

Table S1. Data Sources integrated within the BC COVID-19 Cohort (BCC19C)

British Columbia Centre for Disease Control (BCCDC), Provincial Health Services Authority (PHSA) and Regional Health Authority data sources	Data Date Ranges
Integrated COVID-19 laboratory dataset (SARS-CoV2 tests from private/public labs) ^{S1}	Jan,2020-onward
COVID-19 surveillance case data (information collected on all probable/confirmed cases as part of public health follow up) ^{S2}	Jan,2020-onward
Provincial COVID-19 Monitoring Solution (critical and non-critical care hospital census data) ^{S3}	Jan,2020-onward
Provincial Immunizations Registry (COVID-19 vaccination data) ^{S4}	Dec,2020-onward
Provincial Laboratory Information Solution (laboratory tests from private/public labs) ^{S5}	Jan,2020-onward
Public Health Reporting Data warehouse (Influenza laboratory tests) ^{S6}	Jan,2008-onward
Emergency department visits (hospital-based and community-based ambulatory care)	Mar,2020-onward
Ministry of Health (MoH) Administrative Data Sources:	Data Date Ranges:
Client Roster (CR) (registry of enrollment in the universal public health insurance plan including residential history) ^{S7}	2008/9-onward
Discharge Abstracts Database (DAD) (hospital discharge records) ^{S8}	2008/9-onward
Medical Services Plan (MSP) (physician diagnostic and billing data for services provided through universal public health insurance plan) ^{S9}	2008/9-onward
PharmaNet (Pharma) (prescription drugs dispensed from community pharmacies, includes medications covered by public and private insurance plans) ^{S10}	2008/9-onward
BC Vital Statistics (VS) (deaths registry) ^{S11}	2008/9-onward
National Ambulatory Care Reporting System (NACRS) (hospital-based and community-based ambulatory care) ^{S12}	2011/12-onward
Chronic Disease Registry ^{S13}	2008/9-2018/19
811 Calls (respiratory calls only) ^{S14}	2014-onward
Health System Matrix ^{S15}	2018/19-onward
Population Grouper Methodology ^{S16}	2008/9-onward

Table S2. ICD-9 and ICD-10 diagnostic codes used in the manuscript

Disorder Group	ICD-9 Code (Outpatient Physician Visits Data)		ICD-10 Code (Hospital Discharge Data)	
Depressive or anxiety disorders	300	Neurotic disorders	F40	Phobic anxiety disorders
	311	Depressive disorder, not elsewhere classified	F41	Other anxiety disorders
	B50	Anxiety/depression	F32	Depressive episode
			F33	Recurrent depressive disorders
			F34.1	Dysthymia
Schizophrenia spectrum and other psychotic disorders	295	Schizophrenic psychoses	F20	Schizophrenia
	297	Paranoid states	F21	Schizotypal disorder
	298	Other nonorganic psychoses	F22	Persistent delusional disorders
			F23	Acute and transient psychotic disorders
			F24	Induced delusional disorder
			F25	Schizoaffective disorders
			F28	Other nonorganic psychotic disorders
		F29	Unspecified nonorganic psychosis	
Bipolar and related disorders	296	Affective psychoses	F30	Manic episode
			F31	Bipolar affective disorder
			F34	Persistent mood [affective] disorders (excluding 34.1)
			F38	Other mood [affective] disorders
Eating disorders	307.1	Anorexia nervosa	F50	Eating disorders
	307.5	Other unspecified disorders of eating		
Personality disorders	301	Personality disorders	F60	Specific personality disorders
			F61	Mixed and other personality disorders
			F62	Enduring personality changes, not attributable to brain damage

Table S3. Canadian Emergency Department Information System (CEDIS) Presenting Complaint List (PCL) codes used in the manuscript

Disorder Group	PCL Codes
Depression/suicidal/deliberate self-harm	351
Anxiety/situational crisis	352
Hallucinations/delusions	353
Insomnia	354
Violent/homicidal behaviour	355
Social problem	356
Bizarre behaviour	358
Concern of patient's welfare	359
Pediatric disruptive behaviour	360

Table S4. Psychotropic medications captured in the list of drug categories

Chemical name	Drug category	Chemical name	Drug category
Amitriptyline	Antidepressants	Promazine	Antipsychotics
Amoxapine	Antidepressants	Quetiapine	Antipsychotics
Atomoxetine	Antidepressants	Risperidone	Antipsychotics
Bupropion	Antidepressants	Sulpiride	Antipsychotics
Citalopram	Antidepressants	Sulthiame	Antipsychotics
Clomipramine	Antidepressants	Thiopropazate	Antipsychotics
Desipramine	Antidepressants	Thioridazine	Antipsychotics
Desvenlafaxine	Antidepressants	Trifluoperazine	Antipsychotics
Doxepin	Antidepressants	Trilafon	Antipsychotics
Duloxetine	Antidepressants	Truxal	Antipsychotics
Escitalopram	Antidepressants	Alprazolam	Anxiolytics
Fluoxetine	Antidepressants	Buspirone	Anxiolytics
Fluvoxamine	Antidepressants	Clonazepam	Anxiolytics

Imipramine	Antidepressants	Clorazepate dipotassium	Anxiolytics
Isocarboxazid	Antidepressants	Diazepam	Anxiolytics
Maprotiline	Antidepressants	Lorazepam	Anxiolytics
Mirtazapine	Antidepressants	Bromazepam	Sedatives
Moclobemide	Antidepressants	Chloral hydrate	Sedatives
Nortriptyline	Antidepressants	Chlordiazepoxide	Sedatives
Paroxetine	Antidepressants	Flurazepam	Sedatives
Perphenazine/amitriptyline	Antidepressants	Nitrazepam	Sedatives
Phenelzine	Antidepressants	Oxazepam	Sedatives
Protriptyline	Antidepressants	Temazepam	Sedatives
Sertraline	Antidepressants	Triazolam	Sedatives
Zaleplon	Sedatives	Tranlycypromine	Antidepressants
Zolpidem	Sedatives	Trazodone	Antidepressants
Zopiclone	Sedatives	Trimipramine	Antidepressants
Vilazodone	Antidepressants	Dogmatil	Antipsychotics
Vortioxetine	Antidepressants	Fluphenazine	Antipsychotics
Venlafaxine	Antidepressants	Haloperidol	Antipsychotics
Ziprasidone	Antipsychotics	Loxapine	Antipsychotics
Amisulpride	Antipsychotics	Lurasidone	Antipsychotics
Aripiprazole	Antipsychotics	Methotrimeprazine	Antipsychotics
Asenapine	Antipsychotics	Olanzapine	Antipsychotics
Brexipiprazole	Antipsychotics	Paliperidone	Antipsychotics
Chlorpromazine	Antipsychotics	Perphenazine	Antipsychotics
Clozapine	Antipsychotics		

