CSTE Drug Poisoning Indicators Workgroup

Case Definition Subgroup

Phase II

05/03/2018

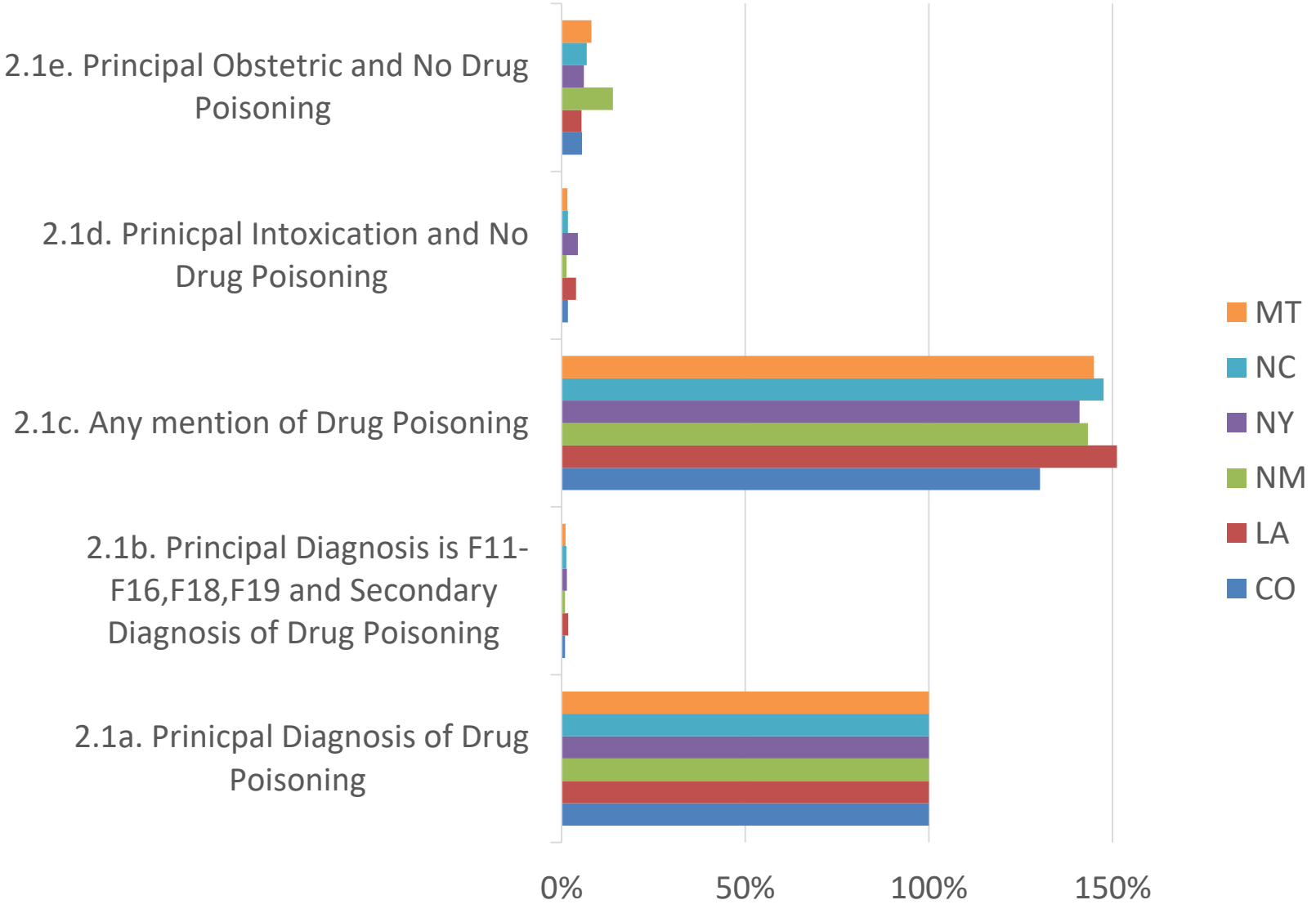
Phase II, Table 2.1. Variations on the CSTE Drug Poisoning Indicator Case Definition 1 from Phase 1 analysis

Purpose: Due to reports that mental health codes for acute intoxication might be mistakenly used during acute overdose events; and coding rules that place O codes related to drug use during pregnancy first in the record, we looked at the ratio of cases with these F or O codes to cases with only T36-T50, to understand how varying our case definition to include these codes in different ways might impact the numbers.

Table 2.1:

	CO	LA	NM	NY	NC	MT
2.1a. Prinicpal Diagnosis of Drug Poisoning	4,877	4081	1,674	16164	9,565	977
2.1b. Principal Diagnosis is F11-F16,F18,F19 and Secondary Diagnosis of Drug Poisoning	46	72	15	233	124	10
2.1c. Any Mention of Drug Poisoning	6,352	6170	2,399	22788	14,114	1416
2.1d. Prinicpal Intoxication and No Drug Poisoning	81	158	22	707	161	15
2.1e. Principal Obstetric and No Drug Poisoning	271	220	233	981	655	79

Phase II, Table 2.1. Variations on the CSTE Drug Poisoning Indicator Case Definition 1 from Phase 1 analysis



Phase II, Table 2.1. Variations on the CSTE Drug Poisoning Indicator Case Definition 1 from Phase 1 analysis

Purpose: Due to reports that mental health codes for acute intoxication might be mistakenly used during acute overdose events; and coding rules that place O codes related to drug use during pregnancy first in the record, we looked at the ratio of cases with these F or O codes to cases with only T36-T50, to understand how varying our case definition to include these codes in different ways might impact the numbers.

Takehome:

- The number of cases added by including F codes, (2.1d and 2.1b) is relatively small.
- The number of cases added by including a principal diagnosis of drug use complicating pregnancy, childbirth, and the puerperium (O99.32) is larger, with 1-10% difference.

