

# TPP ALBERTA 20 PRESCRIPTION DRUG MONITORING PROGRAM ATLAS





Alberta's prescription drug monitoring program, TPP Alberta, uses data to optimize safe patient care. Since it was established in 1986, TPP Alberta has been monitoring the use of certain medications prone to misuse.

The mandate of TPP Alberta is:

- To monitor prescribing, dispensing and utilization practices regarding targeted medications;
- To provide timely and relevant information on targeted medications to prescribers, dispensers, consumers, regulatory bodies and stakeholders;
- To work with stakeholders to enable system level change to ensure appropriate use of targeted medications;
- To ensure efficient and effective functioning of TPP Alberta.

Funded primarily by the province of Alberta, TPP Alberta represents a partnership with program administration by the College of Physicians & Surgeons of Alberta (CPSA). The list of partners includes:

Alberta College of Pharmacy

Alberta Dental Association and College

Alberta Health

Alberta Health Services

Alberta Medical Association

Alberta Pharmacists' Association

Alberta Veterinary Medical Association

College and Association of Registered Nurses of Alberta

College of Physicians & Surgeons of Alberta

College of Podiatric Physicians of Alberta

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## About the Atlas

The purpose of the TPP Alberta Prescription Drug Monitoring Program Atlas is to provide an overview of provincial TPP Alberta medication utilization for the year 2019. As with the 2018 Atlas, provincial utilization will be summarized for two classes of medications: opioids (including codeine-containing and tramadol-containing medications); and, benzodiazepines and benzodiazepine-type drugs (zopiclone and zolpidem). Tramadol was added to the TPP program in 2018 as a monitored drug. The source of information on medication utilization continues to be community pharmacy dispenses extracted from the Pharmaceutical Information Network (PIN), a part of Alberta's electronic health record (Netcare). Data used in the Atlas analyses were extracted on June 10, 2020.

New additions to the 2019 Atlas are:

- an expanded exploration of consumption of benzodiazepines by patients 65 years and older,
- analyses of seasonal patterns for both opioids and benzodiazepine dispenses,
- an exploration of concurrent consumption of benzodiazepines and opioids,
- analyses of top five ingredients by prescriber type, including dispenses by Doctors of Veterinary Medicine (DVM),
- pharmacy local aggregated geographies are sorted on the graphs for each measure by observed rate of the specified measure, rather than by population,
- tramadol data from 2015 to 2019 were added to each year's opioid measures; and,
- letter size format.

The addition of tramadol data for all five years results in higher OME level and count measures than last year's Atlas, when only a few months of data related to this ingredient were included. Standardized age and sex population rates are used throughout the Atlas.

## TPP Alberta Data Source

2019 PIN data were used for the analyses. On January 1, 2013, TPP Alberta officially switched from physical triplicate prescriptions to PIN as the primary data source for prescription monitoring. PIN data consist of dispense records from community pharmacies in Alberta. The primary source for methadone information switched from secure prescriptions to PIN data in August 2015, when it was found that virtually all methadone, which was previously prescribed and dispensed as a compound, switched to commercially available products with Drug Identification Numbers (DINs) captured in PIN. Ongoing gaps within PIN data include dispensing information from inpatient hospital pharmacies and affiliated facilities such as hospices. Also, compounded opioid medications and prescriptions for 'office use' are not reliably captured in PIN.

All prescriber types authorized to prescribe controlled drugs in Alberta and monitored via TPP Alberta are included in the analyses. In 2019, physicians prescribed 85.5% of all opioid dispenses (including codeine and tramadol) and 95.5% of all benzodiazepine dispenses (including z-drugs).

PIN data do not discriminate between medications actually dispensed from those awaiting release to the patient. As pharmacy records may be modified or reversed before the actual dispense, PIN data are dynamic. In an effort to capture actual dispensing as closely as possible, data for this 2019 Atlas were extracted from PIN on June 10, 2020, by which time most modifications and reversals would have occurred.

The data source for veterinarian prescriptions of controlled drugs for animals is the TPP Alberta Prescription Drug Monitoring program, as prescriptions for animal patients are not captured in PIN. Also, specific animal patient and dosage information are not available.

Veterinarian prescriptions for animals were not included in overall analyses, but are shown for the two analytic class sections.



### Pharmacy Local Aggregated Geography

Pharmacy local aggregated geographies (PhLAG) merge local geographies, used by Alberta Health and Alberta Health Services, with neighboring geographies where their residents are dispensed medications, eliminating previous issues with utilization rates in local geographies being artificially low or high. In this Atlas, drug utilization rates count patients in the numerator in each PhLAG where they received prescription dispenses.

The merging of geographies has primarily occurred in smaller cities such as Red Deer, Lethbridge, Medicine Hat, Grande Prairie, Fort McMurray, Spruce Grove, etc. The total number of geographic units has been reduced from 132 local geographies to 106 pharmacy local aggregated geographies. The methods used to develop PhLAGs are consistent with those used to develop other Alberta geographic aggregations used in the health system, like subzones. Rural PhLAG names include various municipality types, such as County, Planning and Special Area, and Municipal District.

### Analytic Drug Class

Analyses of medication utilization were carried out by analytic drug classes, based on the main ingredient of interest within each drug. In the case where a drug had two ingredients of interest, one was chosen as the main ingredient. The two analytic drug classes included in the Atlas are opioids and benzodiazepines. Opioids consist of all opioids and some non-opioid drugs (with a potential for harm or diversion) currently requiring a secure prescription. Consistent with the 2015-2018 Atlases, codeine-containing medications which were dispensed from a regular prescription or available over the counter (8 mg codeine per solid dosage form and 20 mg/30 ml for liquid formulations) were included in the opioid analytic class. Benzodiazepines consist of all benzodiazepines and z-drugs currently monitored by TPP Alberta. Appendix A shows 2019 prescriptions for opioids by main ingredient and route of administration. Appendix B shows 2019 prescriptions for benzodiazepines by main ingredient and route of administration.

## Atlas Measures

TPP utilization is presented in this Atlas using population counts and rates. Age and sex standardized rates were calculated using 2019 Alberta PhLAG population estimates. Patient age was calculated at July 1, 2019.

### *Opioids*

For the opioid analytic class, oral morphine equivalents (OME) were used as the standard measure of dose. Drug OME values were obtained primarily from the Centers for Disease Control<sup>1</sup>, the previous Canadian Guideline for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain<sup>2</sup> and the Compendium of Pharmaceuticals and Specialties<sup>3</sup>. The OME for compounds within the opioid class cannot be calculated as dose and/or route are unknown. Therefore, compounds do not contribute towards a patient's total dose of opioids. Compounds are captured in all other quantity measures.

The OME for a specific drug dispense was calculated as follows:

**Dispense OME = strength x quantity x drug OME**

A patient's total OME per day was calculated as follows:

**Patient OME / day = the sum of the OME for all drug dispenses to the patient in the time period analyzed / days in the time period analyzed<sup>4</sup>**

Population utilization of opioids was presented using the three measures below.

**Opioid consumption = the sum of all patient OME / day in the time period analyzed / 1000 population**

**Opioid patients = the number of patients who received at least one opioid prescription in the time period analyzed / 1000 population**

**High dose opioid patients = the number of patients who received 90 OME / day or greater in the time period analyzed / 1000 population**

The 2017 Canadian Guidelines for Opioids for Chronic Non-Cancer Pain set a watchful opioid dose of 50 OME/day<sup>5</sup>. This threshold is congruent with CDC Guidelines published in 2016<sup>6</sup>.

## Benzodiazepines

The benzodiazepine (BDZ/Z) analytic class includes benzodiazepines and benzodiazepine-like drugs (Z-drugs). The defined daily dose (DDD), as defined by the World Health Organization (WHO), is the assumed average daily maintenance dose for a drug used for its main indication in adults<sup>7</sup>. Drug DDD values were obtained primarily from the WHO DDD/ATC Index<sup>8</sup>. The number of DDDs (i.e., the dose in multiples of the DDD) was used as the standard measure of dosing across all drugs and routes of administration within the benzodiazepines (BDZ/Z) analytic class.

The DDD for compounds within the benzodiazepines class cannot be calculated as dose and/or route are unknown. Therefore, compounds do not contribute towards a patient's total dose of benzodiazepines. Compounds are captured in all other quantity measures.

The DDDs for a specific drug dispense was calculated as follows:

$$\text{Dispense DDDs} = \text{strength} \times \text{quantity} / \text{drug DDD}$$

A patient's total DDDs was calculated as follows:

$$\text{Patient DDDs} = \frac{\text{the sum of the DDDs for all drug dispenses to the patient in the time period analyzed}}{\text{days in the time period analyzed}}^4$$

Population utilization of BDZ/Z was presented using the five measures below. Population rates were age and sex standardized for comparison between pharmacy local aggregate geographies.

**BDZ/Z consumption = the sum of all patient DDDs received in the time period analyzed / 1000 population**

**BDZ/Z patients = the number of patients who received at least one BDZ/Z prescription in the time period analyzed / 1000 population**

**High dose BDZ/Z patients = the number of patients who received 2 DDDs<sup>9</sup> or greater in the time period analyzed / 1000 population**

**Elderly BDZ/Z patients = the number of patients 65 years and older who received at least one BDZ/Z prescription in the time period analyzed / 1000 elderly population**

**Concurrent Opioid BDZ/Z patients = patients who received both opioid and benzodiazepine prescriptions within the same quarter / 1000 population. Patients included were dispensed opioid and BDZ/Z prescriptions concurrently in one or more quarters.**

<sup>1</sup> National Center for Injury Prevention and Control. CDC compilation of benzodiazepines, muscle relaxants, stimulants, zolpidem, and opioid analgesics with oral morphine milligram equivalent conversion factors, 2016 version. Atlanta, GA: Centers for Disease Control and Prevention; 2016. Available at: <https://www.cdc.gov/drugoverdose/resources/data.html>

<sup>2</sup> [http://nationalpaincentre.mcmaster.ca/opioid/cgop\\_b\\_app\\_b08.html](http://nationalpaincentre.mcmaster.ca/opioid/cgop_b_app_b08.html)

<sup>3</sup> <https://www.e-therapeutics.ca/login.action?language=en>

<sup>4</sup> "Days in time period analyzed" is used because the "days of supply" information in the dispense record is often inaccurate within PIN data

<sup>5</sup> 2017 Canadian Guideline for Opioids for Chronic Pain. Available at: <http://nationalpaincentre.mcmaster.ca/guidelines.html>

<sup>6</sup> Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain – United States, 2016. MMWR Recomm Rep 2016;65(No. RR-1):1-49. DOI: <https://www.cdc.gov/mmwr/volumes/65/rr/pdfs/rr6501e1.pdf>

<sup>7</sup> Norwegian Institute of Public Health. WHOCC – Definition and General Considerations [Internet]. WHO Collaborating Centre for Drug Statistics Methodology. 2009 [cited 2014 Oct 7]. Available from: [http://www.whooc.no/ddd/definition\\_and\\_general\\_considera/](http://www.whooc.no/ddd/definition_and_general_considera/)

<sup>8</sup> [http://www.whooc.no/atc\\_ddd\\_index/](http://www.whooc.no/atc_ddd_index/)

<sup>9</sup> For the purpose of this Atlas, 2 DDDs was used as the watchful dose of BDZ/Z

**Table 1. Utilization of Prescription Opioids in Alberta, 2015-2019**

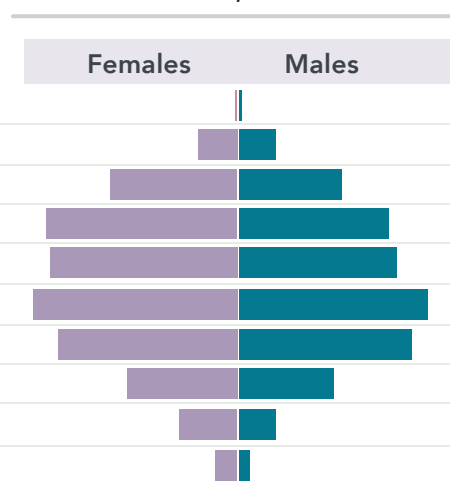
Year	Prescriptions	Patients	Prescribers	Pharmacies	Population	OME per day per 1000 Population	Patients per 1000 Population	Patients ≥90 OME per 1000 Population
2015	1,941,252	628,762	13,767	1,544	4,196,192	1,667	149.8	3.7
2016	2,031,450	654,616	14,789	1,583	4,252,720	1,637	153.9	3.7
2017	1,934,117	634,301	15,330	1,387	4,285,997	1,431	148.0	3.2
2018	1,769,768	597,055	15,215	1,476	4,306,822	1,260	138.6	2.8
2019	1,664,853	573,104	14,908	1,533	4,371,154	1,195	131.1	2.6

5 year trend

**Table 2. Opioid Patients by Age and Sex, 2019\***

Age Group	Females	Percent	Males	Percent	Total Patients	Percent
0-9	300	0.1	334	0.1	635	0.1
10-19	12,864	4.1	10,981	4.2	23,845	4.2
20-29	35,920	11.6	27,801	10.6	63,723	11.1
30-39	52,979	17.0	41,520	15.8	94,507	16.5
40-49	52,298	16.8	44,258	16.9	96,560	16.8
50-59	56,561	18.2	51,096	19.5	107,663	18.8
60-69	50,248	16.2	48,012	18.3	98,265	17.1
70-79	29,819	9.6	25,937	9.9	55,756	9.7
80-89	14,992	4.8	10,331	3.9	25,324	4.4
90+	4,789	1.5	1,981	0.8	6,770	1.2
Total	310,794	100.0	262,279	100.0	573,104	100.0

**Figure 1. Opioid Patients by Age and Sex, 2019**



\*24 female patients of unknown age, 28 male patients of unknown age, 27 patients of unknown sex, and 4 patients of unknown sex or age.

**Table 3. Opioid Prescriptions, Patients, and Prescribers by Prescriber Type, 2019**

Prescriber Type	Prescriptions	Percent	Patients	Percent	Prescribers	Percent
All Prescribers	1,664,853	100.0	573,104	100.0	14,908	100.0
Physicians	1,422,891	85.5	471,734	82.3	10,687	71.7
Pharmacists	105,336	6.3	46,391	8.1	3,307	22.2
Dentists	101,468	6.1	86,472	15.1	494	3.3
Nurse Practitioners	22,387	1.3	8,774	1.5	417	2.8

Note: Prescriptions sum does not match the summary value because only the four major prescriber types are shown. Other known prescriber types are associated with 245 prescriptions (Opticians 127, Dental Hygienists 71, Dieticians 46, and Podiatrists 1).

Note: Patient sum does not match the summary values because patients may obtain prescriptions from more than one prescriber type.

12,526 prescriptions have no prescriber type identified. Also, there are instances where no specified prescriber is identified within the shown groups; i.e., 2% of prescriptions by physicians, 1% by pharmacists, 96% by dentists and 5% by nurse practitioners have an unidentified prescriber.

**Table 4. Opioid Prescriptions by Main Ingredient, 2015-2019\***

Main Ingredient	2015	2016	2017	2018	2019	2019	5 Year Trend
Codeine	1,195,184	1,202,623	1,099,300	939,960	851,198		
Tramadol	188,202	216,673	231,857	242,397	237,325		
Oxycodone	286,201	302,925	273,848	241,005	209,151		
Hydromorphone	100,255	120,623	123,096	117,637	118,525		
Buprenorphine	23,375	36,762	54,389	72,829	88,012		
Methadone	48,194	53,289	60,568	69,832	77,000		
Morphine	65,225	65,748	61,054	59,608	59,296		
Fentanyl	22,115	21,505	19,823	17,471	16,419		
Tapentadol	4,666	4,017	3,638	3,368	3,110		
Butalbital	2,805	2,726	2,491	2,273	2,123		

**Table 5. Opioid Patients by Main Ingredient, 2015-2019\***

Main Ingredient	2015	2016	2017	2018	2019	2019	5 Year Trend
Codeine	495,352	503,477	474,206	427,986	398,171		
Tramadol	110,869	127,838	137,718	143,417	145,161		
Oxycodone	71,759	74,039	63,356	54,434	47,597		
Hydromorphone	24,280	29,663	31,268	32,983	34,571		
Morphine	16,263	16,464	15,273	14,525	13,681		
Buprenorphine	5,587	6,673	7,759	9,583	11,546		
Methadone	5,028	5,363	5,702	6,217	6,732		
Fentanyl	5,164	4,743	4,350	3,980	3,702		
Butalbital	992	908	831	753	684		
Tapentadol	1,278	1,001	886	806	684		

**Table 6. Opioid Prescribers by Main Ingredient, 2015-2019(**

Main Ingredient	2015	2016	2017	2018	2019	2019	5 Year Trend
Codeine	12,801	13,544	13,802	13,399	13,019		
Tramadol	8,049	9,022	9,552	9,834	9,855		
Hydromorphone	4,556	5,144	5,491	5,648	5,808		
Oxycodone	5,425	5,941	5,933	5,997	5,691		
Morphine	3,950	4,232	4,234	4,271	4,186		
Buprenorphine	1,518	1,727	1,796	2,080	2,527		
Fentanyl	2,126	2,181	2,057	1,943	1,985		
Methadone	456	522	592	722	917		
Butalbital	739	698	661	627	579		
Tapentadol	619	574	517	470	467		

\* The ten most commonly prescribed ingredients are displayed. See Appendix A for details on less commonly prescribed ingredients.



**Table 7. Opioid Patients and Associated Prescribers by Dose, 2015-2019**

**Patients**

Patient Dose*	2015	2016	2017	2018	2019	2019	5 Year Trend
Total Patients	628,762	654,616	634,301	597,055	573,104		
≥ 50 OME/day	25,432	26,077	23,648	21,434	20,047		
≥ 90 OME/day	15,305	15,519	13,763	11,953	11,170		
≥ 200 OME/day	7,134	7,038	5,947	5,031	4,761		
≥ 400 OME/day	2,822	2,694	2,221	1,809	1,842		
≥ 600 OME/day	1,433	1,360	1,063	897	914		
≥ 800 OME/day	827	761	582	500	527		
≥ 1,000 OME/day	532	490	377	321	348		
≥ 2,000 OME/day	80	57	52	32	56		

Note: Of 573,104 patients who received opioids in 2019, 553,057 (96.5%) received < 50 OME/day.

**Associated Prescribers**

Patient Dose*	2015	2016	2017	2018	2019	2019	5 Year Trend
Total Prescribers	13,767	14,789	15,330	15,215	14,908		
≥ 50 OME/day	7,871	8,251	7,890	6,999	6,726		
≥ 90 OME/day	6,469	6,745	6,246	5,338	5,085		
≥ 200 OME/day	4,427	4,517	3,914	3,346	3,061		
≥ 400 OME/day	2,498	2,421	1,940	1,552	1,475		
≥ 600 OME/day	1,509	1,455	1,070	862	826		
≥ 800 OME/day	903	842	630	528	524		
≥ 1,000 OME/day	586	562	407	376	369		
≥ 2,000 OME/day	96	71	73	52	75		

\* can include prescriptions from multiple prescribers

Note: Of 14,908 prescribers in 2019, 8,182 (54.9%) prescribed < 50 OME/day.

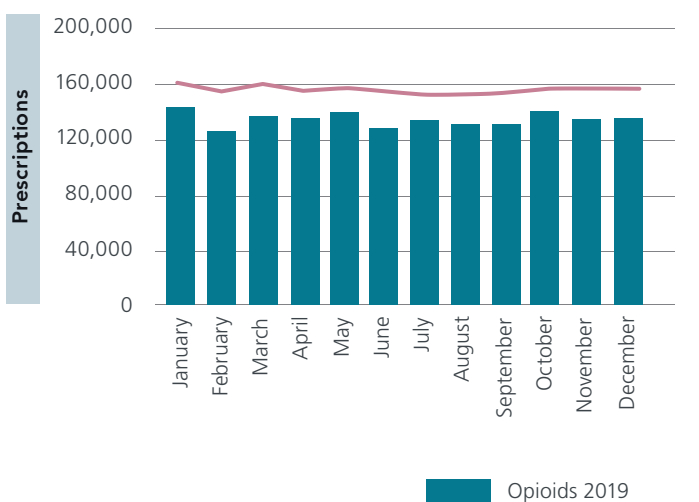
**Table 8. Opioid Patients by Number of Ingredients, 2015-2019**

Ingredients	2015	2016	2017	2018	2019	2019	5 Year Trend
<b>Total Patients</b>	<b>628,762</b>	<b>654,616</b>	<b>634,301</b>	<b>597,055</b>	<b>573,104</b>		
1 Ingredient	538,447	557,578	543,387	513,609	496,565		
2 Ingredients	74,201	80,112	75,941	70,385	64,895		
3 Ingredients	13,328	14,127	12,626	11,007	9,769		
4 Ingredients	2,304	2,315	2,004	1,754	1,574		
5 Ingredients	421	407	297	262	267		
6+ Ingredients	61	77	46	38	3		

**Table 9. Opioid Patients by Number of Prescribers, 2015-2019**

Prescribers	2015	2016	2017	2018	2019	2019	5 Year Trend
<b>Total Patients</b>	<b>628,762</b>	<b>654,616</b>	<b>634,301</b>	<b>597,055</b>	<b>573,104</b>		
1 Prescriber	437,619	454,276	448,545	434,911	424,281		
2 Prescribers	107,745	114,740	109,861	100,905	93,912		
3 Prescribers	39,281	41,720	38,954	33,467	30,556		
4 Prescribers	17,964	18,685	17,222	14,008	12,444		
5 Prescribers	9,686	9,877	8,505	6,388	5,647		
6 Prescribers	5,646	5,723	4,522	3,317	2,803		
7 Prescribers	3,611	3,345	2,583	1,772	1,504		
8+ Prescribers	7,210	6,250	4,109	2,287	1,957		

**Figure 2. Opioid Prescribing Trends by Month for Patients 0-64 Years, 2015-2019**



**Figure 3. Opioid Prescribing Trends by Month for Patients 65 Years and Older, 2015-2019**

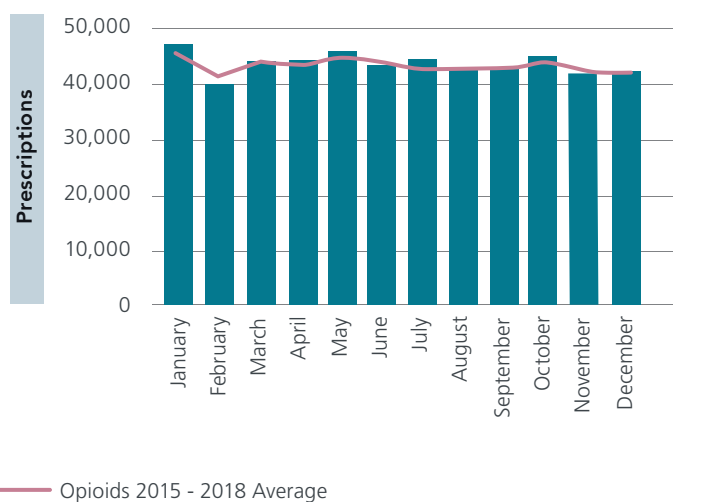
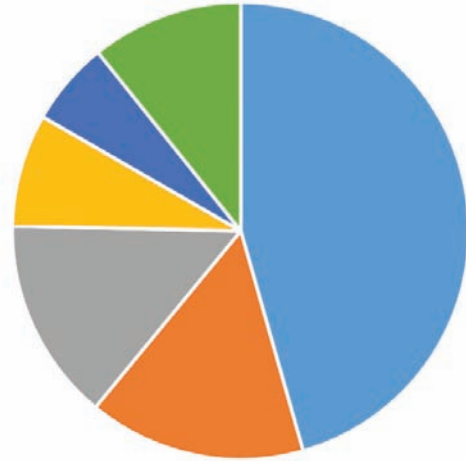


Figure 4. Opioid Prescriptions by Ingredient for Physician Prescribers, 2019

Main Ingredient	Prescriptions	%
Codeine	648,803	46
Tramadol	218,859	15
Oxycodone	204,412	14
Hydromorphone	113,310	8
Buprenorphine	84,516	6
Other Ingredients	152,991	11



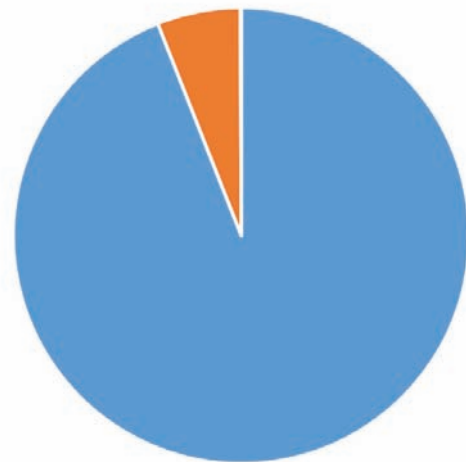
Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all opioids prescribed by physicians.



Note: Black bar shows the proportion of physician opioid prescriptions relative to total opioid prescriptions by all prescriber types. See Table 3.

Figure 5. Opioid Prescriptions by Ingredient for Pharmacist Prescribers, 2019

Main Ingredient	Prescriptions	%
Codeine	99,040	94
Tramadol	6,225	6
Methadone Hydrochloride	44	<1
Buprenorphine	7	<1
Oxycodone	7	<1
Other Ingredients	13	<1



Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all opioids prescribed by pharmacists.



Note: Black bar shows the proportion of pharmacist opioid prescriptions relative to total opioid prescriptions by all prescriber types. See Table 3.

Figure 6. Opioid Prescriptions by Ingredient for Dentist Prescribers, 2019

Main Ingredient	Prescriptions	%
Codeine	90,560	89
Tramadol	8,693	9
Oxycodone	1,564	2
Morphine	464	<1
Hydromorphone	142	<1
Other Ingredients	45	<1



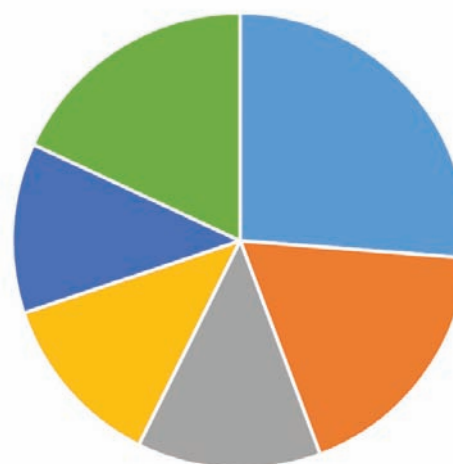
Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all opioids prescribed by dentists.



Note: Black bar shows the proportion of dentist opioid prescriptions relative to total opioid prescriptions by all prescriber types. See Table 3.

Figure 7. Opioid Prescriptions by Ingredient for Nurse Practitioner Prescribers, 2019

Main Ingredient	Prescriptions	%
Codeine	5,868	26
Hydromorphone	4,047	18
Buprenorphine	2,922	13
Methadone Hydrochloride	2,804	13
Morphine	2,702	12
Other Ingredients	4,044	18



Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all opioids prescribed by nurse practitioners.



Note: Black bar shows the proportion of nurse practitioner opioid prescriptions relative to total opioid prescriptions by all prescriber types. See Table 3.

