

Understanding the Need:

Data on Critical Care Patient Demand

Summary & Contents

Introduction /
Conventions Used

2016 - 2021 Actual Data:

ICU Data by Facility

ICU Data by
Catchment Area

Understanding
Invasive Mechanical
Ventilation

Understanding
Continuous Renal
Replacement Therapy

Level of Acuity By
Primary Diagnosis

Case Mix Groups

Partial-year data & considerations for future:

2021-2022 Data

Understanding Future
Demand

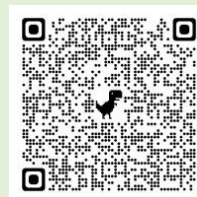
Why do we use data to inform change?

Understanding the nature and distribution of patient need is the foundation of the Tiers of Service framework. It allows the SHA to design and develop our healthcare system to best meet SK patient needs.

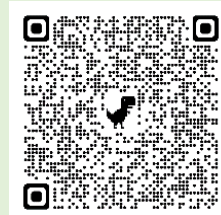
We have been given a tremendous opportunity to thoughtfully design and recommend where the expansion of ICU beds and services can go. To do this meaningfully, it is important to understand utilization, capacity and demand in Saskatchewan ICU's over the past number of years. Asking different questions of the data allows us to plan for different scenarios and endeavor to keep patients closer to home for their ICU care. Not only can we look at the data to see what facility utilization has been and which locations are chronically overcapacity; we can also look at what ICU demand is based on the patient's home address and the reasons for which they seek care. This helps us to not just understand SK patient demand for ICU care overall, but also how it varies in different areas across the province.

The following report looks at utilization in all nine Saskatchewan ICU's, as well as the ICU data by home catchment area. It also explores some services utilized in the ICU, such as invasive mechanical ventilation, continuous renal replacement therapy and the case mix groups (diagnoses or interventions) most commonly admitted to Saskatchewan ICUs. Finally, it estimates the level of severity admitted to all ICUs, how COVID-19 has impacted the ICUs and begins to look to understanding future demand.

CLICK HERE for further information on the **Critical Care** service line, including the most up-to date version of this report



CLICK HERE for all SHA information on the **Tiers of Service**



A note on the data

The majority of the data in this report is from the Discharge Abstract Database for the years of 2016-2021. 2021-22 has not been included in most of the data because this year is incomplete. A brief summary of 2021-22 has been included at the end to show the impact the COVID-19 Pandemic has had on our ICUs.

Note that for some facilities, the number of ICU days was actually lower in 2020-21 than previous years. This is due to service slowdowns and the cancellations of many surgeries that require an ICU bed for post-operative care. The major COVID surge hit our ICUs during the delta wave between October 2021-December 2021.

Facility Data and Catchment Area Data

In this report, the data is split into two different ways on the following pages:

1. **ICU Utilization by Facility:** This data is important as it helps us to understand the demand on each facility within the province and the services that are required there. Throughout this report, you will see this icon when data is referring to facility data:



2. **ICU Utilization by Catchment Area:** This data is important as it shows us the ICU demand based on where the patient lives in the province. Throughout this report, you will see this icon when data is referring to catchment data:



Facility Data


ICU Utilization by Facility. This is an indicator of the volume of patients cared for in a given facility. For example, how many days of patient care in ICU did Royal University Hospital have for the last 5 years, for patients from anywhere in (or outside) of the province? This helps us to understand the demand on each facility and the services that are required there, regardless of where the patient is from.

For reference, the table below shows the number of ICU beds in each facility over the last seven years.

Intensive Care Units

Hospital	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Battlefords Union Hospital	3	3	3	3	3	3	3
Victoria Hospital	8	8	8	8	8	8	8
Cypress Regional Hospital	4	4	4	4	4	4	4
Dr. F.H. Wigmore Regional Hospital	5	4	4	4	4	4	4
Yorkton Regional Health Centre	6	6	6	6	6	6	6
Pasqua Hospital	7	7	6	6	7	7	7
St. Paul's Hospital	13	12	10	10	10	10	12
Regina General Hospital	21	21	19	20	20	20	20
Royal University Hospital	17	15	12	12	13	13	15
Total	84	80	72	73	75	75	79










Catchment Areas



ICU Utilization by Catchment Area shows us the ICU demand based on where the patient lives. For example, How many ICU days did those who lived within the Prince Albert Catchment area have, regardless of what facility they were admitted to? This data helps us to understand the unique ICU needs of each catchment area and if it would be valuable to expand capacity or services in one area of the province, in order to keep patients close to home for their ICU care.

The catchment areas were created by looking at each Small Area Geography (the building blocks of our Health Networks) and determining what the closest ICU is by driving distance. Through this methodology, catchment areas were created for all seven communities that have ICUs (North Battleford, Prince Albert, Saskatoon, Regina, Swift Current, Moose Jaw and Yorkton.) The population size for each of the catchment areas is provided in the table below for reference. Saskatoon’s catchment area is the largest, followed by Regina. Also note that the Northern catchment areas are larger than the Southern ones as there are only two.

Catchment Area	Total Population	% of Total Population
 North Battleford Catchment Area	132,666	10.9%
 Prince Albert Catchment Area	137,827	11.3%
 Swift Current Catchment Area	47,654	3.9%
 Moose Jaw Catchment Area	54,516	4.5%
 Yorkton Catchment Area	83,253	6.8%
 Saskatoon Catchment Area	410,287	33.6%
 Regina Catchment Area	355,184	29.1%
TOTAL	1,221,387	100%



1. ICU Days by Facility and Average Length of Stay

Key Results:

Between the fiscal years of 2016-2021 there were **101,896** days spent in all Saskatchewan ICUs combined. Of those days, **73,910 or 72.5%** were spent in Urban Facilities and **27,985 or 27.5%** were spent in Regional Facilities.

Proportion of ICU Days by Facility 2016-2021

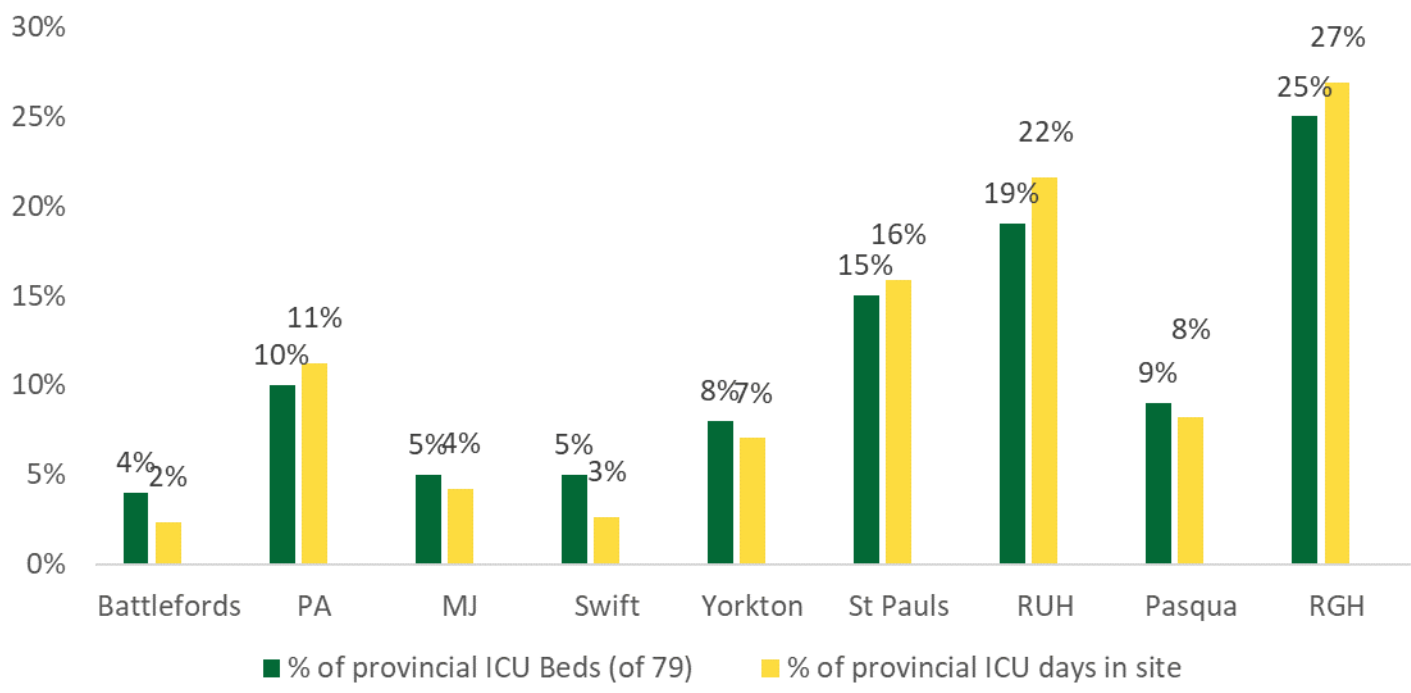


Chart 1: Proportion of ICU Days by Facility, 2016-2021

Proportion of ICU Days by Facility

The above chart provides a summary of the proportion of ICU Days by facility for the last five years of data. The green bar is the proportion of ICU beds that each facility has (as compared to the province's total 79 beds) and the yellow bar is the proportion of the 101,896 ICU days each facility cared for over the last five years. Regina General Hospital cared for the largest proportion of days (27%) and they also have the most ICU beds of any facility in Saskatchewan, with 25% or 20 of the province's 79 beds.

Please note that we would expect Saskatoon and Regina to have the highest ICU days, as they are the only two centers that provide Tier 5 and Tier 6 ICU services.



a) ICU Days in Northern Regional Facilities

Between the fiscal years of 2016-2021, **27,985 or 27.5%** were spent in Regional Facilities the breakdown by facility, year over year is shown below.

Battlefords Union Hospital ICU Days

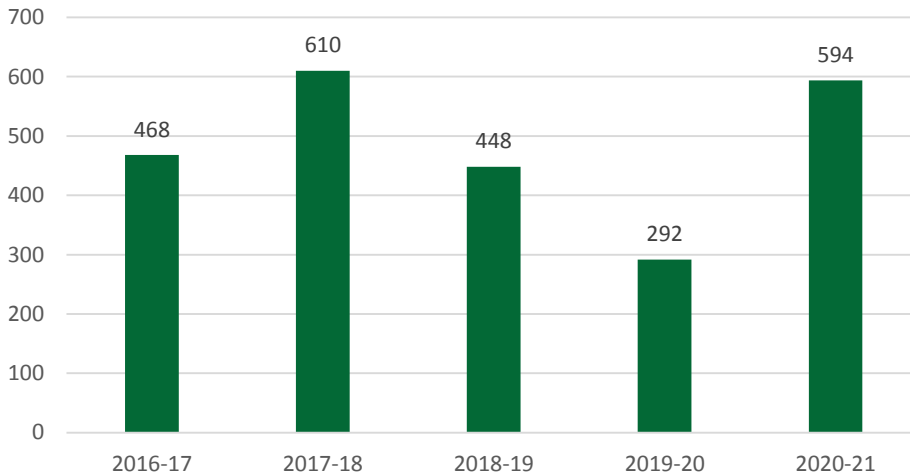


Chart 2: Battleford Union Hospital ICU Days, 2016-2021

Victoria Hospital ICU Days

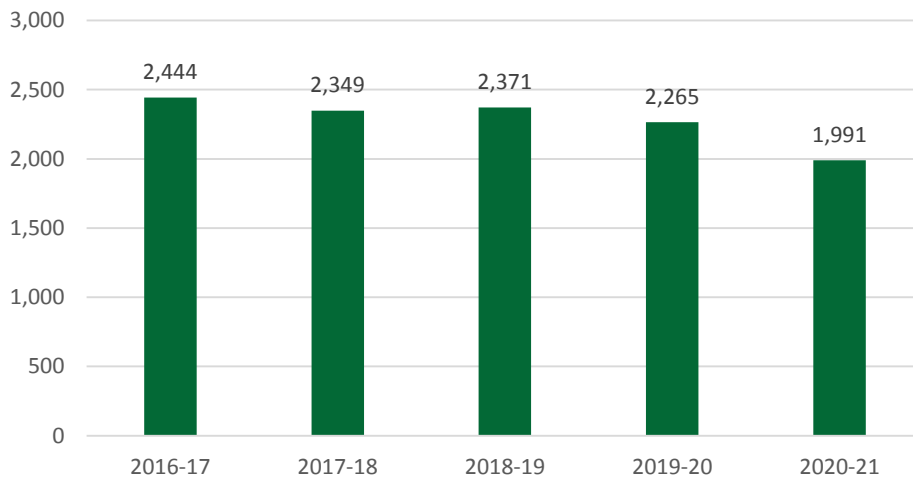


Chart 3: Victoria Hospital ICU Days, 2016-2021



b) ICU Days in Southern Regional Facilities

Between the fiscal years of 2016-2021, **27,985 or 27.5%** were spent in Regional Facilities the breakdown by facility, year over year is shown below.

Cypress Regional Hospital ICU Days

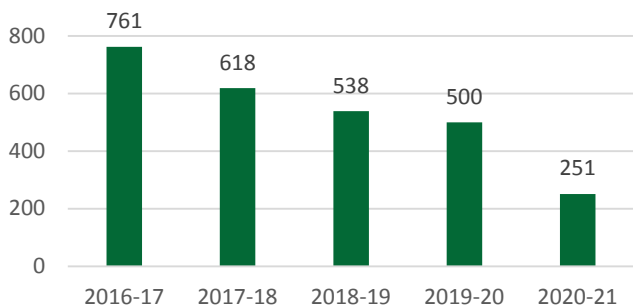


Chart 4: Cypress Regional Hospital ICU Days, 2016-2021

Dr. F. H. Wigmore Regional Hospital

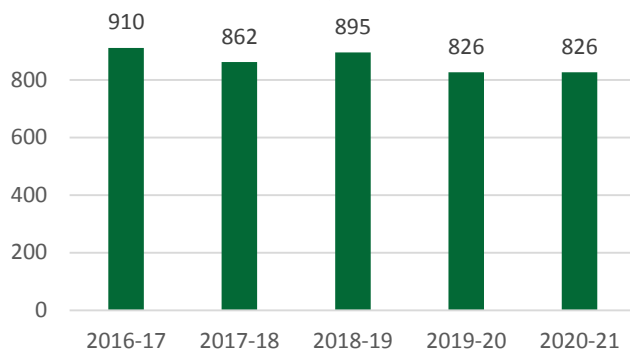


Chart 5: Dr. F.H. Wigmore Hospital ICU Days, 2016-2021

Yorkton Regional Health Centre

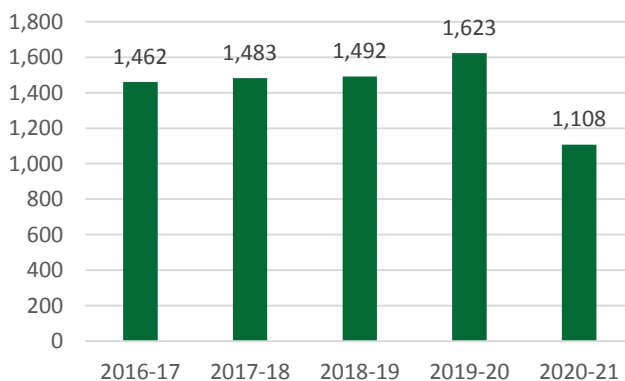


Chart 6: Yorkton Regional Health Center ICU Days, 2016-2021



c) ICU Days in Saskatchewan Urban Facilities

Between the fiscal years of 2016-2021, **73,910 or 72.5%** were spent in Urban Facilities the breakdown by facility, year over year is shown below.

St. Paul's Hospital ICU Days

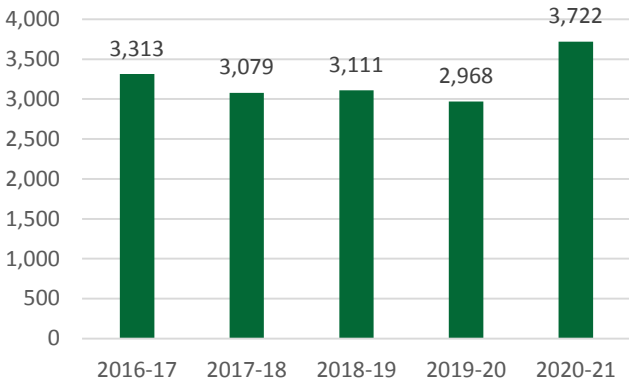


Chart 7: St. Paul's Hospital ICU Days, 2016-2021

Pasqua Hospital ICU Days

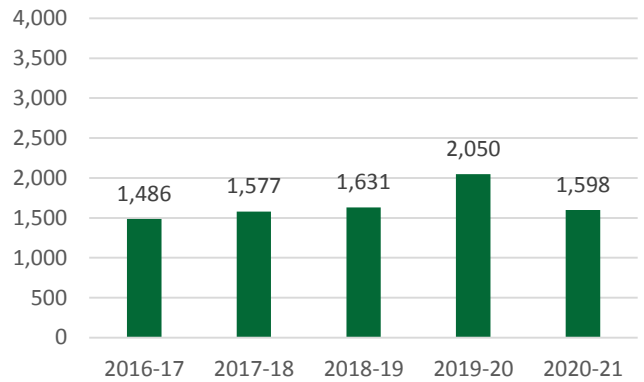


Chart 8: Pasqua Hospital ICU Days, 2016-2021

Royal University Hospital ICU Days

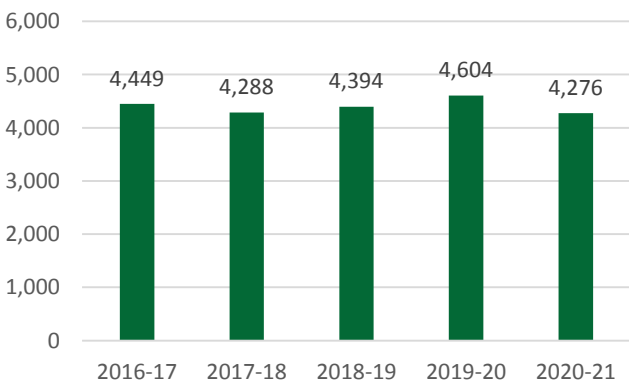


Chart 9: Royal University Hospital ICU Days, 2016-2021

Regina General Hospital ICU Days

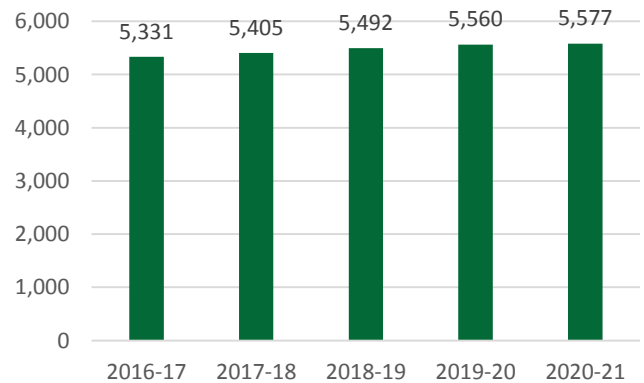


Chart 10: Regina General Hospital ICU Days, 2016-2021



d) Average ICU Days per bed:

Overall, the average ICU days per bed for 2016-2021 for all four urban facilities was 295.6 days and the average ICU days per bed for all five regional facilities was 223.9 Days. The chart below shows all average ICU days per bed for the last five years of data (2016-2021).

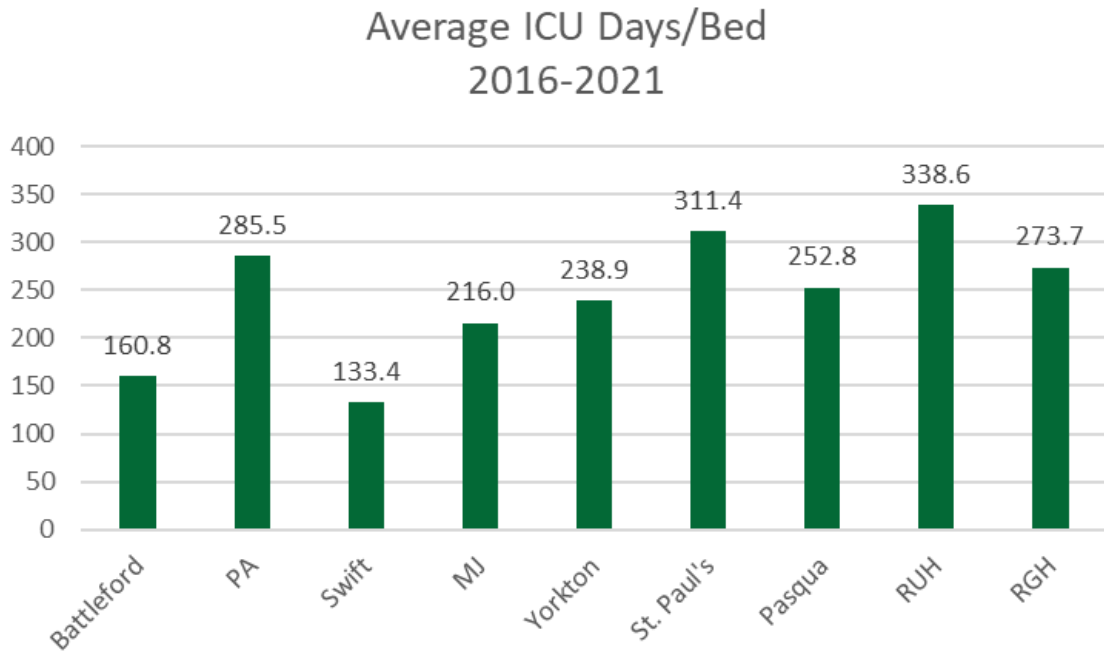


Chart 11: Average ICU Days/Bed by Facility, 2016-2021



e) Understanding ICU Days as it Relates to Tiers of Service Standards – Regional ICUs

The Tiers of Service methodology sets minimum standards of care and services that are to be provided at each level of the Tier in ICU care. This includes an expected minimum occupancy for Tiers 4, 5, and 6. The following charts show the how historical occupancy compares to that of the standards for Tier 4, 5, and 6.

