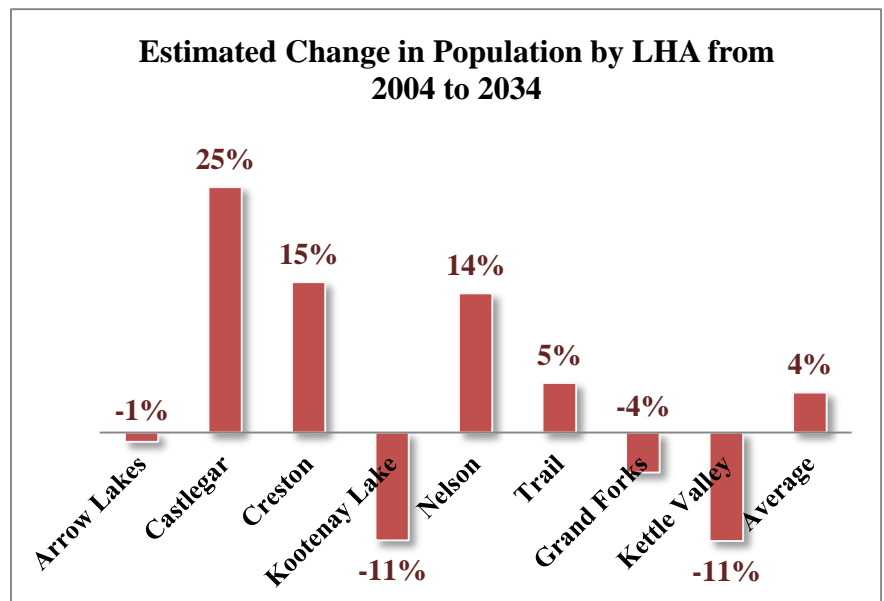
The trend for the population from 2004 to 2034 in the WKBHRD LHAs is an increase in percent of people over the age of 65 shown in Figure 4. From 2004 to 2034, increases in residents over the age of 65 are evident in the Kootenay Lake (9%), Kettle Valley (8%), Grand Forks (7%), Nelson (5%), Arrow Lakes (5%), Creston (3%) and Castlegar (3%) LHAs. Trail LHA however is expected to have a decrease in population over 65 of -4%.



Source: Population projection data obtained through Statistics Canada, LHA boundaries obtained from BC Stats.

Figure 4 Projection of percent population over 65 in WKBHRD.

The total population within the WKBHRD is projected to have a 4% increase from 2004 to 2034. The estimated change in population varies between LHAs over the 30 year timeframe, as shown in Figure 5. Local health areas that are projected to have an increase in population over 30 years include: Castlegar, Creston, Nelson and Trail. Kootenay Lake, Kettle Valley and Grand Forks, however, are estimated to decrease in population from 2004 to 2034. Arrow Lakes LHA is expected to decrease by less than 1% over



Source: Population projection data obtained from Statistics Canada

Figure 5. Percent change in population by LHA from 2004 to 2034.

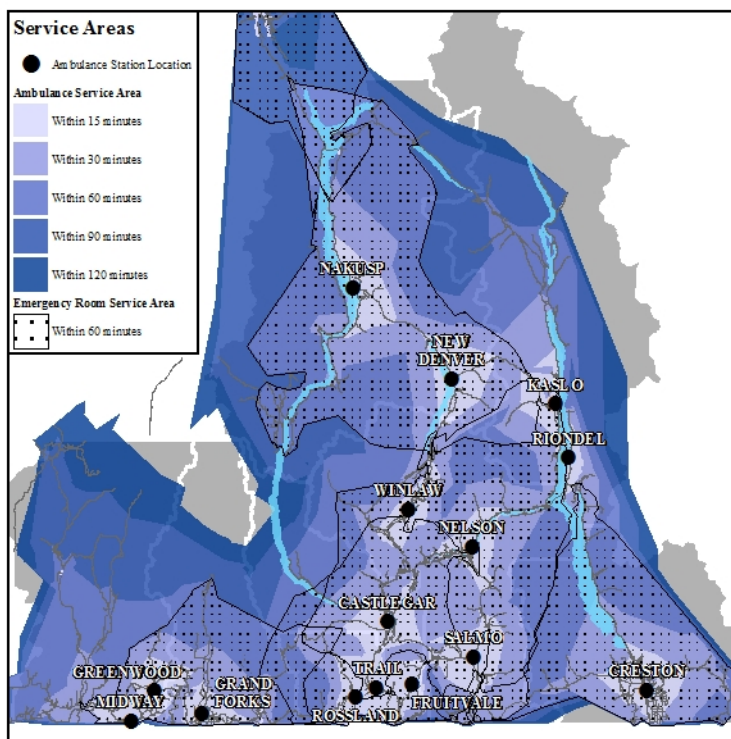
30 years.

The West Kootenay Boundary Regional Hospital District (WKBHRD) on average is projected to have an increase in total population of about 4% over the 30 year period. This increasing population will primarily be in the 65 and over age group. Currently 30% of the WKBHRD's population is over 65. As population increases, the over 65 age group is projected to increase by 4% in the next 20 years throughout the WKBHRD.

Service Areas

Service areas were created to identify gaps in health care services within the West Kootenay Boundary Regional Hospital District (WKBHRD). These service areas were calculated by creating a 'road network' using GIS³. Speed limits were estimated on the road network based on road class. All roads classed as highways were given an 80 km/h speed limit, and all other roads were given a 50 km/hour speed limit. The travelling time was then calculated based on length of road segment and speed travelled. The service area travelling times vary depending on traffic, weather/ road conditions, road construction, ferry dependency/ availability and discrepancies in the estimated speed limit.

Ground Ambulance/ Emergency Room



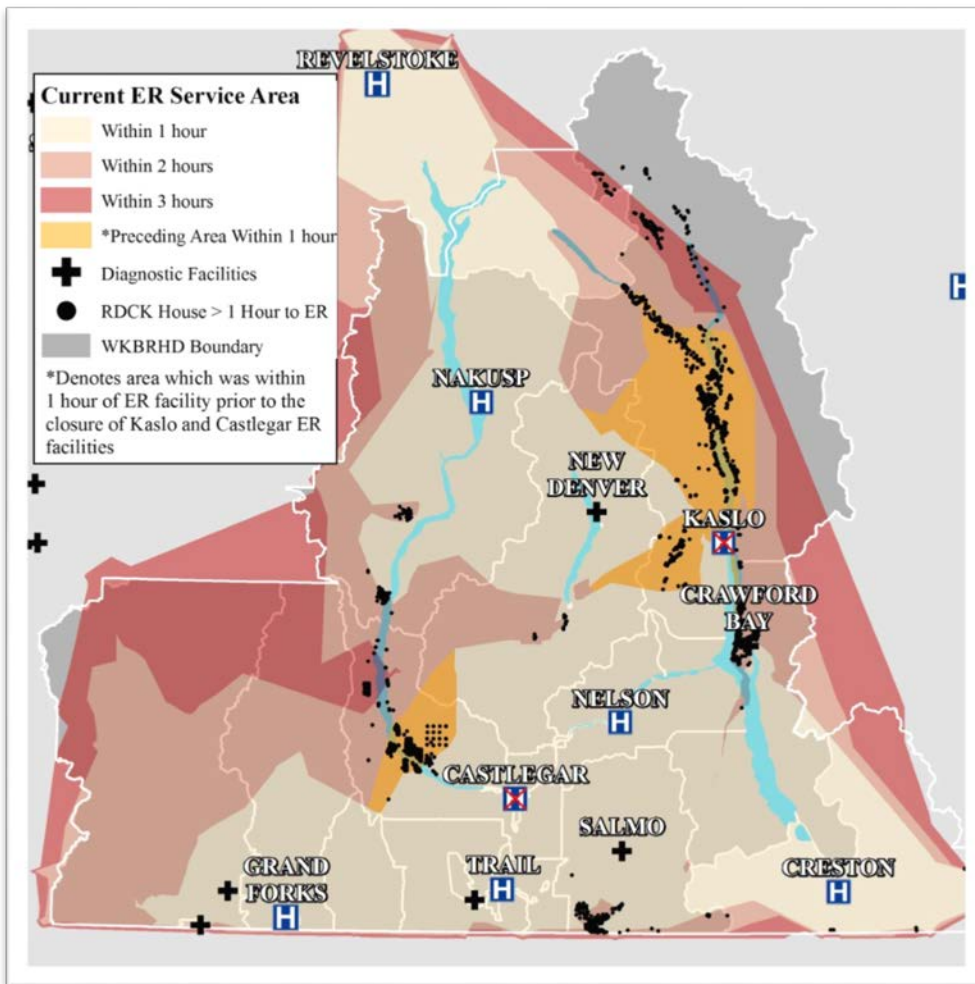
Service areas for the BC Emergency Health Services (BCEHS) ground ambulances were calculated by using the ambulance station as the point of departure and the road network for travelling times. The results of the BCEHS service area response times are shown on Figure 6. Note that these service areas do not take into account the actual speeds ambulance travel. Speed of an ambulance varies frequently depending on; code of the call, road conditions, weather, etc. Wait times as well as other first responder services were not considered for Figure 6.

