



# Key Findings Report

*September 2015*

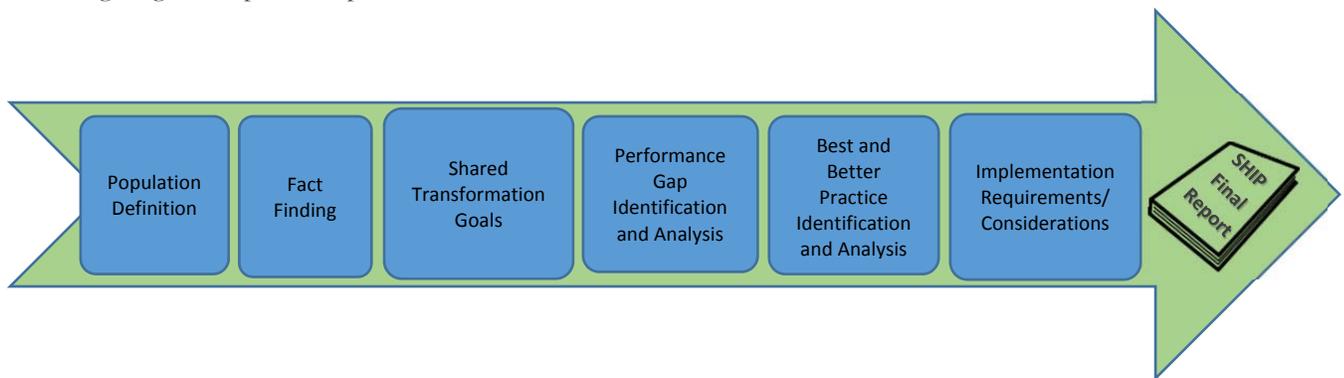
# Contents

Executive Summary .....	1
Introduction.....	3
Background.....	3
Fact Finding.....	4
Methods.....	4
Limitations .....	5
Key Findings.....	6
Prevalence .....	6
Health Status.....	8
Risk Factors .....	9
Health Care Outcomes .....	14
Cost.....	20
Acknowledgments.....	22
References.....	22
Summary of Data Sources.....	22
Glossary.....	24

## Executive Summary

Wisconsin's overall health ranking is currently 23 when compared to other states, and health care costs continue to rise faster than quality is improving.<sup>1</sup> Wisconsin developed a proposal to achieve health care transformation through the advancement of public-private collaborations with the goal to improve health care quality and enable smarter spending. Wisconsin submitted the proposal to the Center for Medicare and Medicaid Innovation (CMMI) in December 2014 and received a State Innovation Model (SIM) Design Award of about \$2.5 million. The project is a joint effort between the Wisconsin Department of Health Services (DHS) and the Statewide Value Committee (SVC) with support from Governor Scott Walker's administration.

The State Health Innovation Plan (SHIP) project is testing a transformation planning framework that aims to create health and health care transformation roadmaps in Wisconsin through the collective impact.<sup>2</sup> The following diagram depicts the phases of the SHIP Transformation Workflow:



In the Population Definition phase, stakeholders participating in the SHIP selected the following populations to study:

- 1) Wisconsites diagnosed with diabetes mellitus (diabetes) and hypertension including men and women, ages 18-64, statewide (does not include gestational diabetes; includes both Type I and Type II diabetes); and
- 2) Wisconsites diagnosed with depression and diabetes mellitus (diabetes) including men and women, ages 18-64, statewide (does not include postpartum depression; includes both Type I and Type II diabetes).

During Fact Finding phase, data were compiled to provide a comprehensive picture of the current state of health for the Wisconsin SHIP selected populations. The stakeholders participating in the SHIP project reviewed the data collected to identify key findings they consider remarkable for those populations. The following are themes from the key findings:

- A comprehensive singular source of health care data in Wisconsin does not exist;
- Disparities in access, overutilization, and social determinants of health exist, as well as disparities in health status, health care access, and outcomes by sub-populations, including gender, race, income, access and education level among other things;
- High utilization of emergency rooms by the selected populations exist, even though many report a usual source of care;

<sup>1</sup> United Health Foundation, America's Health Rankings, 2014. Available at: <http://www.americashealthrankings.org/WI>.

<sup>2</sup> Stanford Social Innovation Review, *Collective Impact*, Winter 2011. Available at: [http://ssir.org/articles/entry/collective\\_impact](http://ssir.org/articles/entry/collective_impact).

- Patients in the selected populations reported low levels of healthy behaviors, which may lead to adverse events and increased chances of developing additional comorbidities;
- Additional-morbid conditions, beyond those that are the immediate focus of the SHIP, significantly drive the cost of care;
- People with depression and diabetes report frequent mental distress, as well as increased levels of moderate and severe distress when compared to the general Wisconsin population;
- Although the majority of people in the selected populations report insurance coverage, they rate their health as fair/poor statistically significantly more than the Wisconsin population.

The key findings identified in this report were used in development of the Shared Transformation Goals to transform the health and health care for the populations.

# Introduction

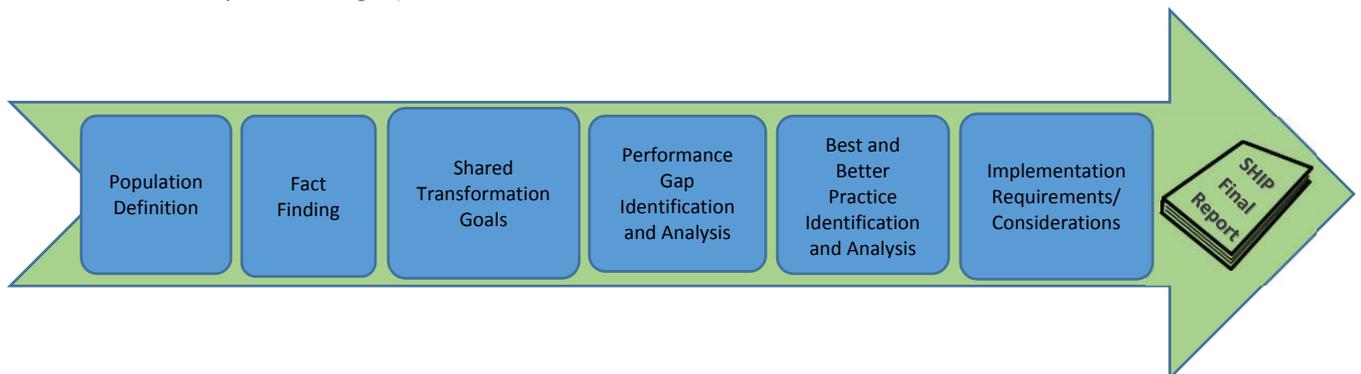
## Background

In December 2014, Wisconsin received a State Innovation Model (SIM) Design Award (planning award) from the Center for Medicare and Medicaid Innovation (CMMI), under a national program designed to foster statewide, innovative health care initiatives that will lead to improved value in health care and a healthier population. The planning award includes \$2.49M and additional federal support in the form of technical assistance. The award period began February 1, 2015 and extends through January 31, 2016. This project will produce a realistic, comprehensive State Health Innovation Plan (SHIP) to transform the health care system for all stakeholders and increase health care value for Wisconsin citizens.

Wisconsin has a rich history of collaboration between the public and private sectors to address complex social issues. Governor Scott Walker stressed this tradition should continue with the SHIP initiative. The SHIP allows us to bring together the private and public sectors in a unique way, to drive accelerated learning in Wisconsin. The SHIP aims to promote better health, increase the value and delivery of health care, and manage health care costs. This public-private collaboration is a unique process, as there are not many SIM models like this around the country.