Table S5. Monthly average numbers and rates for mental health-related outpatient physician visits, in British Columbia (2019-2020)

	Outpatient physician visits							
	2019		2020		2021		2021 vs. 2019 Rate Ratio (95% CI)	P-value*
	Average monthly number of visits	Average monthly rate of visits (per 1,000 pop.)	Average monthly number of visits	Average monthly rate of visits (per 1,000 pop.)	Average monthly number of visits	Average monthly rate of visits (per 1,000 pop.)		
Overall	96,482	18.9 (18.8 to 19.1)	107,765	20.9 (20.8 to 21.1)	119,653	23.1 (23.0 to 23.2)	1.24 (1.23 to 1.25)	<0.0001
Sex								
Female	52,607	20.4 (20.3 to 20.6)	60,116	23.1 (22.9 to 23.3)	68,300	26.1 (25.9 to 26.3)	1.30 (1.28 to 1.31)	<0.0001
Male	43,875	17.4 (17.2 to 17.6)	47,649	18.7 (18.5 to 18.9)	51,353	20.0 (19.8 to 20.2)	1.17 (1.16 to 1.19)	<0.0001
Age groups								
<5	140	0.6 (0.5 to 0.7)	143	0.6 (0.5 to 0.7)	186	0.8 (0.7 to 1.0)	1.35 (1.08 to 1.68)	0.0074
5-9	2,373	9.8 (9.4 to 10.2)	2,569	10.5 (10.1 to 10.9)	2,963	12.1 (11.7 to 12.6)	1.24 (1.17 to 1.31)	<0.0001
10-14	3,761	15.3 (14.9 to 15.8)	4,425	17.8 (17.2 to 18.3)	5,545	22.2 (21.6 to 22.8)	1.45 (1.39 to 1.51)	<0.0001
15-19	6,044	21.8 (21.2 to 22.3)	6,701	24.6 (24.0 to 25.2)	8,247	32.8 (32.1 to 33.5)	1.51 (1.46 to 1.56)	<0.0001
20-29	16,467	23.5 (23.2 to 23.9)	18,459	26.4 (26.0 to 26.8)	22,019	31.3 (30.9 to 31.7)	1.10 (0.99 to 1.21)	<0.0001
30-39	17,012	23.6 (23.2 to 23.9)	19,987	27.0 (26.6 to 27.4)	22,991	30.3 (29.9 to 30.7)	1.28 (1.26 to 1.31)	<0.0001
40-49	14,476	22.3 (22.0 to 22.7)	16,061	24.7 (24.4 to 25.1)	17,223	26.3 (25.9 to 26.7)	1.18 (1.15 to 1.20)	<0.0001
50-59	15,034	20.7 (20.4 to 21.1)	15,865	22.0 (21.7 to 22.4)	16,120	22.5 (22.1 to 22.8)	1.08 (1.06 to 1.11)	<0.0001
60-69	11,651	17.6 (17.3 to 18.0)	12,535	18.6 (18.3 to 18.9)	12,861	18.7 (18.3 to 19.0)	1.06 (1.03 to 1.09)	<0.0001
70-79	6,102	14.7 (14.4 to 15.1)	7,099	16.3 (15.9 to 16.6)	7,455	16.3 (16.0 to 16.7)	1.11 (1.07 to 1.15)	<0.0001
80-89	2,702	14.7 (14.2 to 15.3)	3,078	16.3 (15.8 to 16.9)	3,168	16.3 (15.7 to 16.9)	1.10 (1.05 to 1.16)	<0.001
90+	721	15.6 (14.5 to 16.8)	842	17.6 (16.4 to 18.8)	879	17.1 (16.0 to 18.3)	1.10 (0.99 to 1.21)	0.068
*Chi-square analysis								

Table S6. Monthly average numbers and rates for mental health-related emergency department visits, in British Columbia (2019-2020)

	Emergency department visits							
	2019		2020		2021		2021 vs. 2019 Rate Ratio (95% CI)	P-value*
	Average monthly number of visits	Average monthly rate of visits (per 100,000 pop.)	Average monthly number of visits	Average monthly rate of visits (per 100,000 pop.)	Average monthly number of visits	Average monthly rate of visits (per 100,000 pop.)		
Overall	5,266	103.5 (100.7 to 106.4)	5,011	97.7 (95.0 to 100.5)	5,531	107.9 (105.1 to 110.8)		
Sex								
Female	2,639	102.7 (98.8 to 106.7)	2,478	95.7 (91.9 to 99.5)	2,840	109.9 (105.9 to 114.1)	1.08 (1.02 to 1.13)	0.0068
Male	2,626	104.2 (100.3 to 108.3)	2,533	99.6 (95.8 to 103.6)	2,691	105.5 (101.5 to 109.6)	1.02 (0.97 to 1.08)	0.37
Age groups								
<5	14	6.2 (3.7 to 10.3)	13	5.9 (3.4 to 9.8)	13	5.8 (3.1 to 9.4)	0.93 (0.43 to 1.99)	0.85
5-9	51	20.8 (15.7 to 27.2)	34	14.1 (10.0 to 19.5)	43	17.5 (12.7 to 23.2)	0.84 (0.56 to 1.26)	0.40
10-14	257	104.9 (92.8 to 118.5)	245	98.1 (86.4 to 111.0)	342	136.9 (122.9 to 151.9)	1.31 (1.11 to 1.54)	0.0013
15-19	630	227.0 (209.8 to 245.3)	561	205.9 (189.4 to 223.5)	679	270.0 (250.4 to 291.0)	1.19 (1.07 to 1.33)	0.0017
20-29	1,296	185.2 (175.3 to 195.6)	1,253	179.3 (169.5 to 189.4)	1,325	188.4 (178.4 to 198.7)	1.02 (0.94 to 1.10)	0.67
30-39	996	138.1 (129.8 to 147.0)	1,002	135.3 (127.1 to 143.9)	1,104	145.4 (137.0 to 154.2)	1.05 (0.97 to 1.15)	0.24
40-49	717	110.7 (102.9 to 119.1)	684	105.3 (97.6 to 113.4)	733	112.1 (104.3 to 120.5)	1.01 (0.91 to 1.12)	0.81
50-59	602	83.0 (76.6 to 89.9)	558	77.4 (71.1 to 84.0)	582	81.2 (74.7 to 88.0)	0.98 (0.87 to 1.10)	0.70
60-69	359	54.3 (48.9 to 60.1)	336	49.8 (44.7 to 55.5)	359	52.0 (46.8 to 57.6)	0.96 (0.83 to 1.11)	0.57
70-79	190	45.8 (39.6 to 52.7)	190	43.6 (37.7 to 50.2)	199	43.5 (37.7 to 49.8)	0.95 (0.78 to 1.16)	0.61
80-89	118	64.4 (53.3 to 76.5)	104	55.2 (45.6 to 66.9)	121	62.3 (52.1 to 74.4)	0.97 (0.75 to 1.25)	0.80
90+	36	77.5 (54.8 to 105.7)	32	67.3 (47.4 to 94.3)	32	62.1 (42.7 to 85.9)	0.80 (0.50 to 1.29)	0.37
*Chi-square analysis								