Average Occupancy for Regional ICUs 2016-2021

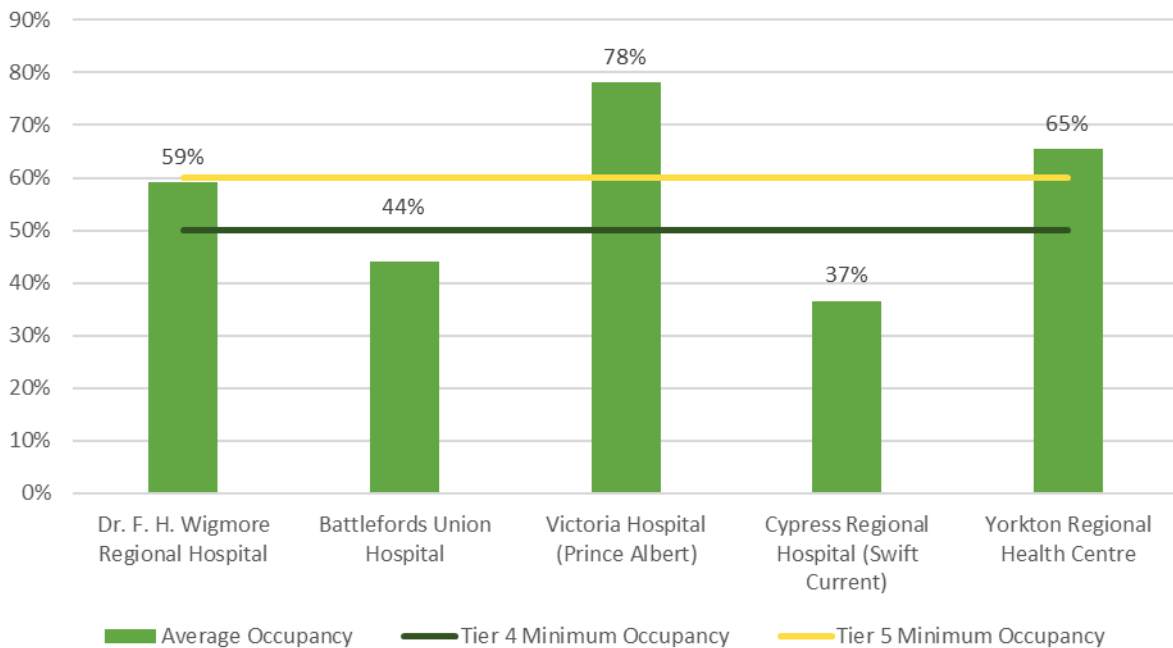


Chart 12: Average Occupancy for Regional ICUs, 2016-2021

The above chart shows the average occupancy for each regional ICU, based on their beds for the last five (complete) years combined. The dark green line is the minimum occupancy to meet the Tier 4 standard and the yellow line is the minimum occupancy to meet the Tier 5 standard. Battleford Union Hospital and Cypress Regional Hospital, both fall below the minimum occupancy for Tier 4.



f) Understanding ICU Days as it Relates to Tiers of Service Standards – Urban ICUs

Average Occupancy for Urban ICUs 2016-2021

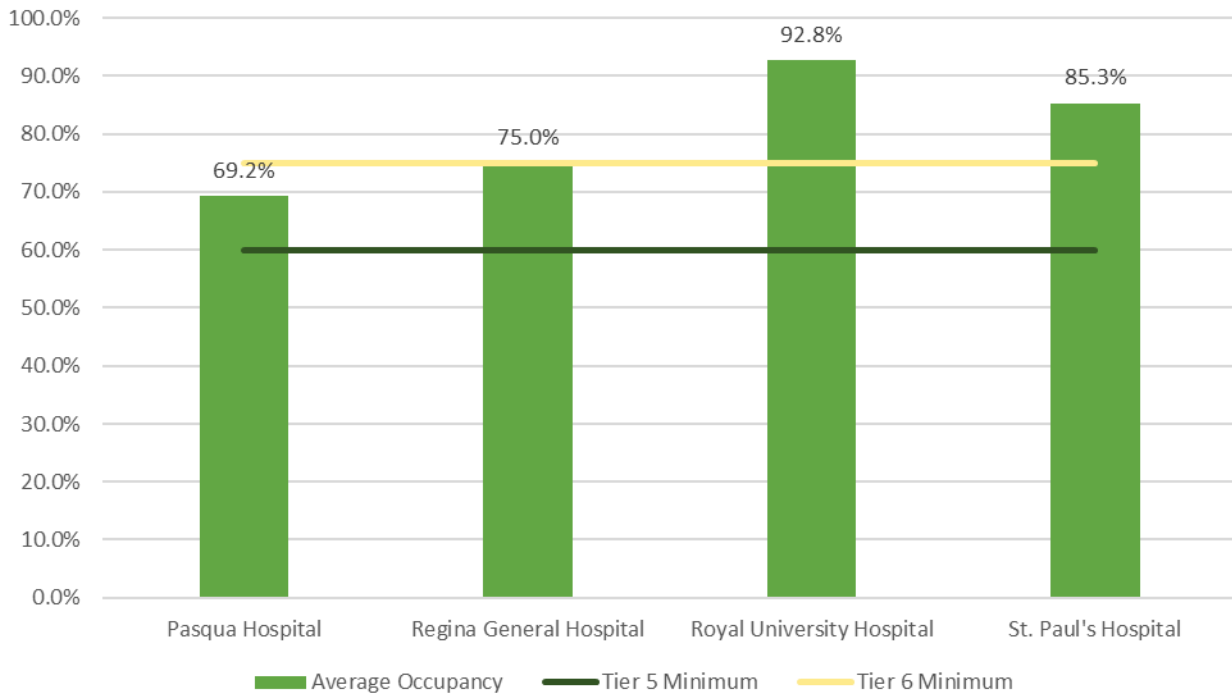


Chart 13: Average Occupancy for Urban ICUs, 2016-2021

The above chart shows the average occupancy for each urban ICU, based on their beds for the last five (complete) years combined. The dark green line is the minimum occupancy to meet the Tier 5 standard and the yellow line is the minimum occupancy to meet the Tier 6 standard. Pasqua Hospital ICU, which functions as a Tier 5 ICU meets the minimum occupancy for that standard. Regina General Hospital meets the standard for a Tier 6 ICU and the Saskatoon ICUs far exceed both Tier 5 and Tier 6 minimum occupancy standards.



g. ICU Admissions and Average Length of Stay

The following charts show each ICUs number of admissions year over year, along with their Average Length of Stay. The average length of stay, number and proportion of admissions for all facilities is as follows:

Facility	ALOS	Average Admissions	% of Provincial Admissions
Battleford Union Hospital	2.6 Days	179	3.3%
Victoria Hospital	2.6 Days	865	15.8%
Cypress Regional Hospital	1.9 Days	282	5.2%
Dr. F.H. Wigmore Hospital	2.7 Days	317	5.8%
Yorkton Regional Health Center	3.2 Days	448	8.2%
St. Paul’s Hospital	6.3 Days	538	9.8%
Pasqua Hospital	3.9 Days	411	7.5%
Royal University Hospital	4.4 Days	927	17.0%
Regina General Hospital	3.4 Days	1497	27.4%

Table 1: ICU Admissions and ALOS by Facility, 2016-2021

h) Regional Admissions and Average Length of Stay:



Battleford Union Hospital

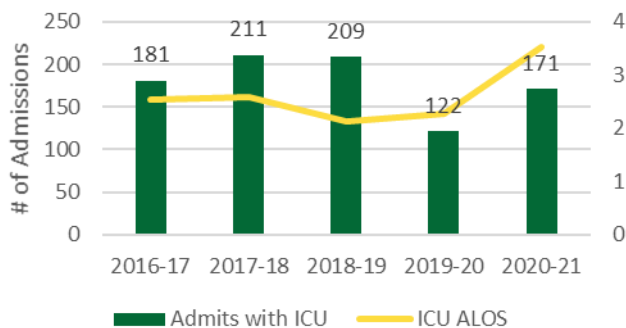


Chart 14: Battleford Union Hospital Yearly Admissions and ALOS, 2016-2021

Victoria Hospital

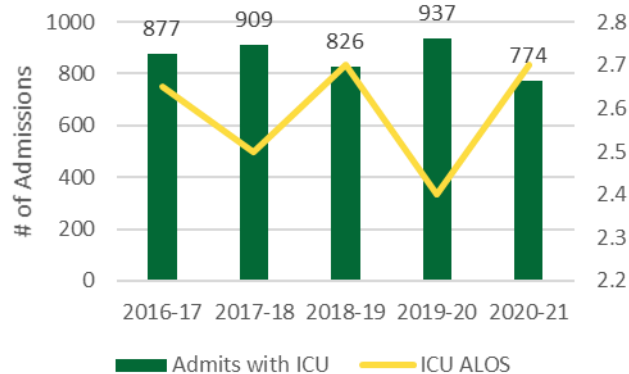


Chart 15: Victoria Hospital Yearly Admissions and ALOS, 2016-2021



h) Regional Admissions and Average Length of Stay:

Cypress Regional Hospital

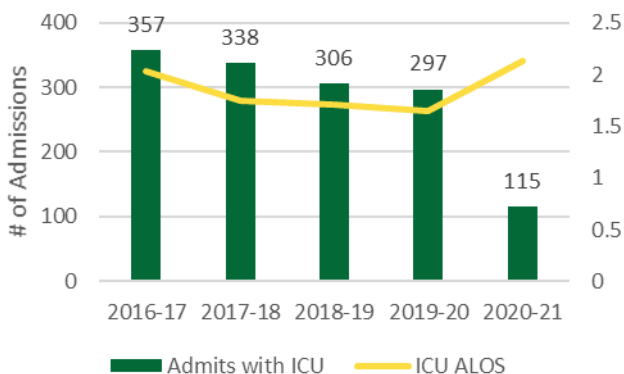


Chart 16: Cypress Regional Hospital Yearly Admissions and ALOS, 2016-2021

Dr. F.H. Wigmore Regional Hospital

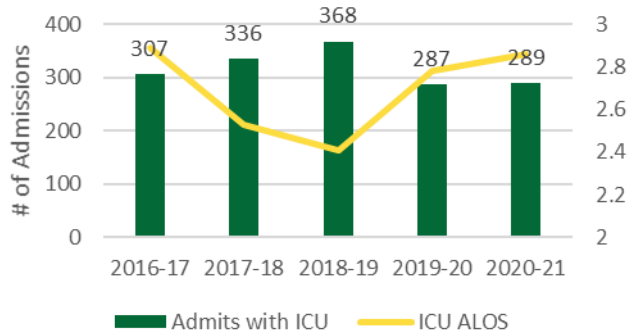


Chart 17: Dr. F.H. Wigmore Hospital Yearly Admissions and ALOS, 2016-2021

Yorkton Regional Health Centre

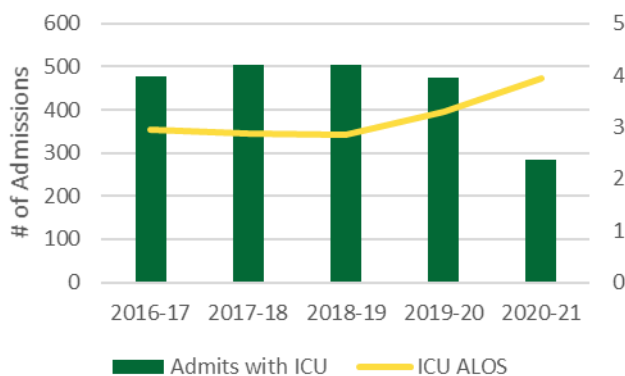


Chart 18: Yorkton Regional Health Center Yearly Admissions and ALOS, 2016-2021



i) Urban Admissions and Average Length of Stay:

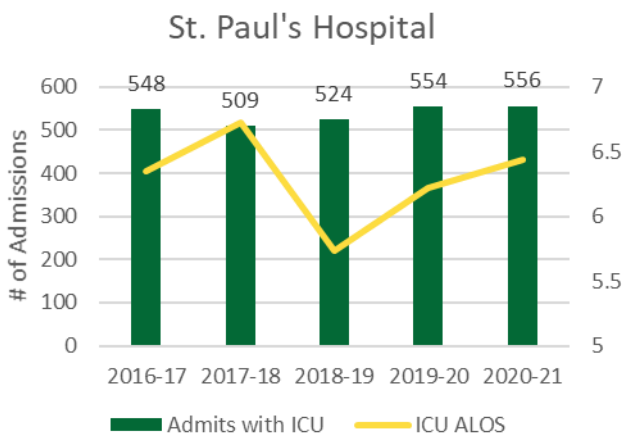


Chart 19: St. Paul's Hospital Yearly Admissions and ALOS, 2016-2021

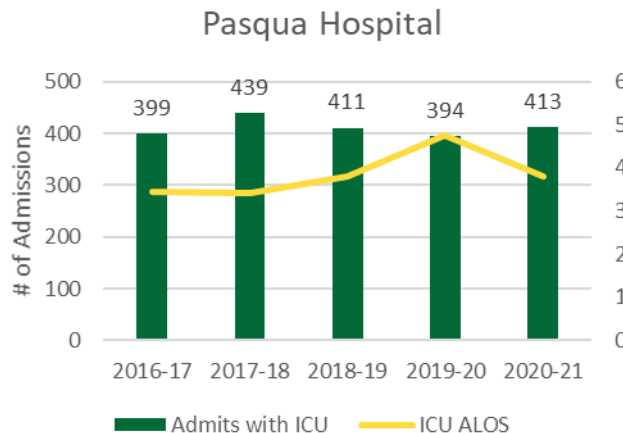


Chart 20: Pasqua Hospital Yearly Admissions and ALOS, 2016-2021

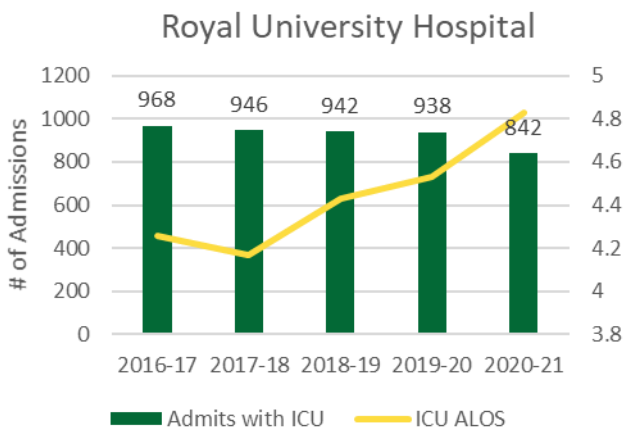


Chart 21: Royal University Hospital Yearly Admissions and ALOS, 2016-2021

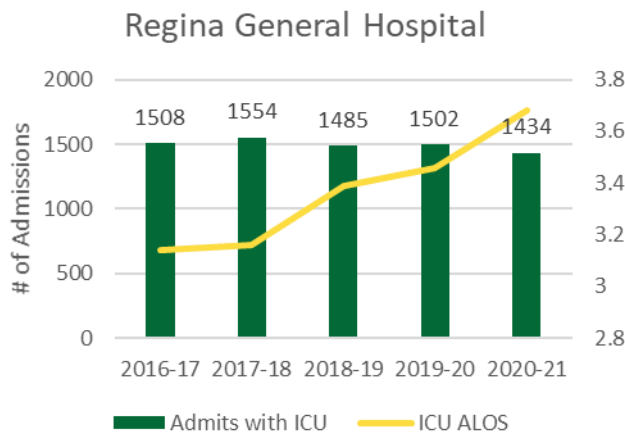


Chart 22: Regina General Hospital Yearly Admissions and ALOS, 2016-2021



j) Out of Province Admissions by Facility:

The bar chart below shows the total number of ICU days between 2016-2021 in Saskatchewan that were occupied by Out of Province patients in each facility.

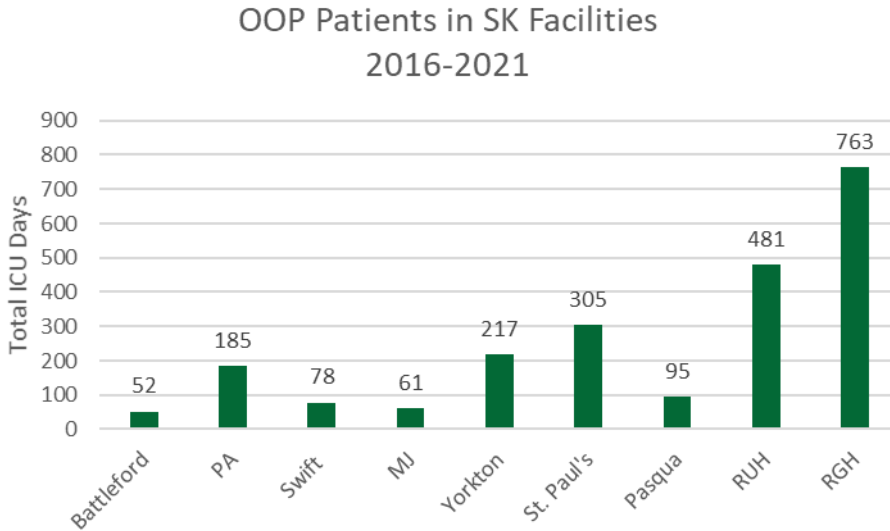


Chart 23: Total ICU Days in SK Facilities for OOP Patients

The total ICU days in SK facilities between 2016-2021 that were occupied by out of province patients was 2,238. The majority of those days were in the urban facilities, 1,644 (73.5%) and 534 (26.5%) in regional facilities.

2. ICU Days by Catchment Area



Key Results:

Between the fiscal years of 2016-2021 there were **101,896** days spent in all Saskatchewan ICUs combined. Of those days, **48,029 or 47.1%** were for patients who lived closest to an ICU in either Saskatoon or Regina and **51,629 or 52.9%** were for patients who lived closest to an ICU in one of the Regional centers (North Battleford, Prince Albert, Swift Current, Moose Jaw or Yorkton.). The chart below shows us the Demand on ICUs by Catchment area for the last five years.

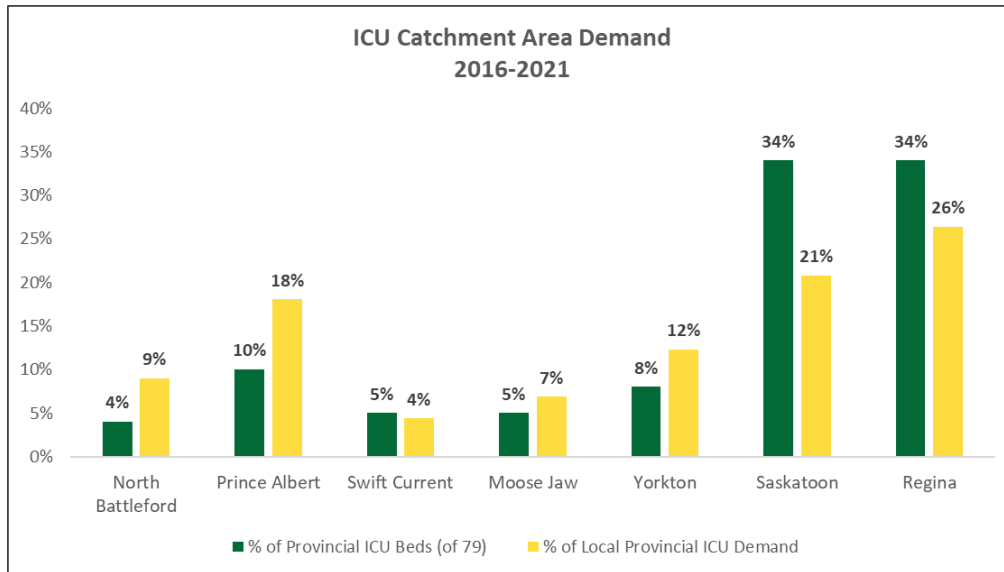


Chart 24: Proportion of ICU Days by Catchment Area

The green bar is the proportion of ICU beds that each catchment area has (as compared to the province’s total 79 beds) and the yellow bar is the demand based on the patient’s home catchment area. The table below shows the demand by catchment area, as well as where patients went for their ICU care.

Patient’s Home Catchment Area	Total Days in other Urban Facility	Total Days in Local Catchment Area Facility	Total Days in Other Catchment Area Facility	Total Days in OOP Facility	TOTAL Catchment Area Days
North Battleford	6,457 (61.7%)	2,249 (21.5%)	490 (4.7%)	1,263 (12.1%)	10,460
Prince Albert	8,065 (42.7%)	10,252 (54.3%)	76 (0.4%)	502 (2.7%)	18,895
Swift Current	1,919 (38.0%)	2,412 (47.8%)	138 (3.9%)	577 (11.4%)	5,045
Moose Jaw	3,062 (42.7%)	3,847 (53.9%)	91 (1.3%)	144 (2.0%)	7,143
Yorkton	5,796(44.7%)	6,716 (51.8%)	59 (0.5%)	387 (3.0%)	12,958
Saskatoon	640 (2.7%)	19,868 (84.6%)	665 (2.8%)	2,315 (9.9%)	23,489
Regina	1,138 (4.1%)	25,321 (90.3%)	397 (1.4%)	1,185 (4.2%)	28,040
OOP Patients	1,644 (73.5%)	594 (26.5%) Regional Facilities*			2,238

Table 2: ICU Days by Catchment Area and Facility, 2016-2021



2. ICU Days by Individual Catchment Area

a) ICU Days for Northern Regional Catchment Areas

The charts below show the year over year ICU demand for each catchment area for the years of 2016-2021. This data is important as we begin to plan ICU services to keep the patient as close to home as possible and meet the demand in that specific area. When we look at the table on page 17, this data preliminarily suggests that the Prince Albert area does not have enough capacity in their ICU to meet demand. Similarly, many patients in the North Battleford Catchment area are traveling to Prince Albert to receive their ICU care.

