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analysis to advance the health of vulnerable populations

Subgroups of Medicaid Clients with Substance Use Disorders

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(Presented to: The DHMH Behavioral Health Integration Data Work Group.)

Funding: Baltimore Substance Abuse Systems, Inc.

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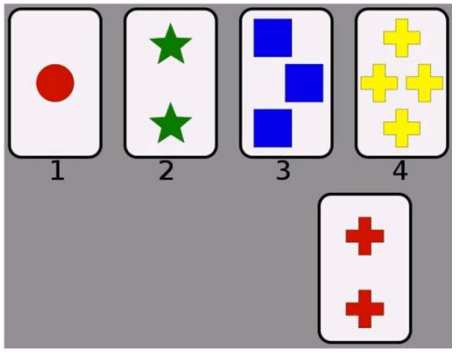
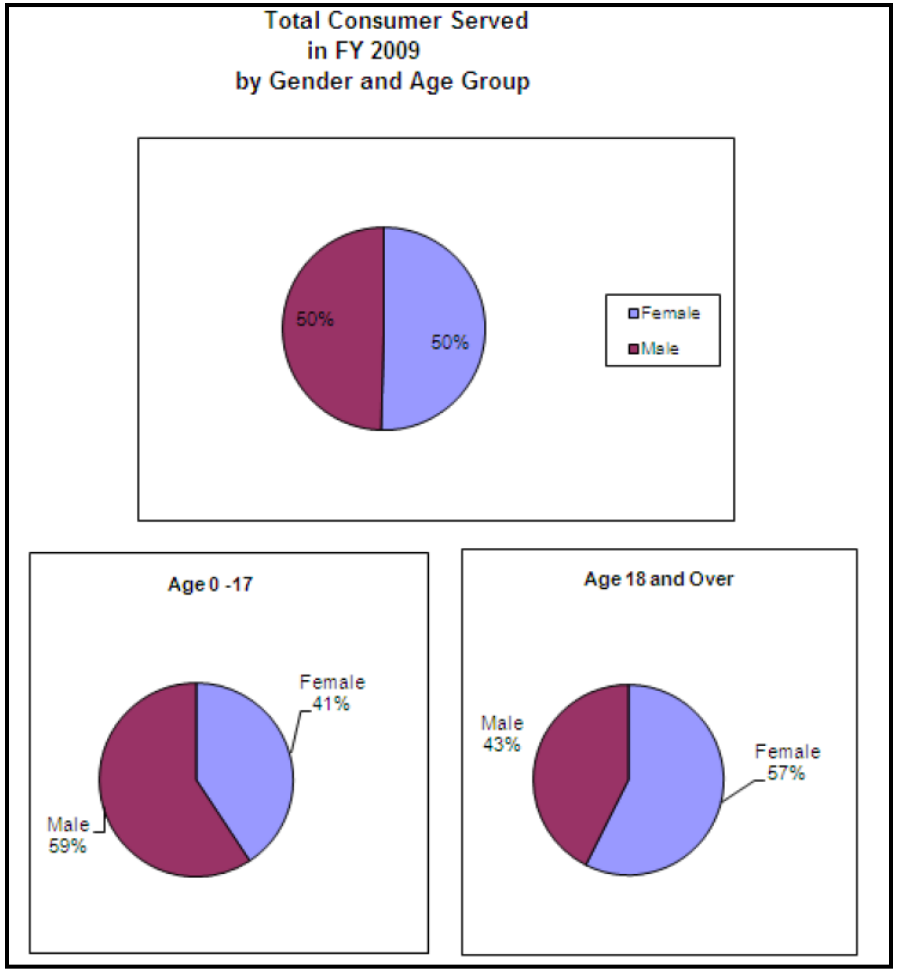
Purpose…

- Create a snapshot of persons with substance use disorders in Medicaid using administrative data.
- Isolate patterns (*e.g.*, homogenous subgroups) to form the basis of future intervention and study.



