



Human Factor
ANALYTICS

Population Health Management Report

Time Period:

Medical Utilization Data: January 1, 2013 to December 31, 2014

Pharmacy Utilization Data: January 1, 2013 to December 31, 2014

Prepared for:

**State of Arkansas
Bureau of Legislative Research**

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Executive Summary

Introduction

The following report is the result of an analysis of archival medical and pharmacy utilization data for Arkansas State Employee (i.e., labeled as “ASE”) and Public School Employee (i.e., labeled as “PSE”) health plans that service employees, spouses, dependents, and retirees of the State of Arkansas. The intent of this analysis is to yield a better understanding of the epidemiology currently influencing this population and to suggest population health management opportunities that can address the specific risk impacting this population. In order to accomplish this task, archival data was processed through proprietary algorithms in order to properly risk-stratify the population. The risk of a population has a direct relationship to current and future spending patterns. Variables that are the building blocks of risk and/or disease include, but are not limited to:

- Age, Gender, Lifestyle, Genetics, Ethnicity, Acute Illness, Chronic Illness, Co-Morbidities, Multi-Morbidities, Medication Compliance/Non-Compliance, Compliance/Non-Compliance to Evidence-Based Guidelines, Gaps in Care, etc.

The majority of the aforementioned variables were utilized to investigate risk stratifications within the population. A sample size of this magnitude can yield unique insights into future population health management strategies. The overall health of a population is determined by multiple factors; however, an individual’s lifestyle is a powerful predictor of leading causes of morbidity and disability.

This report has some limitations in that lifestyle factors such as physical activity status, nutrition, tobacco use, and weight/BMI could not be included in the stratifications of risk associated with this population. However, if the Arkansas State & Public School Life & Health Insurance Program Legislative Task Force and the Bureau of Legislative Research decide to move forward with recommended population health management strategies, this data can be collected and included in future analyses.

This analysis explored multiple areas of interest within the data, including the following research questions:

1. What is the cost burden of lifestyle modifiable risk factors within the employee population?
2. What is the relationship of age and gender to various disease states?
3. What are the gaps in care associated with suggested preventive measures for this population?
4. What is the relationship between drug compliance and non-compliance, as related to disease severity?
5. What is the financial burden associated with chronic disease within this population?
6. What is the distribution of acute disease versus chronic disease within this population?
7. What is the level of HEDIS compliance (i.e., evidence-based & preventive medicine) within this population?
8. What is the expense related to specific co-morbidities (i.e., hypertension, hyperlipidemia, depression, etc.) within this population?
9. What variables best predict and explain future high spenders within this population?
10. What are actionable solutions that can be implemented to mitigate existing and future health risks?

This report has attempted to explain the causality of risk and precursors to risk within the State of Arkansas ASE and PSE data. As was validated through this analysis, there is a wide variety of risk that was identified through the archival healthcare utilization and pharmacy data. It should be noted that each risk group offers an opportunity for population health management strategies. Some of these strategies will include therapeutic lifestyle change (e.g., exercise, proper nutrition, weight management, tobacco cessation, etc.) and some of the strategies will include specific evidence-based clinical tasks. Successful population health management interventions are well communicated, sensitive to human behavior patterns, and are implemented into a supportive work environment.

Population health management has been implemented in the United States for more than 30 years. Scientific documentation has proven that well-designed programs can yield reductions of risk within the participating population and potential reductions in medical expenditures. Through the use of analytics, pre and post results from a population health management program can be measured and strategies can be amended to ensure program success. By having access to additional data, many more questions can be explored with regard to this population. Our hope is that this report will stimulate the need for further questioning of the data and the start to a successful risk management strategy.

Key Findings and Solutions for Consideration

The following key findings resulted from the analysis of archival health care data (i.e., medical utilization data and pharmacy utilization data) conducted by Human Factor Analytics.

Key Finding 1: Reductions in Spending from 2013 to 2014

Pages 14-15, 24-27, 32-35, 53-62, and 65-69 of Population Health Management Report

- Key Finding:** When looking at overall spending for the ASE and PSE populations combined, there was a \$19,778,382 reduction in medical spending from 2013 to 2014; this dollar figure was based on total amount paid. Both populations also had a slight reduction in mean (average) expenditures from 2013 to 2014; the PSE population had a mean expenditure of \$2,542 in 2013 and a mean expenditure of \$2,261 in 2014. The ASE population had mean expenditures of \$2,786 in 2013 and \$2,586 in 2014. Savings was also realized in pharmacy expenditures; this savings combined for PSE and ASE was \$28,707,079.

This savings was primarily due to the inclusion of reference-based pricing for several drug categories and other consumer-based strategies (i.e., a large portion of the population was taking generic and therapeutic equivalent medications rather than brand name medications). An analysis was conducted to investigate the causality of the reduction in medical spend (**Refer to Attachment 3**). The analysis first looked at the overall state of health of the population to see if the population was healthier from 2013 to 2014 or if there had been some type of universal risk reduction. Several methodologies were used to quantify risk within the ASE and PSE populations from 2013 to 2014.

Patterns of risk generally occur within any given population. In order to better understand these patterns, the population was risk stratified into the following five distinct groups:

Group	Description
1	No chronic disease and less than \$1,500 utilization expenditures per 12 months
2	No chronic disease and \$1,500 or more utilization expenditures per 12 months
3	Chronic disease* with no co-morbidities and no complications
4	Chronic disease with co-morbidities, but no complications
5	Chronic disease with co-morbidities and disease-specific complications**, or chronic disease with disease-specific complications but no co-morbidities

*This calculation includes the following chronic diseases: Asthma, Cancer, Heart Disease, Hypertension, COPD, Diabetes, Obesity, Hyperlipidemia, and Depression.

**This calculation includes complications to the following diseases: Asthma, Diabetes, COPD, and Heart Disease.

Mean amount paid within the ASE population was as follows in 2014:

○ Group 1:	N = 29,582	Mean = \$372
○ Group 2:	N = 5,751	Mean = \$5,603
○ Group 3:	N = 16,086	Mean = \$2,783
○ Group 4:	N = 13,920	Mean = \$4,123
○ Group 5:	N = 3,325	Mean = \$9,375

Mean amount paid within the PSE population was as follows in 2014:

○ Group 1:	N = 44,849	Mean = \$299
○ Group 2:	N = 6,643	Mean = \$6,323
○ Group 3:	N = 20,482	Mean = \$2,622
○ Group 4:	N = 14,120	Mean = \$4,180
○ Group 5:	N = 2,868	Mean = \$10,937

An analysis was completed to investigate the economic differences between each group. The analysis revealed that for both ASE and PSE populations, mean expenditures increased as an individual incrementally progressed from Group 3 to 4 to 5.

It should be noted that in chronic Disease Groups 3, 4, and 5, spending was \$7,551,838 less for the ASE population in 2014 when compared to 2013 spending. The total number of chronic diagnoses slightly increased for Group 3 and Group 4. Even though the numbers increased, overall spending decreased for these groups. When looking at the PSE population, spending also reduced in Groups 3 and 4 and was slightly higher for Group 5. Even after subtracting the added costs that Group 5 had in 2014, there was still an \$8,315,974 dollar reduction in spending.

When both the reduction in spending for the ASE and the PSE populations are added together, that equates to a reduction in spending related to the population with chronic disease (i.e., Groups 3, 4, and 5) of \$15,867,812. Therefore, it is plausible to suggest that this reduced spending was due to the increased preventive visits that took place between 2013 and (primarily) in 2014. Past research studies have demonstrated that various preventive visits can lead to cost reductions of 8 to 9 percent (cited research is available upon request). In order to better validate this observation, 2012 data should be analyzed as a baseline year and other statistical experimentation should be completed.

In 2013 and 2014 combined, there were a total of 25,011 individuals from the ASE population who had preventive health codes (i.e., codes that were included in the wellness program, as listed in Appendix V) and 45,535 individuals from the PSE population who had preventive visits. In order to test if participants were of equal risk status to non-participants, an analysis was conducted that counted the number of unique diagnoses for each group to ascertain the equality of risk (**Refer to Attachment 2**). The greater the number of ICD-9 codes, the greater the risk.

In addition to the analysis of risk equality, an analysis was performed to isolate outcomes derived from individuals undergoing a colonoscopy as a preventive visit (**Refer to Attachment 6**). The results identified 1,152 unique individuals from PSE population who had a colon cancer screening and had a tumor or polyp biopsied or removed; the analysis further identified 42 unique individuals with a diagnosis of colon cancer. For the ASE population, 967 unique individuals had a tumor or polyp biopsied or removed, and 31 unique individuals had a diagnosis of colon cancer. The early diagnosis of colon cancer can greatly reduce cost of treatment, improve clinical outcomes, and contribute to an individual's quality of life.

The strategy to increase preventive visits seems to have yielded some good outcomes for both the ASE and PSE populations.

Based on the chronic diseases included in the aforementioned Disease Group Risk Stratification, more than 45 percent of the ASE population and more than 40 percent of the PSE population (i.e., of the portion of each population that had medical claims in 2014) had a chronic disease. It would be estimated that an additional 10 to 15 percent of the population have chronic illness and have not yet been diagnosed, due to gaps in care.

The top three most expensive chronic diseases for both the ASE and PSE populations in 2014 were: (1) Cancer, (2) Heart Disease, and (3) Diabetes. The top three most frequently diagnosed chronic diseases for the ASE population in 2014 were: (1) Hypertension, (2) Hyperlipidemia, and (3) Cancer. The top three most frequently diagnosed chronic diseases for the PSE population in 2014 were: (1) Hypertension, (2) Cancer, and (3) Hyperlipidemia.

For both the ASE and PSE populations, Diabetes was number three (3) for overall costs and number four (4) for frequency. It should be noted that Diabetes is often a precursor for Heart Disease, Renal Disease, and Cancer.

An analysis was performed to look at the prevalence of catastrophic expenditures for 2013 and 2014 (**Refer to Attachment 4**). Catastrophic spend was defined as individuals claims exceeding \$100,000. The ASE population had 52 claims in 2013 and 59 claims in 2014. The PSE population had 85 claims in 2013 and 98 claims in 2014. Thus, both groups had increased catastrophic claims from 2013 to 2014.

Recommended Solution: The impact of chronic disease, co-morbidities, and disease-specific complications magnifies the impact of an individual's mean and overall expenditures. This type of stratification (i.e., the aforementioned Disease Group Risk Stratification) clearly shows that a relatively similar group of individuals drives a large percentage of overall expenditures. A population health management strategy that targeted individuals in Groups 1, 2, & 3 would have the largest return on investment. Groups 1, 2, and 3 would be considered emerging risk or low risk populations.

The challenge is to prevent individuals with chronic disease from developing co-morbidities and disease-specific complications. Special attention should be given to evidence-based medicine compliance for individuals with chronic disease in order to prevent migration to higher risk status. This, in combination with lifestyle modification, should be a primary focus for future population health management strategies.

Consider the implementation of a health risk appraisal and biometric screenings (i.e., height, weight, Blood Pressure, Total Cholesterol, LDL Cholesterol, HDL Cholesterol, Triglycerides, Glucose, HbA1c) for the insured lives within the health plan. A screening of this type will yield invaluable data, increase health risk awareness, and identify individuals that are currently undiagnosed with chronic illness.

Implement a Cultural Audit to determine the population's receptivity to a population health management program. The Cultural Audit will identify critical viewpoints from management-level personnel versus non-management personnel. This type of audit can yield valuable information to the planning stage of any population health management initiative.

Introduce a participation-based wellness program in Year 1. A participation-based wellness program allows an employer to connect wellness participation (e.g., complete a Health Risk Appraisal and participate in a Biometric Screening) with an employer-sponsored health plan. Connecting the wellness program with incentives through the health benefits plan will help ensure high participation rates among plan participants. The data captured through the wellness program will help with the early identification of individuals with various chronic diseases (e.g., hypertension, diabetes, hyperlipidemia, obesity, metabolic syndrome, etc.) and help connect these individuals with physicians for clinical attention to their various risk factors. It would be expected that a program of this type would identify an additional 10 to 15 percent of the

population with chronic illness. The biometric screening should include Height, Weight, Blood Pressure, Total Cholesterol, HDL Cholesterol, LDL Cholesterol, VLDL Cholesterol, Triglycerides, Glucose, HbA1c, and Girth Measurement.

Consider the use of a Health Risk Appraisal (HRA) that has actuarial validity with regard to predicting high-spend individuals. Through the use of advanced analytics a correlation can be made between an individual's overall HRA score and their overall and mean health care expenditures. In the future, this relationship could aid State of Arkansas in negotiating insurance rates (i.e., re-insurance, disability, and life insurance) and better project future expenditures.

In Year 2 of the intervention, consider evolving the participation-based wellness program into a strategy that utilizes evidence-based clinical rules to guide participants to choose from a menu of clinical "to dos" that are relevant to the participant's age, gender, health status (i.e., chronic versus non-chronic) and gaps in care. For example, if the participant has chronic disease, give incentive for the participant to take their medications and get their disease-specific preventive visits.

An analysis was conducted to demonstrate the value of individuals with diabetes complying with their medications; the analysis revealed that compliance to evidence-based medications for diabetes reduced the chance of developing diabetes-specific complications (**Refer to Attachment 7**). Based on an additional analysis, there were a large number of individuals with a diagnosis of diabetes within the ASE and PSE populations who are non-compliant to evidence-based medications related to diabetes management (**Refer to Attachment 1**). Systems are available that can mail specific clinical "to dos" to each member's home and monitor on-going compliance to these directions; this strategy also impacts the spouse and dependent children.

The majority of wellness program strategies often do not implement programs that are sensitive to the clinical side of population health management and just concentrate on lifestyle modification (e.g., exercise, nutrition, stress management, etc.). However, in order to be effective with the chronic population, clinical strategies must be a part of the overall population health management strategy. Further analyses were conducted to identify the importance of chronic disease as a predictor of future spending (**Refer to Attachments 8 and 9**).

Key Finding 2: Diabetes Complications and Co-Morbidities

Pages 28-29 of Population Health Management Report

- **Key Finding:** The top three Diabetes-specific complications for both the ASE and PSE populations in 2014 were: (1) Cardiovascular, (2) Neuropathy, and (3) Retinopathy. Diabetes-specific complications are associated with uncontrolled diabetes and sometimes with undiagnosed diabetes. For example, a diagnosis of Idiopathic Neuropathy means "of no known cause"; however, it is often associated with an undiagnosed case of diabetes. Wellness programming that includes biometric screenings would identify individuals with undiagnosed diabetes.

Individuals with diabetes were identified and a risk stratification analysis was performed. The results of this stratification discovered that for the ASE population in 2014 there were 2,122 individuals with diabetes that had only 0 to 1 co-morbidities attached to their primary diagnosis of diabetes. For the PSE population in 2014, there were 2,344 individuals with diabetes that had only 0 to 1 co-morbidities attached to their primary diagnosis of diabetes. Disease management in combination with compliance to HEDIS guidelines for diabetes would offer a high return on investment with this group of emerging and low-risk individuals with diabetes.

- **Recommended Solution:** Establish evidence-based medicine guidelines (i.e., HEDIS goals, as described in the Recommended Solution for Key Finding 3) for the population that relate to diabetes management:

- Hemoglobin A1c (HbA1c) testing
- Hemoglobin A1c control (<7.0%)
- Retinal eye exam performed
- LDL-C screening
- LDL-C control (<100mg/dl)
- Screening for neuropathy
- Blood Pressure control (<130/80 mm/Hg)
- Medical attention for nephropathy

Key Finding 3: Preventive Screenings

Pages 41-42 of Population Health Management Report

- **Key Finding:** Preventive screenings for breast cancer, cervical cancer, and colorectal cancer were well below HEDIS National Guidelines. The suggested standards for HEDIS National Guidelines are as follows:
 - Breast Cancer Screening: 80% in the 95th percentile and 69% in the 25th percentile
 - Cervical Cancer Screening: 82% in the 95th percentile and 73% in the 25th percentile
 - Colorectal Cancer Screening: 68% in the 95th percentile and 50% in the 25th percentile

Actual screening rates for the ASE population were as follows in 2014:

- Breast Cancer Screening 44.2%
- Cervical Cancer Screening 33.9%
- Colorectal Cancer Screening 15.8%

Actual screening rates for the PSE population were as follows in 2014:

- Breast Cancer Screening 46.1%
- Cervical Cancer Screening 36.6%
- Colorectal Cancer Screening 14.5%

- **Recommended Solution:** Increase the awareness of age/gender-specific preventive screenings within the population. Education in combination with various incentives would increase the population's compliance with preventive screenings. Increased compliance to preventive screenings would identify diseases in the early stage, thus improving treatment outcomes and decreasing future expenditures.

Establish at least five HEDIS (Healthcare Effectiveness and Information Set) goals for the population. HEDIS is one of the most widely recognized healthcare performance measures in the United States. Suggested goals are as follows:

- Goal 1: Increase the number of individuals between the ages of 18 to 75 who have a diagnosis of diabetes and are compliant with the following evidence-based medicine guidelines:
 - Hemoglobin A1c (HbA1c) testing
 - HbA1c poor control (>9.0%)
 - HbA1c control (<8.0%)
 - HbA1c control (<7.0%) for a selected population
 - Eye exam (retinal) performed
 - LDL-C screening
 - LDL-C control (<100 mg/dl)
 - Medical attention for nephropathy
 - BP control (<130/80 mm Hg)

- Goal 2: Increase the number of individuals between the ages of 18 to 74 who had an outpatient visit and had their body mass index (BMI) documented
- Goal 3: Increase the percentage of women between the ages of 40 to 69 who had a mammogram to screen for breast cancer
- Goal 4: Increase the percentage of women between the ages of 21 to 64 who received one or more Pap tests to screen for cervical cancer
- Goal 5: Increase the percentage of individuals between the ages of 50 to 75 who had an appropriate screening for colorectal cancer

Key Finding 4: Musculoskeletal Diagnoses

Pages 22-23 and 43-44 of Population Health Management Report

- **Key Finding:** Expenditures for musculoskeletal-related diagnoses were the second most expensive diagnostic category for both the ASE and PSE populations in 2014 (i.e., approximately \$19.1 million for ASE and approximately \$22.6 million for PSE).

An analysis was completed to investigate which Musculoskeletal & Connective Tissue claims could potentially be work-related. Work-related musculoskeletal claims are usually associated with jobs or crafts that require manual material handling, frequent bending and twisting, static work posture, or whole body vibration. The results of this analysis were as follows for the ASE population in 2014:

○ Back	\$491,575
○ Upper Extremity	\$175,948
○ Hand & Wrist	\$79,805

The results of this analysis were as follows for the PSE population in 2014:

○ Back	\$585,844
○ Upper Extremity	\$229,826
○ Hand & Wrist	\$112,791

- **Recommended Solution:** Based on the high frequency and costs associated with musculoskeletal medical claims, consider the implementation of pre-employment physical ability testing that simulates the essential functions of a particular job or craft. Conduct a job task analysis identify the essential functions of high-risk jobs. EEOC has specific guidelines for the design and implementation of physical ability tests. A well-designed physical ability test can help prevent worksite injury.

Key Finding 5: Medication Compliance

Pages 25, 27, and 51-52 of Population Health Management Report

- **Key Finding:** Calculation of a Medication Possession Ratio revealed that within the ASE population in 2014, 19,605 individuals were prescribed hypertension medication (97.5% MPR) and 6,463 were prescribed statin medication (i.e., lipid management drugs) (98.1% MPR). Within the ASE population, there were 17,308 unique individuals in 2014 who had a diagnosis of hypertension and 9,637 who had a diagnosis of hyperlipidemia.

For the PSE population in 2014, 13,543 individuals were prescribed hypertension medication (96.6% MPR) and 4,060 were prescribed statin drugs (98.5% MPR). Within the PSE population, there were 18,575 unique individuals in 2014 who had a diagnosis of hypertension and 10,164 who had a diagnosis of hyperlipidemia.

The Medication Possession Ratio determines an individual's compliance to medications. However, it only takes into account individuals who have been prescribed medication and have refilled the prescription at least once. It does not take into account the other people who may have a diagnosis, but no prescription has been tracked. For example, a person may have a diagnosis for hypertension, but they may not appear in the pharmacy data due to the fact that they either have no prescription or they have failed to fill a prescription they were prescribed.

- **Recommended Solution:** Implement a solution that identifies all individuals who are non-compliant with medications and implement a mail-out reminder to the member's home address. Combine this strategy with an incentive connected to the member's benefit plan design.

Key Finding 6: Patient/Physician Communication

Pages 22-23 of Population Health Management Report

- **Key Finding:** It should be noted that high frequencies of Symptoms, Signs, and Ill-Defined Conditions (i.e., the fourth most expensive diagnostic category for both the ASE and PSE populations in 2014) could be a strong predictor of poor patient/physician communication. Within this category, no specific diagnosis is rendered, yet treatment cost is experienced. For example, with a diagnosis of Symptoms, Signs, and Ill-Defined Conditions involving the abdomen, in reality the diagnosis could be more specific as Gastro Esophageal Reflux Disease (GERD).
- **Recommended Solution:** Personal electronic health records can help improve the accuracy of an individual's diagnosis, and writing down all symptoms prior to a physician visit can also improve the accuracy of diagnosis.

Key Finding 7: Avoidable Emergency Room Visits

Pages 63-64 of Population Health Management Report

- **Key Finding:** Avoidable Emergency Room visits for the ASE and PSE populations combined amounted to greater than \$1.5 million in excess spending (**Refer to Attachment 5**). Avoidable ER visits are defined as those visits which could have been appropriately treated in another setting at the time the visit occurred. The State of Washington, through sampling of 53 hospitals and 2.2 million patients, established the definition of avoidable ER visits. Avoidable ER visits have the following statistics:
 - 1 out of 9 visits is avoidable.
 - Avoidable visits account for approximately 11 percent of the overall ER spend.
 - Children that are less than 18 years of age comprise 1/3 of all avoidable visits.
 - The majority of avoidable visits are comprised of females.
 - The uninsured have approximately the same rate of avoidable visits as compared to the insured.
 - The majority of avoidable ER visits occur between 12 p.m. and 8 p.m.
- **Recommended Solution:** In order to effectively reduce avoidable ER visits, frequent flyers need to be identified and connected with a primary care physician. The State of Washington research indicated that if these individuals are assigned a primary care physician, avoidable ER visits will be reduced by approximately 58 percent. It would also be suggested to distribute medical self-care guides to help people differentiate between an emergency and a situation that can be resolved at an alternative setting. One other leading cause for avoidable ER visits is related to drug seeking behavior; this can be limited by urging hospitals to limit the amount of pain management drugs that are prescribed, especially opioid-based medications.

Key Finding 8: Warehouse Data in Relational Database

- **Key Finding:** It is recommended that State of Arkansas consider warehousing all relevant healthcare data within a relational database that has the ability to query the data. By having the ability to query and explore archival and current healthcare data, empirical evidence can be gained that will support strategic risk management decision-making. Additionally, such data analysis can serve as a vital tool to measure the pre/post effectiveness of various population health strategies and interventions.

Summary

The overall goal of this population health analysis is to bring meaningful use to the 2013-2014 medical and pharmacy data for the ASE and PSE populations. Meaningful use is defined as gaining insight into future population health management strategies that will promote the health and well-being of the ASE and PSE populations of the State of Arkansas. This analysis will provide a baseline to measure future success of population health management strategies (e.g., wellness, pharmacy management, disease management, and adherence to evidence-based medicine guidelines).

