



# Serious Illness, Medication Safety, Drug Events, & Utilization Outcomes

An Evaluation of 15 Million Californians Using Claims Data

Dolores Yanagihara, MPH, Integrated Healthcare Association

Karl Finison, MA, Onpoint Health Data

# Purpose of Study

- People with serious illness frequently receive fragmented care
- Multiple payers have launched serious illness programs
- Health systems and provider organizations are early in their initiatives to improve serious illness care
- Study goals
  - Develop a methodology to identify individuals with serious illness using the IHA California APCD data
  - Report on variation in serious illness prevalence rates and care in California
    - » Utilization, adverse drug event, and pharmacy use measures were included as outcomes in the study
    - » Geographical analysis of rates was conducted using county and Core-Based Statistical Areas (CBSAs)

# Study Funding & Contributors

- Study was funded by the Gordon and Betty Moore Foundation
- Study contributors included
  - Dolores Yanagihara, Integrated Healthcare Association
  - Karl Finison and Amy Kinner, Onpoint Health Data
  - David Anderson, Mark Japinga, and Robert Sanders, Duke Margolis Center for Health Policy
- All contributors provided input on methodologies and reporting
  - Duke Margolis developed initial definitions of serious illness
  - Onpoint accessed the APCD and created summary reporting
  - IHA and Duke Margolis analyzed the results

*Other collaborators included Donald H. Taylor, Jr.; William Bleser; Jeffrey Clough; Arif Kamal; Gregory Daniel; Harriet Mather; Amy Kelley; David Muhlestein; Nathan Smith; Marissa Schlaifer; and Russ Montgomery.*

# Study Population by Insurance Product & Age

- Adult population, ages 18+ years only
- 10 health plans and CMS Medicare FFS included
- Medi-Cal and CalPERS not included
- 2017 dates of service from IHA's APCD medical and pharmacy claims data

	Commercial HMO	Commercial PPO	Medicare Advantage	Medicare FFS	All Products
18–64 Years	6,827,369	3,089,090	98,752	502,458	10,517,669
65+ Years	239,909	228,156	1,612,446	2,670,542	4,751,053
All Ages (18+ Years)	7,067,278	3,317,246	1,711,198	3,173,000	<b>15,268,722</b>
% of Population	90%	65%	80%	100%	75%