The SHIP project is comprised of six teams; the Population Health, Behavioral Health, and Care Redesign teams make up the “Transformation Teams”, and the Health Information Technology, Transformation Measurement, and Payment Models make up the “Enabling Teams”. Each team includes a workgroup and advisory panel. Workgroups are comprised of seven to twelve people representing various areas of subject matter expertise. The workgroups are building a model to evaluate the needs and characteristics of selected patient populations, identify common goals and better practices to serve that population, and determine obstacles and enablers to spreading better practice statewide. Similar to workgroup members, SHIP advisory panels include people and organizations with specific knowledge and experience. The advisory panels act as a sounding board for the workgroups as population specific questions, ideas or proposals are generated.

Through collective impact,<sup>3</sup> the SHIP aims to create a framework for designing and implementing meaningful health care transformation in Wisconsin through a private- public collaboration. This framework will provide standard methods of population evaluation, development of shared statewide goals, gap analysis, identification of best and better practice, meaningful measures selection and/or development, and alignment of payment models to best practice. The following diagram depicts the phases of the transformation framework tested by the SHIP project:



<sup>3</sup> Stanford Social Innovation Review, *Collective Impact*, Winter 2011. Available at: [http://ssir.org/articles/entry/collective\\_impact](http://ssir.org/articles/entry/collective_impact).

During the Population Definition phase, the SHIP teams selected the following populations to study during the first round of testing the framework:

- 1) Wisconsinites diagnosed with diabetes mellitus (diabetes)<sup>4</sup> with hypertension including men and women, ages 18-64, statewide (does not include gestational diabetes; includes both Type I and Type II diabetes); and
- 2) Wisconsinites diagnosed with depression with diabetes mellitus (diabetes) including men and women, ages 18-64, statewide (does not include postpartum depression; includes both Type I and Type II diabetes).

## Fact Finding

The purpose of the SHIP Fact Finding phase is to provide a comprehensive picture of the current state of the Wisconsin SHIP selected populations. Data was collected from multiple sources to get the most comprehensive, currently available look at the current state of the selected populations. Once the data was received it was compiled into a Data Briefing Summary, which was used to extract Key Findings. Key findings were used to develop Shared Transformation Goals and included in the Wisconsin SHIP.

## Methods

The SHIP Transformation Team workgroups brainstormed questions regarding the selected populations to inform the fact finding stage. Nearly 100 fact finding questions were identified by the workgroups. The SHIP staff aggregated the data requests and distributed the data requests to existing Wisconsin data assets. As no one comprehensive health or health care database exists in Wisconsin, five primary data sources were utilized to gather information for the SHIP project: 1) Behavioral Risk Factor Surveillance System (BRFSS); 2) Wisconsin Collaborative for Healthcare Quality (WHCQ); 3) Wisconsin Health Information Organization (WHIO); 4) Wisconsin Hospital Association Information Center (WHAIC); and 5) the Survey of the Health of Wisconsin (SHOW).<sup>5</sup> Descriptions of the data sources are as follows:

 Behavioral Risk Factor Surveillance System (BRFSS) data includes several years of the most recent data. The Office of Health Informatics (OHI) analyzed statewide distribution of diabetes, hypertension and lifetime depression and then looked at the combination to identify SIM populations ('Diabetes and Depression', and 'Diabetes and Hypertension') and provided the results where appropriate.

 The Survey of the Health of Wisconsin (SHOW) randomly selects households from each census block and stratified by congressional district and poverty level. Participants are assessed through interviews, a self-administered questionnaire, a physical exam, and blood and urine sampling. SHOW provided results for their entire sample, those with diabetes and hypertension, and those with depression and diabetes.

 The Wisconsin Hospital Association Information Center (WHAIC) report is based on facility discharge data collected from hospitals in Wisconsin under Chapter 153 of the state statute. The queries used in this report were applied to inpatient, outpatient surgery, emergency department, and other hospital outpatient data from dates of service in calendar years 2013 and 2014.

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<sup>4</sup> See the Glossary on page 23 for more information about the diseases.

<sup>5</sup> More information regarding each data source is available in the Reference section of this report. Data provided by the Wisconsin Collaborative for Healthcare Quality was used to support findings from other data sources; however, were not specifically identified for Key Findings.



WHIO data represents over 4 million lives covered by 16 payers, including Commercial, WI Medicaid, and Medicare Advantage plans. The claim data are enhanced using grouping software, normalized pricing, and attribution algorithms. Analyses of clinically meaningful episodes of care, nationally endorsed quality measures, and disease categories are useful for understanding resource use and cost of care, patient adherence to evidence-based care standards, and population disease prevalence.

## Limitations

As Wisconsin does not currently have one comprehensive source of all health or health care data, varied data sources have been compiled to provide the best picture of the selected populations from multiple perspectives. Each data source included represents a different organization with various methods of collecting and reporting data, and thus this information cannot easily be reconciled by overlaying multiple data sources.<sup>6</sup> The research presented in the fact finding process was not based on a systematic review of the literature.

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<sup>6</sup> Additional information regarding the limitations of each data source is available in the References section of this report.

# Key Findings

This section includes the Key Findings identified by the SHIP Transformation Team workgroup members. Remarkable information included in the tables below is highlighted for quick identification. Heat maps include short descriptions. Additional explanation, information, and resources can be found in table notes and footnotes. The following symbol, ➤, indicates key workgroup discussion points surrounding the key findings.

**1. Wisconsin does not have a singular comprehensive source for health care data.**

- These findings show billed charges and total standard cost, while the true burden of diabetes such as true health care costs and societal costs are unknown. Investment levels in health promotion, rather than treatment, are unknown.
- There are no data sources currently available regarding the levels of access and use of behavioral health services for the selected populations.

## Prevalence

**2. Among the selected populations, type II diabetes is more prevalent than type I diabetes.**

Prevalence of Diabetes in the Selected Populations			
Type of Diabetes	Diabetes and Hypertension	Depression and Diabetes	
Type 1	1%	2%	
Type 2	88.2%	85%	
Type 1 & 2	12.5%	12.5%	



Note: Data was pulled from WHIO population. Selected populations include: male, female, age 18-64. Selected populations exclude: postpartum depression and gestational diabetes.

- These populations appear to mainly exhibit the symptoms, outcomes, and risk factors of Type II diabetes. The high prevalence of Type II rather than Type I diabetes suggests opportunities for intervention and prevention.

**3. Depression with diabetes is more prevalent among women than men.**

Gender Prevalence			
Population	Diabetes and Hypertension	WI Population	Depression and Diabetes
Total	138,000	3,560,000	67,000
Male	65,000 (47%)	1,800,000 (51%)	27,000 (40%)
Female	73,000 (53%)	1,760,000 (49%)	40,000 (60%)



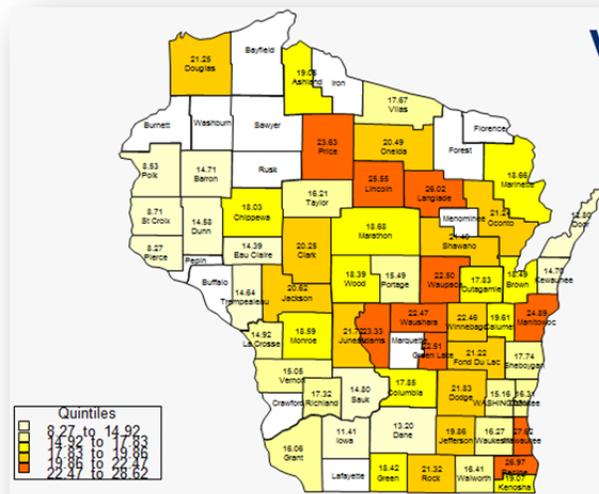
4. When assessing prevalence of people with diabetes and hypertension and depression and diabetes by race, WHA data indicate the highest proportional prevalence among Blacks/African Americans.