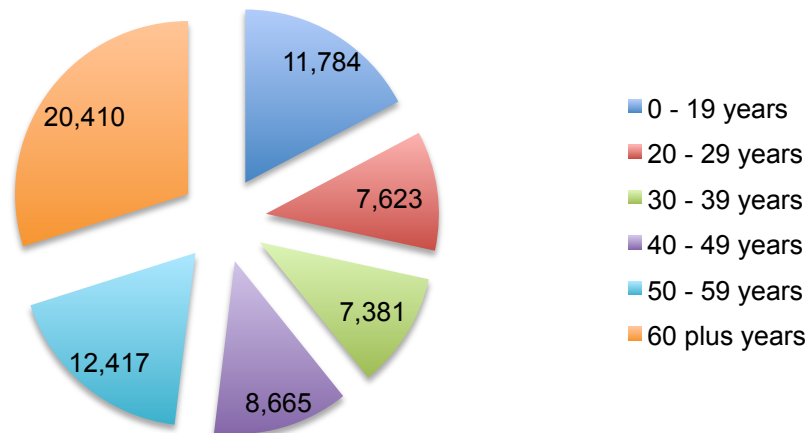
Data Overview

1. Demographic Information (Age and Gender)

ASE

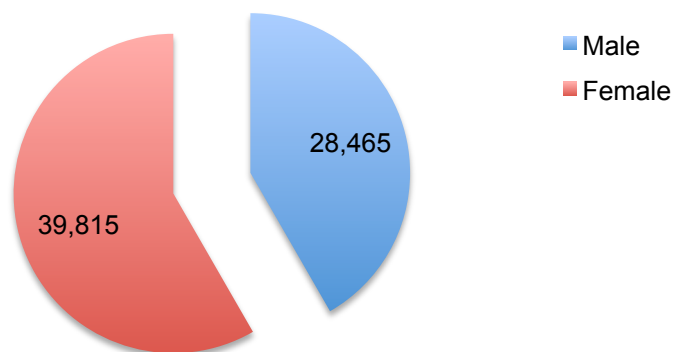
- The mean (average) age for the total population, including Employees, Spouses, and Dependents, was 44.7 in 2013 and 44.5 in 2014. For Employees only, the mean age was 48.8 in 2013 and 46.5 in 2014.

Number of Individuals by Age - Total Population - 2014



- The gender breakdown for the total population, including Employees, Spouses, and Dependents, was 59% female and 41% male in 2013 and 58% female and 42% male in 2014.

Number of Individuals by Gender - Total Population - 2014

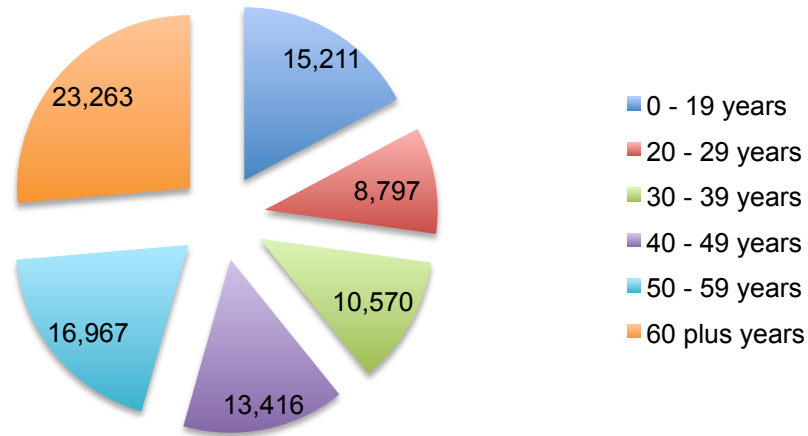


Demographic Information (continued)

PSE

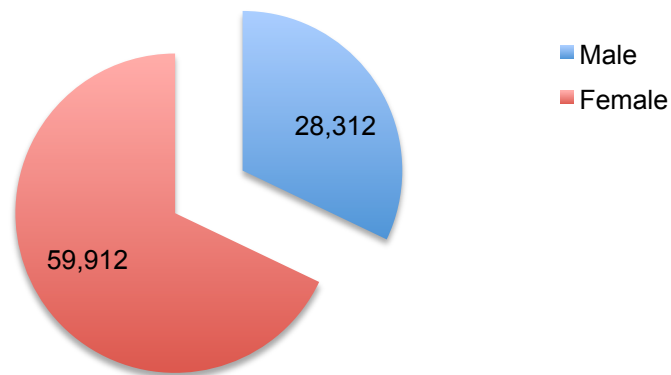
- The mean (average) age for the total population, including Employees, Spouses, and Dependents, was 43.4 in 2013 and 43.3 in 2014. For Employees only, the mean age was 47.2 in 2013 and 49.9 in 2014.

Number of Individuals by Age - Total Population - 2014



- The gender breakdown for the total population, including Employees, Spouses, and Dependents, was 69% female and 31% male in 2013 and 68% female and 32% male in 2014.

Number of Individuals by Gender - Total Population - 2014



2. Overall Medical Expenditures

ASE

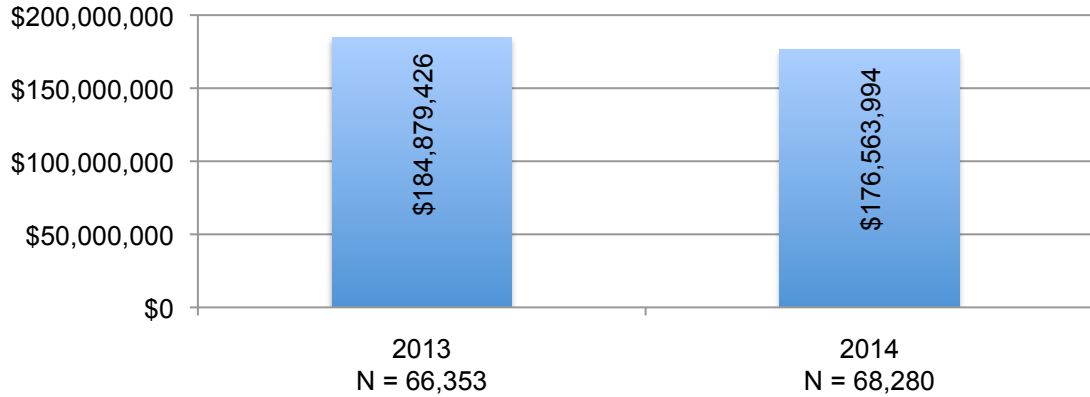
- Overall medical expenditures* based on paid claims for Employee/Spouse/Dependent = \$184,879,426 in 2013 and \$176,563,994 in 2014. Mean amount paid = \$2,786 in 2013 and \$2,586 in 2014.

	2013	2014
Total \$	\$184,879,426	\$176,563,994
Mean \$	\$2,786	\$2,586
N**	66,353	68,280

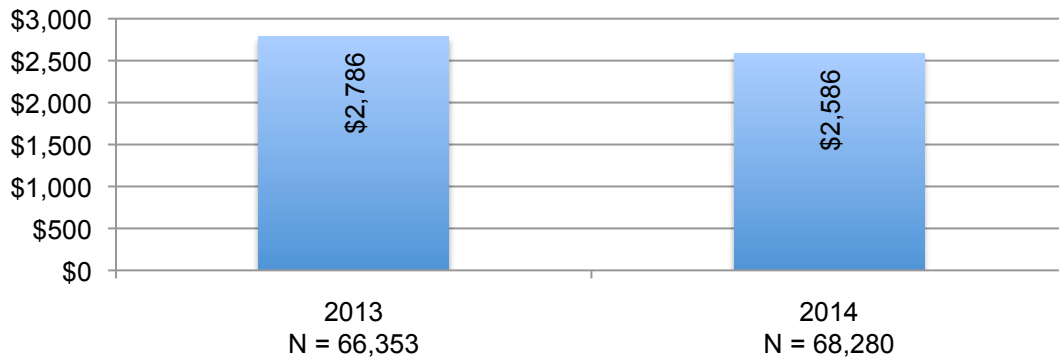
*Medical expenditures do not include pharmacy-related expenditures.

**N is a statistical notation that identifies the number of people in a population. Throughout this report, it is used to indicate the number of individuals incorporated into each analysis.

Total Amount Paid - Total Population



Mean Amount Paid - Total Population



Overall Medical Expenditures (continued)

PSE

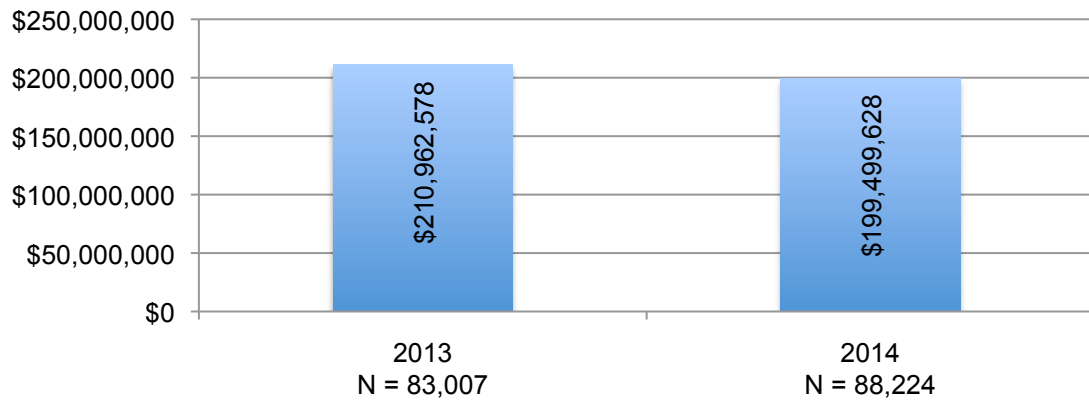
- Overall medical expenditures* based on paid claims for Employee/Spouse/Dependent = \$210,962,578 in 2013 and \$199,499,628 in 2014. Mean amount paid = \$2,542 in 2013 and \$2,261 in 2014.

	2013	2014
Total \$	\$210,962,578	\$199,499,628
Mean \$	\$2,542	\$2,261
N**	83,007	88,224

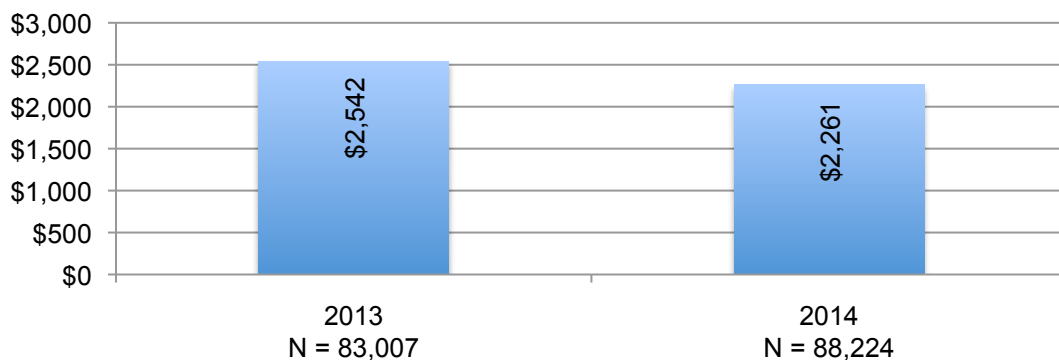
*Medical expenditures do not include pharmacy-related expenditures.

**N is a statistical notation that identifies the number of people in a population. Throughout this report, it is used to indicate the number of individuals incorporated into each analysis.

Total Amount Paid - Total Population



Mean Amount Paid - Total Population



3. *Employee / Spouse / Dependent / Retiree Expenditures*

ASE

- Overall medical expenditures related to employees = \$87,778,562 in 2013 and \$81,533,645 in 2014. Mean amount paid related to employees = \$3,122 in 2013 and \$2,782 in 2014.
- Overall medical expenditures related to spouses = \$35,313,867 in 2013 and \$34,337,284 in 2014. Mean amount paid related to spouses = \$3,512 in 2013 and \$3,400 in 2014.
- Overall medical expenditures related to dependents = \$22,533,795 in 2013 and \$22,821,503 in 2014. Mean amount paid related to dependents = \$1,809 in 2013 and \$1,768 in 2014.
- Overall medical expenditures related to retirees = \$39,253,203 in 2013 and \$37,871,562 in 2014. Mean amount paid related to retirees = \$2,495 in 2013 and \$2,368 in 2014.

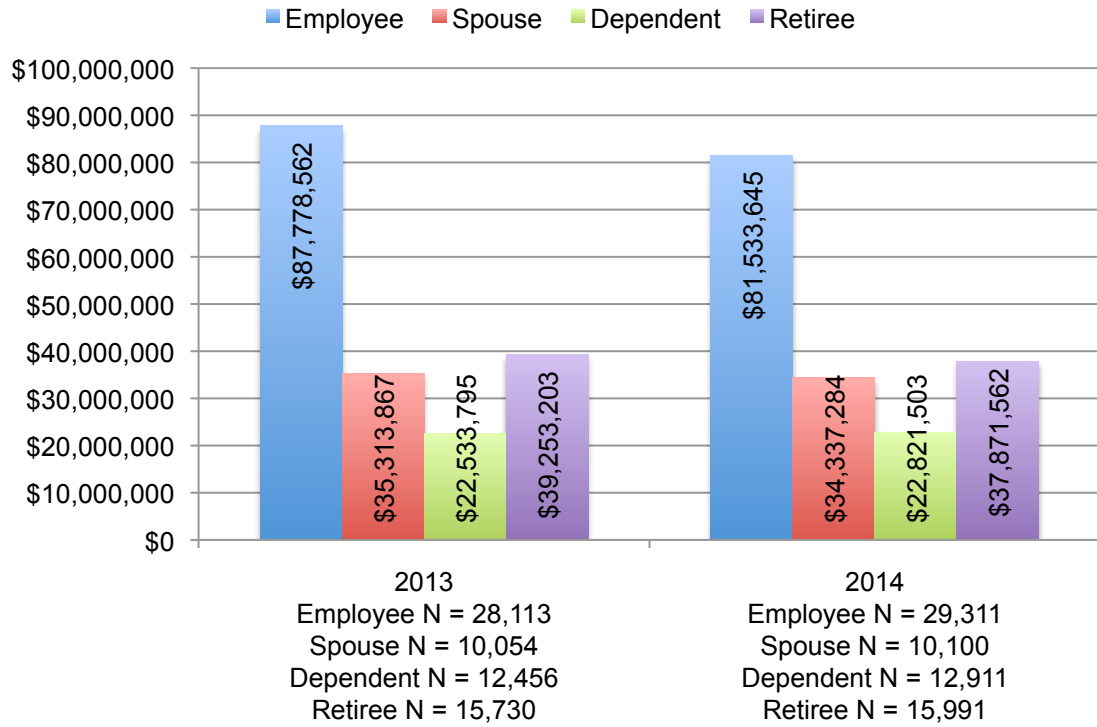
	2013	2014
Employee Total \$	\$87,778,562	\$81,533,645
Employee Mean \$	\$3,122	\$2,782
Employee N	28,113	29,311
Spouse Total \$	\$35,313,867	\$34,337,284
Spouse Mean \$	\$3,512	\$3,400
Spouse N	10,054	10,100
Dependent Total \$	\$22,533,795	\$22,821,503
Dependent Mean \$	\$1,809	\$1,768
Dependent N	12,456	12,911
Retiree* Total \$	\$39,253,203	\$37,871,562
Retiree Mean \$	\$2,495	\$2,368
Retiree N	15,730	15,991

*Retiree includes RET (Retiree) and MED (Medicare).

Employee / Spouse / Dependent / Retiree Expenditures (continued)

ASE

Total Amount Paid - Pharmacy - Employee / Spouse / Dependent / Retiree



Employee / Spouse / Dependent / Retiree Expenditures (continued)

PSE

- Overall medical expenditures related to employees = \$132,782,093 in 2013 and \$120,280,343 in 2014. Mean amount paid related to employees = \$2,893 in 2013 and \$2,503 in 2014.
- Overall medical expenditures related to spouses = \$27,737,786 in 2013 and \$22,863,296 in 2014. Mean amount paid related to spouses = \$2,851 in 2013 and \$2,271 in 2014.
- Overall medical expenditures related to dependents = \$19,897,914 in 2013 and \$21,787,670 in 2014. Mean amount paid related to dependents = \$1,500 in 2013 and \$1,491 in 2014.
- Overall medical expenditures related to retirees = \$30,544,785 in 2013 and \$34,568,319 in 2014. Mean amount paid related to retirees = \$2,165 in 2013 and \$2,232 in 2014.

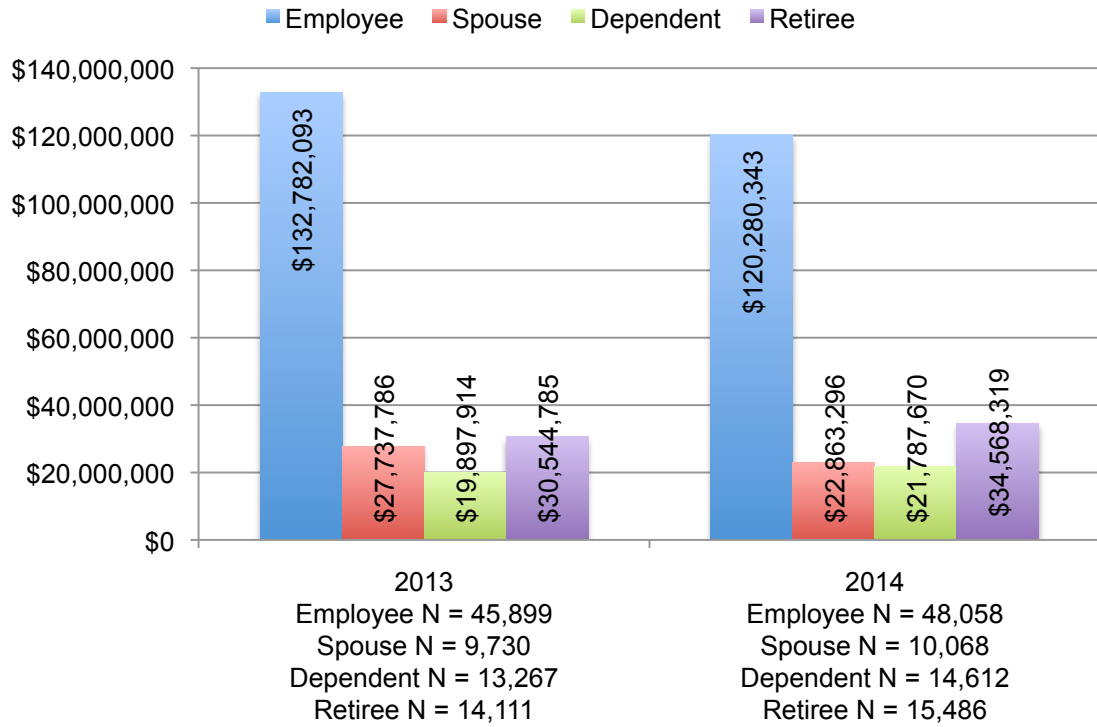
	2013	2014
Employee Total \$	\$132,782,093	\$120,280,343
Employee Mean \$	\$2,893	\$2,503
Employee N	45,899	48,058
Spouse Total \$	\$27,737,786	\$22,863,296
Spouse Mean \$	\$2,851	\$2,271
Spouse N	9,730	10,068
Dependent Total \$	\$19,897,914	\$21,787,670
Dependent Mean \$	\$1,500	\$1,491
Dependent N	13,267	14,612
Retiree* Total \$	\$30,544,785	\$34,568,319
Retiree Mean \$	\$2,165	\$2,232
Retiree N	14,111	15,486

*Retiree includes RET (Retiree) and MED (Medicare).

Employee / Spouse / Dependent / Retiree Expenditures (continued)

PSE

Total Amount Paid - Pharmacy - Employee / Spouse / Dependent / Retiree



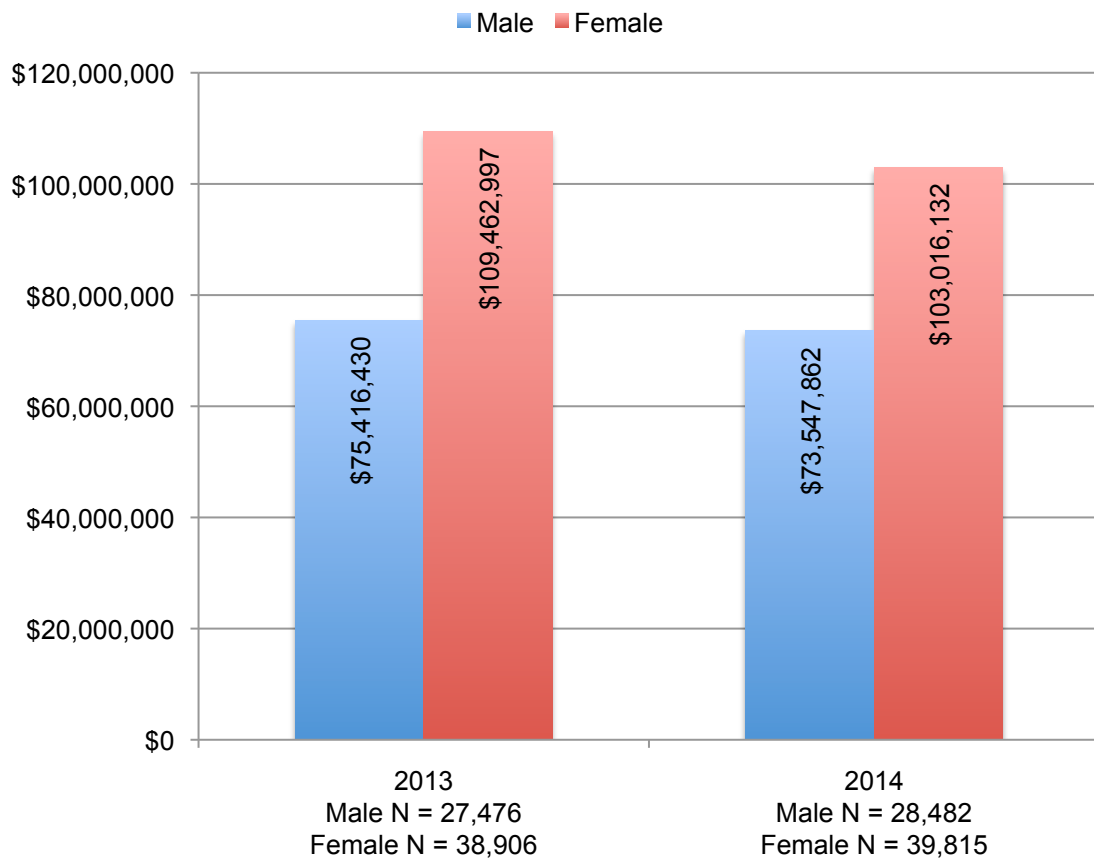
4. Gender-Related Expenditures

ASE

- Overall medical expenditures related to males = \$75,416,430 in 2013 and \$73,547,862 in 2014. Mean amount paid related to males = \$2,745 in 2013 and \$2,582 in 2014.
- Overall medical expenditures related to females = \$109,462,997 in 2013 and \$103,016,132 in 2014. Mean amount paid related to females = \$2,814 in 2013 and \$2,587 in 2014.