Table S7. Monthly average numbers and rates for mental health-related hospital admissions, in British Columbia (2019-2020)

	Hospital admissions							
	2019		2020		2021*		2021 vs. 2019 Rate Ratio [#] (95% CI)	P-value
	Average monthly number of admissions	Average monthly rate of admissions (per 100,000 pop.)	Average monthly number of admissions	Average monthly rate of admissions (per 100,000 pop.)	Average monthly number of admissions	Average monthly admissions (per 100,000 pop.)		
Overall	1,449	28.5 (27.0 to 30.0)	1,404	27.4 (26.0 to 28.9)	1,493	29.1 (27.6 to 30.6)	1.03 (0.96 to 1.11)	0.41
Sex								
Female	755	29.3 (27.3 to 31.5)	722	27.8 (25.8 to 30.0)	819	31.6 (29.5 to 33.9)	1.08 (0.98 to 1.20)	0.11
Male	693	27.5 (25.5 to 29.6)	682	27.4 (26.0 to 28.9)	675	26.4 (24.5 to 28.5)	0.97 (0.88 to 1.08)	0.62
Age groups								
<5	sp	sp	sp	sp	sp	sp	-	-
5-9	sp	sp	sp	sp	sp	sp	-	-
10-14	56	23.0 (17.6 to 29.7)	57	22.9 (17.3 to 29.6)	89	35.7 (28.6 to 43.9)	1.55 (1.11 to 2.17)	0.010
15-19	178	64.0 (55.0 to 73.9)	163	59.8 (51.0 to 69.4)	181	72.1 (62.2 to 83.2)	1.13 (0.92 to 1.39)	0.26
20-29	332	47.5 (42.6 to 52.8)	330	47.2 (42.3 to 52.5)	348	49.5 (44.6 to 55.0)	1.04 (0.90 to 1.21)	0.58
30-39	261	36.2 (31.9 to 40.9)	259	35.0 (30.9 to 39.5)	280	36.8 (32.7 to 41.3)	1.02 (0.86 to 1.20)	0.85
40-49	198	30.6 (26.6 to 35.1)	198	30.5 (26.4 to 34.9)	199	30.5 (26.5 to 35.0)	1.00 (0.82 to 1.21)	0.97
50-59	184	25.4 (22.0 to 29.3)	177	24.5 (21.1 to 28.3)	168	23.4 (20.0 to 27.1)	0.92 (0.75 to 1.13)	0.433
60-69	135	20.4 (17.1 to 24.0)	123	18.2 (15.2 to 21.6)	124	18.0 (15.0 to 21.3)	0.88 (0.69 to 1.13)	0.32
70-79	66	15.8 (12.3 to 20.0)	65	14.9 (11.7 to 19.0)	70	15.2 (11.9 to 19.1)	0.96 (0.69 to 1.35)	0.82
80-89	29	16.1 (11.0 to 22.7)	26	13.5 (9.0 to 19.6)	25	12.9 (8.7 to 19.0)	0.80 (0.47 to 1.37)	0.42
90+	sp	sp	sp	sp	sp	sp	-	-
[#] Calculated using data between January and November 2019/2020/2021. [*] Chi-square analysis. sp=Suppressed. Due to lag in data, hospitalisation data for October-December 2021 were excluded.								

Table S8. Monthly average numbers and rates for psychotropic drug dispensations, in British Columbia (2019-2020)

	Psychotropic drug dispensations							
	2019		2020		2021		2021 vs. 2019 Rate Ratio (95% CI)	P-value*
	Monthly average no. of psychotropic drug dispensations	Monthly average rate of psychotropic drug dispensations (per 1,000 pop.)	Monthly average no. of psychotropic drug dispensations	Monthly average rate of psychotropic drug dispensations (per 1,000 pop.)	Monthly average no. of psychotropic drug dispensations	Monthly average rate of psychotropic drug dispensations (per 1,000 pop.)		
Overall	441,275	85.9 (85.6 to 86.1)	463,529	88.8 (88.5 to 89.0)	476,817	89.9 (89.6 to 90.2)		
Sex								
Female	271,470	104.6 (104.2 to 105.0)	286,313	108.5 (108.1 to 108.9)	296,054	110.4 (110.0 to 110.8)	1.09 (1.08 to 1.10)	<.0001
Male	169,804	66.8 (66.5 to 67.1)	177,217	68.6 (68.3 to 68.9)	180,763	68.9 (68.6 to 69.3)	1.06 (1.05 to 1.07)	<.0001
Age groups								
<5	87	0.40 (0.3 to 0.5)	84	0.40 (0.3 to 0.50)	83	0.4 (0.3 to 0.5)	-	-
5-9	1,048	4.3 (4.1 to 4.6)	1,119	4.6 (4.3 to 4.9)	1,191	4.9 (4.6 to 5.2)	1.13 (1.04 to 1.22)	.0047
10-14	4,016	16.4 (15.9 to 16.9)	4,580	18.4 (17.9 to 18.9)	5,561	22.3 (21.7 to 22.9)	1.36 (1.31 to 1.42)	<.0001
15-19	11,402	41.1 (40.3 to 41.8)	12,306	45.2 (44.4 to 46.0)	14,359	57.1 (56.2 to 58.0)	1.39 (1.36 to 1.42)	<.0001
20-29	38,828	55.5 (54.9 to 56.1)	42,280	60.5 (59.9 to 61.1)	46,177	65.7 (65.1 to 66.3)	1.18 (1.17 to 1.20)	<.0001
30-39	50,422	69.9 (69.3 to 70.5)	54,832	74.1 (73.4 to 74.7)	58,499	77.0 (76.4 to 77.6)	1.10 (1.09 to 1.11)	<.0001
40-49	60,262	93.0 (92.3 to 93.8)	62,448	96.2 (95.4 to 96.9)	62,967	96.3 (95.5 to 97.1)	1.04 (1.02 to 1.05)	<.001
50-59	81,561	112.4 (11.7 to 113.2)	82,689	114.7 (113.9 to 115.5)	80,946	112.9 (112.1 to 113.7)	1.00 (0.99 to 1.01)	.42
60-69	81,378	123.2 (122.3 to 124.0)	84,778	125.8 (124.9 to 126.6)	85,570	124.2 (123.3 to 125.0)	1.01 (1.00 to 1.03)	.099
70-79	58,758	142.0 (140.8 to 143.1)	63,226	144.8 (143.7 to 146.0)	65,260	142.9 (141.8 to 144.0)	1.01 (1.00 to 1.02)	.25
80-89	38,628	210.8 (208.7 to 212.9)	39,846	211.5 (209.4 to 213.6)	40,539	208.5 (206.5 to 210.6)	0.99 (0.98 to 1.00)	.12
90+	14,884	323.2 (318.1 to 324.4)	15,342	320.2 (315.1 to 325.3)	15,666	305.8 (301.0 to 310.3)	0.95 (0.93 to 0.97)	.0031