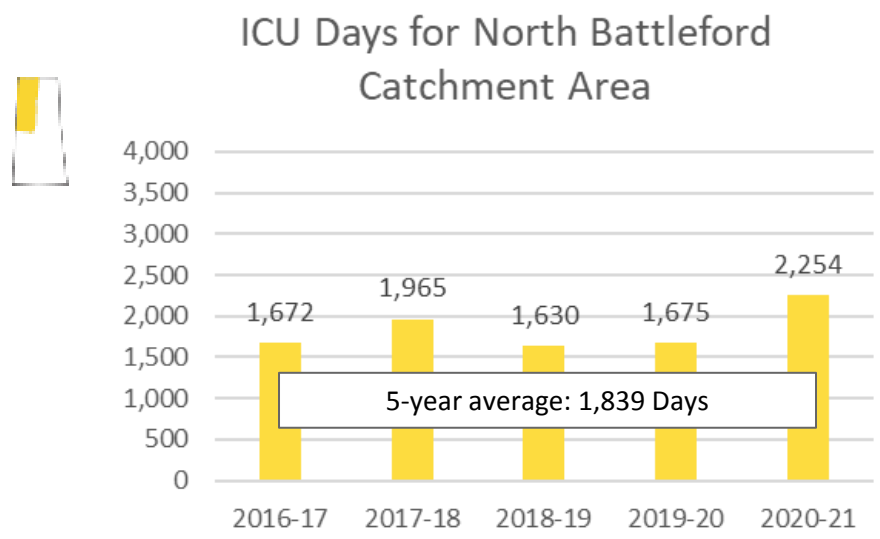


Chart 25: ICU Days, North Battleford Catchment Area, 2016-2021

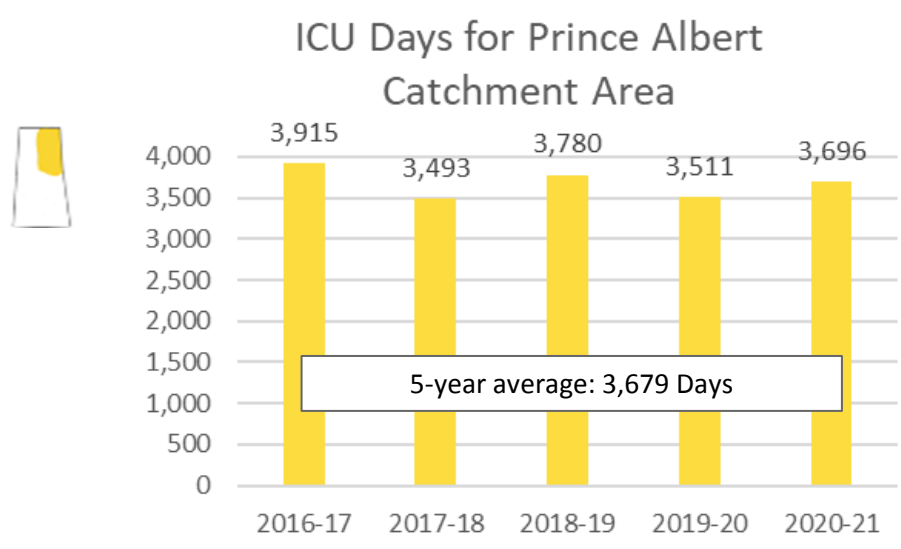


Chart 26: ICU Days, Prince Albert Catchment Area, 2016-2021



b) ICU Days for Southern Regional Catchment Areas

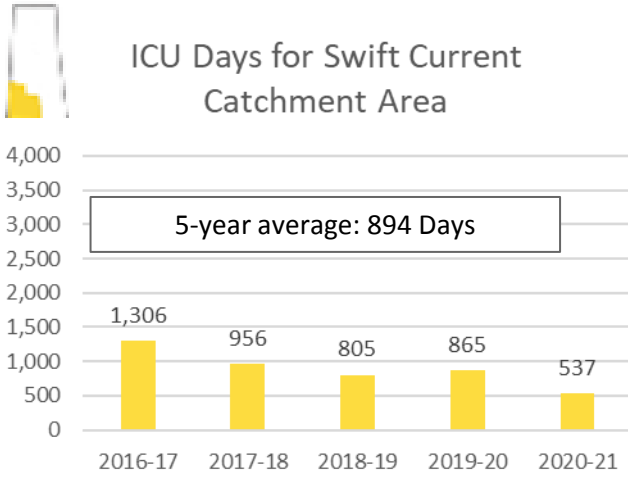


Chart 27: ICU Days, Swift Current Catchment Area, 2016-2021

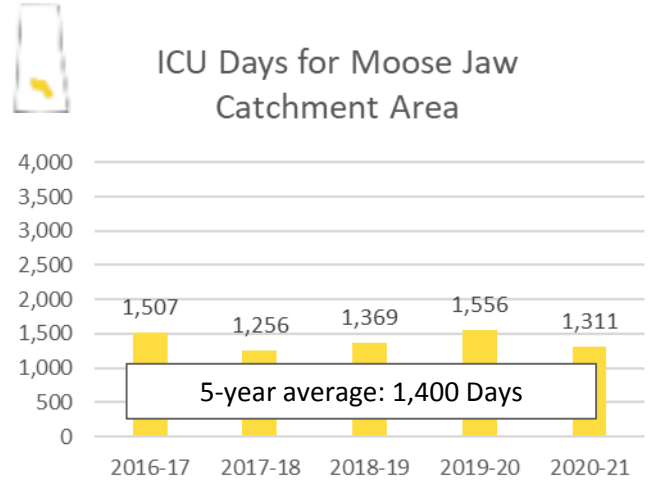


Chart 28: ICU Days, Moose Jaw Catchment Area, 2016-2021

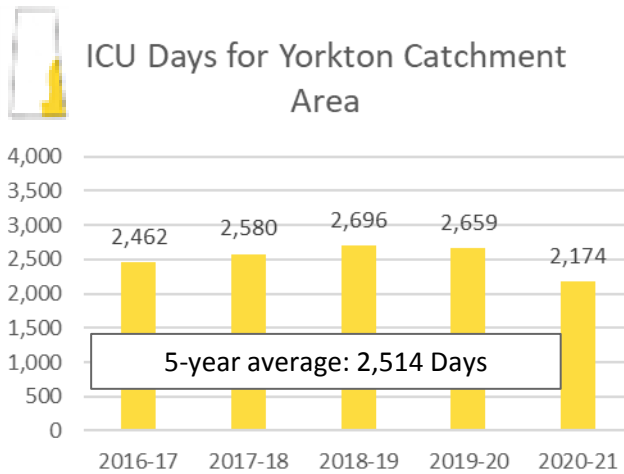


Chart 29: ICU Days, Yorkton Catchment Area, 2016-2021



c) ICU Days for Urban Catchment Areas



ICU Days for Saskatoon Catchment Area

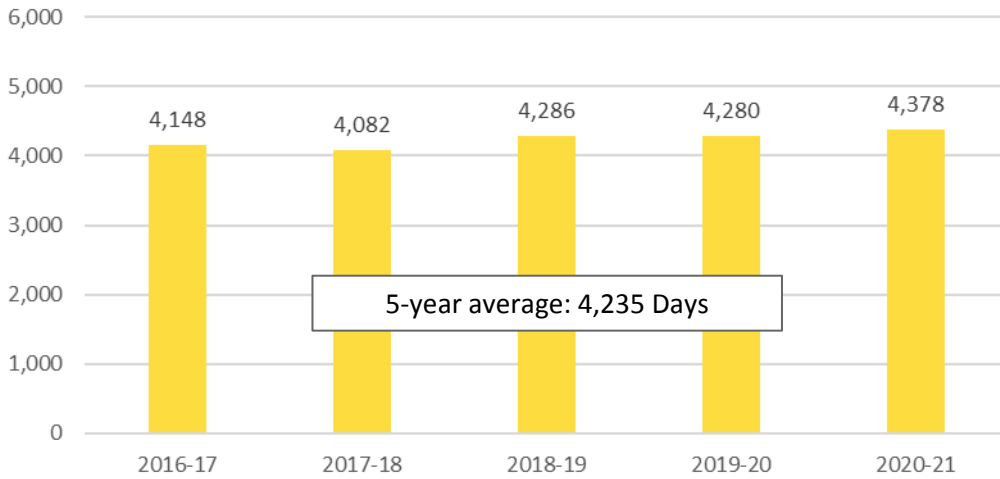


Chart 30: ICU Days, Saskatoon Catchment Area, 2016-2021



ICU Days for Regina Catchment Area

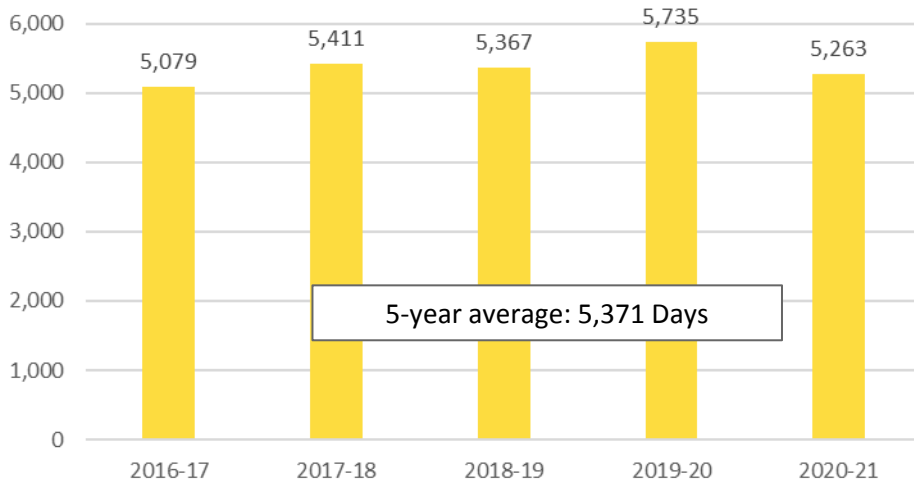
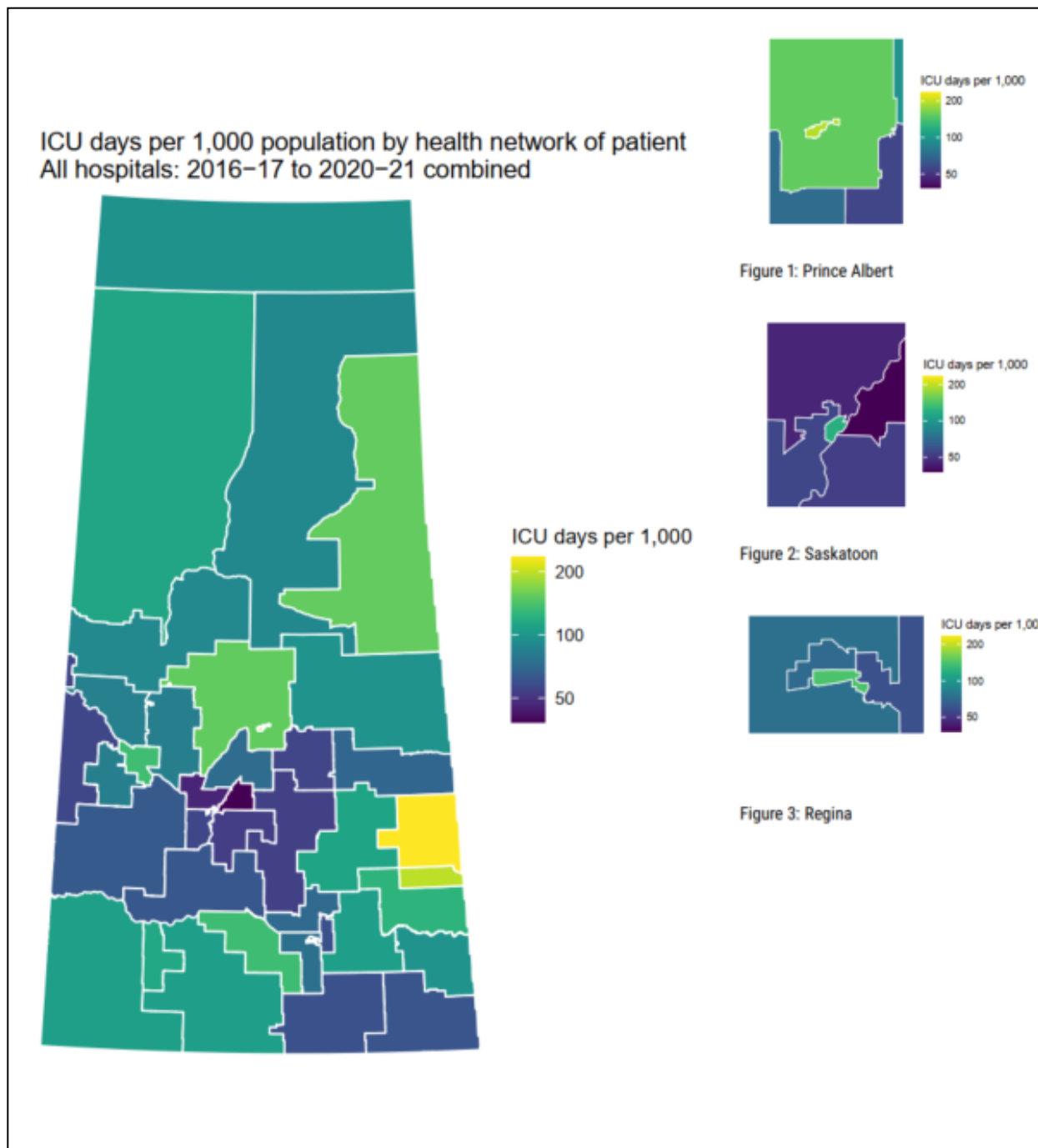


Chart 31: ICU Days, Regina Catchment Area, 2016-2021



d) ICU Days by Health Network

Another way to view ICU Days is by Health Network. The below heat map shows the ICU demand relative to the population size. The numerator of the rate is the total ICU days for residents of the given health network for five years combined (2016-2021). The denominator is the 2018 covered population for residents of the given health network. This map excludes hospitalizations from out of province residents in SK hospitals, but includes hospitalizations of SK residents in OOP Hospitals.



Heat Map 1: ICU Days per 1,000 population by Health Network of Patient



e) ICU Days by Health Network

These Health Networks have the highest ICU days per population

Health Network	Health Network Total Population	ICU days/1,000 population	Total ICU Days
South East 3 (Kamsack)	19,425	235	3,414
South East 4 (Yorkton)	22,546	197	4,406
North East 4 (PA)	46,512	192	8,788
North East 2	8,831	153	1,313
North East 3	26,798	152	4,031
Regina 4	46,956	141	6,498
North West 6 (NB)	24,226	135	3,265
South West 3 (MJ)	44,281	134	5,833
Saskatoon 5	42,649	121	5,047
TOTAL DAYS	282,224 (23%)		42,595 (42%)

Table 3: Health Networks with highest ICU days/population

These Health Networks have the highest ICU days per 1,000 population. The SE3 Network, which is the Kamsack area, has the highest rate of ICU days per 1,000 population. These nine Health Networks account for 23% of our overall Saskatchewan population, but make up 42% of our ICU days (between 2016-2021).

Further exploration of reasons for ICU admission is needed to understand why these Health Networks utilize our ICUs and understand whether they could be cared for closer to home by expanding capacity or services.



f) North Battleford Catchment Area Deep Dive

The charts below illustrate how the North Battleford catchment area is likely underserved when it comes to ICU beds. The first chart, shows the population per ICU bed. As Battleford Union Hospital only has 3 ICU beds, the North West section of the province has a much higher catchment area population per bed, than any other regional ICU. Similarly, the number of ICU days spent per bed in Battleford Union Hospital is higher than any other regional facility. Lastly, more patients in the North West section of SK, leave the province for their ICU care (likely going to Alberta), than any other regional catchment area.



Catchment Area Population per ICU bed

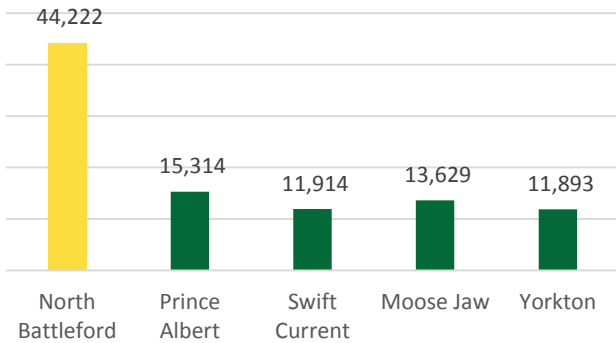


Chart 32: Regional Catchment Area Population per ICU Bed

Catchment Area ICU Days (2016-2021) per ICU bed

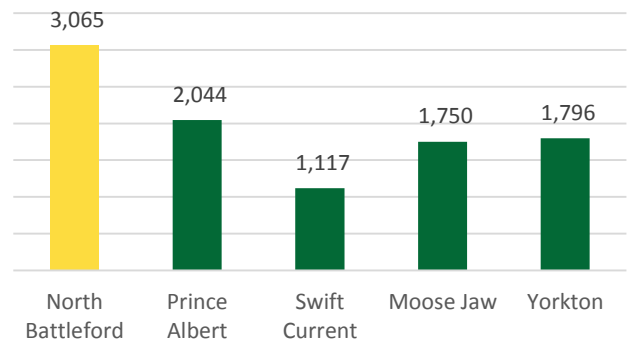


Chart 33: Regional Catchment Area ICU Days per ICU Bed, 2016-2021

Out of Province ICU Days for SK patients (2016-2021)

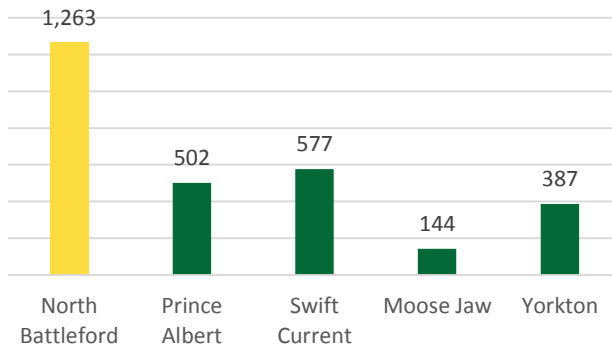


Chart 34: OOP ICU Days by Regional Catchment Area, 2016-2021

3. Understanding Invasive Mechanical Ventilation (IMV) by both ICU Days and Number of Cases



Key Results

Of the 101,896 ICU Days during 2016-2021, up to 64,380 days required Invasive Mechanical Ventilation and of these days **up to 58,336 or 91%** were managed in an Urban Facility. This suggests that one of major reasons (though not the only) for transfer to an Urban facility could be related to the need for IMV. This information may support expanding IMV capacity in regional centers to keep a patient's as close to home as possible.

When we look to the number of IMV cases that were recorded between the years of 2016-2021 these breakdowns are consistent. Of the 11,917 cases of ventilation in the last 5 years **10,776 or 90.4%** were ventilated in an urban facility. Finally, when we look at cases that were ventilated for ≥ 96 hours, of the total **2,864 cases** of that duration, between 2016-2021, **2,620 or 91%** were ventilated in an urban center.

Total Cases of IMV by Timeframe for Regional ICUs 2016-2021

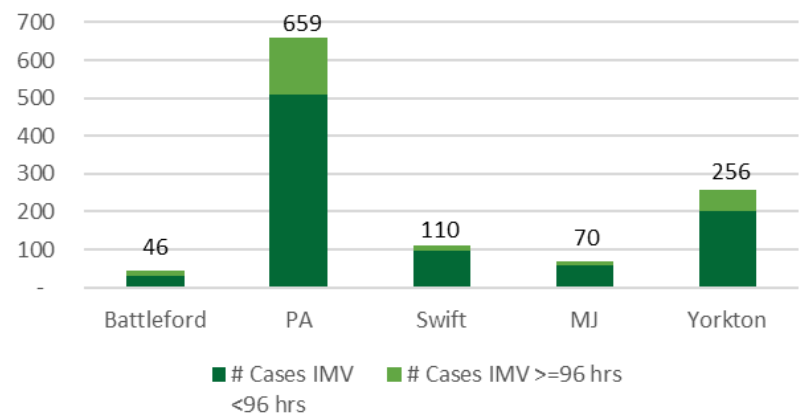


Chart 35: Total Cases of IMV in Regional ICUs, 2016-2021

Total Cases of IMV by Timeframe for Urban ICUs 2016-2021

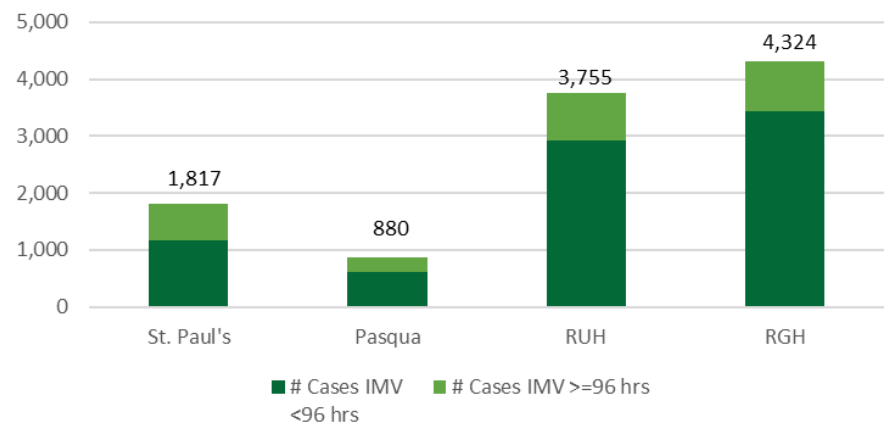


Chart 36: Total Cases of IMV in Urban ICUs, 2016-2021

a) Average IMV Days by Facility

Note that these numbers represent the MAXIMUM number of days that a patient may have been on IMV. It is possible that they were not ventilated for their entire length of stay. For example, if upon discharge the patient had been admitted to the ICU for 10 days, but they were intubated for only 3 of those days, the entire 10 days will be coded in the Discharge Abstract Database to IMV. Therefore the number of IMV days here is very likely an overestimation.