Race Prevalence			
Race (age 18-64)	Diabetes and Hypertension	WI Population	Depression and Diabetes
White	75.4%	84.0%	78.6%
<b>Black/African American</b>	<b>19.8%</b>	<b>8.4%</b>	<b>16.6%</b>
American Indian or Alaskan Native	1.3%	0.9%	1.8%
Multiracial	1.2%	1.6%	1.1%
Declined	0.8%	1.8%	0.8%
Asian	1.0%	1.6%	0.8%
Unavailable	0.4%	1.2%	0.3%

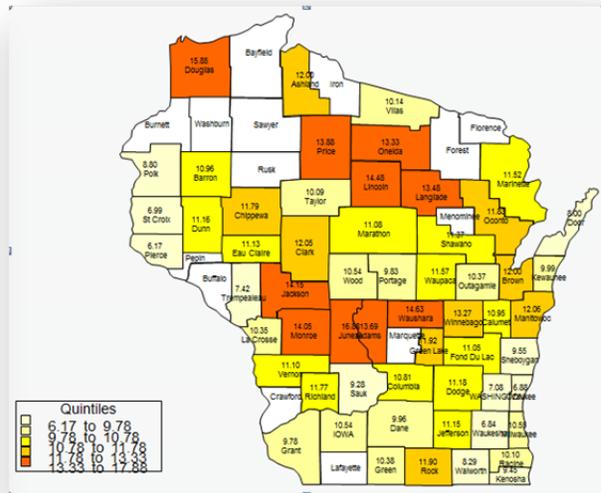


5. The number of patients with diabetes with hypertension, and depression with diabetes varies across the State.

Diabetes and Hypertension age 18-64



Depression and Diabetes age 18-64



Note: Each map represents different quintiles. Counties represented in white have been deidentified and the populations have been added to neighboring counties to protect the identities of the patients. These heat maps are representative of the locations of residence for the patients, not necessarily the counties in which they seek treatment.

- The prevalence of diabetes with hypertension and depression with diabetes varies by region, as indicated in the heat maps.

## Health Status

6. *SHOW data indicate people with depression and diabetes report more severe depression symptoms than the general Wisconsin population.*

DASS Depression Symptoms			
DASS Depression Symptoms	Diabetes and hypertension age 21-64	Total SHOW Population	Depression and Diabetes age 21-64
None	76.2%	82.9%	42.5%
Mild	11.9%	6.4%	26.2%
Moderate	7.5%	6.6%	18.6%
Severe	3.7%	2.5%	8.4%
Extremely Severe	0.6%	1.6%	4.2%

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7. *BRFSS data indicate people of the selected populations have less than half the rate of college education than the general Wisconsin population.*

Literature indicates that higher levels of education can lead to a greater sense of control over one's life, which is linked to better health, healthier lifestyle decisions, and fewer chronic conditions. Researchers estimate that each additional year of schooling leads to about 11 percent more income annually. Nationally, college graduates live an average of nine years longer than high school dropouts.<sup>7</sup>

Self-Reported Education Levels			
Population (age 18-64)	Diabetes and Hypertension	WI Population	Diabetes and Depression
HS or Less	69,000 (51%)	1,500,000 (41%)	36,000 (54%)
Some College/Tech	51,000 (37%)	1,200,000 (34%)	23,000 (35%)
College Degree or more	16,000 (12%)	900,000 (25%)	7,000 (11%)

BRFSS

- Low education appears to be a problem. In light of low education levels, health literacy may be a concern.

<sup>7</sup> County Health Rankings and Roadmaps, *Education*. Available at: <http://www.countyhealthrankings.org/our-approach/health-factors/education>.

8. *SHOW data indicate diabetics with hypertension who participated in an assessment were diagnosed with hypertension around age 44 and diabetes around age 49.*

Age at First Diagnosis		
	Diabetes and Hypertension age 21-64	WI Population
Average age at first diagnosis of diabetes	49.3	43.7
Average age at first diagnosis of hypertension	44	41.9



- Many cases of diabetes and hypertension are preventable, and disease progression can be interrupted and in some cases even reversed. Depression also can be ameliorated through healthier behaviors and prevention or reduction of obesity, chronic disease, sleep disturbances, and substance abuse.

## Risk Factors

### Health Behaviors

9. *According to BRFSS data, obesity rates for the selected populations are more than twice the rate for Wisconsin's general population. Additionally, smoking is more prevalent among persons with depression and diabetes as compared to the general population. However, according to self-reported data, persons in the selected populations drink less alcohol than Wisconsinites overall.*

Demographic and Health Indicators for Hypertension, Diabetes and Depression			
Population	Diabetes and Hypertension	WI Population	Depression and Diabetes
Total	138,000	3,560,000	67,000
Current smoking	27,000 (20%)	790,000 (23%)	23,000 (37%)
Any alcohol past month	56,000 (44%)	2, 247,000 (68%)	24,000 (38%)
Binge drinking past month	12,000 (9%)	920,000 (28%)	5,000 (9%)
Obesity	85,000 (67%)	967,000 (29%)	42,000 (68%)



- There appears to be a disconnect between knowledge of healthy behaviors and follow-through with engaging in healthy behaviors due to the selected populations' high obesity rates and poor health behaviors.

10. *BRFSS data indicate that persons in the selected populations are less active than Wisconsinites overall.*

Number and Percent Estimates of Population (18-64) who had any Physical Activity other than Job in the Past 30 Days			
Population	Diabetes and Hypertension	WI Population 18-64	Depression and Diabetes
All	80,000 (62%)	2,655,000 (80%)	37,000 (59%)
Males	42,000 (68%)	1,333,000 (79%)	15,000 (61%)
Females	38,000 (57%)	1,322,000 (81%)	22,000 (57%)

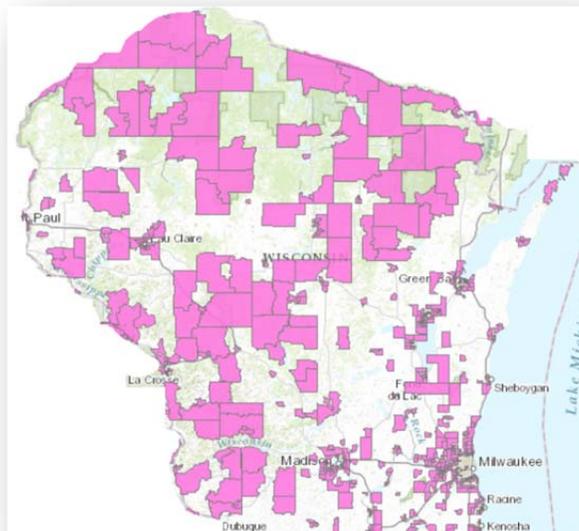


11. *Research indicates that family history is a major risk factor for people with diabetes, hypertension or depression.*<sup>8, 9, 10, 11</sup>

Physical Environment

12. *Access to healthy foods varies by location.*

*Wisconsin Food Deserts<sup>12</sup>*



Note: Pink areas represent locations of low access to food (food deserts). United States Department of Agriculture (USDA) food deserts are census tracts with a substantial share of residents have low levels of access to a grocery store or healthy, affordable food retail outlet.