*Chi-square analysis.

Figure S1. Age-standardized rates (per 1,000 population) for mental health-related outpatient physician visits, by year (2019-2021) and sex, in British Columbia

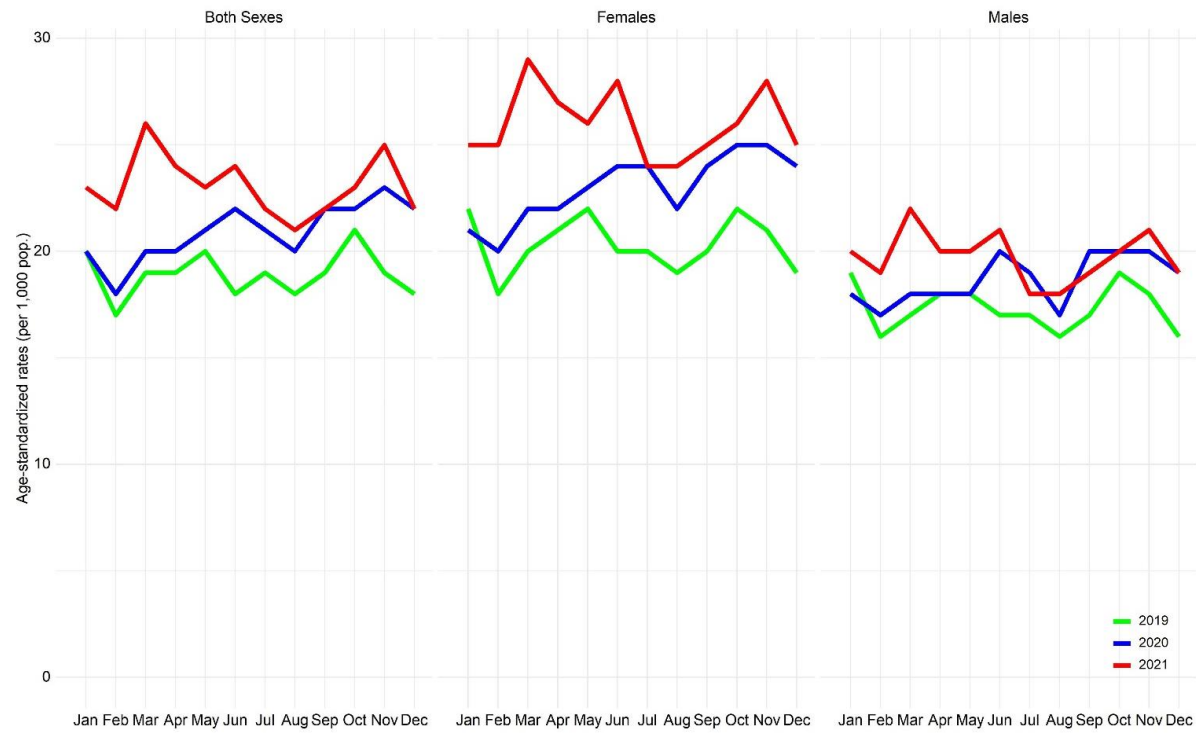


Figure S2. Age-standardized rates (per 1,000 population) for psychotropic drug dispensation, by year (2019-2021) and sex, in British Columbia

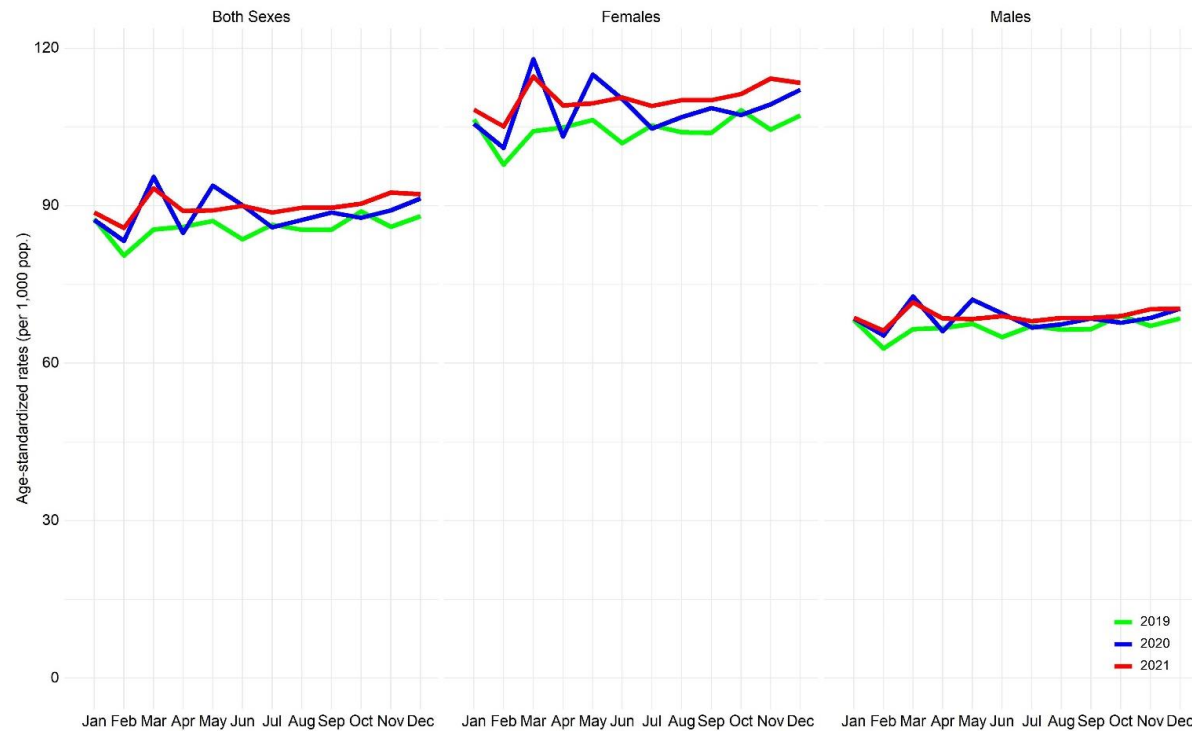


Figure S3. Age-standardized rates (per 100,000 population) for mental health-related emergency department visits, by year (2019-2021) and sex, in British Columbia