	2013	2014
Male Total \$	\$75,416,430	\$73,547,862
Male Mean \$	\$2,745	\$2,582
Male N	27,476	28,482
Female Total \$	\$109,462,997	\$103,016,132
Female Mean \$	\$2,814	\$2,587
Female N	38,906	39,815

Total Amount Paid - Gender - Total Population



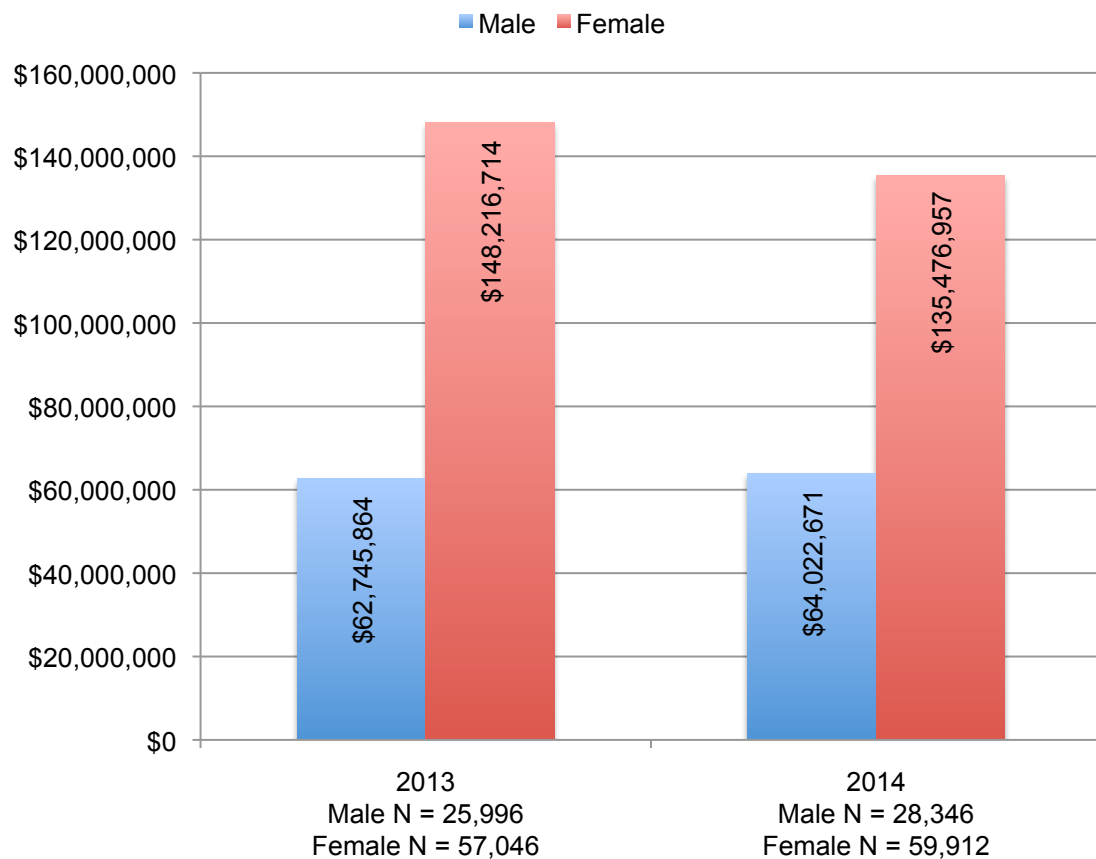
Gender-Related Expenditures (continued)

PSE

- Overall medical expenditures related to males = \$62,745,864 in 2013 and \$64,022,671 in 2014. Mean amount paid related to males = \$2,414 in 2013 and \$2,259 in 2014.
- Overall medical expenditures related to females = \$148,216,714 in 2013 and \$135,476,957 in 2014. Mean amount paid related to females = \$2,598 in 2013 and \$2,261 in 2014.

	2013	2014
Male Total \$	\$62,745,864	\$64,022,671
Male Mean \$	\$2,414	\$2,259
Male N	25,996	28,346
Female Total \$	\$148,216,714	\$135,476,957
Female Mean \$	\$2,598	\$2,261
Female N	57,046	59,912

Total Amount Paid - Gender - Total Population



5. Diagnostic Category Expenditures

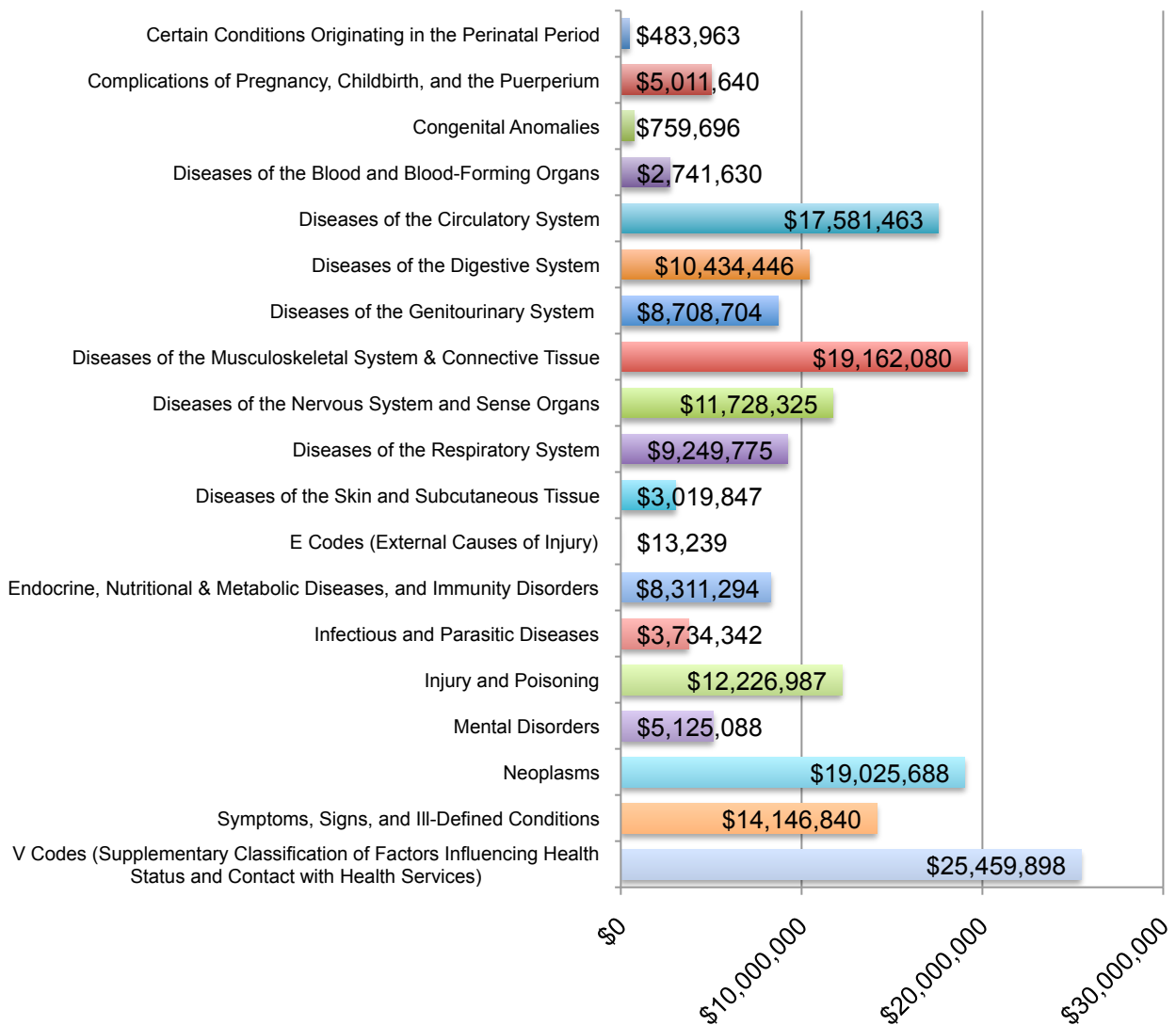
ASE

- The most expensive diagnostic categories* were as follows:

	2013	2014
1.	V Codes	V Codes
2.	Diseases of the Musculoskeletal System & Connective Tissue	Diseases of the Musculoskeletal System & Connective Tissue
3.	Diseases of the Circulatory System	Neoplasms
4.	Neoplasms	Diseases of the Circulatory System
5.	Symptoms, Signs, and Ill-Defined Conditions	Symptoms, Signs, and Ill-Defined Conditions

*Refer to Appendix III for examples of Diagnostic Categories.

Total Amount Paid - Diagnostic Category - Total Population - 2014



Diagnostic Category Expenditures (continued)

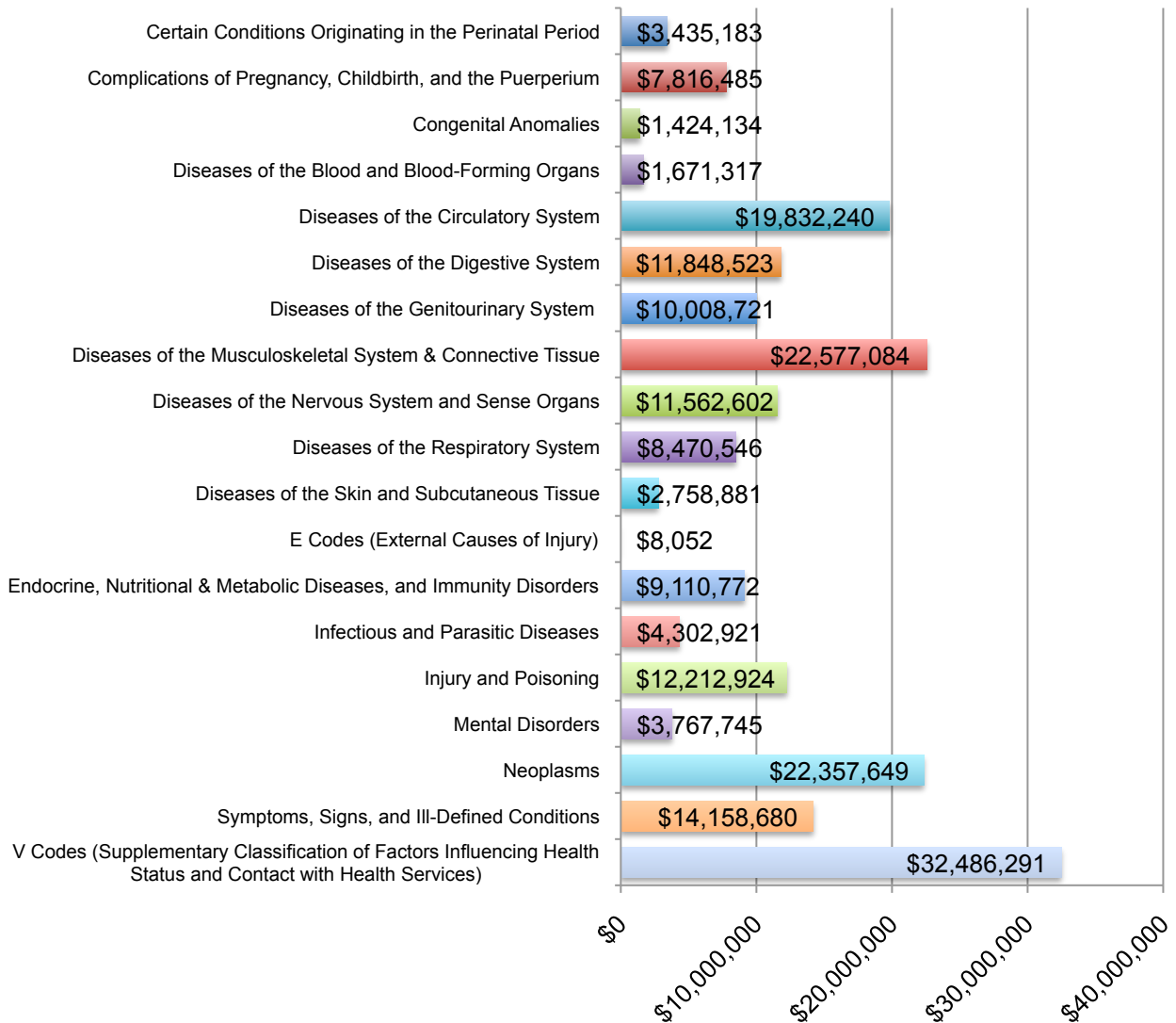
PSE

- The most expensive diagnostic categories* were as follows:

	2013	2014
1.	V Codes	V Codes
2.	Diseases of the Musculoskeletal System & Connective Tissue	Diseases of the Musculoskeletal System & Connective Tissue
3.	Neoplasms	Neoplasms
4.	Diseases of the Circulatory System	Diseases of the Circulatory System
5.	Symptoms, Signs, and Ill-Defined Conditions	Symptoms, Signs, and Ill-Defined Conditions

*Refer to Appendix III for examples of Diagnostic Categories.

Total Amount Paid - Diagnostic Category - Total Population - 2014



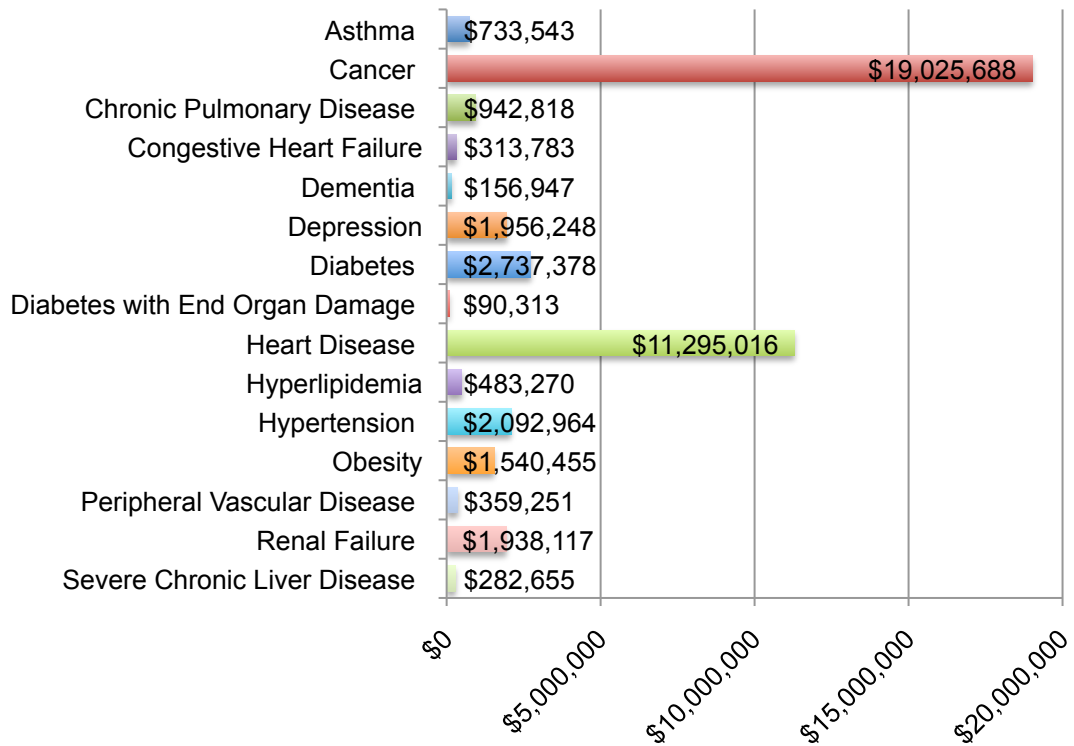
6. Chronic Disease Expenditures

ASE

- The most expensive chronic diseases were as follows:

	2013	2014
1.	Cancer	Cancer
2.	Heart Disease	Heart Disease
3.	Diabetes	Diabetes
4.	Hypertension	Hypertension
5.	Obesity	Depression

Total Amount Paid - Chronic by Category - Total Population - 2014



Chronic Disease Expenditures (continued)

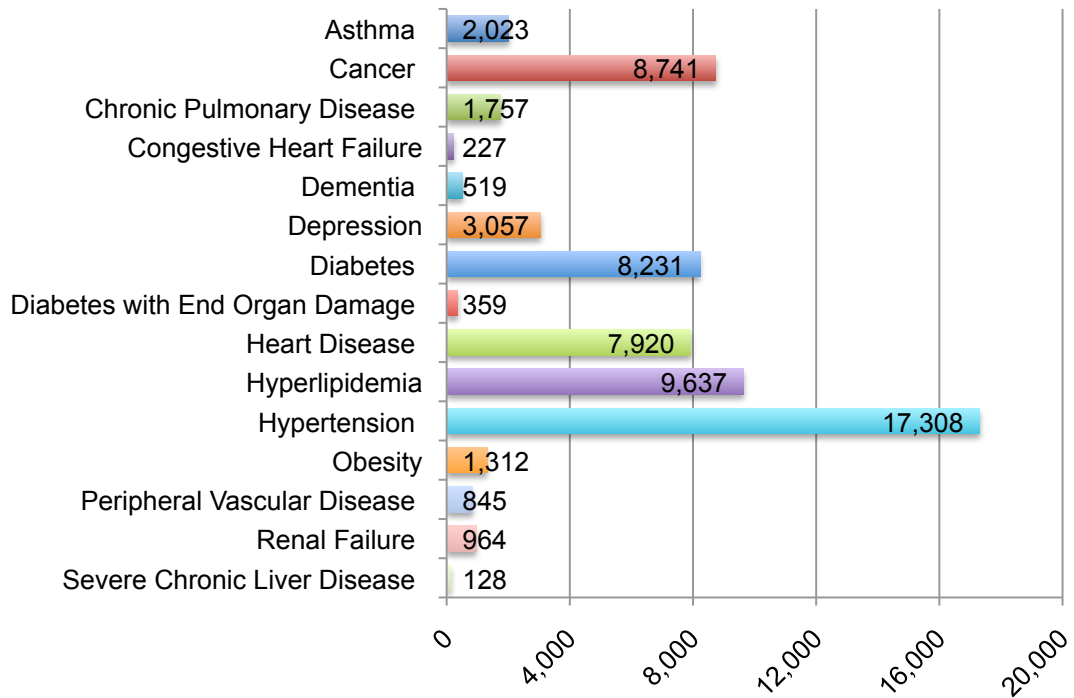
ASE

- The most frequent chronic diseases were as follows:

	2013	2014
1.	Hypertension	Hypertension
2.	Hyperlipidemia	Hyperlipidemia
3.	Cancer	Cancer
4.	Heart Disease	Diabetes
5.	Diabetes	Heart Disease

For this calculation, if an individual has multiple chronic diseases, they will be counted for each chronic disease.

Number of Individuals - Chronic by Category - Total Population - 2014



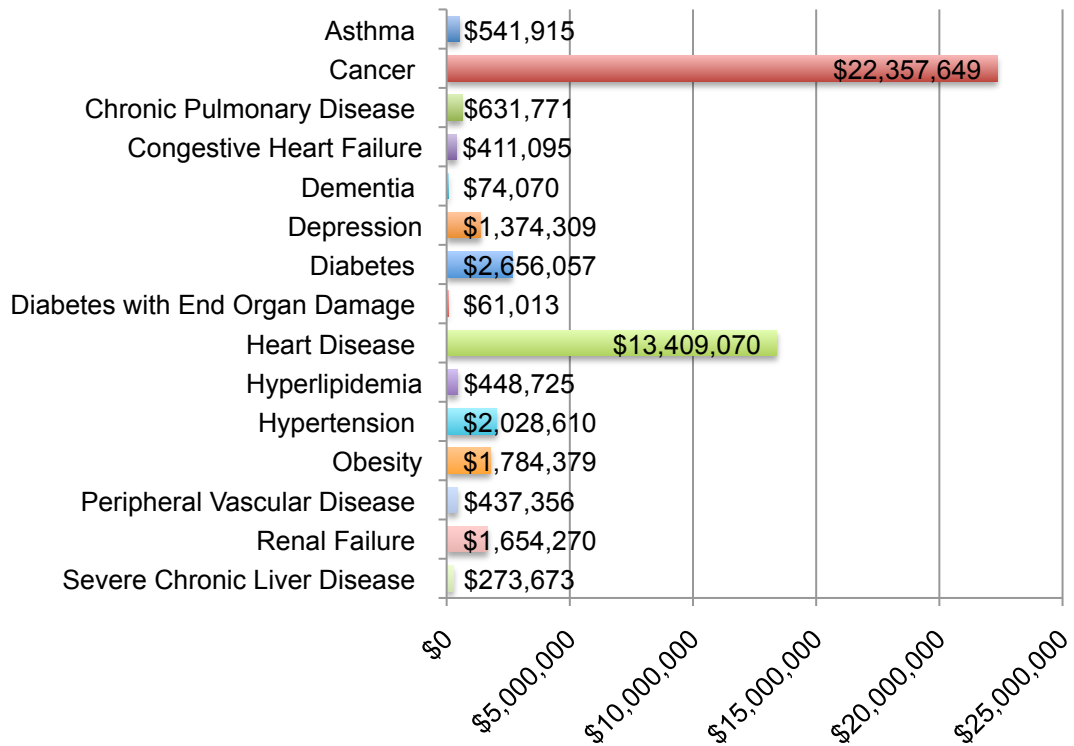
Chronic Disease Expenditures (continued)

PSE

- The most expensive chronic diseases were as follows:

	2013	2014
1.	Cancer	Cancer
2.	Heart Disease	Heart Disease
3.	Diabetes	Diabetes
4.	Hypertension	Hypertension
5.	Renal Failure	Obesity

Total Amount Paid - Chronic by Category - Total Population - 2014



Chronic Disease Expenditures (continued)

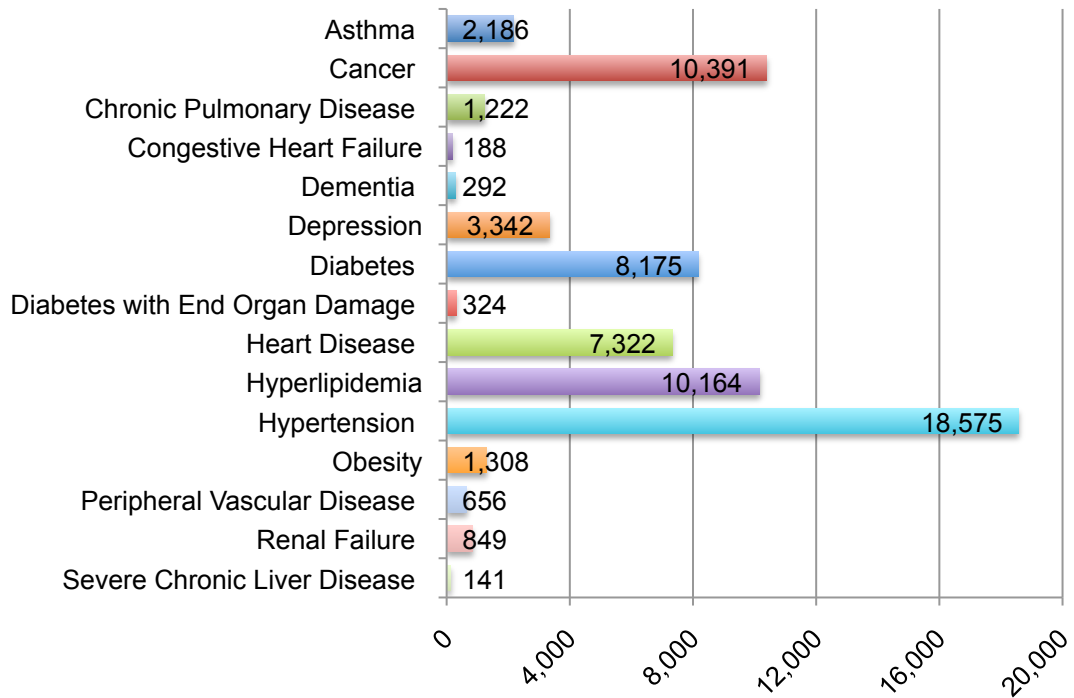
PSE

- The most frequent chronic diseases were as follows:

	2013	2014
1.	Hypertension	Hypertension
2.	Cancer	Cancer
3.	Hyperlipidemia	Hyperlipidemia
4.	Diabetes	Diabetes
5.	Heart Disease	Heart Disease

For this calculation, if an individual has multiple chronic diseases, they will be counted for each chronic disease.