Questions:

- Do we need a case review to confirm that 099.32 are acute overdoses?
- How important is parsimony?

Phase II, Table 2.2: T36-T50 (Poisoning) Adverse Effects by Drug Category

Purpose: Adverse effects swamp poisoning codes T36-T50. This analysis helps determine what these adverse effects represent.

*Ideally, we would do this with a Present on Admission indicator. However, several jurisdiction datasets and the Validation dataset lack this variable.

Indicator Definition:

2.2. CSTE case definition with adverse effects: Any mention of T36 -T50 (as defined in 2.1c) but only including codes with a $5^{th}/6^{th}$ character of "5", indicating adverse effects. Includes all encounter types and missing. Charts display all adverse effects codes, including multiple codes per record.

Phase II, Table 2.2: T36-T50 (Poisoning) Adverse Effects by Drug Category

Table 2.2	CO	LA	NM	NY	NC	MT
Drug Code Class Description						
systemic antibiotics	1954	2345	669	9702	5637	189
systemic anti- infectives and antiparasitics	537	817	162	2879	1641	51
hormones and their synthetic substitutes and antagonists, not elsewhere classified	4525	5951	1357	20782	15372	308
nonopioid analgesics, antipyretics and antirheumatics	1174	1342	405	5299	3083	140
narcotics and psychodysleptics [hallucinogens]	5393	3376	999	13509	9783	433
anesthetics and therapeutic gases	645	406	132	1546	883	57
antiepileptic, sedative- hypnotic and antiparkinsonism drugs	1667	1701	435	5167	4540	134
psychotropic drugs, not elsewhere classified	849	976	256	4325	2382	104
primarily affecting the autonomic nervous system	751	722	221	3123	1994	70
systemic and hematological agents, not elsewhere classified	7424	8232	1757	30102	17320	511
agents primarily affecting the cardiovascular system	1440	2170	410	6908	5025	126
agents primarily affecting the gastrointestinal system	205	186	61	780	453	9
agents primarily acting on smooth and skeletal muscles and the respiratory system	256	254	139	1444	634	22
agents primarily affecting skin and mucous membrane and by ophthalmological, otorhinorlaryngological and dental drugs	95	74	22	343	145	11
diuretics and other and unspecified drugs, medicaments and biological substances	3890	4852	1291	15273	12266	275
Total:	30805	33404	8316	121182	81158	2440

Phase II, Table 2.2: T36-T50 (Poisoning) Adverse Effects by Drug Category

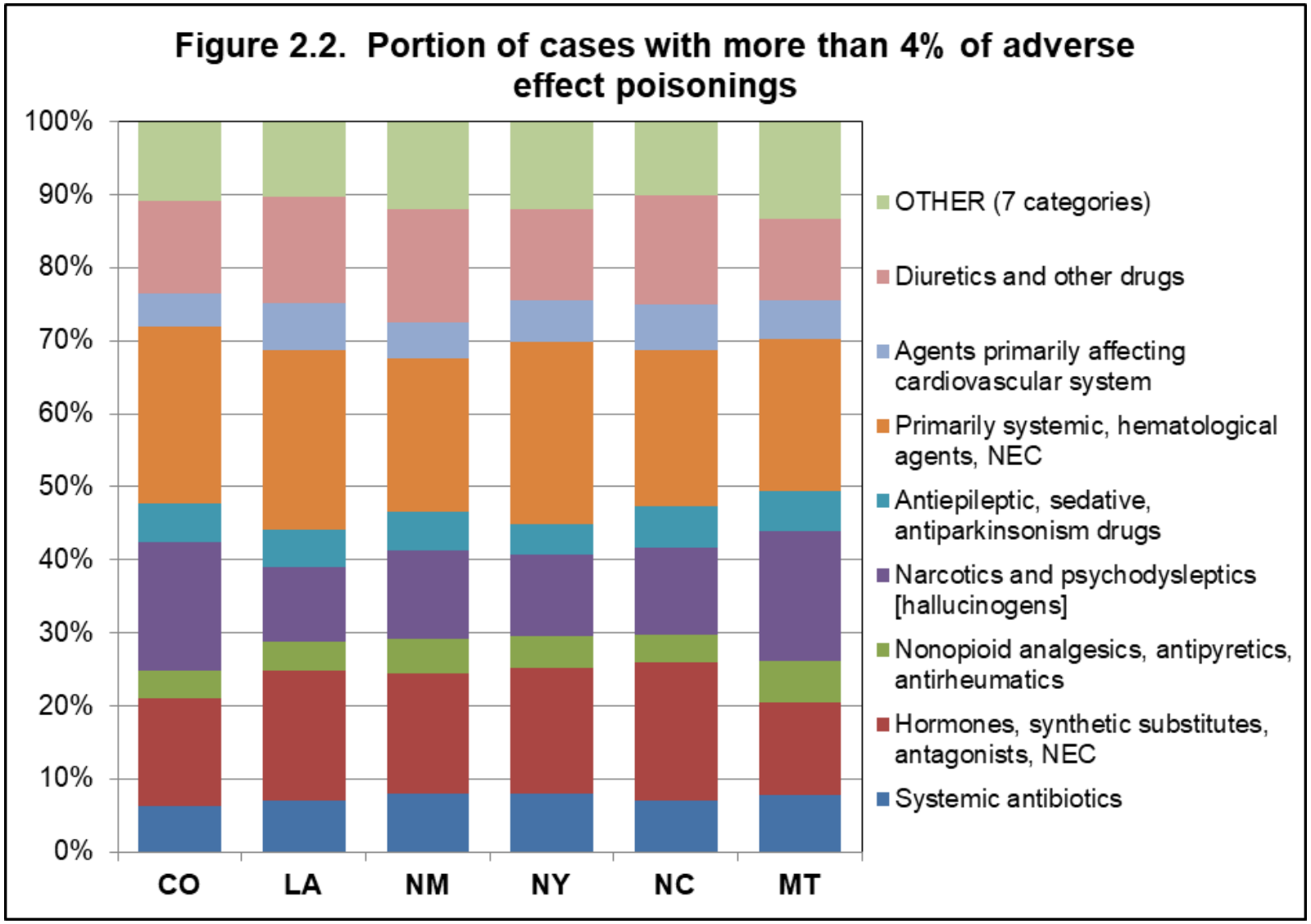
Table 2.2a: Adverse Effects, Select Specific Drugs, Number and Percent of cases