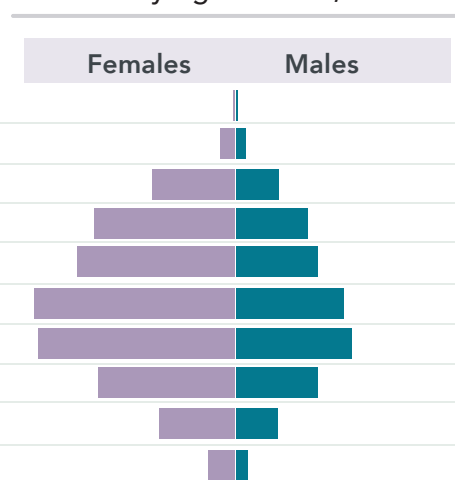
Table 10. Utilization of Prescription Benzodiazepines in Alberta, 2015-2019

Year	Prescriptions	Patients	Prescribers	Pharmacies	DDDs per 1000 Population	Patients per 1000 Population	Patients ≥ 2 DDDs	Patients ≥ 2 DDDs per 1000 Population
2015	1,220,487	373,641	12,033	1,345	41.6	89.0	15,186	3.6
2016	1,284,642	386,883	12,738	1,418	41.0	91.0	14,728	3.5
2017	1,204,418	369,828	13,151	1,385	36.6	86.3	12,257	2.9
2018	1,127,665	355,901	13,399	1,468	33.6	82.6	10,773	2.5
2019	1,057,581	343,277	13,379	1,530	30.8	78.5	9,825	2.2
5 year trend								

Table 11. Benzodiazepine Patients by Age and Sex, 2019\*

Age Group	Females	Percent	Males	Percent	Total Patients	Percent
0-9	405	0.2	542	0.4	947	0.3
10-19	3,971	1.8	2,292	1.8	6,263	1.8
20-29	18,458	8.5	9,395	7.4	27,853	8.1
30-39	29,977	13.9	17,565	13.8	47,542	13.8
40-49	33,099	15.3	20,160	15.9	53,259	15.5
50-59	41,883	19.4	25,253	19.9	67,136	19.6
60-69	41,434	19.2	25,780	20.3	67,214	19.6
70-79	27,449	12.7	16,386	12.9	43,835	12.8
80-89	14,817	6.9	8,091	6.4	22,908	6.7
90+	4,597	2.1	1,693	1.3	6,290	1.8
Total	216,094	100.0	127,166	100.0	343,277	100.0

Figure 8. Benzodiazepine Patients by Age and Sex, 2019



\*4 female patients of unknown age, 9 male patients of unknown age, 15 patients of known age and unknown sex, 2 patients of unknown age or sex

Table 12. Benzodiazepine Prescriptions, Patients, and Prescribers by Prescriber Type, 2019

Prescriber Type	Prescriptions	Percent	Patients	Percent	Prescribers	Percent
All Prescribers	1,057,581	100.0	343,277	100.0	13,379	100.0
Physicians	1,009,927	95.5	333,836	97.2	9,897	74.0
Pharmacists	25,121	2.4	15,296	4.5	3,006	22.5
Nurse Practitioners	9,056	0.9	4,447	1.3	364	2.7
Dentists	7,494	0.7	6,071	1.8	111	0.8

Note: Prescriptions sum does not match the summary value because only the four major prescriber types are shown. 104 prescriptions are associated with other known prescriber types (Opticians 78, Dieticians 17, Dental Hygienists 9).

Note: Patient sum does not match the summary values because patients may obtain prescriptions from more than one prescriber type.

5,879 prescriptions have no prescriber type identified. Also, no specific prescriber is identified within the four major prescriber types, i.e., 1% of prescriptions by physicians, < 1% by pharmacists, 96% by dentists and 7% by nurse practitioner have no identified prescriber.



Table 13. Benzodiazepine Prescriptions by Main Ingredient, 2015-2019\*

Main Ingredient	2015	2016	2017	2018	2019	2019	5 Year Trend
Zopiclone	483,561	510,096	490,362	462,524	431,557		
Lorazepam	308,569	330,213	308,315	293,838	283,773		
Clonazepam	164,802	172,169	169,395	158,148	148,888		
Temazepam	91,799	86,440	68,682	57,666	49,591		
Zolpidem	35,035	40,274	42,116	42,270	42,024		
Diazepam	43,253	48,233	40,843	36,412	34,668		
Alprazolam	28,436	28,938	26,771	25,014	22,826		
Bromazepam	22,357	21,875	16,669	13,177	11,013		
Clobazam	8,890	10,110	10,068	10,008	10,064		
Nitrazepam	16,321	18,065	14,809	13,430	8,700		

Table 14. Benzodiazepine Patients by Main Ingredient, 2015-2019\*

Main Ingredient	2015	2016	2017	2018	2019	2019	5 Year Trend
Zopiclone	186,615	192,225	180,564	169,657	158,763		
Lorazepam	143,231	151,540	144,670	141,627	139,704		
Clonazepam	52,250	53,687	50,209	47,838	45,699		
Zolpidem	16,671	17,645	17,475	17,102	16,893		
Temazepam	25,427	24,094	19,555	16,475	14,130		
Diazepam	15,188	15,965	14,097	12,785	12,350		
Alprazolam	10,115	10,066	9,119	8,281	7,578		
Clobazam	3,233	3,400	3,380	3,473	3,534		
Triazolam	3,037	3,400	3,136	3,149	3,290		
Bromazepam	4,351	4,147	3,254	2,703	2,311		

Table 15. Benzodiazepine Prescribers by Main Ingredient, 2015-2019\*

Main Ingredient	2015	2016	2017	2018	2019	2019	5 Year Trend
Zopiclone	10,295	10,855	11,197	11,332	11,291		
Lorazepam	7,643	8,128	8,369	8,579	8,596		
Clonazepam	5,687	5,984	6,157	6,255	6,226		
Diazepam	3,766	4,074	4,093	4,060	4,078		
Zolpidem	3,389	3,774	3,905	4,021	4,053		
Temazepam	3,809	3,949	3,888	3,659	3,501		
Alprazolam	3,118	3,265	3,240	3,198	3,093		
Clobazam	1,858	1,997	2,122	2,199	2,217		
Bromazepam	1,596	1,639	1,530	1,418	1,294		
Oxazepam	1,508	1,501	1,340	1,228	1,143		

\* The ten most commonly prescribed ingredients are displayed. See Appendix B for details on less commonly prescribed ingredients.

Table 16. Benzodiazepine Patients and Associated Prescribers by Dose, 2015-2019

<b>Patients</b>							
Patient Dose*	2015	2016	2017	2018	2019	2019	5 Year Trend
Total Patients	373,641	386,883	369,828	355,901	343,277		
≥ 1 DDDs	56,118	55,947	49,865	46,060	42,849		
≥ 2 DDDs	15,186	14,728	12,257	10,773	9,825		
≥ 4 DDDs	2,097	1,862	1,329	1,106	973		
≥ 6 DDDs	515	449	301	227	225		
≥ 8 DDDs	152	122	75	68	61		
≥ 10 DDDs	63	49	34	28	24		

<b>Associated Prescribers</b>							
Patient Dose*	2015	2016	2017	2018	2019	2019	5 Year Trend
Total Prescribers	12,033	12,738	13,151	13,399	13,379		
≥ 1 DDDs	8,447	8,888	8,895	8,999	8,833		
≥ 2 DDDs	5,697	5,929	5,615	5,468	5,212		
≥ 4 DDDs	2,252	2,127	1,557	1,298	1,136		
≥ 6 DDDs	832	752	434	321	292		
≥ 8 DDDs	325	266	85	89	76		
≥ 10 DDDs	128	134	37	39	36		

\* can include prescriptions from multiple prescribers

Table 17. Benzodiazepine Patients by Number of Ingredients, 2015-2019

Ingredients	2015	2016	2017	2018	2019	2019	5 Year Trend
<b>Total Patients</b>	<b>373,641</b>	<b>386,883</b>	<b>369,828</b>	<b>355,901</b>	<b>343,277</b>		
1 Ingredient	295,868	306,614	299,555	292,646	285,270		
2 Ingredients	63,237	65,218	58,832	53,746	49,704		
3 Ingredients	11,762	12,197	9,657	8,127	7,147		
4 Ingredients	2,224	2,302	1,510	1,176	990		
5 Ingredients	434	433	224	169	139		
6+ Ingredients	116	119	50	37	27		

Table 18. Benzodiazepine Patients by Number of Prescribers, 2015-2019

Prescribers	2015	2016	2017	2018	2019	2019	5 Year Trend
<b>Total Patients</b>	<b>373,641</b>	<b>386,883</b>	<b>369,828</b>	<b>355,901</b>	<b>343,277</b>		
1 Prescriber	266,197	273,803	267,412	261,137	255,136		
2 Prescribers	70,442	73,489	68,528	64,586	60,513		
3 Prescribers	22,249	23,714	21,256	19,360	17,866		
4 Prescribers	8,160	8,723	7,349	6,444	5,898		
5 Prescribers	3,186	3,654	2,881	2,468	2,169		
6 Prescribers	1,504	1,595	1,178	950	833		
7 Prescribers	726	815	583	404	387		
8+ Prescribers	1177	1090	641	552	475		

Figure 9. Benzodiazepine Prescribing Trends by Month for Patients 0-64 Years, 2015-2019

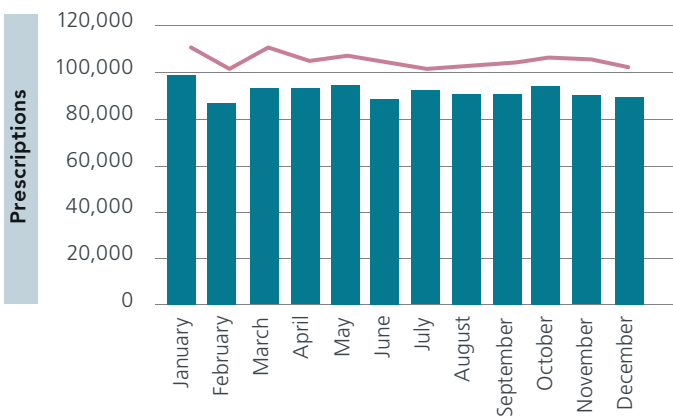


Figure 10. Benzodiazepine Prescribing Trends by Month for Patients 65 Years and Older, 2015-2019

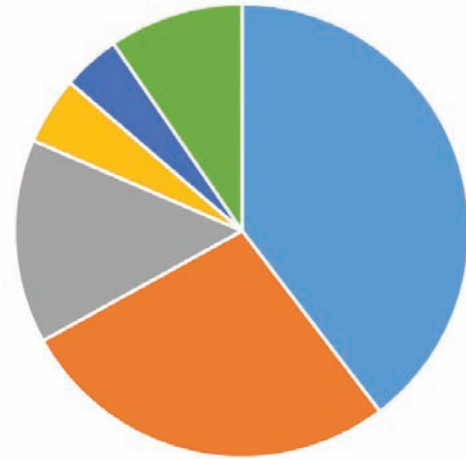


Benzodiazepines 2019

Benzodiazepines 2015-2018 Average

Figure 11. BDZ/Z Prescriptions by Ingredient for Physician Prescribers, 2019

Main Ingredient	Prescriptions	%
Zopiclone	400,382	40
Lorazepam	275,760	27
Clonazepam	146,994	15
Temazepam	48,796	5
Zolpidem	41,429	4
Other Ingredients	96,566	10



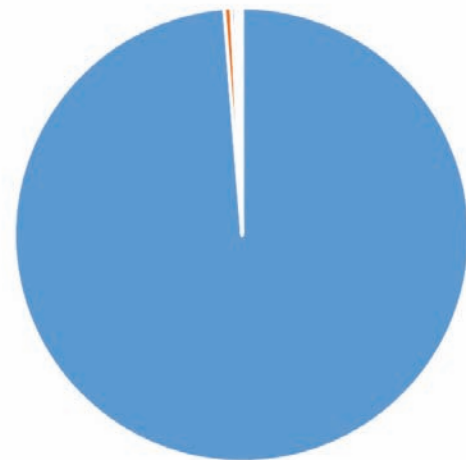
Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all BDZ/Z prescribed by physicians.



Note: Black bar shows the proportion of physician BDZ/Z prescriptions relative to total BDZ/Z prescriptions by all prescriber types. See Table 12.

Figure 12. BDZ/Z Prescriptions by Ingredient for Pharmacist Prescribers, 2019

Main Ingredient	Prescriptions	%
Zopiclone	24,805	99
Zolpidem	128	1
Lorazepam	73	<1
Clobazam	41	<1
Clonazepam	41	<1
Other Ingredients	33	<1



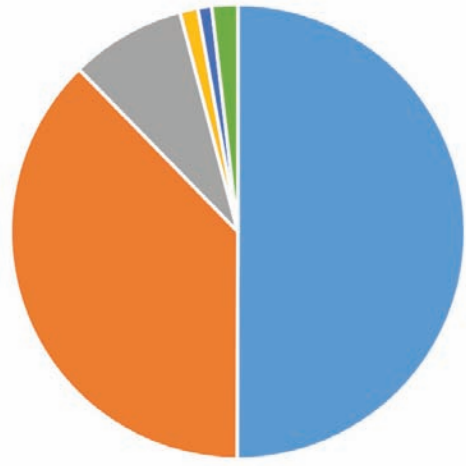
Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all BDZ/Z prescribed by pharmacists.



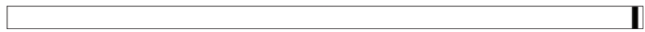
Note: Black bar shows the proportion of pharmacist BDZ/Z prescriptions relative to total BDZ/Z prescriptions by all prescriber types. See Table 12.

Figure 13. BDZ/Z Prescriptions by Ingredient for Dentist Prescribers, 2019

Main Ingredient	Prescriptions	%
Lorazepam	3,751	50
Triazolam	2,820	38
Diazepam	615	8
Midazolam	96	1
Clonazepam	74	1
Other Ingredients	138	2



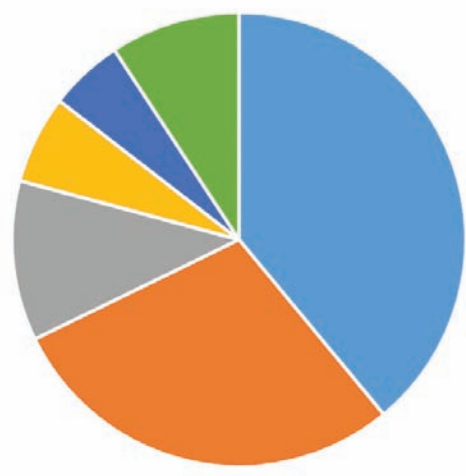
Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all BDZ/Z prescribed by dentists.



Note: Black bar shows the proportion of dentist BDZ/Z prescriptions relative to total BDZ/Z prescriptions by all prescriber types. See Table 12.

Figure 14. BDZ/Z Prescriptions by Ingredient for Nurse Practitioner Prescribers, 2019

Main Ingredient	Prescriptions	%
Zopiclone	3,531	39
Lorazepam	2,607	29
Clonazepam	1,032	11
Temazepam	571	6
Diazepam	477	5
Other Ingredients	838	9



Note: The % column represents the number of prescriptions for each main ingredient as a proportion of all BDZ/Z prescribed by nurse practitioners.



Note: Black bar shows the proportion of nurse practitioner BDZ/Z prescriptions relative to total BDZ/Z prescriptions by all prescriber types. See Table 12.



# Medication Use – Benzodiazepines in Elderly Patients

Table 19. Utilization of Prescription Benzodiazepines in Elderly Patients in Alberta, 2015-2019

Year	Prescriptions	Patients	Prescribers	Pharmacies	Elderly Population	Elderly Patient DDDs	Elderly Patients DDDs per 1000 Population	Elderly Patients per 1000 Elderly Population
2015	324,499	105,647	8,453	1,283	487,055	60,388.5	124.0	216.9
2016	340,906	108,853	9,017	1,363	506,800	61,187.0	120.7	214.8
2017	337,198	107,083	9,397	1,353	529,962	57,205.7	107.9	202.1
2018	328,443	105,575	9,675	1,432	551,546	54,560.2	98.9	191.4
2019	317,583	103,725	9,696	1,490	580,391	52,697.9	90.8	178.7

5 year trend

Table 20. Elderly Benzodiazepine Patients, Prescriptions and Prescribers by Prescriber Type, 2019

Prescriber Type	Prescriptions	Percent	Patients	Percent	Prescribers	Percent
All Prescribers	317,583	100.0	103,725	100.0	9,696	100.0
Physicians	303,300	95.5	102,169	98.5	7,252	74.8
Pharmacists	9,893	3.1	6,439	6.2	2,206	22.8
Nurse Practitioners	2,198	0.7	1,269	1.2	227	2.3
Dentists	798	0.3	631	0.6	11	0.1

Note: Prescriptions sum does not match the summary value because only the four major prescriber types are shown.

Note: Patient sum does not match the summary values because patients may obtain prescriptions from more than one prescriber type.

Table 21. Elderly Benzodiazepine Patients and Associated Prescribers by Dose, 2015-2019

### Elderly Patients

Patient Dose*	2015	2016	2017	2018	2019	2019	5 Year Trend
<b>Total Patients</b>	<b>105,647</b>	<b>108,853</b>	<b>107,083</b>	<b>105,575</b>	<b>103,725</b>		
≥ 1 DDDs	20,276	20,285	18,570	17,639	16,891		
≥ 2 DDDs	3,939	3,853	3,296	2,956	2,856		
≥ 4 DDDs	302	288	182	173	179		
≥ 6 DDDs	58	49	33	23	37		
≥ 8 DDDs	15	10	6	7	10		

### Associated Prescribers

Patient Dose*	2015	2016	2017	2018	2019	2019	5 Year Trend
<b>Total Prescribers</b>	<b>8,453</b>	<b>9,017</b>	<b>9,397</b>	<b>9,675</b>	<b>9,696</b>		
≥ 1 DDDs	5,634	5,989	5,947	6,060	6,034		
≥ 2 DDDs	2,857	2,961	2,705	2,559	2,455		
≥ 4 DDDs	472	456	290	262	257		
≥ 6 DDDs	109	84	49	38	62		
≥ 8 DDDs	25	15	9	13	16		

\* can include prescriptions from multiple prescribers

**Table 22.** Utilization of Concurrent Prescription Opioids and Benzodiazepines in Alberta, 2015-2019

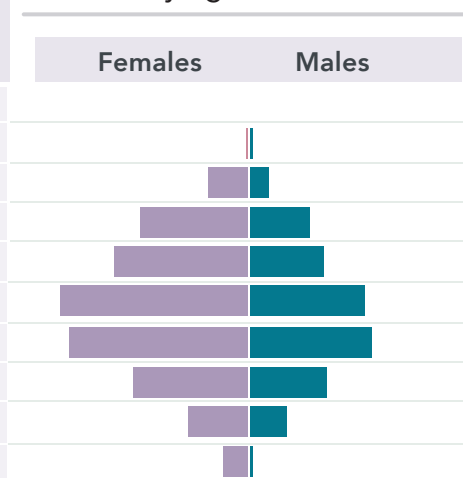
Year	Patients	Patients per 1000 population	Patients ≥ 90 OMEs and ≥ 2 DDDs	Elderly Patients	Elderly Patients per 1000 Elderly Population
2015	131,185	31	64	37,234	76
2016	134,809	32	47	38,606	76
2017	123,585	29	27	37,252	70
2018	111,914	26	15	34,970	63
2019	103,226	24	15	33,439	58
5 year					

Note: Concurrent Opioid BDZ/Z patients are patients who received both opioid and benzodiazepine prescriptions within the same quarter. Patients included were dispensed opioid and BDZ/Z prescriptions concurrently in one or more quarters.

**Table 23.** Concurrent Opioid and Benzodiazepine Patients by Age and Sex, 2019\*

Age Group	Females	Percent	Males	Percent	Total Patients	Percent
0-9	14	0.0	9	0.0	23	0.0
10-19	490	0.8	290	0.7	780	0.8
20-29	3,379	5.3	1,848	4.7	5,227	5.1
30-39	7,591	11.8	4,277	11.0	11,868	11.5
40-49	10,257	16.0	5,827	15.0	16,084	15.6
50-59	14,077	21.9	8,952	23.0	23,029	22.3
60-69	13,841	21.5	9,371	24.1	23,212	22.5
70-79	8,666	13.5	5,471	14.1	14,137	13.7
80-89	4,511	7.0	2,407	6.2	6,918	6.7
90+	1,457	2.3	478	1.2	1,935	1.9
Total	64,285	100.0	38,934	100.0	103,226	100.0

**Figure 15.** Concurrent Opioid and Benzodiazepine Patients by Age and Sex, 2019



\*2 female patients of unknown age, 4 male patients of unknown age, 6 patients of unknown sex, and 2 patients of unknown sex or age.

**Table 24.** Concurrent Opioid and Benzodiazepine Patients by Prescriber Type in Alberta, 2015-2019

Prescriber Type	2015	2016	2017	2018	2019	2019	5 Year Trend
Physicians	129,599	133,151	121,980	110,254	101,543		
Pharmacists	31,071	30,433	26,514	19,426	15,835		
Dentists	12,336	12,926	11,850	10,982	10,133		
Nurse Practitioners	1,782	2,625	2,931	3,212	3,499		

Figure 16. Five Year Opioid Patient Trends for the Top Five PhLAGs in 2019

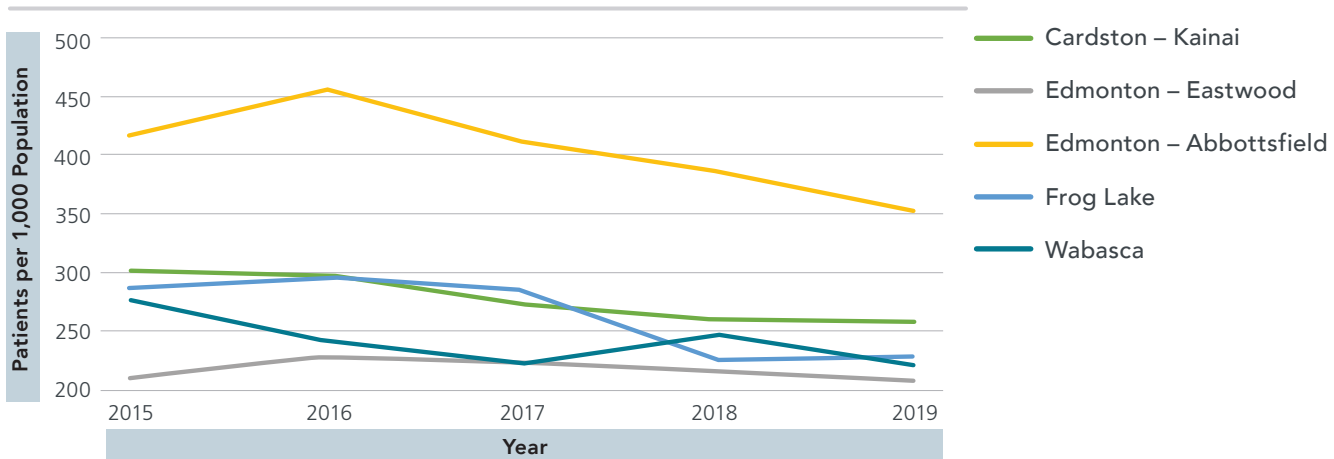


Figure 17. Five Year Total OME per Day Trends for the Top Five PhLAGs in 2019

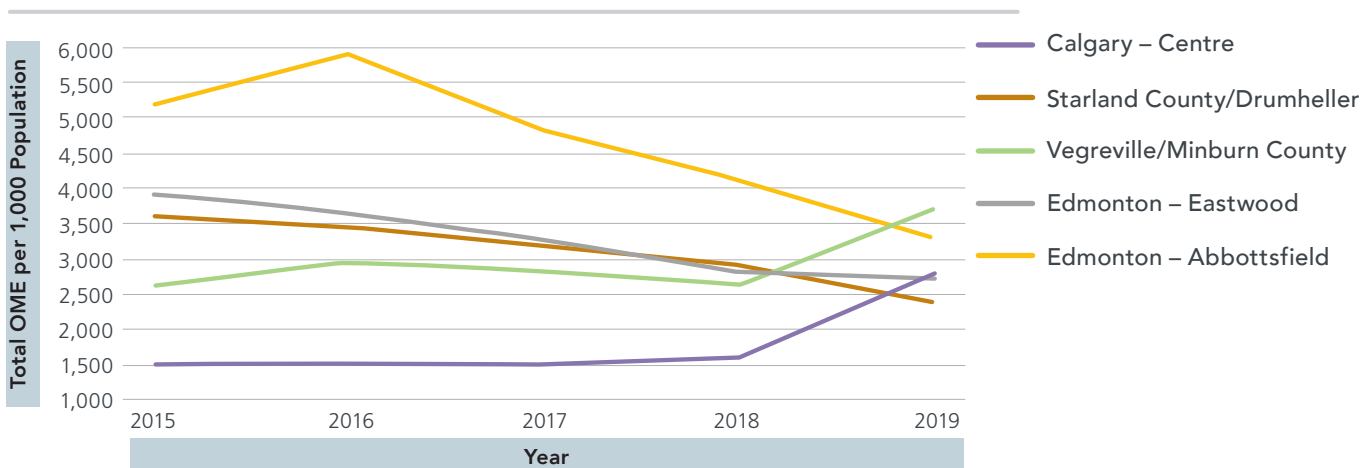


Figure 18. Five Year Opioid Patients who Received 90 OME or Greater per Day Trends for the Top Five PhLAGs in 2019

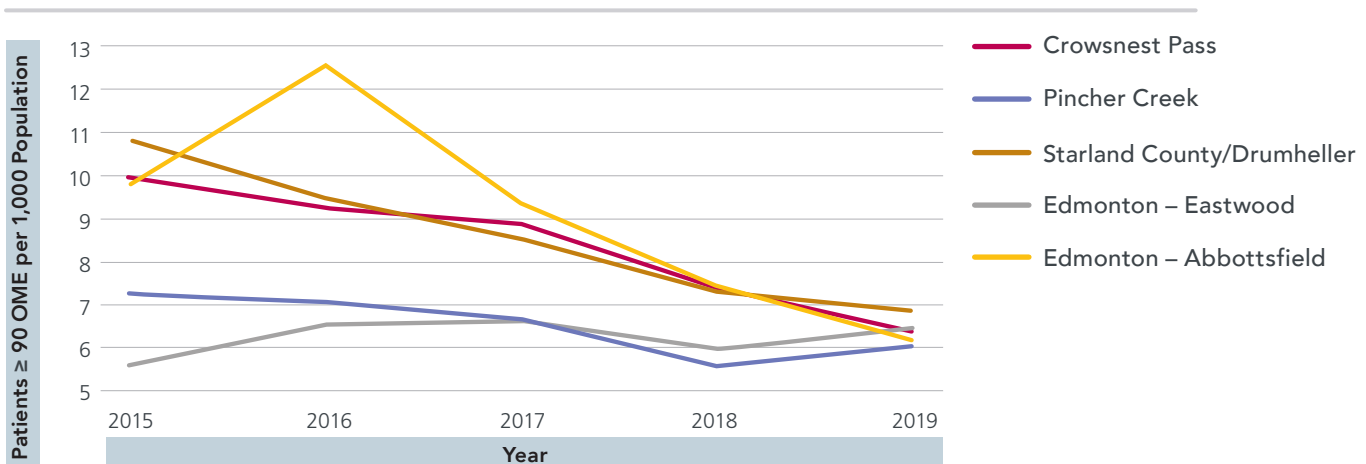


Figure 19. Five Year Benzodiazepine Patient Trends for the Top Five PhLAGs in 2019

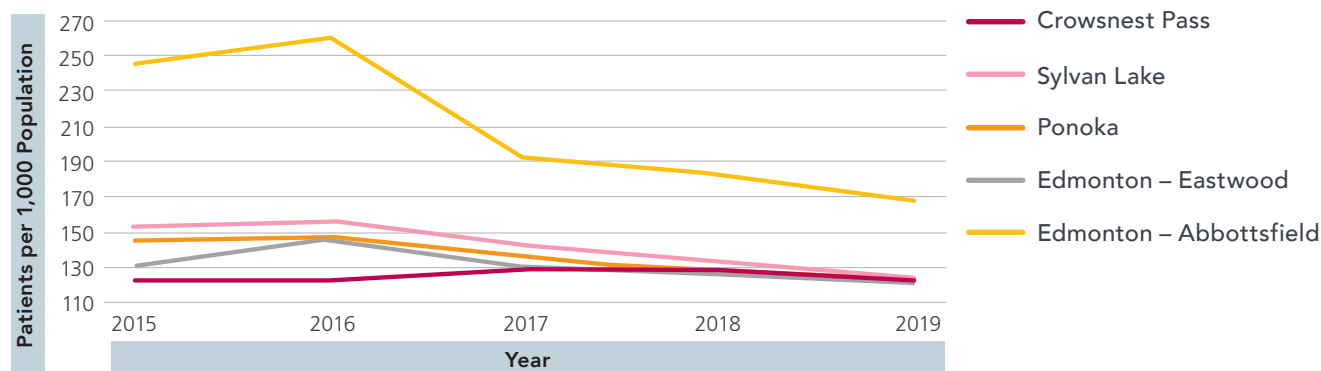


Figure 20. Five Year Benzodiazepine DDDs Trends for the Top Five PhLAGs in 2019

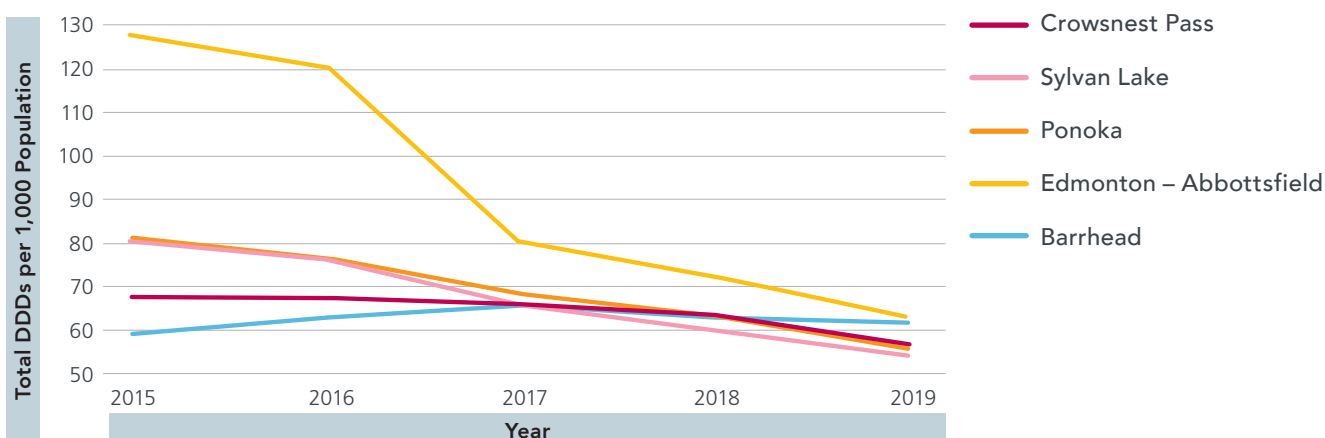


Figure 21. Five Year Benzodiazepine Patients Who Received 2 DDDs or Greater Trends for the Top Five PhLAGs in 2019