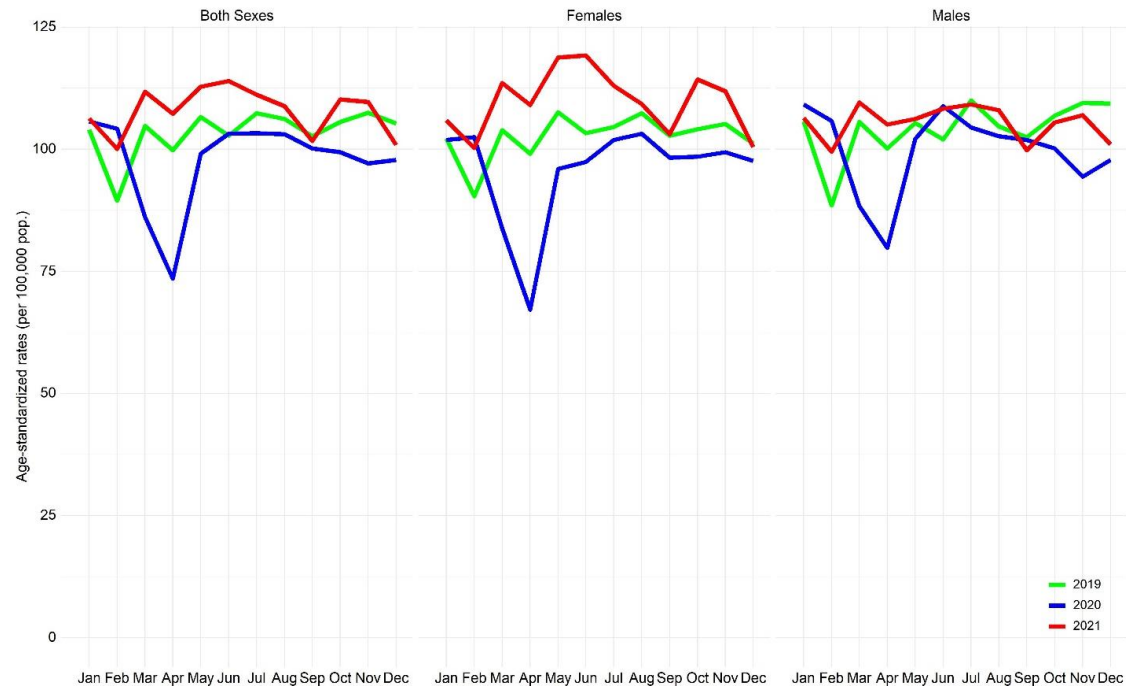
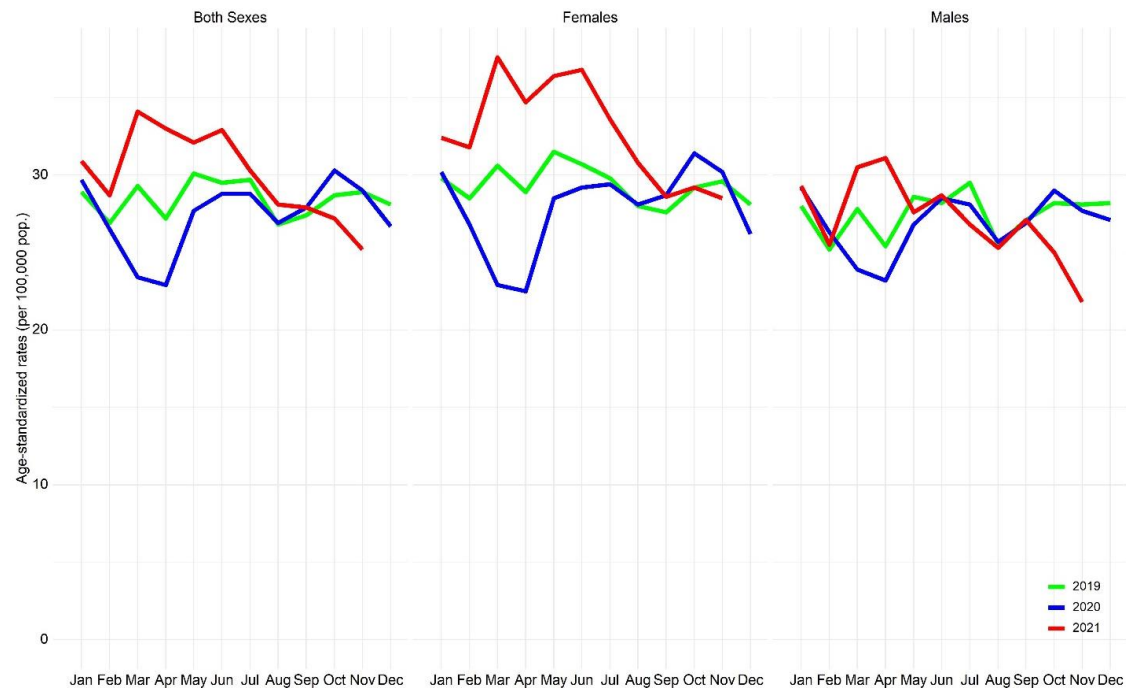


Figure S4. Age-standardized rates (per 100,000 population) for mental health-related hospital admissions, by year (2019-2021) and sex, in British Columbia



Due to lag in data, hospitalisation data for December 2021 was excluded.