The actual average response times of each ambulance station was not able to be obtained for this research.

Source: BCAS locations digitized by the SGRC.

Figure 6. Service areas for BC Ambulance Service in the WKBHRD.

³ ArcGIS Resource Center. 2012. Creating a network dataset. ESRI.
<http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#//00470000005t000000>. (online) 08 APRIL 2015.



Source: Results from service area analysis RDCK's dataset on house location

Figure 7. Map displaying previous and current emergency room service areas.

hour ER services in orange. Houses that are currently greater than 1 hour from an ER in the RDCK are displayed as well in Figure 7.

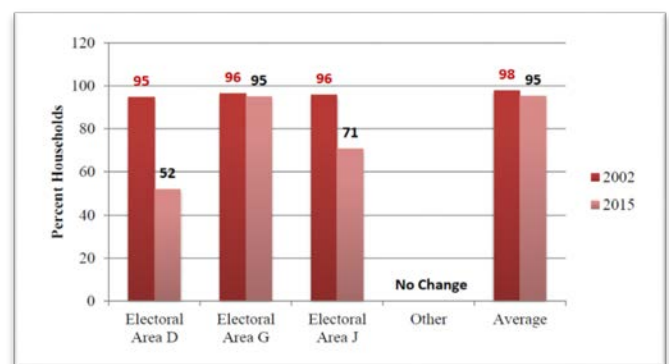
Central Kootenay Electoral Area D was the most heavily impacted by the loss of 24 hour services in Kaslo. The loss of Kaslo's 24 hour facility reduced the percentage of households within 1 hour to an ER from 95% to 52%. Figure 8 displays the previous and current number of houses within one hour of a 24 hour ER facility.

Diagnostic Facilities

Diagnostic facility service areas were evaluated to visualize regions with gaps in diagnostic services. Using location data for the diagnostic facilities, the travel times to facilities based on diagnostic type were calculated. Figure 9 displays the results of the service areas by diagnostic type as well as availability of the service.

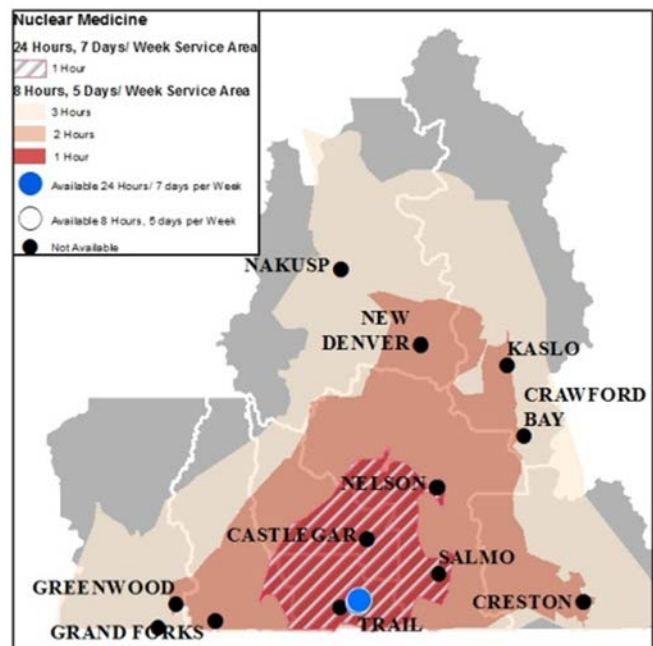
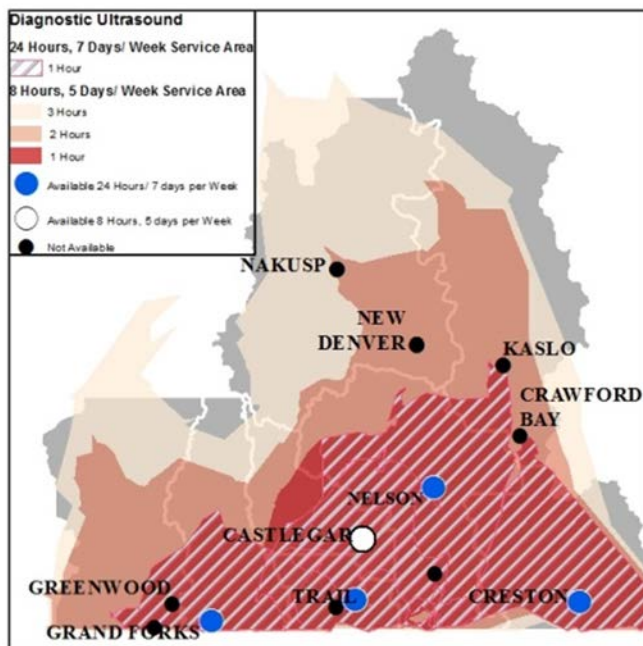
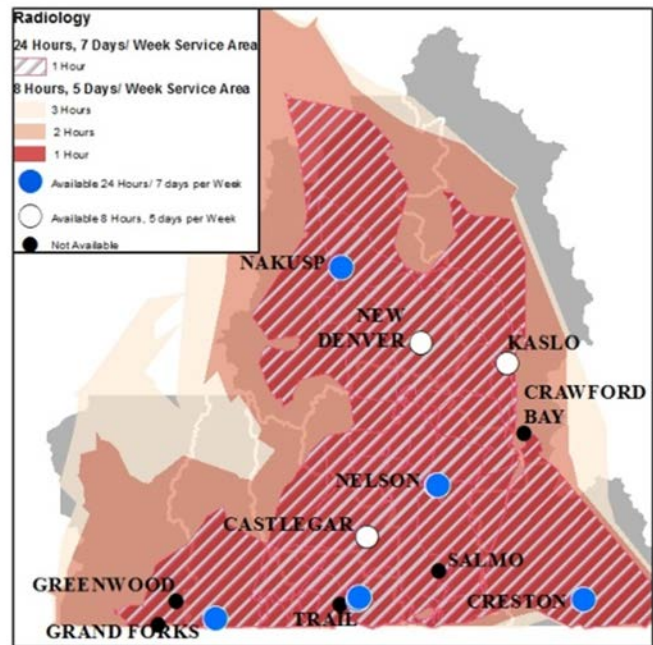
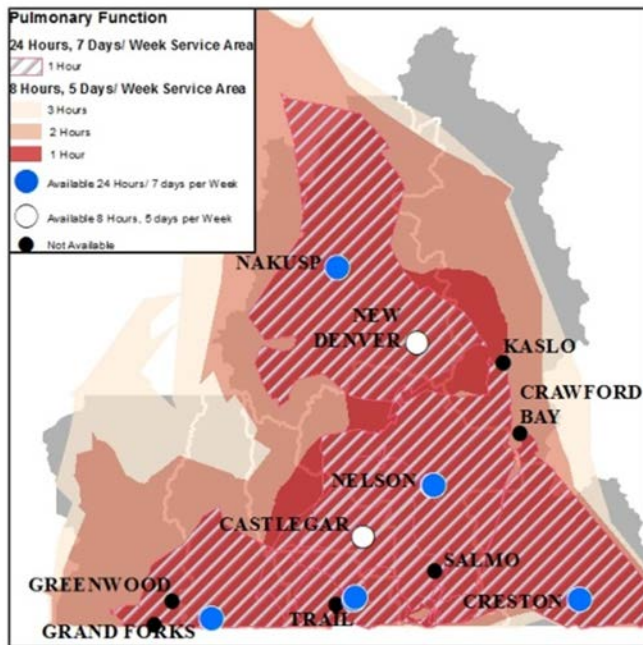
Current and previous emergency room service areas were calculated to determine the impact of the ER facility closures the WKBRHD. The results of ER service areas are shown in on Figure 7.