➤ The map is not representative of all disparities that exist in reference to access to healthy foods.

<sup>8</sup> Rodolfo Valdez et Al. *Family History and Prevalence of Diabetes in the U.S. Population*, Diabetes Care 30:2517–2522, 2007.

<sup>9</sup> Martha Rodriguez-Moran et al. *Family History of Hypertension and Cardiovascular Risk Factors in Prepubertal Children*. Am J Hypertens (2010) 23 (3): 299-304.

<sup>10</sup> Vasan RS, Beiser A, Seshadri S, et al. *Residual lifetime risk for developing hypertension in middle-aged women and men: the Framingham Heart Study*. JAMA. 2002;287(10):1003–1010.

<sup>11</sup> Haggerty, J. (2013). *Risk Factors for Depression*. Psych Central. Retrieved on May 19, 2015, from <http://psychcentral.com/lib/risk-factors-for-depression>.

<sup>12</sup> United States Department of Agriculture Economic Research Service, *Food Access Research Atlas*. Available at: <http://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas.aspx>.

**13. SHOW data indicate that the selected populations stated they feel that their community is safe enough from crime to walk or bicycle.**

Community Safety Conditions			
Population	Diabetes and Hypertension age 21-64	WI Population	Diabetes and Depression age 21-64
Community is safe from crime for walking or riding a bike (% that feel somewhat safe or very safe)	92.7%	97.4%	93.1%

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Social and Economic Factors

**14. BRFSS data indicate persons in the selected populations are more likely to be unemployed and have low incomes than the general population.**

The effect of social and economic conditions on patients’ health, stress, and ability to make healthy choices is unknown. However, national data indicate that unemployed persons are more likely to be in poor or fair health and more likely to suffer from increased stress, heart disease, and depression than those who are employed.<sup>13</sup> The ongoing stress and challenges associated with poverty can lead to cumulative health damage, both physical and mental.<sup>14</sup>

Demographic and Health Indicators for Diabetes, Depression and Hypertension			
Population	Diabetes and Hypertension	WI Population	Diabetes and Depression
Total	138,000	3,560,000	67,000
Employed (Yes)	64,000 (47%)	2,525,000 (71%)	21,000 (32%)
Income groups*			
≤\$25,000	49,000 (40%)	811,000 (26%)	34,000 (57%)
\$25-49,999	34,000 (28%)	860,000 (27%)	15,000 (26%)
\$50,000+	39,000 (31%)	1,511,000 (47%)	11,000 (18%)

\* Household income has significant missing data due to refusal to report



- Fixing the health care system alone, rather the community context people live in, will yield little improvement for people with these diagnoses today, nor for those at risk of developing the conditions.
- A return on investment could be realized fairly quickly from disease management and health coaching.
- An enhanced, statewide focus on reducing obesity and increasing access to affordable, healthy food, and physical activity would help the entire state population, and would result in significant

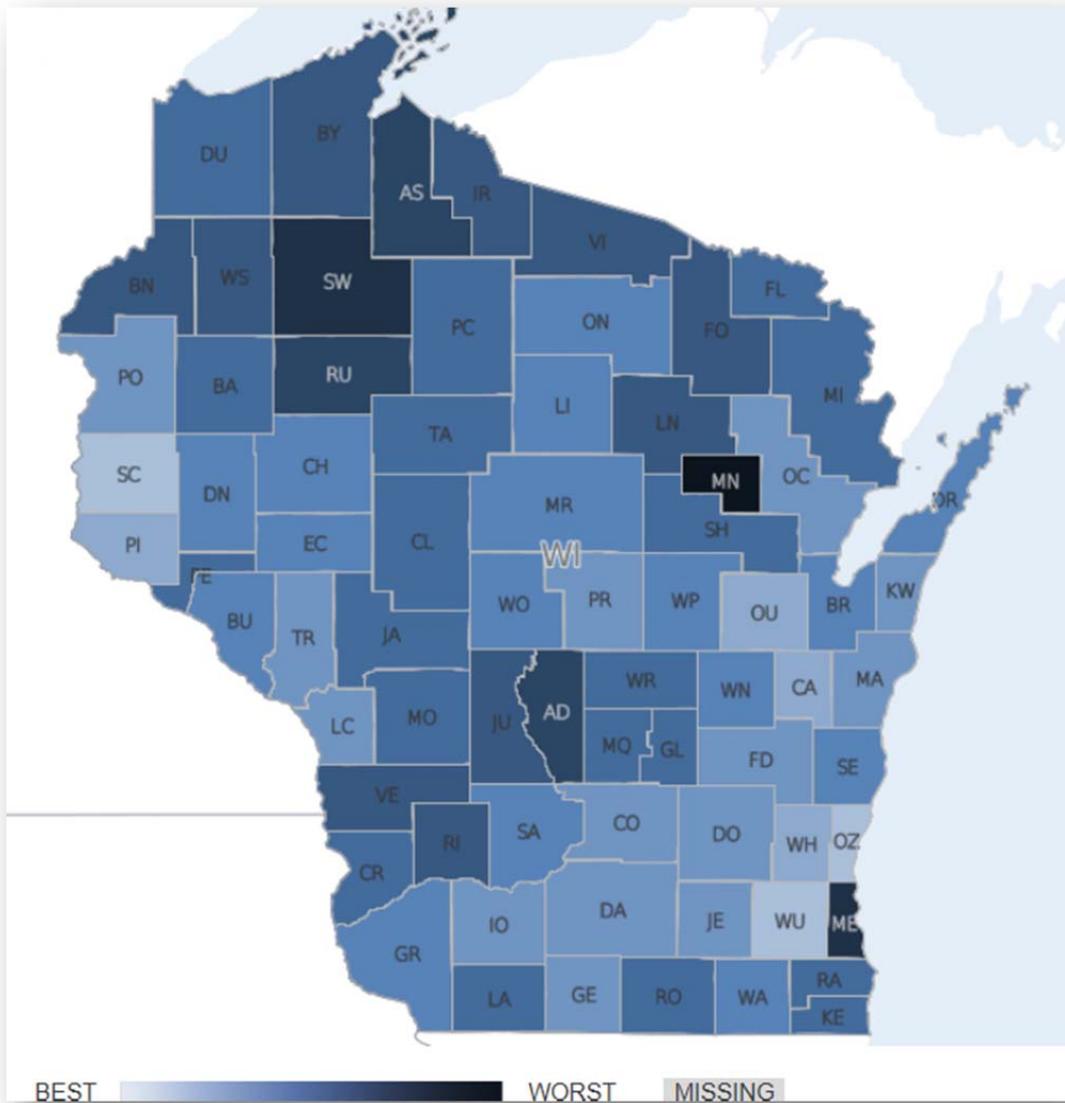
<sup>13</sup> County Health Rankings and Roadmaps, *Employment*. Available at: <http://www.countyhealthrankings.org/our-approach/health-factors/employment> .

<sup>14</sup> County Health Rankings and Roadmaps, *Health Factors*. Available at: <http://www.countyhealthrankings.org/our-approach/health-factors/income>.

cost savings over the long term. Such investments would also yield societal benefits as people become more productive.

