

CHCS

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FACES OF MEDICAID
DATA SERIES

Multimorbidity Pattern Analyses and Clinical Opportunities: *Diabetes*

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This set of tables is part of the analysis, *Clarifying Multimorbidity to Improve Targeting and Delivery of Clinical Services for Medicaid Populations*, which was undertaken by the Center for Health Care Strategies and The Johns Hopkins University School of Medicine and Bloomberg School of Public Health to help policymakers identify intervention strategies with the potential to both improve quality and reduce costs for Medicaid beneficiaries with multiple chronic conditions. For the full report, visit www.chcs.org.

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*The **Center for Health Care Strategies (CHCS)** is a nonprofit health policy resource center dedicated to improving health care quality for low-income children and adults, people with chronic illnesses and disabilities, frail elders, and racially and ethnically diverse populations experiencing disparities in care. CHCS works with state and federal agencies, health plans, providers and consumer groups to develop innovative programs that better serve Medicaid beneficiaries with complex and high-cost health care needs. Its program priorities are: enhancing access to coverage and services; improving quality and reducing racial and ethnic disparities; integrating care for people with complex and special needs; and building Medicaid leadership and capacity.*

Overview

This set of tables is part of the *Faces of Medicaid* analysis, *Clarifying Multimorbidity to Improve Targeting and Delivery of Clinical Services for Medicaid Populations*, undertaken by the Center for Health Care Strategies (CHCS) and The Johns Hopkins University School of Medicine and Bloomberg School of Public Health. The analysis sought to help policymakers identify intervention strategies with the potential to both improve quality and reduce costs for adult Medicaid beneficiaries with multiple chronic conditions.

The following tables summarize multimorbidity data on diabetes for adult Medicaid-only beneficiaries with disabilities under the age of 65 and inventory clinical opportunities for addressing multimorbidity associated with diabetes. For this analysis, “multimorbidity patterns” are defined as the specific and often multiple conditions that a person has (e.g., a person with depression, hypertension, chronic pain, and asthma), as opposed to a simple tally of the number of conditions that someone has (e.g., a person with five chronic conditions). The tables are intended to aid policymakers in identifying subgroups of Medicaid beneficiaries who stand to benefit from targeted care management and tailoring intervention strategies to improve health outcomes and reduce costs. Contents include:

1. **Multimorbidity Summary Table (Table 1):** This table lists the five most costly patterns of multimorbidity (based on total annual costs, excluding long-term care expenditures) for diabetes. These data can be used to help prioritize care management opportunities to improve outcomes and control costs. Prevalence, costs, and hospitalization rates are summarized for:
 - Beneficiaries who *only* have the specific diabetes pattern, without additional comorbidities.
 - Beneficiaries who have the specific diabetes pattern *plus* potentially other comorbidities. In other words, all individuals represented in this group have the conditions specified in the stated multimorbidity pattern, but any individual may have other conditions as well. This broader approach has a greater likelihood of capturing all individuals with diabetes and the identified comorbidities in the population.
2. **Multimorbidity Pattern Table (Table 2):** This table details the 16 most prevalent multimorbidity patterns for diabetes, including prevalence, cost, and hospitalization data for each. Data include beneficiaries who *only* have the specific conditions in each multimorbidity pattern.
3. **Clinical Opportunities Table (Table 3):** A series of literature searches was conducted for the multimorbidity patterns that the analysis identified as high-priority opportunities from a prevalence, clinical, and cost perspective. In addition to presenting actionable, clinical opportunities for Medicaid stakeholders responsible for care management program design, these clinical opportunities tables also help identify gaps in knowledge around clinical management of these conditions. Literature is categorized as follows:
 - Clinical “pearls” that offer recommendations relevant to an aspect of care for individuals with the specified multimorbidity pattern;
 - Single disease-specific models that address processes important to caring for individuals with multimorbidity, such as care coordination and medication management;
 - Relevant clinical practice guidelines and systematic reviews; and
 - Evidence-based models for the specific multimorbidity pattern.

Table 1: Diabetes Multimorbidity Summary

This table lists the five most costly patterns of multimorbidity -- based on total annual costs, excluding long-term care expenditures -- for diabetes. These data can be used to help prioritize care management opportunities to improve outcomes and control costs.