The two charts below show the MAXIMUM Average IMV Days in each hospital over the last five years. It is easier to view on two graphs, because the Urban centers have much higher ventilated days than the Regional Centers. The dark green bars represent the maximum average number of IMV days in each facility between 2016-2021. The light green line (right axis), is the maximum proportion of facility days that are coded to IMV. The Tier 4 standard is that at least 10% of ICU days must include IMV.

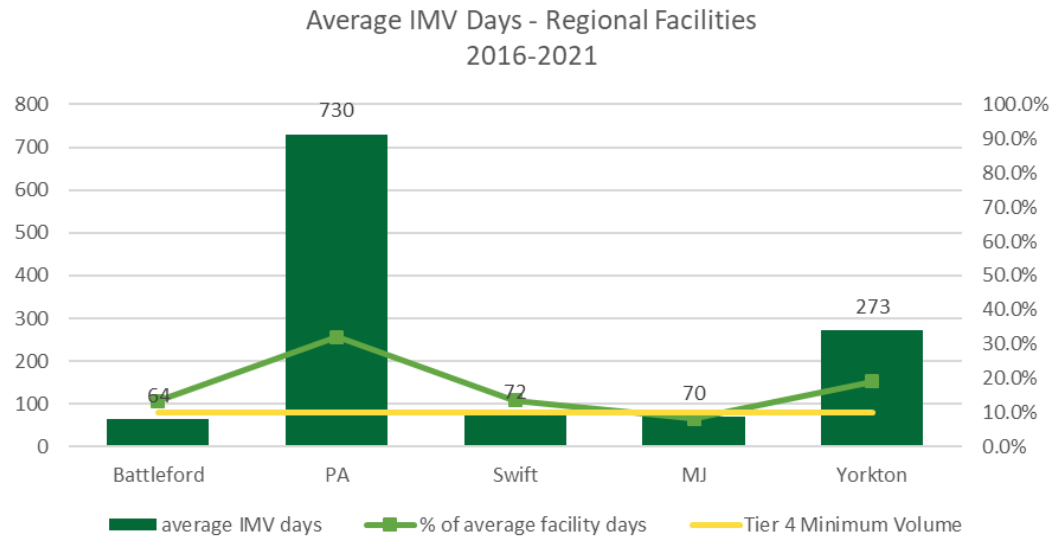


Chart 37: Average IMV Days in Regional ICUs, 2016-2021

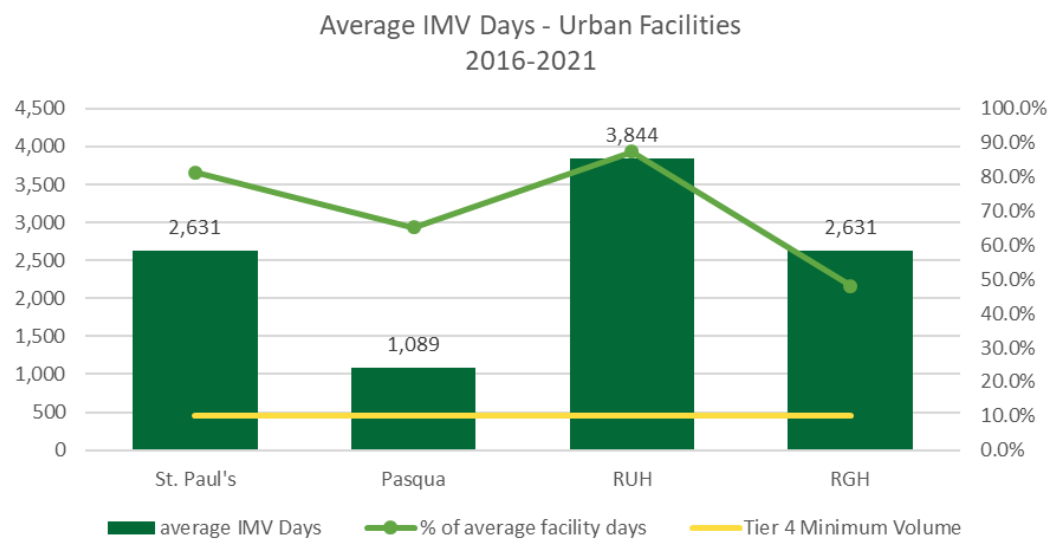


Chart 38: Average IMV Days in Urban ICUs, 2016-2021



b) IMV cases and days breakdown for the North:

The charts below illustrate the breakdown of IMV days and cases for both the facilities in Northern Saskatchewan (Battleford Union Hospital and Victoria Hospital), as well as the two Northern Catchment areas (North Battleford and Prince Albert) and which facility those patients were cared for.

In Battleford Union Hospital, two of the three beds have ventilator capacity; however this is dependent on staffing and at times it is only possible to ventilate one of the three beds. In Victoria Hospital, four of the eight beds have ventilator capacity.



IMV Days by Facility
North Battleford Catchment Area

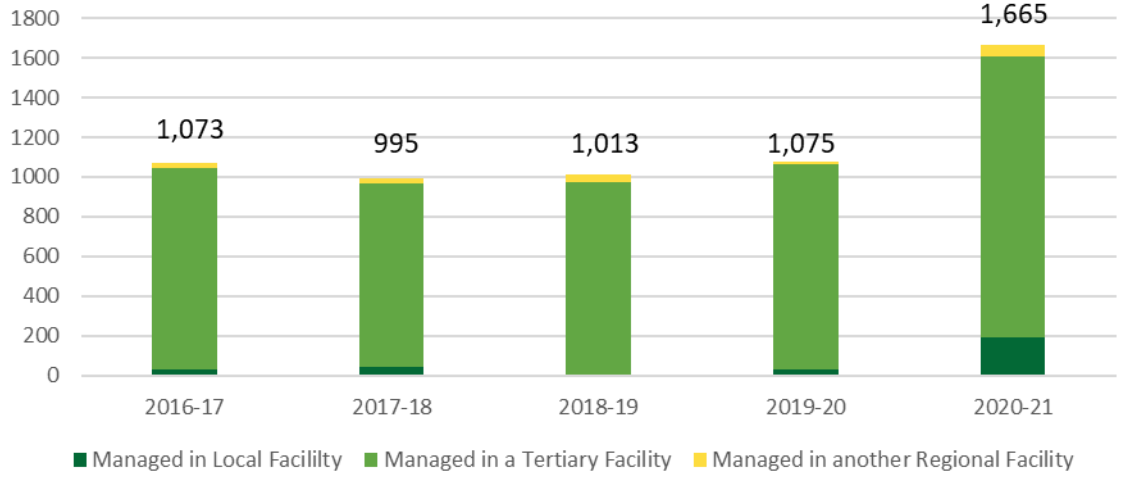


Chart 39: IMV Days North Battleford Catchment Area, 2016-2021



IMV Days by Facility
Prince Albert Catchment Area

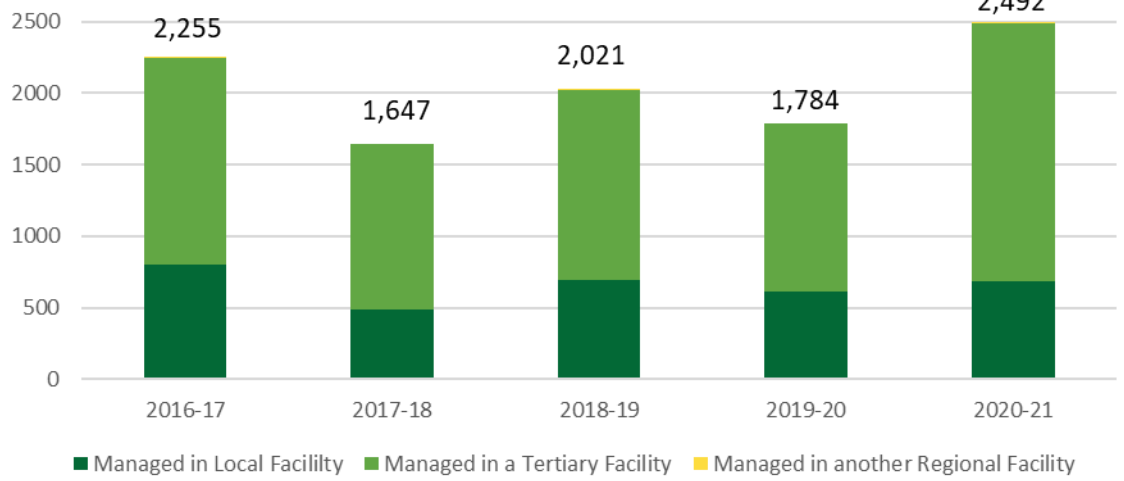


Chart 40: IMV Days Prince Albert Catchment Area, 2016-2021



b) IMV cases and days breakdown for the North:

The charts below show the number of cases cared for in the Battleford Union and Victoria Hospitals by timeframe (<96 hours or >=96 hours). Overall, the Battleford Union Hospital ventilated 0.4% of all provincial IMV cases and the Victoria Hospital ventilated 15.4% of Provincial IMV cases for the years of 2016-2021. The Tier 5 standard is to have a clinical workload of more than 200 IMV patients per year to maintain clinical expertise.

IMV cases by timeframe
Battleford Union Hospital

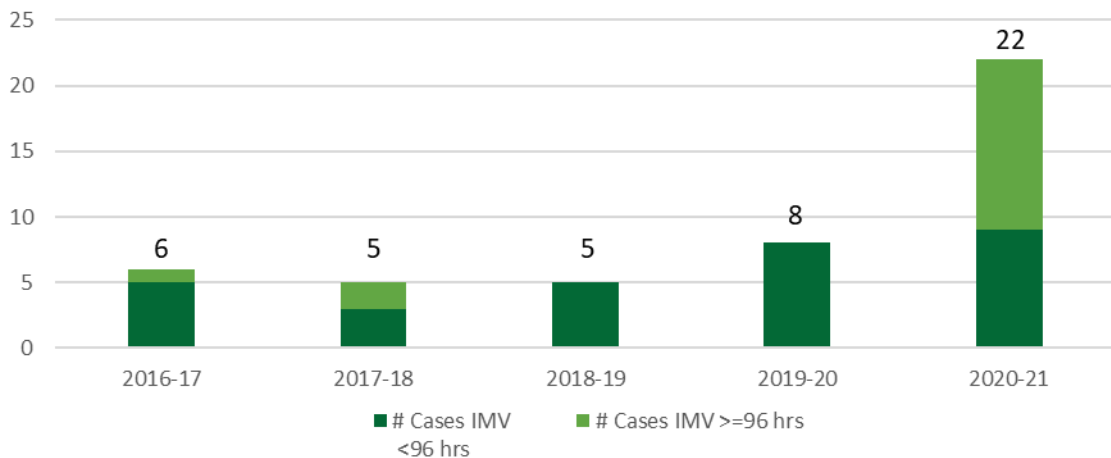


Chart 41: IMV Case Battleford Union Hospital, 2016-2021

IMV Cases by Timeframe
Victoria Hospital

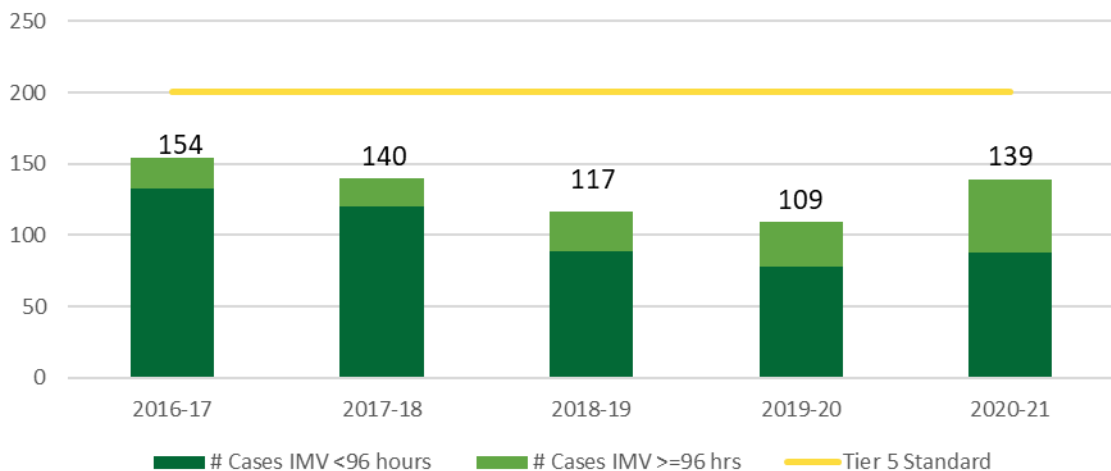


Chart 42: IMV Case Victoria Hospital, 2016-2021



c) IMV cases and days breakdown for the South:

The charts below illustrate the breakdown of IMV cases and days for both the facilities in Southern Saskatchewan (Cypress Regional Hospital, Dr. F.H. Wigmore Hospital, and Yorkton Regional Health Centre), as well as the three Southern Catchment areas (Swift Current, Moose Jaw, and Yorkton) and which facility those patients were cared for in.

In both Cypress Regional Hospital and Dr. F.H. Wigmore Hospital, one of the four beds have ventilator capacity. In Yorkton Regional health Centre, two of the six beds have ventilator capacity.



IMV Days by Facility
Swift Current Catchment Area

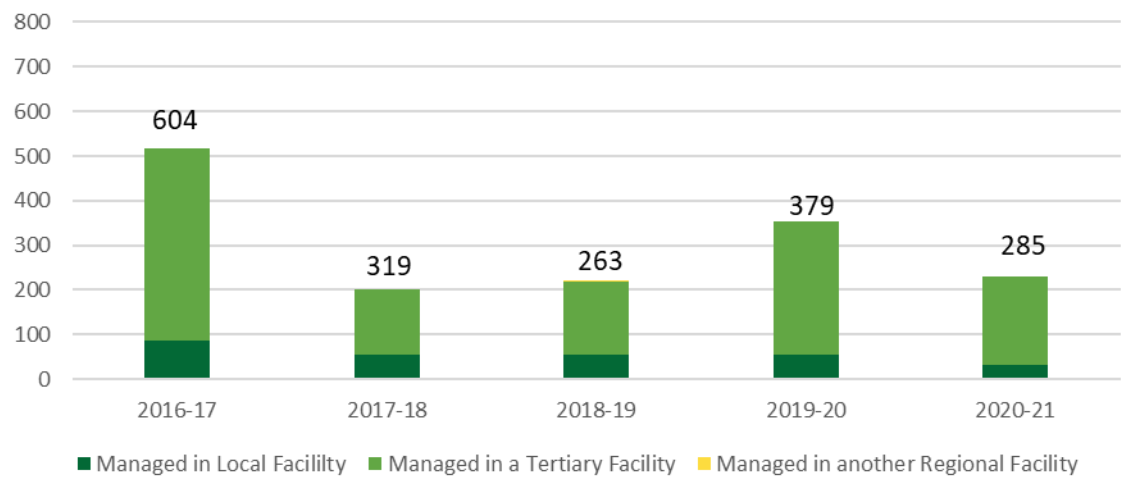


Chart 43: IMV Days Swift Current Catchment Area, 2016-2021



IMV Days by Facility
Moose Jaw Catchment Area

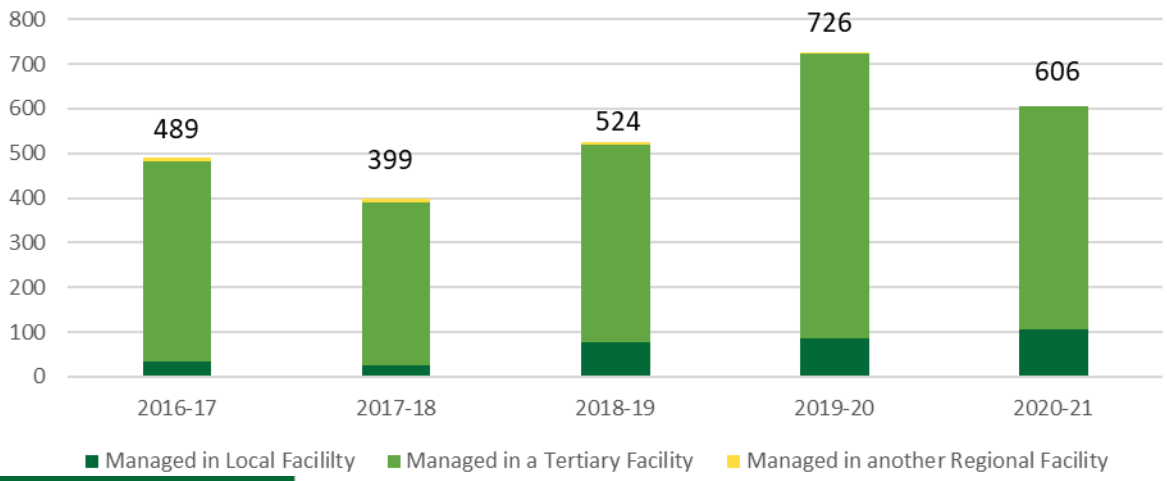


Chart 44: IMV Days Moose Jaw Catchment Area, 2016-2021



c) IMV cases and days breakdown for the South continued:



IMV Days by Facility
Yorkton Catchment Area

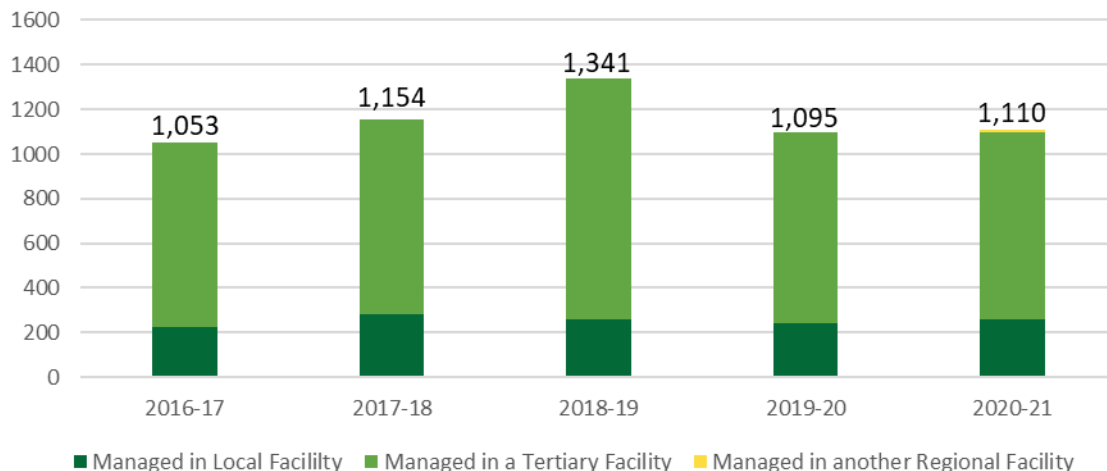


Chart 45: IMV Days Yorkton Catchment Area, 2016-2021

The charts below and on the next page show the number of IMV cases cared for in the Cypress Regional Hospital, Dr. F.H. Wigmore Hospital and Yorkton Regional Health Center by timeframe (<96 hours or >=96 hours). Overall, the Cypress Regional Hospital ventilated 0.9% of all provincial IMV cases, the Dr. F.H. Wigmore Hospital ventilated 0.6% of all provincial IMV cases, and the Yorkton Regional Health Center ventilated 2.1% of Provincial IMV cases for the years of 2016-2021.