**15. Prevalence of poverty varies by region.**

Percentage of children under age 18 in poverty<sup>15</sup>



- Overall in Wisconsin, child poverty ranges from six percent to 59 percent, with an overall rate of 18 percent. This ranks Wisconsin in the 90<sup>th</sup> percentile as compared to other states.
- Poverty status is defined by family; either everyone in the family is in poverty or no one in the family is in poverty.
- Poverty can result in an increased risk of mortality, prevalence of medical conditions and disease incidence, depression, intimate partner violence, and poor health behaviors.

<sup>15</sup> County Health Rankings, *Children in Poverty*. Available at: <http://www.countyhealthrankings.org/app/wisconsin/2015/measure/factors/24/map>.

Access to Care

16. *BRFSS data indicate about 11 percent of Wisconsin’s general population stated they experience frequent mental distress, while roughly 40 percent of those with depression and diabetes responded they experience frequent mental distress.*

Demographic and Health Indicators for Hypertension, Diabetes and Depression			
Population	Diabetes and Hypertension	WI Population	Depression and Diabetes
Total	138,000	3,560,000	67,000
Frequent mental distress	25,000 (18%)	398,000 (11%)	26,000 (40%)



➤ Increased mental distress increases social isolation, which aggravates depression.

17. *BRFSS data indicate over 80 percent of people in the selected populations stated they have insurance coverage.*

Self-Reported Access to Insurance			
Population (age 18-64)	Diabetes and Hypertension	WI Population	Diabetes and Depression
Total	138,000	3,560,000	67,000
Insurance coverage (yes)	114,000 (83%)	3,019,000 (85%)	56,000 (87%)



18. *WHA data indicate patients with depression and diabetes utilize Medicare and Medicaid at higher rates than the Wisconsin population.*

Insurance Coverage by Payer Type			
Payer Type	Diabetes and Hypertension	WI Population	Diabetes and Depression
Medicare	24.9%	21.6%	34.4%
Medicaid	18.8%	17.7%	27.9%
Private/commercial	47.6%	51.3%	29.9%
Other	2.8%	3.5%	2.4%
Self-pay	5.9%	5.8%	5.5%



Note: Other includes payers not identified in the listed categories, e.g. student health plans.

19. For most in the selected populations, *SHOW* data indicate patients' usual source of care is a clinic or doctor's office.

Usual Source of Care and Care Type			
	Total	Diabetes and Hypertension	Depression and Diabetes
Usual Source of Care			
Yes	90.4%	95.8%	94.6%
No	9.6%	4.2%	1.5%
Usual Source of Care Type			
Emergency	3.9%	5.2%	6.3%
Hospital Outpatient	3.2%	3.3%	5.8%
Clinic or Doctors Office	88.6%	85.1%	87.0%
Community Health Center	1.6%	1.3%	0.5%
Other	2.8%	5.1%	0.4%

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## Health Care Outcomes

Health and Health Outcomes

20. According to *BRFSS* data, persons in the selected populations are about four times more likely than other Wisconsinites to rate their health as fair or poor.

Demographic and Health Indicators for Hypertension, Diabetes and Depression			
Population	Diabetes and Hypertension	WI Population	Depression and Diabetes
Total	138,000	3,560,000	67,000
Fair/poor health:	62,000 (44%)	459,000 (13%)	37,000 (55%)

BRFSS

21. *WHIO data indicate among patients with depression and diabetes, about 43 percent also have hypertension, 33 percent hyperlipidemia, and 18 percent a back or spine condition.*

Top 10 Comorbidities for Patients with Depression & Diabetes age 18-64				
Disease Related	Members with Comorbidity	% of Members with Condition	Total Resource Use (Disease-related)	Inpatient Admits per 1,000
Diabetes	20,239	100%	\$75,687,234	40.92
Depression	20,239	100%	\$47,714,686	42.68
Hypertension	8,644	43%	\$15,649,593	8.58
Hyperlipidemia	6,806	33%	\$3,009,934	0.05
Back and Spine Pain or Condition	3,724	18%	\$24,113,836	10.44
Osteoarthritis	1,595	8%	\$16,334,342	20.78
Asthma	1,379	7%	\$7,116,004	3.62
COPD, Emphysema	1,152	6%	\$12,632,341	21.52
Chronic Renal Failure, ESRD	1,024	5%	\$32,142,566	11.08
CAD, Other	875	4%	\$7,300,724	6.34
Migraine	741	4%	\$2,271,632	1.33
CHF	641	3%	\$17,365,481	22.48



22. *WHIO data indicate among those with diabetes and hypertension, roughly 55 percent also have hyperlipidemia, 23 percent depression, and nearly 14 percent a back or spine condition.*

Top 10 Comorbidities for Patients with Diabetes & Hypertension age 18-64				
Disease Related	Members with Comorbidity	% of Members with Condition	Total Resource Use (Disease-related)	Inpatient Admits per 1,000
Diabetes	37,572	100%	\$134,418,512	34.8521
Hypertension	37,572	100%	\$44,706,603	10.5219
Hyperlipidemia	20,680	55%	\$6,528,247	0.0865
Depression	8,644	23%	\$25,759,165	14.356
Back and Spine Pain or Condition	5,382	14%	\$37,946,939	10.7814
Osteoarthritis	3,281	9	\$36,597,834	27.4435
Chronic Renal Failure, ESRD	3,245	9	\$104,609,755	13.2317
CAD, Other	2,040	7	\$18,920,335	8.4464
Asthma	1,828	5	\$9,456,021	3.1998
COPD, Emphysema	1,030	5	\$19,722,172	18.6512
CHF	626	5	\$46,097,389	29.6056
Pneumonia	573	3	\$11,551,052	13.52



➤ Better control of one condition improves the others.

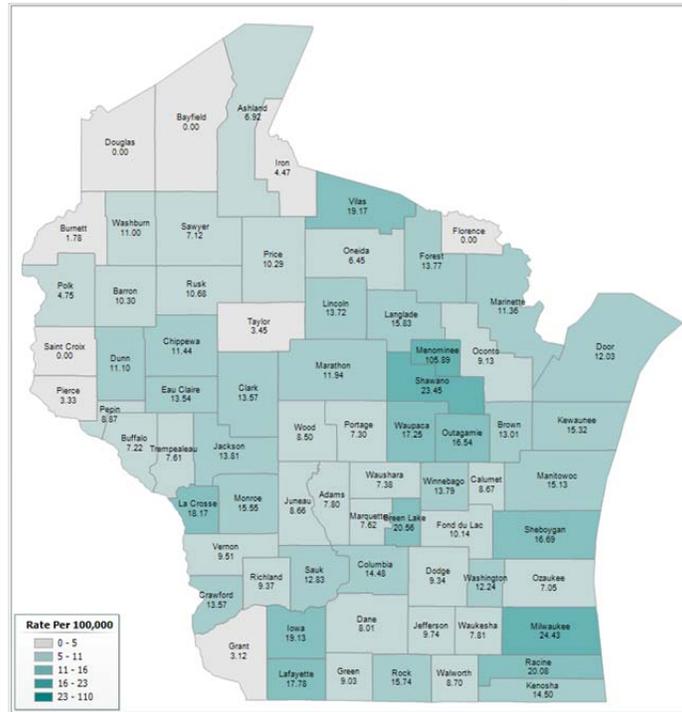
23. *Low income or publicly insured diabetics with hypertension are twice as likely to have heart disease as those with higher incomes or private insurance.*

Prevalence of Heart Disease by Income Level and Insurance Type	
Characteristics	Diabetes/Hypertension age 18-64
<b>Income (groups)</b>	
<100% FPL	8,000 (42%)
100-199% FPL	12,000 (46%)
200%+ FPL	16,000 (23%)
<b>Insurance Type</b>	
Private	16,000 (24%)
Public	15,000 (52%)
Uninsured	Insufficient sample size



24. Lower extremity amputation rates among diabetics vary by county, ranging from a low of x people with diabetes to a high of y per 100,000.