Medicaid-Only Adult Beneficiaries with Disabilities, Under Age 65

Multimorbidity Pattern		Prevalence among beneficiaries with diabetes	Prevalence among overall population	Per capita cost	Percent of total annual costs among beneficiaries with diabetes	Percent of total annual costs among overall population	Per capita hospitalizations
Diabetes							
1	+ Psychiatric Disorders	4.88%	0.83%	\$9,380	2.96%	0.74%	0.12
		64.95%	11.07%	\$18,305	76.94%	19.13%	0.92
2	+ Psychiatric Disorders, Hypertension	4.23%	0.72%	\$8,811	2.41%	0.60%	0.17
		41.10%	7.00%	\$19,907	52.95%	13.16%	1.13
3	Diabetes only (no comorbidities among conditions considered)	5.58%	0.95%	\$5,135	1.86%	0.46%	0.11
		100.00%	17.04%	\$15,453	100.00%	24.86%	0.77
4	+ Hypertension	5.23%	0.89%	\$5,290	1.79%	0.45%	0.13
		62.77%	10.70%	\$16,986	69.00%	17.15%	0.94
5	+ Psychiatric Disorders, Hypertension, Coronary heart disease	2.06%	0.35%	\$10,386	1.39%	0.34%	0.39
		22.33%	3.80%	\$23,612	34.12%	8.48%	1.52

Co-occurring conditions that were considered include: Depressive disorders, hypertension, coronary heart disease, asthma and/or chronic obstructive pulmonary disease, back or spine disorders, antipsychotic or mood stabilizer drugs, drug and alcohol disorders, diabetes, anxiety disorder or benzodiazepam use, congestive heart failure, hepatitis or chronic liver disease, stroke, prednisone use, dizziness, gastrointestinal bleed, anticoagulation drugs (warfarin), chronic renal failure/end stage renal disease, HIV or AIDS, and personality disorders.

KEY

- Beneficiaries with only diabetes and the specified multimorbidity pattern (no other comorbidities).
- Beneficiaries with diabetes, the specified multimorbidity pattern, and potentially other additional comorbidities, varying by individual.

Table 2: Diabetes Multimorbidity Patterns

This table presents the 16 most prevalent co-occurring conditions for diabetes (columns in the left half), and prevalence, hospitalization, and cost data for each pattern (columns in the right half). These data reveal patterns that are prime for targeted interventions across a number of variables of interest, including population prevalence, per capita costs, and annual hospitalization rates. For each pattern, these variables are calculated for individuals who have the specified conditions and no other comorbidities. The condition columns are ordered from most prevalent (left) to least prevalent (right) in the diabetes population. A checkmark represents the presence of the specified condition. Unless noted, all cost estimates exclude long-term care costs.