IMV cases by timeframe
Cypress Regional Hospital

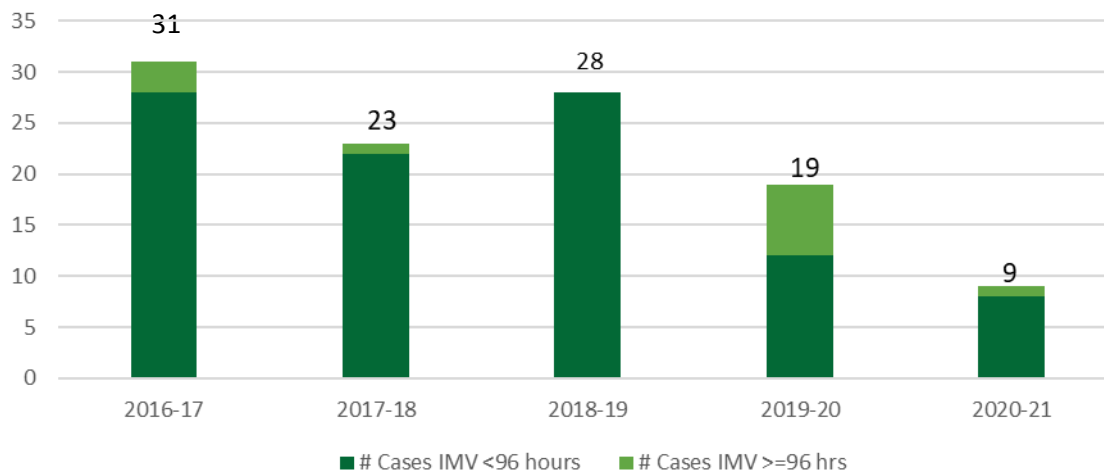


Chart 46: IMV Cases Cypress Regional Hospital, 2016-2021



c) IMV cases and days breakdown for the South continued:

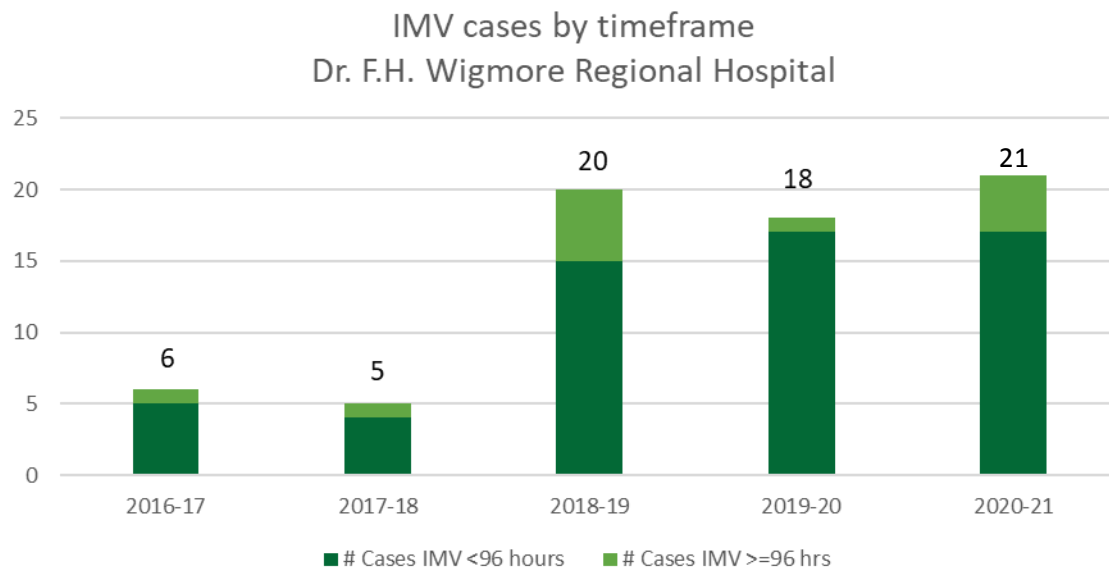


Chart 47: IMV Cases Dr. F.H. Wigmore Regional Hospital, 2016-2021

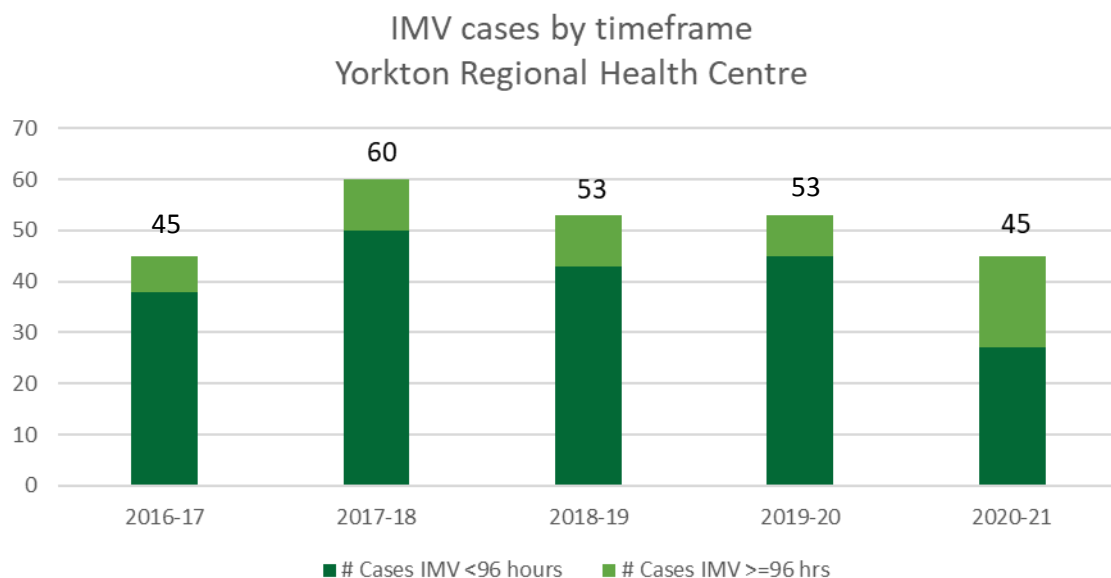


Chart 48: IMV Cases Yorkton Regional Health Center, 2016-2021



d) IMV days and cases breakdown for Saskatoon:

The charts below illustrate the breakdown of IMV cases for the facilities in Saskatoon (St. Paul's Hospital, Royal University Hospital), as well as the number of IMV ICU days for the Saskatoon Catchment area and the type of facility those patients were cared for in.

In Saskatoon, both facilities have the ability to ventilate in all of their ICU beds. St. Paul's Hospital ventilated 15.2% of all IMV cases in Saskatchewan between 2016-2021, while Royal University Hospital ventilated 31.5% of all IMV cases.



IMV Days by Facility
Saskatoon Catchment Area

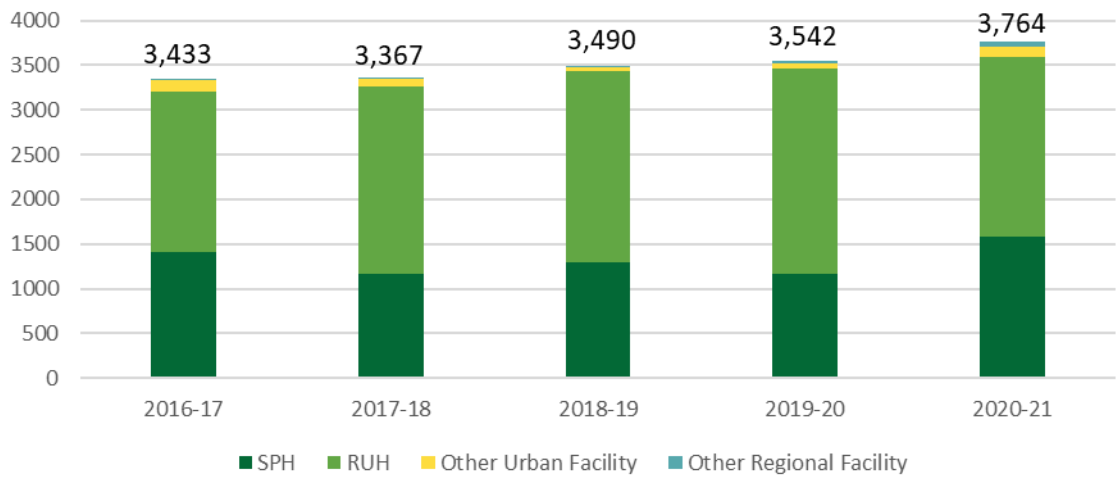


Chart 49: IMV Days Saskatoon Catchment Area



IMV cases by timeframe
St. Paul's Hospital

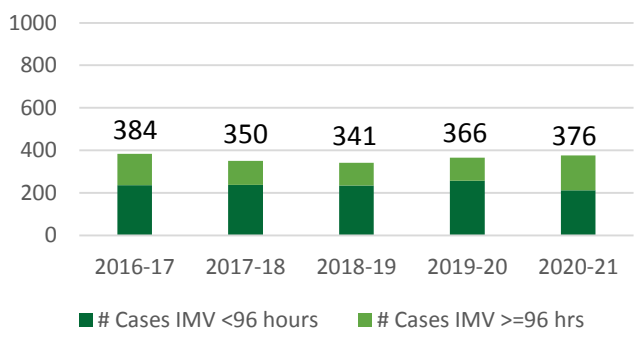


Chart 50: IMV cases St. Paul's Hospital

IMV cases by timeframe
Royal University Hospital

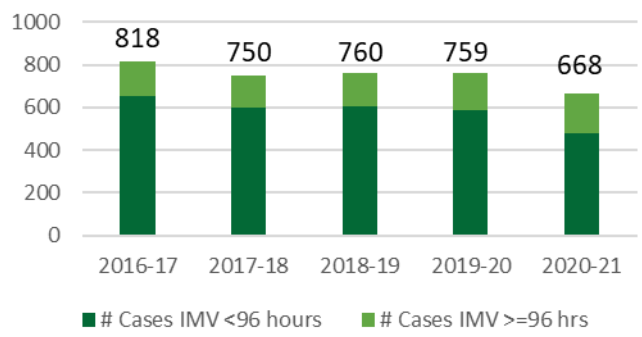


Chart 51: IMV cases Royal University Hospital



e) IMV days and cases breakdown for Regina:

The charts below illustrate the breakdown of IMV cases for the facilities in Regina (Pasqua Hospital, Regina General Hospital), as well as the number of IMV ICU days for the Regina Catchment area and the type of facility those patients were cared for in.

In Regina, both facilities have the ability to ventilate in all of their ICU beds. Pasqua Hospital ventilated 7.4% of all IMV cases in Saskatchewan between 2016-2021, Regina General Hospital ventilated 36.3% of all IMV cases.

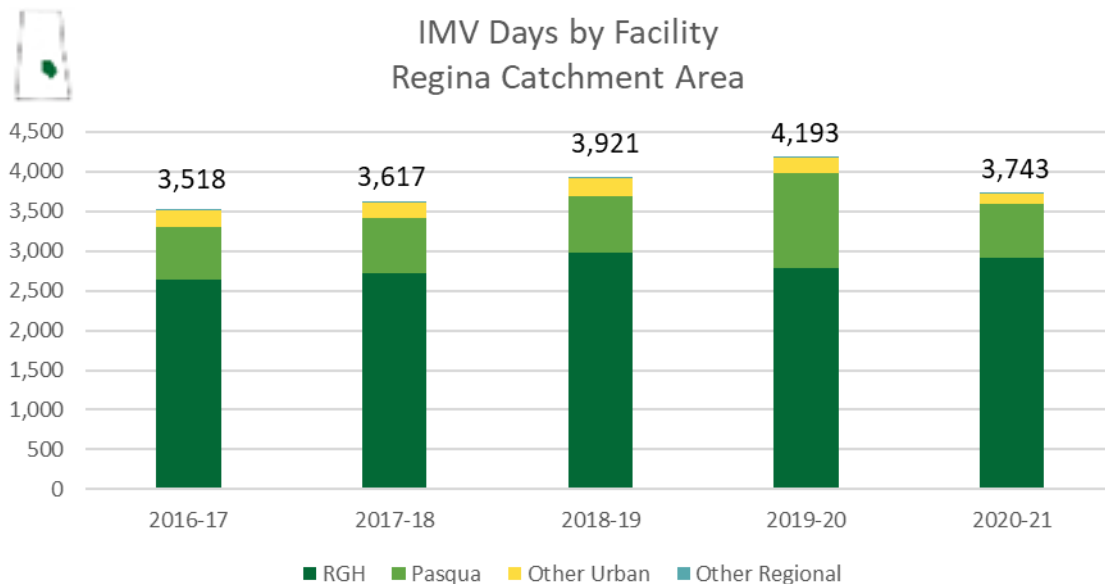


Chart 52: IMV Days Regina Catchment Area

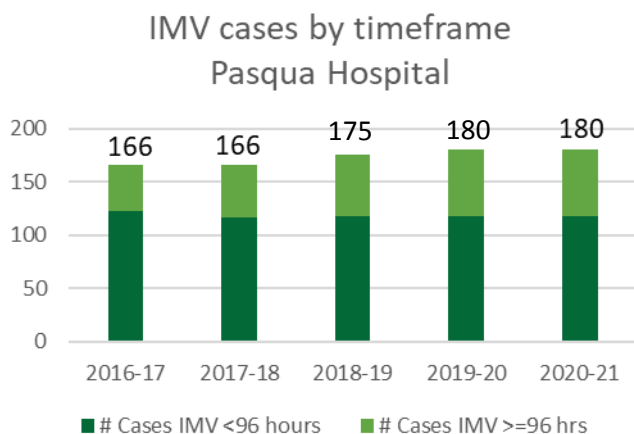


Chart 53: IMV cases Pasqua Hospital

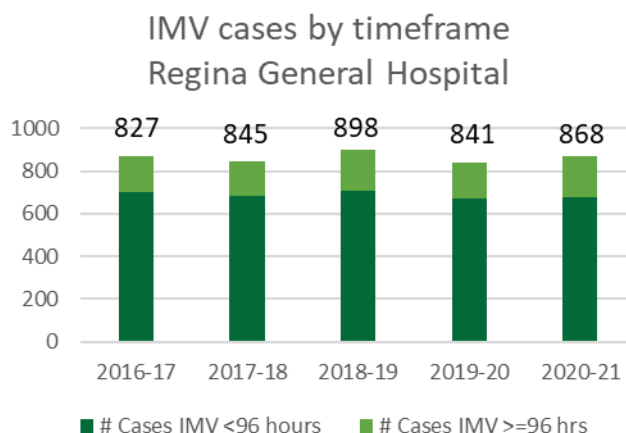


Chart 54: IMV cases Regina General Hospital



4. Understanding Continuous Renal Replacement Therapy (CRRT)

Key Results:

Between the years of 2016-2021 there were 9,343 days coded in the Discharge Abstract Database for CRRT. Only facilities in the urban centers have the capability to provide CRRT. The chart below shows the Catchment Area Demand for CRRT between 2016-2021

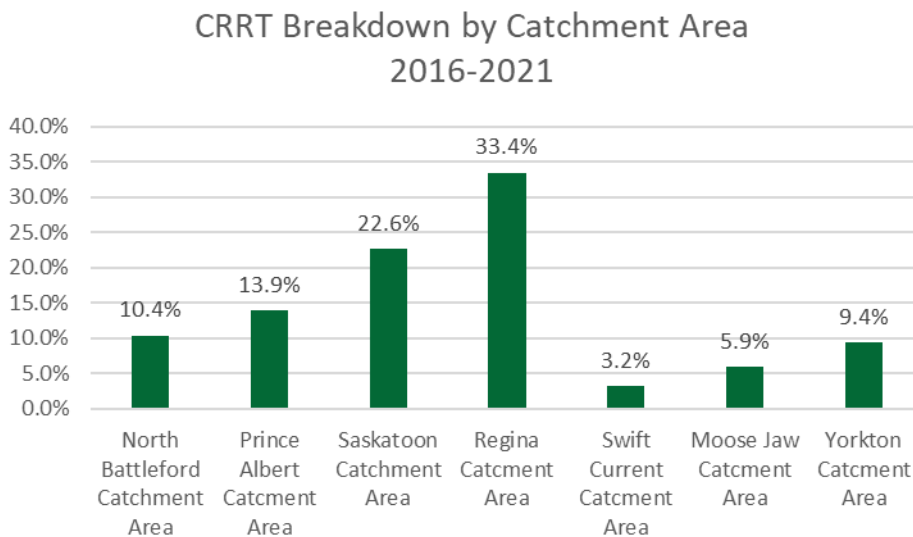


Chart 55: CRRT Days by Catchment Area, 2016-2021

The chart below gives the 5 year summary for which facilities managed CRRT in the ICU.

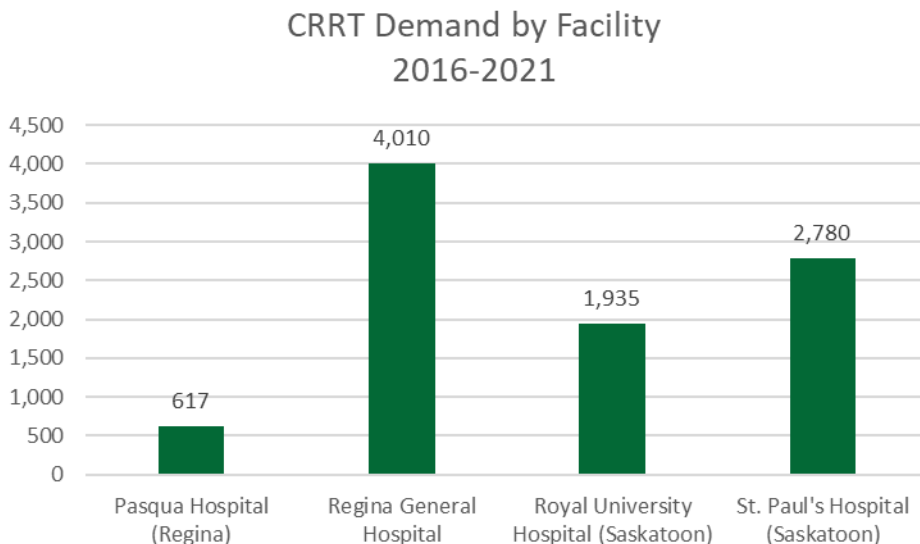


Chart 56: CRRT Days by Facility, 2016-2021



a. CRRT Demand for the Northern Areas:

The Northern half of the province accounts for nearly a quarter of the CRRT demand between the years of 2016-2021. The two charts below show the year over year demand in both the North Battleford and Prince Albert Catchment Areas.

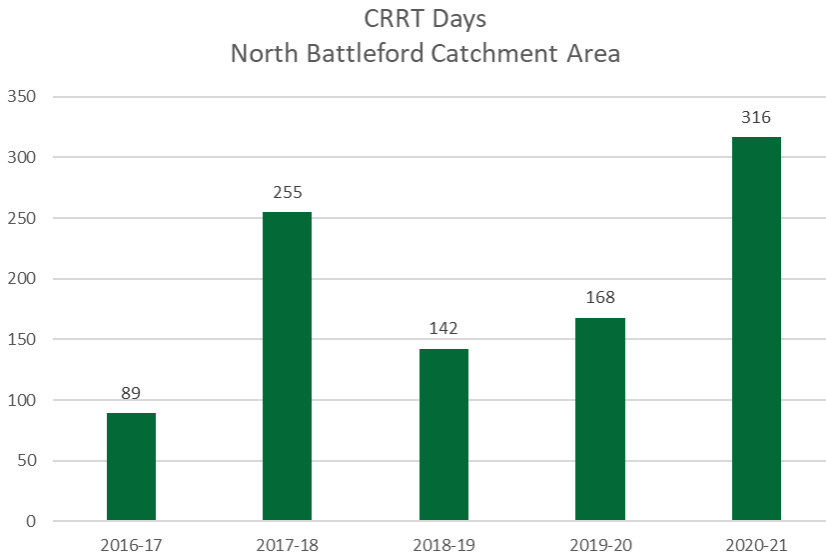


Chart 57: North Battleford Catchment Area CRRT Demand:

Overall, the North Battleford Catchment area represented 10.4% of the provincial demand between the years of 2016-2021.

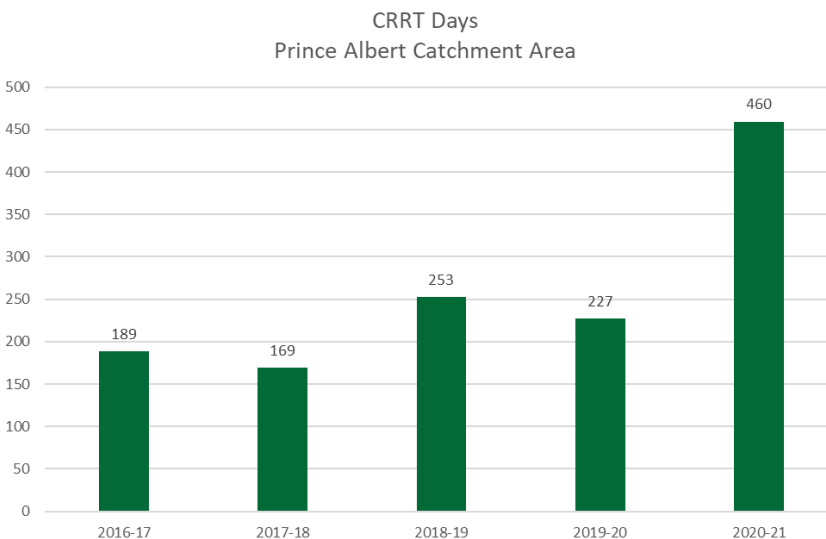


Chart 58: Prince Albert Catchment Area CRRT Demand:

Overall, the Prince Albert Catchment area represented 13.9% of the provincial demand between the years of 2016-2021.



b) CRRT Demand for the Southern Areas:

The Southern half of the province accounts for 18.5% of the CRRT demand between the years of 2016-2021. The charts below show the year over year demand in Swift Current, Moose Jaw, and Yorkton catchment areas.

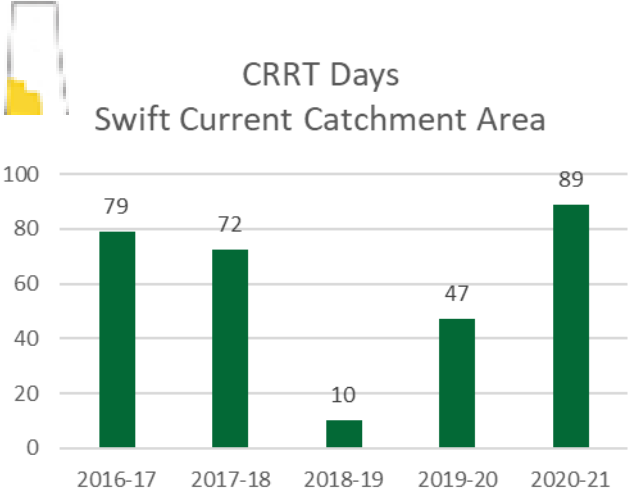


Chart 59: Swift Current Catchment Area CRRT Demand:

Overall, the Swift Current Catchment area represented 3.2% of the provincial demand between the years of 2016-2021.

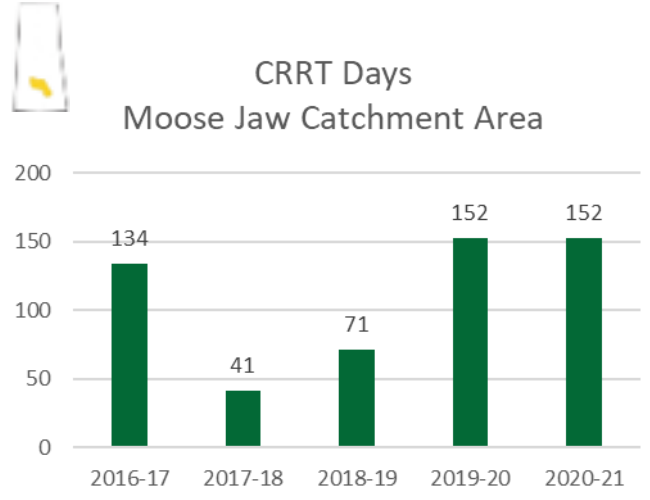


Chart 60: Moose Jaw Catchment Area CRRT Demand:

Overall, the Moose Jaw Catchment area represented 5.9% of the provincial demand between the years of 2016-2021.