Example: MHA Block Grant Reporting FY2011



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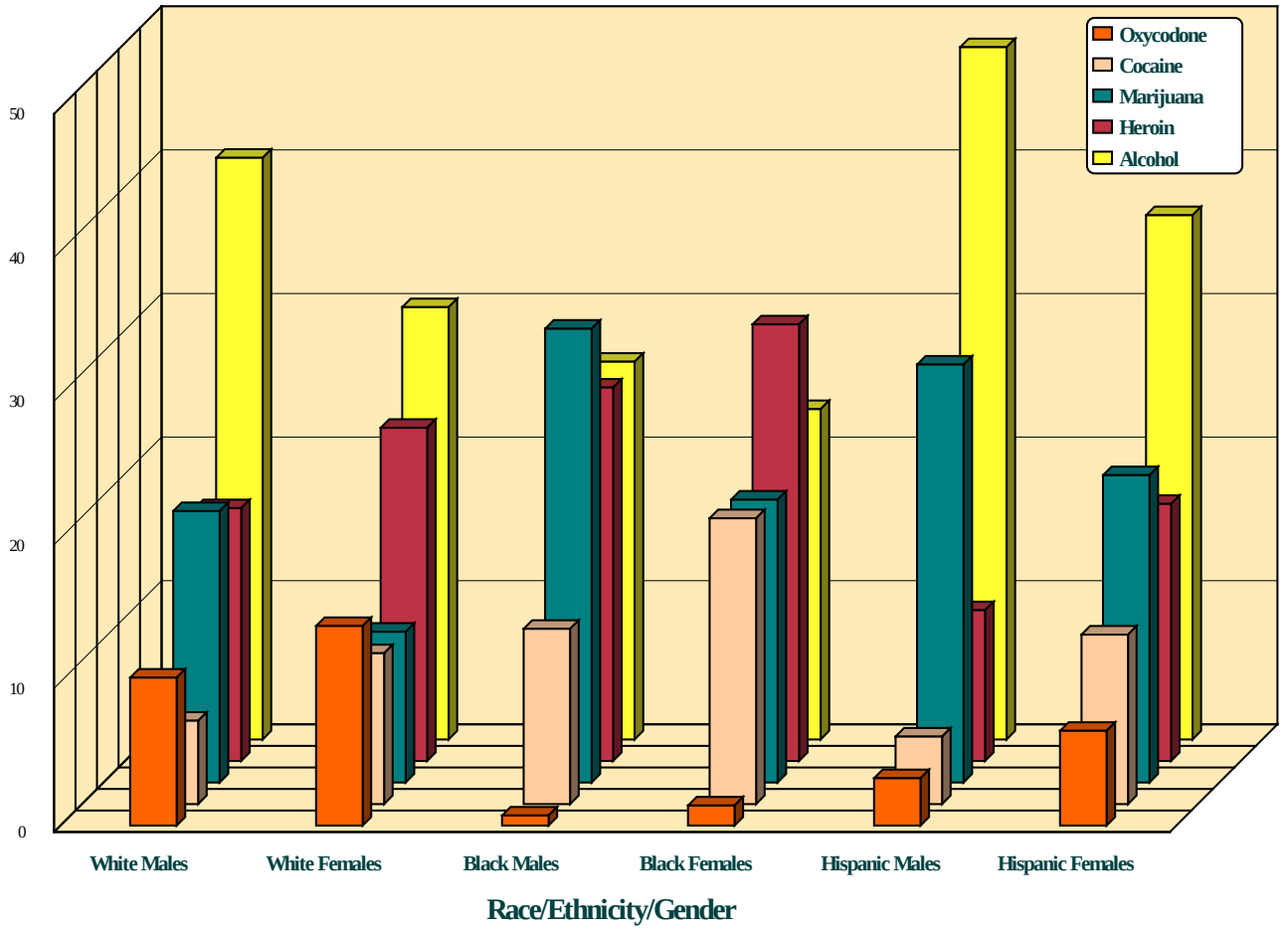
Example: ADAA Outlooks and Outcomes FY2011



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Presentation Outline

- Data Isolation
- Population Description
- Latent Class Analysis (LCA)Method
- Most Frequent Provider Identification
- Conclusions and relevance to Behavioral Health Integration

Data Isolation

- Calendar Year (CY) 2010
- Maryland Medicaid Enrollee with…
  - Any evidence of substance use disorder (SUD)
    - Diagnostic code defined (ICD-9)
    - Buprenorphine/Methadone
  - Age 0-64
  - No rare/special waiver program participation
  - In state residents

Demographics (n=57,353)