WI Population with Diabetes: Lower-Extremity Amputation- Area-Level Rate



➤ The statewide risk-adjusted rate is 13.55 per 100,000 population.

Note: Rates by county of patient residence and denominators under 50 are not reported.

Pharmacy

25. WHIO data indicate half of diabetics with hypertension and about 60 percent of persons with depression and diabetes are prescribed at least nine medications.

Number of Different Medication in a 12-month period for Patients with Diabetes & Hypertension age 18-64

Patients with Diabetes & Hypertension  
# of Different Medications in a 12-month period  
Count of Patients

Count of patient # of other medications	# of Meds Related to Diabetes and/or Hypertension -->															Grand Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15
no other rx	28	59	129	184	158	136	83	51	24	14	5	1					872
All other Rx (not related to Diabetes/ HTN)	277	581	1,395	1,944	1,850	1,473	892	553	262	120	56	21	8	3	2		9,437
1 to 5	78	352	863	1,273	1,324	1,113	795	497	306	164	66	32	12	8	1	1	6,885
6 to 10	87	292	649	999	1,110	1,038	778	552	277	170	88	47	28	6	6	1	6,128
11 to 20	30	118	260	419	435	461	345	266	169	115	56	45	15	12	3	3	2,752
> 20																	
Grand Total	500	1,402	3,296	4,819	4,877	4,221	2,893	1,919	1,038	583	271	146	63	29	10	7	26,074

% of Population taking Multiple Medications

Count of patient # of other medications	# of Meds Related to Diabetes and/or Hypertension -->															Grand Total		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			15
no other rx	0.1%	0.2%	0.5%	0.7%	0.6%	0.5%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.3%	100.0%
All other Rx (not related to Diabetes/ HTN)	1.1%	2.2%	5.4%	7.5%	7.1%	5.6%	3.4%	2.1%	1.0%	0.5%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	36.2%	96.7%
1 to 5	0.3%	1.4%	3.3%	4.9%	5.1%	4.3%	3.0%	1.9%	1.2%	0.6%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	26.4%	60.5%
6 to 10	0.3%	1.1%	2.5%	3.8%	4.3%	4.0%	3.0%	2.1%	1.1%	0.7%	0.3%	0.2%	0.1%	0.0%	0.0%	0.0%	23.5%	34.1%
11 to 20	0.1%	0.5%	1.0%	1.6%	1.7%	1.8%	1.3%	1.0%	0.6%	0.4%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%	10.6%	10.6%
> 20																		
Grand Total	1.9%	5.4%	12.6%	18.5%	18.7%	16.2%	11.1%	7.4%	4.0%	2.2%	1.0%	0.6%	0.2%	0.1%	0.0%	0.0%	100.0%	

In 12 month period:

80.1% % of Patients taking 3 or more Diabetes and/or Depression medications

60.5% % of Patients taking 3 or more other medications

50.0% % of Patients taking 3 or more Diab/Dep AND 6 or more other



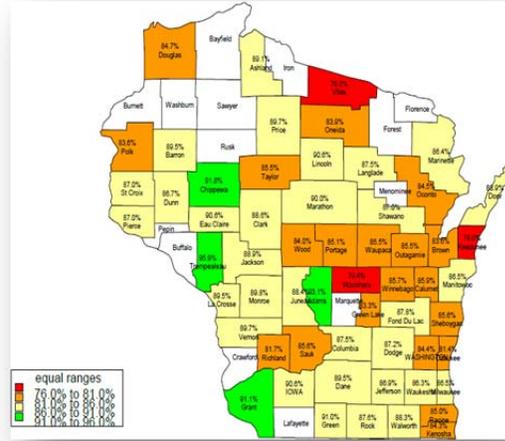
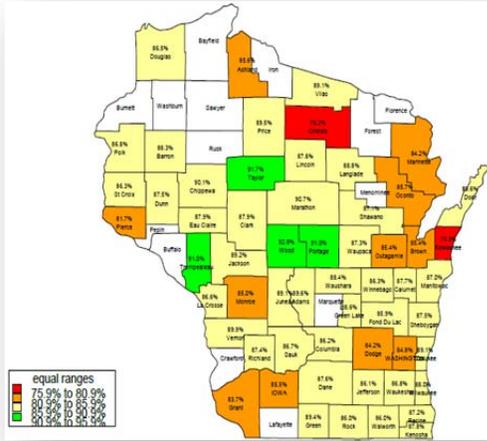
➤ High medication use negatively affects quality of life.

26. Variation in filling prescriptions for medications exists throughout the state, but overall compliance is high. Whether patients took medications appropriately after receiving them is unknown.

Depression & Diabetes Patients age 18-64

Compliance with Diabetes Medication Adherence Measures

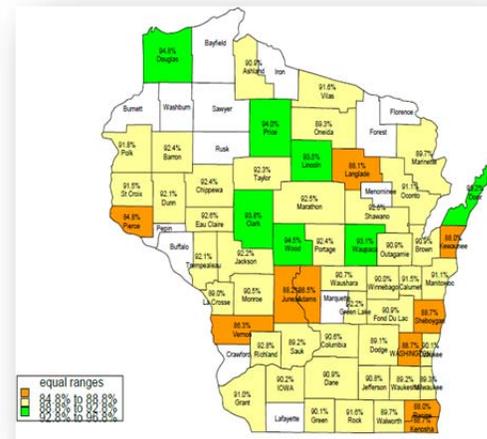
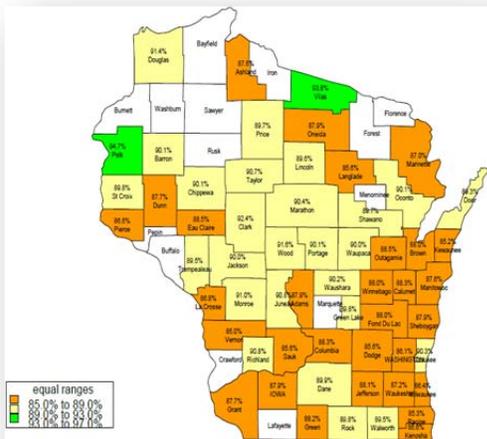
Compliance with Depression Medication Adherence Measures



Diabetes and Hypertension Patients age 18-64

Compliance with Diabetes Medication Adherence Measures

Compliance with Hypertension Medication Adherence Measures



Care Utilization

27. *The selected populations use the emergency room (ER) three to four times more frequently than other Wisconsinites. Diabetes is the primary condition for which patients in the selected populations use the ER.*

**Emergency Room Utilization per 1,000 population**

	Population n	# of Encounters	Encounters per 1,000 Population
<b>Statewide - all</b>			
Current (10/13 - 9/14) Total	1,943,666	570,447	355
Prior (10/12 - 9/13) Total	1,811,889	548,344	350
<b>Diabetes &amp; Hypertension</b>			
Current (10/13 - 9/14) Total	37,572	41,765	1,204
Diabetes-related ER		9,651	278
Hypertension-related ER		1,149	33
Prior (10/12 - 9/13) Total	35,886	40,814	1,186
Diabetes-related ER		9,906	288
Hypertension-related ER		1,167	34
<b>Diabetes &amp; Depression</b>			
Current (10/13 - 9/14)	20,329	28,147	1,500
Diabetes-related ER		6,050	322
Depression-related ER		2,593	138
Prior (10/12 - 9/13)	18,630	27,152	1,515
Diabetes-related ER		6,084	339
Depression-related ER		2,257	126