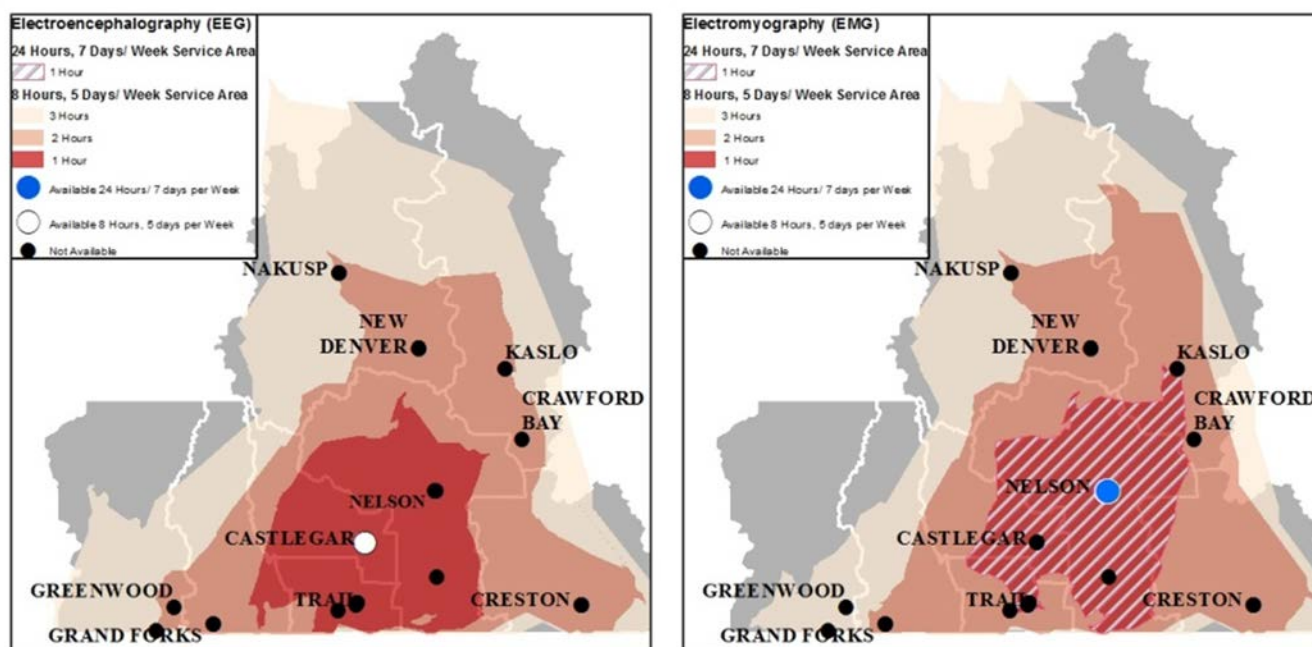
Prior to the closure and/ or reduction in hours of operation at Kaslo and Castlegar ERs, the service area within one hour to an ER was 26867.94 Km² in the WKBRHD. The current one hour service area is now 24685.37 Km². Therefore the WKBRHD lost approximately 8% of area within one hour of an ER facility as a result of the closure of hospitals in Kaslo and Castlegar. Figure 7 highlights the area that lost one



Source: Road data obtained from Digital Road Atlas and RDCK, LHA boundaries obtained from BC Stats

Figure 8. Percentage of houses from 2002 and 2015 within 1 hour of a ER facility.





Source: Diagnostic facility location data obtained from DataBC

Figure 9. Diagnostic facility by service type. From top left to right: Pulmonary Function, Radiology and Diagnostic Ultrasound service areas. From bottom left to right: Nuclear Medicine, Electroencephalography and Electromyography service areas.

The WKBRHD is heavily reliant on facilities in Trail, Castlegar and Nelson for their Nuclear Medicine, Electromyography (EMG) and Electroencephalography (EEG) respective diagnostic services. EMG availability in Castlegar is limited to 8 hours per day, 5 days per week.

The loss of two ER facilities has reduced the service area, and subsequently increased travelling times to an ER for some residents. Almost 50% of houses in Electoral Area D lost one hour service to an ER. It is also evident that the WKBRHD is heavily reliant on diagnostic services in the Trail and Nelson hospitals as well as the Castlegar Health Centre.

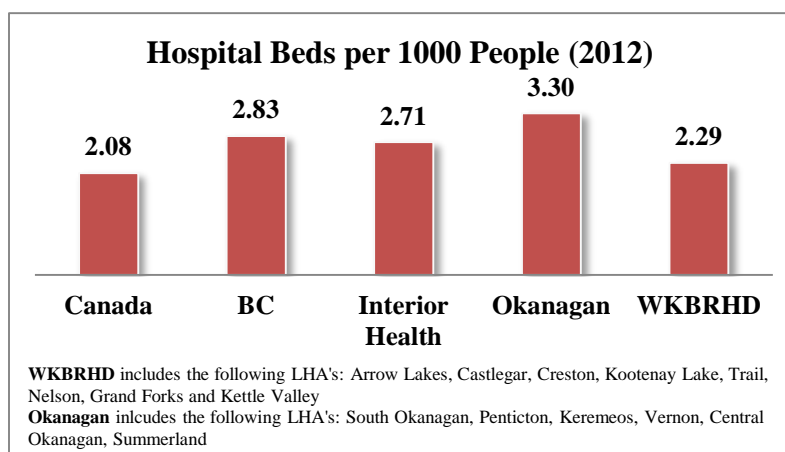
Care Beds

The number of beds within hospitals as well as residential care beds within the long term care facilities was compared to the population data in the WKBRHD.

Hospital Care

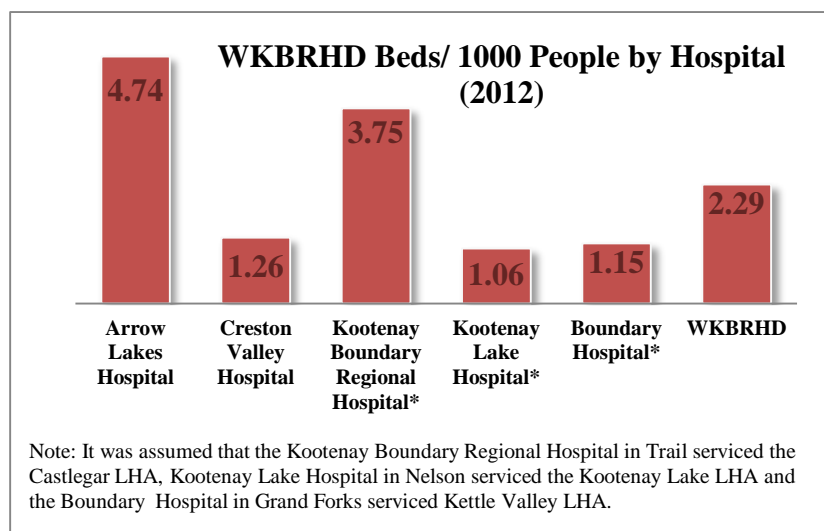
The total number of fully staffed hospital beds per 1000 people within the WKBRHD was compared to the total number of hospital beds on a regional and national scale. The results are shown in

Figure 10. The LHAs within the WKBRHD had an average of 2.29



Source: 2012 Hospital bed data obtained from the Canadian Institute of Health and Information (CIHI), Population data obtained from StatisticsCanada

Figure 10. Comparison of number of beds per 1000 people.

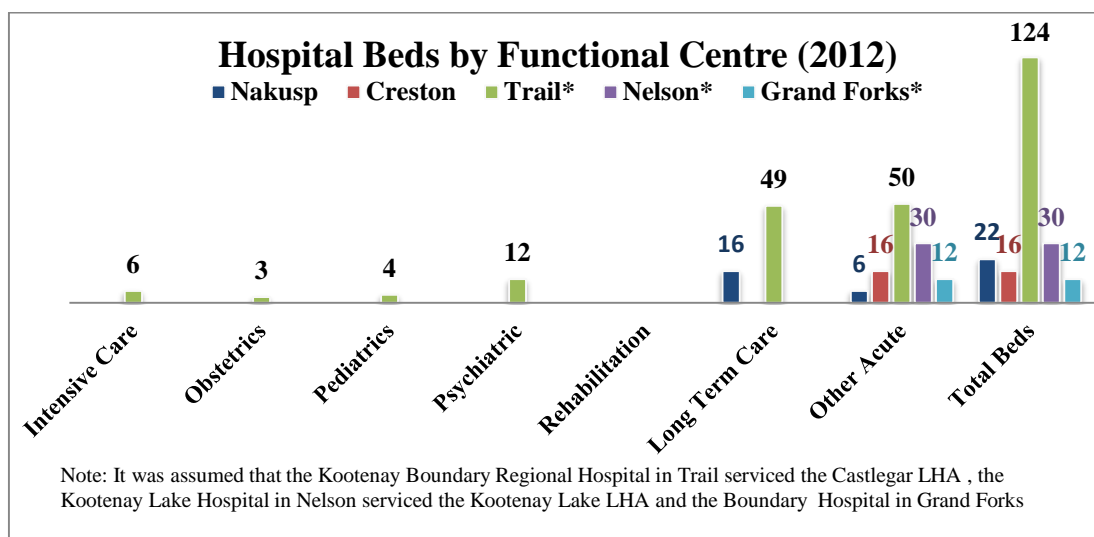


Source: 2012 Hospital bed data obtained from CIHI, Population data obtained from StatsCanada

Figure 11. Number of beds/ 1000 people by hospital in WKBHRD.

residents, 73% of beds at Arrow Lakes Hospital are assigned to the long term care functional centre. When the long term care functional centre beds are omitted from the total bed count, Arrow Lakes Hospital has a count of 1.29/ 1000 residents. Figure 12 displays the number of beds by functional centre for each hospital in the WKBHRD. Kootenay Lake Hospital in Nelson and Boundary Hospital in Grand Forks has 1.06 and 1.15 beds per 1000 people respectively, which are about half the bed counts compared to the Okanagan, Interior Health Authority, BC and Canada.