Number of Individuals - Chronic by Category - Total Population - 2014



7. Diabetes Expenditures & Related Risk Stratification

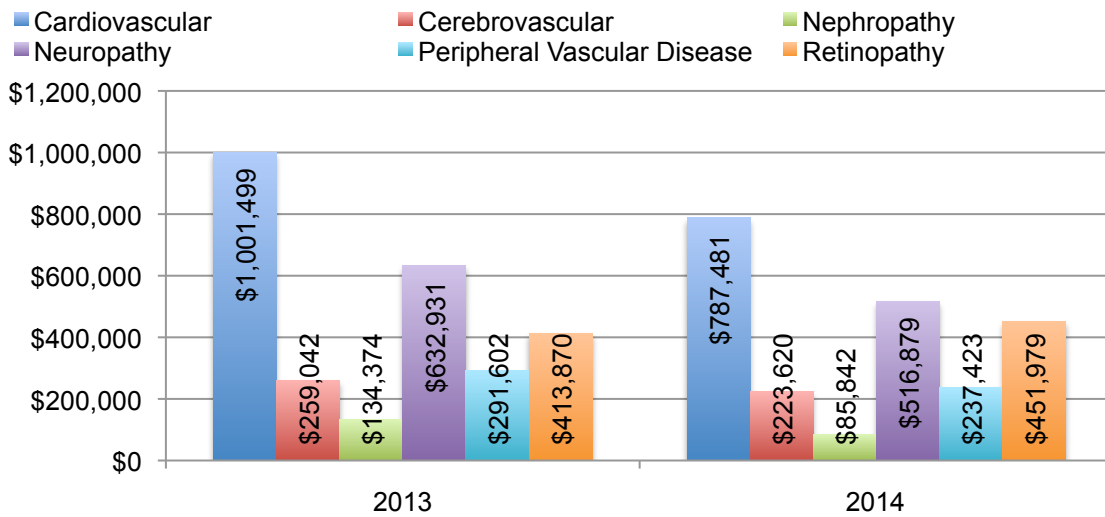
ASE

- The most expensive complications* associated with diabetes were as follows:

	2013	2014
1.	Cardiovascular	Cardiovascular
2.	Neuropathy	Neuropathy
3.	Retinopathy	Retinopathy

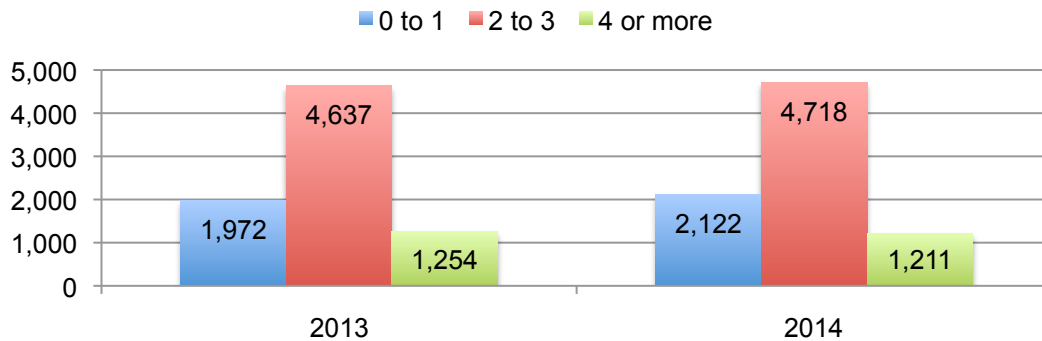
*Refer to Appendix IV for examples of Complications of Diabetes.

Total Amount Paid - Complications of Diabetes - Total Population



- In 2013, 4,637 individuals had 2 to 3 co-morbidities and 1,254 individuals had 4 or more co-morbidities. In 2014, 4,718 individuals had 2 to 3 co-morbidities and 1,211 individuals had 4 or more co-morbidities. Individuals with Type II Diabetes had more co-morbidities attached to the primary illness of Diabetes versus individuals with Type I Diabetes. Type I Diabetes is normally developed at a young age, thus long-term lifestyle modification is usually more successful. Type II Diabetes is normally adult onset, thus multiple risk factors have already developed over time.

Distribution of Co-Morbid Patterns - Type II Diabetes - Total Population



Diabetes Expenditures & Related Risk Stratification (continued)

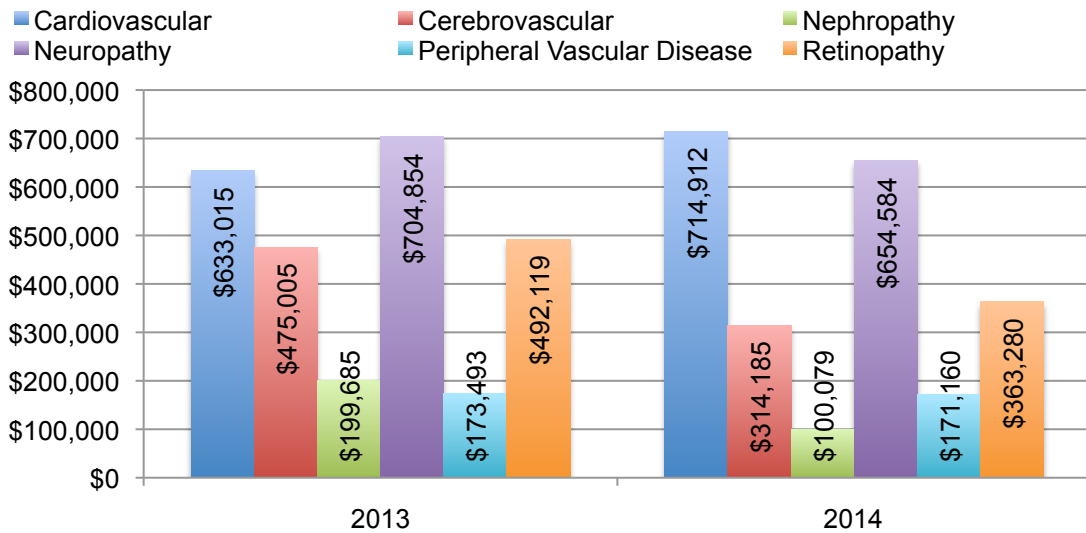
PSE

- The most expensive complications* associated with diabetes were as follows:

	2013	2014
1.	Neuropathy	Cardiovascular
2.	Cardiovascular	Neuropathy
3.	Retinopathy	Retinopathy

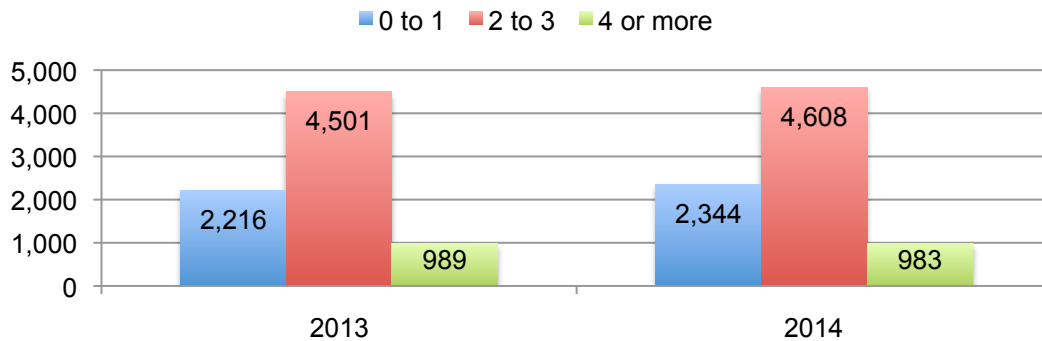
*Refer to Appendix IV for examples of Complications of Diabetes.

Total Amount Paid - Complications of Diabetes - Total Population



- In 2013, 4,501 individuals had 2 to 3 co-morbidities and 989 individuals had 4 or more co-morbidities. In 2014, 4,608 individuals had 2 to 3 co-morbidities and 983 individuals had 4 or more co-morbidities. Individuals with Type II Diabetes had more co-morbidities attached to the primary illness of Diabetes versus individuals with Type I Diabetes. Type I Diabetes is normally developed at a young age, thus long-term lifestyle modification is usually more successful. Type II Diabetes is normally adult onset, thus multiple risk factors have already developed over time.

Distribution of Co-Morbid Patterns - Type II Diabetes - Total Population



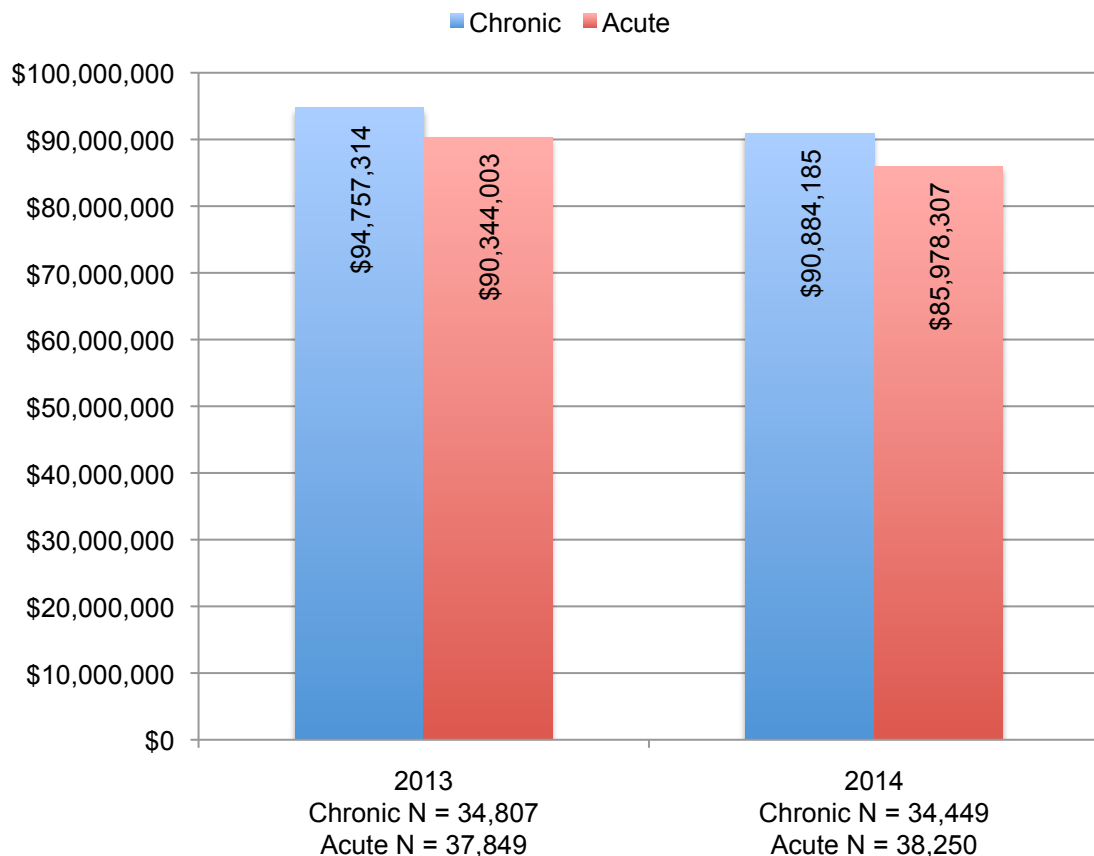
8. Summary of Chronic vs. Acute Expenditures

ASE

- Overall medical expenditures related to Chronic Disease = \$94,757,314 in 2013 and \$90,884,185 in 2014. Mean amount paid related to Chronic Disease = \$2,722 in 2013 and \$2,638 in 2014.
- Overall medical expenditures related to Acute Disease = \$90,344,003 in 2013 and \$85,978,307 in 2014. Mean amount paid related to Acute Disease = \$2,387 in 2013 and \$2,248 in 2014.

	2013	2014
Chronic Total \$	\$94,757,314	\$90,884,185
Chronic Mean \$	\$2,722	\$2,638
Chronic N	34,807	34,449
Acute Total \$	\$90,344,003	\$85,978,307
Acute Mean \$	\$2,387	\$2,248
Acute N	37,849	38,250

Total Amount Paid - Chronic vs. Acute Disease - Total Population



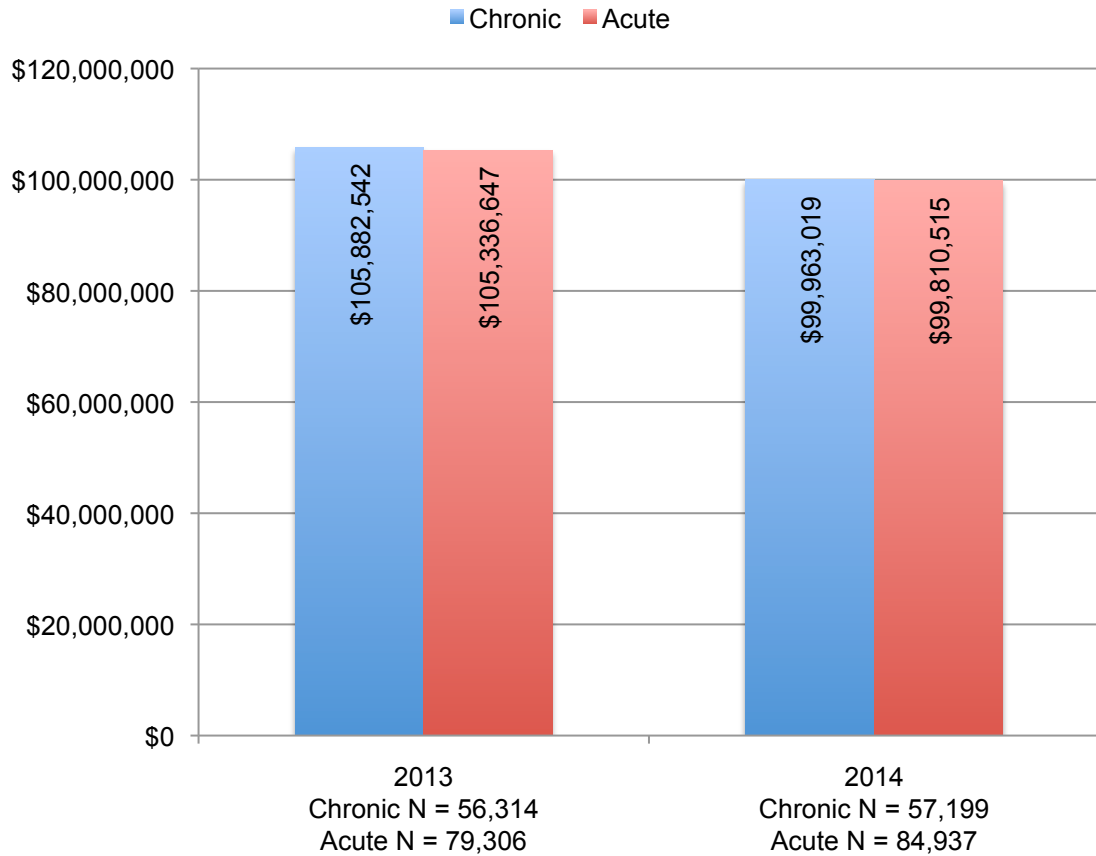
Summary of Chronic vs. Acute Expenditures (continued)

PSE

- Overall medical expenditures related to Chronic Disease = \$105,882,542 in 2013 and \$99,963,019 in 2014. Mean amount paid related to Chronic Disease = \$1,880 in 2013 and \$1,748 in 2014.
- Overall medical expenditures related to Acute Disease = \$105,336,647 in 2013 and \$99,810,515 in 2014. Mean amount paid related to Acute Disease = \$1,328 in 2013 and \$1,175 in 2014.

	2013	2014
Chronic Total \$	\$105,882,542	\$99,963,019
Chronic Mean \$	\$1,880	\$1,748
Chronic N	56,314	57,199
Acute Total \$	\$105,336,647	\$99,810,515
Acute Mean \$	\$1,328	\$1,175
Acute N	79,306	84,937

Total Amount Paid - Chronic vs. Acute Disease - Total Population



9. Disease Group Risk Stratification

ASE




The population was risk stratified by segregating the population into the following five distinct groups:

Group	Description
1	No chronic disease and less than \$1,500 utilization expenditures per 12 months
2	No chronic disease and \$1,500 or more utilization expenditures per 12 months
3	Chronic disease* with no co-morbidities and no complications
4	Chronic disease with co-morbidities, but no complications
5	Chronic disease with co-morbidities and disease-specific complications**, or chronic disease with disease-specific complications but no co-morbidities

*This calculation includes the following chronic diseases: Asthma, Cancer, Heart Disease, Hypertension, COPD, Diabetes, Obesity, Hyperlipidemia, and Depression.

**This calculation includes complications to the following diseases: Asthma, Diabetes, COPD, and Heart Disease.

- Overall medical expenditures related to Disease Group 1 = \$10,233,730 in 2013 and \$11,014,121 in 2014. Mean amount paid related to Disease Group 1 = \$376 in 2013 and \$372 in 2014.
- Overall medical expenditures related to Disease Group 2 = \$33,765,293 in 2013 and \$32,221,310 in 2014. Mean amount paid related to Disease Group 2 = \$5,390 in 2013 and \$5,603 in 2014.
- Overall medical expenditures related to Disease Group 3 = \$47,031,911 in 2013 and \$44,763,812 in 2014. Mean amount paid related to Disease Group 3 = \$2,926 in 2013 and \$2,783 in 2014.
- Overall medical expenditures related to Disease Group 4 = \$61,535,861 in 2013 and \$57,392,026 in 2014. Mean amount paid related to Disease Group 4 = \$4,448 in 2013 and \$4,123 in 2014.
- Overall medical expenditures related to Disease Group 5 = \$32,312,630 in 2013 and \$31,172,726 in 2014. Mean amount paid related to Disease Group 5 = \$9,493 in 2013 and \$9,375 in 2014.

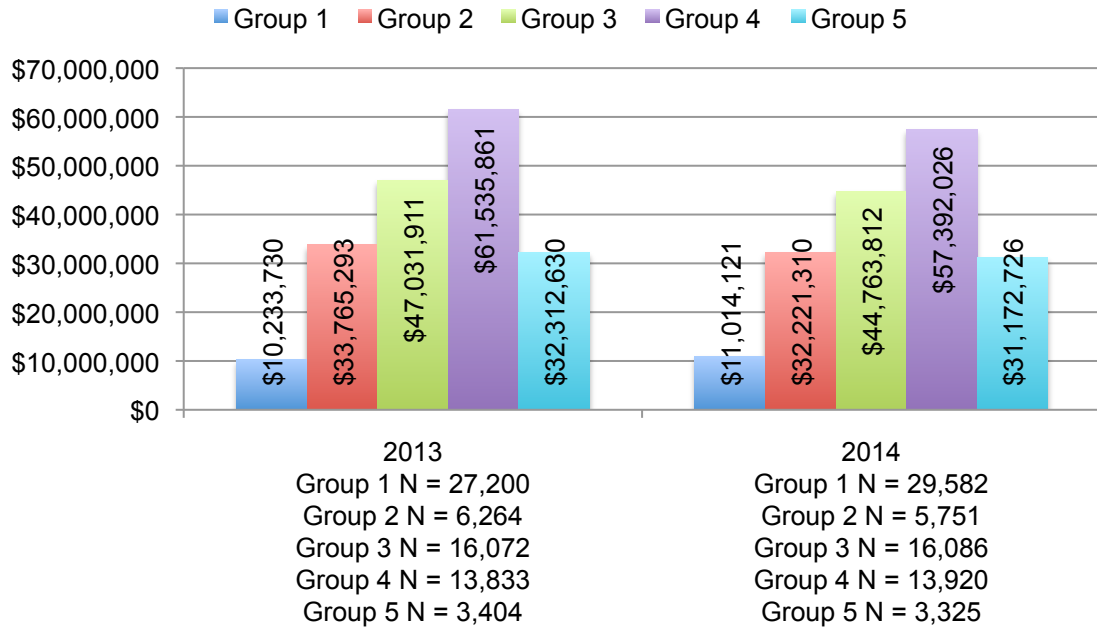
	2013	2014
Disease Group 1 Total \$	\$10,233,730	\$11,014,121
Disease Group 1 Mean \$	\$376	\$372
Disease Group 1 N	27,200	29,582
Disease Group 2 Total \$	\$33,765,293	\$32,221,310
Disease Group 2 Mean \$	\$5,390	\$5,603
Disease Group 2 N	6,264	5,751
Disease Group 3 Total \$	\$47,031,911	 \$44,763,812
Disease Group 3 Mean \$	\$2,926	\$2,783
Disease Group 3 N	16,072	16,086
Disease Group 4 Total \$	\$61,535,861	 \$57,392,026
Disease Group 4 Mean \$	\$4,448	\$4,123
Disease Group 4 N	13,833	13,920
Disease Group 5 Total \$	\$32,312,630	 \$31,172,726
Disease Group 5 Mean \$	\$9,493	\$9,375
Disease Group 5 N	3,404	3,325

(Arrows highlight reduction in total amount paid for Disease Groups with chronic disease.)

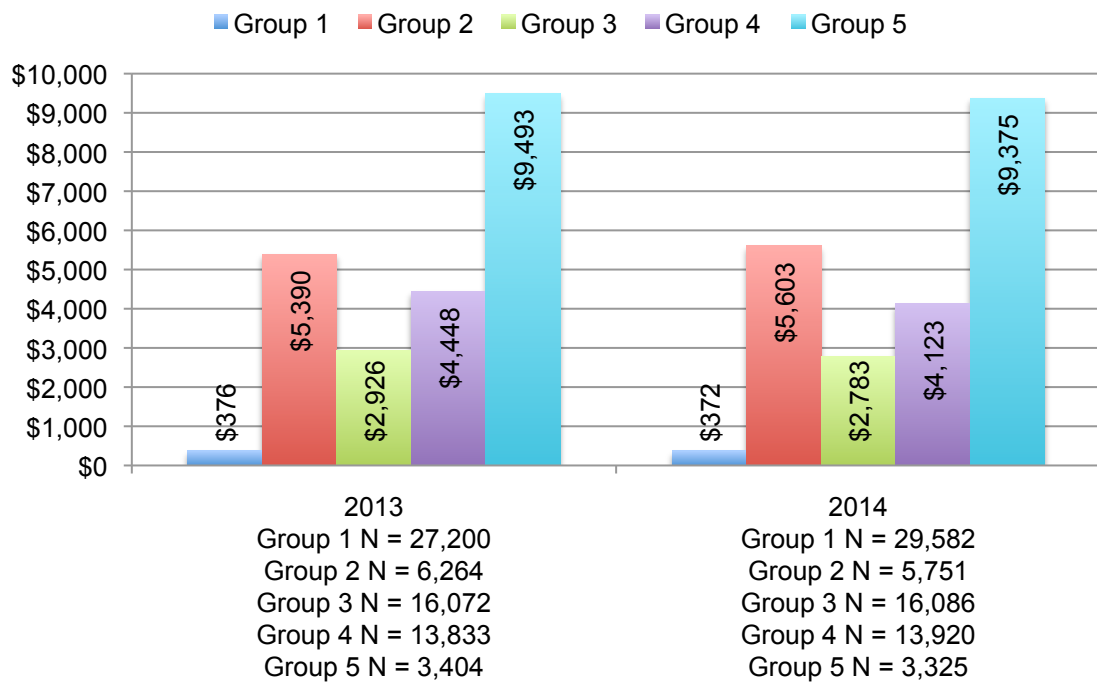
Disease Group Risk Stratification (continued)

ASE

Total Amount Paid - Disease Group Risk Stratification - Total Population



Mean Amount Paid - Disease Group Risk Stratification - Total Population



Disease Group Risk Stratification (continued)

PSE




The population was risk stratified by segregating the population into the following five distinct groups:

Group	Description
1	No chronic disease and less than \$1,500 utilization expenditures per 12 months
2	No chronic disease and \$1,500 or more utilization expenditures per 12 months
3	Chronic disease with no co-morbidities and no complications
4	Chronic disease with co-morbidities, but no complications
5	Chronic disease with co-morbidities and disease-specific complications**, or chronic disease with disease-specific complications but no co-morbidities

*This calculation includes the following chronic diseases: Asthma, Cancer, Heart Disease, Hypertension, COPD, Diabetes, Obesity, Hyperlipidemia, and Depression.

**This calculation includes complications to the following diseases: Asthma, Diabetes, COPD, and Heart Disease.

- Overall medical expenditures related to Disease Group 1 = \$12,495,361 in 2013 and \$13,410,998 in 2014. Mean amount paid related to Disease Group 1 = \$317 in 2013 and \$299 in 2014.
- Overall medical expenditures related to Disease Group 2 = \$46,064,270 in 2013 and \$42,001,658 in 2014. Mean amount paid related to Disease Group 2 = \$5,994 in 2013 and \$6,323 in 2014.
- Overall medical expenditures related to Disease Group 3 = \$57,538,940 in 2013 and \$53,695,383 in 2014. Mean amount paid related to Disease Group 3 = \$2,909 in 2013 and \$2,622 in 2014.
- Overall medical expenditures related to Disease Group 4 = \$65,977,691 in 2013 and \$59,022,987 in 2014. Mean amount paid related to Disease Group 4 = \$4,747 in 2013 and \$4,180 in 2014.
- Overall medical expenditures related to Disease Group 5 = \$28,886,316 in 2013 and \$31,368,603 in 2014. Mean amount paid related to Disease Group 5 = \$10,009 in 2013 and \$10,937 in 2014.