Medicaid-Only Adult Beneficiaries with Disabilities, Under Age 65

Diabetes +												Pattern Prevalence, % ¹	Cumulative Prevalence, %	Annual Hospitalization Rate Per Capita	Per Capita Costs, excl. Long-term Care	% Total Annual Costs, excl. Long-term Care ²	Cumulative % of Total Annual Costs, excl. Long-term Care	% Total Annual Long-term Care Costs	Very High-Cost Prevalence, % ³	High-Cost Prevalence, % ⁴	
Psychiatric disorders	Hypertension	Coronary heart disease	Asthma and/or chronic obstructive pulmonary disease	Back or spine disorders	Chronic pain	Congestive heart failure	Drug and alcohol disorders	Stroke	Dizziness	Chronic renal failure/end stage renal disease	Schizophrenia	Developmental disorders									
													5.58%	5.58%	0.11	\$5,135	1.86%	1.86%	2.52%	0.86%	4.97%
	✓												5.23%	10.82%	0.13	\$5,290	1.79%	3.65%	1.35%	0.82%	5.91%
✓													4.88%	15.70%	0.12	\$9,380	2.96%	6.61%	3.91%	1.56%	14.07%
✓	✓												4.23%	19.93%	0.17	\$8,811	2.41%	9.02%	2.23%	1.66%	15.12%
✓	✓	✓											2.06%	21.99%	0.39	\$10,386	1.39%	10.41%	1.12%	3.07%	22.22%
	✓	✓											2.00%	23.99%	0.34	\$7,971	1.03%	11.44%	0.60%	2.36%	13.18%
✓	✓			✓									1.24%	25.23%	0.14	\$8,569	0.69%	12.13%	0.29%	1.51%	16.03%
✓											✓		1.20%	26.43%	0.32	\$14,987	1.16%	13.29%	1.84%	5.00%	32.42%
✓		✓											1.16%	27.58%	0.24	\$9,994	0.75%	14.04%	0.85%	2.03%	17.22%
✓	✓										✓		1.09%	28.67%	0.50	\$16,264	1.15%	15.18%	1.70%	7.59%	38.28%
✓				✓									1.08%	29.75%	0.13	\$8,166	0.57%	15.75%	0.33%	1.36%	13.01%
		✓											1.03%	30.78%	0.20	\$6,215	0.41%	16.17%	0.48%	1.70%	7.32%
✓					✓								1.02%	31.80%	0.33	\$12,655	0.84%	17.00%	0.98%	4.88%	22.56%
✓	✓	✓		✓									1.01%	32.81%	0.37	\$10,408	0.68%	17.68%	0.34%	2.02%	25.08%
✓	✓		✓										0.96%	33.77%	0.35	\$11,352	0.71%	18.39%	0.49%	2.99%	24.75%
✓	✓				✓								0.94%	34.71%	0.40	\$12,294	0.75%	19.14%	0.69%	5.41%	26.20%

KEY

- Index condition with no comorbidity in identified conditions.
- Patterns with the top three highest total annual costs.
- Patterns with the top three highest annual hospitalization rates.
- Patterns with the top three high-cost prevalence rates.

¹ Prevalence of this pattern among beneficiaries with diabetes.

² \$4.9 billion, excluding long-term care costs, was spent by Medicaid on 320,197 disabled Medicaid-only beneficiaries with diabetes. Results are presented for the top 16 out of 3,445 total patterns observed for people with diabetes.

³ The proportion of beneficiaries with this specific multimorbidity pattern who are represented among beneficiaries in the top 1st to 5th percentile of costs in the overall population of Medicaid-only adult beneficiaries with disabilities.

⁴ The proportion of beneficiaries with this specific multimorbidity pattern who are represented among beneficiaries in the top 5.01st to 20th percentile of costs in the overall population of Medicaid-only adult beneficiaries with disabilities.

Table 3: Diabetes Clinical Opportunities

The following table inventories evidence-based models of care for diabetes and associated multimorbid patterns, including references published since 2000. This resource provides an actionable complement to the multimorbidity cost and prevalence data presented earlier. It is intended to guide Medicaid stakeholders in tailoring implementation strategies to improve care for beneficiaries with these multimorbidity patterns.

A bibliography of full citations by author is available at www.chcs.org.

Clinical pearl for specific multimorbidity pattern	Single-disease focused clinical care delivery model for multimorbid patients	Clinical practice guidelines or systematic review for multimorbidity pattern	Model for specific multimorbidity pattern
Diabetes + Psychiatric Conditions			
Barragán-Rodríguez 2008; de Lorde Lima 1998. Newly-diagnosed depression and low magnesium improved by magnesium repletion as well as by new antidepressant.	Amaoko 2008. In newly-diagnosed people with diabetes, an intervention to reduce uncertainty can improve outcomes and psychosocial adjustment.	Brown 2003. Older adults with DM should be screened for cognitive impairment to improve management, falls, and depression.	Katon 2006. Depression case manager improves quality of life at no increased cost.
O’Kane 2008. Newly-diagnosed people are at increased risk of depression related to self-monitoring.	Lustman 2000. Fluoxetine effective in treating depression.		Babamoto 2009. Community-health workers appear to improve outcomes and utilization in newly-diagnosed.
Consensus guideline 2006. Tricyclic antidepressants indicated for diabetic neuropathy but can increase HTN.			Bogner 2007. PROSPECT depression management program decreased mortality among people with both diseases.
Diabetes + Hypertension			
Pellegrini 2003. Structural and organizational factors will influence quality of care for hypertensive diabetics.	West 2007. Motivational interviewing improves weight loss.	Strippoli 2006. Only ACE at maximum tolerable doses have been shown to decrease overall mortality.	Planas 2009. Hypertension medication therapy management program in patients with diabetes in managed care setting resulted in better hypertension control.
	Canzanello 2005. Describes physician-nurse team model to improve long-term hypertension control rates by active intervention and home blood pressure measurement.	Giovanni 2005. Cochrane evaluation of comparative effectiveness of antihypertensive agents in patient with diabetes and mormoalburnimuria. ACE endorsed.	Bebb 2007. Describes randomized trial of treatment algorithm for hypertension in patients with diabetes. Intervention was ineffective.
	Von Muenster 2008. Describes pharmacist interventions during physician-pharmacist co-management of hypertension. Could be applied to patients with multimorbidity.	Arauz-Pacheco 2002. ACE-I, ARB, betablockers and distal tubule diuretics are first-line agents for treatment of HTN.	McLean 2008. Randomized trial of community pharmacist and nurse to improve hypertension management in patients with diabetes. Effective intervention.
	Carter 2009. Meta-analysis of team-based care intervention for hypertension. Positive effects.	Borzecki 2005. Review of approaches to comanagement of hypertension and diabetes.	