28. *Patients in the selected populations are treated and released from the ER considerably less than the general Wisconsin population, and they are admitted to inpatient stays from the ER at rates that are more than double the general population.*

**Percentage of ER Visits and Treatment Type per Population (any chief complaint)  
Men and Women Age 18-64**

ER Treatment Type	Diabetes and Hypertension	WI Population	Depression and Diabetes
ER- Treated and Released	68.8%	81.9%	68.1%
ER-To Inpatient	24.0%	12.9%	26.0%
ER-To Observation	6.7%	4.3%	5.6%
ER-To Outpatient Surgery	0.5%	0.90%	0.40%



29. *The high emergency room utilization these populations demonstrate indicates condition acuity. It may also indicate poor care coordination or the lack of a medical home, though this cannot be substantiated from current findings.*

30. *In light of these populations' high emergency department utilization, a strategy to reduce preventable emergency room use could improve health outcomes and reduce cost.*

31. When they visit the hospital, people with depression and diabetes stay longer on average than other Wisconsin patients. They are also readmitted three times as often. Diabetics with hypertension are readmitted twice as often.

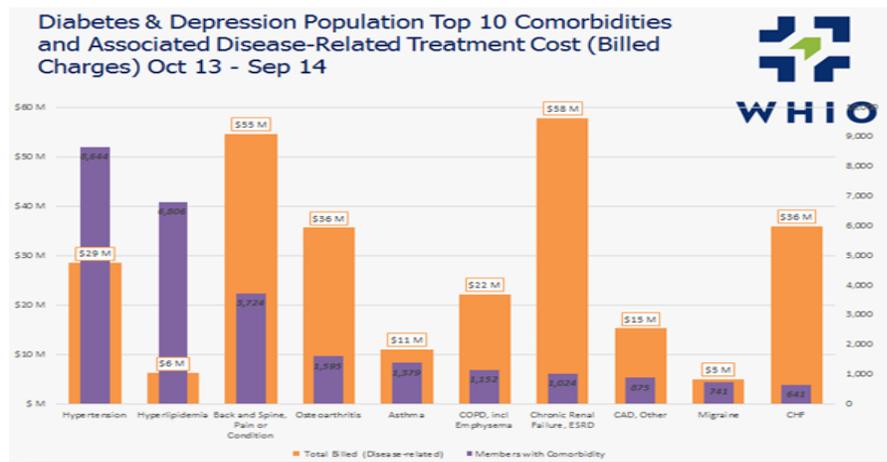
Hospital Encounters			
Measure	Diabetes and Hypertension	WI Population	Depression and Diabetes
Average length of stay in days for patients admitted to the hospital (days)	5.0	4.5	5.1
Average length of stay for patients admitted to with a chief complaint of the diagnosis (days)	4.2	N/A	4.9
Average length of stay for patients admitted to the hospital with a chief complaint of suicide ideation and/or attempted suicide (days)	5.4	4.8	4.8
Total Number of ER Visits that lead to Inpatient	15,534	503,641	10,323
Total Number of ER Visits for the Condition* that lead to Inpatient	3,435		2,965
Readmission Rate - All Causes	21.8%	9.7%	30.2%
Readmission Rate- Admitted and readmitted for the condition	7.9%		12.1%

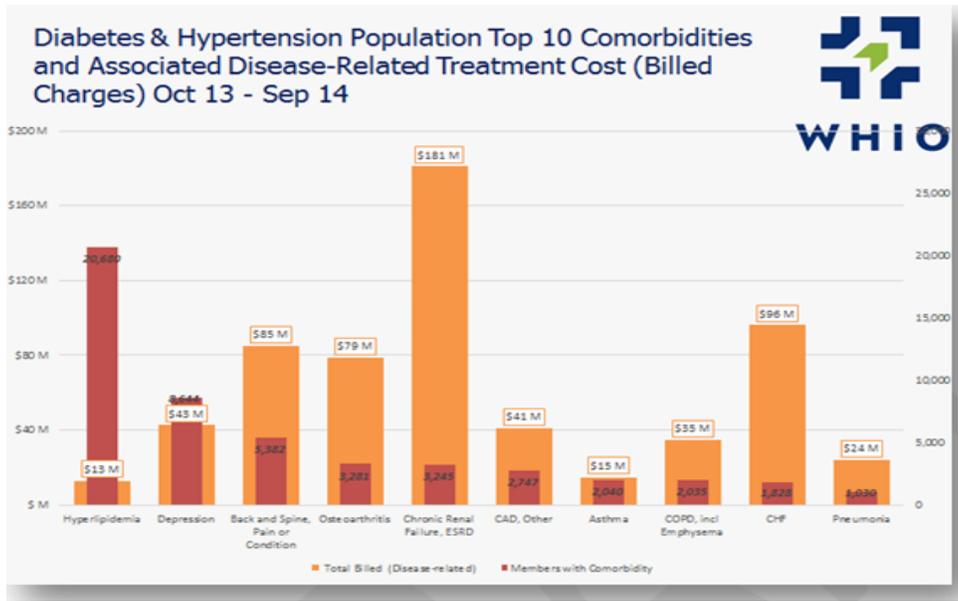


## Cost

### Cost Drivers

32. WHIO data indicates chronic renal failure/end stage renal disease (ESRD) is the most costly comorbidity for the selected populations. Congestive heart failure (CHF) and musculoskeletal conditions are also major cost drivers.





- These diseases produced a continuum of severity. We want to interrupt disease progression and reduce severity.
- Literature reviewed by the Wisconsin Division of Public Health (DPH) indicates that treatment of one condition could significantly ameliorate the selected populations' other conditions.<sup>16</sup>

**33. Societal costs for the selected populations are unknown, but may be substantial.**

- In the United States, diabetes costs \$69 billion annually in work lost, disability, and premature death.<sup>17</sup>
- According to the Center for Disease Control (CDC) Chronic Disease Cost calculator, absenteeism due to diabetes among Wisconsinites 18 to 64 costs \$70 million annually, hypertension \$93 million, and depression \$137 million.<sup>18</sup>

<sup>16</sup> Nouwen et al. Type 2 diabetes mellitus as a risk factor for the onset of depression: a systematic review and meta-analysis. *Diabetologia*. 2010 Dec; 53(12):2480-6

<sup>17</sup> <http://www.cdc.gov/diabetes/pdfs/data/2014-report-estimates-of-diabetes-and-its-burden-in-the-united-states.pdf>.

<sup>18</sup> Centers for Disease Control and Prevention, Chronic Disease Cost Calculator Version 2. Available at: <http://www.cdc.gov/chronicdisease/calculator/>.

## Acknowledgments

The Wisconsin SHIP project appreciates the voluntary contributions made by stakeholders who participated in the workgroups, advisory panels and data collection. Participation in the project was laudable; about twenty-seven people devoted a considerable amount of time to formulate the key findings included in this report.