# Serious Illness Operational Definition

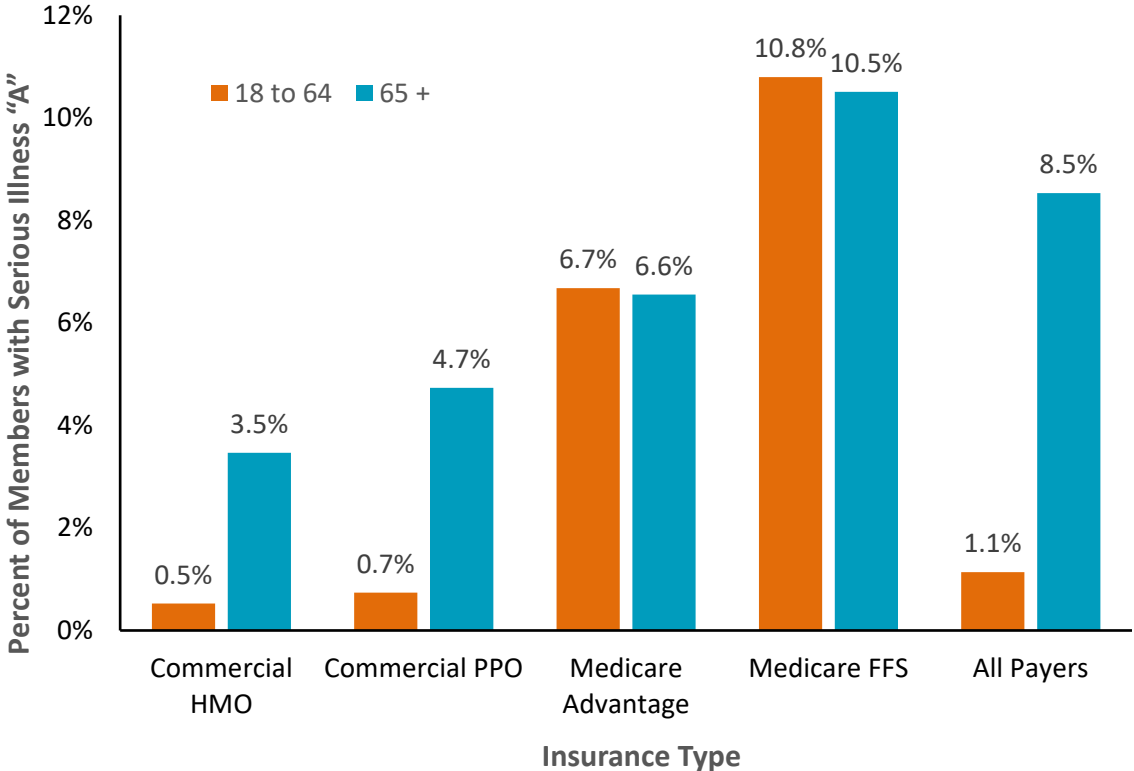
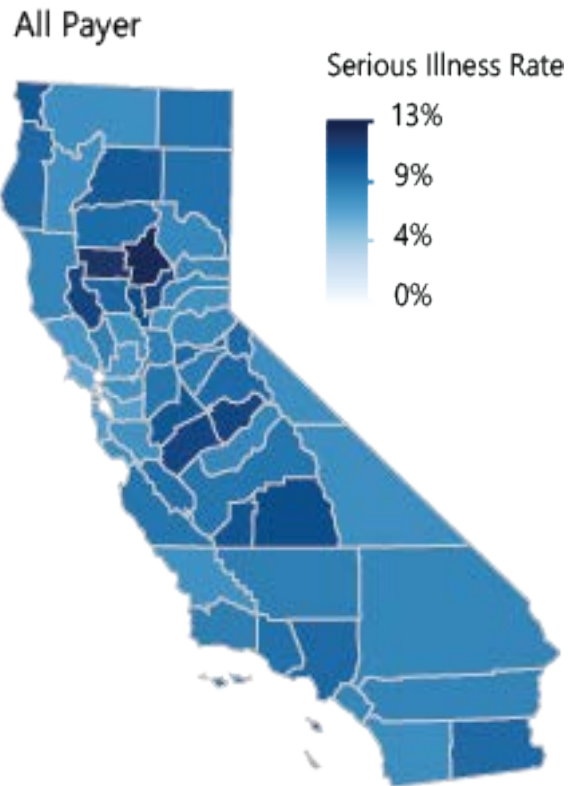
- A diagnosis of 1 or more serious medical conditions (e.g., COPD, CHF, colorectal cancer, dementia) or 3 or more chronic conditions (e.g., diabetes + ischemic heart disease + depression) *AND*
- At least 1 inpatient hospitalization in past year *AND*
- Functional limitation using claims-based surrogate defined as skilled nursing facility (SNF), home health, durable medical equipment (DME) (e.g., oxygen)
- Since functional limitation was difficult to operationalize, two analyses were conducted
  - Serious Illness “A”: Less restrictive, functional limitation not required
  - Serious Illness “B”: More restrictive, functional limitation required
- Individuals without serious illness formed a comparison group

# Outcome Measures

- Medical utilization measures
  - Inpatient use and readmission
  - ED visits (avoidable and total)
  - Office visits
- Pharmacy use
  - Total medication use and number of different medications used by each individual
  - High risk medications – List and codes developed during the project
    - Anticoagulants, antiplatelets, steroids, sedatives (e.g., benzodiazepines), analgesics (opioid and non-opioid), anti-psychotics, anti-depressants
- Adverse drug events

# Serious Illness “A” Prevalence by County, Age, & Payer Type

- Prevalence varied twofold across counties among the 65+ years population, with rates ranging from 6% to 13%
- Overall, 1.1% of the 18–64 years population, and 8.5% of the 65+ years population, were identified as having serious illness



# Top Conditions by Serious Illness Category & Age

- Arthritis, diabetes, heart disease, depression, and COPD are common among those with and without serious illness; the seriously ill had more heart failure

Condition	No Serious Illness		Serious Illness "A"		Serious Illness "B"	
	18-64	65+	18-64	65+	18-64	65+
Arthritis	1	1	2	1	2	1
Diabetes	2	2	1	3	1	2
Ischemic Heart Disease	6	3	6	2	6	4
Depression	3	6	5	6	3	6
Heart Failure	10	8	3	4	4	3
COPD	7	7	7	5	5	5
CKD34	9	5	10	7	9	9
Liver Disease	5		4		7	
Osteoporosis	8	4		10		10
Asthma	4		8		8	
Alzheimer's/Dementias		9, 10		8, 9		7, 8
CKD5_ESRD			9		10	