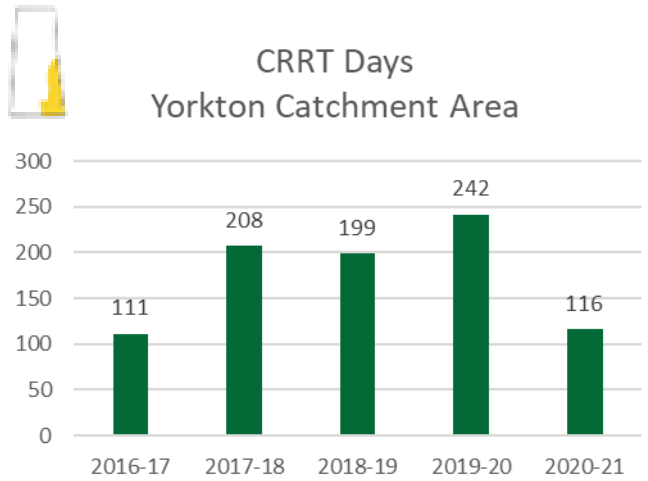


Chart 61: Yorkton Catchment Area CRRT Demand:

Overall, the Yorkton Catchment area represented 9.4% of the provincial demand between the years of 2016-2021.



c) CRRT Demand for Urban Facilities

The charts below show the number of CRRT ICU Days in the four urban facilities.

CRRT Demand by Saskatoon Facility

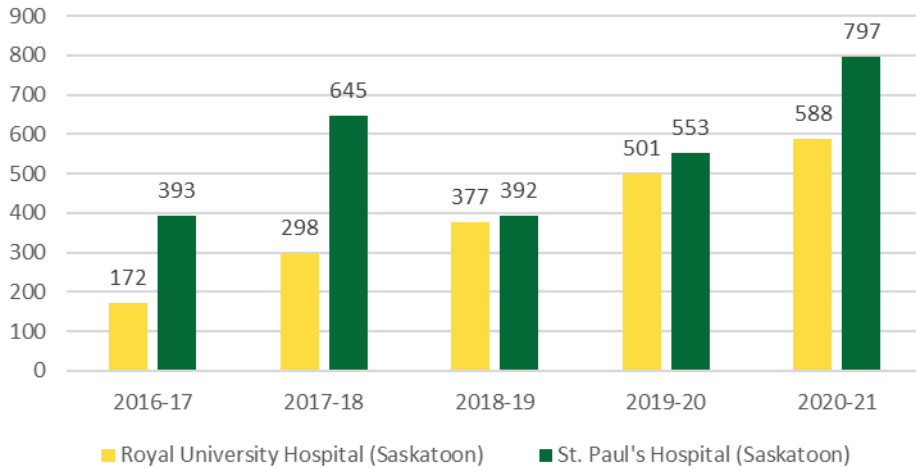


Chart 62: CRRT ICU Days by Saskatoon Facility:

This chart shows the year over year demand on CRRT days at each ICU facility in Saskatoon. Overall, the Saskatoon facilities managed 50.5% of CRRT days between 2016-2021.

CRRT Demand by Regina Facility

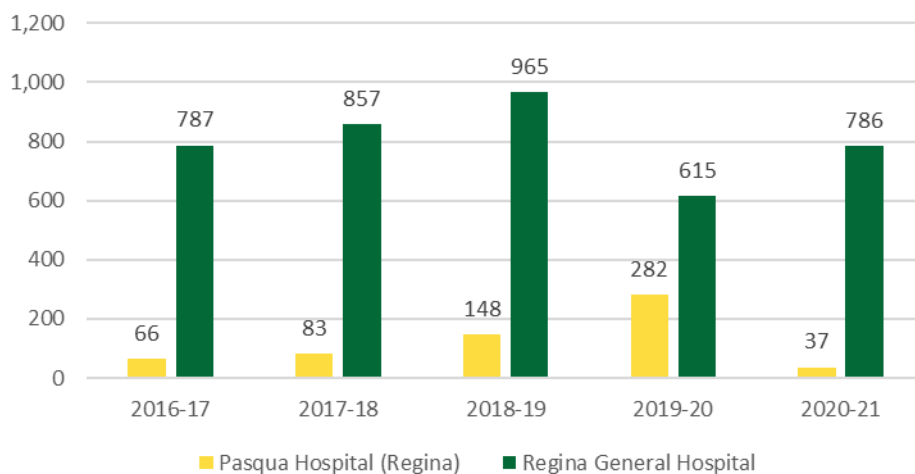


Chart 63: CRRT ICU Days by Regina Facility:

This chart shows the year over year demand on CRRT days at each ICU facility in Regina. Overall, the Regina facilities managed 49.5% of CRRT days between 2016-2021.



5. Level of Acuity by Primary Diagnosis

Key Results:

The Level of Acuity information is a methodology developed by the Canadian Institutes for Health Information (CIHI). The methodology is built upon Case Mix Groups (CMGs), a complex analysis that reviews intervention and diagnosis codes in order to group cases into like categories for the purposes of analyzing and understanding the types of patients that are admitted to our hospitals. At its most detailed level the CMG methodology has over 500 groupings. The Level of Acuity is a recent methodology developed by CIHI, that groups the various CMGs into the type of hospital that usually provides that level of care.

The result provides a useful picture of the level of acuity that is provided at our Regional facilities as compared to our Urban facilities. The table below shows the proportion of the 101,896 ICU days in 2016-2021 by acuity level.

Acuity Level	% of 2016-2021 ICU Days Provincially
Highest Acuity	24%
Medium Acuity	23%
Standard Acuity	53%

Table 4: Proportion of Overall Provincial ICU Days by Acuity

Level of Care by Facility Type
2016-2021

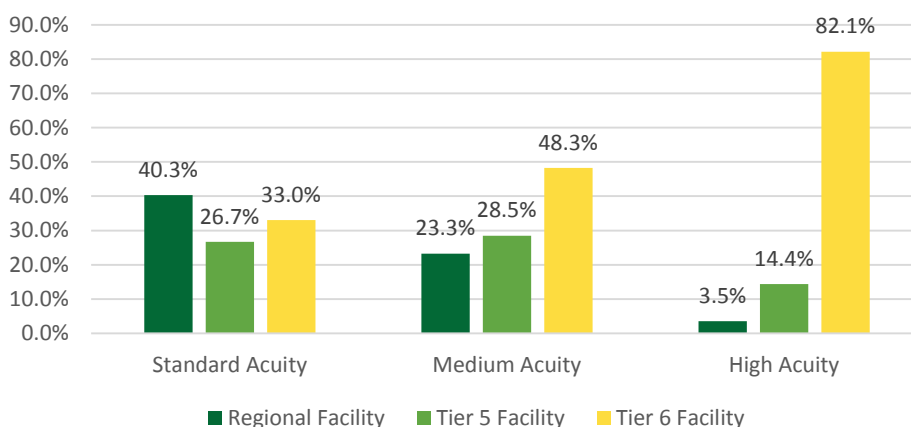


Chart 64: Proportion of Overall ICU Days by Acuity Level and Facility Type

Based on chart 64, the ICU days grouped to the lowest acuity level, are more evenly split between regional and urban centers. However, nearly all of the ICU days grouped in the highest acuity level are cared for at an urban facility (Tiers 5 and 6).



a) Level of Acuity in Northern Catchment Areas and Facilities



North Battleford Catchment Area
Average Level of Acuity 2016-2021

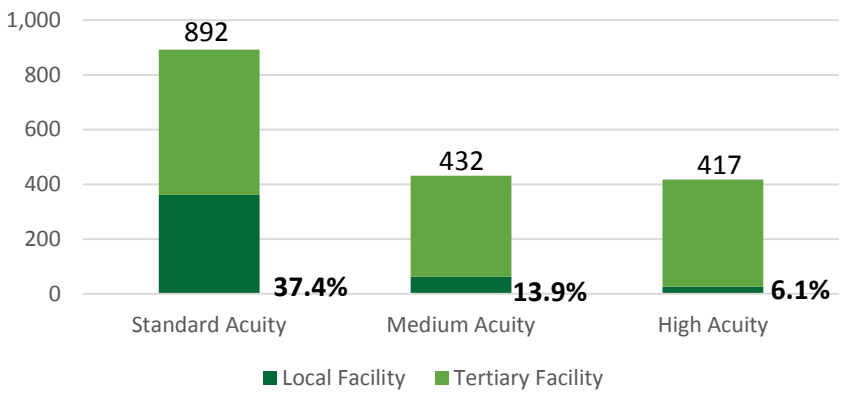


Chart 65: Average Acuity Level of Care North Battleford Catchment Area

The chart above show the average level of acuity in the North Battleford Catchment Area and where those ICU days were managed. The highest acuity level accounts for 23.0% of all NB catchment area days, medium acuity level accounts for 24.4% and standard acuity accounts for 52.6% of all NB Catchment Area days between 2016-2021. The bottom percentages show what percent of the demand in the NB Catchment area has been historically managed in the local facility (Battleford Union Hospital).



Prince Albert Catchment Area
Average Level of Acuity 2016-2021

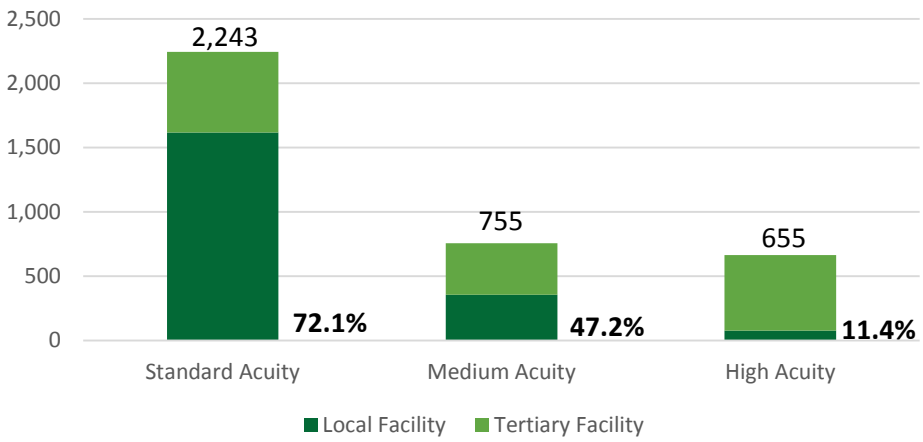


Chart 66: Average Acuity Level of Care Prince Albert Catchment Area

The chart above show the level of acuity in the Prince Albert Catchment Area and where those ICU days were managed. The highest acuity level accounts for 18.1% of all PA catchment area days, medium acuity level accounts for 20.6% and standard acuity accounts for 61.4% of all PA Catchment Area days between 2016-2021. The bottom percentages show what percent of the demand in the PA Catchment area has been historically managed in the local facility (Victoria Hospital).



b) Level of Acuity in Southern Catchment Areas and Facilities

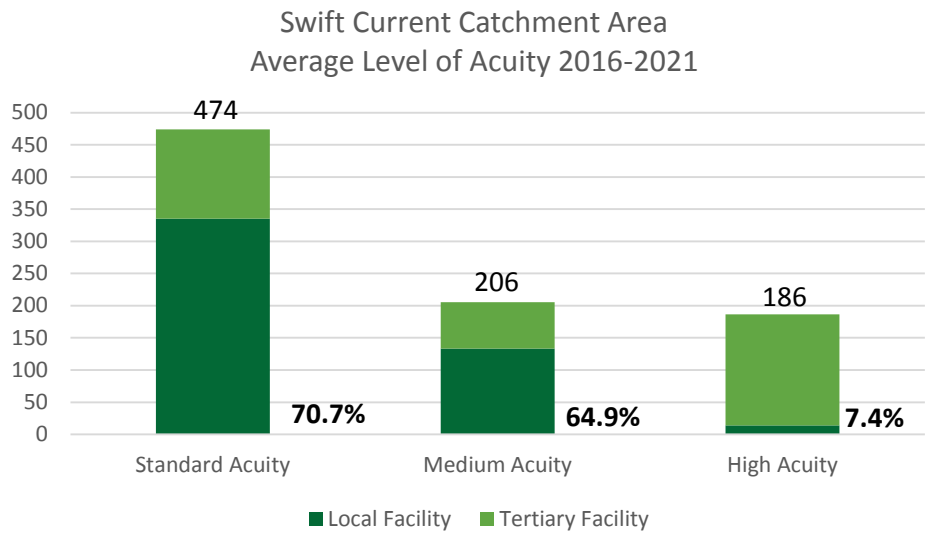


Chart 67: Average Acuity Level of Care Swift Current Catchment Area

The chart above show the level of acuity in the Swift Current Catchment Area and where those ICU days were managed. The highest acuity level accounts for 21.1% of all Swift Current catchment area days, medium acuity level accounts for 23.5% and standard acuity accounts for 55.5% of all Swift Current Catchment Area days between 2016-2021.

The bottom percentages show what percent of the demand in the Swift Current Catchment area has been historically managed in the local facility (Cypress Regional Hospital).

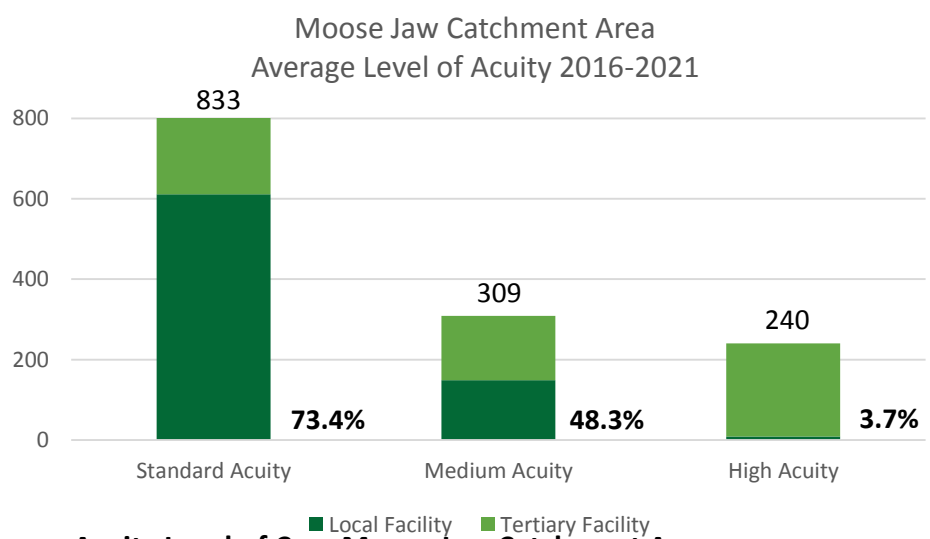


Chart 68: Average Acuity Level of Care Moose Jaw Catchment Area

The chart above show the level of acuity in the Moose Jaw Catchment Area and where those ICU days were managed. The highest acuity level accounts for 17.3% of all Moose Jaw catchment area days, medium acuity level accounts for 22.4% and standard acuity accounts for 60.3% of all Moose Jaw Catchment Area days between 2016-2021.

The bottom percentages show what percent of the demand in the Moose Jaw Catchment area has been historically managed in the local facility (Dr. F.H. Wigmore Hospital)



b) Level of Acuity in Southern Catchment Areas and Facilities contd.

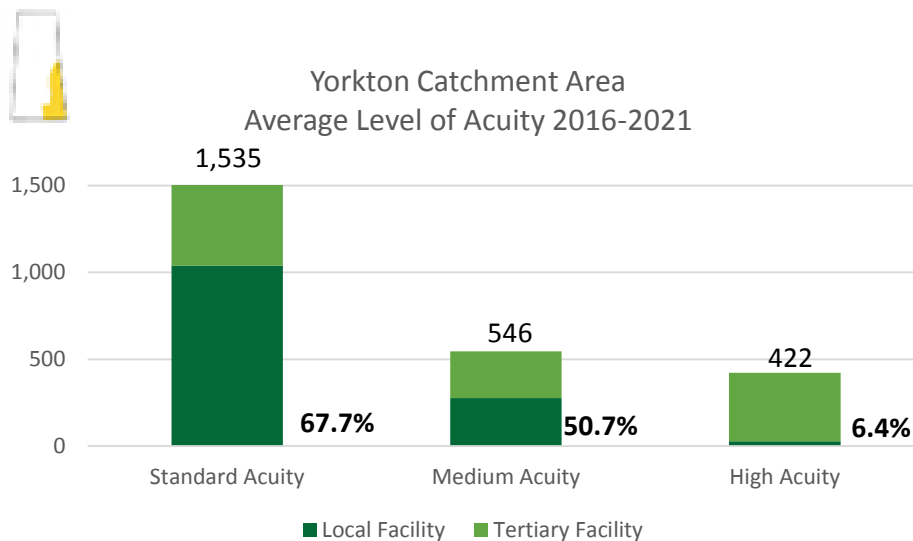


Chart 69: Average Acuity Level of Care Yorkton Catchment Area

The chart above show the level of acuity in the Yorkton Catchment Area and where those ICU days were managed. The highest acuity level accounts for 16.8% of all Yorkton catchment area days, medium acuity level accounts for 21.9% and standard acuity accounts for 61.4% of all Yorkton Catchment Area days between 2016-2021.

The bottom percentages show what percent of the demand in the Yorkton Catchment area has been historically managed in the local facility (Yorkton Regional Health Center).



c) Level of Acuity by St. Paul's Hospital and Royal University Hospital (Facility Data)

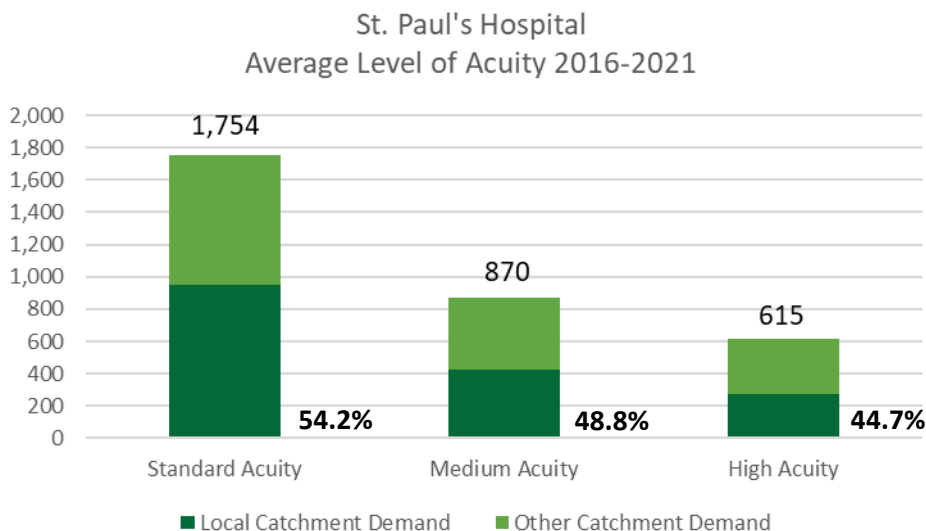


Chart 70: Average Level of Acuity, St. Paul's Hospital

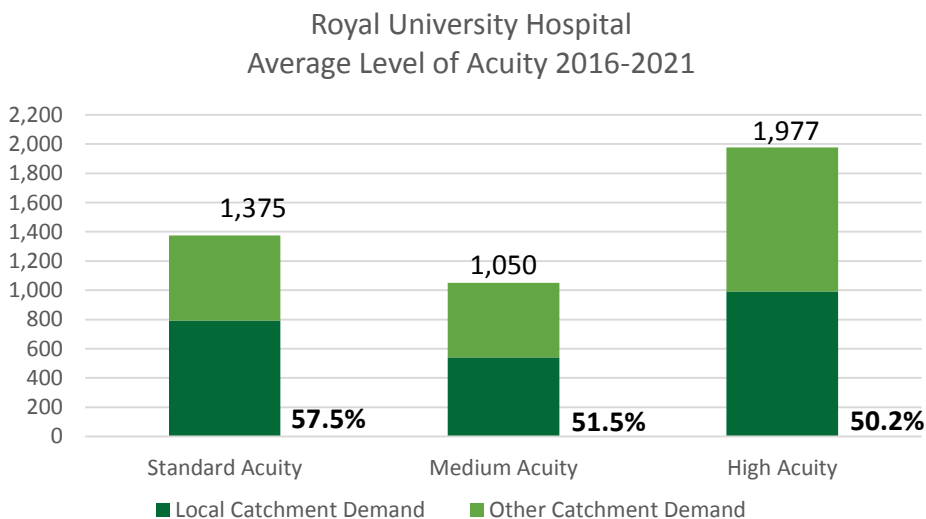


Chart 71: Average Level of Acuity, Royal University Hospital

The charts above show the average level of acuity in St. Paul's Hospital and Royal University Hospital and where the demand comes from. The dark green (and percentages) shows the average demand by acuity level for the local Saskatoon Catchment Area, the light green bar is the demand from other Catchment areas. (Primarily those living in the North Battleford and Prince Albert catchment areas, but also patients from the South and Out of Province as well.) The table below shows the breakdown of acuity in Regina Hospitals between 2016-2021 is as follows:

Facility	Standard Acuity	Medium Acuity	High Acuity
SPH	54.1%	26.9%	19.0%
RUH	31.2%	23.9%	44.9%



d) Level of Acuity by Pasqua Hospital and Regina General Hospital (Facility Data)