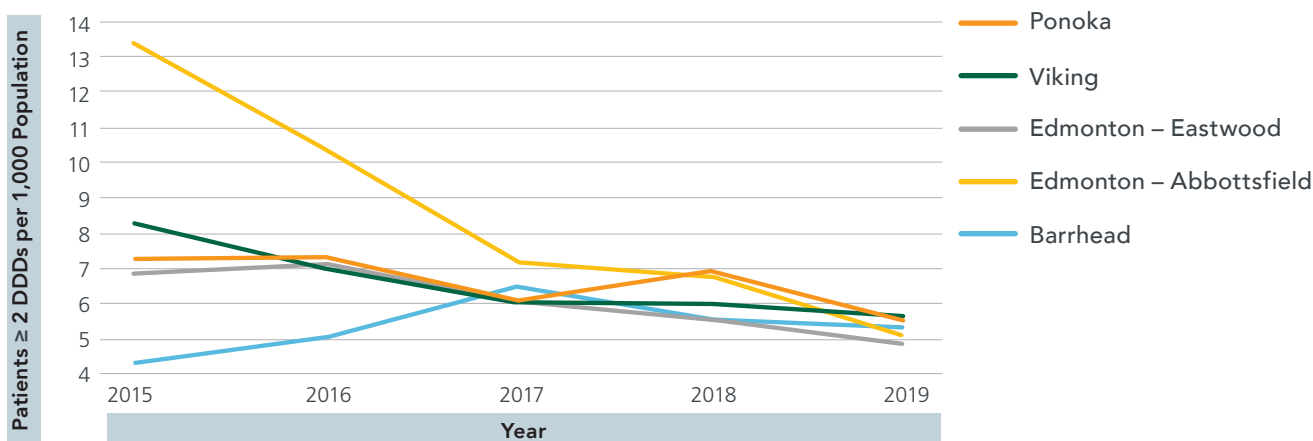


Figure 22. Five Year Elderly Benzodiazepine Patient Trends for the Top Five PhLAGs in 2019

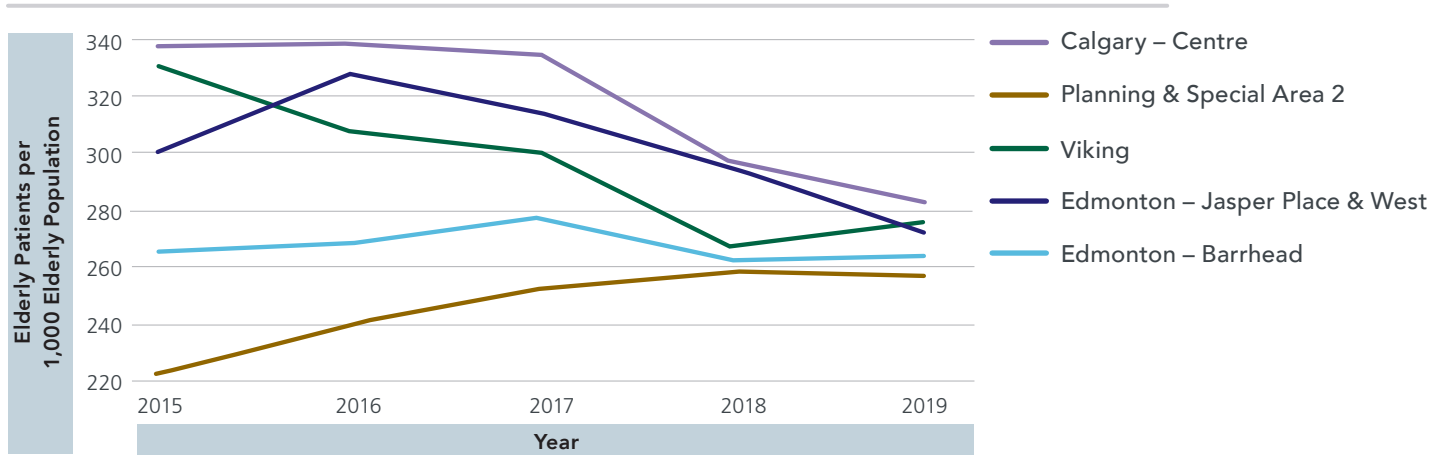


Figure 23. Five Year Total DDDs in Elderly Patients Trends for the Top Five PhLAGs in 2019

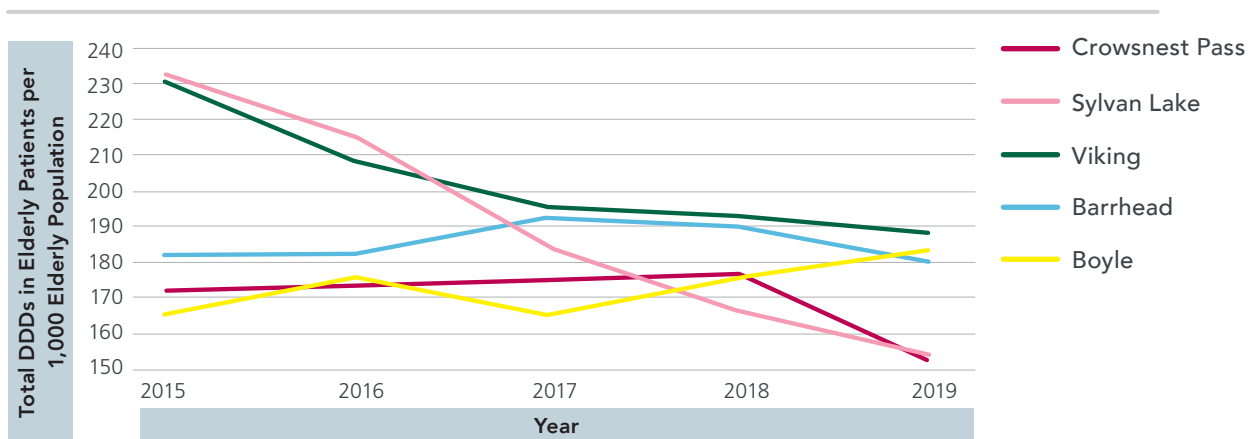
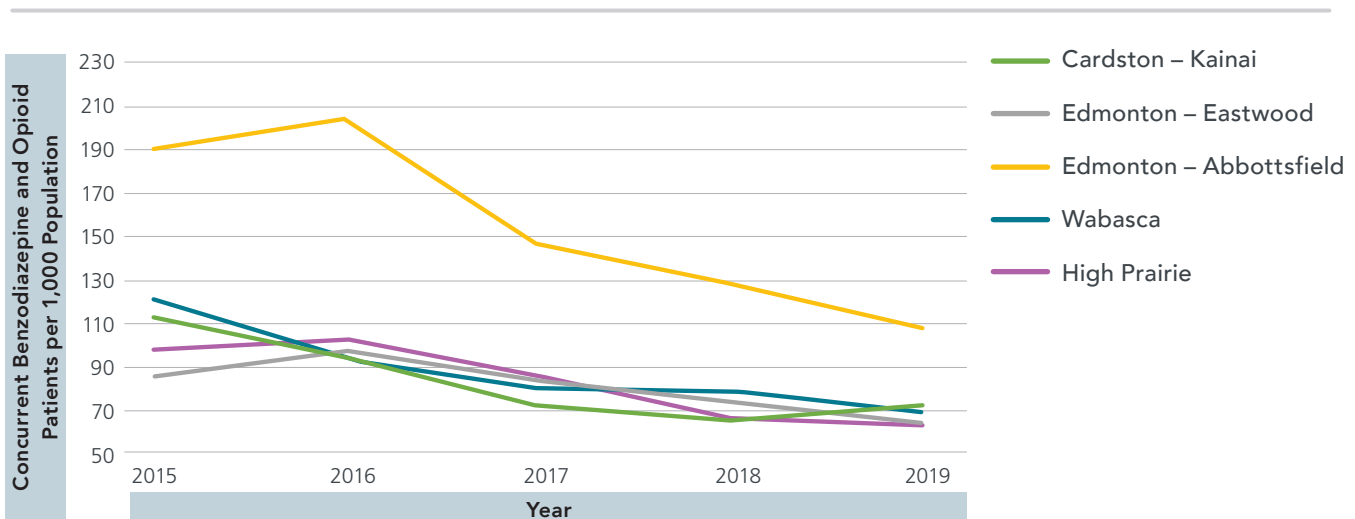


Figure 24. Five Year Patients Who Consumed Opioids and Benzodiazepines in the Same Quarter Trends for the Top Five PhLAGs in 2019





Veterinarian prescriptions for animal clients are monitored by TPP Alberta, as there is a potential for misuse by the human owners of the animal patients. Veterinarian prescriptions for animals were not included in the overall analyses.

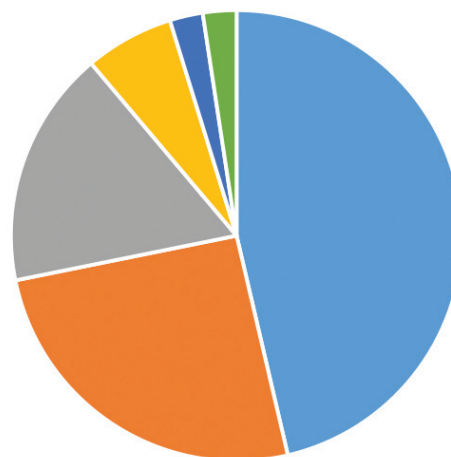
In 2019, 1,001 veterinarians in Alberta prescribed 21,882 opioid prescriptions for animal clients. 491 veterinarians prescribed 1,927 BDZ/Z prescriptions for animal clients.

The five most commonly prescribed ingredients are shown for the two analytic classes.

The data source for veterinarian prescriptions of controlled drugs for animals is the TPP Alberta Prescription Drug Monitoring program, as prescriptions for animal patients are not captured in PIN. Also, specific animal patient and dosage information are not available.

**Figure 25. Opioid Prescriptions by Ingredient for Veterinarian Prescribers, 2019**

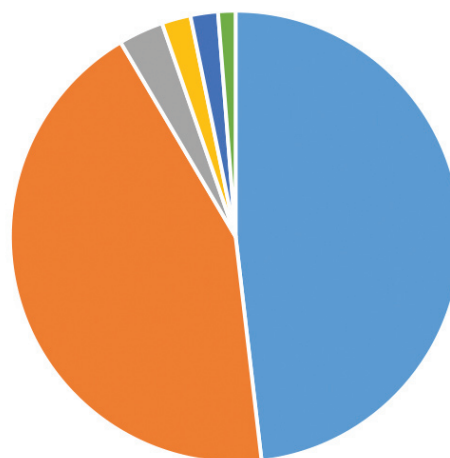
Main Ingredient	Prescriptions
Tramadol	10,142
Buprenorphine	5,574
Hydrocodone	3,726
Codeine	1,395
Butorphanol	519
Other ingredients	526



Note: Prescriptions by Veterinarians were created for animal clients, and not included in the analyses of opioid utilization

**Figure 26. Benzodiazepine Prescriptions by Ingredient for Veterinarian Prescribers, 2019**

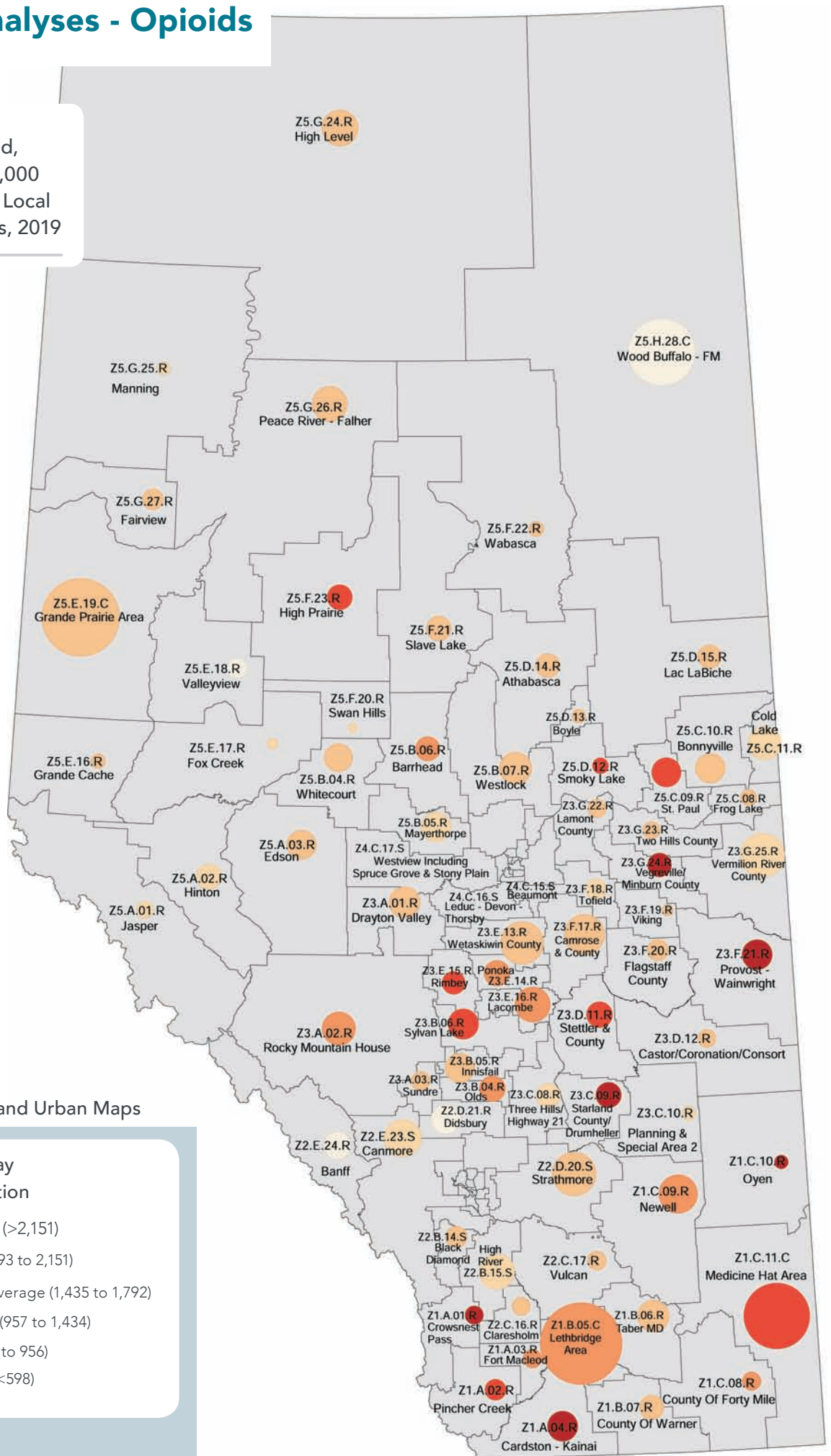
Main Ingredient	Prescriptions
Alprazolam	928
Diazepam	835
Clorazepate Dipotassium	62
Lorazepam	40
Midazolam	38
Other ingredients	24



Note: Prescriptions by Veterinarians were created for animal clients, and not included in the overall analyses of BDZ/Z utilization

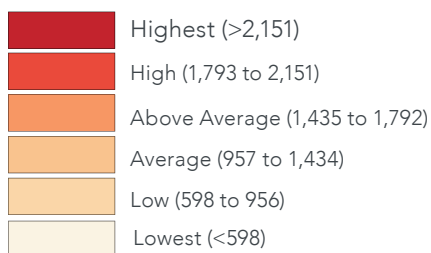
# Geographic Analyses - Opioids

Figure 27a.  
Age and Sex Standardized,  
Total OME per Day per 1,000  
Population, by Pharmacy Local  
Aggregated Geographies, 2019

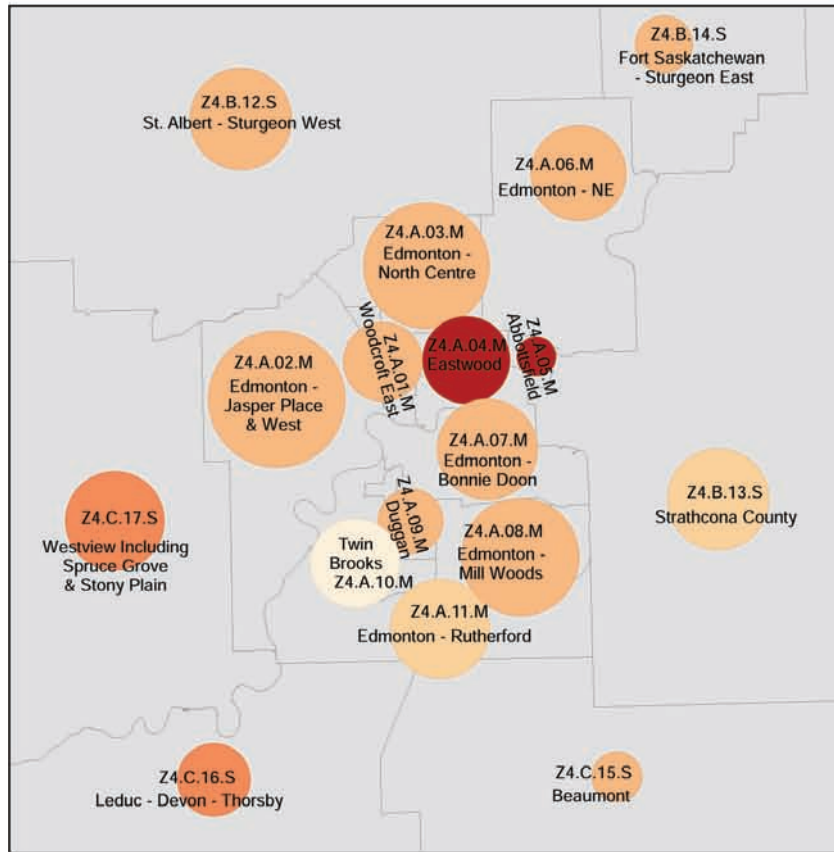


Legend: Provincial and Urban Maps

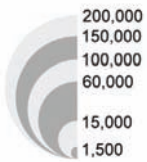
Total OME per Day  
per 1,000 Population



Edmonton



Population



Calgary

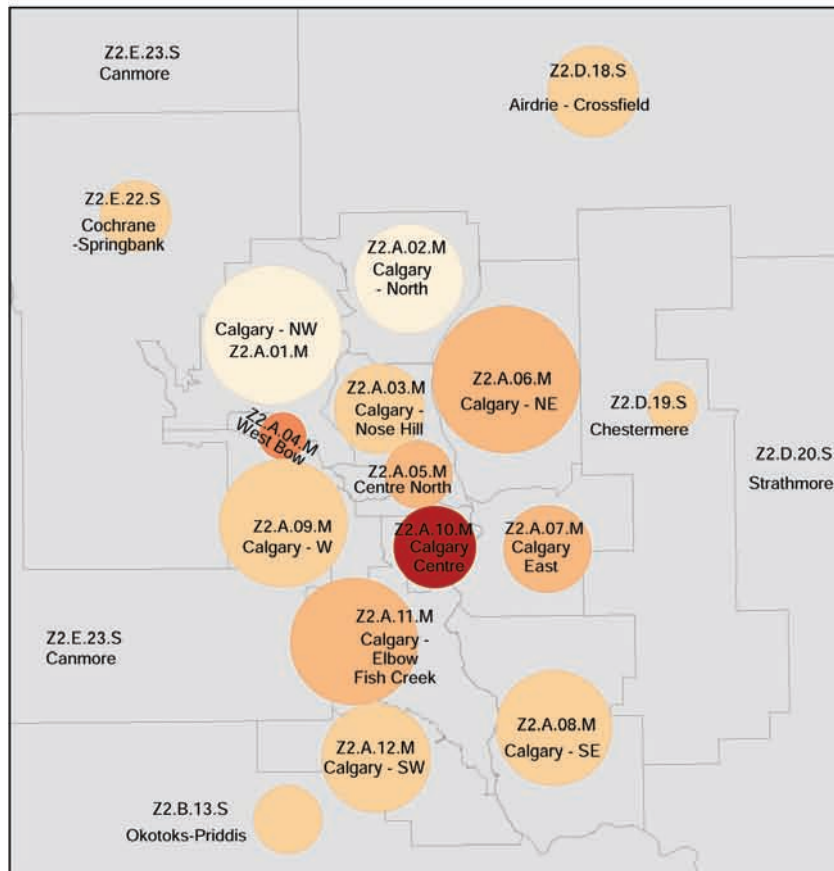
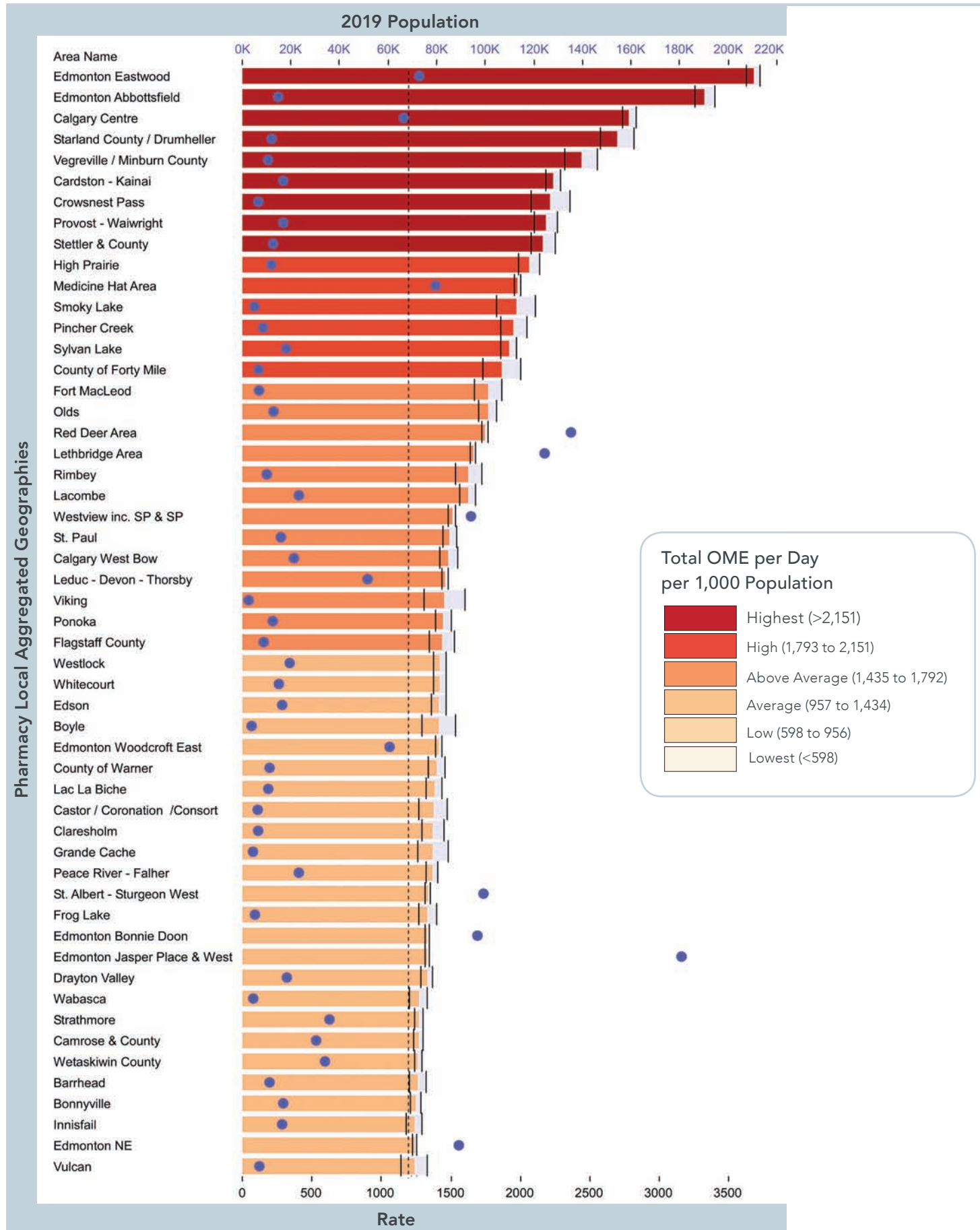


Figure 27b. Age and Sex Standardized, Total OME per Day per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. • Blue dots show the population.