	Number						Percent					
	CO	LA	NM	NY	NC	MT	CO	LA	NM	NY	NC	MT
Narcotics and [hallucinogens]	**5393**	**3376**	**999**	**13509**	**9783**	**433**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Opioids	5278	3270	967	13205	9652	428	97.9%	96.9%	96.8%	97.7%	98.7%	98.8%
Cannabis	87	56	27	184	78	5	1.6%	1.7%	2.7%	1.4%	0.8%	1.2%
Psychotropic drugs, not elsewhere classified	**849**	**976**	**256**	**4325**	**2382**	**104**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Amphetamines	59	44	20	43	46	4	6.9%	4.5%	7.8%	1.0%	1.9%	3.8%

Table 2.2b: Categories with More than 4% of Adverse Effect Poisonings, Percent of cases

	CO	LA	NM	NY	NC	MT
Systemic antibiotics	6.3%	7.0%	8.0%	8.0%	6.9%	7.7%
Hormones, synthetic substitutes, antagonists, NEC	14.7%	17.8%	16.3%	17.1%	18.9%	12.6%
Nonopioid analgesics, antipyretics, antirheumatics	3.8%	4.0%	4.9%	4.4%	3.8%	5.7%
Narcotics and psychodysleptics [hallucinogens]	17.5%	10.1%	12.0%	11.1%	12.0%	17.7%
Antiepileptic, sedative, antiparkinsonism drugs	5.4%	5.1%	5.2%	4.3%	5.6%	5.5%
Primarily systemic, hematological agents, NEC	24.1%	24.6%	21.1%	24.8%	21.3%	20.9%
Agents primarily affecting cardiovascular system	4.7%	6.5%	4.9%	5.7%	6.2%	5.2%
Diuretics and other drugs	12.6%	14.5%	15.5%	12.6%	15.1%	11.3%
OTHER (7 categories)	10.8%	10.3%	11.9%	11.9%	10.0%	13.3%

Phase II, Table 2.2: T36-T50 (Poisoning) Adverse Effects by Drug Category



Phase II, Table 2.2: T36-T50 (Poisoning) Adverse Effects by Drug Category

Purpose: Adverse effects swamp poisoning codes T36-T50. This analysis helps determine what these adverse effects represent.

Takehome:

- Drugs with abuse potential make up a small portion of adverse effects cases. 10-20%. Mostly what we see is medical misadventure.
- Among adverse effects of drugs with abuse potential, opioids make up the lion's share.

Phase II, Table 2.3: Comparing Poisoning, Adverse Effects, and Behavioral Health Codes for Specific Drugs.

***Based on CSTE Case Definition Indicator Definition 2.1c (any mention)**

Purpose: Drugs with abuse potential are of great interest to policymakers. This analysis compares the number of adverse effects and behavioral health codes (F-codes) to the number of poisoning codes for specific drugs.

Table 2.3.1X. The impact of including Adverse Effects in various opioid definitions				
		NM	NC	CO
Non-heroin opioids alone	Case Definition Overdose	516	3,552	299
	Case Definition Overdose plus Adverse Effect	1,158	9,306	853
Non-heroin opioids and heroin	Case Definition Overdose	11	60	1
	Case Definition Overdose plus Adverse Effect	11	60	1
Heroin alone	Case Definition Overdose	134	614	38
	Case Definition Overdose plus Adverse Effect	134	614	38

Phase II, Table 2.3: Comparing Poisoning, Adverse Effects, and Behavioral Health Codes for Specific Drugs.

*Based on CSTE Case Definition Indicator Definition 2.1c (any mention)