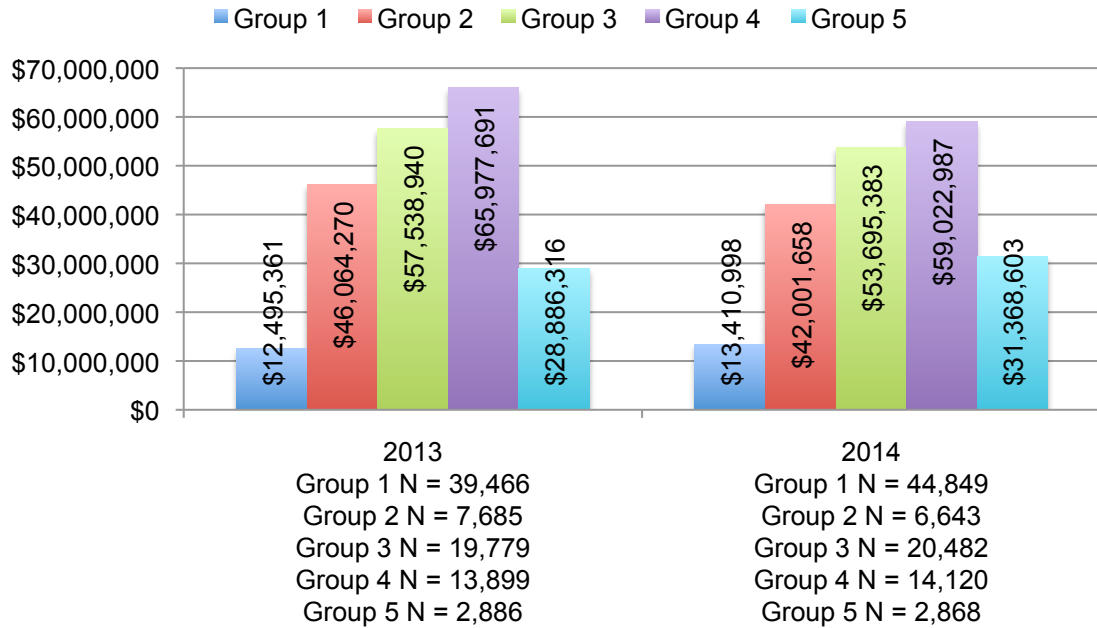
	2013	2014
Disease Group 1 Total \$	\$12,495,361	\$13,410,998
Disease Group 1 Mean \$	\$317	\$299
Disease Group 1 N	39,466	44,849
Disease Group 2 Total \$	\$46,064,270	\$42,001,658
Disease Group 2 Mean \$	\$5,994	\$6,323
Disease Group 2 N	7,685	6,643
Disease Group 3 Total \$	\$57,538,940	 \$53,695,383
Disease Group 3 Mean \$	\$2,909	\$2,622
Disease Group 3 N	19,779	20,482
Disease Group 4 Total \$	\$65,977,691	 \$59,022,987
Disease Group 4 Mean \$	\$4,747	\$4,180
Disease Group 4 N	13,899	14,120
Disease Group 5 Total \$	\$28,886,316	 \$31,368,603
Disease Group 5 Mean \$	\$10,009	\$10,937
Disease Group 5 N	2,886	2,868

(Arrows highlight reduction in total amount paid for Disease Groups with chronic disease.)

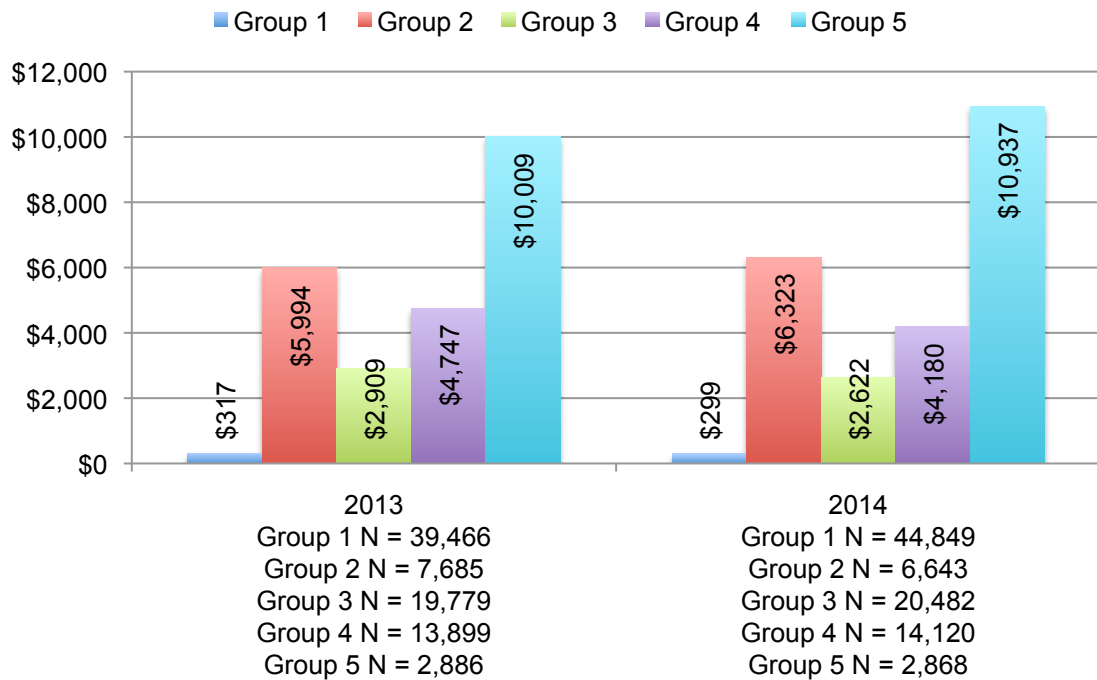
Disease Group Risk Stratification (continued)

PSE

Total Amount Paid - Disease Group Risk Stratification - Total Population



Mean Amount Paid - Disease Group Risk Stratification - Total Population



10. Expenditures Related to Lifestyle Modifiable & Preventive Utilization

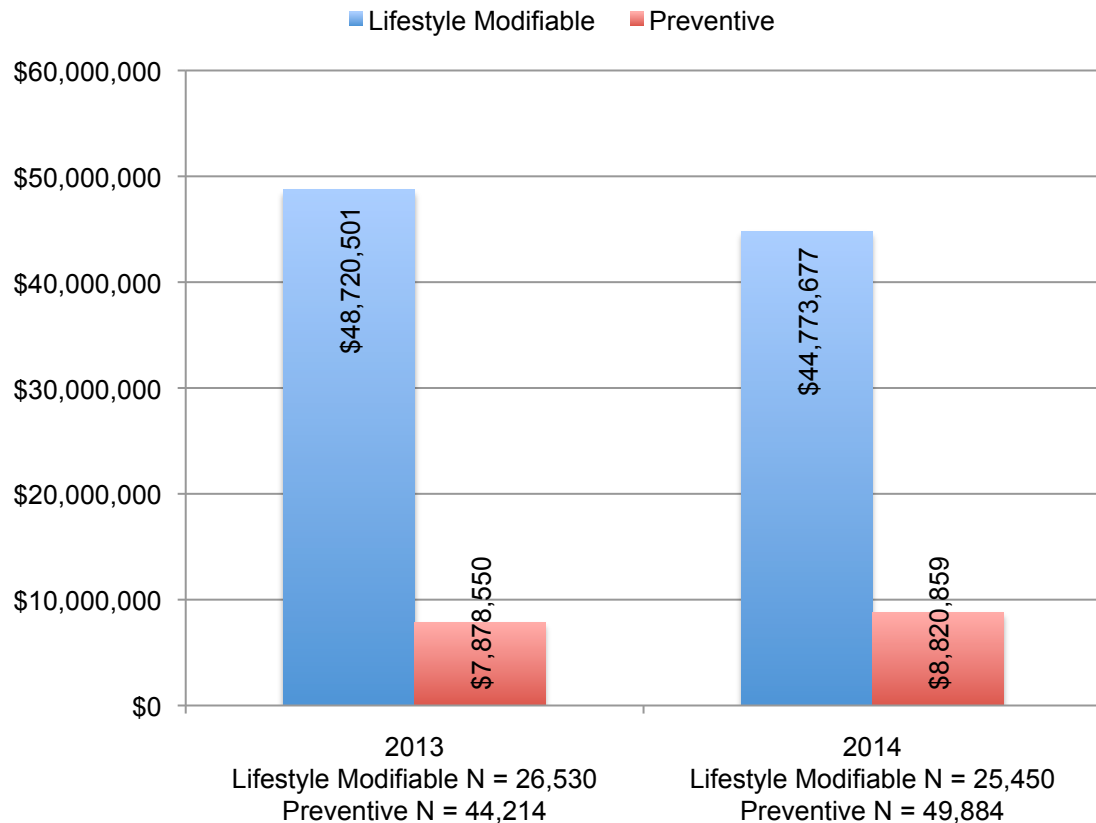
ASE

- Overall medical expenditures related to Lifestyle Modifiable utilization = \$48,720,501 in 2013 and \$44,773,677 in 2014. Mean amount paid related to Lifestyle Modifiable = \$1,836 in 2013 and \$1,759 in 2014.
- Overall medical expenditures related to Preventive* utilization = \$7,878,550 in 2013 and \$8,820,859 in 2014. Mean amount paid related to Preventive = \$178 in 2013 and \$177 in 2014.

	2013	2014
Lifestyle Modifiable Total \$	\$48,720,501	\$44,773,677
Lifestyle Modifiable Mean \$	\$1,836	\$1,759
Lifestyle Modifiable N	26,530	25,450
Preventive Total \$	\$7,878,550	\$8,820,859
Preventive Mean \$	\$178	\$177
Preventive N	44,214	49,884

*For this calculation, Preventive includes ICD-9 codes identified as preventive screenings. This calculation is not specific to the codes listed for Participants in the wellness program (i.e., Appendix V).

Total Amount Paid - Lifestyle Modifiable and Preventive Utilization - Total Population



Expenditures Related to Lifestyle Modifiable & Preventive Utilization (continued)

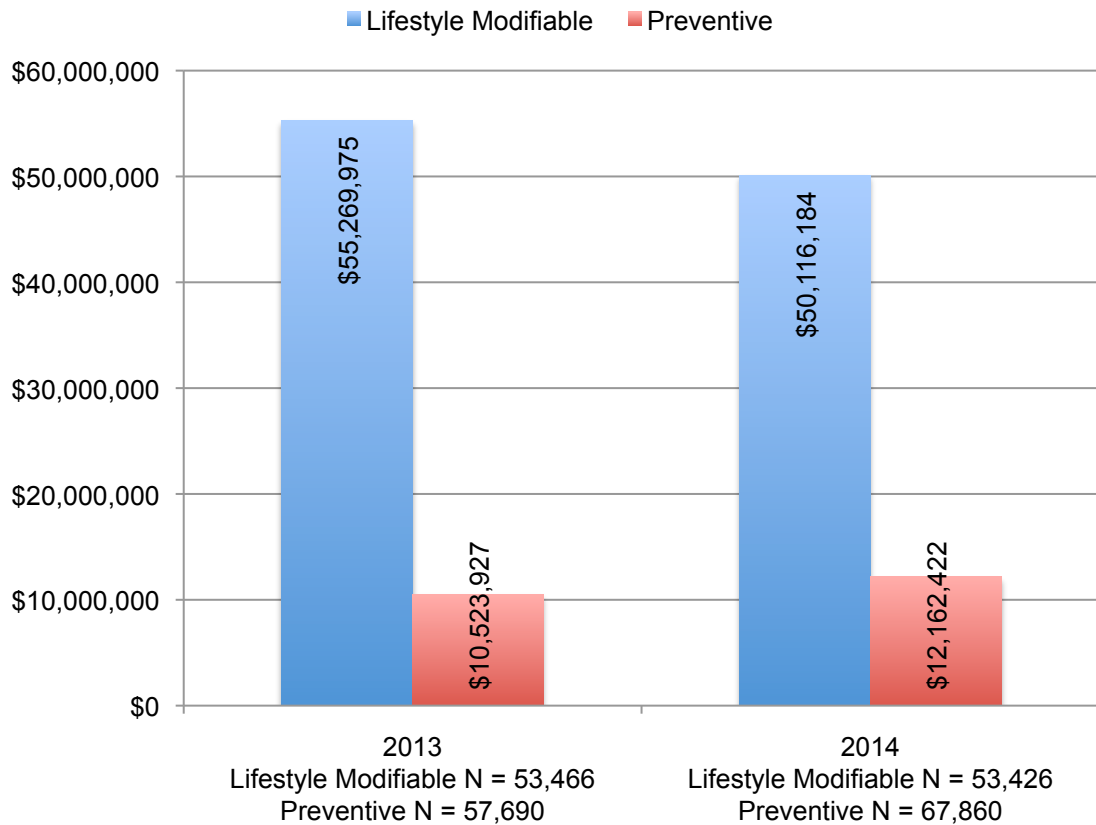
PSE

- Overall medical expenditures related to Lifestyle Modifiable utilization = \$55,269,975 in 2013 and \$50,116,184 in 2014. Mean amount paid related to Lifestyle Modifiable = \$1,034 in 2013 and \$938 in 2014.
- Overall medical expenditures related to Preventive utilization = \$10,523,927 in 2013 and \$12,162,422 in 2014. Mean amount paid related to Preventive = \$182 in 2013 and \$179 in 2014.

	2013	2014
Lifestyle Modifiable Total \$	\$55,269,975	\$50,116,184
Lifestyle Modifiable Mean \$	\$1,034	\$938
Lifestyle Modifiable N	53,466	53,426
Preventive Total \$	\$10,523,927	\$12,162,422
Preventive Mean \$	\$182	\$179
Preventive N	57,690	67,860

*For this calculation, Preventive includes ICD-9 codes identified as preventive screenings. This calculation is not specific to the codes listed for Participants in the wellness program (i.e., Appendix V).

Total Amount Paid - Lifestyle Modifiable and Preventive Utilization - Total Population



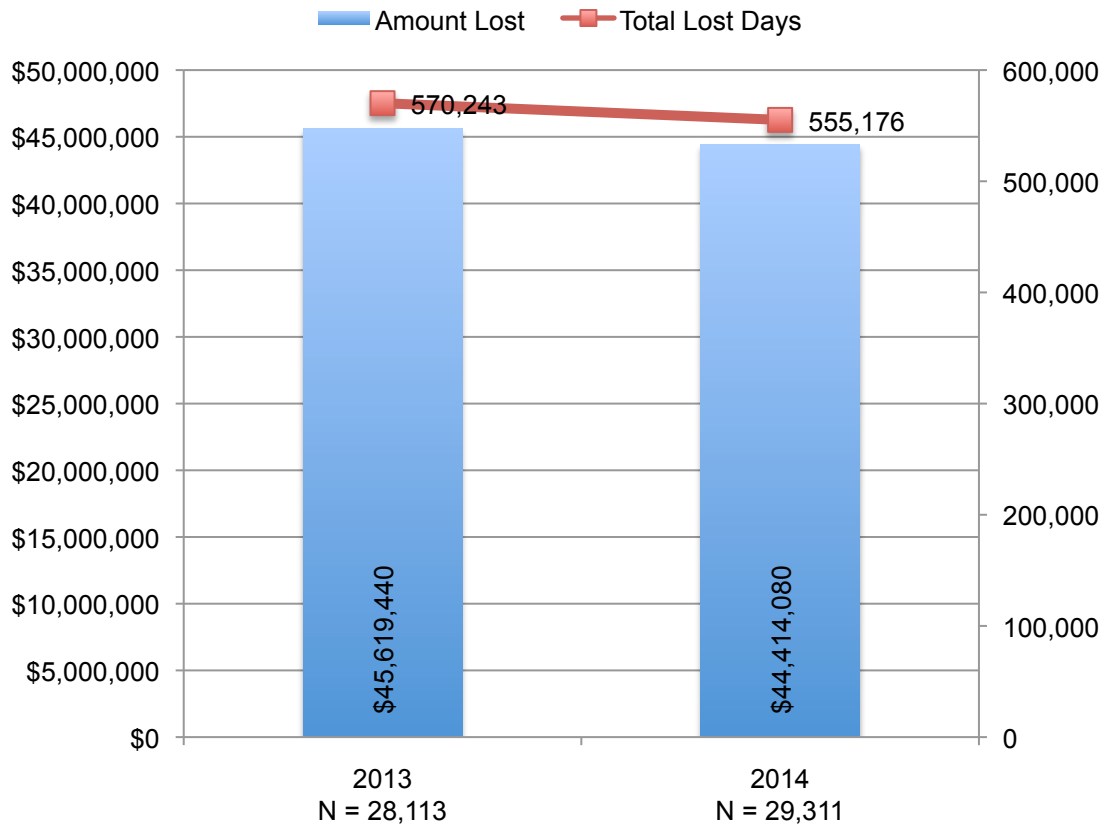
11. Estimated Lost Time & Cost due to Health Disparities

ASE

The calculation for lost time is based on normative data from the Work Loss Data Institute, which associates each ICD-9 code (i.e., unique diagnosis) with a mean, or average, lost time. This analysis utilizes that data to estimate the total lost days related to health disparities. Total Amount Lost is calculated based on a rate of \$10 per hour for an 8-hour day.

- Total lost days due to health disparities = 570,243 in 2013 and 555,176 in 2014. The estimated total amount lost = \$45,619,440 in 2013 and \$44,414,080 in 2014.

Total Lost Days and Amount Lost due to Health Disparities - Employees Only



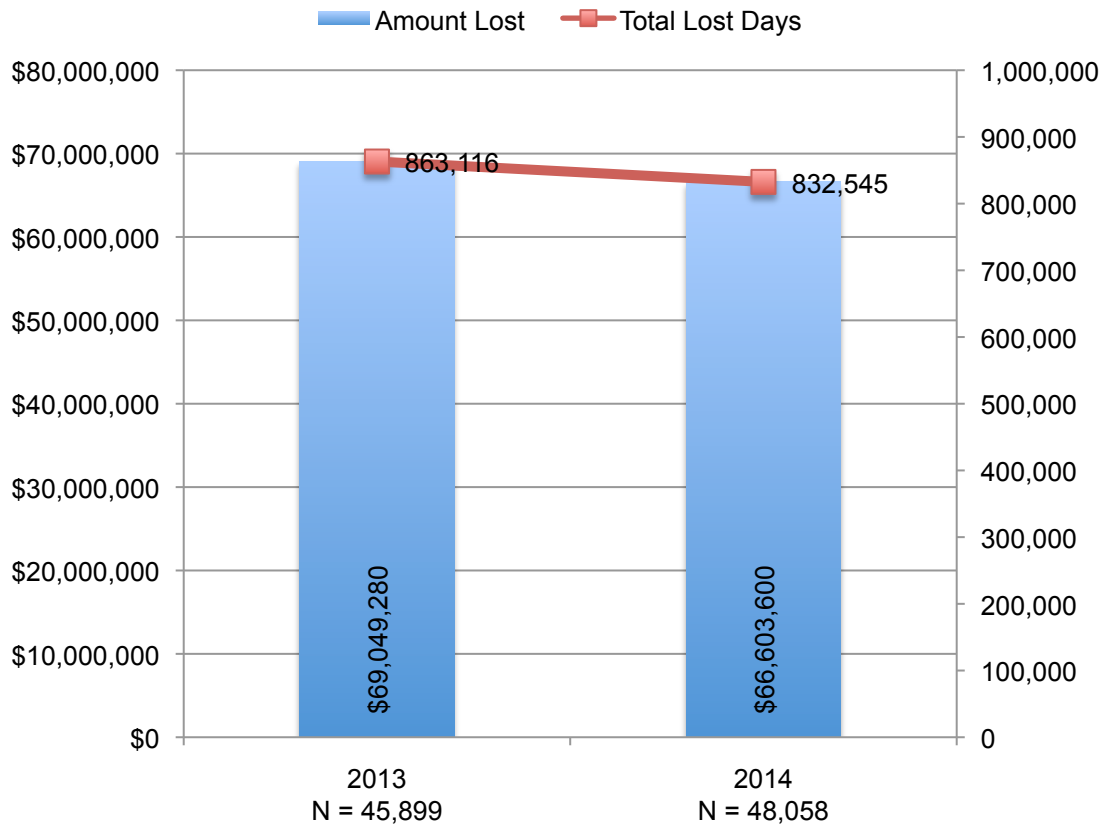
Estimated Lost Time & Cost Due to Health Disparities (continued)

PSE

The calculation for lost time is based on normative data from the Work Loss Data Institute, which associates each ICD-9 code (i.e., unique diagnosis) with a mean, or average, lost time. This analysis utilizes that data to estimate the total lost days related to health disparities. Total Amount Lost is calculated based on a rate of \$10 per hour for an 8-hour day.

- Total lost days due to health disparities = 863,116 in 2013 and 832,545 in 2014. The estimated total amount lost = \$69,049,280 in 2013 and \$66,603,600 in 2014.

Total Lost Days and Amount Lost due to Health Disparities - Employees Only

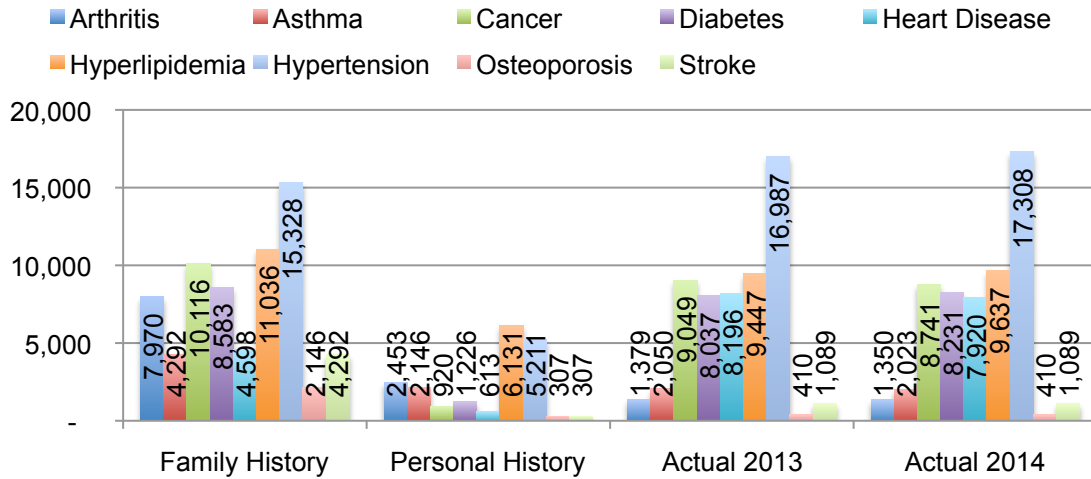


12. Health Risk Projection

The Genetic Information Nondiscrimination Act of 2008 (GINA) limits the ability for a health risk appraisal to ask questions related to family history. However, family history is extremely indicative when predicting future incidence rates of various chronic diseases. Human Factor Analytics has a proprietary archival database of health risk appraisal results containing multiple demographic variables (e.g., industry, gender, age, geographic location, etc.). By deriving normative data from that database, this analysis is able to predict the possible impact of family history as related to future development of chronic diseases within the population.