- Age (yrs): Mean= 38; SD= 13.3; range= 0-64
- Females (%)= 48.5
- Pregnancy (% of females)= 14.7
- Race (%): Black= 49.5; White= 45.8; Hispanic= 1.4; Other= 3.3

Regional Distribution

Region	Frequency	Percent
Baltimore City	24,611	42.9
Baltimore Suburbs	14,893	26.0
Washington Suburbs	6,174	10.8
Western Maryland	3,469	6.1
Eastern Maryland	5,997	10.5
Southern Maryland	2,209	3.9
Total	**57,353**	**100.0**

Enrollment Category

Enrollment Group	Frequency	Percent
Full HealthChoice	36,071	62.9
Fee-for-service	1,971	3.4
PAC (Primary Adult Care)	13,499	23.5
Dual (Medicare-Medicaid)	5,812	10.1
Total	**57,353**	**100.0**

37% are categorically “Aged, Blind, or Disabled”, by state or federal criteria

Medicaid Expenditures

Enrollment	Total Expenditure Quartile Ranges			
	Low	Moderate	Moderate-High	High
Full HealthChoice	≤ $3,929	$3,930-$8,361	$8,362-$18,471	> $18,471
Fee-for-service Only	≤ $3,424	$3,425-$11,481	$11,482-$36,312	> $36,312
PAC	≤ $1,140	$1,141-$1,771	$1,772-$2,652	> $2,652
Dual	≤ $1,549	$1,550-$3,599	$3,600-$10,097	> $10,097
Across Groups	**≤ $1,966**	**$1,967-$4,817**	**$4,818-$14,658**	**> $14,658**

Inpatient Utilization

Inpatient Admission Counts	Frequency	Percent
0	37,806	65.9
1	11,764	20.5
2	3,829	6.7
3 or more	3,954	6.9
Total	**57,353**	**100.0**

Emergency Department Use

Emergency Department Visit Counts	Frequency	Percent
0	18,612	32.5
1	12,527	21.8
2	7,828	13.7
3 or more	18,386	32.1
total	**57,353**	**100.0**

Other Select Service Utilization (n=57,353)

- Long-term Care 1.4%
- Methadone 21%
- Buprenorphine 13%

Substance Use Diagnoses

Substance Use Disorder Diagnostic Type*	Percent
Opioid Dependence	41%
Alcohol Abuse	23%
Alcohol Dependence	19%
Other Unspecified Abuse	18%
Cannabis Abuse	15%
Unspecified Dependence	10%
Cocaine Abuse	10%
Cocaine Dependence	9%
Cannabis Dependence	8%
Opioid Abuse	7%
Drug Induced Mental Disorders	6%
Other Combined Dependence	5%
Alcohol Induced Mental Disorders	4%
Drug Dependence in Surrounding Pregnancy	2%
Sedative, Hypnotic, Anxiolytic, Dependence	2%

*ICD-9 Codes, with 4 digit resolution

Morbidity in the MEDC for Psychosocial Problems:

Expanded Diagnosis Cluster*	Percent
Substance Use	83%
Tobacco Use	35%
Depression	33%
Anxiety, Neuroses	25%
Schizophrenia and Affective Psychosis	15%
Psychological Signs and Symptoms	6%
Attention Deficit Disorder	4%
Family and Social Problems	3%
Behavioral Problems	2%
Personality Disorders	1%
Psychosocial Disorders, Other	1%

- **Weiner et al., (1991). *Medical Care, 29*(5), 452-472.**
- **www.acg.jhsph.org**

Other MEDCs...

Major Expanded Diagnosis Cluster*	Percent
Musculoskeletal	53%
General Signs and Symptoms	47%
Cardiovascular	45%
General Surgery	39%
Gastrointestinal/Hepatic	39%
Neurologic	38%
Respiratory	37%
Skin	33%
Genito-urinary	22%
Female Reproductive	22%
Allergy	22%
Ears, Nose, Throat	20%

- **Weiner et al., (1991). *Medical Care, 29*(5), 452-472.**
- **www.acg.jhsph.org**