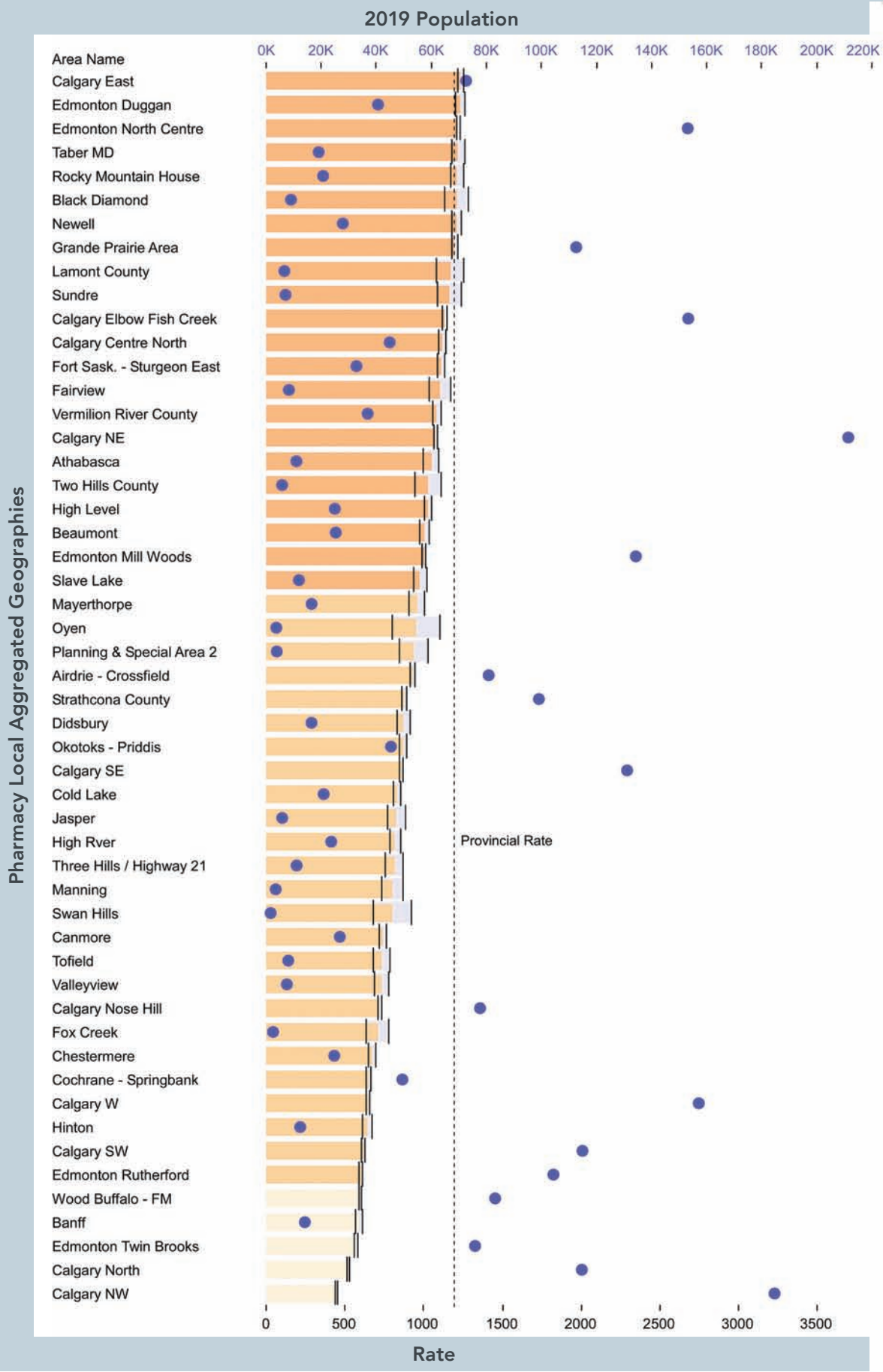
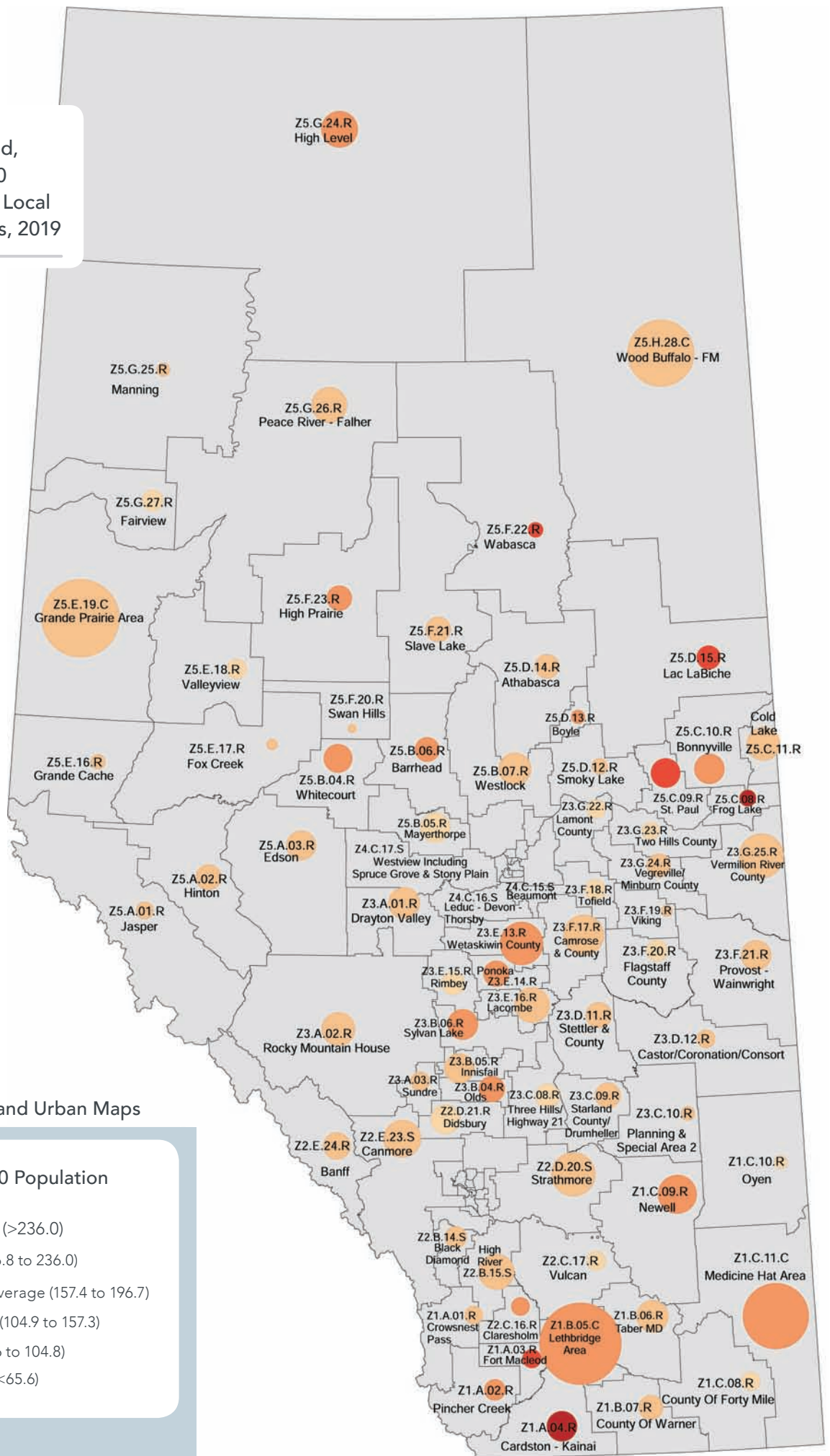


Figure 28a.  
 Age and Sex Standardized,  
 Opioid Patients per 1,000  
 Population, by Pharmacy Local  
 Aggregated Geographies, 2019

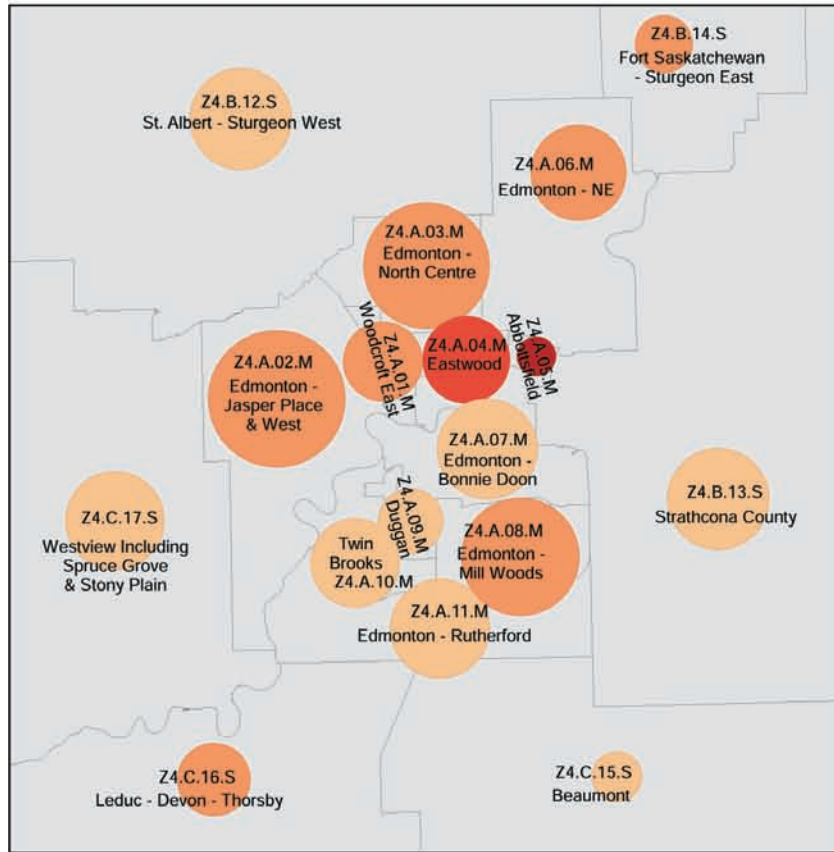


Legend: Provincial and Urban Maps

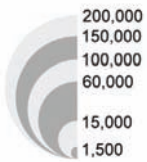
Patients per 1,000 Population

<span style="display:inline-block; width:15px; height:15px; background-color:#800000;"></span>	Highest (>236.0)
<span style="display:inline-block; width:15px; height:15px; background-color:#FF0000;"></span>	High (196.8 to 236.0)
<span style="display:inline-block; width:15px; height:15px; background-color:#FF4500;"></span>	Above Average (157.4 to 196.7)
<span style="display:inline-block; width:15px; height:15px; background-color:#FF8C00;"></span>	Average (104.9 to 157.3)
<span style="display:inline-block; width:15px; height:15px; background-color:#FFD700;"></span>	Low (65.6 to 104.8)
<span style="display:inline-block; width:15px; height:15px; background-color:#FFFACD;"></span>	Lowest (<65.6)

Edmonton



Population



Calgary

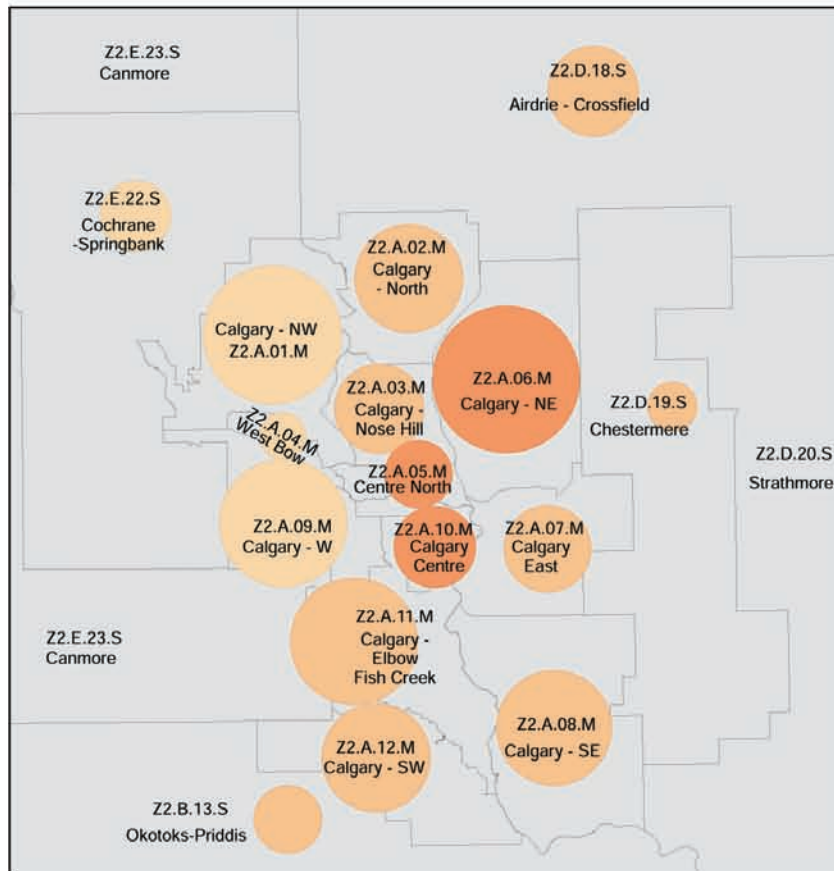
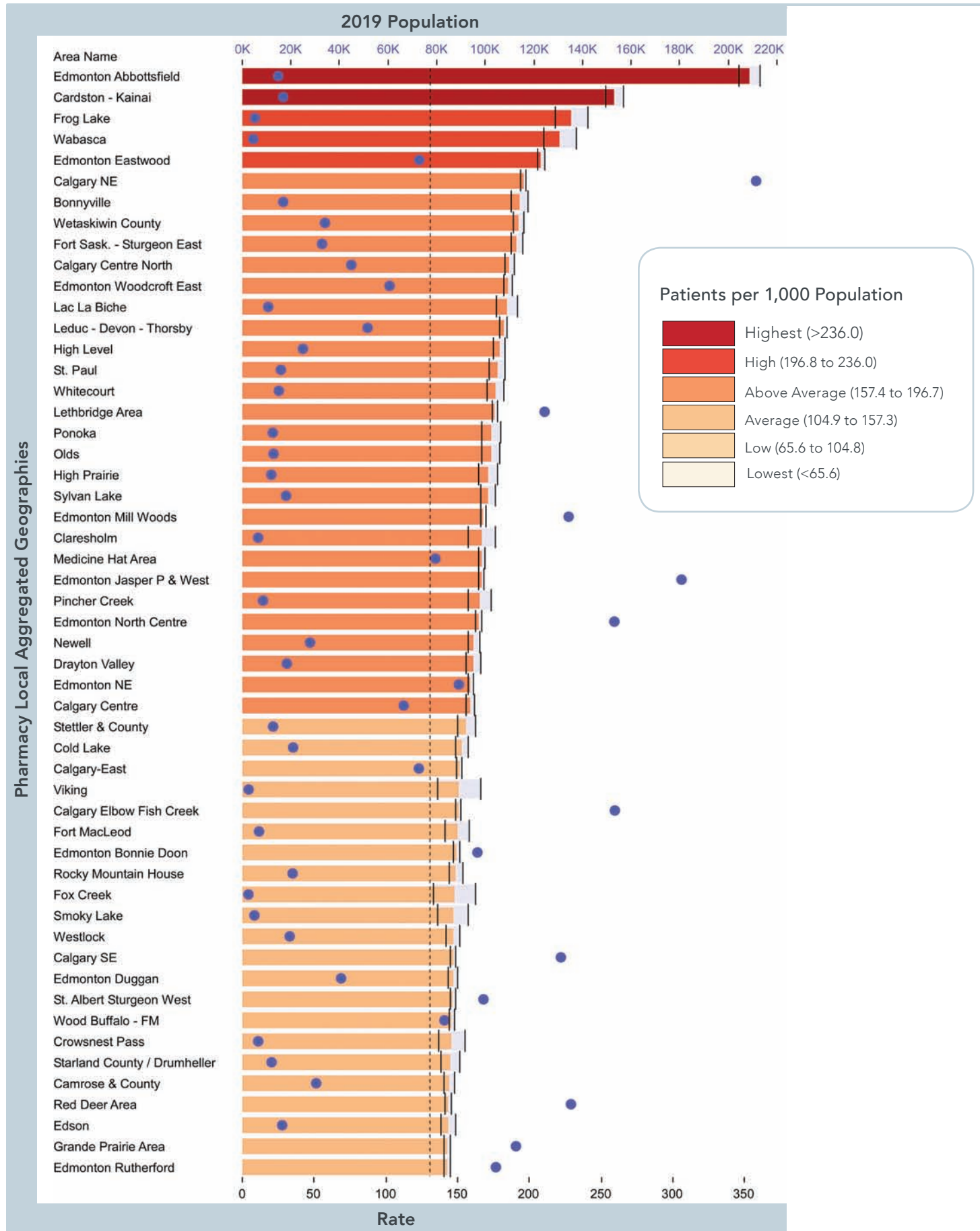


Figure 28b. Age and Sex Standardized, Opioid Patients per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.

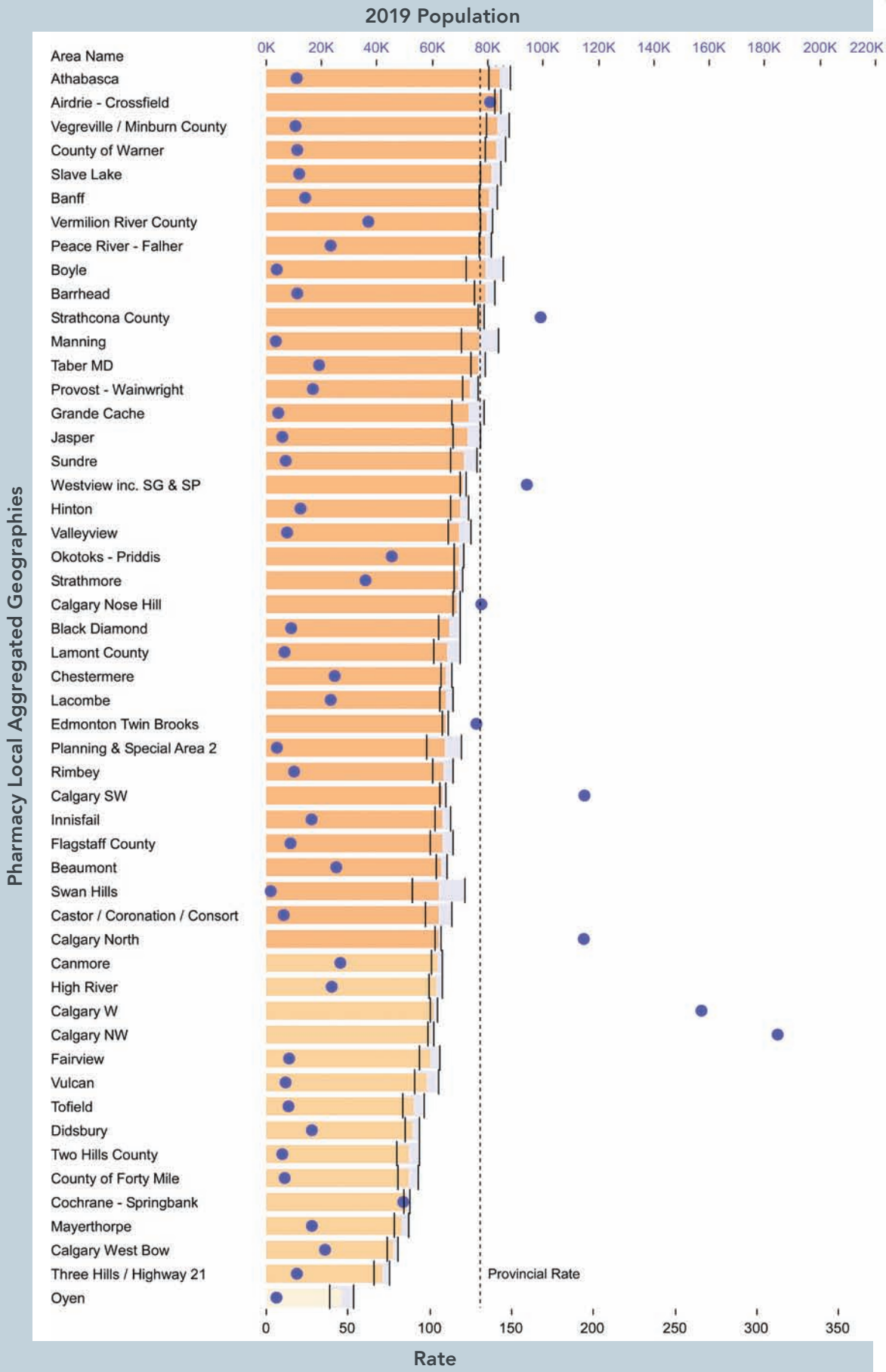
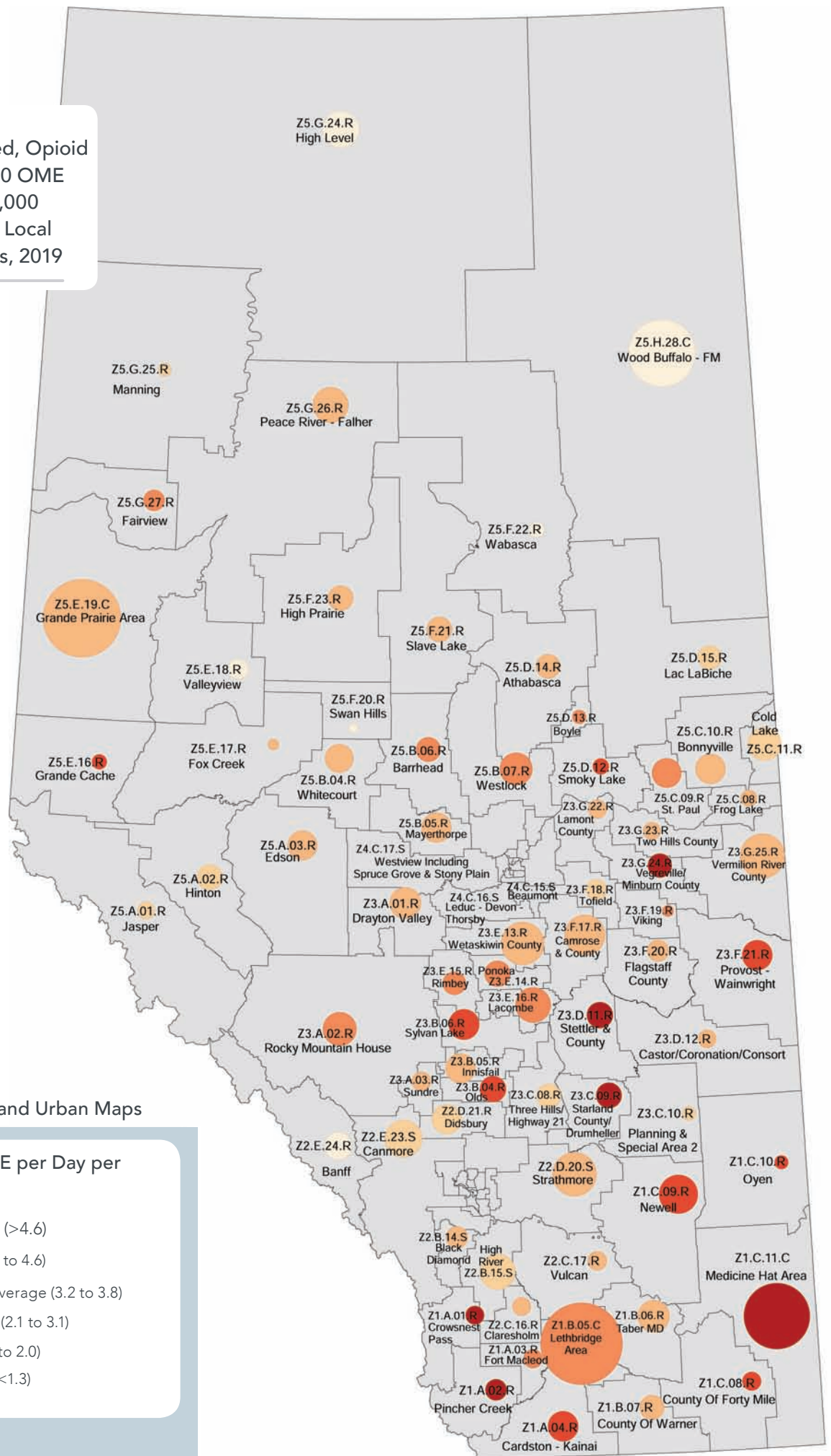


Figure 29a.  
 Age and Sex Standardized, Opioid  
 Patients Who Received 90 OME  
 or Greater per Day per 1,000  
 Population, by Pharmacy Local  
 Aggregated Geographies, 2019

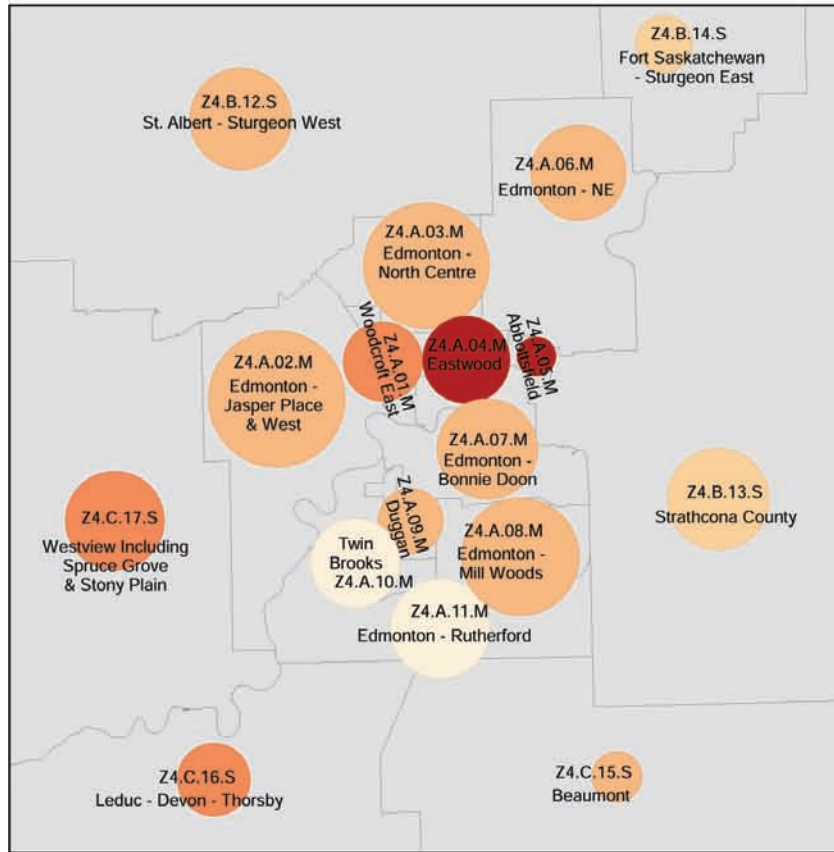


Legend: Provincial and Urban Maps

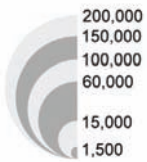
Patients  $\geq 90$  OME per Day per  
 1,000 Population

- Highest (>4.6)
- High (3.9 to 4.6)
- Above Average (3.2 to 3.8)
- Average (2.1 to 3.1)
- Low (1.3 to 2.0)
- Lowest (<1.3)