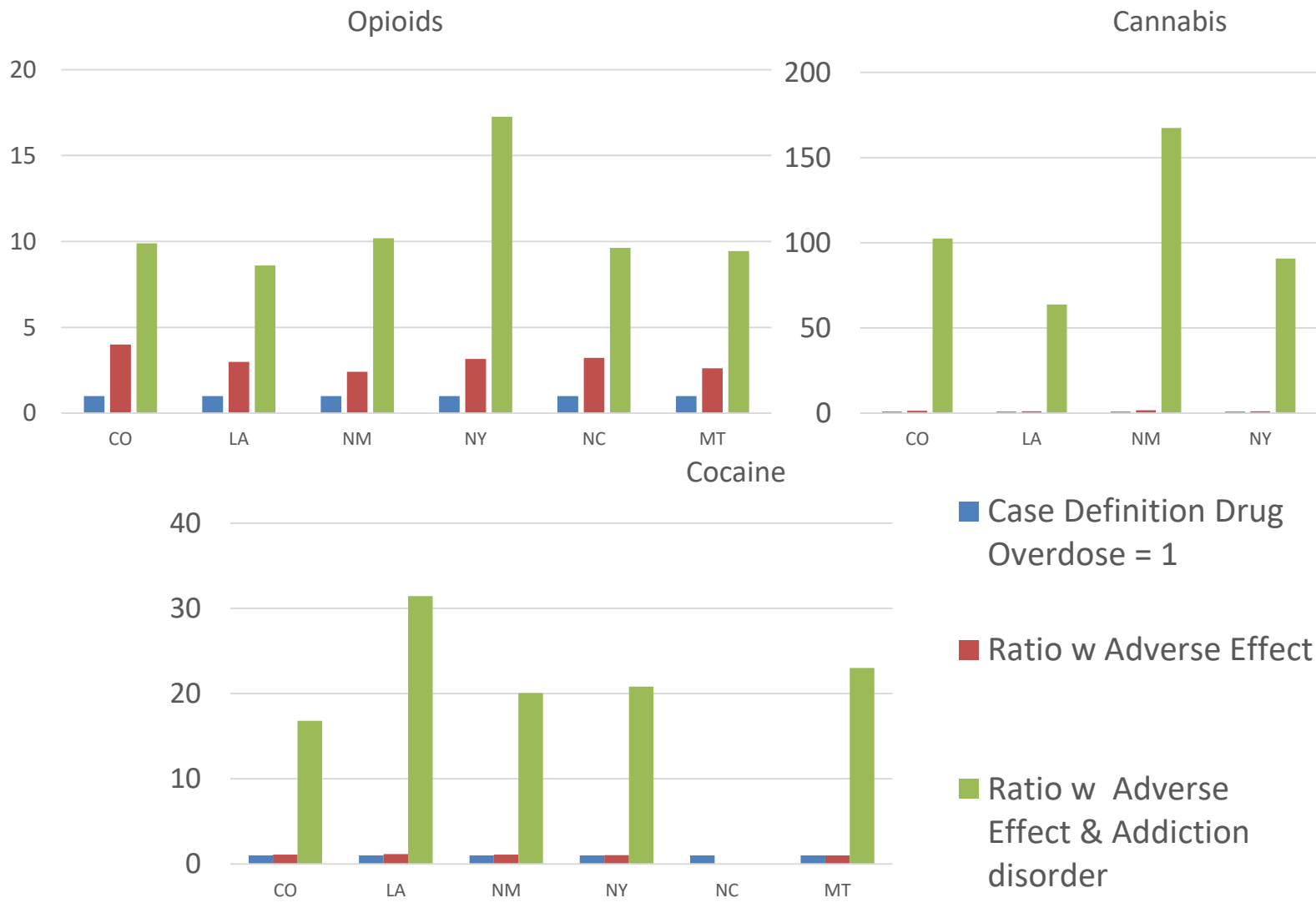
Table 2.3. Comparing Poisoning, Adverse Effects, and Behavioral Health Codes for Specific Drugs.

	Number of Cases						Proportionate Increase Over Case Definition					
	CO	LA	NM	NY	NC	MT	CO	LA	NM	NY	NC	MT
Opioids												
Case Definition Drug Overdose	1,733	1,606	661	5,940	4,226	262						
w Adverse Effect	6,923	4,811	1,598	18,754	13,639	687	4.0	3.0	2.4	3.2	3.2	2.6
w Adverse Effect & Addiction disorder	17,135	13,824	6,735	102,540	40,685	2,472	9.9	8.6	10.2	17.3	9.6	9.4
Cannabis												
Case Definition Drug Overdose	189	246	36	872	316	19						
w Adverse Effect	275	298	63	1,051	392	24	1.5	1.2	1.8	1.2	1.2	1.3
w Adverse Effect & Addiction disorder	19,379	15,716	6,026	79,120	33,733	1,889	102.5	63.9	167.4	90.7	106.8	99.4
Ampthetamines												
Case Definition Drug Overdose	439	332	211	423	430	64						
w Adverse Effect	478	372	228	465	474	68	1.1	1.1	1.1	1.1	1.1	1.1
Cocaine												
Case Definition Drug Overdose	221	299	62	3,149	--	2						
w Adverse Effect	245	345	67	3,252	--	2	1.1	1.2	1.1	1.0	--	1.0
w Adverse Effect & Addiction disorder	3,711	9,398	1,243	65,512	--	46	16.8	31.4	20.0	20.8	--	23.0
Benzodiazepines												
Case Definition Drug Overdose	1,034	1,040	415	3,578	--	235						
w Adverse Effect	1,691	1,529	562	5,188	--	281	1.6	1.5	1.4	1.4	--	1.2

Phase II, Table 2.3: Comparing Poisoning, Adverse Effects, and Behavioral Health Codes for Specific Drugs.