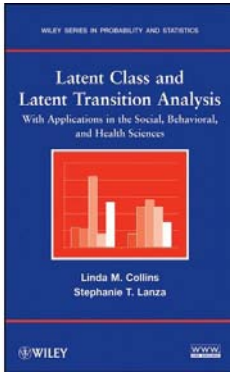
Other MEDCs, Less Common

Major Expanded Diagnosis Cluster*	Percent
Infectious Disease	18%
Renal	17%
Hematologic	16%
Endocrine	16%
Nutritional	15%
Reconstructive	11%
Dental	11%
Eye	10%
Toxic Effects	9%
Rheumatologic	8%
Genetic	4%
Malignancies	3%

- **Weiner et al., (1991). *Medical Care, 29*(5), 452-472.**
- **www.acg.jhsph.org**

Latent Class Analysis

- Find “hidden” subgroups using…
- Moss et al. (2007): Subtypes of alcohol dependence in national representative sample, *Drug and Alcohol Dependence*, 91:149.
- Collins LM and Lanza ST, Latent Class and Latent Transition Analysis, Wiley, New York, NY, 2010.



http://methodology.psu.edu/latentclassbook/

An Example…

Table 4. Item-Response Probabilities for Five-Class Model: Probability of Endorsing Item Given Latent Class

	Latent Class				
Item	*Nondrinkers (17.9%)*	*Experimenters (21.9%)*	*Drinkers (9.3%)*	*Occasional Bingers (17.4%)*	*Heavy Drinkers (33.5%)*
Lifetime alcohol use	0.000	1.000	1.000	1.000	1.000
Past year use	0.000	0.607	1.000	1.000	1.000
Past month use	0.000	0.000	1.000	0.385	1.000
Lifetime drunkenness	0.000	0.241	0.293	1.000	1.000
Past year drunkenness	0.000	0.000	0.000	1.000	1.000
Past month drunkenness	0.000	0.000	0.000	0.000	0.924
5+ drinks in past 2 weeks	0.000	0.000	0.161	0.000	0.732

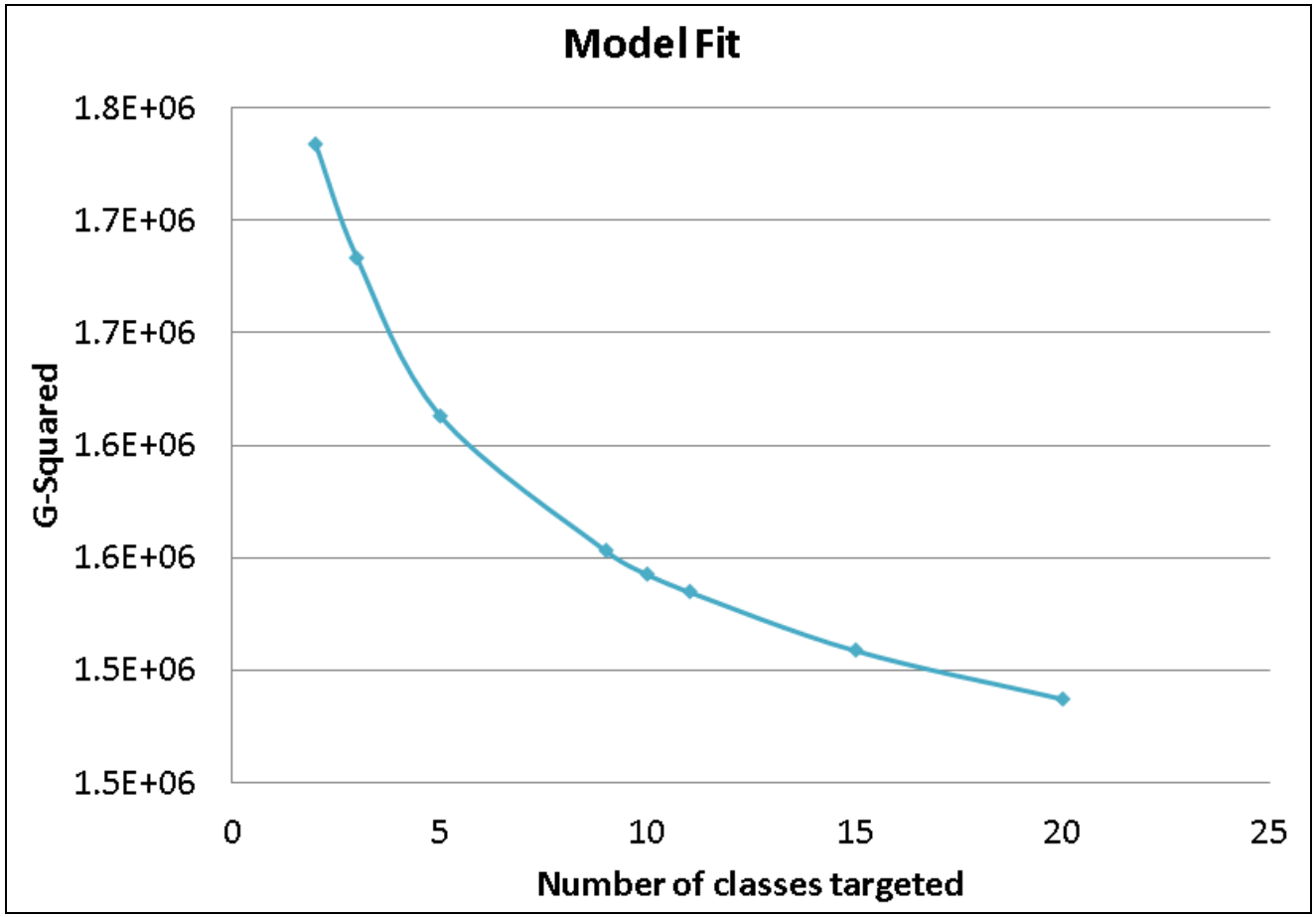
From Lanza et al. (2007), Structural Equation Modeling: A Multidisciplinary Journal, 14:4, 671.