Edmonton



Population



Calgary

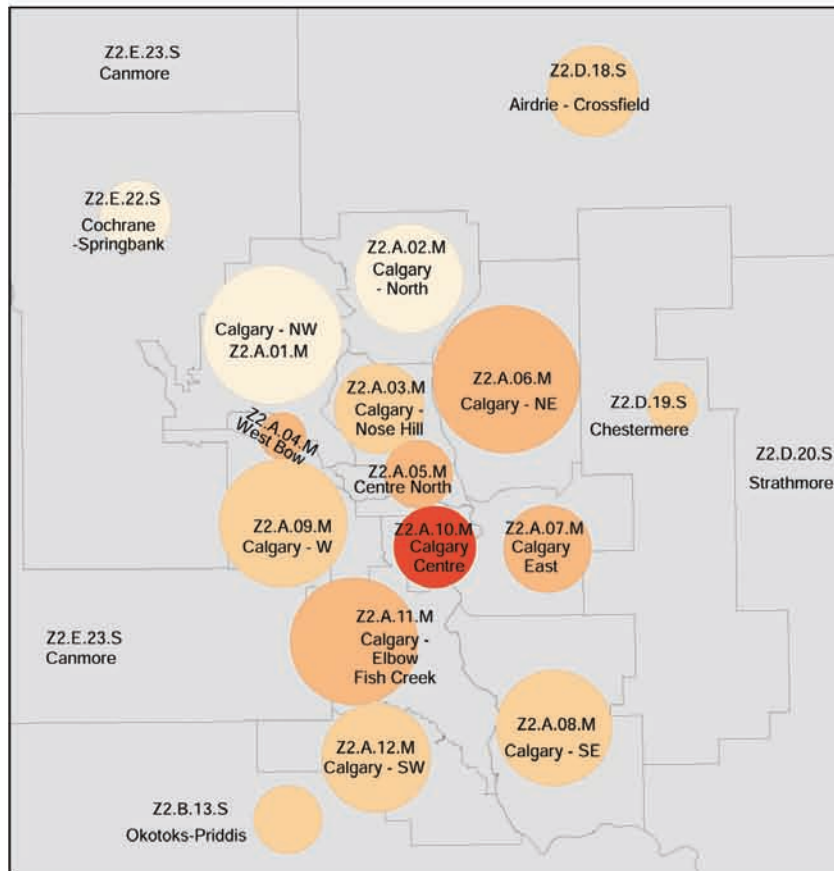
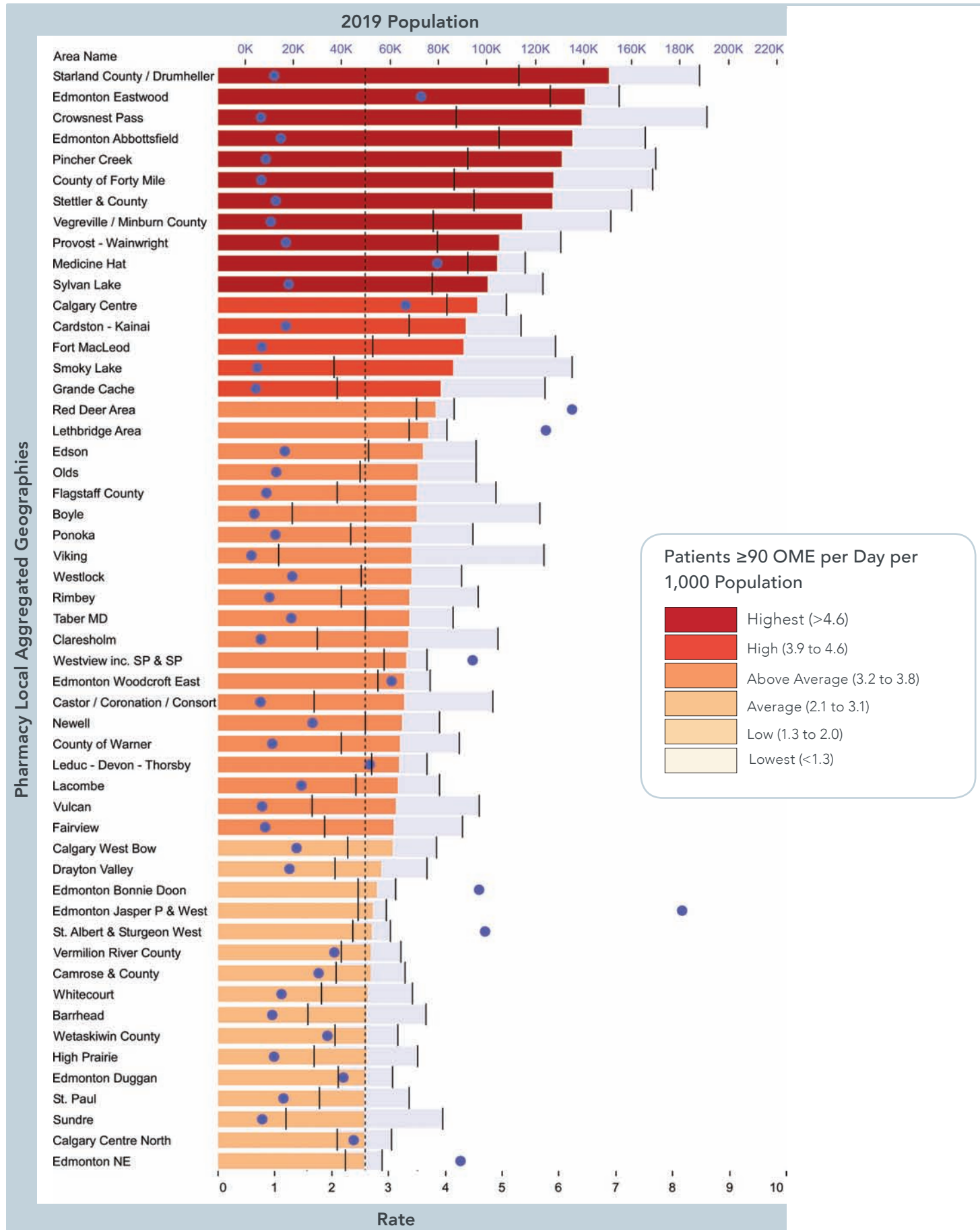
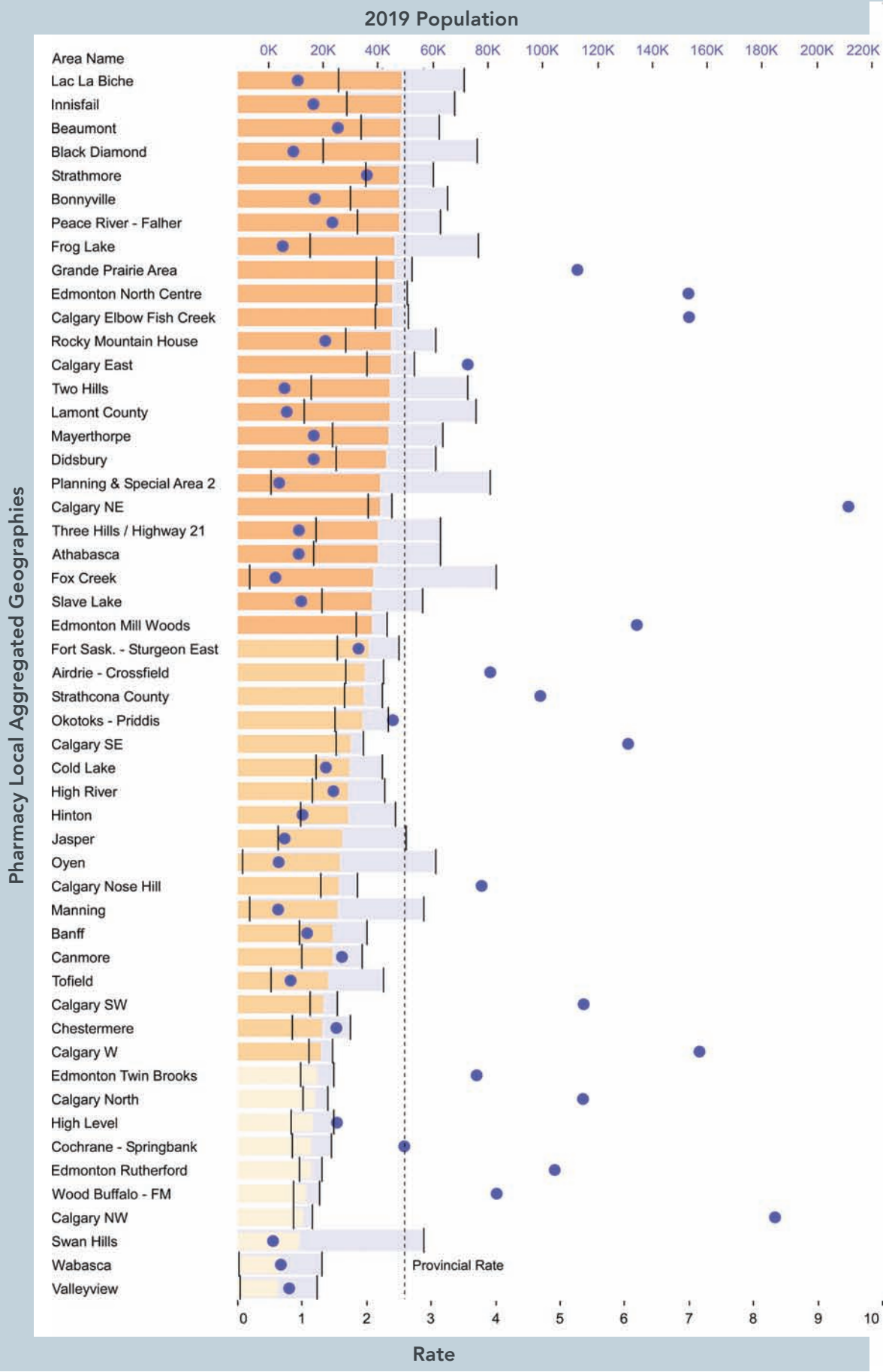


Figure 29b. Age and Sex Standardized, Opioid Patients Who Received 90 OME or Greater per Day per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.

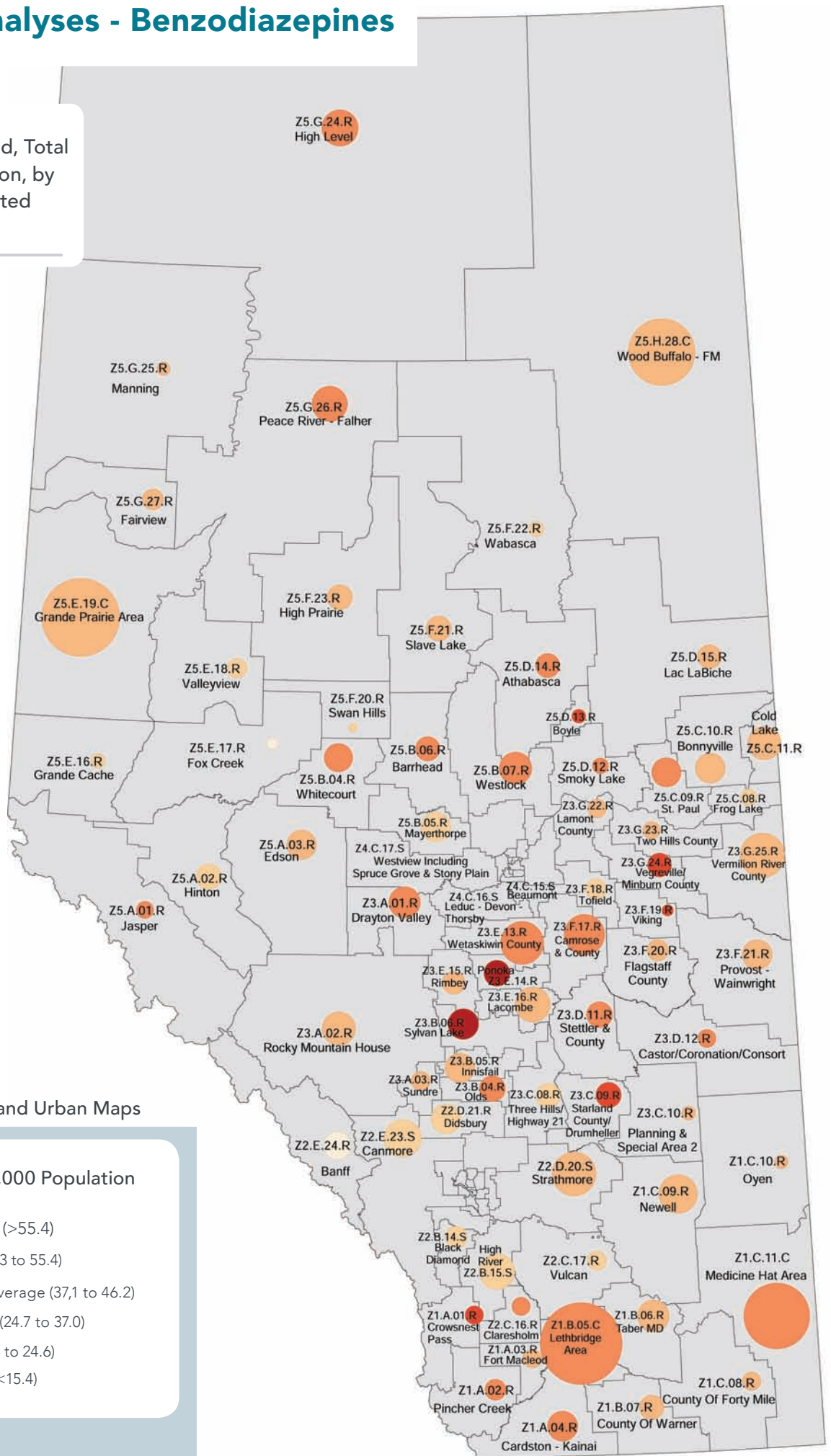


Pharmacy Local Aggregated Geographies

# Geographic Analyses - Benzodiazepines

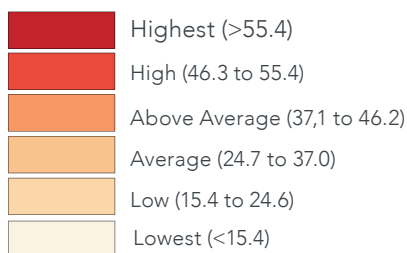
Figure 30a.

Age and Sex Standardized, Total DDDs per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019

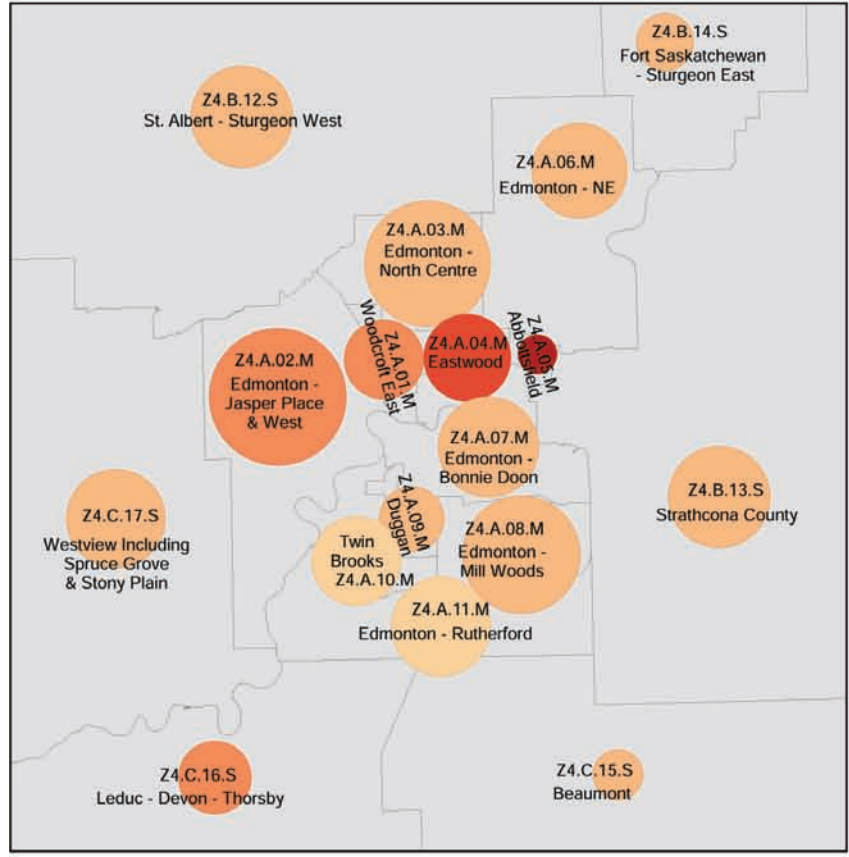


Legend: Provincial and Urban Maps

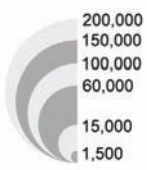
Total DDDs per 1,000 Population



Edmonton



Population



Calgary

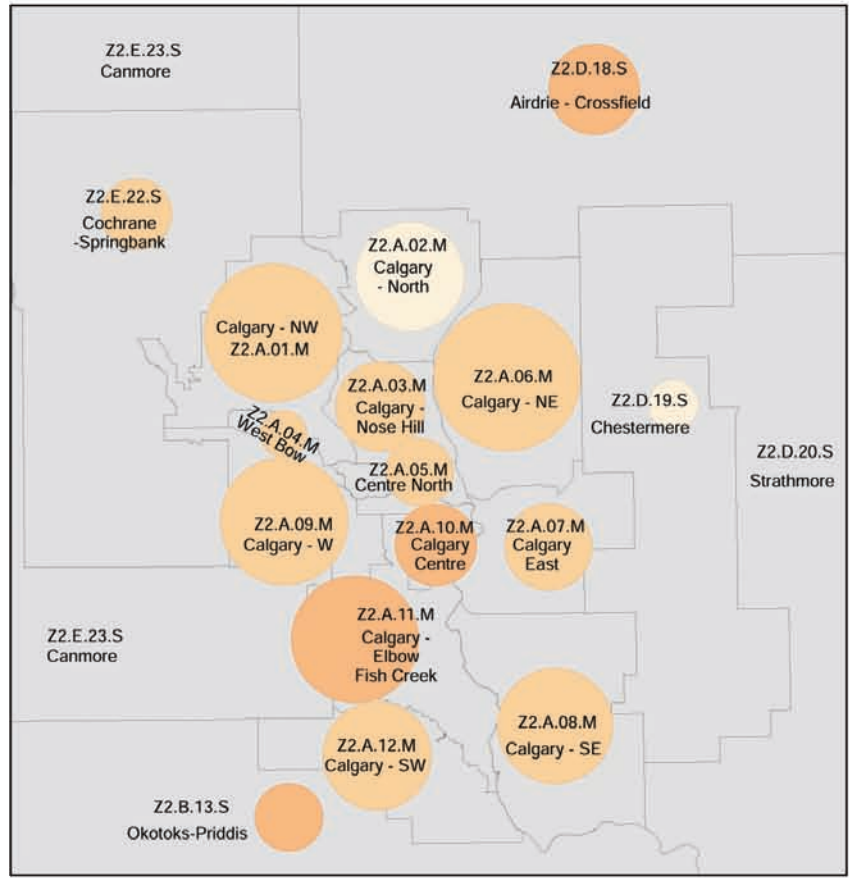
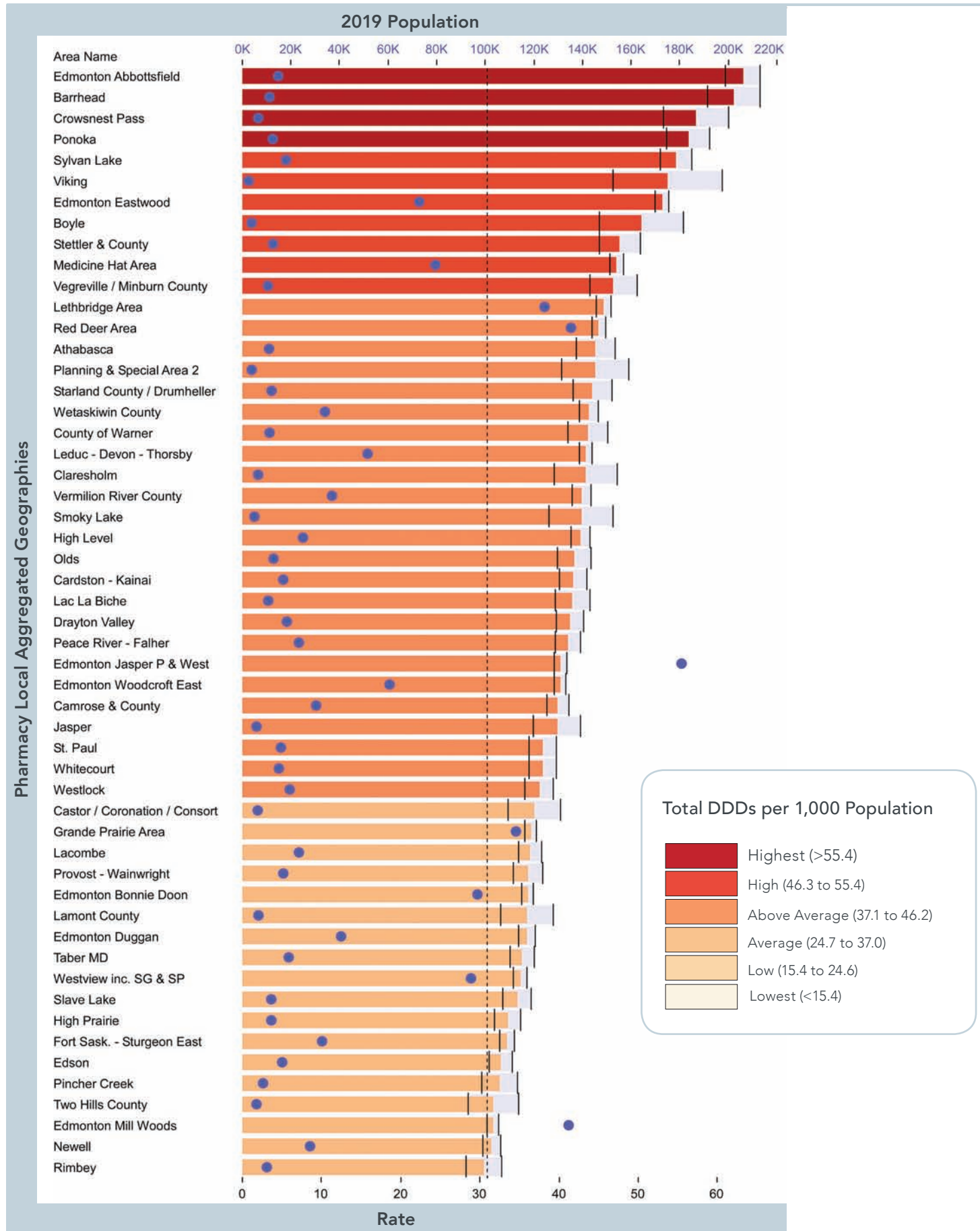
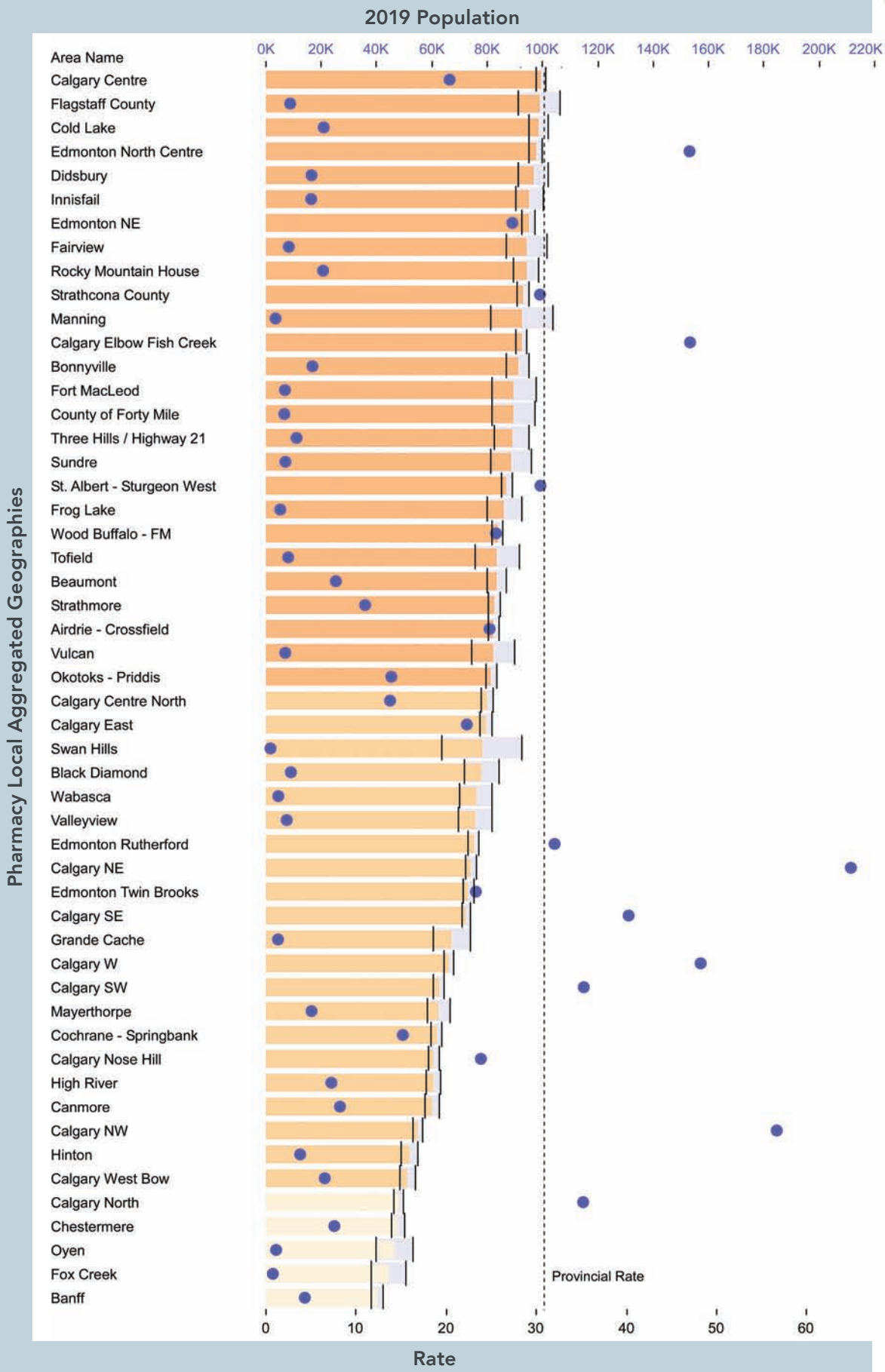


Figure 30b. Age and Sex Standardized, Total DDDs per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019



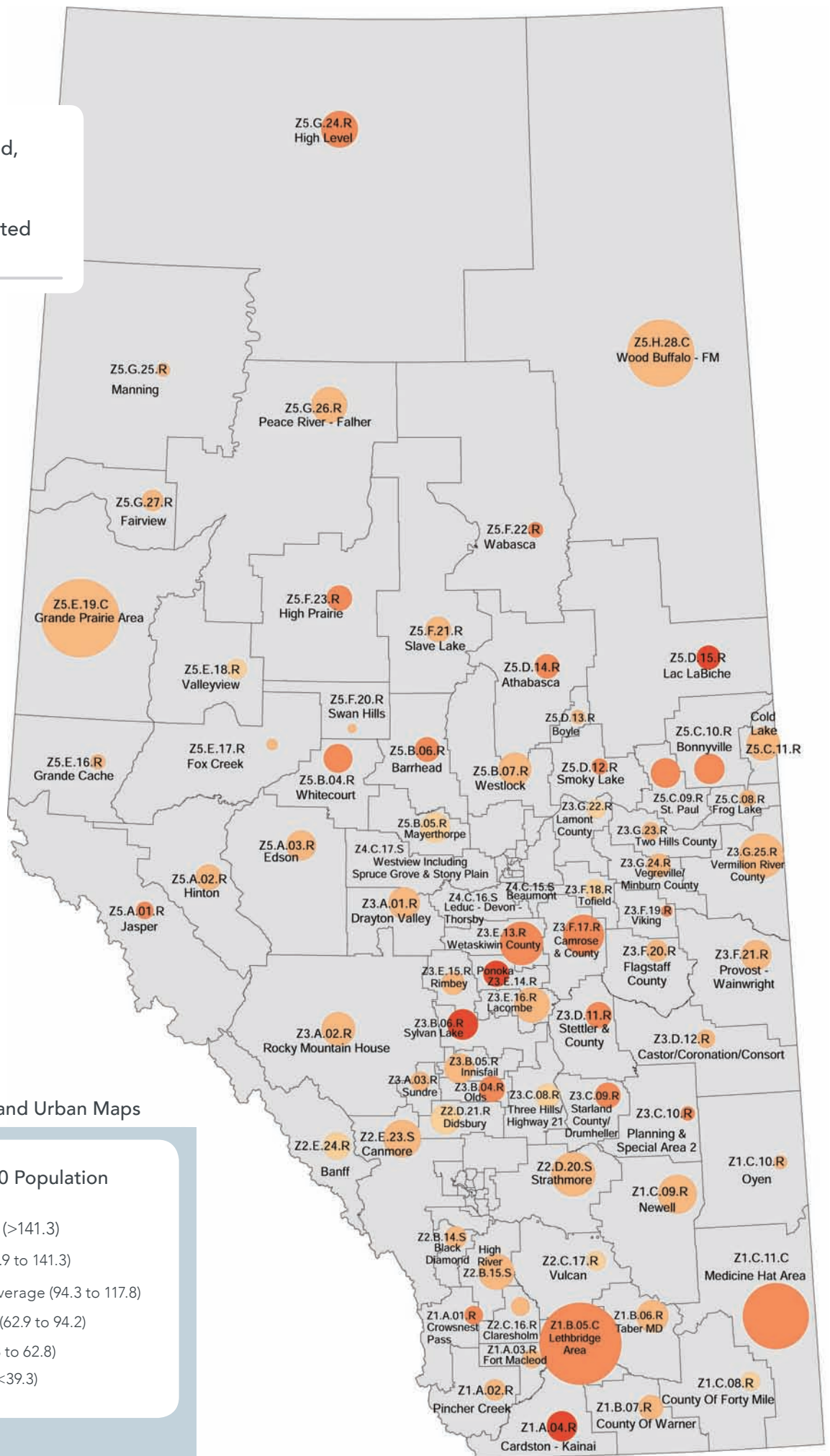


Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.