Figure S5. Percent change in monthly average age-specific rates for mental health-related related outpatient physician visits, 2021 versus 2019, in British Columbia, by sex and condition

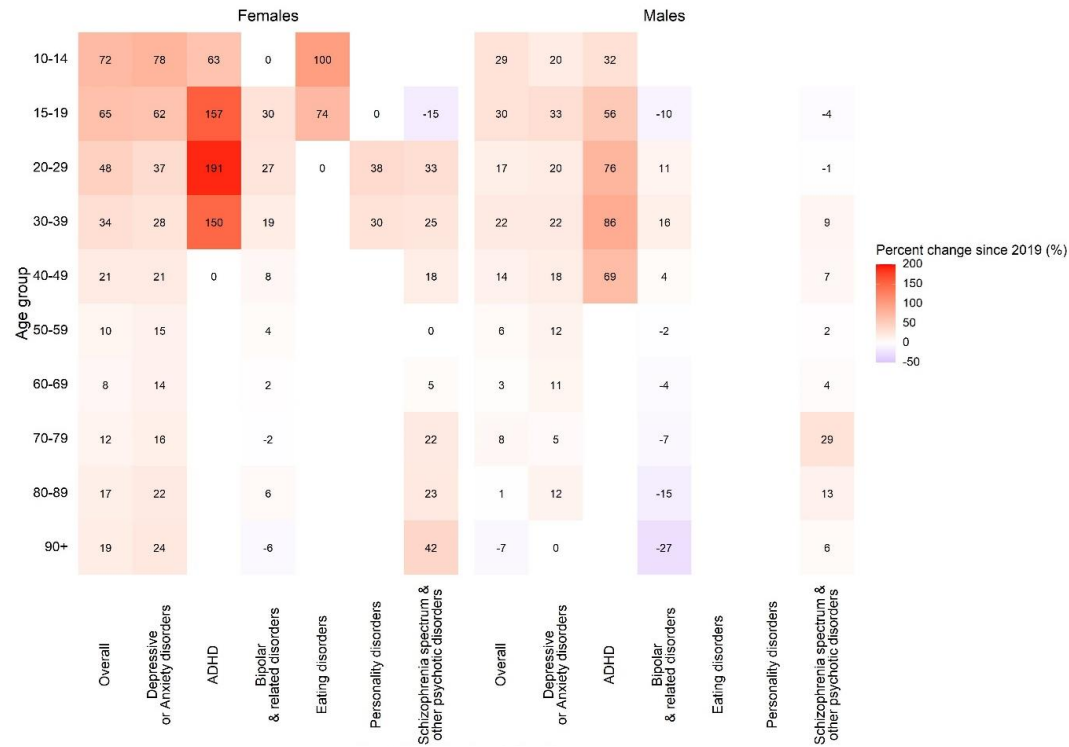


Figure S6. Percent change in monthly average age-specific rates for psychotropic drug dispensations, 2021 versus 2019, in British Columbia, by sex and type of drug

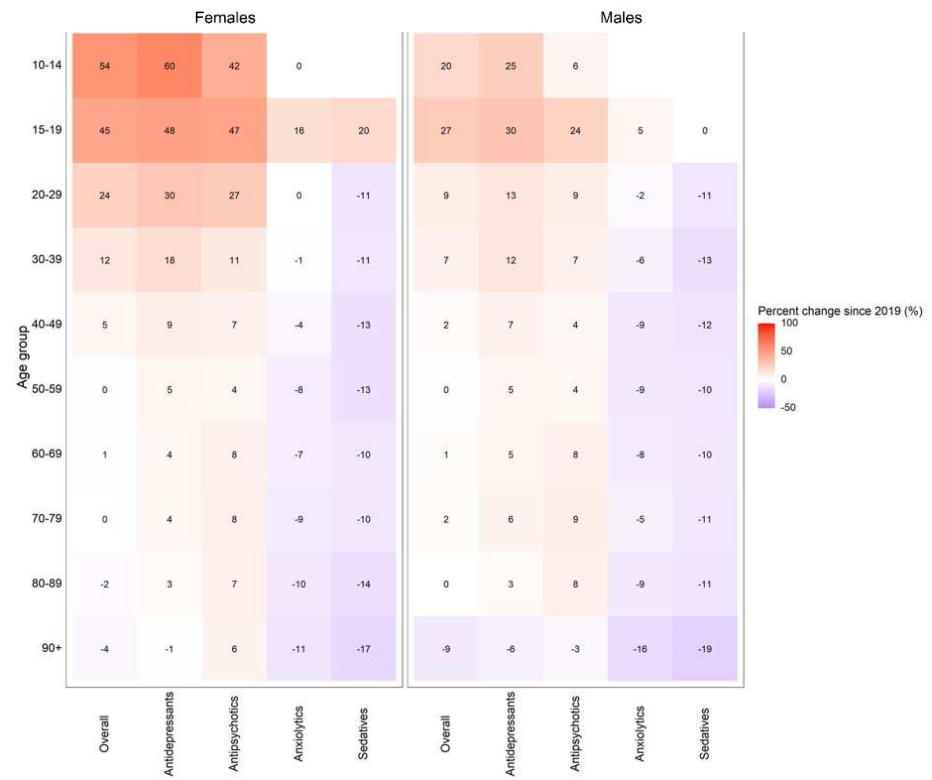


Figure S7. Percent change in monthly average age-specific rates for mental health-related emergency department visits, 2021 versus 2019, in British Columbia, by sex and condition