Model Parameters (a.k.a., items), 70 Total...

- 1. Age Group (0-11, 12-17, 18-21, 22-30, 31-54, 55-64)
- 2. Gender
- 3. Race (Black, White, Other)
- 4. Region (Baltimore City, Suburbs, East., West., South.)
- 5. Enrollment Category (HealthChoice, PAC, FFS, Dual)
- 6. Aged/Blind/Disabled Category
- 7. Pregnancy
- 8. Service Use: Inpatient, ED, LTC, ORT (Opioid Replacement Therapy)
- 9. Diagnostic Markers (23 SUDs, 23 MEDCs, 10 EDCs)
- 10. Expenditure Level (Quartiles by Enrollment Category)

Final inclusion: ≥10 Months of Medicaid
Population Change: 57,353 → 46,343

LCA Model Fit Statistics



Classification Distribution…

Class	1	2	3	4	5	6	7	8	9	10
Mean Poster. Prob. (stdev)	.90 (.15)	.94 (.13)	.85 (.17)	.86 (.17)	.83 (.17)	.85 (.16)	.94 (.12)	.89 (.16)	.89 (.15)	.94 (.13)
Percent	10%	7%	11%	10%	13%	11%	8%	7%	11%	11%
N	4,652	3,265	5,138	4,680	6,196	5,158	3,732	3,258	5,250	5,014

Class Labels

1. Low Morbidity ORT (Opioid Replacement Therapy)
2. Women – Pregnant
3. Women – High ER Use
4. Disabled ORT
5. Adult – PAC/Dual
6. Adult – Dual
7. Adult – High Somatic Morbidity
8. Adult – High Psychological Morbidity
9. Urban ORT – PAC
10. Teenagers/Young Adults

Selected posterior fit probabilities…

Class	Low Morbid. ORT	Women-Pregnant	Women-High ER Use	Disabled, ORT	Adult-PAC/Dual	Adult-Dual	Adult-High Somatic Morbid.	Adult-High Psych. Morbid.	Urban ORT- PAC	Teenagers/ Young Adults
N	4,652	3,265	5,138	4,680	6,196	5,158	3,732	3,258	5,250	5,014
Mean Age (Stdev)	32(9)	26(6)	31(10)	48(8)	43(11)	49(10)	46(11)	38(12)	43(7)	18(5)
Female	51%	100%	78%	57%	34%	43%	57%	41%	41%	26%
Pregnant	1%	86%	6%	0%	0%	0%	3%	3%	0%	0%
Duals	2%	1%	5%	10%	16%	31%	20%	19%	5%	0%
PAC	40%	0%	11%	17%	37%	5%	2%	7%	58%	2%
Inpatient	2%	74%	22%	26%	10%	68%	96%	86%	1%	18%
ER	36%	79%	92%	78%	63%	92%	100%	99%	31%	57%
ORT	83%	23%	35%	80%	2%	1%	23%	31%	69%	1%
Depression	26%	32%	47%	47%	32%	32%	3%	85%	32%	19%
Cardio-vascular	11%	22%	40%	74%	46%	88%	97%	61%	38%	7%