Pharmacy Local Aggregated Geographies

Figure 31a.  
 Age and Sex Standardized,  
 Benzodiazepine Patients  
 per 1,000 Population, by  
 Pharmacy Local Aggregated  
 Geographies, 2019

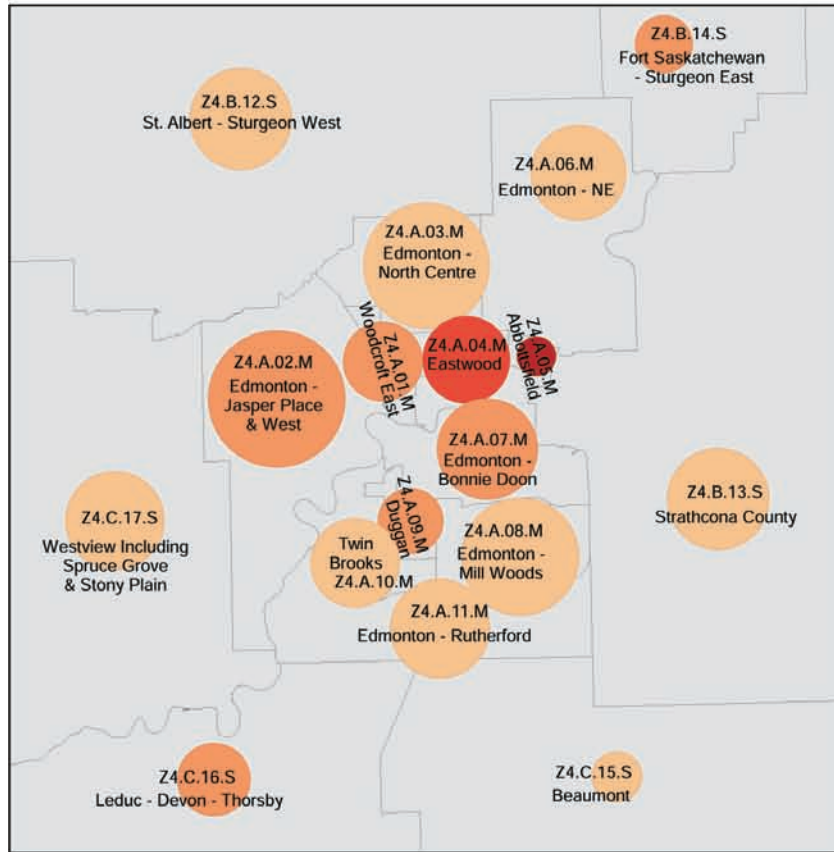


Legend: Provincial and Urban Maps

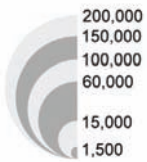
Patients per 1,000 Population

Dark Red	Highest (>141.3)
Red	High (117.9 to 141.3)
Orange	Above Average (94.3 to 117.8)
Light Orange	Average (62.9 to 94.2)
Yellow-Orange	Low (39.3 to 62.8)
Yellow	Lowest (<39.3)

Edmonton



Population



Calgary

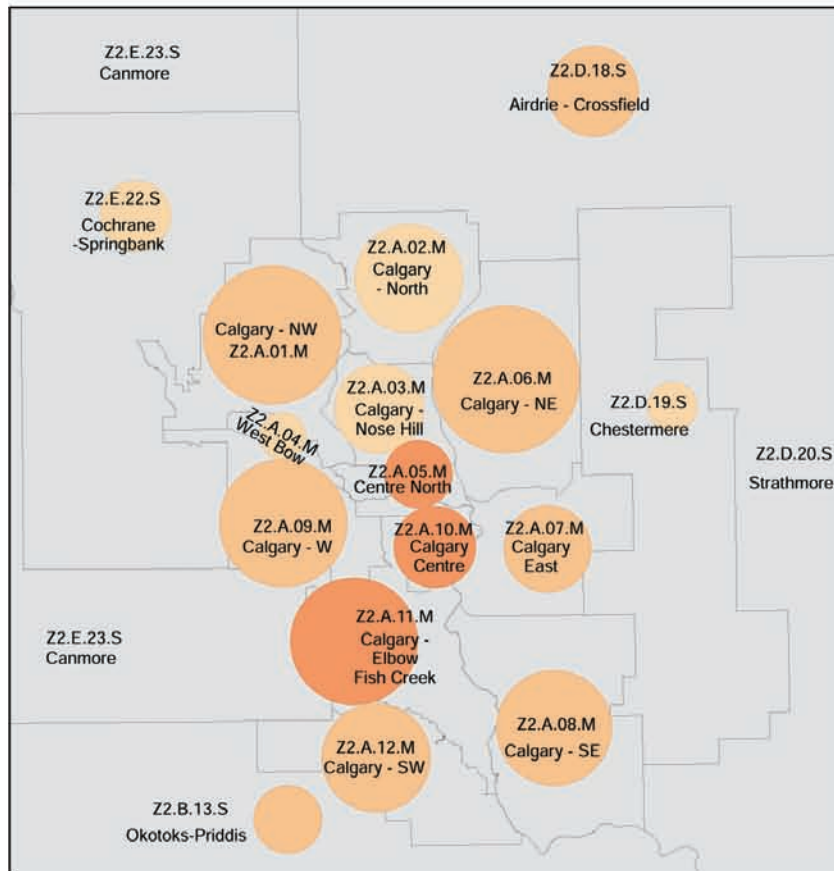
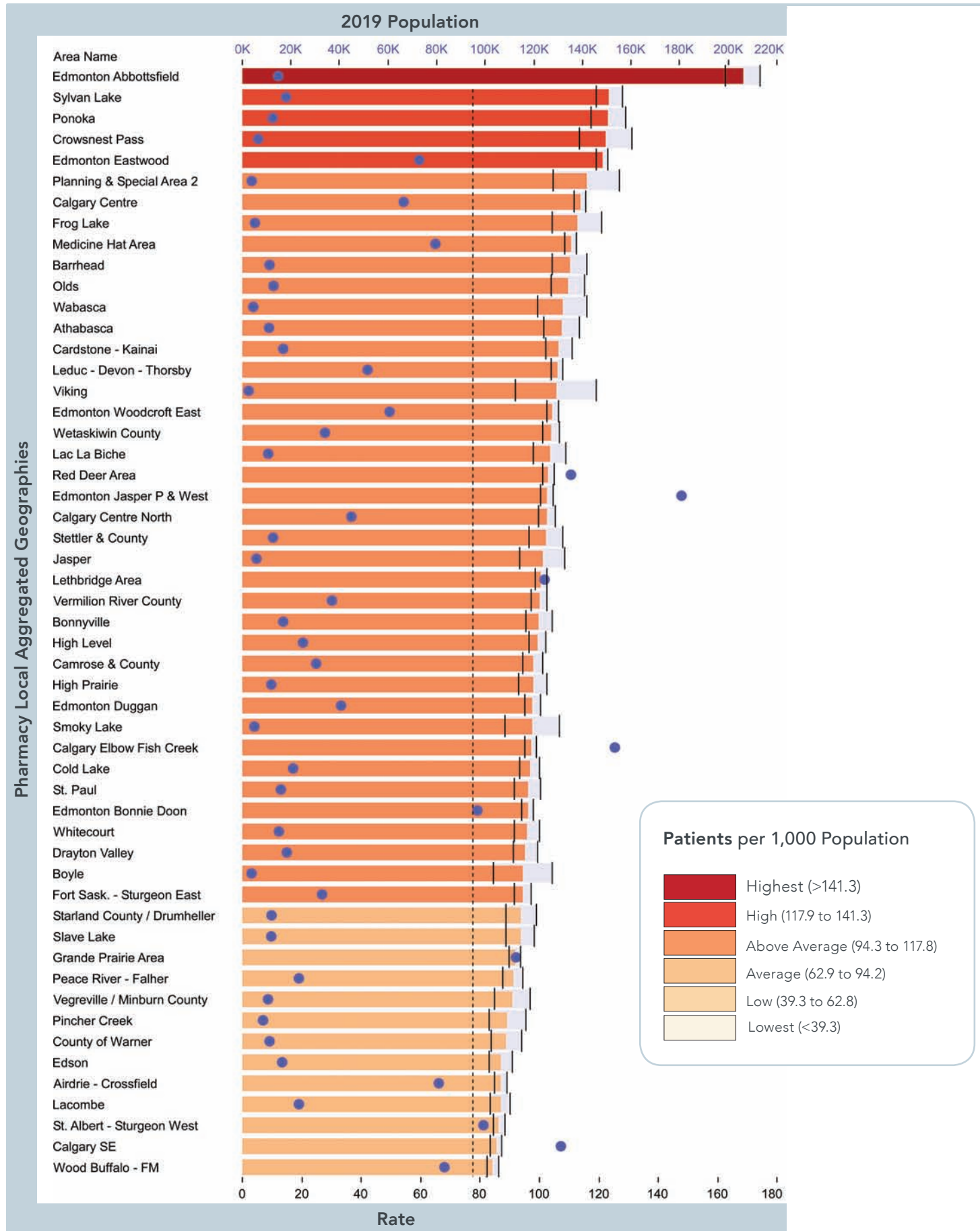
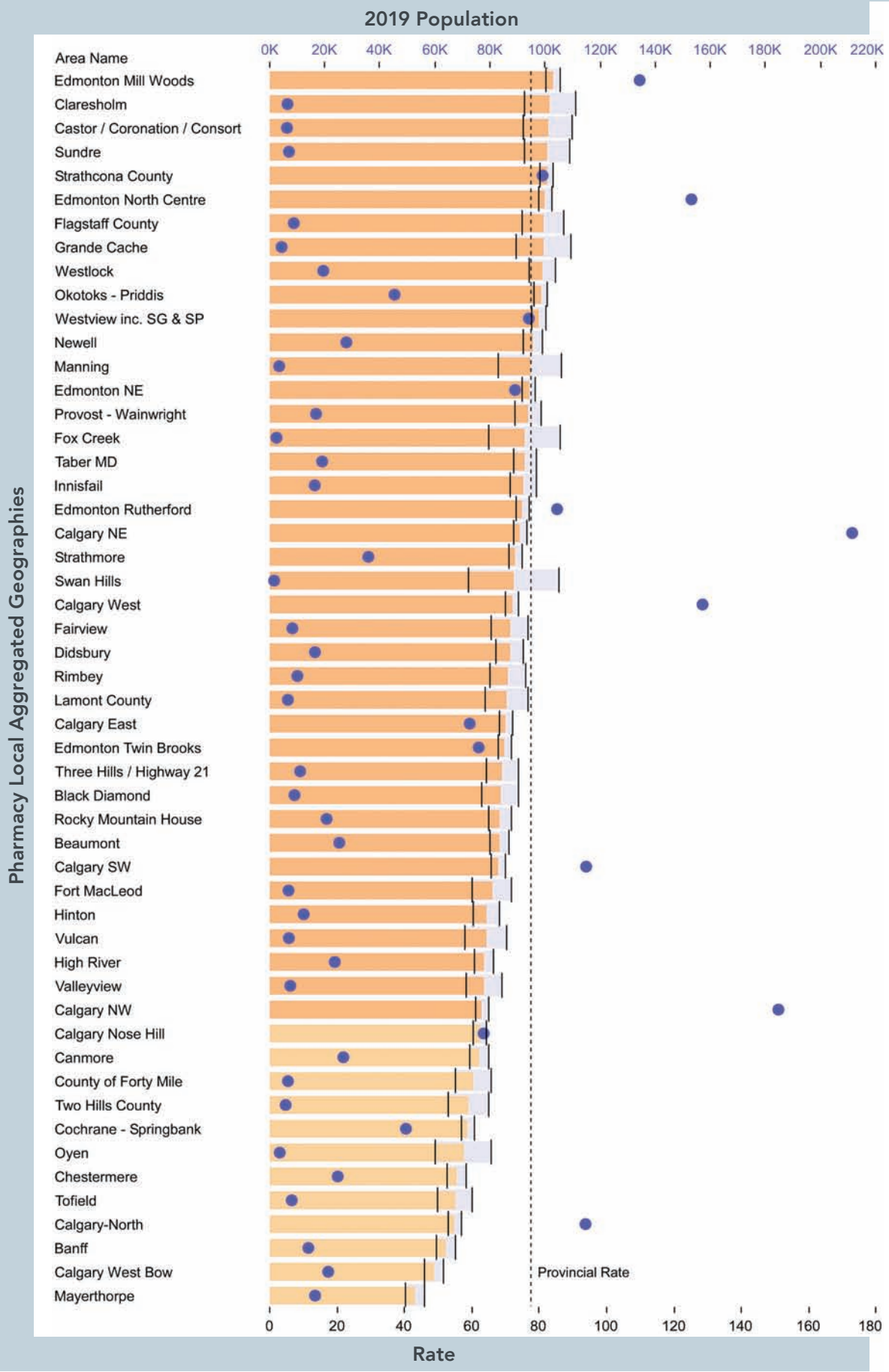


Figure 31b. Age and Sex Standardized, Benzodiazepine Patients per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019



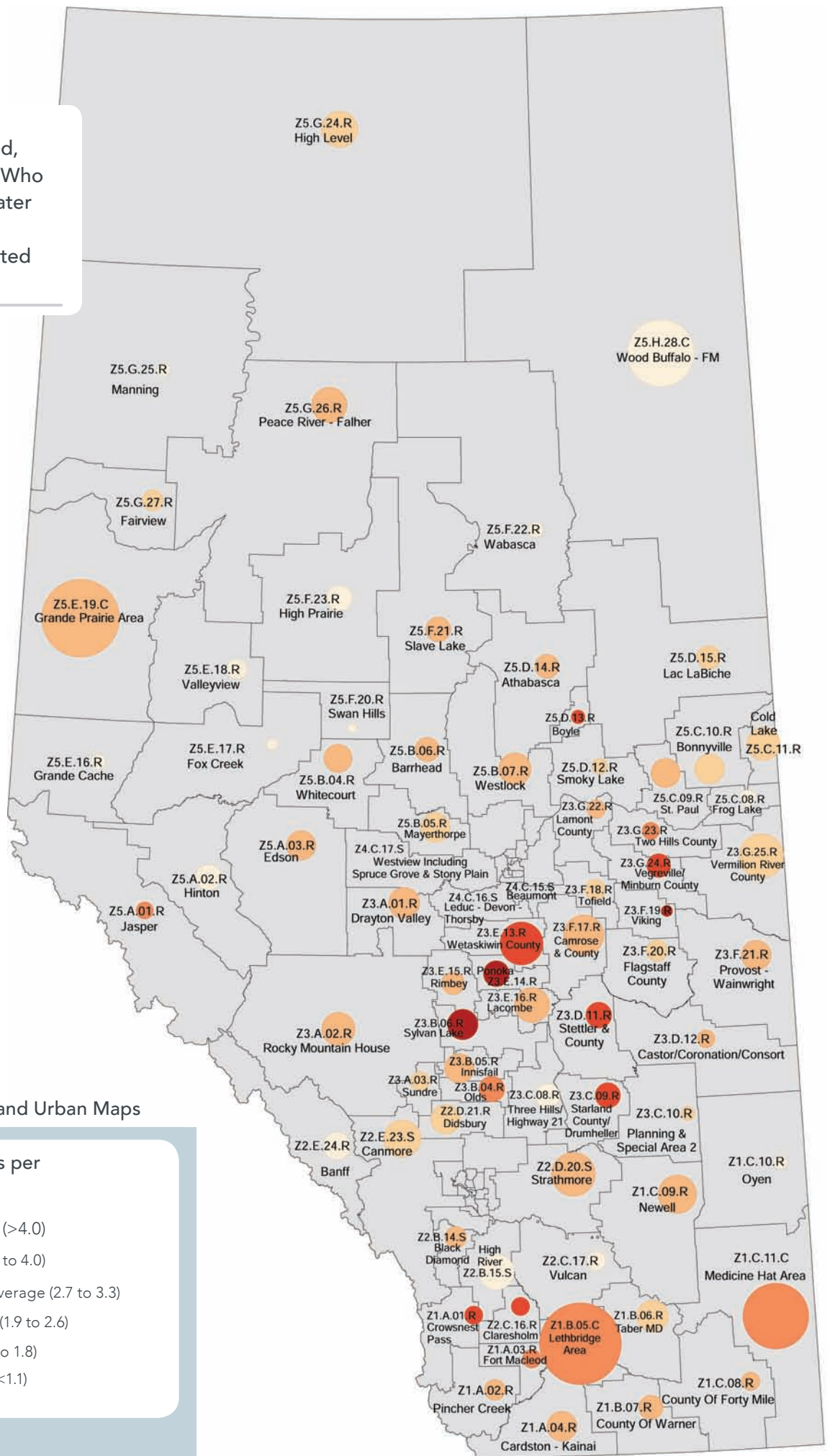


Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.



Pharmacy Local Aggregated Geographies

Figure 32a.  
 Age and Sex Standardized,  
 Benzodiazepine Patients Who  
 Received 2 DDDs or Greater  
 per 1,000 population, by  
 Pharmacy Local Aggregated  
 Geographies, 2019

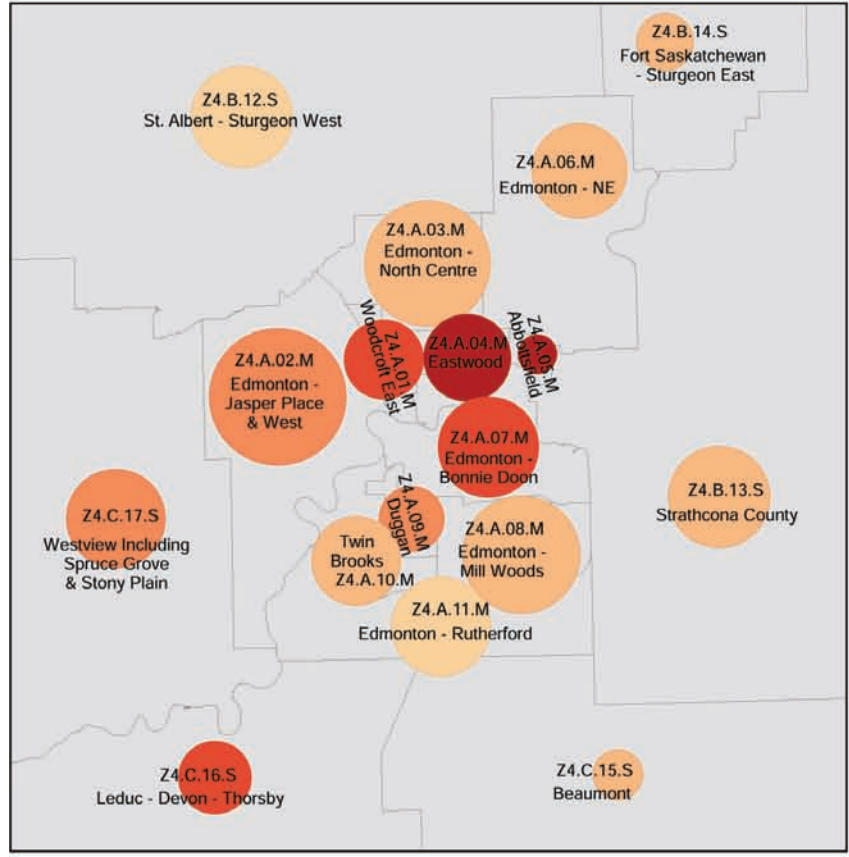


Legend: Provincial and Urban Maps

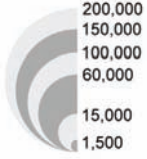
Patients  $\geq 2$  DDDs per 1,000 Population

<span style="display:inline-block; width:15px; height:15px; background-color:#800000;"></span>	Highest (>4.0)
<span style="display:inline-block; width:15px; height:15px; background-color:#D9534F;"></span>	High (3.4 to 4.0)
<span style="display:inline-block; width:15px; height:15px; background-color:#E69A00;"></span>	Above Average (2.7 to 3.3)
<span style="display:inline-block; width:15px; height:15px; background-color:#F4C400;"></span>	Average (1.9 to 2.6)
<span style="display:inline-block; width:15px; height:15px; background-color:#F9E79F;"></span>	Low (1.1 to 1.8)
<span style="display:inline-block; width:15px; height:15px; background-color:#FDE08C;"></span>	Lowest (<1.1)

Edmonton



Population



Calgary

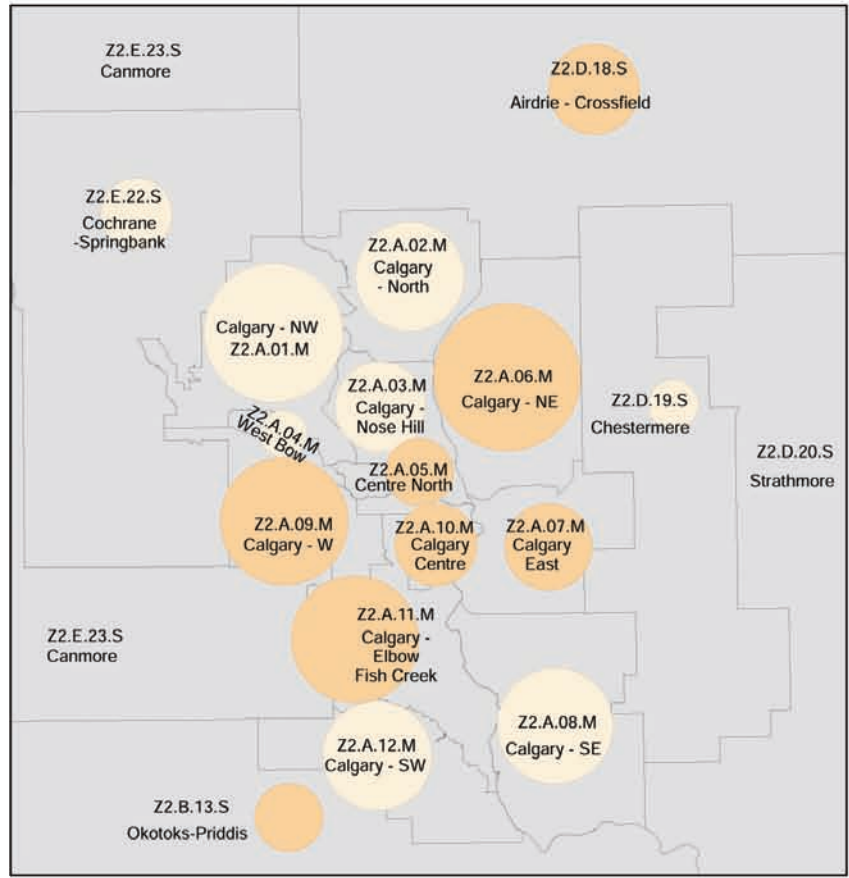
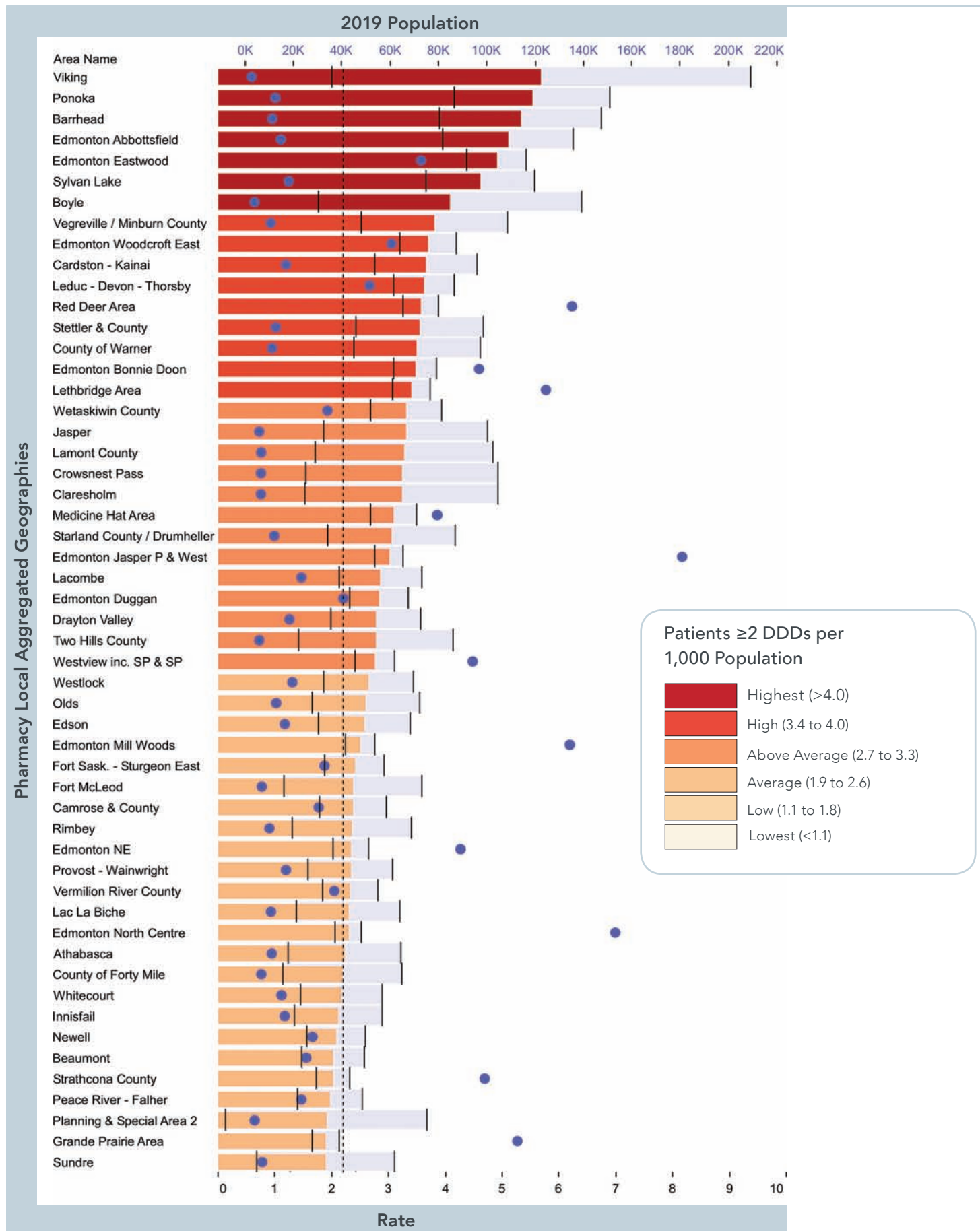
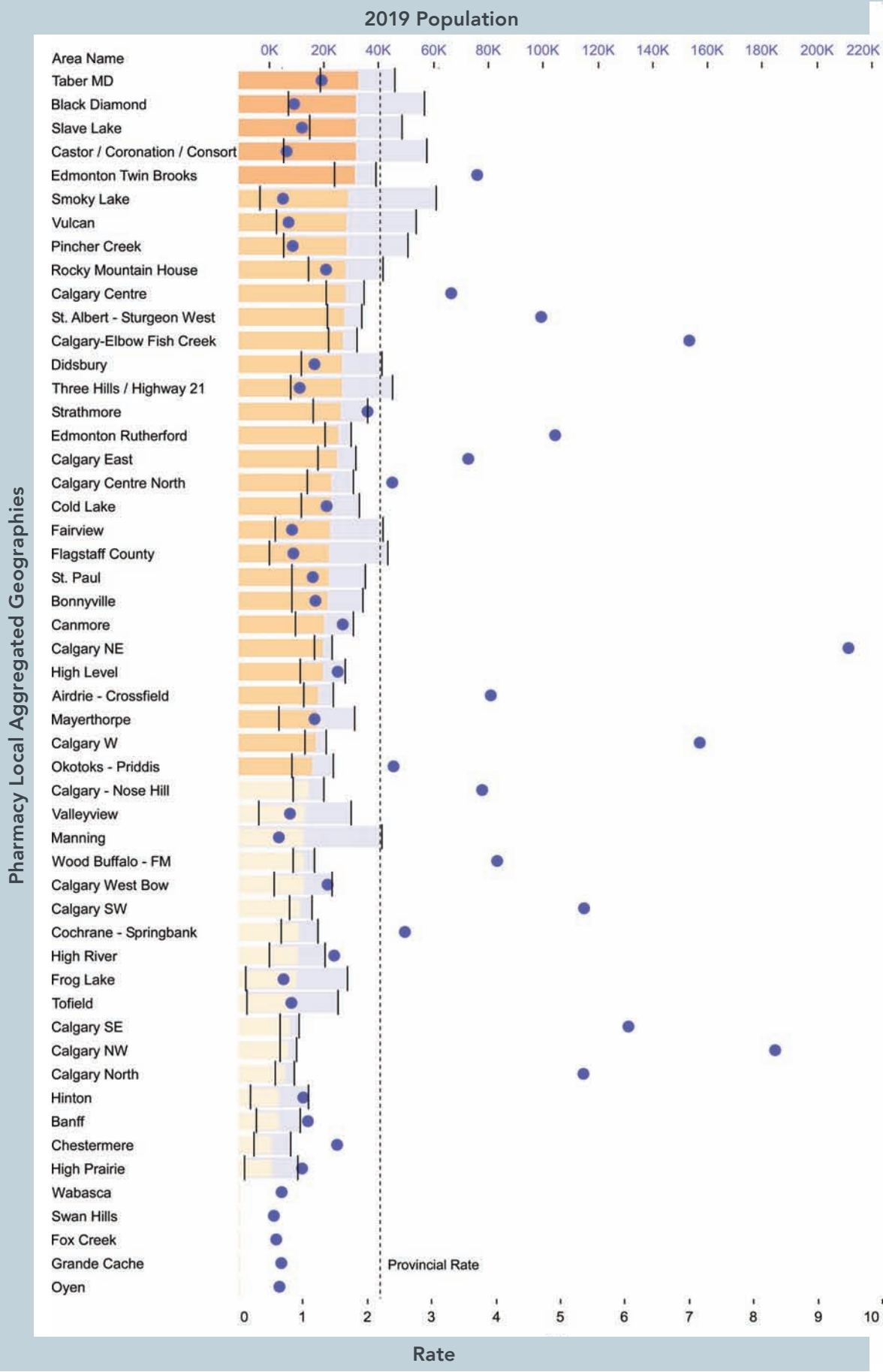


Figure 32b. Age and Sex Standardized, Benzodiazepine Patients Who Received 2 DDDs or Greater per 1,000 population, by Pharmacy Local Aggregated Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.