***Based on CSTE Case Definition Indicator Definition 2.1c (any mention)**

Ratio of



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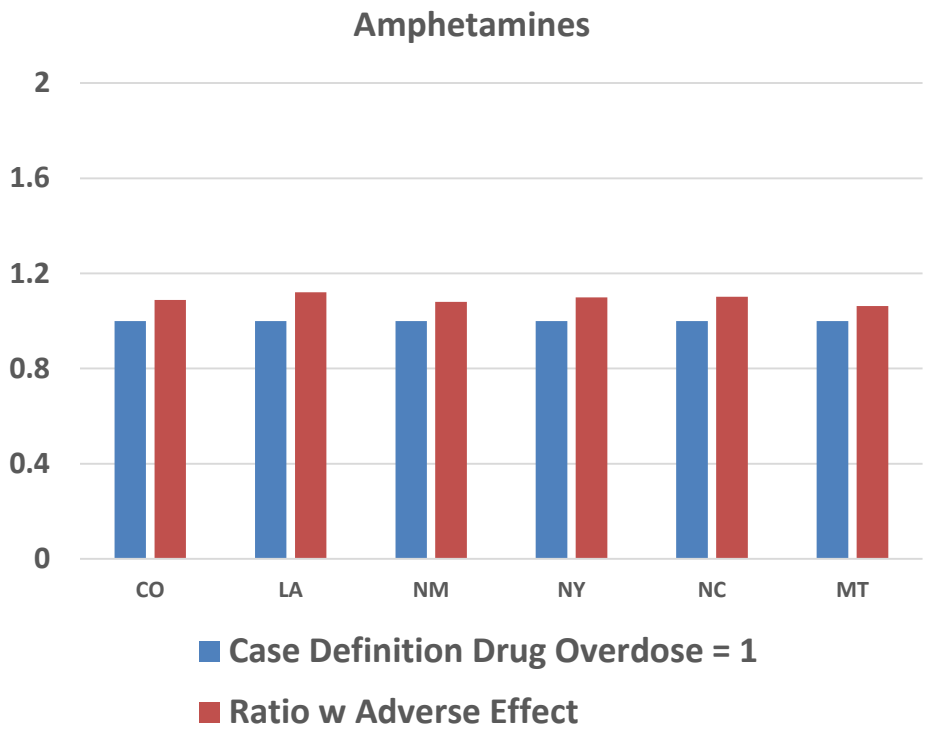
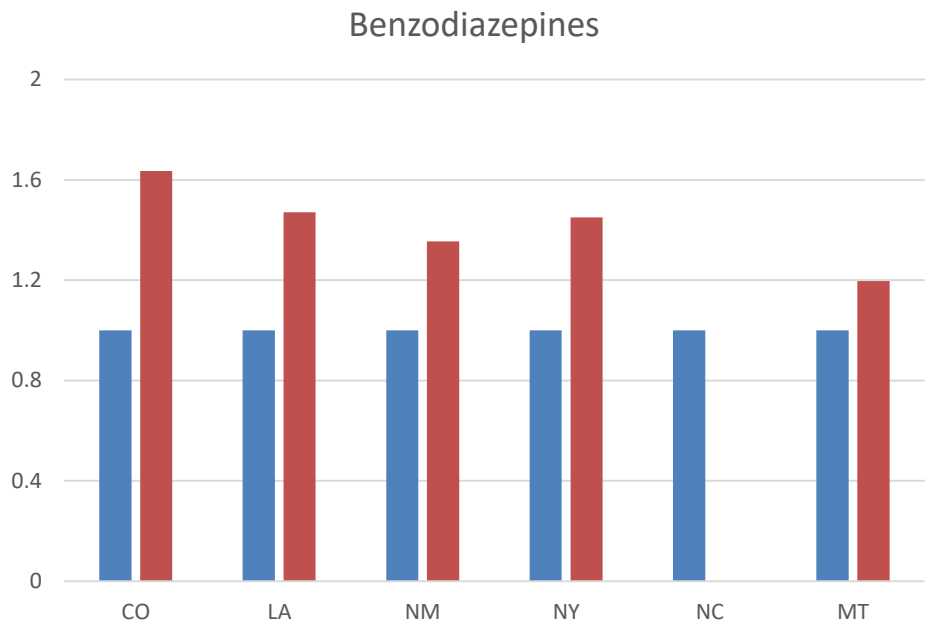




Phase II, Table 2.3: Comparing Poisoning, Adverse Effects, and Behavioral Health Codes for Specific Drugs.

Purpose:

Takehome:

- Adverse effects and mental health codes should not be part of an acute overdose definition. They should be considered when measuring the burden of drug use on a hospital system.

Questions:

- Do states need a sub indicator for cannabis that includes adverse effects? (There is not a clear clinical distinction between cannabis overdose and adverse effect)
- What indicators are other subcommittees testing?

Phase II, Table 4. Investigation of Potential Changes to PfS/DDPI Indicator Definitions. Excluding discharge codes of deceased/expired.

Purpose: "All diagnoses" is used for DDPI / PfS grant planning. These indicators will be used for CDC planning and evaluation. PfS/DDPI indicators exclude cases with discharge codes of deceased/expired.

This series of analyses investigates the impact of

- Fig 2.4: changing the number of diagnosis fields included,
- Fig 2.4.a: using only the initial and missing encounters,
- Fig 2.4.b: including counts of cases with both heroin and non-heroin opioid codes,
- Fig 2.4.c: changing the manner/intention included.

Phase II, Table 4. Investigation of Potential Changes to PfS/DDPI Indicator Definitions.