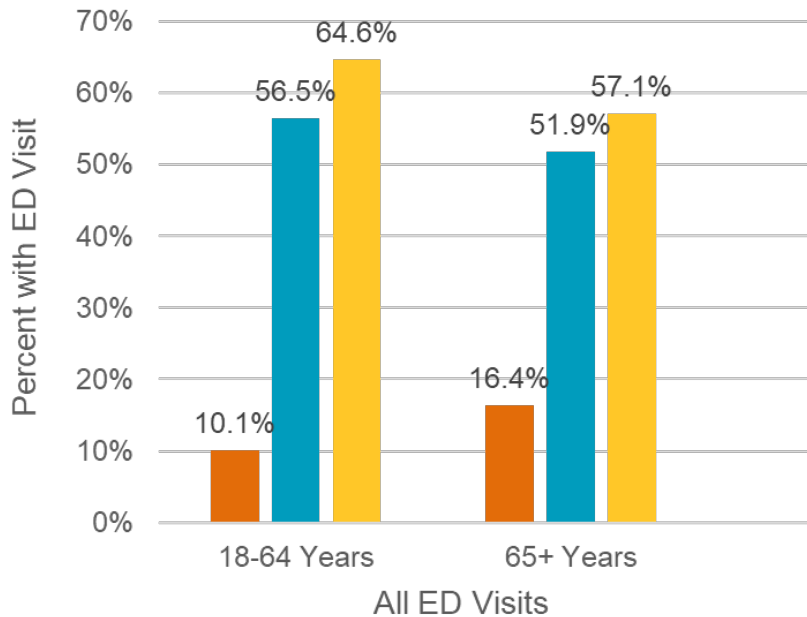


# Utilization by Serious Illness Category & Age

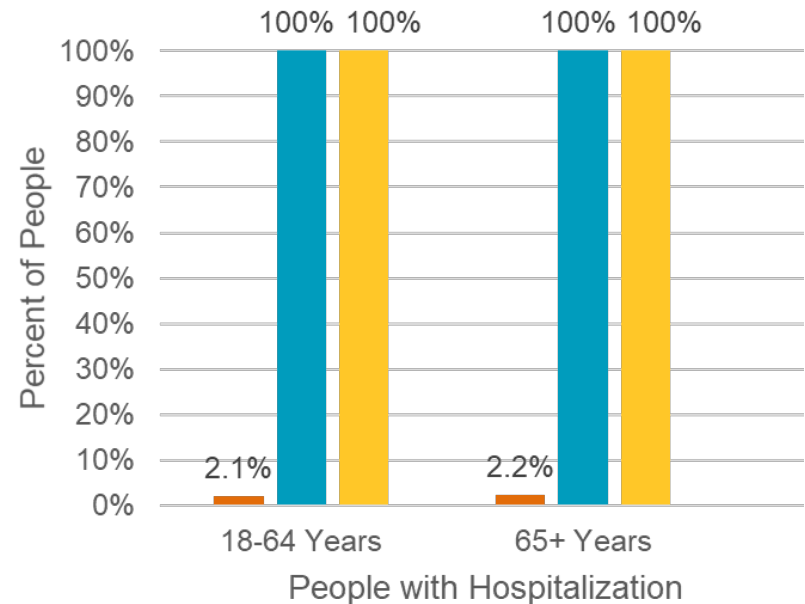
- More than half of people with serious illness had 1+ ED visits, compared to 10% – 16% for people without serious illness
- Most ED visits not “avoidable”

- By definition, all with serious illness had a hospitalization, compared to 2% of people without serious illness
- Serious illness population had 2.5 to 5 times higher percent readmissions