Hospital beds were evaluated by functional centre for each of the hospitals within the WKBHRD boundary and are displayed in Figure 12. With the exception of long term care beds at the Arrow Lakes Hospital in Nakusp, Trail is the only hospital with beds assigned to specific functional centres.



Source: Hospital bed data by type obtained from CIHI (2012)

Figure 12. Hospital beds by functional centre in WKBHRD.

On average, the numbers of beds in the WKBHRD are lower than the Okanagan, Interior Health and Provincial average, yet higher than the national average. The amount of beds per 1000 people varies significantly across the region.

beds per 1000 people, which was a lower bed density than Okanagan LHAs, Interior Health Authority and all of BC. The WKBHRD is however higher than the national average of 2.08 beds per 1000 people.

The number of beds per 1000 people for each hospital showed significant variability, as shown in Figure 11. For analysis purposes, it was assumed that residents in Castlegar LHA used Trail hospital, Kootenay Lake LHA used Nelson hospital and Kettle Valley LHA used Grand Forks hospital.

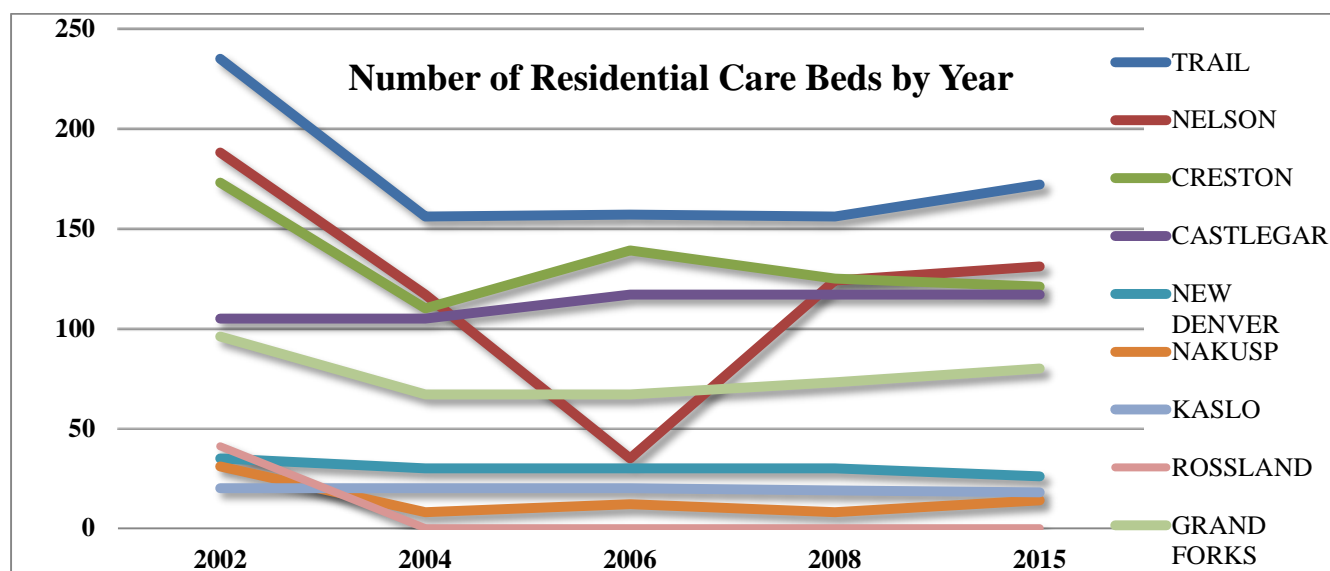
Although Arrow Lakes Hospital in Nakusp has the highest number of beds by population at 4.7/ 1000

The highest being 4.74 beds/ 1000 people in Nakusp and the lowest being 1.06/ 1000 at Kootenay Lake hospital in Nelson. With the exception of Kootenay Boundary Regional Hospital in Trail, there are few hospital beds assigned to specific functional centres within the WKBRHD.

Long Term Care

The changes in residential care bed counts within long term care facilities throughout the WKBRHD were examined from the period of 2002 to 2015. Interior health refers to residential care as “complex health care needs requiring 24-hour professional care”⁴. For this analysis, it was assumed that the residential care bed data falls under Interior Health’s previously mentioned definition of residential care.

Figure 13 displays the number of residential care beds in each town within the WKBRHD by year.

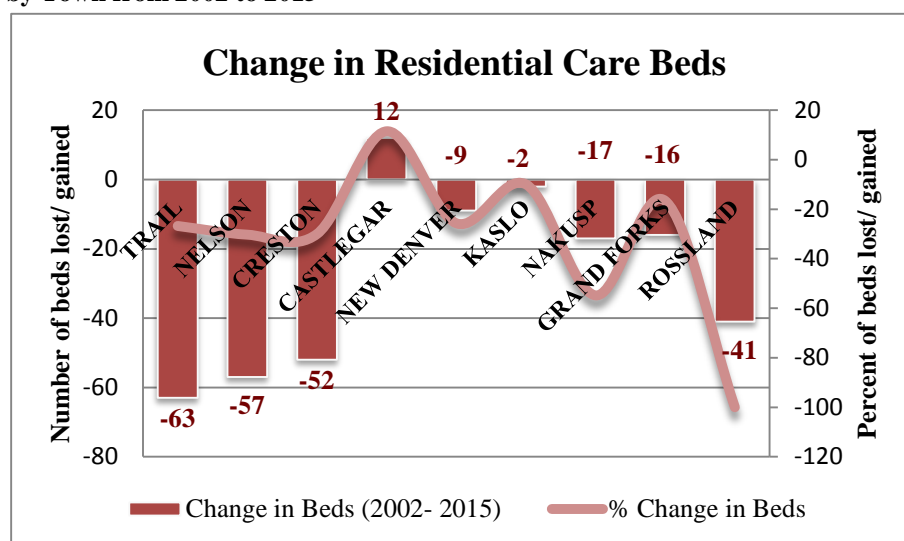


Source: Historical residential care bed counts obtained from PDF document provided by RDCK directors titled “Kootenay Boundary Health Care Losses”, 2015 residential care bed counts obtained from Interior Health Authority website.

Figure 13. Number of Residential Care Beds by Town from 2002 to 2015

The most significant changes in number of residential care beds in the WKBRHD occurred from 2002 to 2004. Rossland and Nakusp lost 100% and 74% of their long term beds respectively. Trail, Nelson, Creston and Grand Forks lost 30-38% of residential care beds within this same time frame.

From 2002 to 2015 the change in residential care beds indicated a trending decrease, shown in Figure 14.