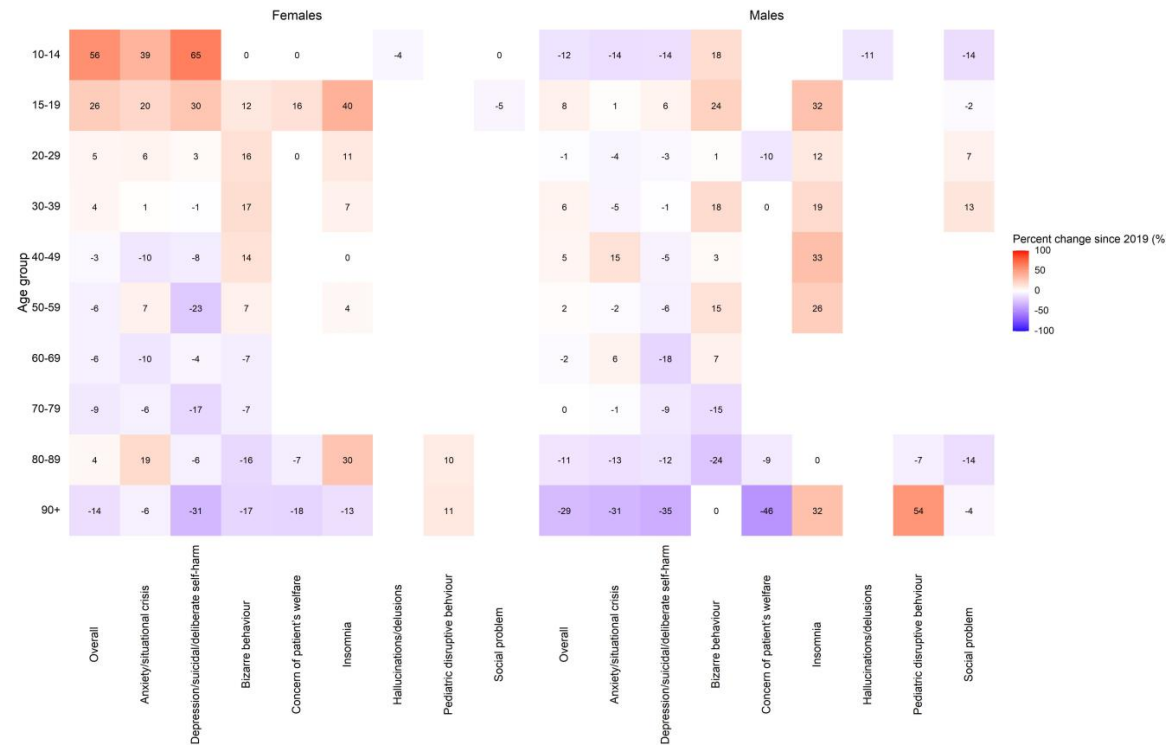
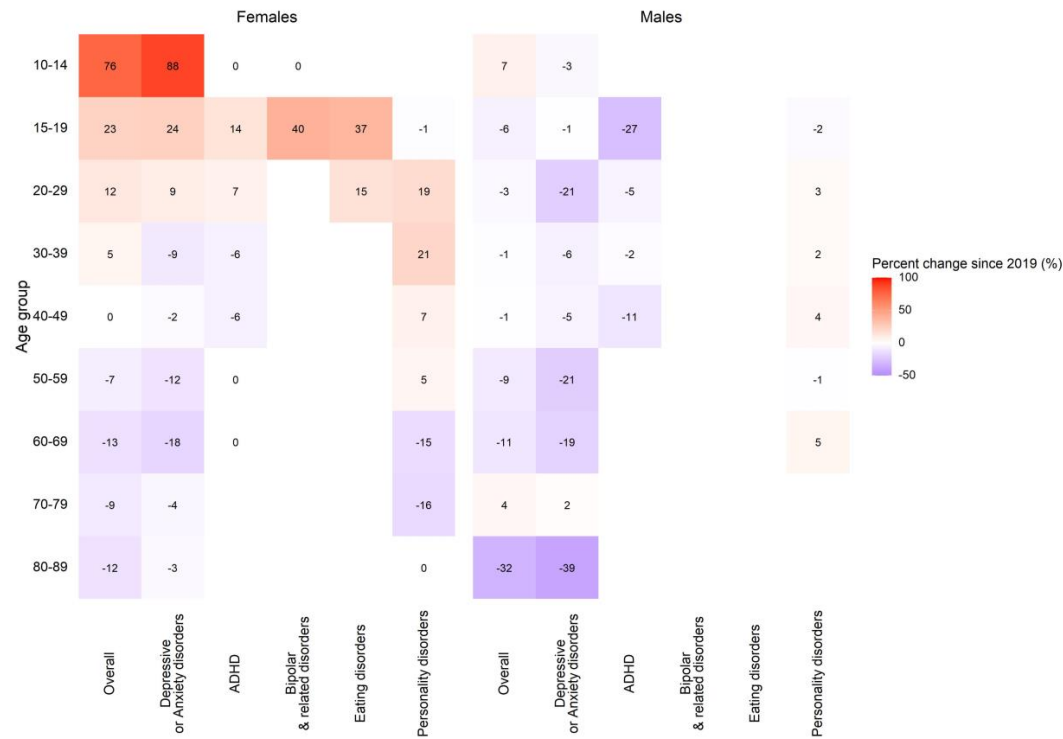


Figure S8. Percent change in monthly average age-specific rates for mental health-related hospital admissions, 2021 versus 2019, in British Columbia, by sex and condition Table



Due to lag in data, hospitalisation data for December 2021 was excluded.

Figure S9. Age-specific rates (per 1,000 population) for mental health-related outpatient physician visits in British Columbia, by year, sex and condition

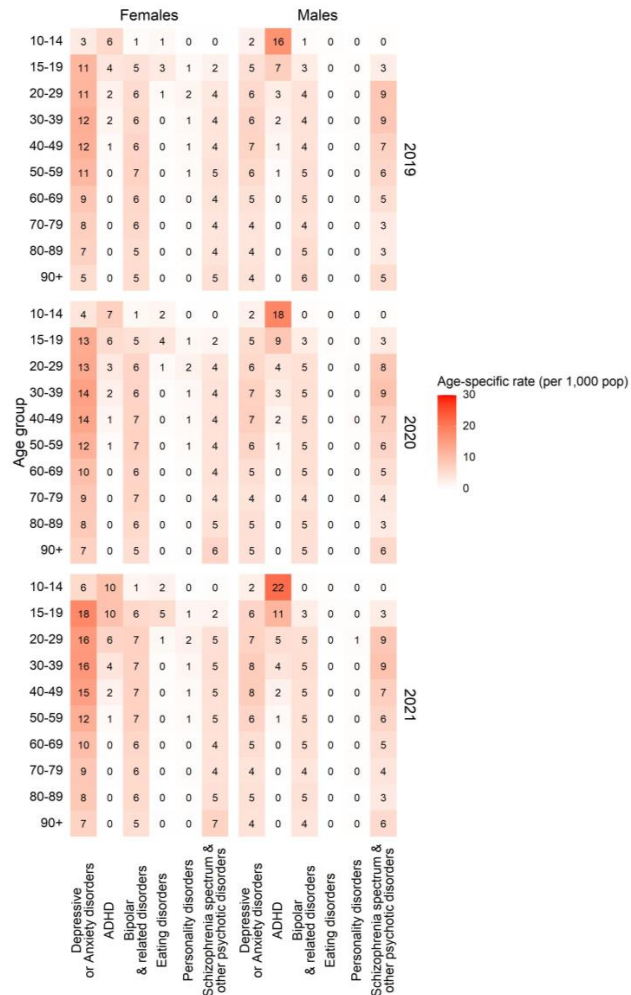


Figure S10. Age-specific rates (per 1,000 population) for psychotropic drug dispensations in British Columbia, by year, sex and condition