### Emergency Department Visits



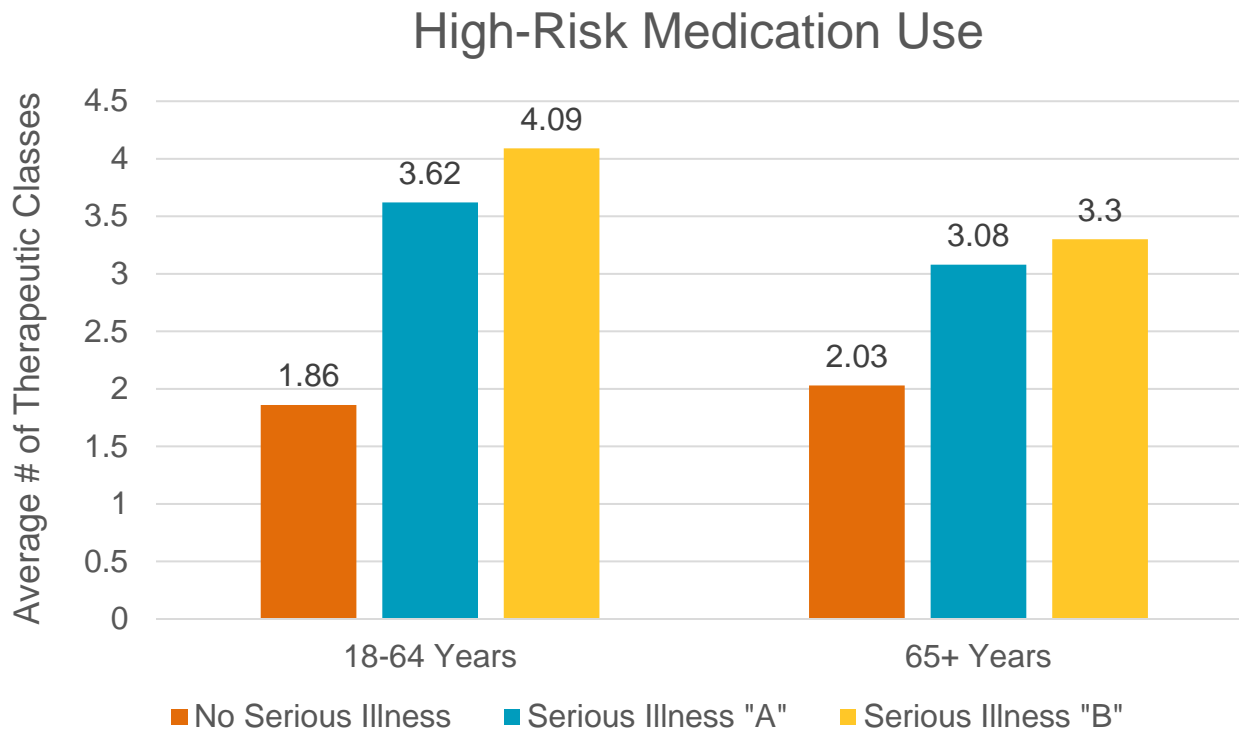
### Hospitalizations



■ No Serious Illness ■ Serious Illness A ■ Serious Illness B

# High-Risk Medication Use by Serious Illness Category & Age

- Pharmacy use was higher in the serious illness population, with more people taking multiple medications (i.e., polypharmacy)
- Adults with serious illness took high-risk drugs in twice as many therapeutic areas for ages 18–65 years and 1.5 times more for ages 65+ years