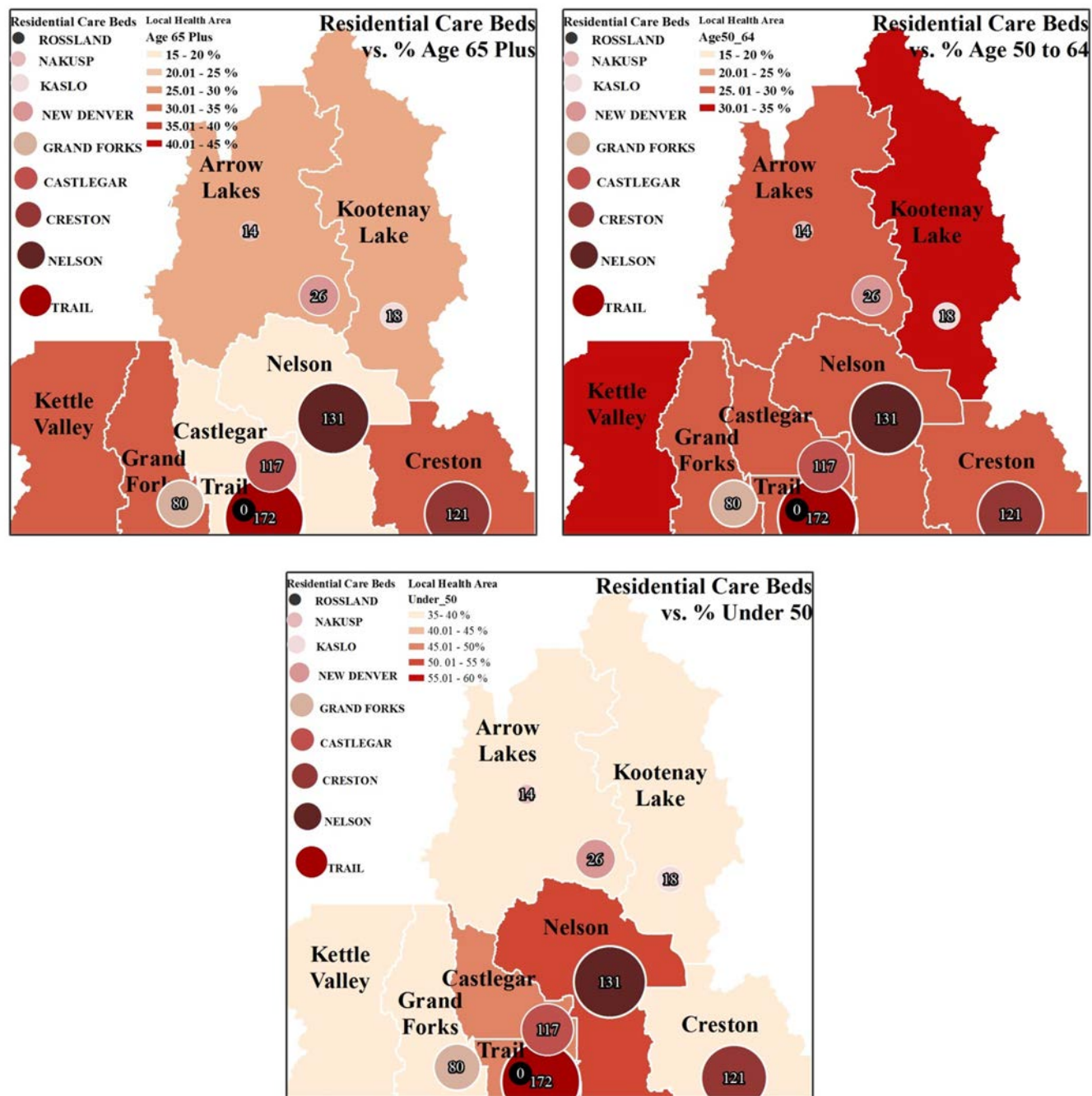
Source: Historical residential care bed counts obtained from PDF document provided by RDCK directors titled “Kootenay Boundary Health Care Losses”, 2015 long term care bed counts obtained from Interior Health Authority website.

Figure 14. Change in Residential Care Beds.

⁴ Interior Health. 2015. Residential Care. <https://www.interiorhealth.ca/YourCare/HousingHealth/ResidentialCare/Pages/default.aspx> (online) 8/4/2014.

In total, 245 residential care beds were lost in the WKBRHD from 2002 to 2015. Significant losses in residential care beds occurred in Rossland (-100%), Nakusp (-55%), Creston (-30%), Nelson (-30%), Trail (-26%) and New Denver (-25%). Castlegar was the only city that had an increase in beds at 12%.

Residential care bed counts were analyzed against population demographics for the LHAs in the region. Figure 15 displays the current number of residential care beds and trends in population, including percent population over the age of 65, percent age 50 to 64 and percent under 50 years.



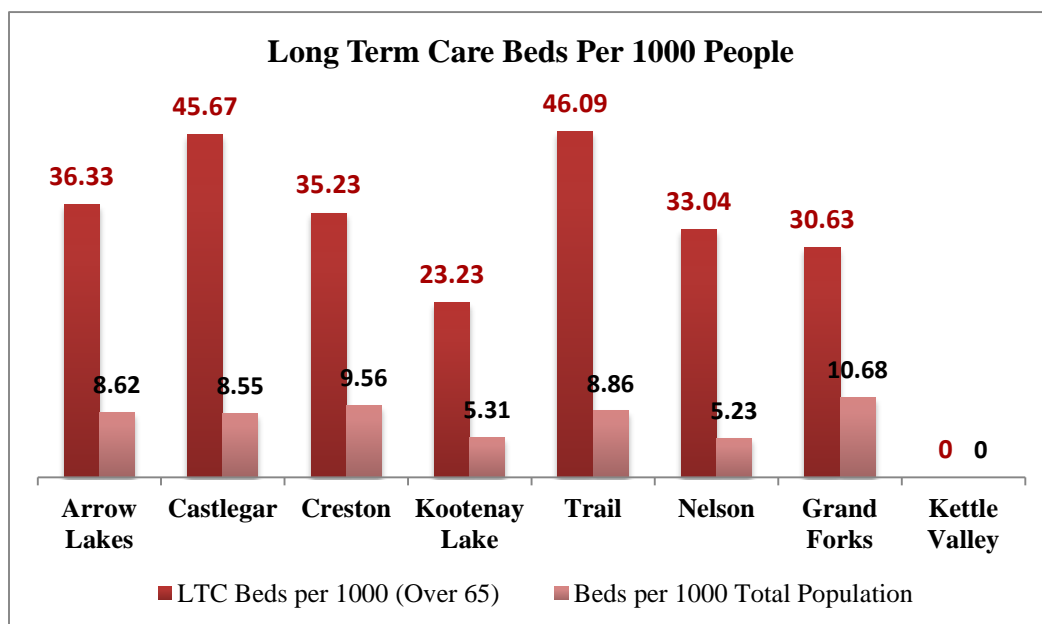
Source: Current residential care bed numbers obtained from Interior Health Authorities website, Population demographic data obtained from Statistics Canada.

Figure 15. From left to right: Long term care beds vs. percent population age 65 and over, 50- 64 and under 50 years.

Arrow Lakes, Kootenay Lake, Creston, Kettle Valley and Grand Forks LHAs have 30- 35 % of their population over the age of 65. Twenty five to 35 % of the population is between the ages of 50-64 in all of the LHAs within the WKBRHD. It is projected that there will be a 5 to 10% increase of people over the age of 65 throughout the region in the next 20 years.

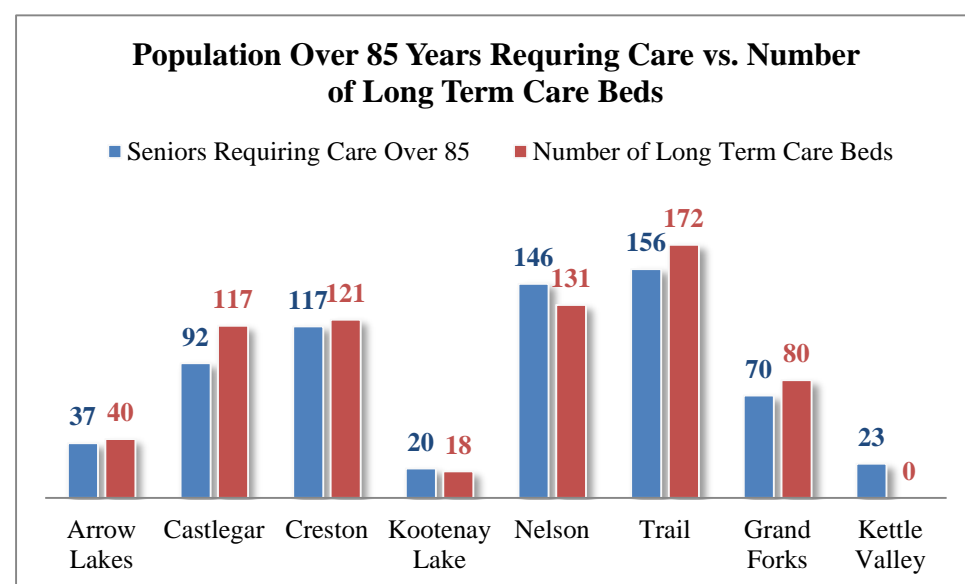
Currently residential care beds are on the decline at an average of -31% throughout the LHAs within the WKBRHD. Figure 16 displays the number of long term care beds per 1000 people by total population as well as by population over 65 years of age.

A 2011 study conducted by the Canadian Institute for Health and Information (CIHI) found that 25% of seniors over the age of 85 had moderate (15%), severe (5%) or total limitation (5%) of functional capacity⁵. Based on this study,



Source: Current residential care bed numbers obtained from Interior Health Authorities website, Population demographic data obtained from Statistics Canada.

Figure 16. Long term care beds per 1000 people.



Source: Current residential care bed numbers obtained from Interior Health Authorities website. Population demographic data obtained from Statistics Canada. Seniors requiring residential care calculated based on research performed by the CIHI.

Figure 17 Estimate of population over 85 years requiring residential care vs. number of long term care beds.

the number of seniors over 85 assumed to have a limitation of functional capacity within the WKBRHD was calculated. The results of this analysis compared to the number of residential care beds in the WKBRHD are shown in Figure 17.