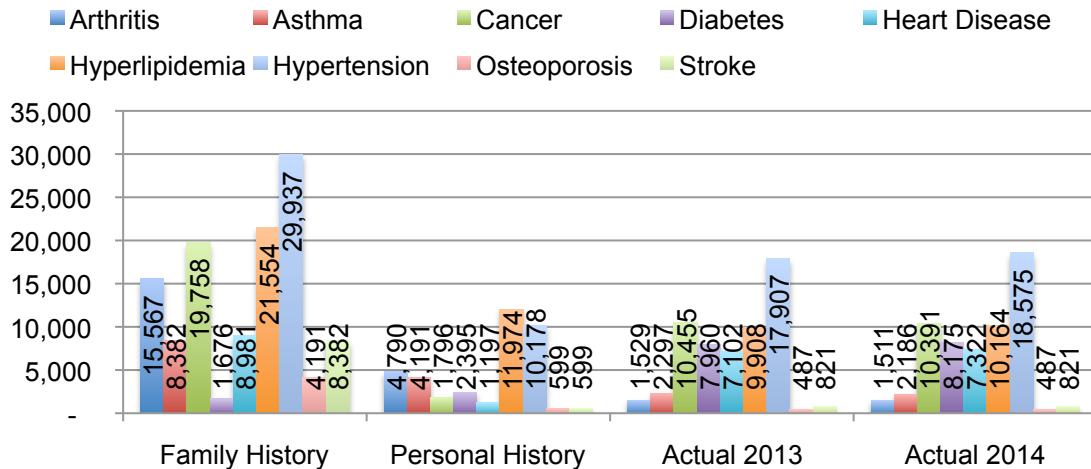
ASE

Health Risk Prediction - Normative Data - Total Population



PSE

Health Risk Prediction - Normative Data - Total Population



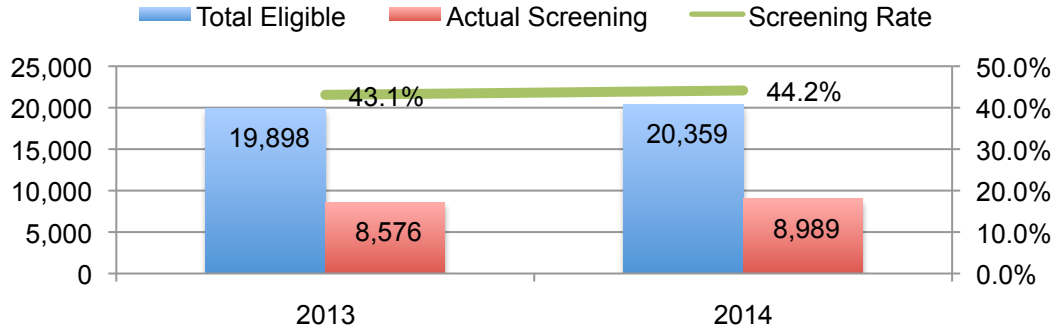
13. Preventive Screening Compliance

ASE

- A review of preventive screenings revealed that screenings for breast cancer (43.1% in 2013 and 44.2% in 2014), cervical cancer (35.6% in 2013 and 33.9% in 2014) and colon cancer (15.3% in 2013 and 15.8% in 2014) were well below HEDIS national guidelines. For this analysis, compliance is based on completion of the screening within a one-year period (i.e., calendar year).

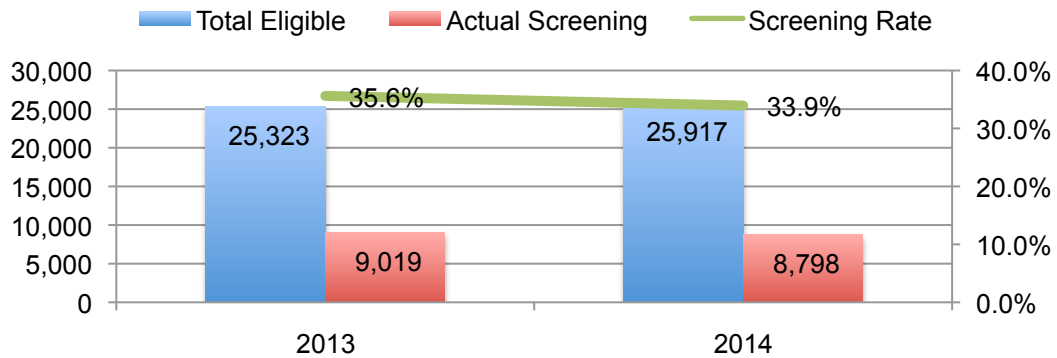
Breast Cancer Screening Rate - Total Population

National Norm is 80% in the 95th Percentile and 69% in the 25th Percentile



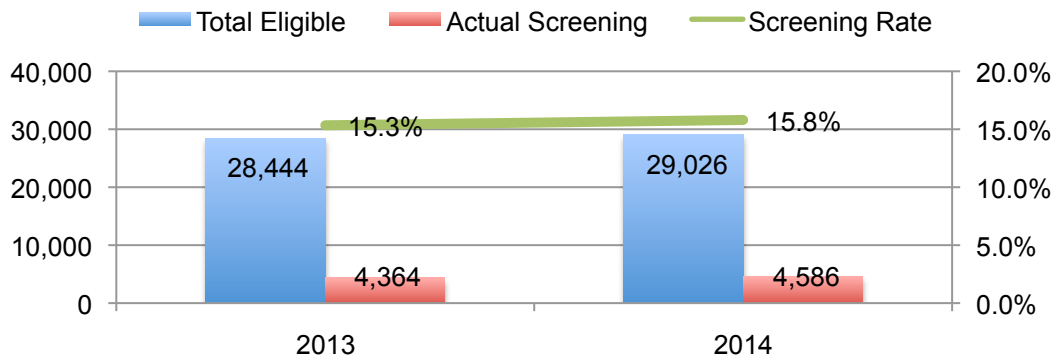
Cervical Cancer Screening Rate - Total Population

National Norm is 82% in the 95th Percentile and 73% in the 25th Percentile



Colorectal Cancer Screening Rate - Total Population

National Norm is 68% in the 95th Percentile and 50% in the 25th Percentile



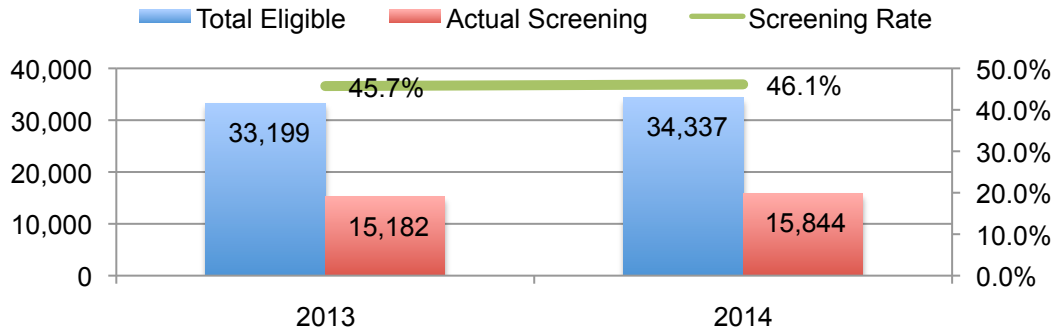
Preventive Screening Compliance (continued)

PSE

- A review of preventive screenings revealed that screenings for breast cancer (45.7% in 2013 and 46.1% in 2014), cervical cancer (38.3% in 2013 and 36.6% in 2014) and colon cancer (14.5% in 2013 and 14.5% in 2014) were well below HEDIS national guidelines. For this analysis, compliance is based on completion of the screening within a one-year period (i.e., calendar year).

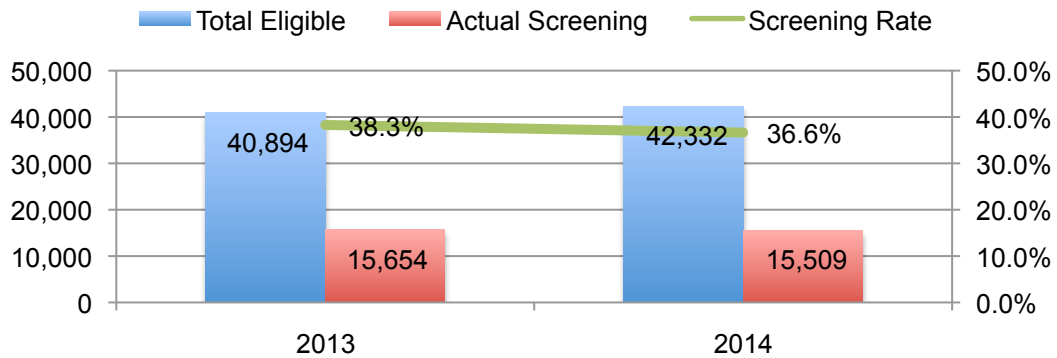
Breast Cancer Screening Rate - Total Population

National Norm is 80% in the 95th Percentile and 69% in the 25th Percentile



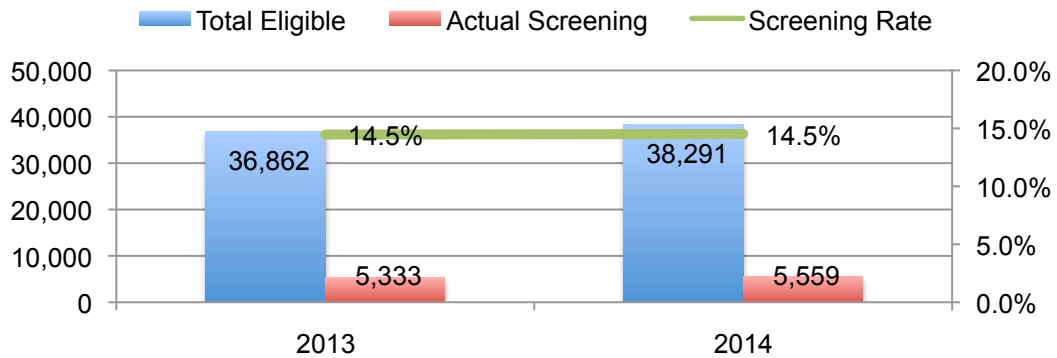
Cervical Cancer Screening Rate - Total Population

National Norm is 82% in the 95th Percentile and 73% in the 25th Percentile



Colorectal Cancer Screening Rate - Total Population

National Norm is 68% in the 95th Percentile and 50% in the 25th Percentile



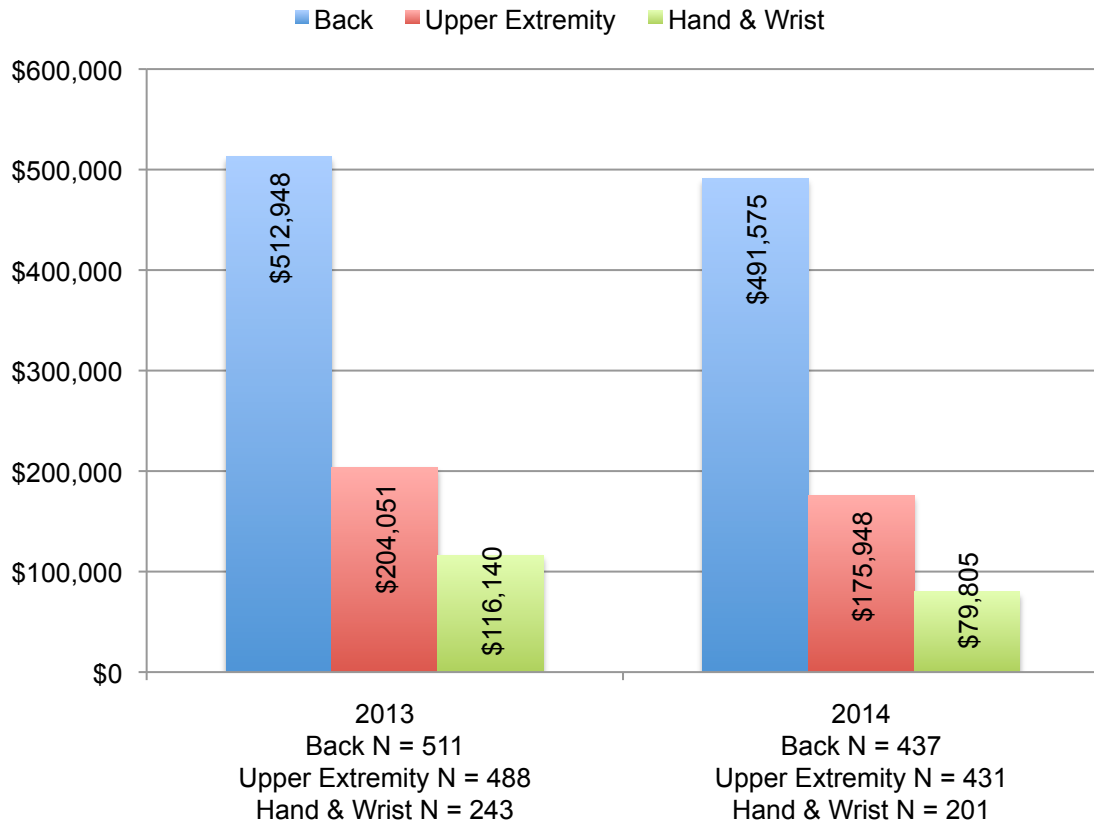
14. Potentially Work-Related Musculoskeletal Expenditures

ASE

The musculoskeletal conditions that may be caused by (non-accidental) physical work activities include disorders of inflammation, degeneration, and physiological disruption of muscles, tendons, ligaments, nerves, synovia, and cartilage involving limbs and trunk. These entities are included in categories 353-355, 722-724, and 726-729 of the International Classification of Diseases (commonly referred to as ICD-9) (World Health Organization, 1977). Common examples are low back strain, tenosynovitis, and carpal tunnel syndrome.

- Potentially work-related expenditures related to the musculoskeletal diagnostic category were \$833,139 in 2013 and \$747,328 in 2014. For all years, claims that could potentially be work-related were comprised primarily of back and upper extremity.

Total Amount Paid - Potentially Work-Related Musculoskeletal Injuries - Employees Only



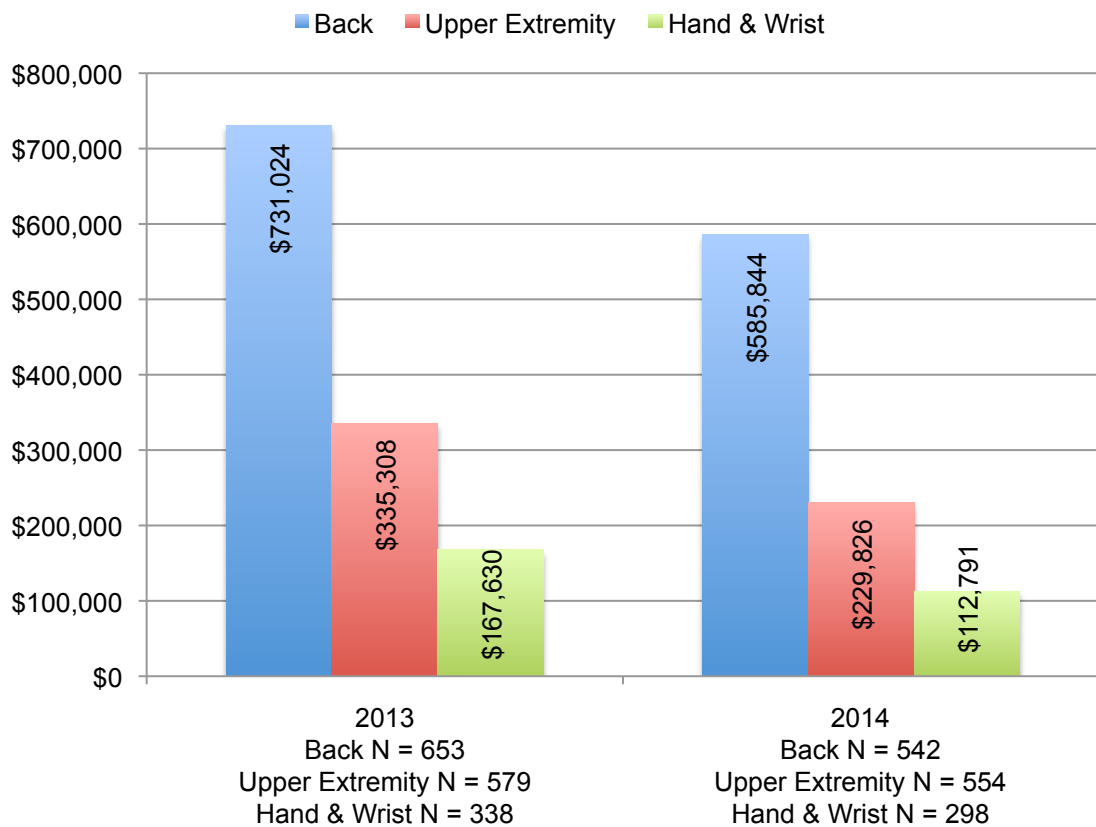
Potentially Work-Related Musculoskeletal Expenditures (continued)

PSE

The musculoskeletal conditions that may be caused by (non-accidental) physical work activities include disorders of inflammation, degeneration, and physiological disruption of muscles, tendons, ligaments, nerves, synovia, and cartilage involving limbs and trunk. These entities are included in categories 353-355, 722-724, and 726-729 of the International Classification of Diseases (commonly referred to as ICD-9) (World Health Organization, 1977). Common examples are low back strain, tenosynovitis, and carpal tunnel syndrome.

- Potentially work-related expenditures related to the musculoskeletal diagnostic category were \$1,233,962 in 2013 and \$928,461 in 2014. For all years, claims that could potentially be work-related were comprised primarily of back and upper extremity.

Total Amount Paid - Potentially Work-Related Musculoskeletal Injuries - Employees Only



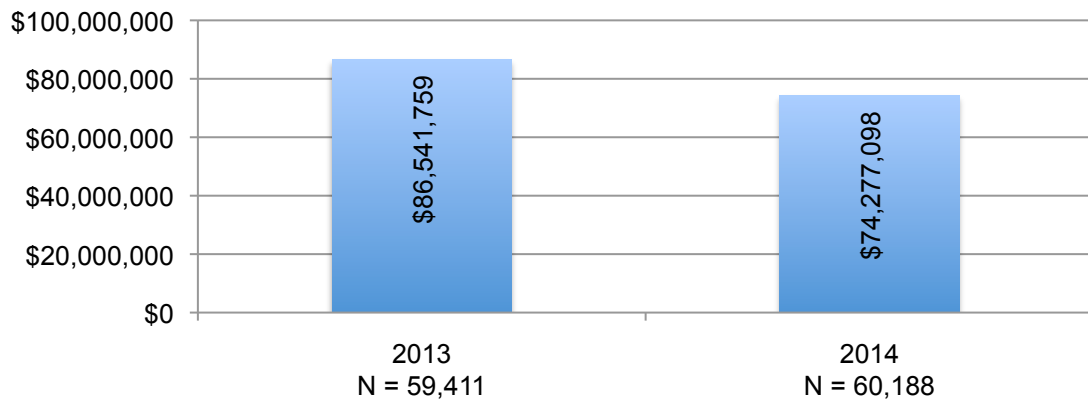
15. Pharmacy Expenditures

ASE

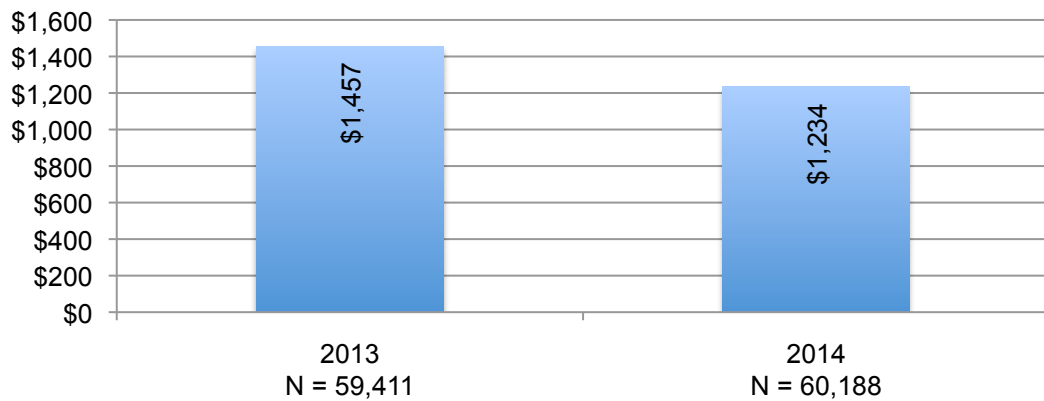
- Pharmaceutical expenditures combined for Employees, Spouses, and Dependents were \$86,541,759 in 2013 and \$74,277,098 in 2014. Mean amount paid = \$1,457 in 2013 and \$1,234 in 2014.

	2013	2014
Total \$	\$86,541,759	\$74,277,098
Mean \$	\$1,457	\$1,234
N	59,411	60,188

Total Amount Paid - Pharmacy - Total Population



Mean Amount Paid - Pharmacy - Total Population



Pharmacy Expenditures (continued)

ASE

- Pharmaceutical expenditures related to employees = \$31,865,556 in 2013 and \$25,897,884 in 2014. Mean amount paid related to employees = \$1,210 in 2013 and \$981 in 2014.
- Pharmaceutical expenditures related to spouses = \$11,254,907 in 2013 and \$9,135,022 in 2014. Mean amount paid related to spouses = \$1,291 in 2013 and \$1,068 in 2014.
- Pharmaceutical expenditures related to dependents = \$6,278,024 in 2013 and \$5,497,860 in 2014. Mean amount paid related to dependents = \$649 in 2013 and \$556 in 2014.
- Pharmaceutical expenditures related to retirees = \$37,143,273 in 2013 and \$33,746,332 in 2014. Mean amount paid related to retirees = \$2,527 in 2013 and \$2,199 in 2014.

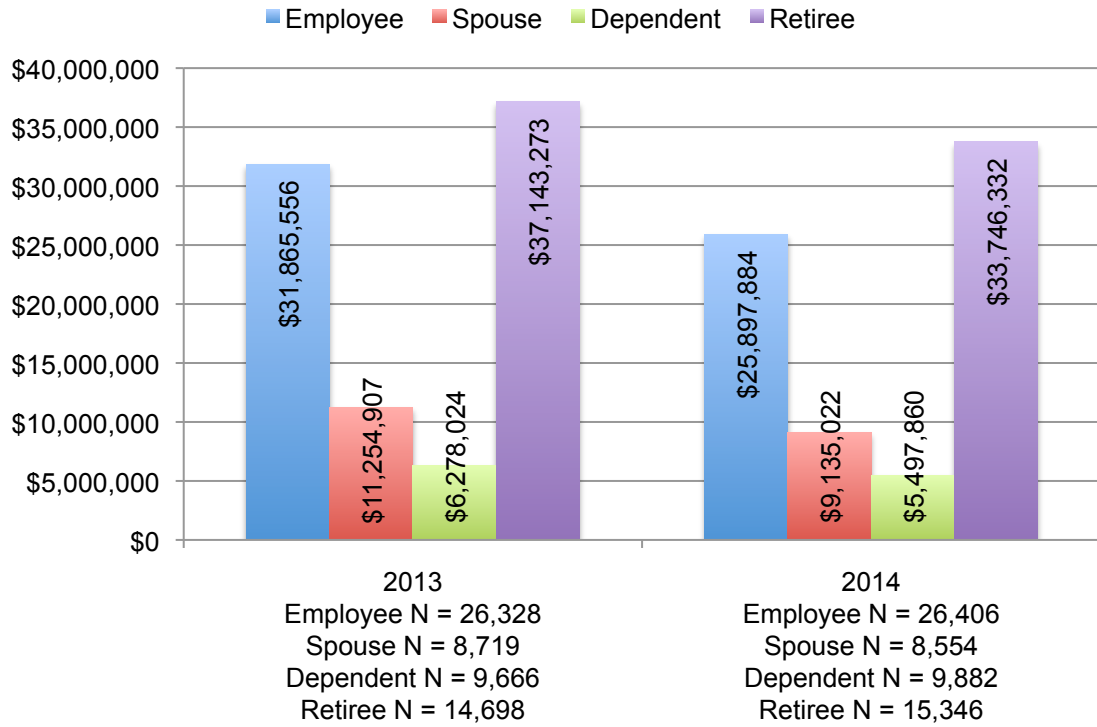
	2013	2014
Employee Total \$	\$31,865,556	\$25,897,884
Employee Mean \$	\$1,210	\$981
Employee N	26,328	26,406
Spouse Total \$	\$11,254,907	\$9,135,022
Spouse Mean \$	\$1,291	\$1,068
Spouse N	8,719	8,554
Dependent Total \$	\$6,278,024	\$5,497,860
Dependent Mean \$	\$649	\$556
Dependent N	9,666	9,882
Retiree* Total \$	\$37,143,273	\$33,746,332
Retiree Mean \$	\$2,527	\$2,199
Retiree N	14,698	15,346

*Retiree includes RET (Retiree) and MED (Medicare).