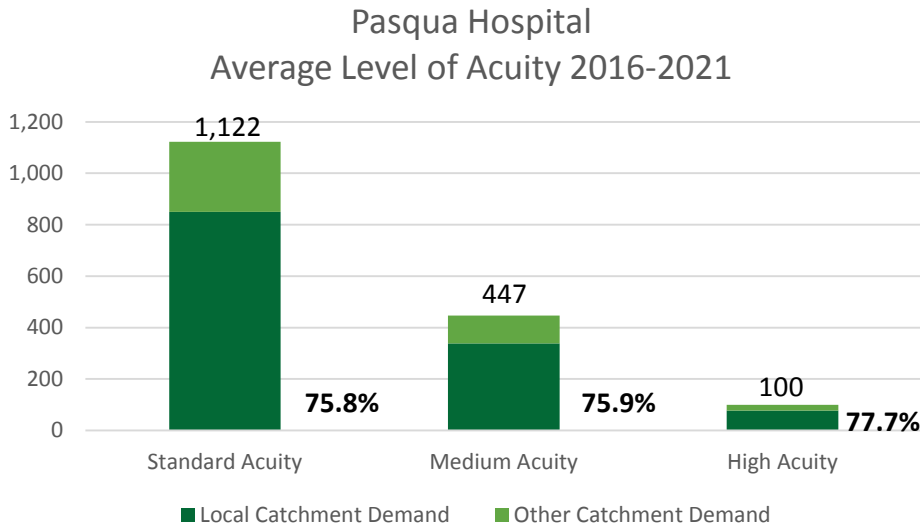


Chart 72: Average Level of Acuity, Pasqua Hospital

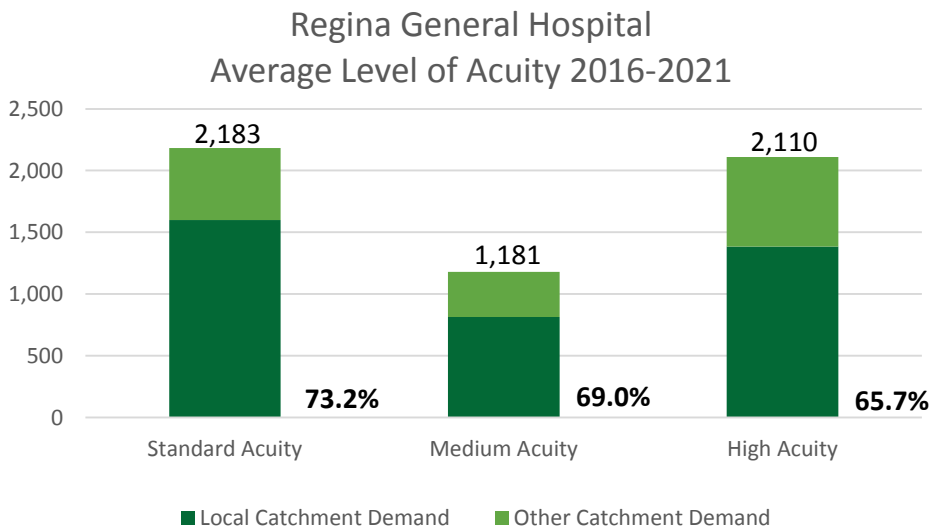


Chart 73: Average Level of Acuity, Regina General Hospital

The charts above show the average level of acuity in the Pasqua Hospital and the Regina General Hospital and where the demand comes from. The dark green (and percentages) shows the average demand by acuity level for the local Regina Catchment Area, the light green bar is the demand from other Catchment areas. (Primarily those living in the Swift Current, Moose Jaw, and Yorkton catchment areas, but also patients from the North and Out of Province as well.) The table below shows the breakdown of acuity in Regina Hospitals between 2016-2021 is as follows:

Facility	Standard Acuity	Medium Acuity	High Acuity
Pasqua	67.2%	26.8%	6.0%
RGH	39.9%	21.6%	38.5%

6. Case Mix Groups

Key Results:

As discussed in the Level of Acuity section, the Case Mix Groups are based on intervention and diagnosis codes to give an understanding of common groups of patients admitted to Saskatchewan Hospitals and ICUs. The following section explores the top ten Case Mix Groups for each Facility and Catchment area to demonstrate what CMGs are cared for in the local facility and what must be transferred to the tertiary center for care. The section for Saskatoon and Regina shows the top ten CMGs admitted to the four urban centers, as well as the Provider Programs who admit to the ICUs.

The table below is the top 20 Case Mix Groups in Saskatchewan ICUs between 2016-2021 and whether they were cared for at a local or urban facility. Major Respiratory Diagnosis is where the COVID diagnosis would be grouped. These CMGs represent over 80% of ICU Days between 2016-2021.

Table 7: Provincial Top 20 Case Mix Groups

Case Mix Group	ICU Days in Regional Facility		ICU Days in Urban Facility	
Major Respiratory Diagnosis	1,903	1.9%	7,665	7.5%
Trauma With Major Intervention	551	0.5%	6,584	6.5%
Sepsis	2,409	2.4%	3,256	3.2%
Pneumonia	1,687	1.7%	3,941	3.9%
Chronic Obstructive Pulmonary Disease	2,457	2.4%	2,576	2.5%
Major Nervous System Intervention	1	0.0%	4,586	4.5%
Major Cardiac Diagnosis	2,520	2.5%	1,681	1.6%
Unrelated Interventions	404	0.4%	3,317	3.3%
Other Cardiac Diagnosis	2,681	2.6%	962	0.9%
Major Cardiac Intervention	0	0.0%	3,608	3.5%
Multisystemic/Unspecified Site Infection	591	0.6%	3,016	3.0%
Major GI Intervention	1,485	1.5%	2,119	2.1%
Other Trauma Diagnosis	993	1.0%	2,207	2.2%
Coronary Artery Bypass Graft (CABG)	0	0.0%	3200	3.1%
Other Nervous System Diagnosis	541	0.5%	2,622	2.6%
Other GI Intervention	1,171	1.1%	1,511	1.5%
Other Respiratory Diagnosis	714	0.7%	1,810	1.8%
Diabetes	1,105	1.1%	1,277	1.3%
Hepatobiliary Diagnosis	847	0.8%	1,144	1.1%
Stroke	718	0.7%	1,253	1.2%
Grand Total	22,778	22.4%	58,335	57.2%

a. Case Mix Groups in the North Battleford Catchment Area


Case Mix Group	Local Facility		Tertiary Facility		Other Regional Facility	
	# of days	% of catchment demand	# of days	% of catchment demand	# of days	% of catchment demand
Major Respiratory Diagnosis	192	2.1%	963	10.5%	32	0.3%
Chronic Obstructive Pulmonary Disease	510	5.5%	202	2.2%	50	0.5%
Trauma With Major Intervention	12	0.1%	587	6.4%	10	0.1%
Pneumonia	181	2.0%	374	4.1%	41	0.4%
Multisystemic/Unspecified Site Infection	20	0.2%	478	5.2%	3	0.0%
Unrelated Interventions	78	0.9%	368	4.0%	3	0.0%
Other Trauma Diagnosis	123	1.3%	262	2.8%	39	0.4%
Other GI Intervention	118	1.3%	214	2.3%	21	0.2%
Sepsis	63	0.7%	216	2.4%	50	0.5%
Major Respiratory System Intervention	3	0.0%	107	1.2%	0	0.0%
TOTALS	1300	14.1%	3772	41.0%	249	2.7%

Table 8: Top Ten Case Mix Groups North Battleford Catchment Area

Table 8 shows the top ten case mix groups for the Prince Albert catchment area for 2016-2021. These CMGs account for **58.0% of all ICU days** within the Prince Albert catchment area for the last five years of data. This table shows the types of diagnoses and interventions that can be cared for in local facility and what (such as the majority of Trauma with Major Intervention), often needs to be sent to an urban facility.


b) Case Mix Groups in the Prince Albert Catchment Area

Case Mix Group	Local Facility		Tertiary Facility		Other Regional Facility	
	# of days	% of catchment demand	# of days	% of catchment demand	# of days	% of catchment demand
Sepsis	1,148	6.2%	416	2.3%	0	0.0%
Major Respiratory Diagnosis	584	3.2%	796	4.3%	0	0.0%
Major Cardiac Diagnosis	1,052	5.7%	252	1.4%	4	0.0%
Trauma With Major Intervention	250	1.4%	1,044	5.7%	0	0.0%
Pneumonia	675	3.7%	443	2.4%	9	0.1%
Chronic Obstructive Pulmonary Disease	825	4.5%	132	0.7%	19	0.1%
Other Cardiac Diagnosis	834	4.5%	116	0.6%	1	0.0%
Multisystemic/Unspecified Site Infection	360	2.0%	503	2.7%	0	0.0%
Other Trauma Diagnosis	454	2.5%	253	1.4%	7	0.0%
Other Respiratory Diagnosis	310	1.7%	356	1.9%	0	0.0%
TOTAL	6,493	35.3%	4,310	23.4%	41	0.2%

Table 9: Top Ten Case Mix Groups Prince Albert Area

Table 9 shows the top ten case mix groups for the Prince Albert catchment area for 2016-2021. These CMGs account for **58.9% of all ICU days** within the Prince Albert catchment area for the last five years of data. This table shows the types of diagnoses and interventions that can be cared for in local facility and what (such as the majority of Trauma with Major Intervention), often needs to be sent to an urban facility.



c) Case Mix Groups in the Swift Current Catchment Area



Case Mix Group	Local Facility		Tertiary Facility		Other Regional Facility	
	# of days	% of catchment demand	# of days	% of catchment demand	# of days	% of catchment demand
Major Respiratory Diagnosis	151	3.4%	261	5.8%	0	0.0%
Other Cardiac Diagnosis	248	5.5%	26	0.6%	39	0.9%
Major GI Intervention	248	5.5%	32	0.7%	0	0.0%
Sepsis	181	4.1%	76	1.7%	1	0.0%
Major Cardiac Diagnosis	227	5.1%	2	0.0%	21	0.5%
Trauma With Major Intervention	19	0.4%	174	3.9%	0	0.0%
Major Cardiac Intervention	0	0.0%	192	4.3%	0	0.0%
Chronic Obstructive Pulmonary Disease	142	3.2%	47	1.0%	4	0.1%
Other GI Intervention	127	2.8%	39	0.9%	16	0.4%
Coronary Artery Bypass Graft (CABG)	0	0.0%	178	4.0%	0	0.0%
TOTALS	1342	30.0%	1027	23.0%	81	1.8%

Table 10: Top Ten Case Mix Groups Swift Current Catchment Area

Table 10 shows the top ten case mix groups for the Swift Current catchment area for 2016-2021. These CMGs account for **54.8% of all ICU days** within the Swift Current catchment area for the last five years of data. This table shows the types of diagnoses and interventions that can be cared for in local facility and what (such as CABG), must be sent to an urban facility.


d) Case Mix Groups in the Moose Jaw Catchment Area

Case Mix Group	Local Facility		Tertiary Facility		Other Regional Facility	
	# of days	% of catchment demand	# of days	% of catchment demand	# of days	% of catchment demand
Other Cardiac Diagnosis	636	9.1%	35	0.5%	11	0.2%
Major Respiratory Diagnosis	181	2.6%	284	4.1%	4	0.1%
Major Cardiac Diagnosis	359	5.1%	42	0.6%	3	0.0%
Chronic Obstructive Pulmonary Disease	348	5.0%	25	0.4%	3	0.0%
Sepsis	200	2.9%	142	2.0%	5	0.1%
Major GI Intervention	221	3.2%	73	1.0%	18	0.3%
Trauma With Major Intervention	103	1.5%	185	2.6%	0	0.0%
Major Cardiac Intervention	0	0.0%	284	4.1%	0	0.0%
Pneumonia	213	3.0%	62	0.9%	0	0.0%
Major Nervous System Intervention	0	0.0%	264	3.8%	0	0.0%
TOTALS	2261	9.1%	1395	19.9%	45	0.6%

Table 11: Top Ten Case Mix Groups Moose Jaw Catchment Area

Table 11 shows the top ten case mix groups for the Moose Jaw catchment area for 2016-2021. These CMGs account for **52.9% of all ICU days** within the Moose Jaw catchment area for the last five years of data. This table shows the types of diagnoses and interventions that can be cared for in local facility and what (such as Major Nervous System Intervention), must be sent to an urban facility.


e) Case Mix Groups in the Yorkton Catchment Area

Case Mix Group	Local Facility		Tertiary Facility		Other Regional Facility	
	# of days	% of catchment demand	# of days	% of catchment demand	# of days	% of catchment demand
Major Respiratory Diagnosis	622	4.9%	537	4.3%	0	0.00%
Sepsis	660	5.2%	364	2.9%	0	0.00%
Pneumonia	409	3.3%	396	3.1%	0	0.00%
Major GI Intervention	570	4.5%	118	0.9%	17	0.13%
Other Cardiac Diagnosis	631	5.0%	62	0.5%	1	0.01%
Major Cardiac Diagnosis	567	4.5%	122	1.0%	2	0.01%
Chronic Obstructive Pulmonary Disease	486	3.9%	174	1.4%	5	0.04%
Trauma With Major Intervention	103	0.8%	473	3.8%	0	0.00%
Other GI Intervention	369	2.9%	73	0.6%	0	0.00%
Major Nervous System Intervention	0	0.0%	410	3.3%	0	0.00%
TOTALS	4417	35.1%	2728	21.7%	25	0.2%

Table 12: Top Ten Case Mix Groups Yorkton Catchment Area

Table 12 shows the top ten case mix groups for the Yorkton catchment area for 2016-2021. These CMGs account for **57.0% of all ICU days** within the Yorkton catchment area for the last five years of data. This table shows the types of diagnoses and interventions that can be cared for in local facility and what (such as Major Nervous System Intervention), must be sent to an urban facility.


f) Case Mix and Provider Groups in St. Paul's Hospital

Case Mix Group	ICU Days	% of ICU Days
Major Respiratory Diagnosis	2,365	14.6%
Pneumonia	1,540	9.5%
Multisystemic/Unspecified Site Infection	1,274	7.9%
Sepsis	987	6.1%
Other Trauma Diagnosis	849	5.2%
Chronic Obstructive Pulmonary Disease	717	4.4%
Major Vascular Intervention	650	4.0%
Major GI Intervention	633	3.9%
Trauma With Major Intervention	609	3.8%
Other GI Intervention	607	3.8%
	10,232	63.2%

Table 13: Top Ten Case Mix Groups St. Paul's Hospital

Provider Program	Number of ICU Days	% of ICU Days
Generalist	5,535	34.2%
Various	3,307	20.4%
Internal Medicine	2,436	15.0%
General Surgery	2,376	14.7%
Vascular Surgery	1,037	6.4%
Thoracic Surgery	421	2.6%
Otolaryngology	324	2.0%
Urology	233	1.4%
Cardiology	174	1.1%
General Pediatrics	118	0.7%
Orthopedic Surgery	87	0.5%
Plastic Surgery	57	0.4%
Oral Surgery	23	0.1%
Nephrology	23	0.1%
Neurosurgery	11	0.1%
Neurology	11	0.1%
Psychiatry	6	0.04%
Hematology/Oncology	5	0.03%
Gynecology	5	0.03%
Cardiac Surgery	3	0.02%
TOTAL	16,193	100%

Table 14: Provider Groups St. Paul's


g) Case Mix and Provider Programs in Pasqua Hospital

Case Mix Group	ICU Days	% of ICU Days
Chronic Obstructive Pulmonary Disease	936	11.2%
Major Respiratory Diagnosis	903	10.8%
Pneumonia	752	9.0%
Sepsis	624	7.5%
Unrelated Interventions	469	5.6%
Diabetes	459	5.5%
Multisystemic/Unspecified Site Infection	374	4.5%
Major GI Intervention	327	3.9%
Major Cardiac Diagnosis	269	3.2%
Other Respiratory Diagnosis	266	3.2%
	5,379	64.5%

Table 15: Top Ten Case Mix Groups Pasqua Hospital

Provider Program	Number of ICU Days	% of ICU Days
Generalist	4,044	48%
Internal Medicine	1,307	16%
General Surgery	1,267	15%
Various	898	11%
Thoracic Surgery	239	3%
Otolaryngology	147	2%
Orthopedic Surgery	132	2%
Hematology/Oncology	102	1%
Urology	77	1%
Gynecology	27	0%
Plastic Surgery	24	0%
Vascular Surgery	19	0%
Ophthalmology	16	0%
Cardiology	13	0%
General Pediatrics	11	0%
Neurology	5	0%
Neurosurgery	4	0%
Oral Surgery	4	0%
Obstetric	2	0%
Psychiatry	1	0%
TOTAL	8,341	100%

Table 16: Provider Groups Pasqua


h) Case Mix and Provider Programs in Royal University Hospital

Case Mix Group	ICU Days	% of ICU Days
Trauma With Major Intervention	3,358	15.3%
Major Nervous System Intervention	3,062	13.9%
Other Nervous System Diagnosis	1,431	6.5%
Major Respiratory Diagnosis	1,383	6.3%
Coronary Artery Bypass Graft (CABG)	1,344	6.1%
Major Cardiac Intervention	1,293	5.9%
Unrelated Interventions	760	3.5%
Multisystemic/Unspecified Site Infection	736	3.3%
Major GI Intervention	728	3.3%
Pneumonia	674	3.1%
TOTALS	14,770	67.1%

Table 17: Top Ten Case Mix Groups Royal University Hospital

Provider Program	Number of ICU Days	% of ICU Days
Neurosurgery	4,980	22.6%
Generalist	4,147	18.8%
General Surgery	3,267	14.8%
Cardiac Surgery	2,633	12.0%
Various	2,039	9.3%
Internal Medicine	1,824	8.3%
Neurology	1,290	5.9%
Orthopedic Surgery	455	2.1%
Cardiology	322	1.5%
General Pediatrics	151	0.7%
Hematology/Oncology	148	0.7%
Thoracic Surgery	133	0.6%
Vascular Surgery	115	0.5%
Neonatal-perinatal medicine	109	0.5%
Psychiatry	99	0.5%
Obstetric	85	0.4%
Plastic Surgery	65	0.3%
Respirology	53	0.2%
Gynecology	34	0.2%
Otolaryngology	31	0.1%
Urology	21	0.1%
Nephrology	4	0.02%
Ophthalmology	3	0.01%
Oral Surgery	2	0.01%
TOTAL	22,010	100.0%

Table 18: Provider Groups RUH


i) Case Mix and Provider Programs in Regina General Hospital

Case Mix Group	ICU Days	% of ICU Days
Major Respiratory Diagnosis	3,014	11.0%
Trauma With Major Intervention	2,460	9.0%
Major Cardiac Intervention	2,310	8.4%
Coronary Artery Bypass Graft (CABG)	1,856	6.8%
Unrelated Interventions	1,598	5.8%
Major Nervous System Intervention	1,523	5.6%
Sepsis	1,132	4.1%
Pneumonia	975	3.6%
Major Respiratory System Intervention	820	3.0%
Other Trauma Diagnosis	792	2.9%
	16,480	60.2%

Table 19: Top Ten Case Mix Groups Regina General Hospital

Provider Program	Number of ICU Days	% of ICU Days
Generalist	6,540	23.9%
Cardiac Surgery	4,134	15.1%
General Surgery	3,492	12.8%
Neurosurgery	3,373	12.3%
Internal Medicine	3,319	12.1%
Various	3,148	11.5%
Thoracic Surgery	752	2.7%
Vascular Surgery	718	2.6%
Orthopedic Surgery	433	1.6%
Cardiology	339	1.2%
Psychiatry	217	0.8%
Plastic Surgery	209	0.8%
Urology	153	0.6%
Otolaryngology	133	0.5%
Obstetric	124	0.5%
Neurology	94	0.3%
General Pediatrics	86	0.3%
Gynecology	49	0.2%
Hematology/Oncology	26	0.1%
Oral Surgery	24	0.1%
Ophthalmology	3	0.0%
TOTAL	27,366	100%

Table 20: Provider Groups RGH



7. What Happened in 2021-2022?

Though currently incomplete, the data in the Discharge Abstract Database, begins to show us the burden that COVID-19 has had on our ICUs compared to years past. The below bar charts, show the burden on regional and urban facilities compared to the averages that we have seen for ICU days between 2016-2021. For the urban areas especially, the days are already encroaching or have past the historical five year average. (Reminder that IMV days are the MAXIMUM number of days possible). The next page provides more details on how complete the 2021-22 data is.