Table 2.4. Number of cases identified by number of diagnosis codes examined

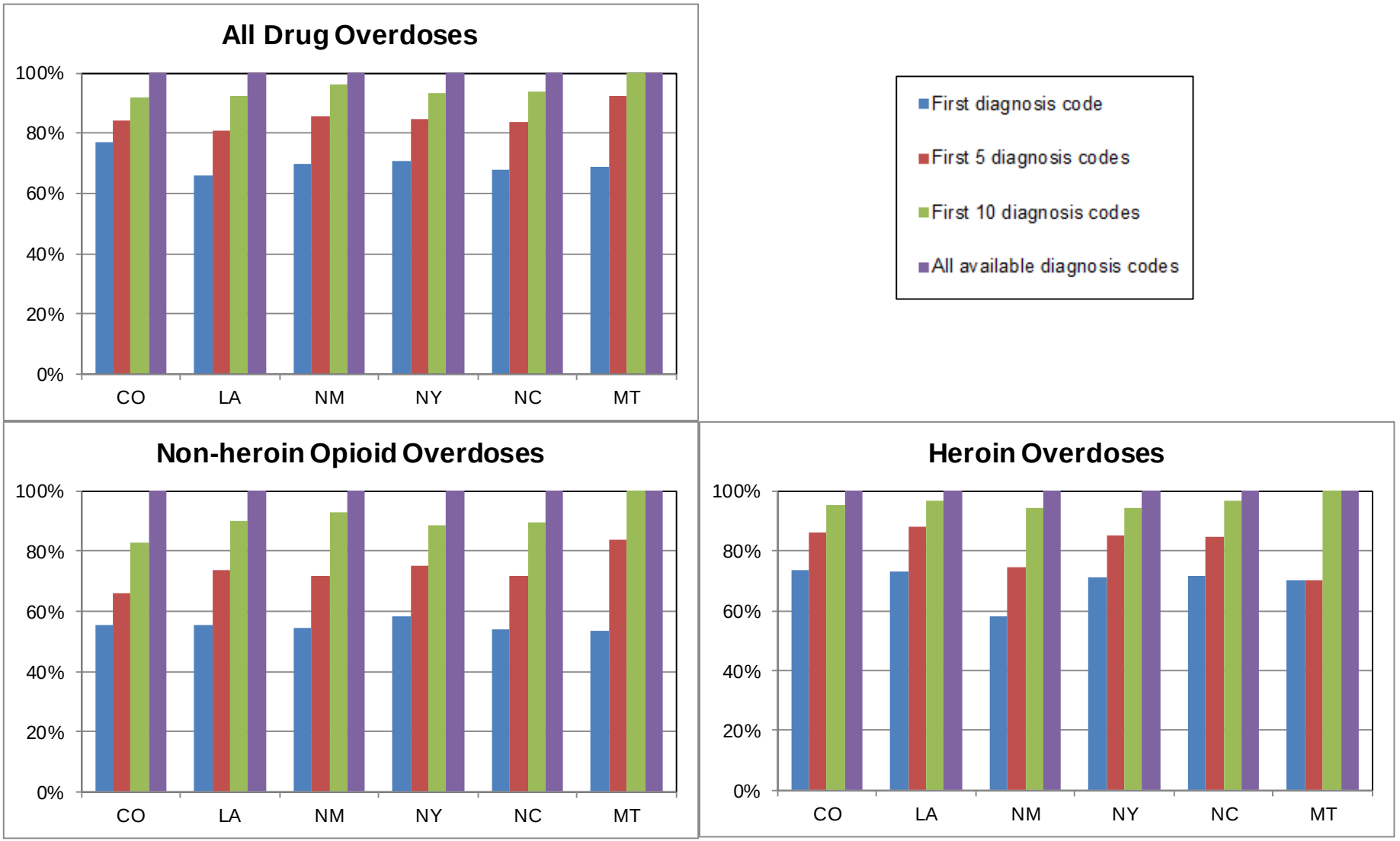
		CO	LA	NM	NY	NC	MT
All drug overdoses	First diagnosis code	4,781	4,081	1,629	15,767	9,335	962
	First 5 diagnosis codes	5,247	4,987	2,009	18,823	11,505	1,287
	First 10 diagnosis codes	5,718	5,691	2,258	20,765	12,915	1,396
	All available diagnosis codes	6,219	6,170	2,341	22,237	13,767	1,396
Non-heroin opioid overdoses	First diagnosis code	799	724	272	2,224	1,848	130
	First 5 diagnosis codes	953	964	358	2,849	2,440	203
	First 10 diagnosis codes	1,194	1,174	464	3,369	3,059	242
	All available diagnosis codes	1,440	1,308	500	3,801	3,412	242
Heroin overdoses	First diagnosis code	160	211	79	1,293	430	7
	First 5 diagnosis codes	188	254	101	1,546	506	7
	First 10 diagnosis codes	208	278	128	1,710	579	10
	All available diagnosis codes	218	288	136	1,817	599	10

Table 2.4. Percent of all cases identified by number of diagnosis codes examined

		CO	LA	NM	NY	NC	MT
All drug overdoses	First diagnosis code	76.9%	66.1%	69.6%	70.9%	67.8%	68.9%
	First 5 diagnosis codes	84.4%	80.8%	85.8%	84.6%	83.6%	92.2%
	First 10 diagnosis codes	91.9%	92.2%	96.5%	93.4%	93.8%	100.0%
	All available diagnosis codes	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-heroin opioid overdoses	First diagnosis code	55.5%	55.4%	54.4%	58.5%	54.2%	53.7%
	First 5 diagnosis codes	66.2%	73.7%	71.6%	75.0%	71.5%	83.9%
	First 10 diagnosis codes	82.9%	89.8%	92.8%	88.6%	89.7%	100.0%
	All available diagnosis codes	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Heroin overdoses	First diagnosis code	73.4%	73.3%	58.1%	71.2%	71.8%	70.0%
	First 5 diagnosis codes	86.2%	88.2%	74.3%	85.1%	84.5%	70.0%
	First 10 diagnosis codes	95.4%	96.5%	94.1%	94.1%	96.7%	100.0%
	All available diagnosis codes	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Phase II, Table 2.4. Investigation of Potential Changes to PfS/DDPI Indicator Definitions.

Figure 2.4. Percent of all cases identified by number of diagnosis codes examined



Phase II, Table 4. Investigation of Potential Changes to PfS/DDPI Indicator Definitions. Excluding discharge codes of deceased/expired.

Table 2.4a. Number of overdose hospitalizations identified by encounter type

	CO	LA	NM	NY	NC	MT
All drug overdoses - initial/subsequent/missing	6,219	6,170	2,341	22,237	13,767	1,396
All drug overdoses - initial/missing only	6,139	6,033	2,306	21,635	13,634	1,380
Non-heroin opioids - initial/subsequent/missing	1,440	1,308	500	3,801	3,412	242
Non-heroin opioids - initial/missing only	1,434	1,291	495	3,745	3,395	241
Heroin overdoses - initial/subsequent/missing	218	288	136	1,817	599	10
Heroin overdoses - initial/missing only	216	287	135	1,790	595	10

Percent of overdose hospitalizations with a subsequent encounter code

	CO	LA	NM	NY	NC	MT
All drug overdoses	1.3%	2.2%	1.5%	2.7%	1.0%	1.1%
Non-heroin opioid overdoses	0.4%	1.3%	1.0%	1.5%	0.5%	0.4%
Heroin overdoses	0.9%	0.3%	0.7%	1.5%	0.7%	0.0%