Class 1: "Low Morbidity ORT" (n= 4,708)

- Mean Age (sd): 32 (9)
- White (90%)
- PAC (40%)
- Baltimore City (16%)

- Utilization:
  - ER Visit (36%)
  - Inpatient Admit (2%)

- Methadone (58%), Buprenorphine (25%)

- Expenditures Above Median (24%)

- SUD Diagnoses:
  - Opioid Dependence (81%)

- Psychological Diseases:
  - Depressive Disorder (26%)
  - Anxiety, Neuroses (23%)
  - Tobacco (21%)

- Somatic Diseases:
  - Musculoskeletal (30%)

Class 6: "Adult – Dual" (n= 5,130)

- Mean Age (SD): 49 (10)
- Dual (31%)
- Baltimore City (44%)
- Disabled(79%)
- Utilization:
  - ER Visit (92%)
  - Inpatient Admit (68%)
  - LTC (4%)
- Expenditures Above Median (64%)
- SUD diagnoses:
  - Drug Induced mental illness (21%)
  - Alcohol Dependence (32%)
  - Alcohol Abuse (44%)

- Psychological Diseases:
  - Anxiety, Neuroses (21%)
  - Tobacco (55%)
  - Depressive Disorder (32%)
- Other Diseases:
  - Allergies (33%)
  - Cardiovascular (88%)
  - ENT (25%)
  - Endocrine (35%)
  - Gastro./Hepatic (71%)
  - General Signs/Symptoms (90%)
  - General Surgery (63%)
  - Genitourinary (34%)
  - Hematologic (35%)
  - Infections (24%)
  - Musculoskeletal (77%)
  - Neurologic (64%)
  - Nutritional (28%)
  - Renal (43%)
  - Respiratory (71%)
  - Skin (44%)

Class 7: "Adult – High Somatic Morbidity" (n=3,735)

- Mean Age (SD): 46 (11)
- Dual (20%)
- Baltimore City (49%)
- Disabled(77%)
- Utilization:
  - ER Visit (100%)
  - Inpatient Admit (96%)
  - LTC (10%)
- Expenditures Above Median (91%)
- SUD diagnoses:
  - Drug Induced Mental Illness (21%)
  - Alcohol Dependence (30%)
  - Alcohol Abuse (37%)
  - Opioid Dependence (44%)
  - Opioid Abuse (21%)
  - Cocaine Abuse (26%)
  - Unspecified Abuse (42%)

- Other Diseases:
  - Allergies (53%)
  - Cardiovascular (97%)
  - ENT (38%)
  - Endocrine (55%)
  - Eye (28%)
  - Female Reproductive (29%)
  - Gastro./Hepatic (96%)
  - General Signs/Symptoms (100%)
  - General Surgery (93%)
  - Genetic (28%)
  - Genitourinary (67%)
  - Hematologic (72%)
  - Infections (60%)
  - Musculoskeletal (93%)
  - Neurologic (90%)
  - Nutritional (55%)
  - Reconstructive (33%)
  - Renal (80%)
  - Respiratory (94%)
  - Rheumatologic (28%)
  - Skin (67%)
  - Toxic effects (43%)

Class 8: "Adult – High Psychological Morbidity" (n= 3,295)

- Mean Age (SD): 38 (12)
- Dual (19%)
- Baltimore City (43%)
- Disabled(73%)

- Utilization:
  - ER Visit (99%)
  - Inpatient Admit (86%)
- Methadone (12%), Buprenorphine (19%)
- Expenditures Above Median (85%)
- SUD Diagnoses:
  - Drug Induced Mental Disorder (24%)
  - Alcohol Dependence (38%)
  - Opioid Dependence (47%)
  - Cocaine Dependence (28%)
  - Other Combo Dependence (21%)
  - Alcohol Abuse (41%)
  - Cannabis Abuse (25%)
  - Opioid Abuse (20%)
  - Cocaine Abuse (31%)
  - Other Unspecified Abuse (48%)