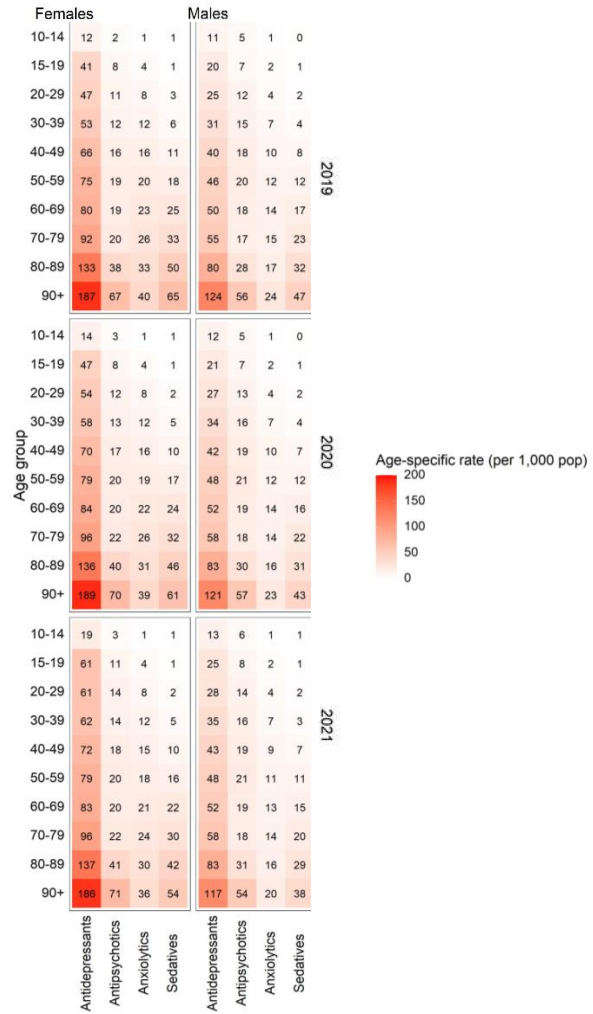


Figure S11. Age-specific rates (per 100,000 population) for mental health-related emergency department visits in British Columbia, by year, sex and condition

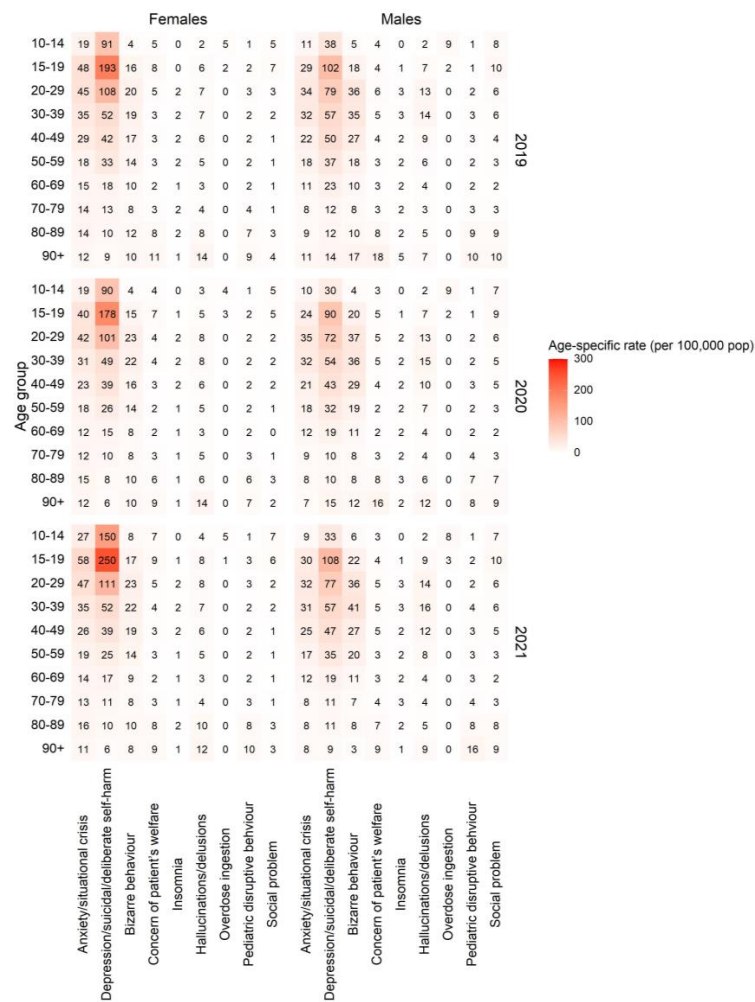
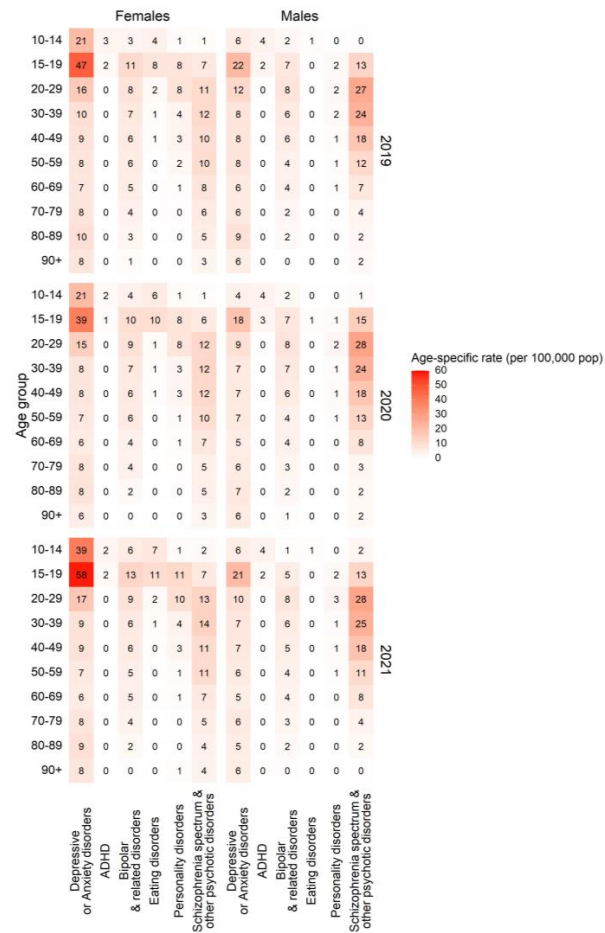


Figure S12. Age-specific rates (per 100,000 population) for mental health-related hospital admissions in British Columbia, by year, sex and condition



Due to lag in data, hospitalisation data for December 2021 was excluded.

Supplementary References:

- S1. British Columbia Centre for Disease Control [creator]. Integrated COVID-19 laboratory dataset (SARS-CoV2 tests from private/public labs). Public Health Reporting Data Warehouse, British Columbia Centre for Disease Control [publisher] (2020). 2021.
- S2. British Columbia Centre for Disease Control [creator]. COVID-19 surveillance case data. British Columbia Centre for Disease Control [publisher]. (2020). 2021.
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