Clinical pearl for specific multimorbidity pattern	Single-disease focused clinical care delivery model for multimorbid patients	Clinical practice guidelines or systematic review for multimorbidity pattern	Model for specific multimorbidity pattern
Diabetes + Hypertension (continued)			
		Zanchetti 2002. Review of issues related to hypertension control in diabetes. Highlights importance of control and use of ACE inhibitors.	Sanders 2002. Chart-based reminder systems for patients with hypertension and diabetes failed to improve physician compliance with clinical guideline for hypertension management DM.
		Reboldi 2009. Review of optimal combination therapy in patients with diabetes and hypertension.	Andros 2006. Describes use of pharmacy claims at a managed care organization to assess degree of hypertensive control among diabetics.
			Choe 2008. Describes effect of multidisciplinary team to achieve optimal hypertension control in diabetics. Positive effect.
Diabetes + Coronary Heart Disease			
Rachmani 2002. A patient participation program was successful at improving cardiovascular outcomes in diabetics at low cost.	Wanner 2005; Diabetics and non-diabetics on hemodialysis do not achieve mortality benefit from atorvastatin or rosuvastatin.	Orozco 2008. Lifestyle modification can reduce incidence of DM and improve cardiovascular risk.	Sandhoff 2007. Clinical pharmacy service for managing the treatment of coronary artery disease in Kaiser system. Uses EMR to coordinate with all providers to reduce cardiac risk in CAD population. Focuses on lipids, hypertension, diabetes, and smoking cessation.
Bourassa 2008. Describes need for blood pressure and glycemic control to prevent coronary disease in diabetics.	ACCORD group 2008. Intensive glucose lowering increases mortality in people with cardiovascular disease or high cardiovascular risk.	Cochrane 2005. Metformin monotherapy as a first agent can reduce cardiovascular risk and mortality.	Young 2009. DIAD Trial – Detection of Ischemia in Asymptomatic Diabetics. Screening for coronary disease in diabetics with myocardial perfusion imaging did not result in lower cardiac event rates.
	Dobscha 2009. Collaborative care for chronic pain in primary care. Randomized trial demonstrated improvements in variety of outcomes.	Rosenzweig 2008. Endocrine society clinical practice guideline for primary prevention of cardiovascular disease, including coronary artery disease, and type 2 diabetes.	McConnell 2003. Clinical pharmacy cardiac risk service more than doubled the number of patients with coronary artery disease and diabetes who achieved goal dosage of ACE inhibitor.
	West 2007. See above.	Ryden 2007. Guidelines from the task force on diabetes and cardiovascular diseases.	
		Williams 2007. Guideline on core components of cardiac rehabilitation / secondary prevention programs to address risk factors such as hypertension, diabetes, etc.	
Diabetes + Chronic Pain			
	West 2007. See above.	Consensus guideline 2006. Tricyclic antidepressants and duloxetine indicated for both diabetic neuropathy and depression	