The number of residential care beds in the local health areas compared to the estimated number of seniors over 85 experiencing functional limitations is relatively similar. Nelson LHA, however, has a larger number of estimated

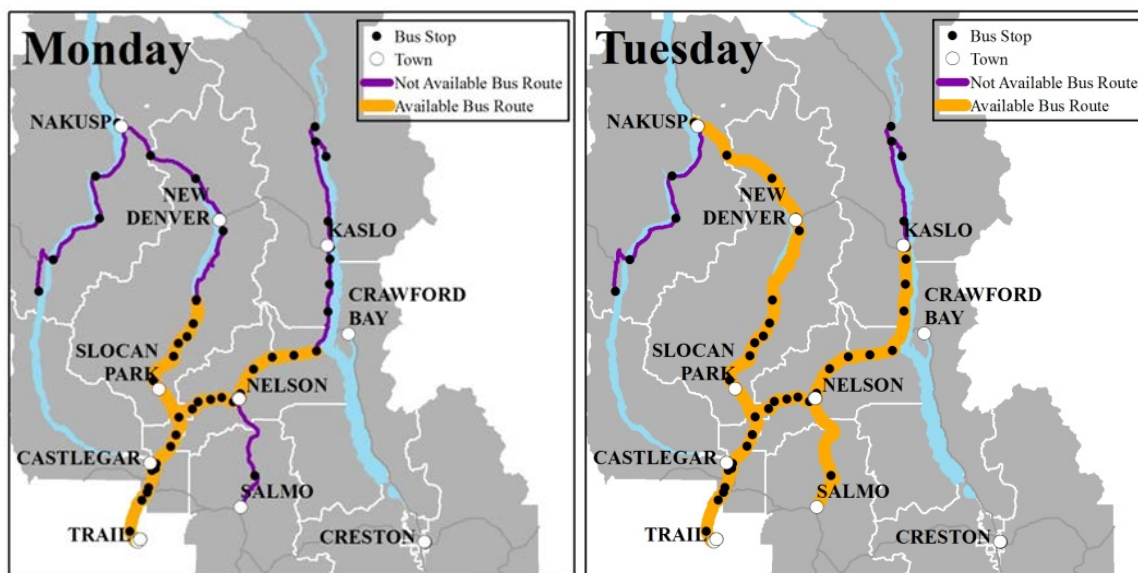
⁵ Canadian Institute for Health Information. 2011. Health Care in Canada 2011, A Focus on Seniors and Aging. https://secure.cihi.ca/free_products/HCIC_2011_seniors_report_en.pdf (online). 02 APRIL 2015.

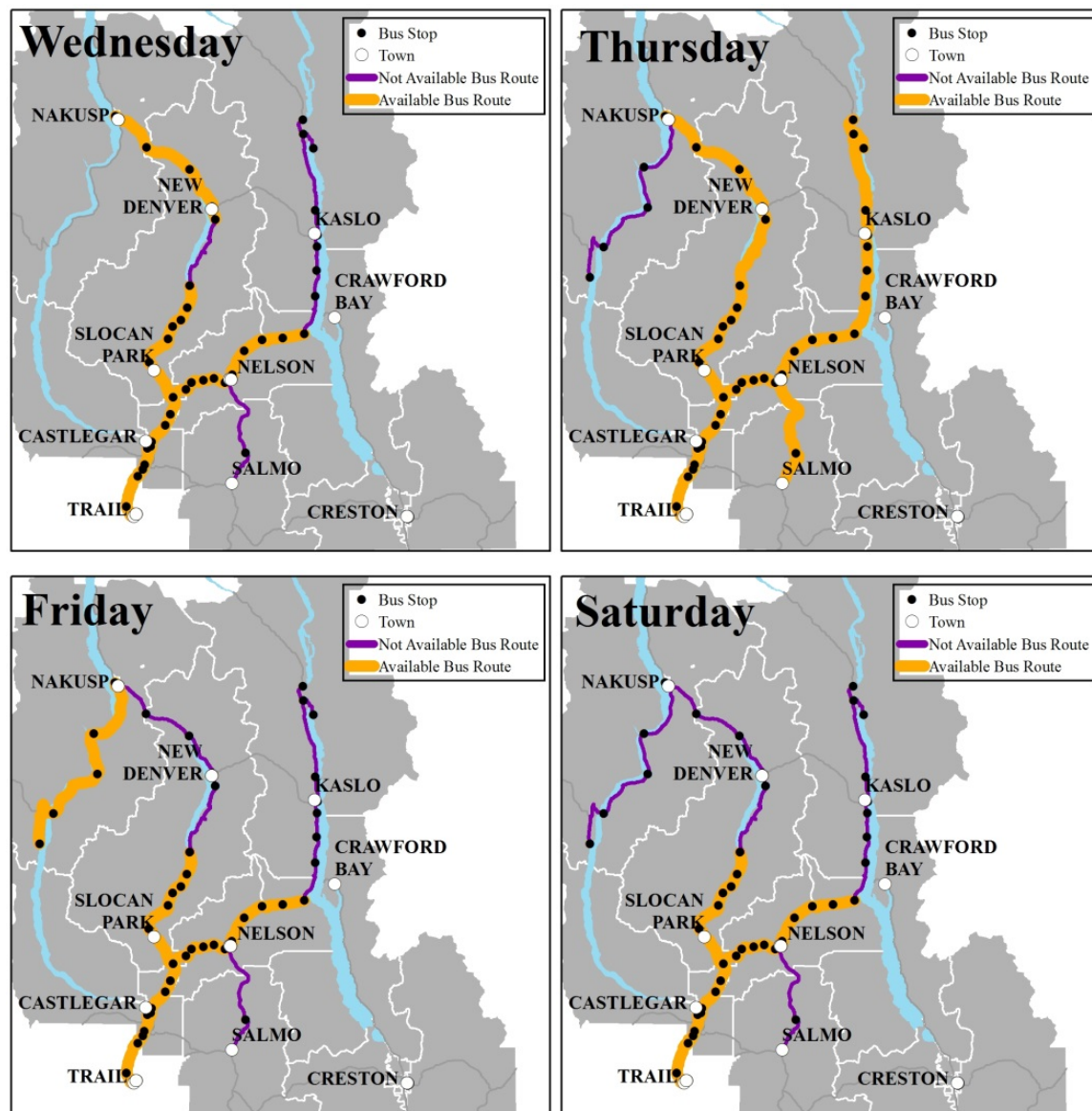
seniors requiring care then there are residential care beds. The Kettle Valley LHA has no residential care beds for the estimated 23 seniors requiring residential care. The residents requiring beds in the Kettle Valley LHA would likely be absorbed by the residential care beds in Grand Forks, which has 10 extra beds. It should be noted that this is only an estimate of the population requiring care. The analysis displayed on Figure 17 does not take into account people under the age of 85 requiring care, nor is it known that 25% of seniors over the age of 85 require residential care beds in the WKBRHD.

Transportation

Available transportation solutions for seniors requiring care was explored within the Regional District of the Central Kootenay (RDCK) as a pilot for future research within the West Kootenay Boundary Regional Hospital District (WKBRHD). The transportation options reviewed were: BC Transit, HandyDart, Health Connections and Paratransit.

BC Transit services the largest area within the RDCK at the highest frequency. BC Transit servicing is most widespread on Tuesdays and Thursdays. On the weekend, services are limited on Saturday to Balfour, Nelson, Trail and Slokan Valley. Weekly service availability is shown in Figure 18 with the exception of Sundays, as there is no service available for that day.





Source: BC Transit routes and stops obtained from BC Transit Website.

Figure 18. BC Transit Bus schedule for RDCK and Trail.