Pharmacy Expenditures (Continued)

ASE

Total Amount Paid - Pharmacy - Employee / Spouse / Dependent / Retiree



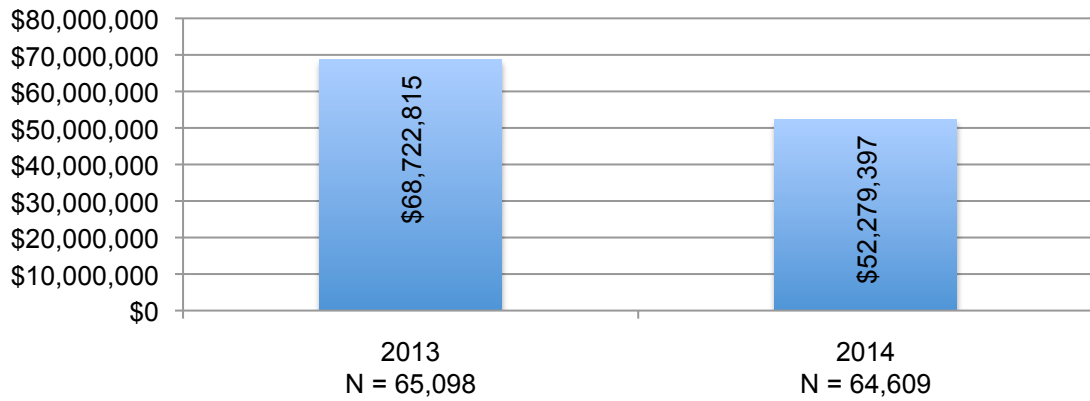
Pharmacy Expenditures (continued)

PSE

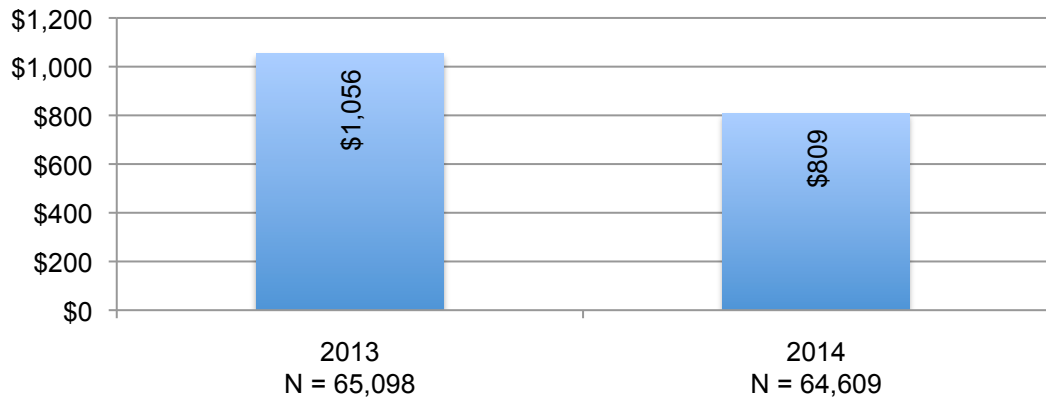
- Pharmaceutical expenditures combined for Employees, Spouses, and Dependents were \$68,722,815 in 2013 and \$52,279,397 in 2014. Mean amount paid = \$1,056 in 2013 and \$809 in 2014.

	2013	2014
Total \$	\$68,722,815	\$52,279,397
Mean \$	\$1,056	\$809
N	65,098	64,609

Total Amount Paid - Pharmacy - Total Population



Mean Amount Paid - Pharmacy - Total Population



Pharmacy Expenditures (continued)

PSE

- Pharmaceutical expenditures related to employees = \$44,687,348 in 2013 and \$31,987,174 in 2014. Mean amount paid related to employees = \$1,071 in 2013 and \$783 in 2014.
- Pharmaceutical expenditures related to spouses = \$8,713,430 in 2013 and \$7,739,221 in 2014. Mean amount paid related to spouses = \$1,070 in 2013 and \$972 in 2014.
- Pharmaceutical expenditures related to dependents = \$6,417,965 in 2013 and \$5,010,014 in 2014. Mean amount paid related to dependents = \$612 in 2013 and \$462 in 2014.
- Pharmaceutical expenditures related to retirees = \$8,904,072 in 2013 and \$7,542,989 in 2014. Mean amount paid related to retirees = \$1,872 in 2013 and \$1,530 in 2014.

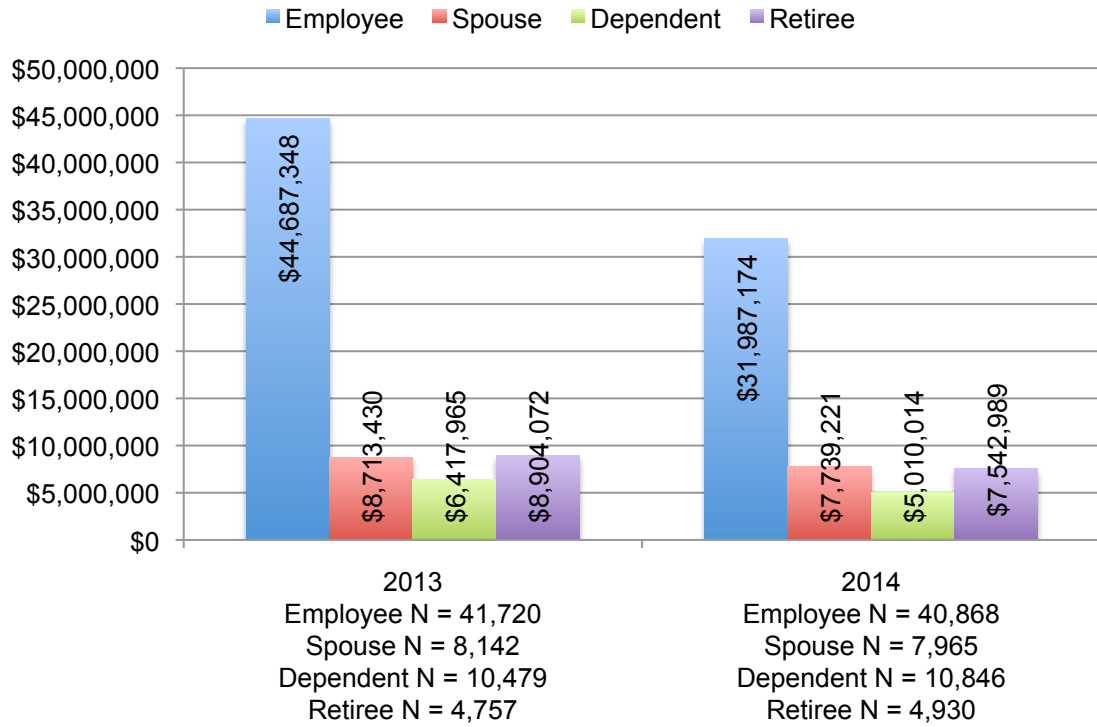
	2013	2014
Employee Total \$	\$44,687,348	\$31,987,174
Employee Mean \$	\$1,071	\$783
Employee N	41,720	40,868
Spouse Total \$	\$8,713,430	\$7,739,221
Spouse Mean \$	\$1,070	\$972
Spouse N	8,142	7,965
Dependent Total \$	\$6,417,965	\$5,010,014
Dependent Mean \$	\$612	\$462
Dependent N	10,479	10,846
Retiree* Total \$	\$8,904,072	\$7,542,989
Retiree Mean \$	\$1,872	\$1,530
Retiree N	4,757	4,930

*Retiree includes RET (Retiree) and MED (Medicare).

Pharmacy Expenditures (continued)

PSE

Total Amount Paid - Pharmacy - Employee / Spouse / Dependent / Retiree



16. Medication Compliance

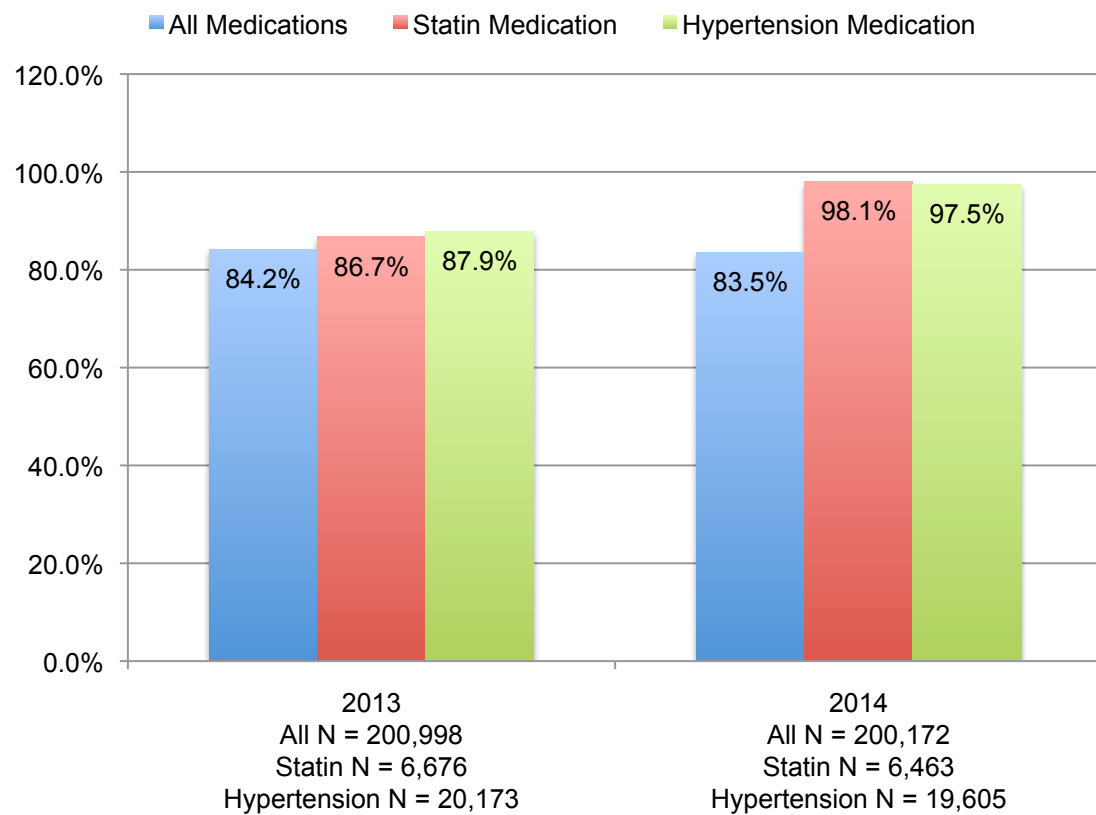
ASE

Medication Possession Ratio is calculated as follows:

$$\frac{\text{Beginning Date of Prescription} - \text{End Date of Prescription}}{\text{Days of Prescription}} = \frac{\text{Sum of Days Supply for Prescription}}{\text{Days of Prescription}} = \text{Medication Possession Ratio}$$

Medication Possession Ratio measures the average compliance to prescriptions for those individuals who received a prescription and refilled it at least once.

Medication Possession Ratio - Total Population



Medication Compliance (continued)

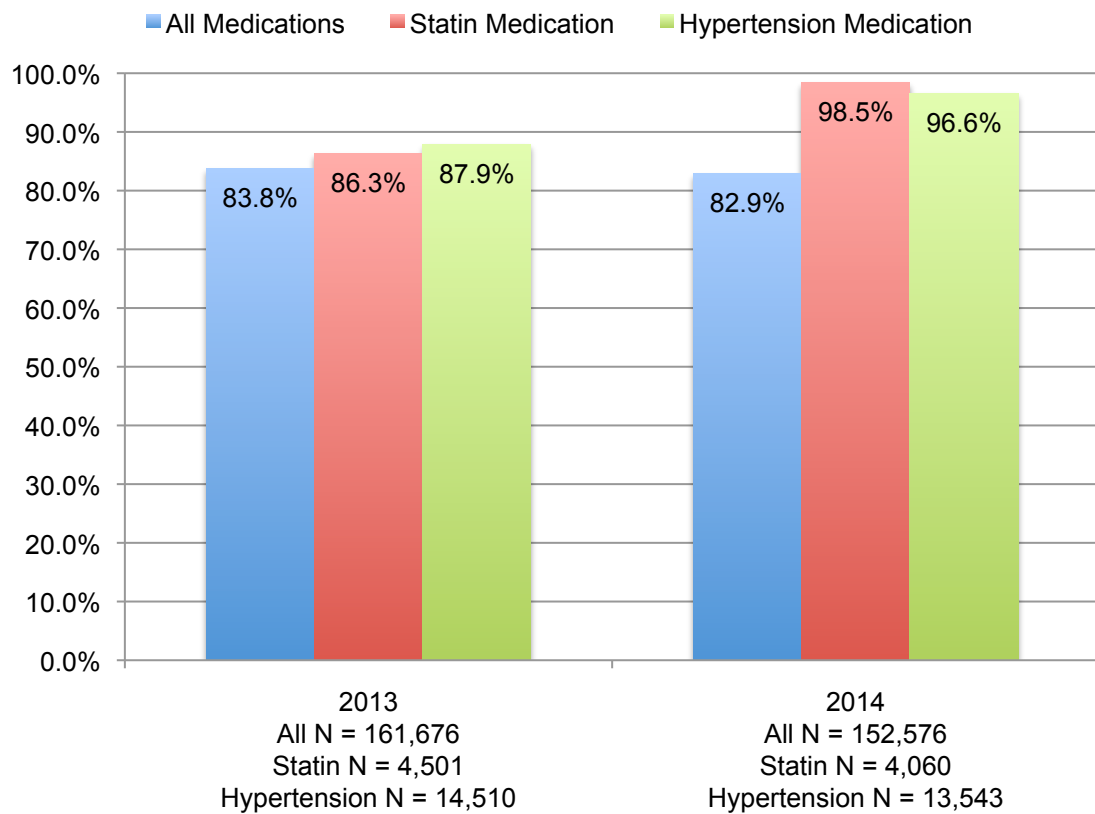
PSE

Medication Possession Ratio is calculated as follows:

$$\frac{\text{Beginning Date of Prescription} - \text{End Date of Prescription}}{\text{Days of Prescription}} = \frac{\text{Sum of Days Supply for Prescription}}{\text{Days of Prescription}} = \text{Medication Possession Ratio}$$

Medication Possession Ratio measures the average compliance to prescriptions for those individuals who received a prescription and refilled it at least once.

Medication Possession Ratio - Total Population



17. Participant & Non-Participant Expenditures

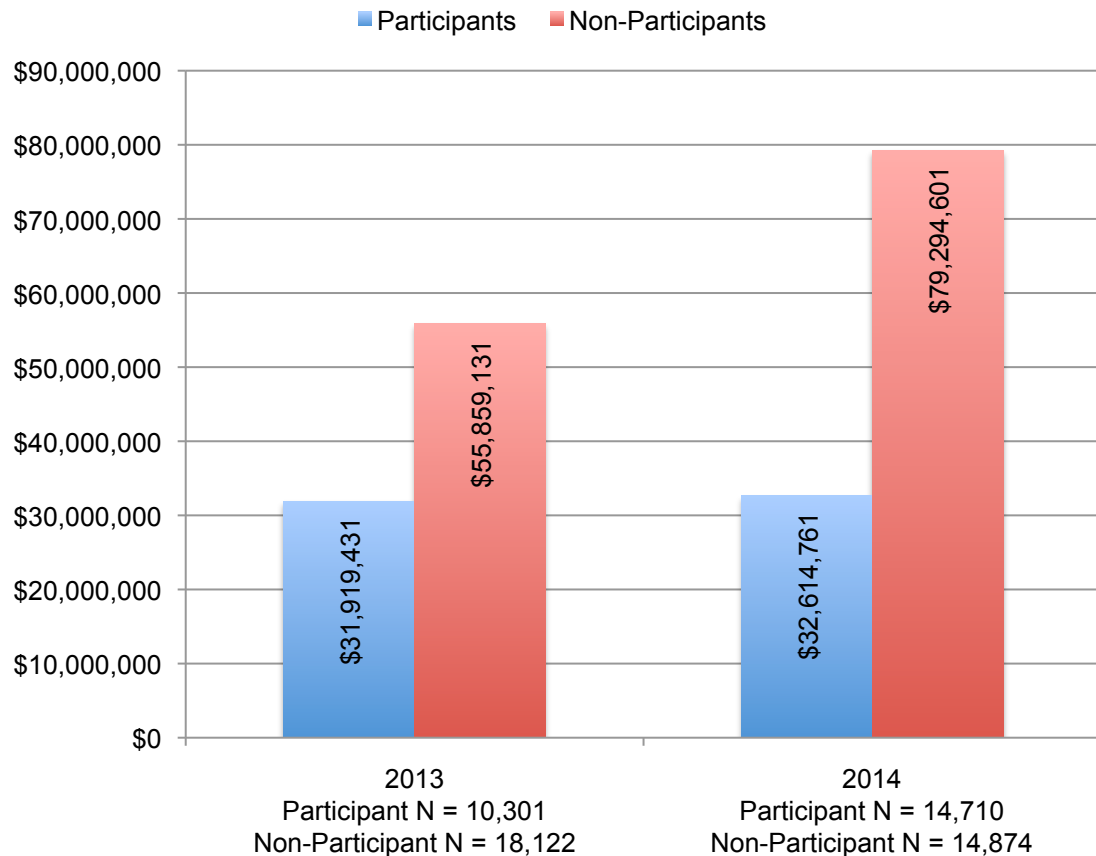
ASE

- Overall medical expenditures related to Participants* = \$31,919,431 in 2013 and \$32,614,761 in 2014. Mean amount paid related to Participants = \$3,099 in 2013 and \$2,217 in 2014.
- Overall medical expenditures related to Non-Participants = \$55,859,131 in 2013 and \$79,294,601 in 2014. Mean amount paid related to Non-Participants = \$3,082 in 2013 and \$5,331 in 2014.

	2013	2014
Participant Total \$	\$31,919,431	\$32,614,761
Participant Mean \$	\$3,099	\$2,217
Participant N	10,301	14,710
Non-Participant Total \$	\$55,859,131	\$79,294,601
Non-Participant Mean \$	\$3,082	\$5,331
Non-Participant N	18,122	14,874

*Refer to Appendix V for definition of wellness participation.

Total Amount Paid - Participants & Non-Participants - Employees Only



Participant & Non-Participant Expenditures (continued)

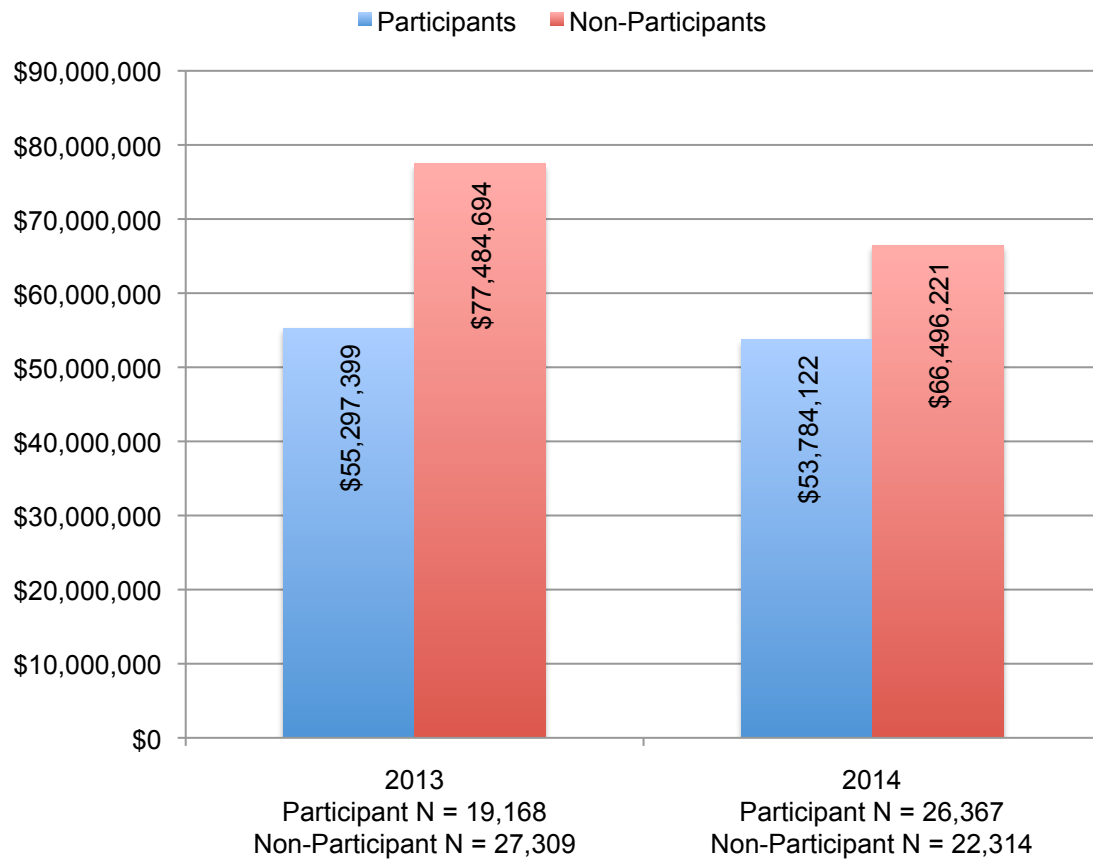
PSE

- Overall medical expenditures related to Participants* = \$55,297,399 in 2013 and \$53,784,122 in 2014. Mean amount paid related to Participants = \$2,885 in 2013 and \$2,040 in 2014.
- Overall medical expenditures related to Non-Participants = \$77,484,694 in 2013 and \$66,496,221 in 2014. Mean amount paid related to Non-Participants = \$2,837 in 2013 and \$2,980 in 2014.

	2013	2014
Participant Total \$	\$55,297,399	\$53,784,122
Participant Mean \$	\$2,885	\$2,040
Participant N	19,168	26,367
Non-Participant Total \$	\$77,484,694	\$66,496,221
Non-Participant Mean \$	\$2,837	\$2,980
Non-Participant N	27,309	22,314

*Refer to Appendix V for definition of wellness participation.

Total Amount Paid - Participants & Non-Participants - Employees Only



Appendix I: Supplemental & Statistical Analyses

The following sections illustrate the supplemental and statistical analyses performed by HFA to answer specific research topics within the State of Arkansas data.

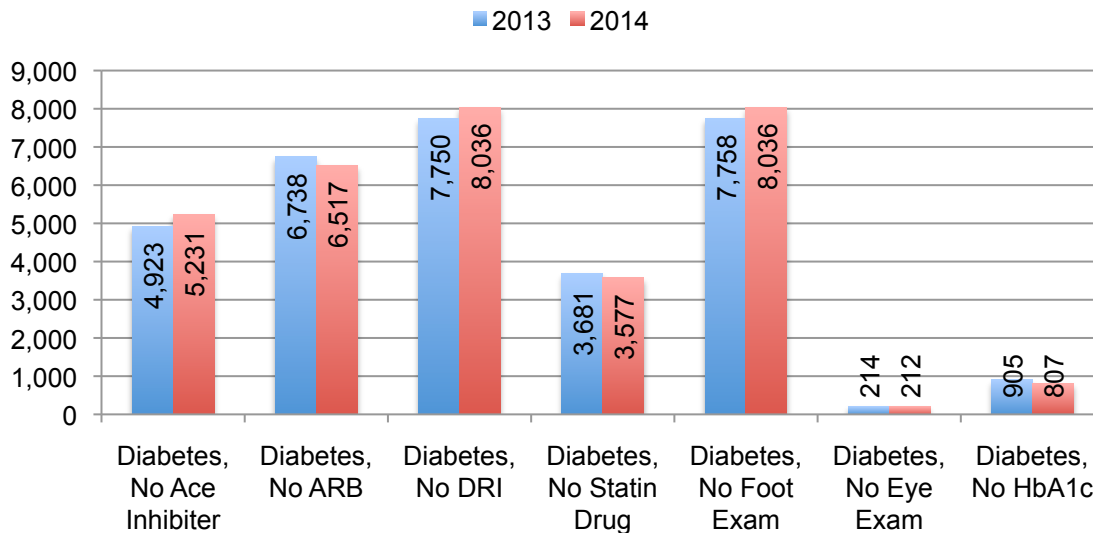
Attachment 1: Diabetes Non-Compliance to Evidence-Based Guidelines

ASE

	2013	2014
Diabetes, No Ace Inhibiter	4,923	5,231
Diabetes, No ARB	6,738	6,517
Diabetes, No DRI	7,750	8,036
Diabetes, No Statin Drug	3,681	3,577
Diabetes, No Foot Exam	7,758	8,036
Diabetes, No Eye Exam	214	212
Diabetes, No HbA1c	905	807
Total Eligible*	8,060	8,256

*Eligibility is defined as diagnosis of Diabetes or diagnosis of Diabetes with End Organ Damage.