## References

### Summary of Data Sources

#### **Behavioral Risk Factor Surveillance System (BRFSS):**

BRFSS is a United States health survey that looks at behavioral risk factors. It is run by Centers for Disease Control and Prevention and conducted by the individual state health departments. The survey is administered by telephone and is the world's largest such survey. In 2009, the BRFSS began conducting surveys by cellular phone in addition to traditional "landline" telephones. The Behavioral Risk Factor Surveillance System (BRFSS) and the Family Health Survey (FHS) suffer from limitations inherent to any survey design. The sampling frame uses a limited number of strata to represent the whole state. County based and small area estimations may lead to small cell sizes and cause unreliable estimates. As they rely on self-reported information they are prone to reporting bias. Finally, because the surveys are in English or Spanish, only adults with a telephone who can be interviewed in English/Spanish are included in the sample.

#### **Wisconsin Collaborative for Healthcare Quality (WCHQ):**

WCHQ is a multi-stakeholder, voluntary consortium of Wisconsin organizations. The WCHQ membership, including health systems, medical groups, hospitals and health plans, reports performance measures. WCHQ publicly reports a broad and growing collection of healthcare performance measures that evaluate ambulatory and hospital care. WCHQ data represents care delivered by 65% of providers in the state; therefore, WCHQ data only represents a portion of the patients in the state of Wisconsin. WCHQ data is included in the Wisconsin SHIP Data Briefing Summary.

#### **Wisconsin Health Information Organization (WHIO):**

WHIO is a robust All-Payer Claims Database, consisting of a rolling two years of medical and pharmacy claims information (300M claim lines; > \$80B billed charges). It is updated semiannually. The data represents over 4 Million lives covered by 16 payers, including Commercial, WI Medicaid, and Medicare Advantage plans. The claim data are enhanced using grouping software, normalized pricing, and attribution algorithms. Analyses of clinically meaningful episodes of care, nationally endorsed quality measures, and disease categories are useful for understanding resource use and cost of care, patient adherence to evidence-based care standards, and population disease prevalence. At this time, WHIO does not contain Medicare Fee for Service claims from CMS, or any data on services provided to the uninsured population.

#### **Wisconsin Hospital Association Information Center (WHAIC):**

Pursuant to Chapter 153, Wisconsin Statutes, all Wisconsin hospital and surgery centers are required to submit inpatient and outpatient data to WHAIC each quarter. Data are compiled from the following settings: inpatient; outpatient surgery; emergency department visits; observation; and other hospital outpatient. To identify the same patient across hospitals, each submitted record contains a unique case identifier (UCID). This is calculated using an algorithm defined by the WHAIC. It is a 64 character hexadecimal hashed value based on the patient's name, sex and date of birth. One limitation is that the

UCID is not 100% accurate. Patients having the same birth date and very similar names, such as twins, may receive the same UCID. Or the same patient may have different UCIDs due to a name change or clerical error.

**Survey of the Health of Wisconsin (SHOW):**

SHOW's specific aims are: 1) to conduct annual health surveys of state residents and communities; 2) to conduct longitudinal follow-up of survey participants; and 3) through a flexible design, enable academic- and community-driven ancillary studies. It measures objective and subjective data on major health determinants and outcomes. Urine, blood, and DNA are collected for long-term storage in a biorepository. It also includes extensive and multi-modal collection of contextual community-level data. Through its multi-modal, modular, flexible design, it enables local community-driven ancillary studies. This is the first state-of-the-art comprehensive health surveillance system of this magnitude and scope. By the end of requested funding, they will have between 5,800 and 8,300 subjects participating. Adults age 21 to 74 in each household are invited to participate. However, SHOW uses sampling strategies to choose a representative sample, and weighs data to mitigate participant bias. SHOW provided data about participants age 21-64, as experimenters do not assess persons 18-20 years old. Participation bias could influence results if persons with certain characteristics choose to participate more often than other persons recruited. SHOW participation rates range from 55% to 63%.

## Glossary

*This Glossary is intended to define key terminology for the Key Findings Report to create a common understanding of various industry nomenclatures. This list of definitions is not intended to be an exhaustive list, rather it identifies definitions key to the Wisconsin State Health Innovation Plan (SHIP) populations.*

**Diabetes** Diabetes mellitus refers to a group of diseases that affect how your body uses blood sugar (glucose). Glucose is vital to your health because it's an important source of energy for the cells that make up your muscles and tissues. It's also your brain's main source of fuel. If you have diabetes, no matter what type, it means you have too much glucose in your blood, although the causes may differ. Too much glucose can lead to serious health problems. Chronic diabetes conditions include type 1 diabetes and type 2 diabetes.<sup>19</sup>

**Type I** Type 1 diabetes is a chronic condition in which the pancreas produces little or no insulin, a hormone needed to allow sugar (glucose) to enter cells to produce energy. Various factors may contribute to type 1 diabetes, including genetics and exposure to certain viruses. Although type 1 diabetes usually appears during childhood or adolescence, it also can begin in adults. Despite active research, type 1 diabetes has no cure. With proper treatment, people with type 1 diabetes can expect to live longer, healthier lives than did people with type 1 diabetes in the past.<sup>20</sup>

**Type II** Type 2 diabetes is a chronic condition that affects the way your body metabolizes sugar (glucose), your body's important source of fuel. With type 2 diabetes, your body either resists the effects of insulin — a hormone that regulates the movement of sugar into your cells — or doesn't produce enough insulin to maintain a normal glucose level. More common in adults, type 2 diabetes increasingly affects children as childhood obesity increases. There's no cure for type 2 diabetes, but you may be able to manage the condition by eating well, exercising, and maintaining a healthy weight. If diet and exercise aren't enough to manage your blood sugar well, you also may need diabetes medications or insulin therapy.<sup>21</sup>

**Hypertension (High Blood Pressure)** High blood pressure is a common condition in which the long-term force of the blood against your artery walls is high enough that it may eventually cause health problems, such as heart disease. Blood pressure is determined both by the amount of blood your heart pumps and the amount of resistance to blood flow in your arteries. The more blood your heart pumps and the narrower your arteries, the higher your blood pressure. You can have high blood pressure (hypertension) for years without any symptoms. Even without symptoms, damage to blood vessels and your heart continues and can be detected. Uncontrolled high blood pressure increases your risk of serious health problems, including heart attack and stroke. High blood pressure generally develops over many years, and it affects nearly everyone eventually. Fortunately, high blood pressure can be easily detected. And once you know you have high blood pressure, you can work with your doctor to control it.<sup>22</sup>

**Depression** Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest. Also called major depressive disorder or clinical depression, it affects how you feel, think, and behave and can lead to a variety of emotional and physical problems. You may have trouble doing normal day-to-day activities, and sometimes you may feel as if life isn't worth living. Depression may require long-term treatment.<sup>23</sup>

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<sup>19</sup> Mayo Clinic, Diseases and Conditions, Diabetes. Available at: <http://www.mayoclinic.org/diseases-conditions/diabetes/basics/definition/con-20033091>.

<sup>20</sup> Mayo Clinic, Diseases and Conditions, Type 1 Diabetes. Available at: <http://www.mayoclinic.org/diseases-conditions/type-1-diabetes/basics/definition/con-20019573>.

<sup>21</sup> Mayo Clinic, Diseases and Conditions, Diabetes, Type 2 Diabetes. Available at: <http://www.mayoclinic.org/diseases-conditions/type-2-diabetes/basics/definition/con-20031902>.

<sup>22</sup> Mayo Clinic, Diseases and Conditions, High blood pressure (Hypertension). Available at: <http://www.mayoclinic.org/diseases-conditions/high-blood-pressure/basics/definition/con-20019580>.

<sup>23</sup> Mayo Clinic, Diseases and Conditions, Depression. Available at: <http://www.mayoclinic.org/diseases-conditions/depression/basics/definition/con-20032977>.