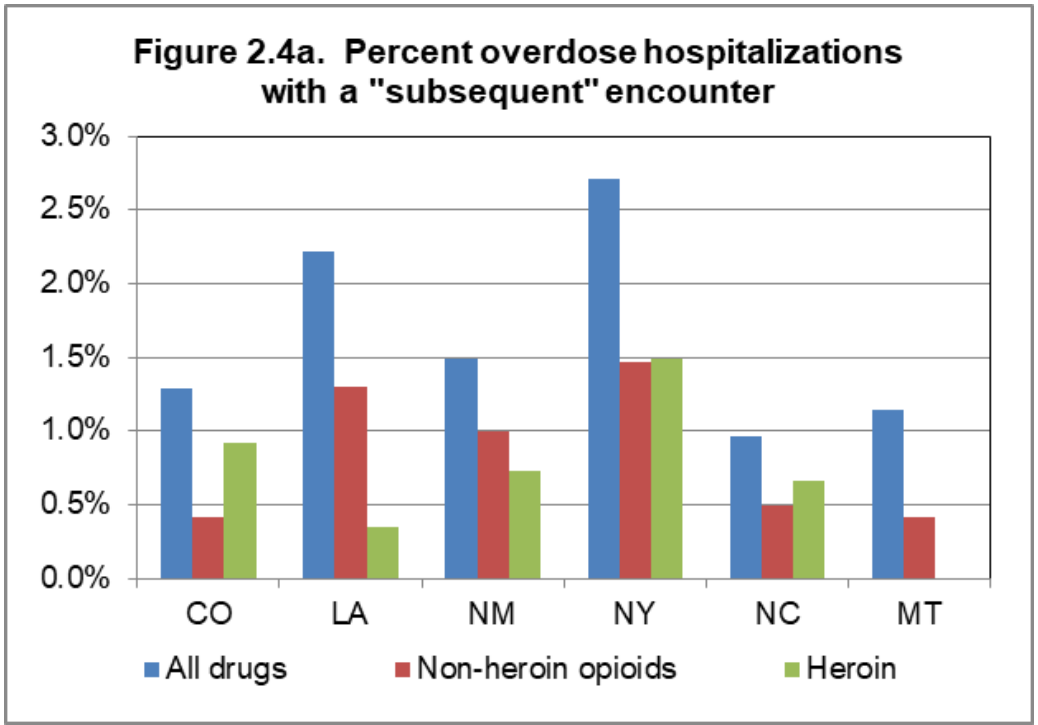


Table 2.4b: DDPI / PfS Opioid Case Definition Alternatives

	CO	LA	NM	NY	NC	MT
Hospitalizations involving heroin alone	208	267	125	1,717	545	10
Hospitalizations involving heroin and other opiods	10	21	11	100	54	0
Hospitalizations involving other opioids alone	1,440	1,308	500	3,801	3,412	242

Percent of cases by alternative opioid definition

	CO	LA	NM	NY	NC	MT
Hospitalizations involving heroin alone	12.5%	16.7%	19.7%	30.6%	13.6%	4.0%
Hospitalizations involving heroin and other opiods	0.6%	1.3%	1.7%	1.8%	1.3%	0.0%
Hospitalizations involving other opioids alone	86.9%	82.0%	78.6%	67.7%	85.1%	96.0%