# Variation in Utilization Measures by CBSA

## Serious Illness “A”, All Insurance, Age 65+ Years

Region	Total Members					
Modesto	57,302	100	10.392	1,410.7	1,721.0	11,160
El Centro	21,605	96	9.493	1,531.0	1,666.4	10,182
Hanford-Corcoran	12,305	95	10.435	1,403.8	1,731.3	9,807
Chico	39,856	92	12.661	1,091.3	1,843.5	10,026
Los Angeles-Long Beach-Glendale	1,095,522	75	9.545	926.4	1,744.0	9,886
Merced	31,442	75	11.268	1,201.8	1,776.1	8,429
Visalia-Porterville	43,964	73	10.893	1,051.2	1,624.1	10,644
Stockton-Lodi	78,805	71	8.899	1,345.8	1,650.1	9,341
Sacramento--Roseville--Arden-Arcade	317,137	68	8.161	1,543.1	1,642.4	9,309
Redding	36,719	61	10.185	1,126.8	1,593.8	9,581
Santa Rosa	93,657	61	7.353	1,575.7	1,566.1	9,875
Bakersfield	84,820	60	8.542	1,055.8	1,635.5	9,787
Fresno	107,264	59	8.898	1,242.0	1,644.9	8,812
Napa	26,049	59	8.388	1,452.5	1,564.6	9,388
Yuba City	22,531	58	11.034	1,173.1	1,572.9	9,042
Riverside-San Bernardino-Ontario	455,782	57	8.274	1,138.1	1,688.9	8,846
Oakland-Hayward-Berkeley	352,383	54	7.158	1,620.6	1,633.0	8,906
Santa Maria-Santa Barbara	63,603	53	8.536	1,174.7	1,598.5	9,179
Anaheim-Santa Ana-Irvine	409,426	51	8.189	942.1	1,657.0	9,363
Oxnard-Thousand Oaks-Ventura	126,324	51	9.137	955.5	1,663.3	8,723
San Luis Obispo-Paso Robles-Arroyo Grande	51,337	46	7.653	1,289.5	1,540.9	9,623
Vallejo-Fairfield	64,624	45	7.273	1,828.3	1,574.4	8,619
San Diego-Carlsbad	405,034	44	7.822	1,037.4	1,650.9	8,939
San Jose-Sunnyvale-Santa Clara	211,946	42	7.645	1,339.2	1,639.9	7,781
San Francisco-Redwood City-South San Francisco	211,894	41	7.258	1,441.9	1,617.2	8,062
San Rafael	54,109	40	6.474	1,394.2	1,523.2	9,444
Salinas	52,477	39	8.918	1,130.5	1,593.1	7,680
Madera	18,836	37	8.149	1,144.3	1,586.2	8,748
Santa Cruz-Watsonville	41,428	37	7.830	1,023.0	1,541.6	9,689

Per 1,000  
Ranking

Prevalence %

ED Visit Rate per  
1,000

IP Discharge Rate  
per 1,000

Prescription Rate  
per 1,000

# Top Adverse Drug Events for ED Visits

- Adverse drug events were more common in the seriously ill population, but 7 ADEs were in common across all categories

ADE	No Serious Illness		Serious Illness "A"		Serious Illness "B"	
	18–64	65+	18–64	65+	18–64	65+
Adverse Drug Reactions	4	4	2	2	1	1
Syncope and collapse	3	2	3	1	3	2
Headache	1	3	1	4	2	4
Dizziness and giddiness	2	1	4	3	4	3
Acute renal failure, unspecified	10	8	6	5	6	5
Gastrointestinal haemorrhage, unspecified	7	5	8	6	8	6
Hypokalemia	6	10	7	9	7	9
Hypo-osmolality and hyponatraemia		6	10	7	9	7
Rash and other nonspecific skin eruption	5	7	9		10	
Hyperkalemia			5	10	5	10
Disorientation, unspecified		9		8		8
Allergic urticaria	8					
Other visual disturbances	9					

# Conclusions

- This study provided evidence that methodologies can be constructed to identify individuals with serious illness
- This can provide information to help researchers, policymakers, and health systems identify opportunities to improve and evaluate the services and programs offered to this population
- Programs can be tailored to regions where the seriously ill population is most dense or is deemed to be at greater risk
- As the aging U.S. population continues to expand, such analyses will become increasingly more important to conduct

# Policy Implications & Actions

- Provides a methodology that CMS and other states can use to target, benchmark, and evaluate their serious illness initiatives
  - Primary Care First - Serious Illness Population and Direct Contracting models
- Provides useful data for health systems and risk-bearing clinical entities as they seek to understand the seriously ill members across all of their patient populations (i.e., not just those with Medicare FFS)
- Can help pinpoint needed improvements for specific types of services or conditions
- Can empower efforts to improve serious-illness care in a specific geographic area

# Appendix: Serious Illness Cohort Definition Sources

1. Kelley AS, Covinsky KE, Gorges RJ, et al. Identifying Older Adults with Serious Illness: A Critical Step toward Improving the Value of Health Care. *Health Serv Res.* 2017;52(1):113-131. doi:10.1111/1475-6773.12479
2. Kelley AS, Bollens-Lund E. Identifying the Population with Serious Illness: The “Denominator” Challenge. *J Palliat Med.* 2018;21(S2):S7-S16. doi:10.1089/jpm.2017.0548
3. Long P, Abrams M, Milstein A, Anderson G, Lewis Apton K, Lund Dahlberg M, and Whicher D, Editors. 2017. *Effective Care for High-Need Patients: Opportunities for Improving Outcomes, Value, and Health.* Washington, DC: National Academy of Medicine. <https://nam.edu/wp-content/uploads/2017/06/Effective-Care-for-High-Need-Patients.pdf>