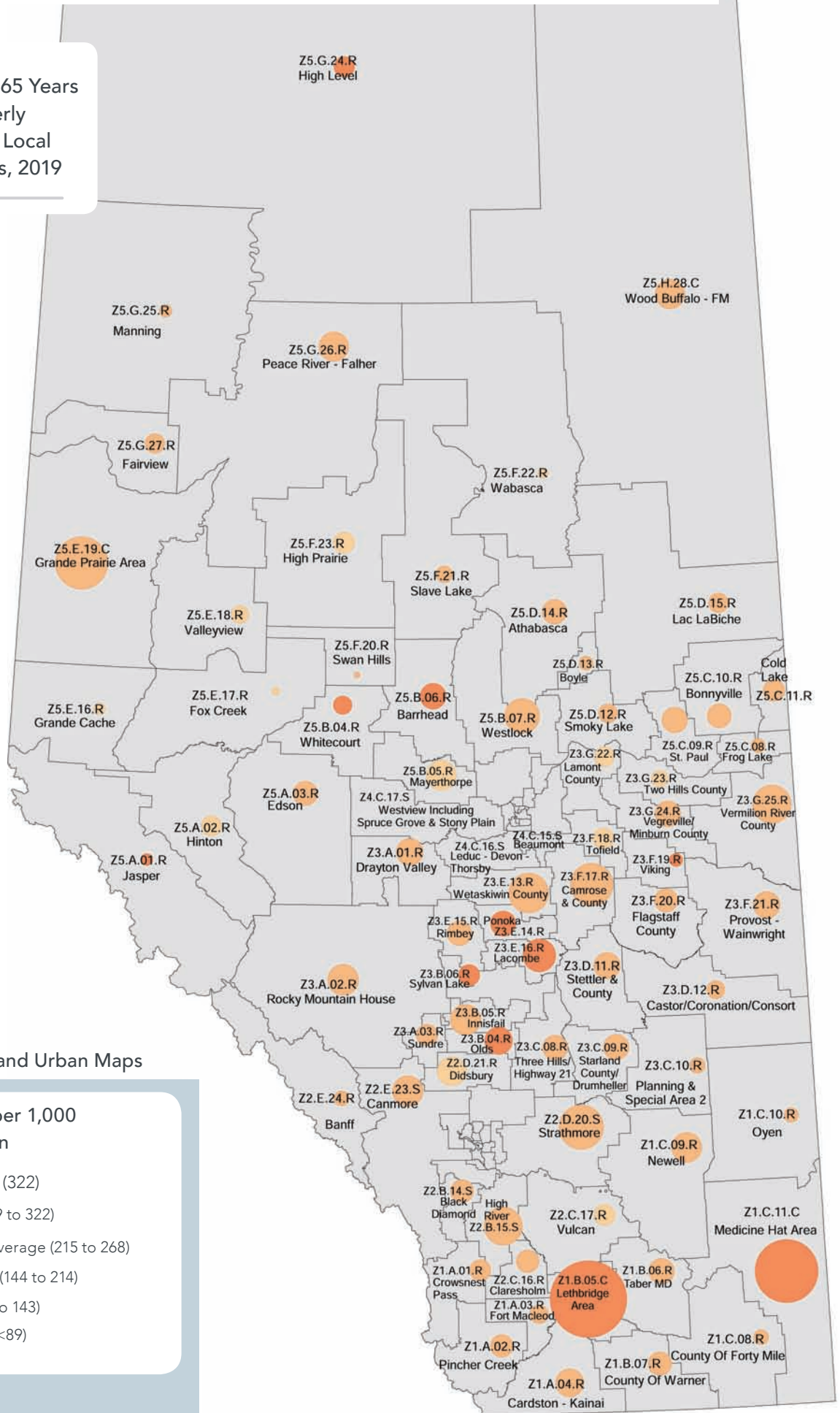


Pharmacy Local Aggregated Geographies

# Geographic Analyses - Benzodiazepines in Elderly Patients

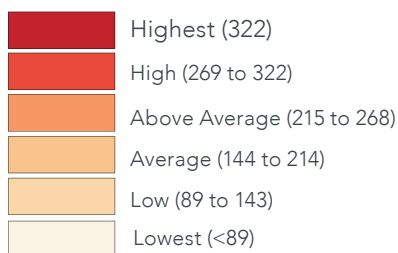
Figure 33a.

Benzodiazepine Patients 65 Years and Older per 1,000 Elderly Population, by Pharmacy Local Aggregated Geographies, 2019

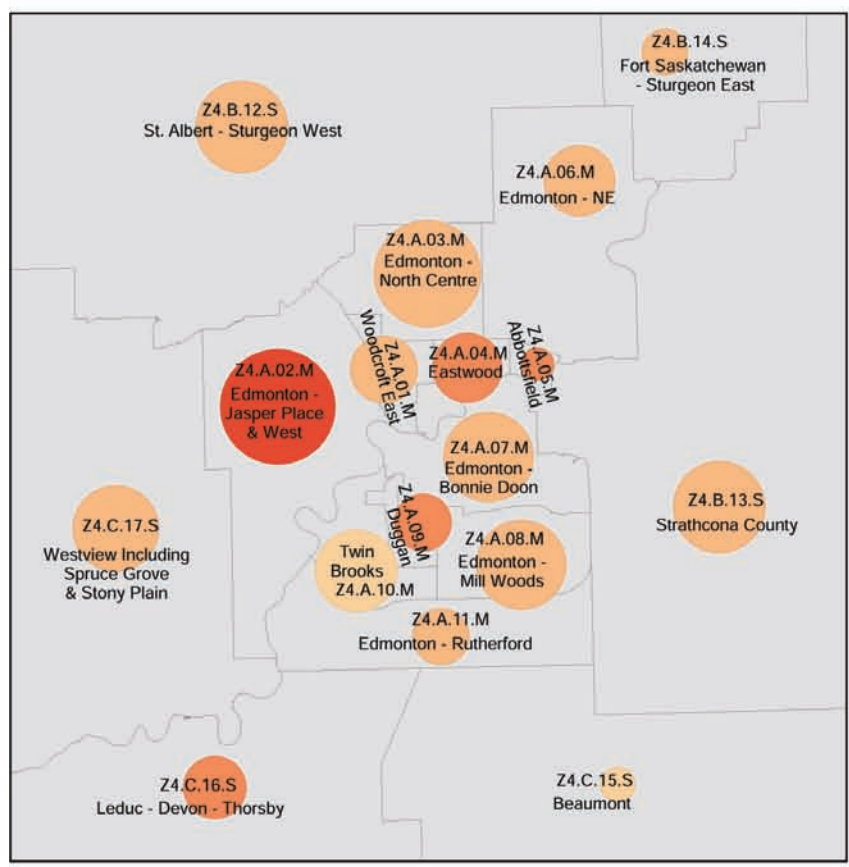


Legend: Provincial and Urban Maps

Elderly Patients per 1,000 Elderly Population



**Edmonton**



Elderly (65+) Population



**Calgary**

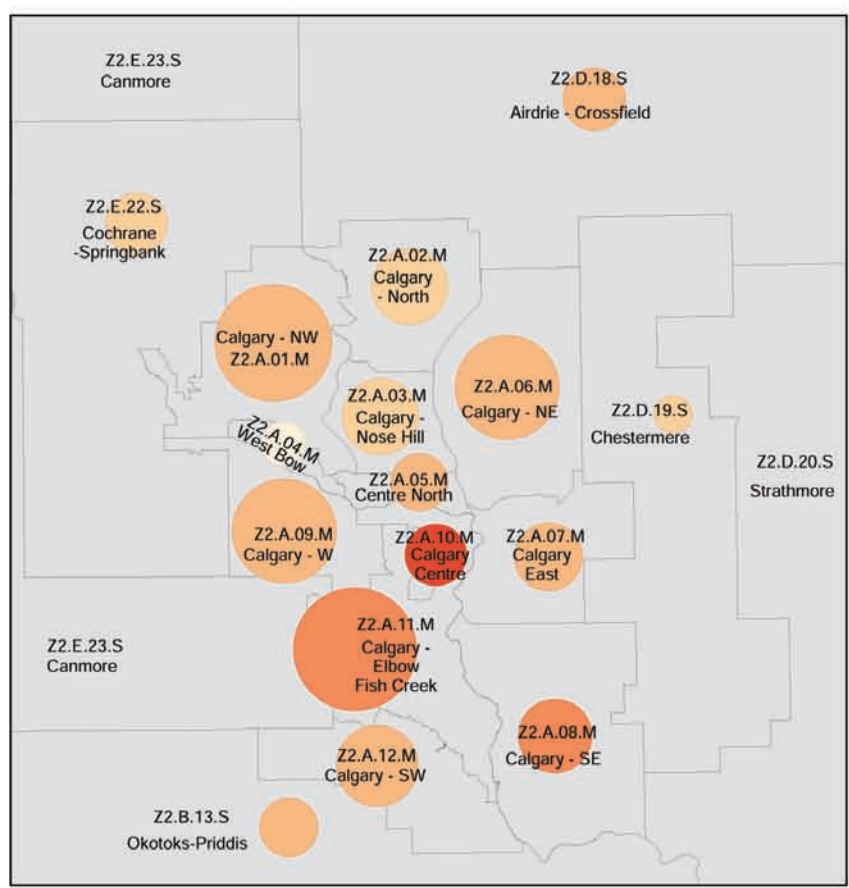
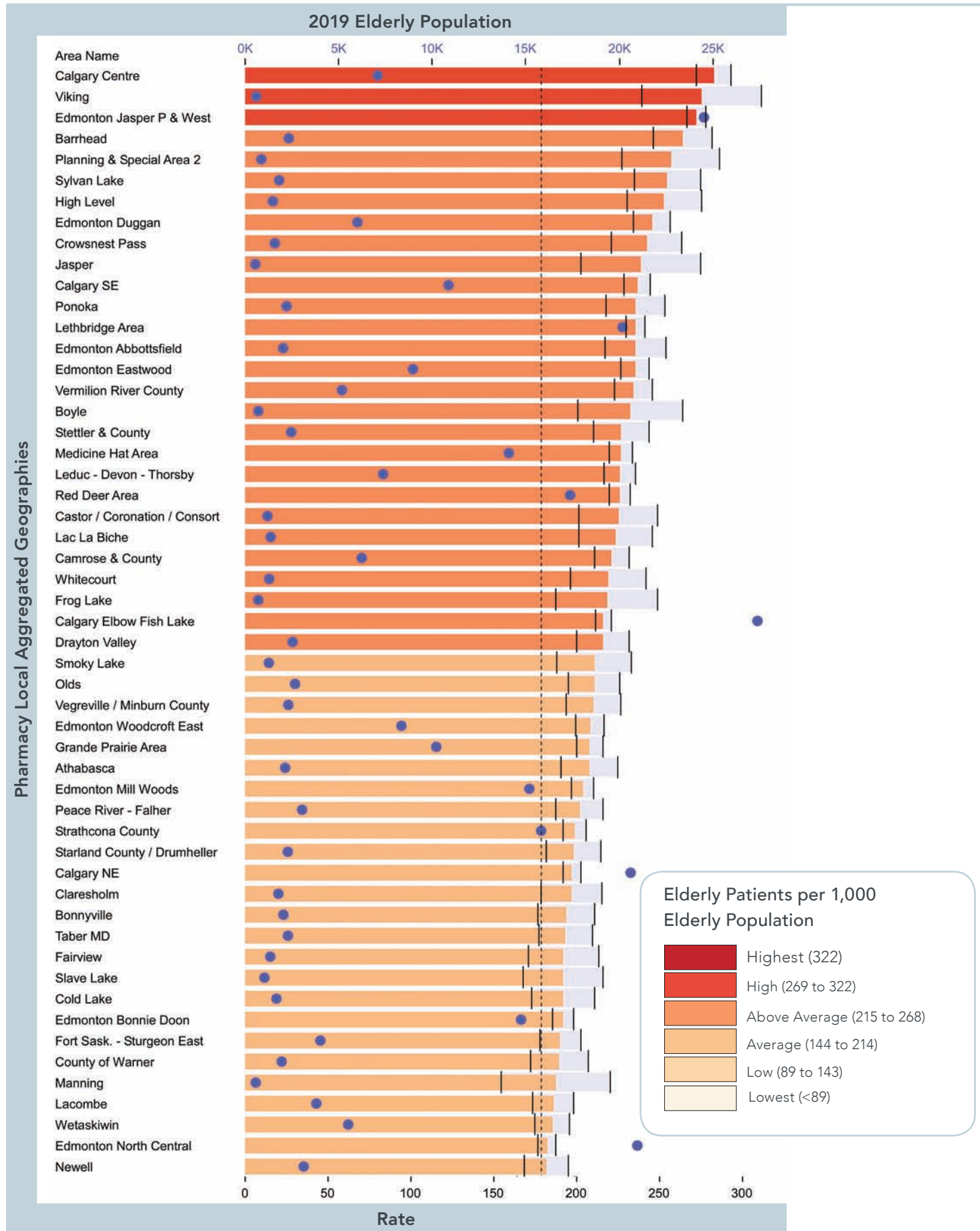


Figure 33b. Benzodiazepine Patients 65 Years and Older per 1,000 Elderly Population, by Pharmacy Local Aggregated Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.

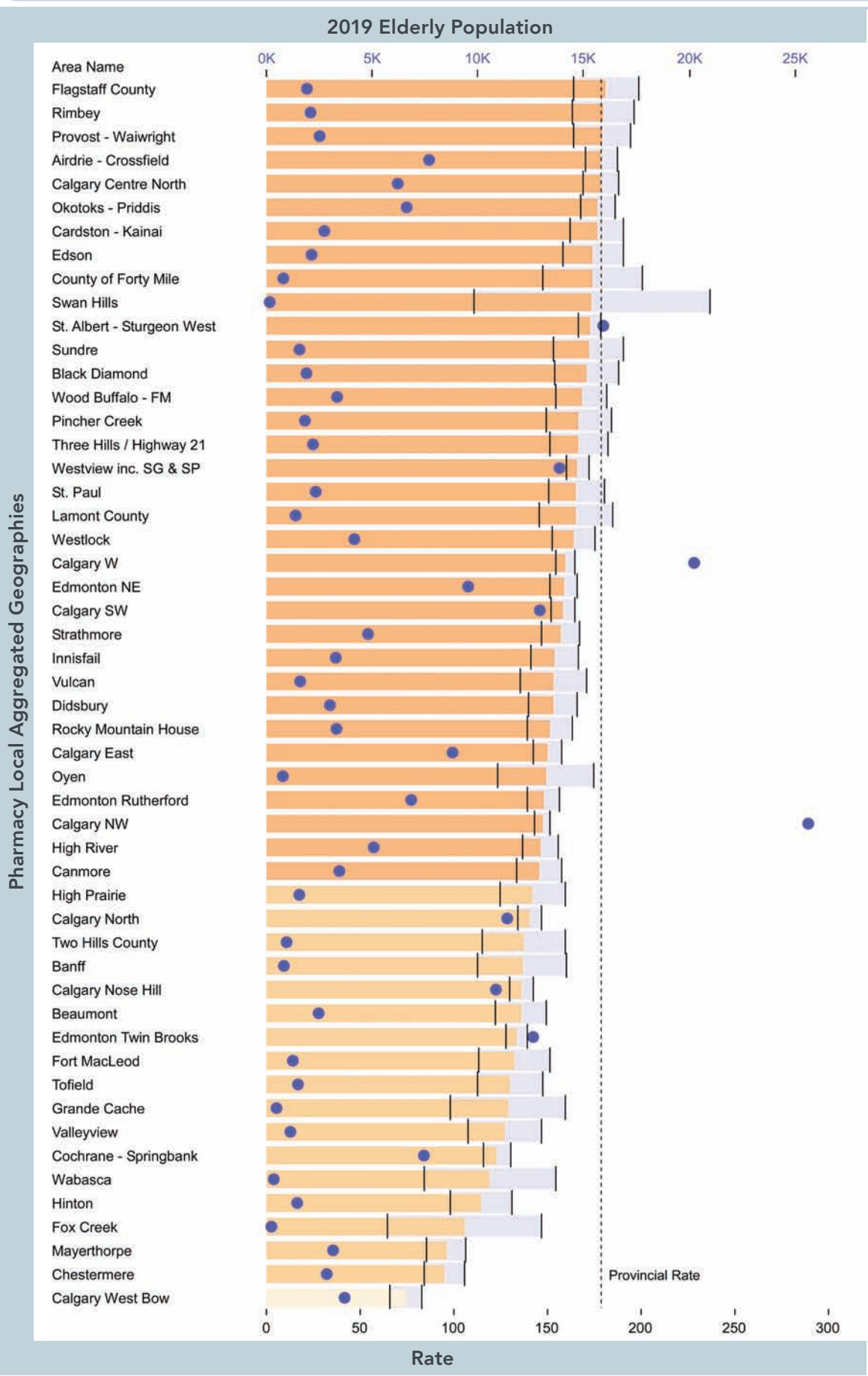
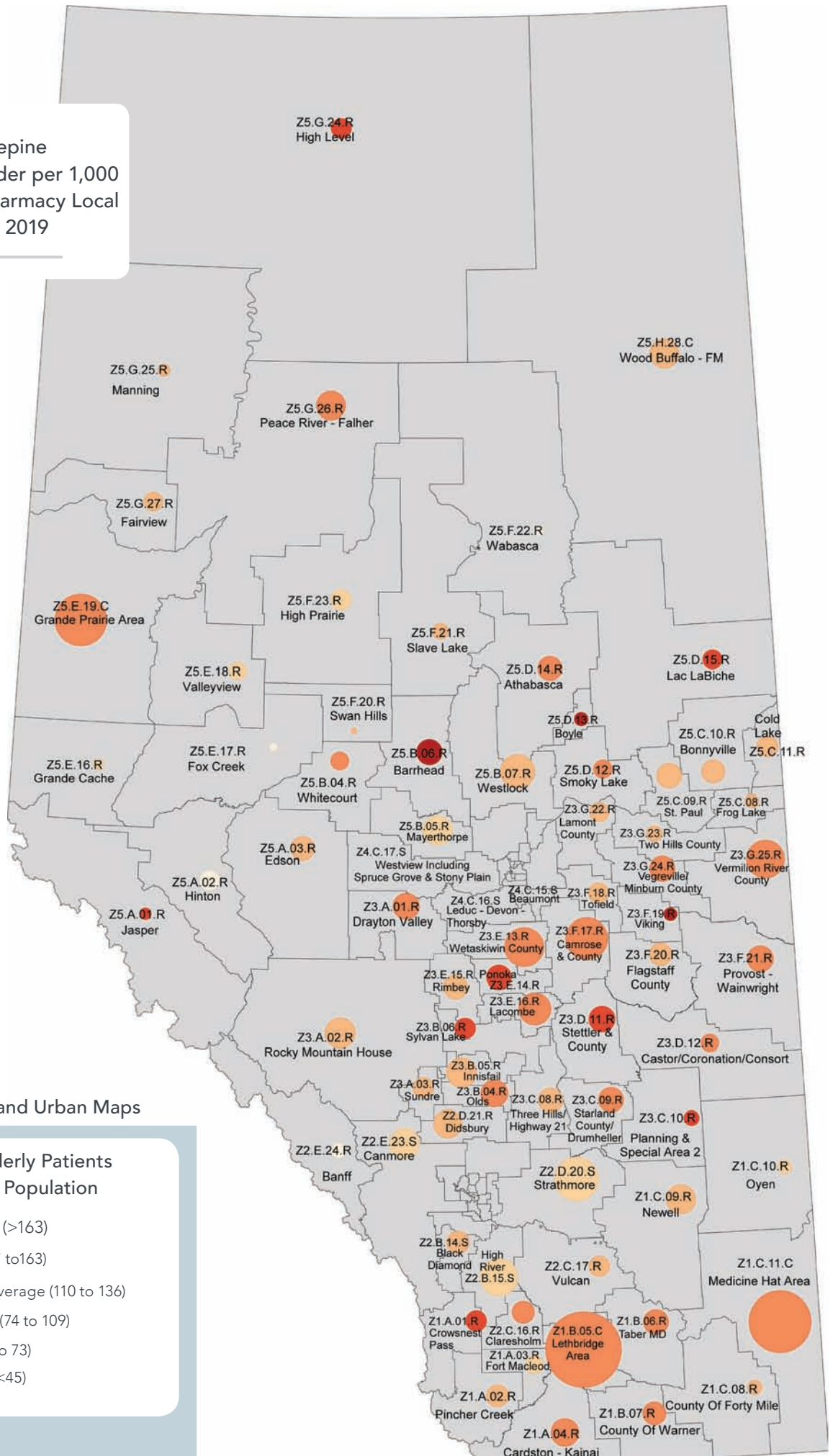
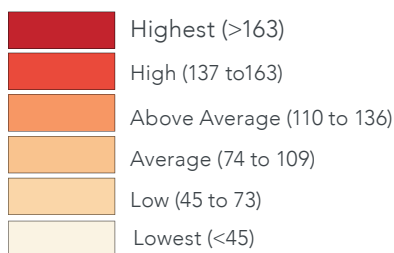


Figure 34a.  
 Total DDDs in Benzodiazepine  
 Patients 65 Years and Older per 1,000  
 Elderly Population, by Pharmacy Local  
 Aggregate Geographies, 2019

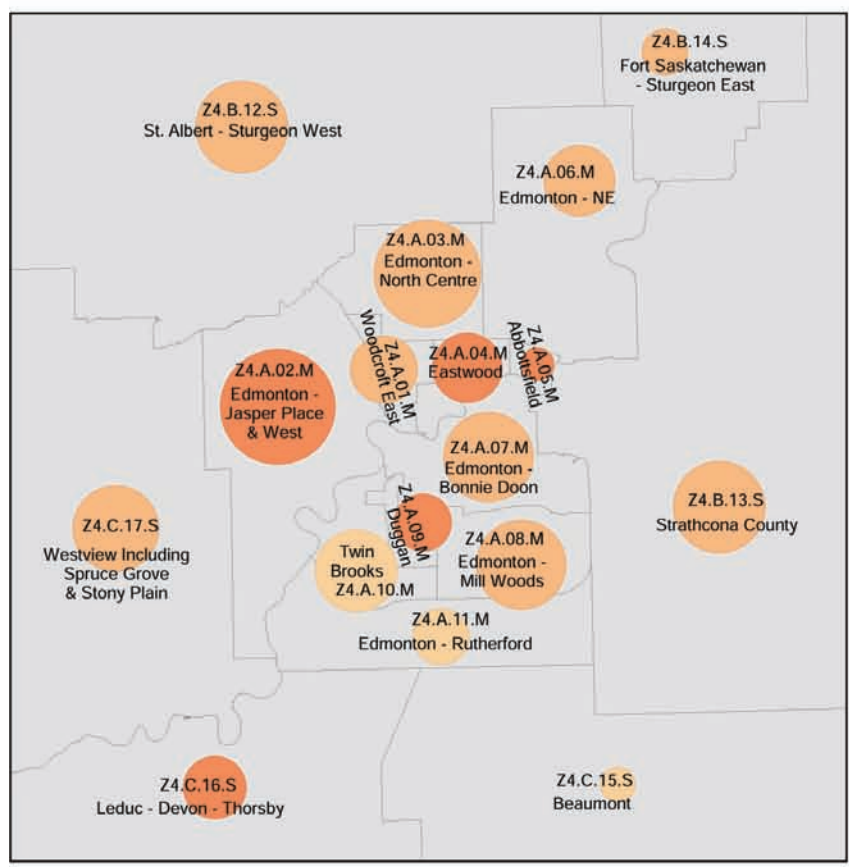


Legend: Provincial and Urban Maps

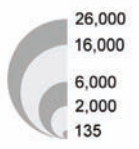
Total DDDs in Elderly Patients  
 per 1,000 Elderly Population



**Edmonton**



**Elderly (65+) Population**



**Calgary**

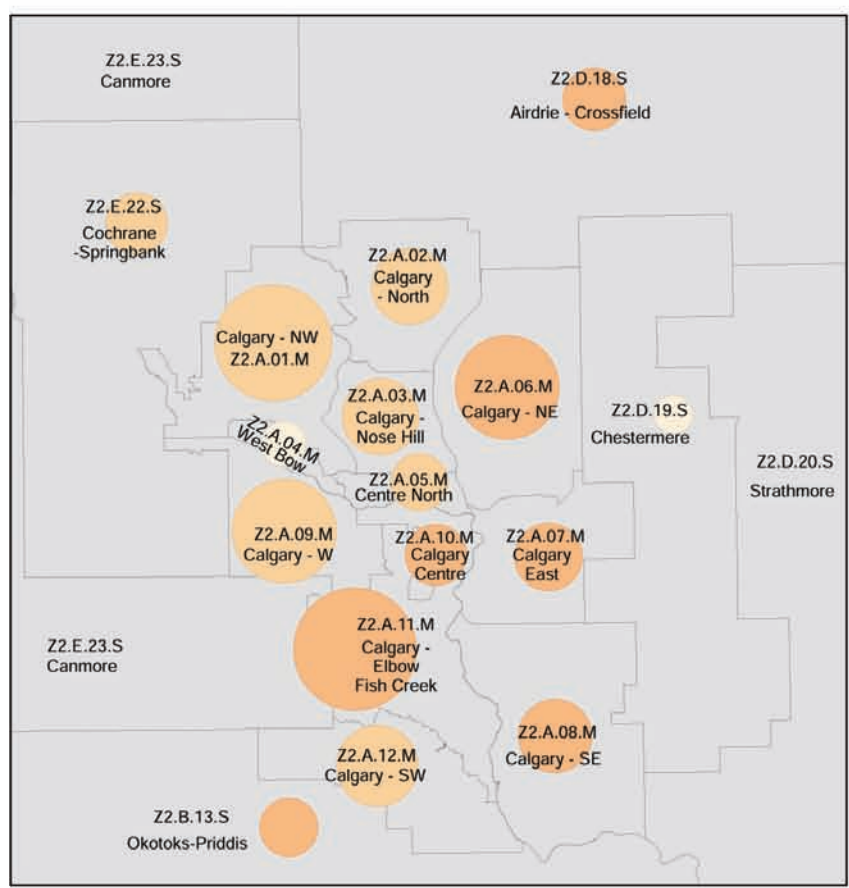
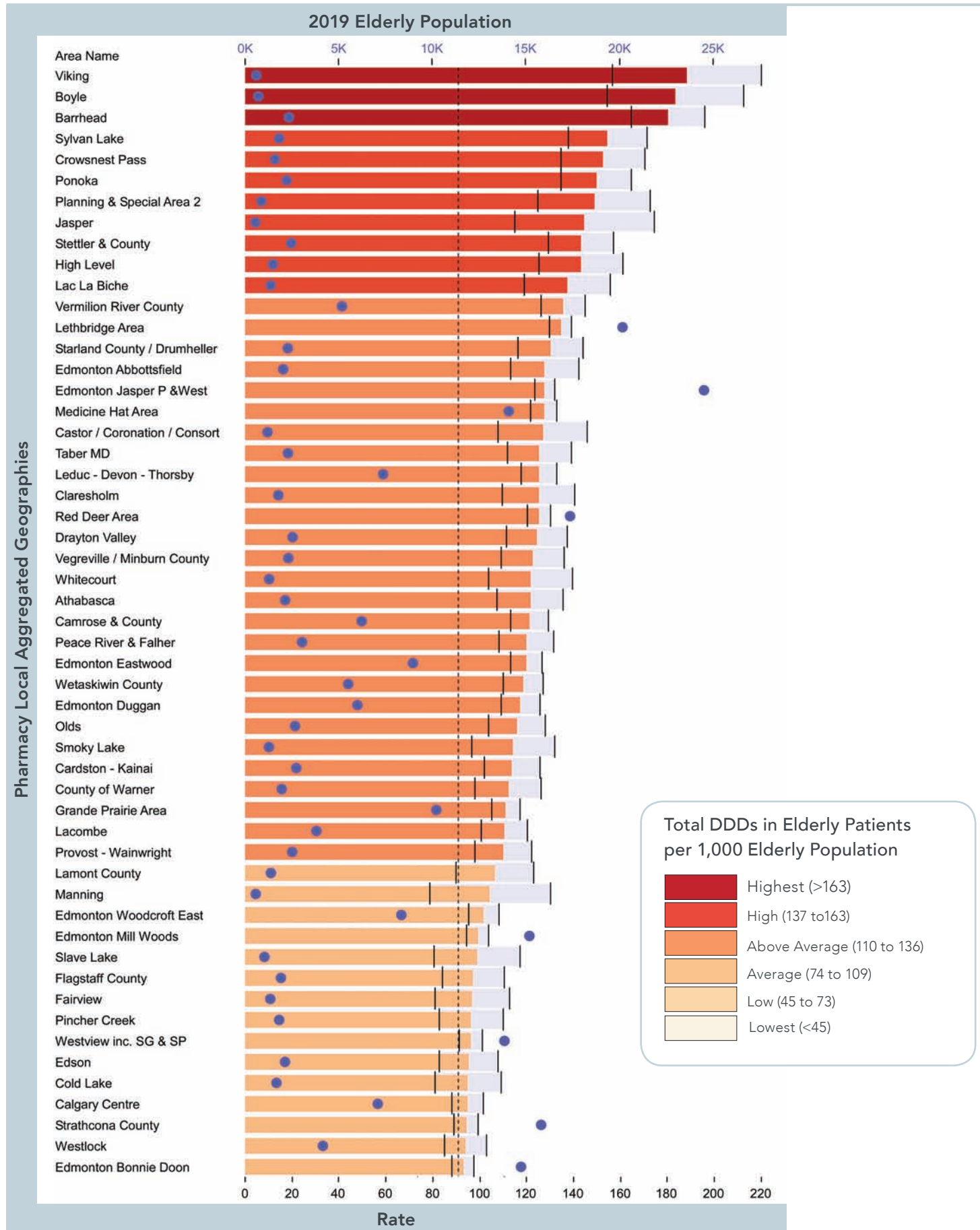
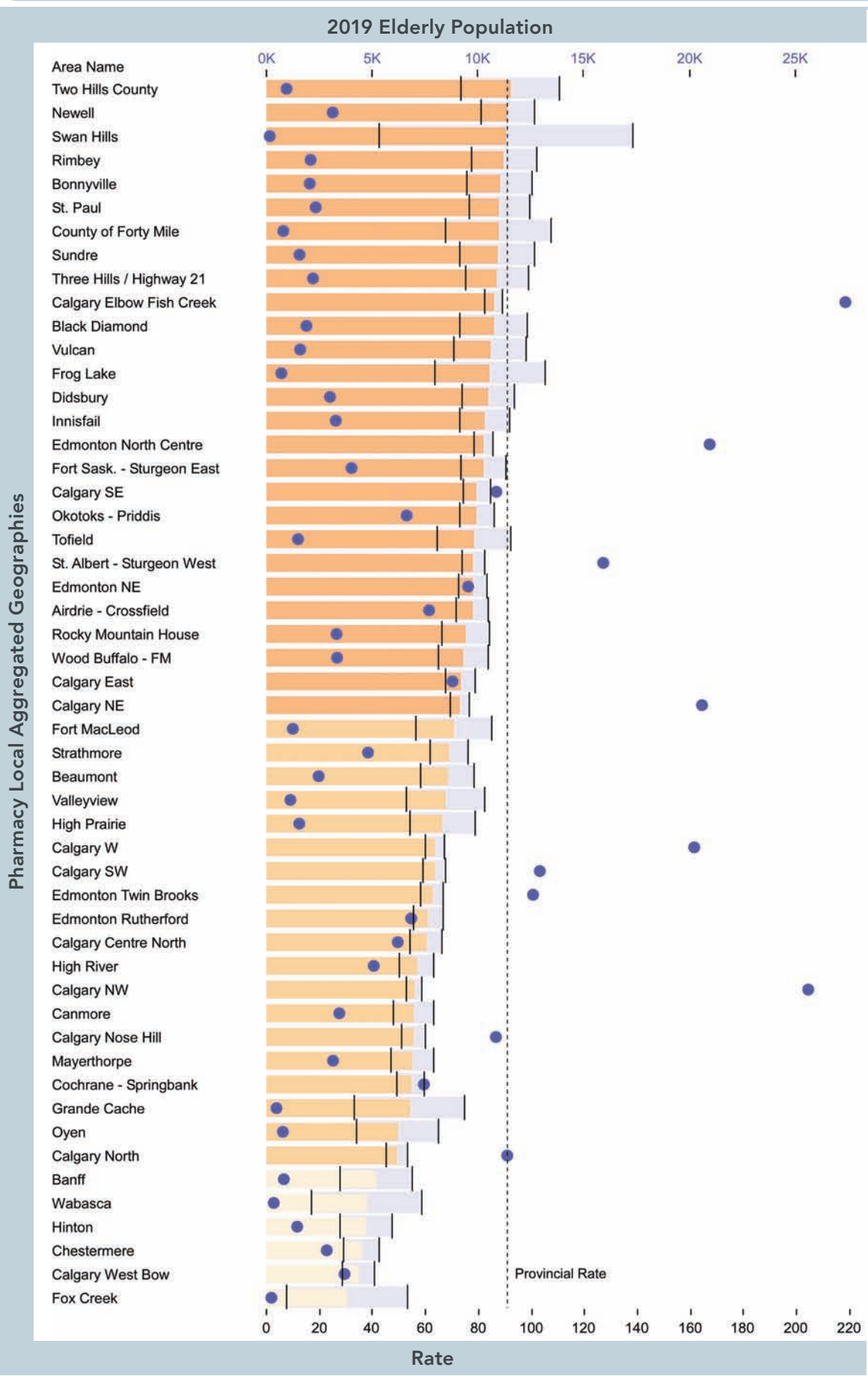


Figure 34b. Total DDDs in Benzodiazepine Patients 65 Years and Older per 1,000 Elderly Population, by Pharmacy Local Aggregate Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.