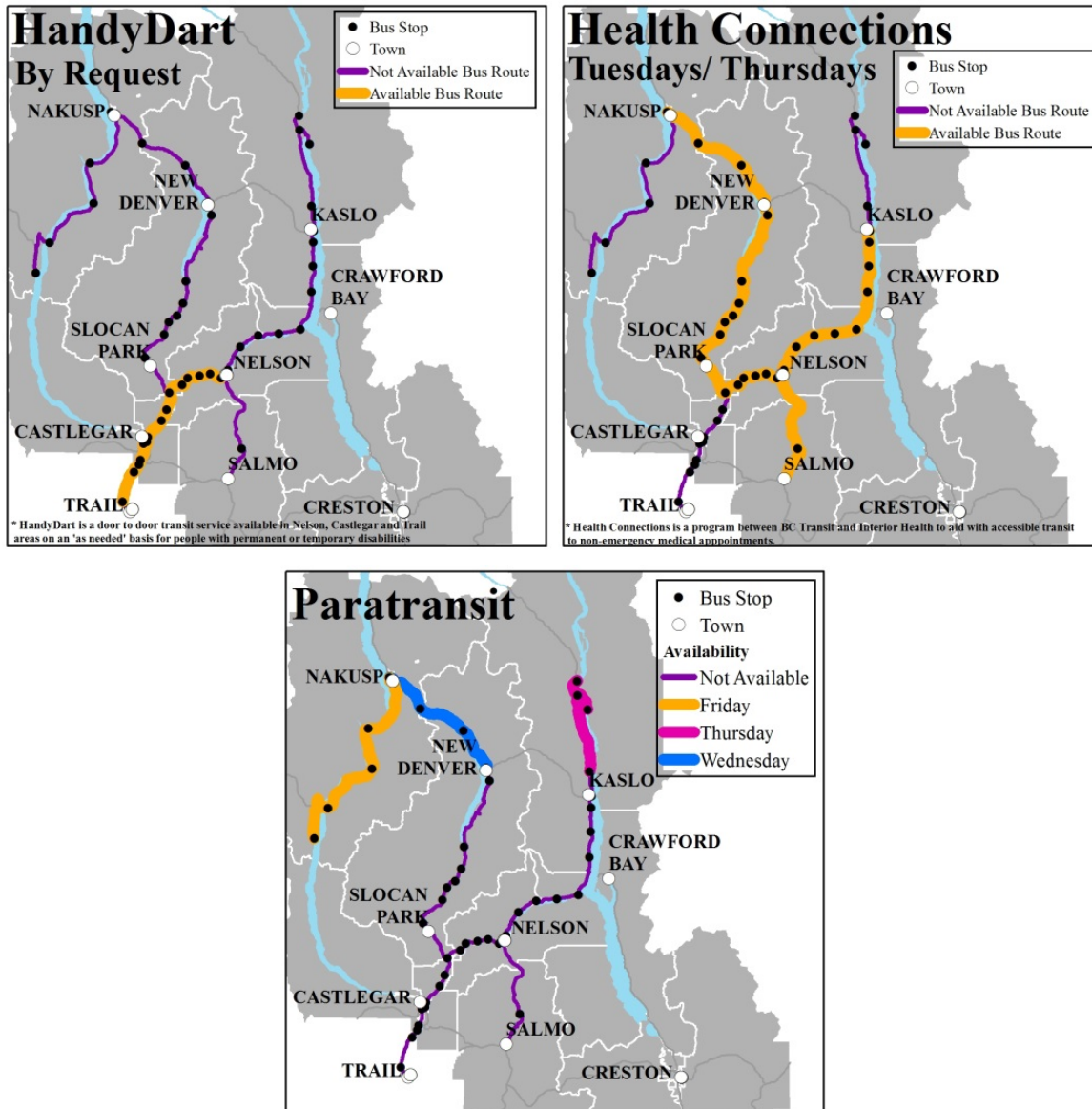
It is evident from Figure 18 that a gap in BC transit services exists within the RDCK on Monday, Wednesday, Friday, Saturday and Sunday. Kaslo and surrounding area as well as north of New Denver and surrounding area are missing transit services on the above mentioned days. This limits transportation options to health care services to Tuesday and Thursday only. Due to the dynamics of the bus schedule for the rural routes, further research would be required for an in depth analysis of scheduling logistics.

The service routes for HandyDart, Health Connections and ParaTransit transportation options are displayed in Figure 19. Handydart is a door- to- door service offered through BC Transit. It is for people with permanent/ temporary disabilities that would prevent usage of their fixed route transit system⁶. Users must register to be eligible for this service. BC Transit website indicates that the service is only available in the areas around Trail, Castlegar and Nelson.

⁶ BC Transit. 2015. handyDart. <http://bctransit.com/west-kootenay/riderinfo/handydart>. (online). 01APRIL2015.

Another transportation option in the region is Health Connections. Health Connections is a regional travel assistance program sponsored by Interior Health and ran by BC Transit⁷. The program offers transportation options from Kaslo, Nakusp and Salmo to Nelson and back at subsidized transit rates. Users of this service are required to book ahead of time for exact scheduling.

Paratransit is a transportation service offered through BC Transit for people with disabilities. Paratransit service in the region is targeted more towards offering local transit options in the rural communities surrounding Nakusp and Kaslo.



Source: BC Transit routes and stops obtained from BC Transit Website

Figure 19. From left to right: HandyDart, Health Connections and Paratransit service routes.

HandyDart is the most limited service in the region as it has restrictive service routes. Health Connections has a much larger service area but it is only available Tuesdays and Thursdays. These are also the only days that services are offered with the standard bus schedule with BC Transit. Finally ParaTransit has limited service routes because it is targeted at local transit options in rural communities instead of transportation to health care facilities.

⁷ British Columbia Health. 2015. Health Connections.

<http://www2.gov.bc.ca/gov/topic.page?id=61EE42451F754D418FD4004E4994E8C0> (online). 01APRIL2015.

Conclusion

Discussion

Population Projections

Based on the projected population data obtained through Statistics Canada, it is evident that the demographic of seniors is increasing throughout the West Kootenay Boundary Regional Hospital District (WKBHRD). This increase in seniors is particularly significant in the Kootenay Lake, Kettle Valley and Grand Forks local health areas (LHAs), which are projected to have approximately 8 % increases in population over 65 years by 2034. These three LHAs are also projected to have decreases in total population over 30 years at 11% for both Kootenay Lake and Kettle Valley and 4% in Grand Forks. The similarity of increasing population over 65 to decreasing total population indicates that people under the age of 65 are moving away from these LHAs.

Increases in total population are expected in Castlegar (25%), Creston (15%), Nelson (14%) and Trail (5%) by 2034. These LHAs are expecting an increase in the population over 65 of about 5 to 10 %. Population projections could be indicating movement from rural LHAs such as Kootenay Lake and Kettle Valley with little to no health care services to LHAs with existing services within the WKBHRD. Expected increases in total population and percent population over 65 within the above mentioned LHAs indicates a greater amount of residents moving to these LHAs than there are leaving the LHAs with decreasing populations. Therefore this indicates that movement of population over 65 years into Castlegar, Creston, Nelson and Trail LHAs is occurring from outside of the region. The movement of population within the 'baby boomer' demographic is visible from 2015 to 2025 but decreases in 2034. This could indicate that 'baby boomer' demographic is not necessarily moving into the WKBHRD from outside regions.

Population vs. Ambulance and Emergency Room Service Area

The scope of this report and a lack of access to BC Emergency Health Services ground ambulance response time data limited the ability to accurately predict ambulance service areas. Based on the estimated ambulance service areas, areas of concern were identified where ambulance response times were greater than 15 minutes, and greater than 60 minutes to the closest emergency room.

The reduced hours of the Victorian Community Health Centre in Kaslo from a 24 hour, 7 days per week facility to 8 hours, 5 days per week facility has impacted Electoral Area D of the RDCK significantly. Previously 95% of houses were within 1 hour of an emergency room facility. With the loss of this facility, more than 50% of houses are now greater than an hour away from an emergency room.

The Kootenay Lake LHA which Electoral Area D is within has one the highest percentage of people greater than 65 years of age when compared to the rest of the LHAs within the WKBHRD. The Kootenay Lake LHA also has one of the lowest total populations when compared to other LHAs (approximately 3000 residents). It is possible that this reduction of hours at the Victorian Community Health Centre was due to too small of a population to contribute resources to. Arrow Lakes LHA in comparison has a relatively similar population (around 4000 residents), and maintains a 24 hour/ 7 days per week facility. Similarly, Kettle Valley LHA has a comparable population to Kootenay Lake with few services and a large area greater than one hour to Grand Forks hospital. Proximity of Kettle Valley residents to hospitals in Kelowna, Penticton and Oliver however were not taken into consideration during this research.

Population vs. Diagnostic Facility Service Area

The population is heavily reliant on Trail, Castlegar and Nelson for Nuclear Medicine, Electroencephalography and Electromyography respective diagnostic services. The Centre for Nuclear Science and Technology Information indicates that “one out of three patients admitted to hospitals undergo at least one medical procedure that uses isotopes⁸”. Therefore it could be assumed that 1/3 of patients admitted to hospitals within WKBRHD are being transferred to Trail for Nuclear Medicine diagnostic services. Electroencephalography diagnostic service is only available at the Castlegar Community Health Centre, which is not a 24 hour facility. The reliance on the diagnostic services in Trail, Castlegar and Nelson and the lack of hours to access them puts more pressure onto these health care facilities from the surrounding LHAs within the WKBRHD.

Population vs. Hospital Beds

The WKBRHD has the lowest amount of beds per 1000 people when compared to the Okanagan LHAs, the Interior Health Authority region, and the entire BC province. Kootenay Lake Hospital in Nelson and Boundary Hospital in Grand Forks have the lowest number of beds per 1000 people in the WKBRHD. With LHAs relying on the diagnostic services that are only available in Nelson and Trail, it is likely the number of beds per 1000 people in these hospitals is lower than what was calculated as the service areas for these hospitals extends well beyond the LHA they are located in.