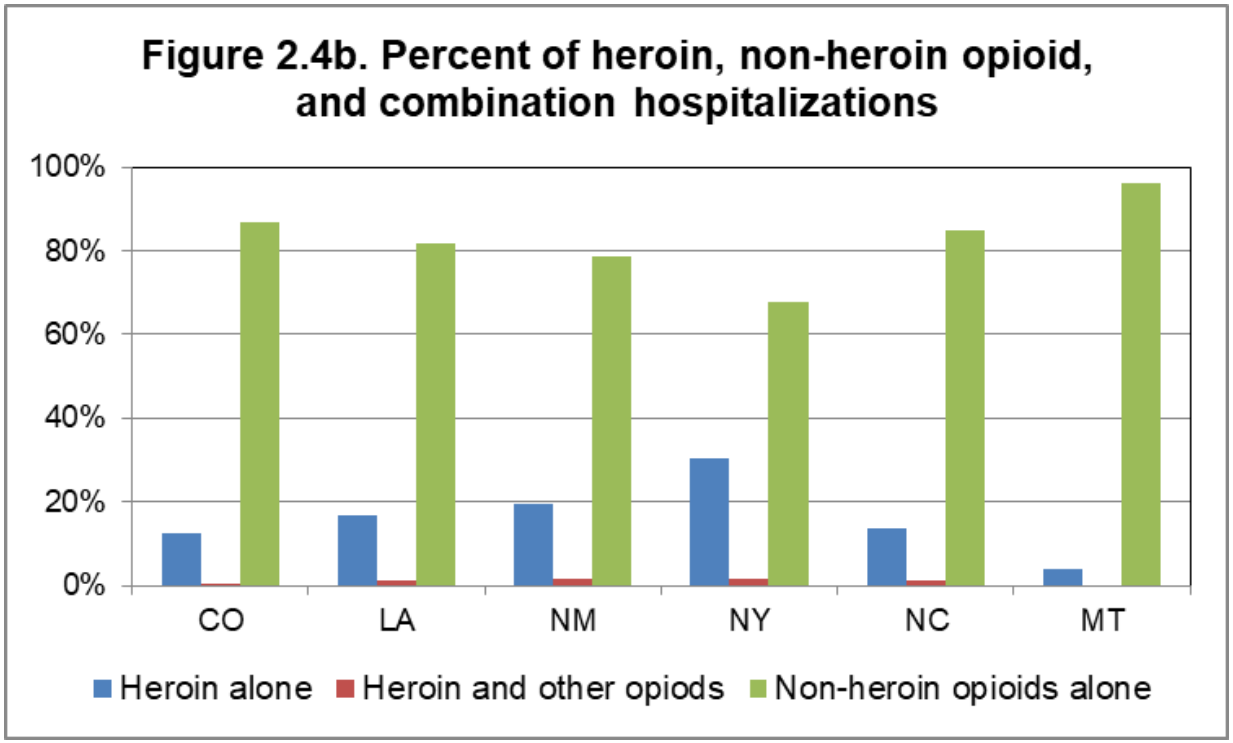
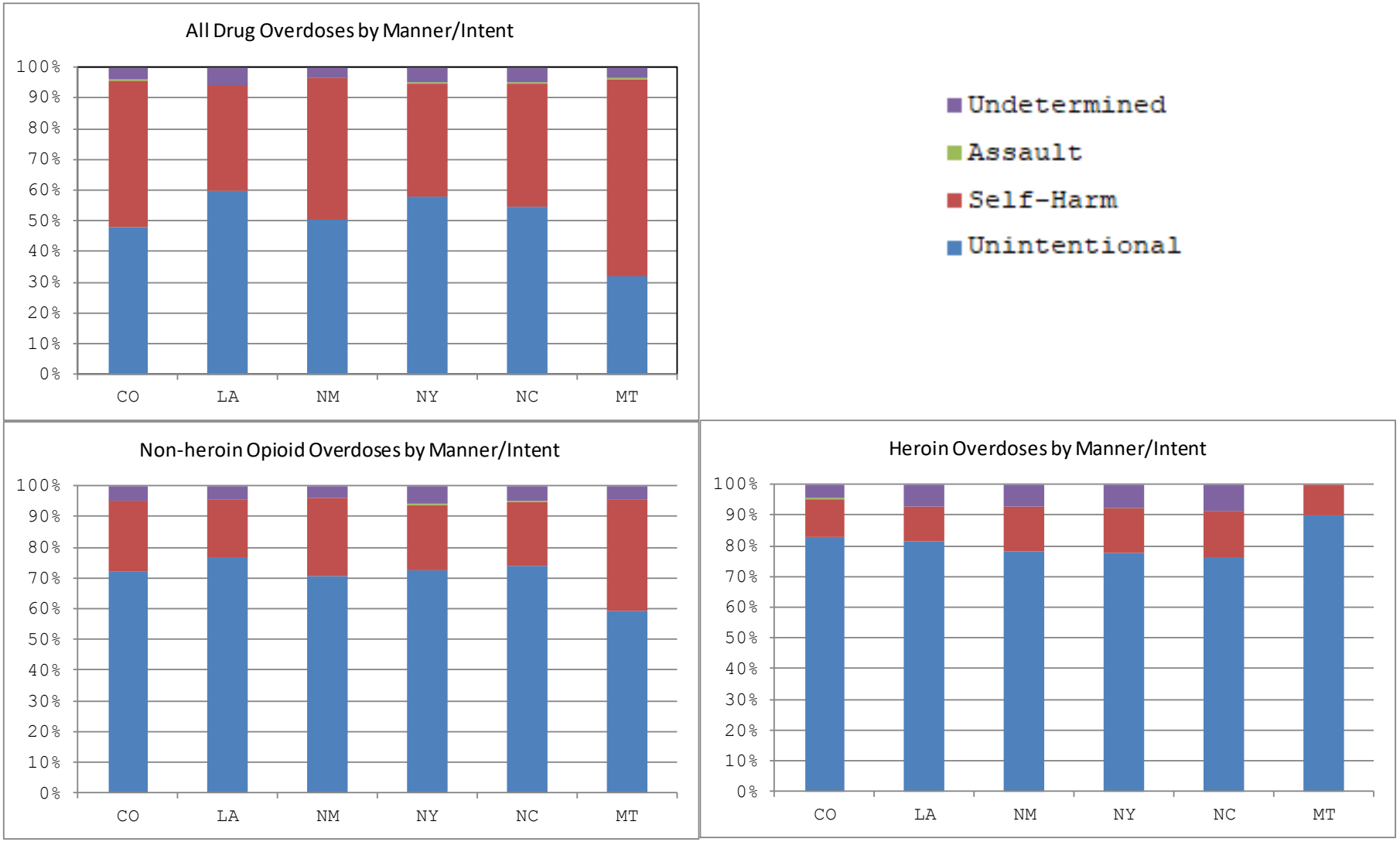


Table 2.4c. Number of overdose hospitalizations by manner/intent type

		Uninten-tional	Self-Harm	Assault	Undeter-mined
All Drugs	CO	2,987	2,970	19	243
	LA	3,686	2,114	9	361
	NM	1,183	1,074	5	79
	NY	12,819	8,220	60	1,138
	NC	7,489	5,541	44	693
	MT	449	894	3	50
Non-heroin Opioids	CO	1,040	327	1	72
	LA	1,001	246	1	60
	NM	353	128	0	19
	NY	2,750	810	10	231
	NC	2,522	712	5	173
	MT	143	88	0	11
Heroin	CO	181	26	1	10
	LA	235	32	0	21
	NM	106	20	0	10
	NY	1,414	260	1	142
	NC	457	90	1	51
	MT	9	1	0	0

Figure 2.4c. Portion of overdose hospitalizations by manner/intent type



Phase II, Table 4. Investigation of Potential Changes to PfS/DDPI Indicator Definitions. Excluding discharge codes of deceased/expired.

Takehome:

- A large percent of cases only have drug poisoning diagnosis code in a secondary field. This is most pronounced for non-heroin opioids:
  - All drug: 25-30%
  - Non heroin opioid: around 45%
  - Heroin: 30-40%
- Subsequent encounters only make up a small percent of total cases. For heroin and non-heroin, the percent is even smaller than for all-drug.
- Most overdoses are unintentional. Self harm is a more prevalent intent category for the all-drug category, than for opioids or heroin.