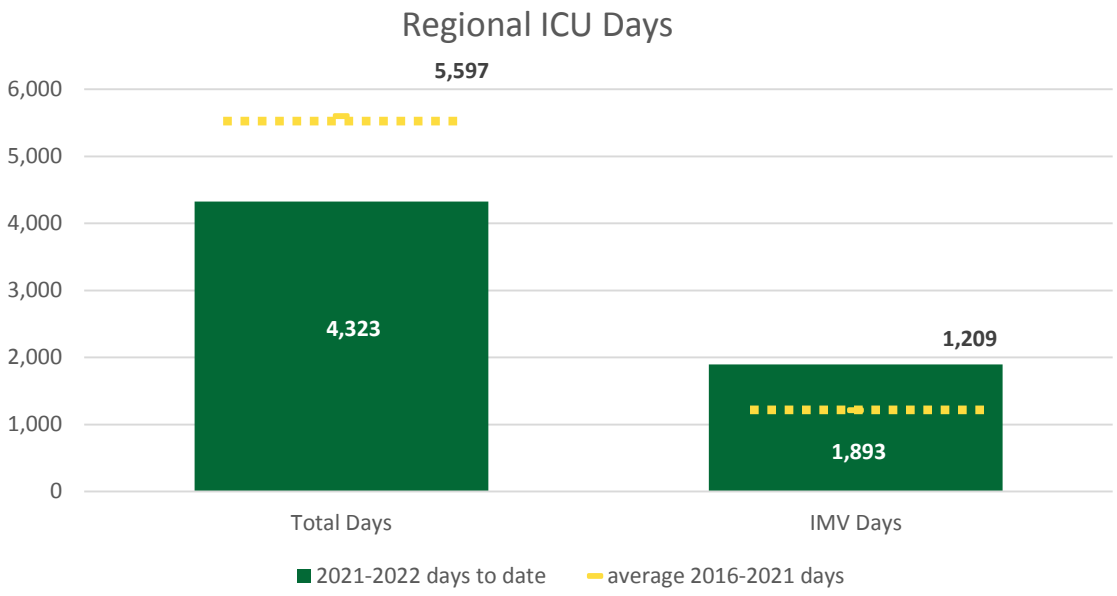


Chart 74: Breakdown of 2021-2022 ICU Days in Regional Facilities

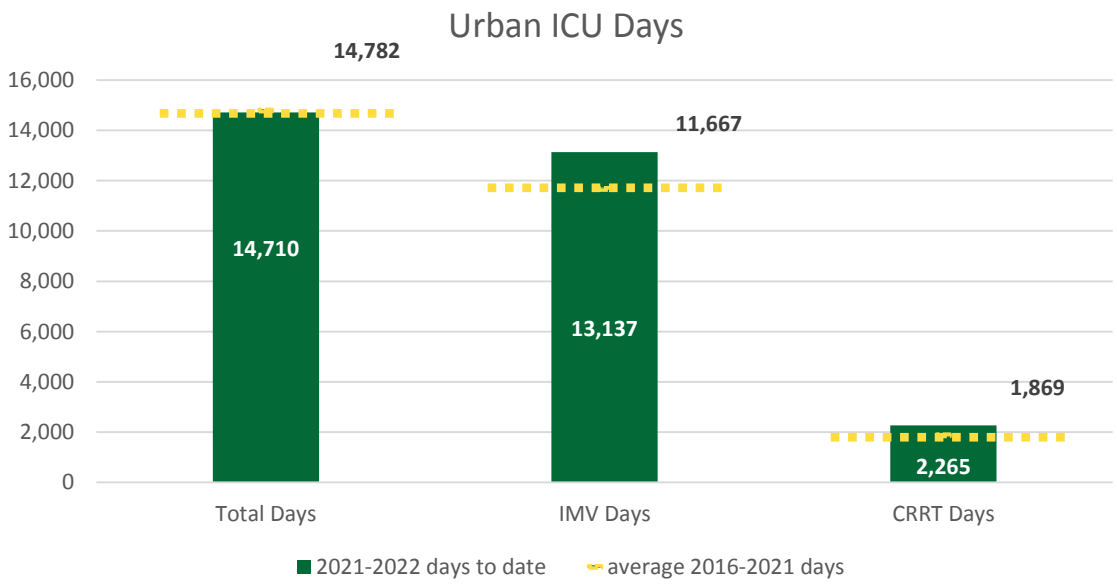


Chart 75: Breakdown of 2021-2022 ICU Days in Urban Facilities

2021-2022 Data:

The table below shows the months that the Discharge Abstract Database is fully complete until for ICU days data. Cases that are coded to COVID-19 are rushed, so in some instances ICU days that are coded to COVID may be complete until January 2022, however there is variation between sites.

This data tells an important story on the impact COVID has had on our ICUs and is something that needs to be considered as we look to what ICU needs in Saskatchewan may be in the future.

Facility	Data Complete Until
Battleford Union Hospital	November 2021
Victoria Hospital	October 2021
Cypress Regional Hospital	January 2022
Dr. F.H. Wigmore Hospital	November 2021
Yorkton Regional Health Center	November 2021
St. Paul's Hospital	November 2021
Pasqua Hospital	November 2021
Royal University Hospital	November 2021
Regina General Hospital	October 2021

Table 21: 2021-2022 Discharge Abstract Database Completion Dates



8. Would be Occupancy Rates

Looking at historical data, we can see the that biggest capacity issues occurred within our urban facilities. The chart below, uses historical ICU volumes from between 2016-2021 to understand what the ‘would be’ occupancy rates are if we increased to 70 beds in the Urban centers (see Table__ below for beds per facility) and the capacity that may be opened up as a result.

“Would Be” Occupancy Rates at Historical ICU volumes*

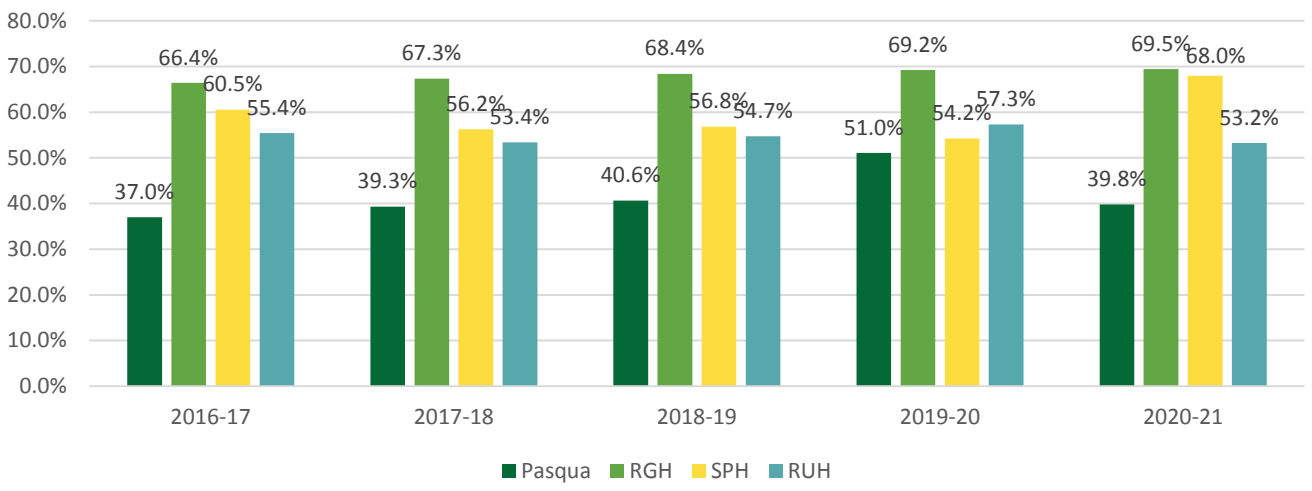


Chart 76: “Would be” Occupancy Rates at Historical ICU Volumes

Facility	# of Beds
Pasqua	11
RGH	22
SPH	15
RUH	22

Table 22: ICU Beds per facility after proposed expansion



9. Surgical Demand and ICU Capacity

To reduce the surgical backlog that has built up over the pandemic, the SHA projects increasing surgeries in the next three years. The charts below show the historical surgical volumes from 2016-2021 and the number of ICU days associated with an OR intervention. (This includes both those who required ICU care due to surgical complication or post-operative care, as well as those who may have had surgery as a part of their ICU care.) If we assume that the drop in 2020-21 ICU days for patients with an OR intervention is largely due to reduced surgical volumes (as a result of the pandemic), then we should expect 1 additional ICU day for each 20 surgeries over and above historical rates. The table below shows the surgery projections for the next three years.

Historical Surgical Data

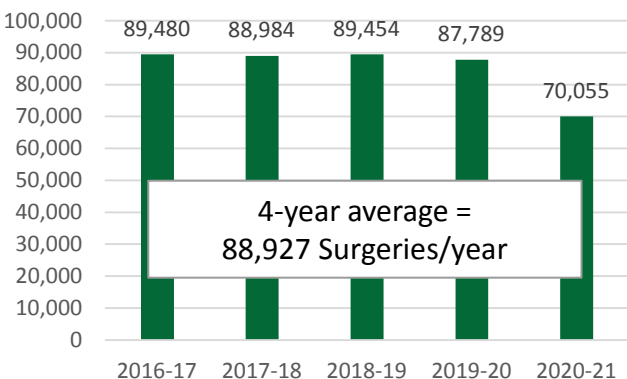


Chart 77: Historical Surgical Volumes, 2016-2021

ICU Days with an OR Intervention

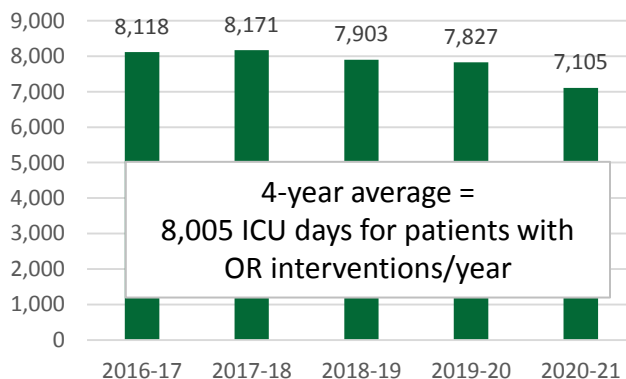


Chart 78: ICU Days with an associated OR Intervention, 2016-2021

Year	Surgery Projections	Potential increase in ICU Days (provincially)
2022-23	97,000	404 ICU Days
2023-24	103,000	704 ICU Days
2024-25	107,000	904 ICU Days

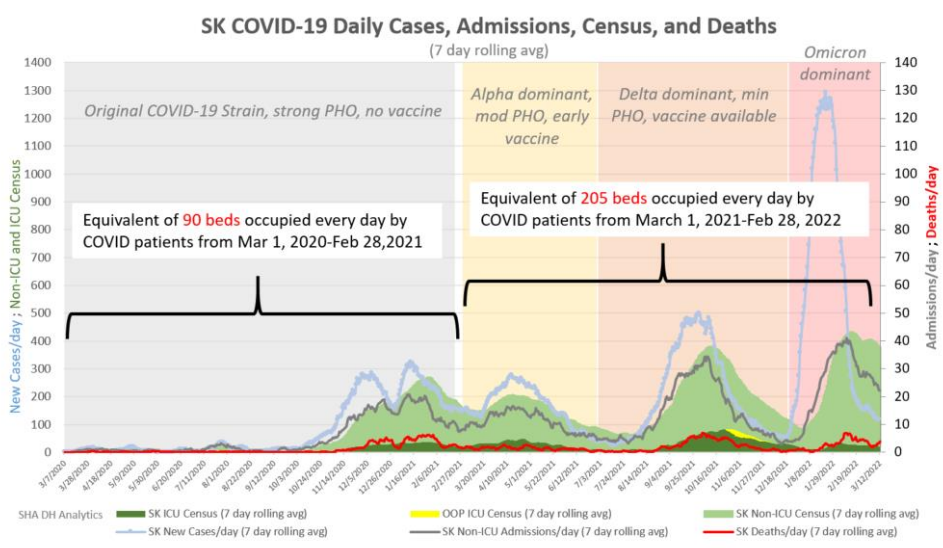
Table 23: Surgical Projections

If we meet those surgical projections in Table 2, this would amount to 404-904 ICU days, or up to 3 additional ICU beds provincially.

3. Continued COVID-19 Demand on ICU Capacity

It is difficult to know what the continued demand on our ICUs will be as a result of the COVID-19 pandemic. It is expected that there will continue to be a baseline of COVID patients admitted to our ICUs for the foreseeable future. The possible numbers are hard to pinpoint and depend on many factors such as the degree of return to pre-pandemic behaviours and the emergence of another variant of concern. What we do know is that for the last 12 months of the pandemic, COVID-19 demand in our hospitals has required 34 ICU Beds (43% of historical capacity), every day. The graph created by Digital Health Analytics in the SHA demonstrates this effectively.

Significant Additional Demand on Hospital Capacity



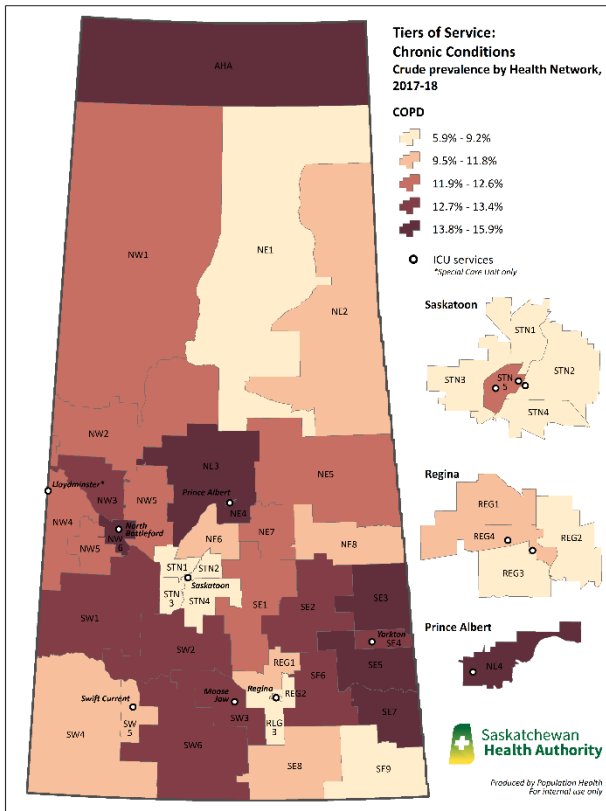
COVID-19 inpatient demand equivalent of **205 beds every single day of the past 12 months.**

Area where patient from (not where admitted)	Daily # beds for covid patients	% of total	# Non-ICU beds (Mainly Medicine)	# ICU beds
INH	68	33%	56	12
Saskatoon	52	25%	46	6
IRH	46	23%	37	9
Regina	39	19%	32	7
Saskatchewan	205		171	34

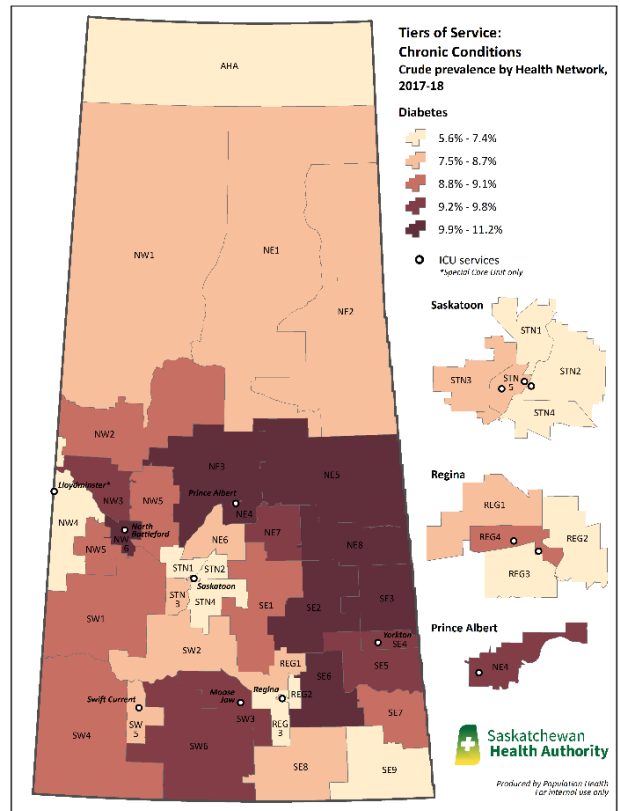
Chart 78: Historical COVID-19 Demand on Hospital Capacity

4. Rates of Chronic Conditions across Saskatchewan

The heat maps below show the distribution of COPD, Diabetes, Asthma, Heart Failure, Hypertension, and Ischaemic Heart Disease across the province. These conditions can contribute to an ICU stay and could also be considered when expanding ICU capacity. The darker colours indicate a higher prevalence in that Health Network.



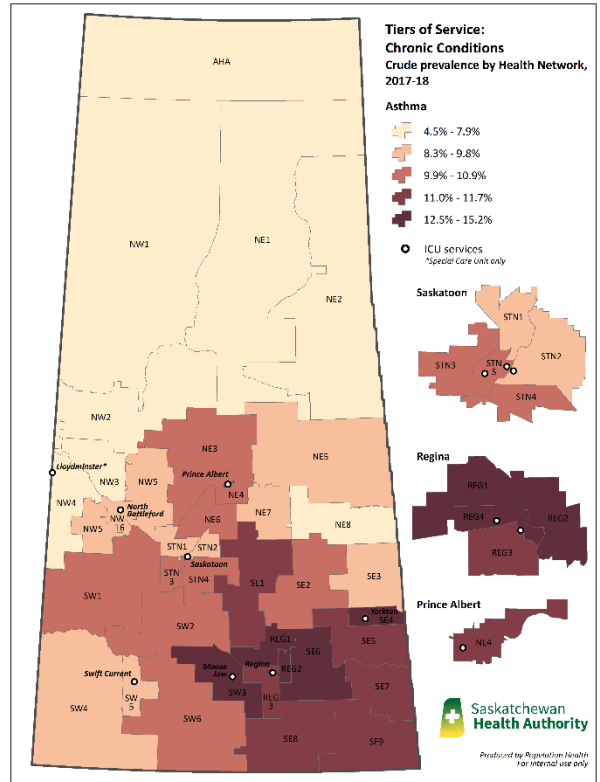
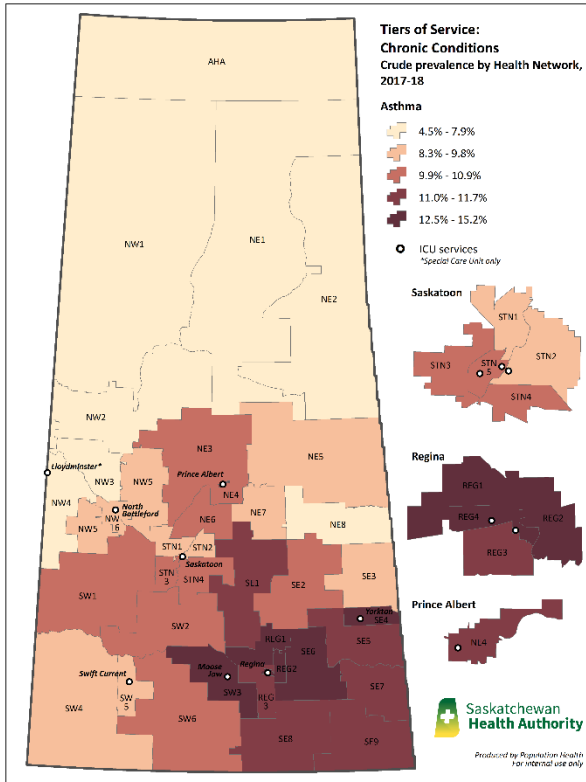
Heat Map 1: Prevalence of COPD by Health Network.



Heat Map 2: Prevalence of Diabetes by Health Network.

4. Rates of Chronic Conditions across Saskatchewan

The heat maps below show the distribution of COPD, Diabetes, Asthma, Heart Failure, Hypertension, and Ischaemic Heart Disease across the province. These conditions can contribute to an ICU stay and could also be considered when expanding ICU capacity. The darker colours indicate a higher prevalence in that Health Network.

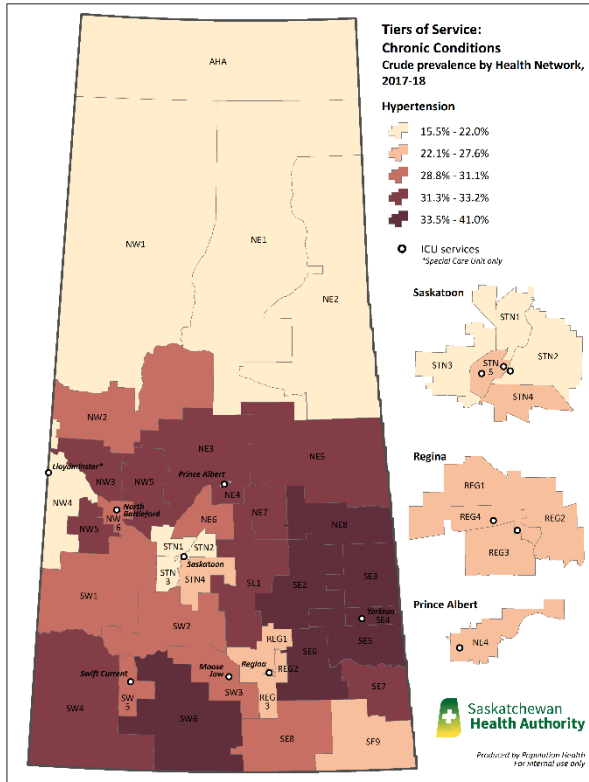


Heat Map 3: Prevalence of Asthma by Health Network.

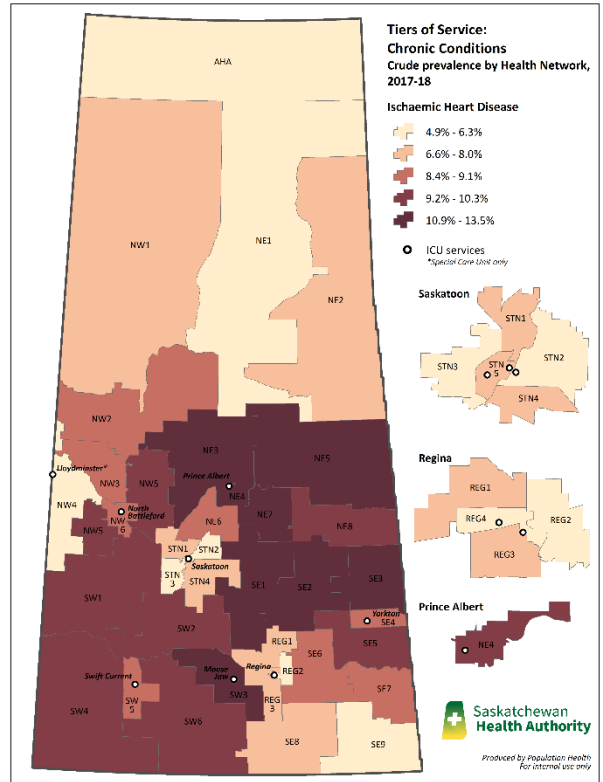
Heat Map 4: Prevalence of Heart Failure by Health Network.

4. Rates of Chronic Conditions across Saskatchewan

The heat maps below show the distribution of COPD, Diabetes, Asthma, Heart Failure, Hypertension, and Ischaemic Heart Disease across the province. These conditions can contribute to an ICU stay and could also be considered when expanding ICU capacity. The darker colours indicate a higher prevalence in that Health Network.



Heat Map 5: Prevalence of Hypertension by Health Network.



Heat Map 6: Prevalence of Ischaemic Heart Disease by Health Network.