The loss of 24 hour ER services to the hospital in Kaslo has increased the amount of people relying on Nelson’s hospital due to its close proximity to the Kootenay Lake LHA. The number of beds at the Kootenay Lake hospital in Nelson does not reflect the increase in use and demand on its ER facilities as a result of the Kaslo loss in ER services. Therefore assuming that Nelson is the primary hospital for the Kootenay Lake LHA as well as the Nelson LHA, the bed per 1000 people is extremely low at 1.06. Although Kootenay Boundary Regional Hospital (KBRH) in Trail has a higher than national average bed count, this analysis did not take into account other LHAs usage of this hospital.

Population vs. Long Term Care

The BC Liberals promised an increase of 5000 additional non- profit residential care beds across the province by 2008 during their 2001 provincial election campaign⁹. From 2002 to 2015, the WKBRHD lost 245 residential care beds. In that same time frame, the total population of the WKBRHD increased 3.5% and the percent of population over 65 increased 8%. As long term care beds are primarily used by seniors¹⁰ and population over 65 is increasing, long term care bed counts should theoretically be increasing as opposed to decreasing in the WKBRHD.

Furthermore, the decrease in residential care beds within the WKBRHD puts even more pressure on the acute care system by having hospital beds utilized by people waiting for residential care beds⁹.

⁸ Centre for Nuclear Science and Technology Information. 2014. Medical Applications. <http://www.nuclearconnect.org/know-nuclear/applications/medical-uses>. (online) 15MAR2015.

⁹ Cohen, M., Tate, J., Baumbusch, J. 2009. An Uncertain Future for Seniors: BC’s Restructuring of Home and Community Health Care, 2001- 2008. Canadian Centre for Policy Alternatives. [https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC Office Pubs/bc_2009/CCPA bc uncertain future full.pdf](https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC%20Office%20Pubs/bc_2009/CCPA_bc_uncertain_future_full.pdf). (Online) 31JULY 2015.

¹⁰ Canadian Life and Health Insurance Association Inc. 2012. CLHIA Report on Long-Term Car Policy. [http://www.clhia.ca/domino/html/clhia/CLHIA_LP4W_LND_Webstation.nsf/resources/Content_PDFs/\\$file/LTC_Policy_Paper.pdf](http://www.clhia.ca/domino/html/clhia/CLHIA_LP4W_LND_Webstation.nsf/resources/Content_PDFs/$file/LTC_Policy_Paper.pdf). (Online) 19 MARCH 2015.

Population vs. Transportation (RDCK Only)

A study conducted on rural seniors by Nelson Cares Society's Age Friendly Community Initiative identified access to health services and long distances to medical centres as being a barrier for rural seniors¹⁰. Availability of BC Transit fixed routes and Interior Health sponsored bus routes are limited throughout the RDCK. Tuesdays and Thursdays are the only days in the week that rural residents in the Kaslo area and Nakusp area are able to use public transit to access Trail, Nelson and Castlegar health care facilities. Bus route services also have time constraints as their availability is limited from 6:00am to 10:00pm on those days. Other challenges are faced by seniors utilizing public transit that were not explored in this report. These challenges include bus scheduling and length of travel time to diagnostic facilities that increase the difficulty in utilizing the existing services.

Arrow Lakes and Kootenay Lakes LHA have the highest percent of residents over 65 years with the least options for transportation service routes and scheduling. Evidently population density influences the cost per rider of operating bus services. However transportation has been identified as one of the biggest barriers for seniors in the region¹¹. Exploring the feasibility of a higher level of servicing from an Interior Health sponsored bus service such as 'Health Connections' bus service is required to identify usage and scheduling efficiencies of this service.

Recommendations

This analysis shows that the population within the West Kootenay Boundary Hospital District receives less public health services when measured by total beds relative to the neighboring Okanagan District, the IH region, and BC as a whole. Services were reduced in 2002-4 and again more recently through the reduction in operating hours of facilities in Castlegar and Kaslo.

Further study is required to determine and document how the reduction in these services have impacted the residents of the West Kootenay Boundary Regional Hospital District: Interior Health cooperation or contribution of IH admissions data or data for use of specific types of health services by population would be required for best results. The actual response times of ambulance and other first responders in the WKBRHD should be compared to other regions in BC. The amount of travel for health services within the region and between the region and larger centres should be quantified and monitored for change over time. The impact of reduced health services on the choices residents make about where to live in the region, or whether to leave the region altogether, is another interesting dimension that should be explored, especially given the significant population aging that the region will experience over the next 20 years. Service reduction mitigation strategies, including improved public transportation for populations that are unable to drive themselves, can be modelled using GIS. Gaps in transportation scheduling and service routes can be identified to build a route system that is optimal for rural seniors. Residents in the Kaslo and Argenta region have already taken the initiative to write down the scheduling that is optimal for them¹⁰. With the identification of gaps in scheduling/ service routes and incorporating residents input, there will be a justified need for increased funding for enhanced transportation to health care facilities. The costs of public transit options as well as routes and schedules would have to be considered in order to determine the most cost-effective strategies. Tele-health may also mitigate service reductions by providing virtual access to out-of-region specialists.

¹¹Younie, C. 2014. Transportation Solutions for Rural Seniors. Age-Friendly Community Initiative, Nelson CARES Society.

Higher level analysis can be conducted on long term care beds as well. Variables such as quantities of market priced vs. assisted long term care bed counts can be examined based on population demographics and average income. Assisted living options and their associated service areas can also be mapped to show which organization supports what local health area.

GIS could be used to explore the optimal locations for services in the region. Moving existing services will always be controversial, however. A more detailed retrospective review of the shuffling of services within the region and moving services out of the region may be possible, especially if IH supports this work by providing service change data going back in time, to more fully evaluate the changes to travel times and costs. Other organizations, such as unions representing health workers, may also be tracking changes to health services as well.

We recommend that decision-makers in the WKBRHD continue to carefully monitor changes in health services to ensure that residents receive a level of care similar to what other British Columbians receive. We also recommend that where possible decision-makers prepare strategies to respond quickly should IH propose further service reductions. There will always be more demand for health services than available resources so the focus must remain on how the regional population can best be served by the available health budgets.

Literature Cited

- ArcGIS Resource Center. 2012. Creating a network dataset. ESRI.
<http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#/00470000005t000000>. (online) 08 APRIL 2015.
- BC Transit. 2015. handyDart. <http://bctransit.com/west-kootenay/riderinfo/handydart>. (online). 01APRIL2015.
- British Columbia Health. 2015. Health Connections.
<http://www2.gov.bc.ca/gov/topic.page?id=61EE42451F754D418FD4004E4994E8C0> (online).)01APRIL2015.
- Canadian Institute for Health Information. 2011. Health Care in Canada 2011, A Focus on Seniors and Aging.
https://secure.cihi.ca/free_products/HCIC_2011_seniors_report_en.pdf (online). 02 APRIL 2015.
- Canadian Life and Health Insurance Association Inc. 2012. CLHIA Report on Long-Term Care Policy
[http://www.clhia.ca/domino/html/clhia/CLHIA_LP4W_LND_Webstation.nsf/resources/Content_PDFs/\\$file/LTC_Policy_Paper.pdf](http://www.clhia.ca/domino/html/clhia/CLHIA_LP4W_LND_Webstation.nsf/resources/Content_PDFs/$file/LTC_Policy_Paper.pdf). (Online) 19 MARCH 2015.
- Centre for Nuclear Science and Technology Information. 2014. Medical Applications.
<http://www.nuclearconnect.org/knownuclear/applications/medical-uses>. (online) 15MAR2015.
- Cohen, M., Tate, J., Baumbusch, J. 2009. An Uncertain Future for Seniors: BC's Restructuring of Home and Community Health Care, 2001- 2008. Canadian Centre for Policy Alternatives.
https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC_Office_Pubs/bc_2009/CCPA_bc_uncertain_future_full.pdf. (Online) 31July 2015.
- ESRI. 2015. What is GIS? <http://www.esri.com/what-is-gis>. 03/27/2015.
- Interior Health. 2015. Residential Care.
<https://www.interiorhealth.ca/YourCare/HousingHealth/ResidentialCare/Pages/default.aspx> . (online) 8/4/2014.
- Ministry of Health. 2015. Rural Health Services in BC: A Policy Framework to Provide a System of Quality Care.
<http://www.health.gov.bc.ca/library/publications/year/2015/rural-health-policy-paper.pdf>. 03/26/2015.
- Younie, C. 2014. Transporation Solutions for Rural Seniors. Age-Friendly Community Initiative, Nelson CARES Society.