- Psychological Diseases:
  - Anxiety, Neuroses (63%)
  - Tobacco (71%)
  - Family & Social Probs. (25%)
  - Schizophrenia and affective psychosis (67%)
  - Depressive Disorder (85%)
  - Psychological Signs/Symptoms (50%)
- Other Diseases:
  - Allergies (29%)
  - Cardiovascular (61%)
  - ENT (24%)
  - Gastro./Hepatic (53%)
  - General Signs/Symptoms (75%)
  - General Surgery (49%)
  - Genitourinary (28%)
  - Infections (20%)
  - Musculoskeletal (74%)
  - Neurologic (65%)
  - Reconstructive (21%)
  - Renal (29%)
  - Respiratory (51%)
  - Skin (51%)
  - Toxic Effects (26%)

Most Frequent Providers

- Not Inpatient or ER
- >4,900 most frequent providers across the population.
- Mean (SD) Visits: 18 (27)

Most Frequent Provider Types…

Place	Place %	Type	Type %	Specialty	Specialty %	Category	Category %
Office	84	Physician	25	None	47	Medicine	41
		Methadone Clinic	14	Internal Medicine	8	Methadone Clinic	23
Home	4	MH Clinic	13	Diabetes Waiver Case Mgt	7		
		Hospital, Acute	11	Private Owner	7	E&M Office	20
Outpatient Hospital	4	FQHC	8	Family Practice	4	FQHC visit	4
		ADAA Certified Program	5	Psychiatry	3	Physician-Medicare Crossover	2
State or Local Public Health Clinic	3	ICF-Addictions	4	General Practice	3		
		Clinic- Local Health Department	3	MH	3	Radiology	2
Community MH Center	2	Comp. Outpatient Rehab	3	ICF-Addictions	2	Therapeutic Nursery	1
Sum(Places)	97	Sum(Types)	71	Sum (Specialties)	72	Sum(Category)	91

Most Frequent Provider "Case-Mix", Top 10 by Total Number of Unique Clients...

Most Frequent Provider Name	Low Morbid ORT	Women-Preg.	Women-High ER Use	Disabled ORT	Adult-PAC/ Dual	Adult Dual	Adult-High Som.	Adult-High Psych.	Urban ORT-PAC	Teens/ Young Adults	Total	ASAM Level, per list from Dr. Olsen
JOHNS HOPKINS HOSPITAL	--	80	40	125	157	210	165	60	42	116	998	1 & 2.1 adult, 3.1women
TOTAL HEALTH CARE INC [A]	15	31	17	126	65	69	24	29	362	22	760	1adult, 2.1 adult
BALT. BEH. HEALTH INC [B]	37	--	14	117	57	16	54	202	191	--	698	n/a
GLASS SUBST. ABUSE PROGRAMS	149	24	53	151	--	--	32	23	182	--	614	OMT adult
Provider NAME A	101	24	26	243	--	--	42	20	138	--	594	n/a
TURNING POINT CLINIC	38	--	--	238	--	--	38	16	233	--	573	OMT adult
BALT. MEDICAL SYSTEMS [A]	25	17	84	37	125	88	39	29	55	15	514	n/a
No Most Frequent Provider	100	19	3	3	128	73	7	9	110	62	514	n/a
HEALTH CARE FOR HOMELESS [A]	--	--	--	63	158	57	29	51	116	--	493	1 adult
UMD MED SYS	--	97	14	48	54	50	57	36	50	22	428	1adol., 1 & 2.1adult

A= FQHC, B= MH clinic

Conclusions

- LCA reveals 10 SUD group with reasonable face validity
- Links to providers gives us existing populations (case-mixes) and program pairings of potential focus
- High morbidity populations suggest targets for specific interventions or meaningful surveillance…

Relevance to behavioral health integration

- The current "who/what" regarding persons with SUD is described and organized.
  - This includes percentiles regarding (mental health and somatic).
- Apply to broader Medicaid population
  - Targets for surveillance, interventions (e.g., medical home), broader policies (e.g., finance reform)

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About The Hilltop Institute

The Hilltop Institute at the University of Maryland, Baltimore County (UMBC) is a nationally recognized research center dedicated to improving the health and wellbeing of vulnerable populations. Hilltop conducts research, analysis, and evaluations on behalf of government agencies, foundations, and nonprofit organizations at the national, state, and local levels.

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