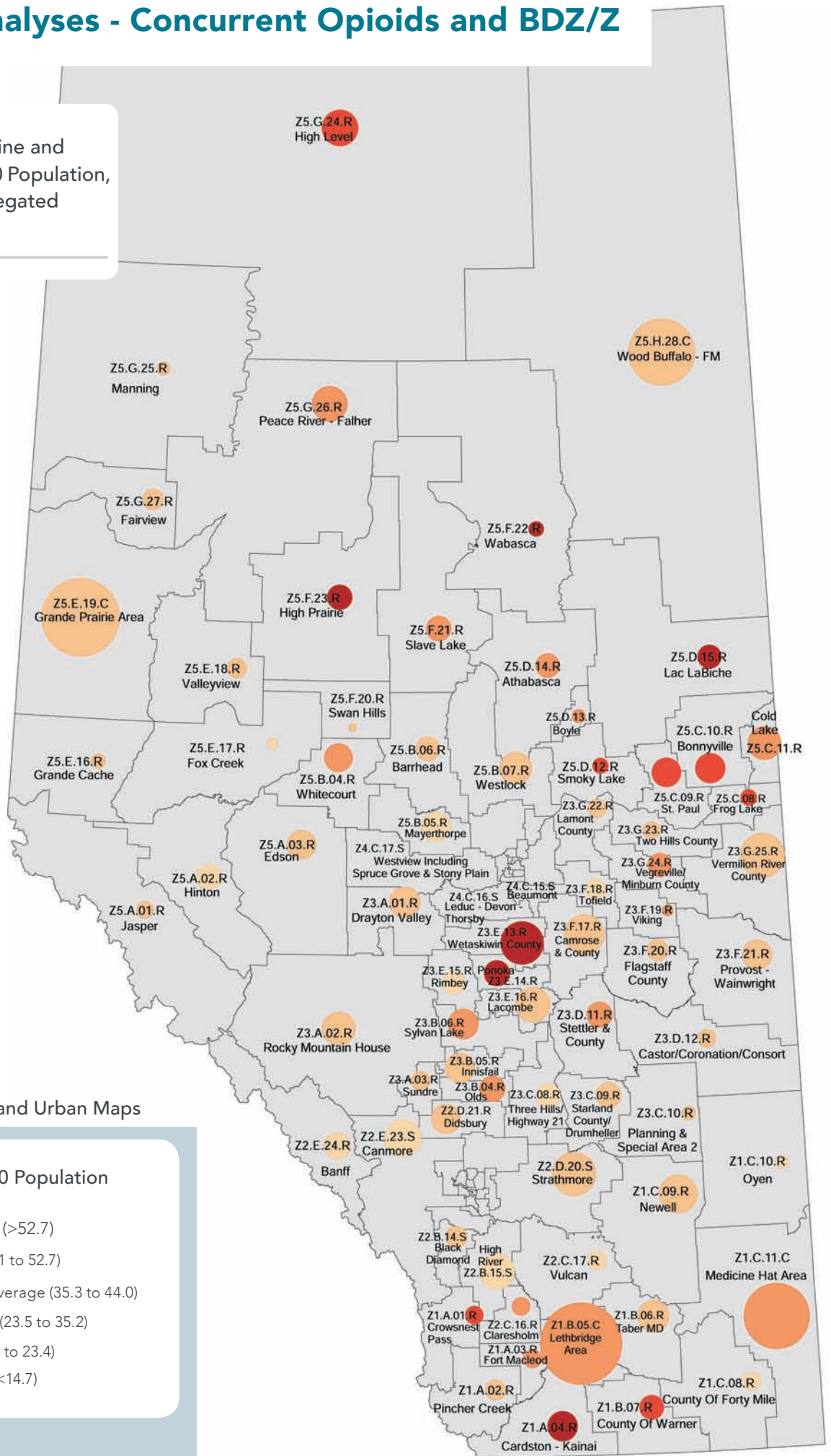


Pharmacy Local Aggregated Geographies

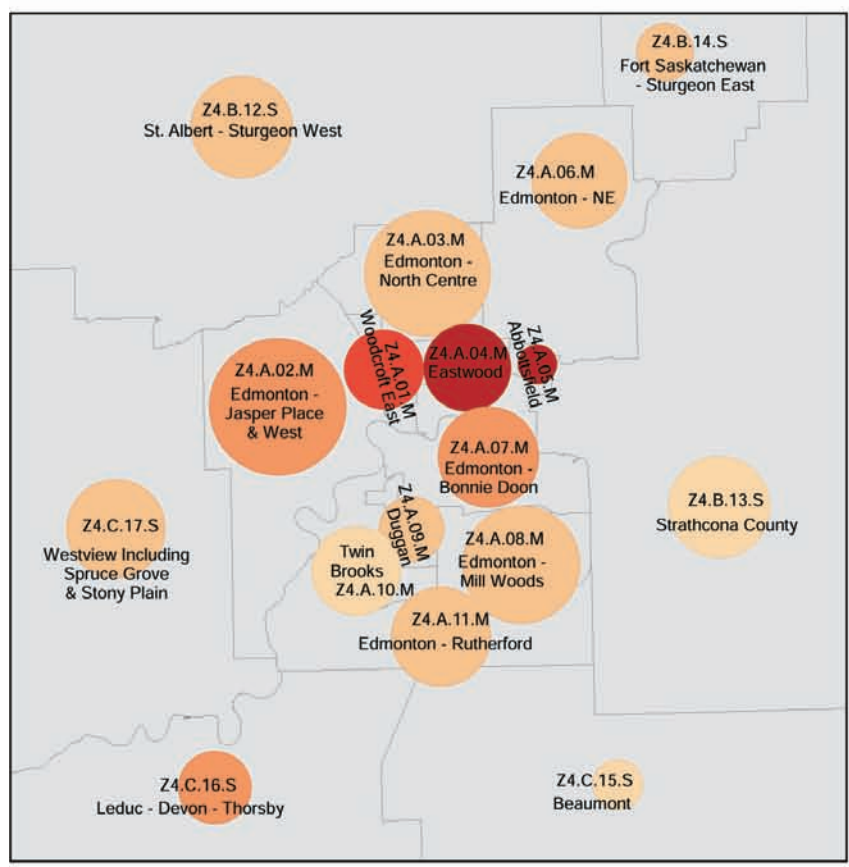
# Geographic Analyses - Concurrent Opioids and BDZ/Z

Figure 35a.

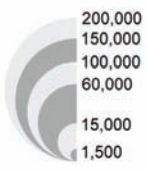
Concurrent Benzodiazepine and Opioid Patients per 1,000 Population, by Pharmacy Local Aggregated Geographies, 2019



Edmonton



Population



Calgary

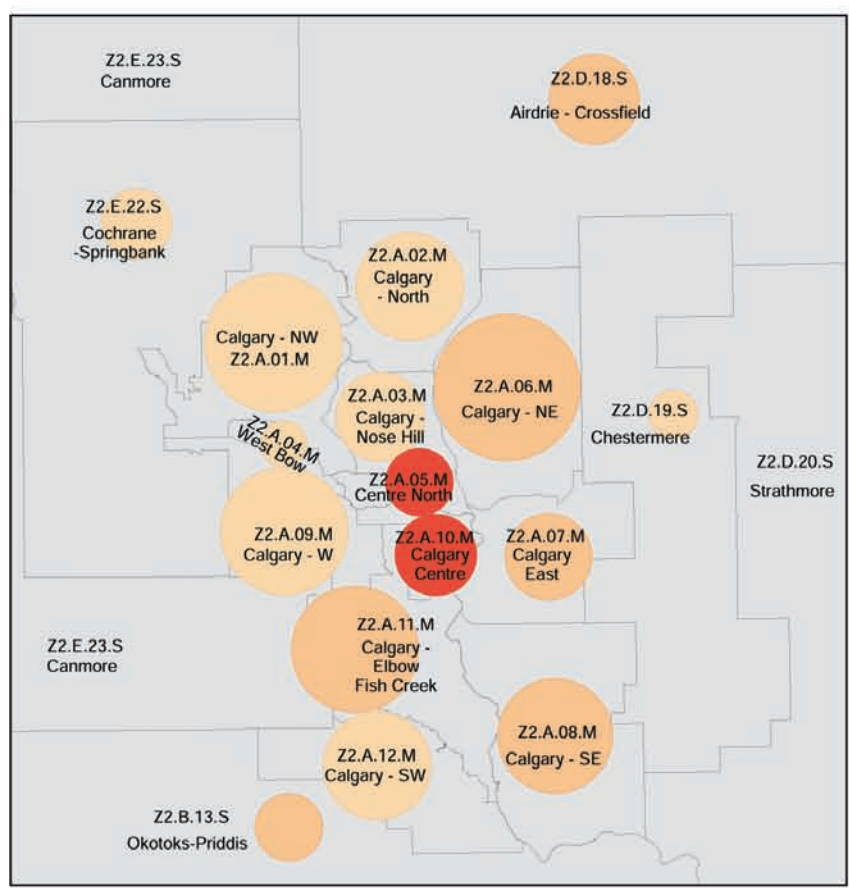
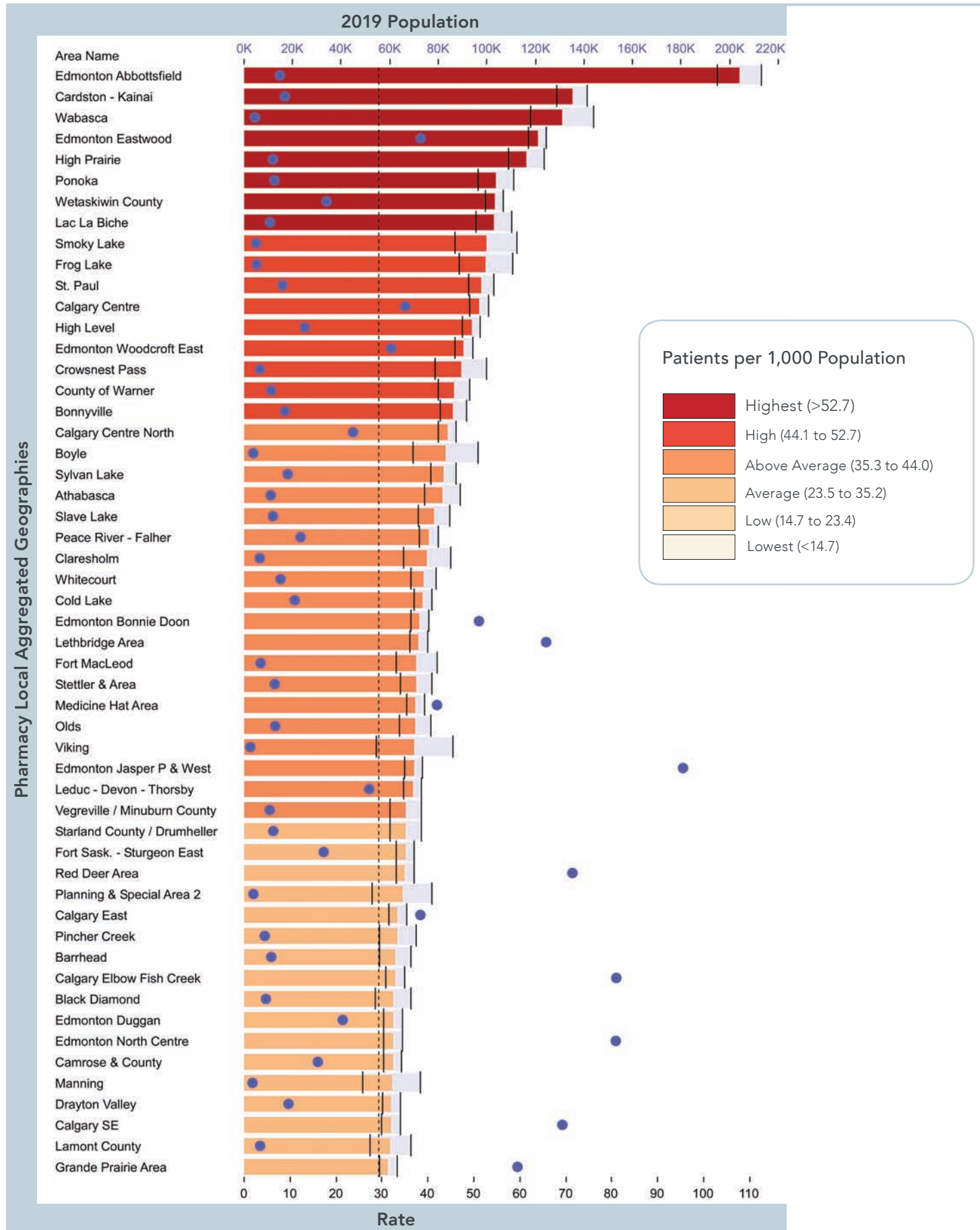
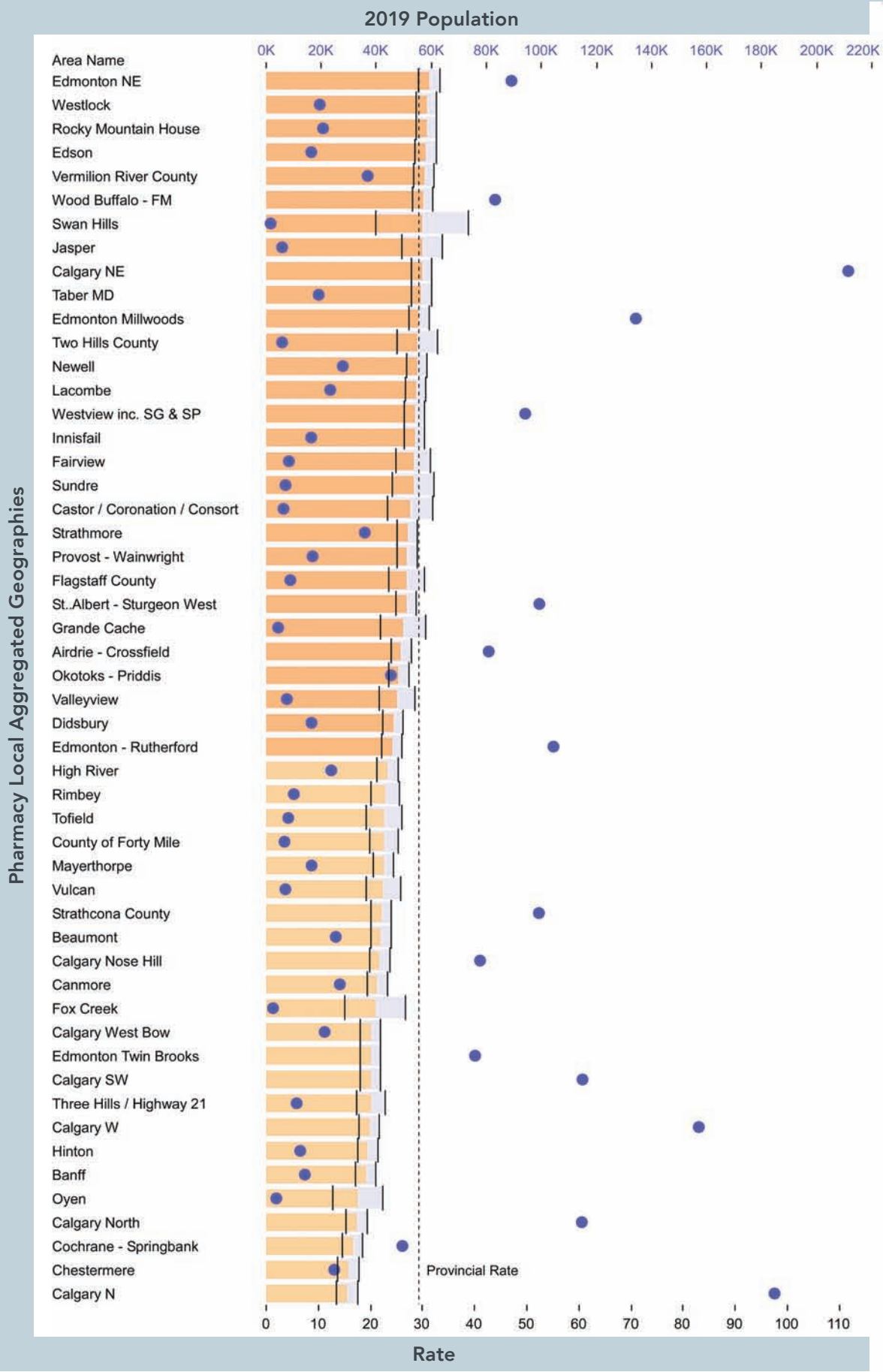


Figure 35b. Concurrent Benzodiazepine and Opioid Patients per 1,000 population, by Pharmacy Local Aggregated Geographies, 2019





Mauve bar shows the 95% confidence limits | Black line shows provincial rate. ● Blue dots show the population.



Pharmacy Local Aggregated Geographies



**Table 25. Opioid Analytic Class Prescriptions, Patients, Prescribers and Pharmacies by Main Ingredient, ATC Code and Route of Administration, 2019**

Main Ingredient	ATC Code Description	Route	Prescriptions	Patients	Prescribers	Pharmacies
Buprenorphine	N02AE01-BUPRENORPHINE	Buccal	394	163	72	126
Buprenorphine	N02AE01-BUPRENORPHINE	Transdermal	10,679	3,321	1,489	931
Buprenorphine	N07BC51-BUPRENORPHINE, COMBINATIONS	Sublingual	61,635	6,395	1,020	987
Butalbital	N02AA79-CODEINE, COMBINATIONS WITH PSYCHOLEPTICS	Oral	1,971	644	540	444
Butalbital	N02BA71-ACETYSALICYLIC ACID, COMB WITH PSYCHOLEPTICS	Oral	296	121	126	115
Butorphanol	N02AF01-BUTORPHANOL	Nasal	326	73	87	82
Codeine	M03BB53-CHLORZOXAZONE, COMBINATIONS EXCL PSYCHOLEPTICS	Oral	25	14	12	11
Codeine	N02AA59-CODEINE, COMBINATIONS	Oral	5,010	2,610	1,472	723
Codeine	N02AJ06	Oral	713,549	303,536	12,639	1,454
Codeine	N02AJ07	Oral	1,601	1,134	665	372
Codeine	N02BE51-ACETAMINOPHEN, COMB EXCL PSYCHOLEPTICS	Oral	6,208	3,246	1,425	648
Codeine	R05DA04-CODEINE	Intramuscular	15	6	6	5
Codeine	R05DA04-CODEINE	Oral	65,004	29,769	5,506	1,379
Codeine	R05DA04-CODEINE	Unknown	102	89	18	19
Codeine	R05DA20-COMBINATIONS	Oral	104,709	85,924	3,396	1,373
Codeine	R05FA02-OPIUM DERIVATIVES AND EXPECTORANTS	Oral	36,393	31,425	3,868	1,247
Fentanyl	N01AH01-FENTANYL	Intramuscular	1,614	1,064	300	139
Fentanyl	N02AB03-FENTANYL	Buccal	31	11	8	12
Fentanyl	N02AB03-FENTANYL	Transdermal	15,821	3,175	1,860	913
Fentanyl	N02AB03-FENTANYL	Unknown	36	16	8	2
Hydrocodone	R05DA03-HYDROCODONE	Oral	56	30	29	30
Hydrocodone	R05DA20-COMBINATIONS	Oral	523	372	229	241
Hydromorphone	N02AA03-HYDROMORPHONE	Intramuscular	4,395	2,279	764	233
Hydromorphone	N02AA03-HYDROMORPHONE	Oral	112,309	31,589	5,631	1,377
Hydromorphone	N02AA03-HYDROMORPHONE	Unknown	12	8	6	7
Ketamine	N01AX03-KETAMINE	Intramuscular	38	14	9	13
Ketamine	N01AX03-KETAMINE	Unknown	7	4	4	4
Meperidine	N02AB02-PETHIDINE	Intramuscular	406	98	90	84
Meperidine	N02AB02-PETHIDINE	Oral	1,573	461	383	372
Methadone	N07BC02-METHADONE	Oral	69,366	6,066	675	915
Methadone	N07BC02-METHADONE	Unknown	320	168	106	67
Morphine	N02AA01-MORPHINE	Intramuscular	2,234	1,192	604	215
Morphine	N02AA01-MORPHINE	Intravenous	14	10	10	6
Morphine	N02AA01-MORPHINE	Oral	56,916	13,509	4,188	1,300
Morphine	N02AA01-MORPHINE	Parenteral	123	90	61	11
Morphine	N02AA01-MORPHINE	Rectal	106	31	34	33
Morphine	N02AA01-MORPHINE	Unknown	47	38	17	12
Normethadone	R05DA20-COMBINATIONS	Oral	14	14	11	13
Opium	N02AA02-OPIUM	Rectal	260	172	166	123
Oxycodone	N02AA05-OXYCODONE	Oral	107,148	19,400	4,444	1,365
Oxycodone	N02AA05-OXYCODONE	Rectal	75	11	14	11
Oxycodone	N02AA05-OXYCODONE	Unknown	5	3	3	3
Oxycodone	N02AA55-OXYCODONE, COMBINATIONS	Oral	1,563	417	305	294
Oxycodone	N02AJ17	Oral	130,912	39,292	5,208	1,414
Oxycodone	N02AJ18	Oral	120	35	37	37
Pentazocine	N02AD01-PENTAZOCINE	Oral	175	39	47	45
Remifentanyl	N01AH06-REMIFENTANIL	Intravenous	1	1	1	1
Sufentanyl	N01AH03-SUFENTANIL	Intravenous	5	3	4	2
Tapentadol	N02AX06-TAPENTADOL	Oral	3,353	803	470	471
Tramadol	N02AJ13	Oral	18,567	17,155	4,390	1,216
Tramadol	N02AX02-TRAMADOL	Oral	5,846	5,256	2,419	1,085
Tramadol	N02AX02-TRAMADOL	Unknown	4	4	4	4

“Unknown” route indicates that the medication format and route were not specified on the prescription.

**Table 26. Benzodiazepine Analytic Class Prescriptions, Patients, Prescribers and Pharmacies by Main Ingredient, ATC code and Route of Administration, 2019**

Main Ingredient	ATC Code Description	Route	Prescriptions	Patients	Prescribers	Pharmacies
Alprazolam	N05BA12-ALPRAZOLAM	Oral	24,906	8,245	3,199	1,269
Alprazolam	N05BA12-ALPRAZOLAM	Unknown	1	1	1	1
Bromazepam	N05BA08-BROMAZEPAM	Oral	13,085	2,690	1,419	891
Chlordiazepoxide	N05BA02-CHLORDIAZEPOXIDE	Oral	2,365	1,149	747	588
Clobazam	N05BA09-CLOBAZAM	Oral	9,717	3,384	2,165	1,033
Clobazam	N05BA09-CLOBAZAM	Unknown	245	95	97	64
Clonazepam	N03AE01-CLONAZEPAM	Oral	157,270	47,570	6,250	1,436
Clonazepam	N03AE01-CLONAZEPAM	Unknown	136	52	47	37
Clorazepate Dipotassium	N05BA05-CLORAZEPATE POTASSIUM	Oral	204	71	84	73
Diazepam	N05BA01-DIAZEPAM	Intramuscular	27	15	13	15
Diazepam	N05BA01-DIAZEPAM	Oral	36,052	12,592	4,022	1,347
Diazepam	N05BA01-DIAZEPAM	Rectal	141	100	59	88
Diazepam	N05BA01-DIAZEPAM	Unknown	33	16	13	18
Flurazepam	N05CD01-FLURAZEPAM	Oral	869	309	283	278
Lorazepam	N05BA06-LORAZEPAM	Intramuscular	147	123	105	38
Lorazepam	N05BA06-LORAZEPAM	Oral	99,514	46,020	6,241	1,423
Lorazepam	N05BA06-LORAZEPAM	Sublingual	192,676	103,791	7,852	1,444
Lorazepam	N05BA06-LORAZEPAM	Unknown	40	29	25	12
Midazolam	N05CD08-MIDAZOLAM	Intramuscular	2,055	1,549	329	187
Midazolam	N05CD08-MIDAZOLAM	Unknown	56	41	14	12
Nitrazepam	N05CD02-NITRAZEPAM	Oral	13,366	2,466	1,091	782
Nitrazepam	N05CD02-NITRAZEPAM	Unknown	36	14	13	13
Oxazepam	N05BA04-OXAZEPAM	Oral	4,709	1,622	1,229	767
Temazepam	N05CD07-TEMAZEPAM	Oral	57,436	16,418	3,661	1,336
Temazepam	N05CD07-TEMAZEPAM	Unknown	28	10	10	9
Triazolam	N05CD05-TRIAZOLAM	Oral	4,875	3,125	636	822
Zaleplon	N05CF03-ZALEPLON	Oral	1	1	1	1
Zolpidem	N05CF02-ZOLPIDEM	Sublingual	42,113	17,040	4,024	1,279
Zopiclone	N05CF01-ZOPICLONE	Oral	459,678	168,871	11,337	1,454
Zopiclone	N05CF01-ZOPICLONE	Unknown	16	8	9	6

“Unknown” route indicates that the medication format and route were not specified on the prescription.

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