Number of Individuals Non-Compliant to Diabetes Evidence-Based Guidelines



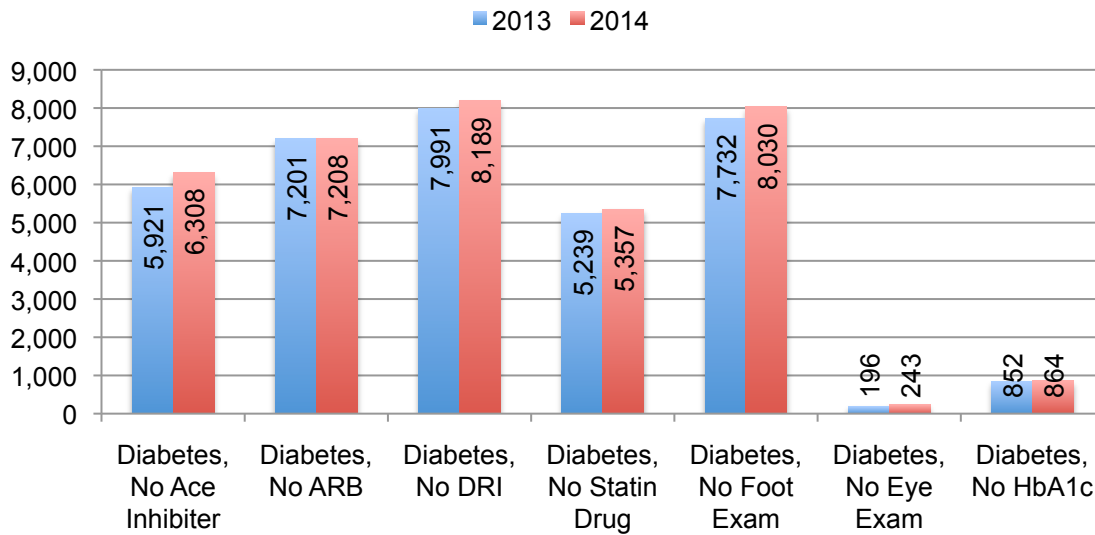
Attachment 1: Diabetes Non-Compliance to Evidence-Based Guidelines (continued)

PSE

	2013	2014
Diabetes, No Ace Inhibiter	5,921	6,308
Diabetes, No ARB	7,201	7,208
Diabetes, No DRI	7,991	8,189
Diabetes, No Statin Drug	5,239	5,357
Diabetes, No Foot Exam	7,732	8,030
Diabetes, No Eye Exam	196	243
Diabetes, No HbA1c	852	864
Total Eligible*	7,996	8,189

*Eligibility is defined as diagnosis of Diabetes or diagnosis of Diabetes with End Organ Damage.

Number of Individuals Non-Compliant to Diabetes Evidence-Based Guidelines

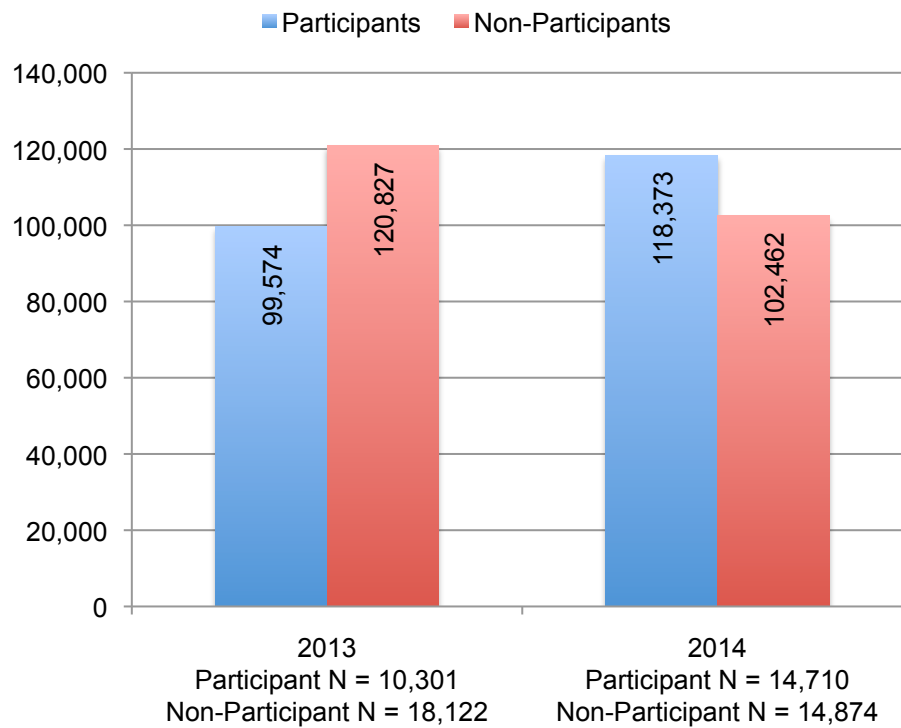


Attachment 2: Number of ICD-9 Codes for Participants & Non-Participants

ASE

	2013	2014
Participant Total # of ICD-9 Codes	99,574	118,373
Participant Mean # of ICD-9 Codes	9.67	8.05
Participant N	10,301	14,710
Non-Participant Total # of ICD-9 Codes	120,827	102,462
Non-Participant Mean # of ICD-9 Codes	6.67	6.89
Non-Participant N	18,122	14,874

Number of ICD-9 Codes for Participants & Non-Participants

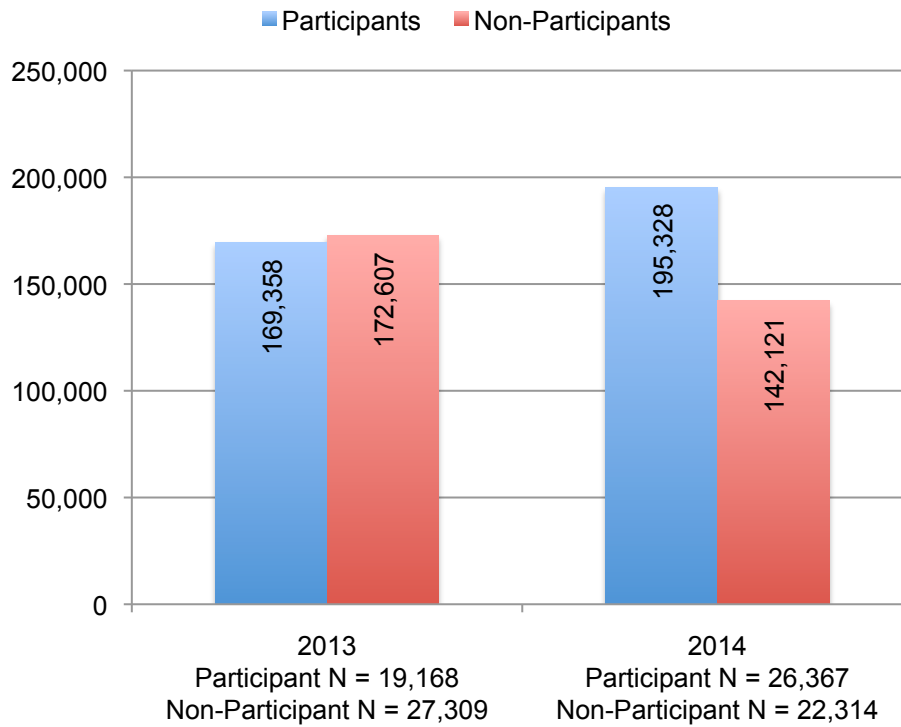


**Attachment 2: Number of ICD-9 Codes for Participants & Non-Participants
(continued)**

PSE

	2013	2014
Participant Total # of ICD-9 Codes	169,358	195,328
Participant Mean # of ICD-9 Codes	8.84	7.41
Participant N	19,168	26,367
Non-Participant Total # of ICD-9 Codes	172,607	142,121
Non-Participant Mean # of ICD-9 Codes	6.32	6.37
Non-Participant N	27,309	22,314

Number of ICD-9 Codes for Participants & Non-Participants



Attachment 3: Brand vs. Generic Medication Usage

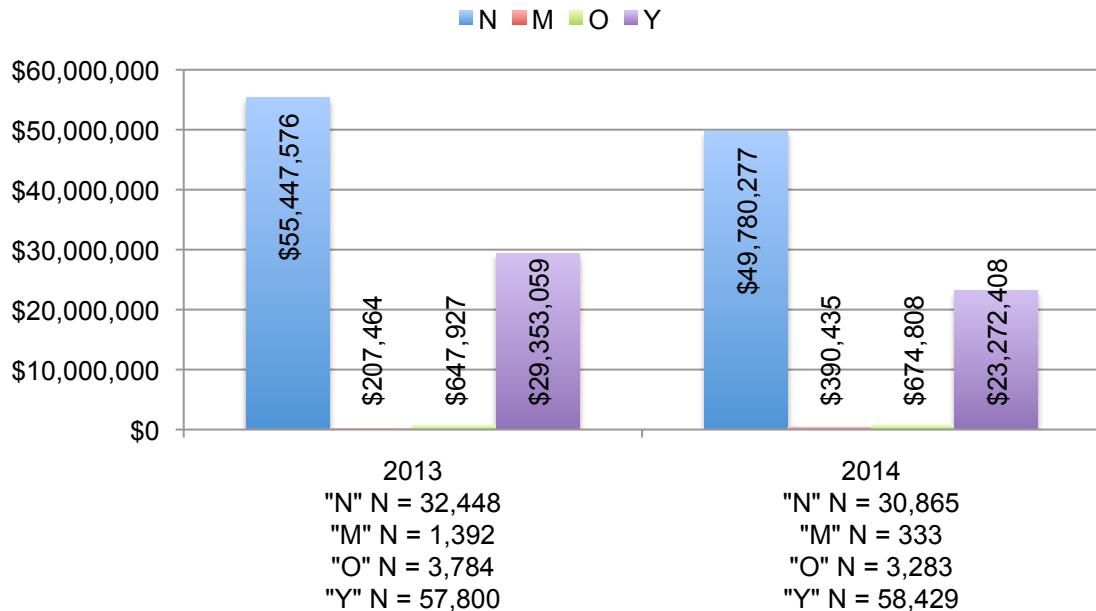
ASE

	2013	2014
"N" Total \$	\$55,477,576	\$49,780,277
"N" Mean \$	\$1,710	\$1,613
"N" N	32,448	30,865
"M" Total \$	\$207,464	\$390,435
"M" Mean \$	\$149	\$1,172
"M" N	1,392	333
"O" Total \$	\$647,927	\$674,808
"O" Mean \$	\$171	\$206
"O" N	3,784	3,283
"Y" Total \$	\$29,353,059	\$23,272,408
"Y" Mean \$	\$508	\$398
"Y" N	57,800	58,429

Medication type is defined as follows:

- **N** = Single-source, no generics available. Single-source drug product available from one manufacturer. The drug product is not generic, nor is it available as a generic.
- **M** = Considered single-source, co-licensed. Drug product that is co-licensed and not considered generic, nor is it available as a generic. The drug product is generally considered a single-source drug product despite multiple manufacturers.
- **O** = Original product, generics available. Original drug product considered to be the industry standard. These drug products are available from multiple manufacturers.
- **Y** = Considered generic, multiple sources. A drug product available from multiple manufacturers. Often, this is a copy of an original drug product valued as the standard.

Brand vs. Generic Medication Usage



Attachment 3: Brand vs. Generic Medication Usage (continued)

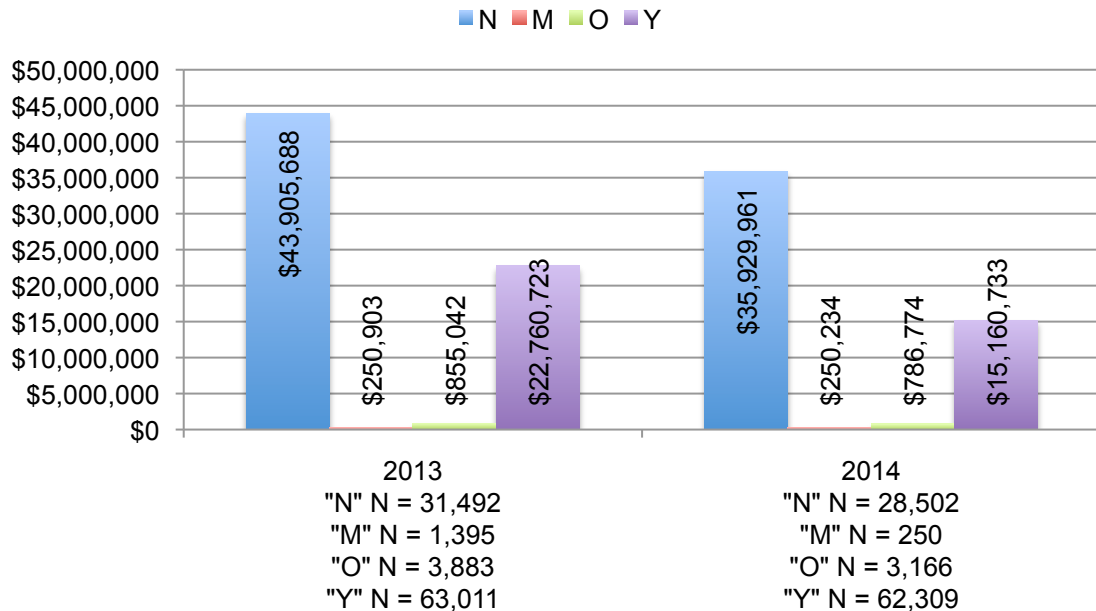
PSE

	2013	2014
"N" Total \$	\$43,905,688	\$35,929,961
"N" Mean \$	\$1,394	\$1,261
"N" N	31,492	28,502
"M" Total \$	\$250,903	\$250,234
"M" Mean \$	\$180	\$1,001
"M" N	1,395	250
"O" Total \$	\$855,042	\$786,774
"O" Mean \$	\$220	\$249
"O" N	3,883	3,166
"Y" Total \$	\$22,760,723	\$15,160,733
"Y" Mean \$	\$361	\$243
"Y" N	63,011	62,309

Medication type is defined as follows:

- **N** = Single-source, no generics available. Single-source drug product available from one manufacturer. The drug product is not generic, nor is it available as a generic.
- **M** = Considered single-source, co-licensed. Drug product that is co-licensed and not considered generic, nor is it available as a generic. The drug product is generally considered a single-source drug product despite multiple manufacturers.
- **O** = Original product, generics available. Original drug product considered to be the industry standard. These drug products are available from multiple manufacturers.
- **Y** = Considered generic, multiple sources. A drug product available from multiple manufacturers. Often, this is a copy of an original drug product valued as the standard.

Brand vs. Generic Medication Usage



Attachment 4: Catastrophic Claims

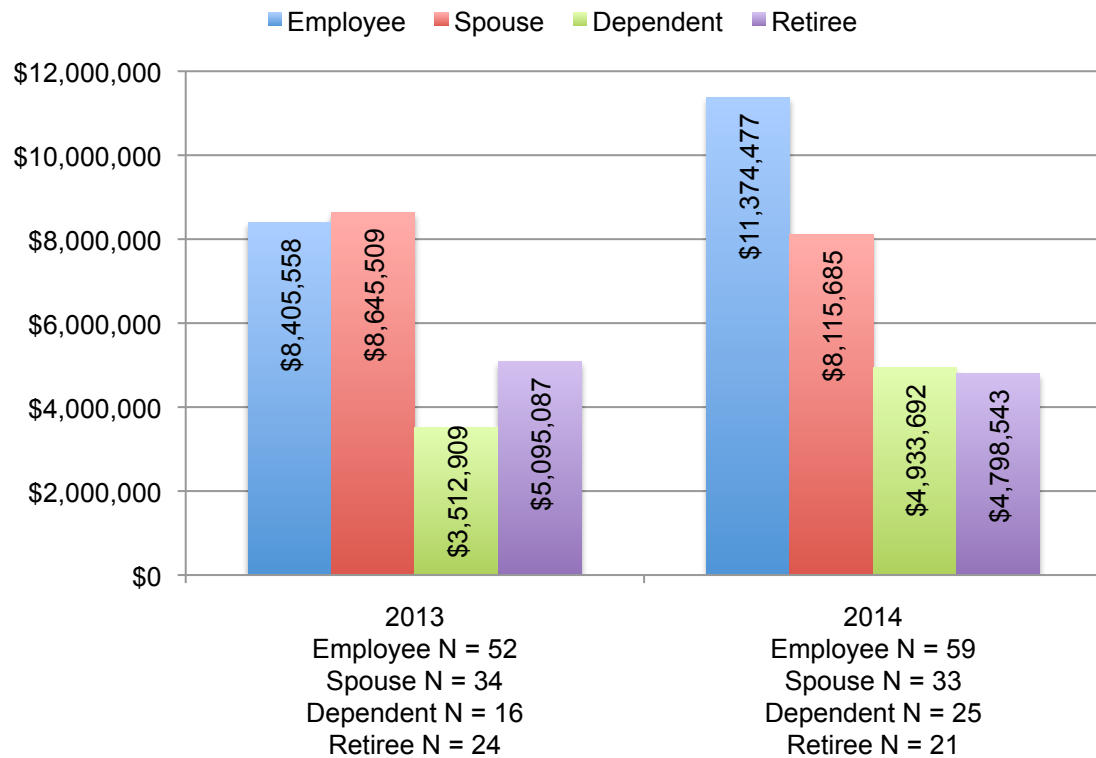
ASE

	2013	2014
Employee Total \$	\$8,405,558	\$11,374,477
Employee Mean \$	\$161,645	\$192,788
Employee N	52	59
Spouse Total \$	\$8,645,509	\$8,115,685
Spouse Mean \$	\$254,280	\$245,930
Spouse N	34	33
Dependent Total \$	\$3,512,909	\$4,933,692
Dependent Mean \$	\$219,557	\$197,348
Dependent N	16	25
Retiree** Total \$	\$5,095,087	\$4,798,543
Retiree Mean \$	\$212,295	\$228,502
Retiree N	24	21

*For this analysis, catastrophic claims are defined as claims greater than \$100,000.

**Retiree includes RET (Retiree) and MED (Medicare).

Total Amount Paid for Catastrophic Claims



Attachment 4: Catastrophic Claims (continued)

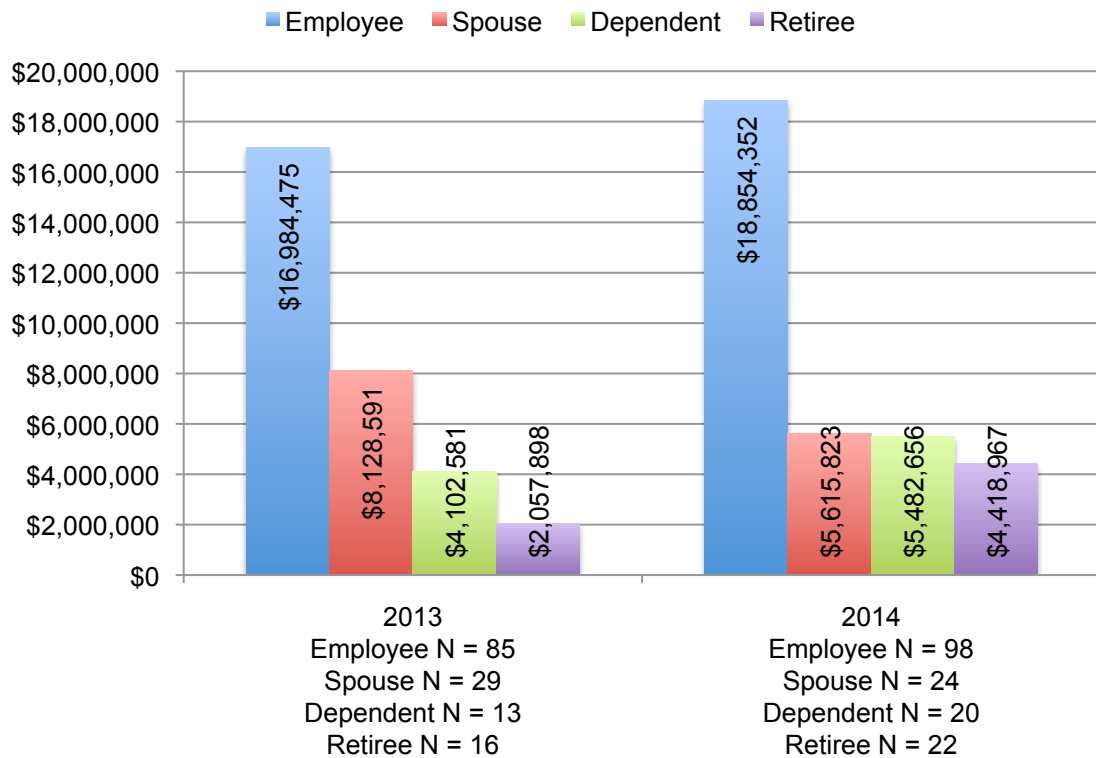
PSE

	2013	2014
Employee Total \$	\$16,984,475	\$18,854,352
Employee Mean \$	\$199,817	\$192,391
Employee N	85	98
Spouse Total \$	\$8,128,591	\$5,615,823
Spouse Mean \$	\$280,296	\$233,993
Spouse N	29	24
Dependent Total \$	\$4,102,581	\$5,482,656
Dependent Mean \$	\$315,583	\$274,133
Dependent N	13	20
Retiree** Total \$	\$2,057,898	\$4,418,967
Retiree Mean \$	\$128,619	\$200,862
Retiree N	16	22

*For this analysis, catastrophic claims are defined as claims greater than \$100,000.

**Retiree includes RET (Retiree) and MED (Medicare).

Total Amount Paid for Catastrophic Claims



Attachment 5: Avoidable Emergency Room Visits

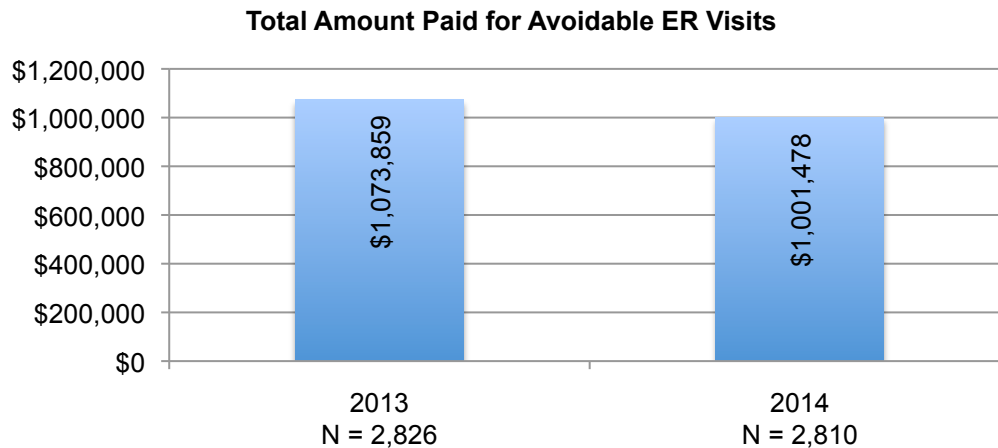
Examples of Avoidable Emergency Room visits:

Examples of Most Frequent Avoidable ER Visits
Headache
Urinary tract infection, site not specified
Acute bronchitis
Lumbago
Acute pharyngitis
Backache, unspecified
Unspecified otitis media
Anxiety state, unspecified
Unspecified sinusitis (chronic)
Alcohol Abuse-Unspec

ASE

	2013	2014
Avoidable ER Visits* Total \$	\$1,073,859	\$1,001,478
Avoidable ER Visits Mean \$	\$380	\$356
Avoidable ER Visits N	2,826	2,810

*Refer to Appendix VI for definition of Avoidable Emergency Room visits.

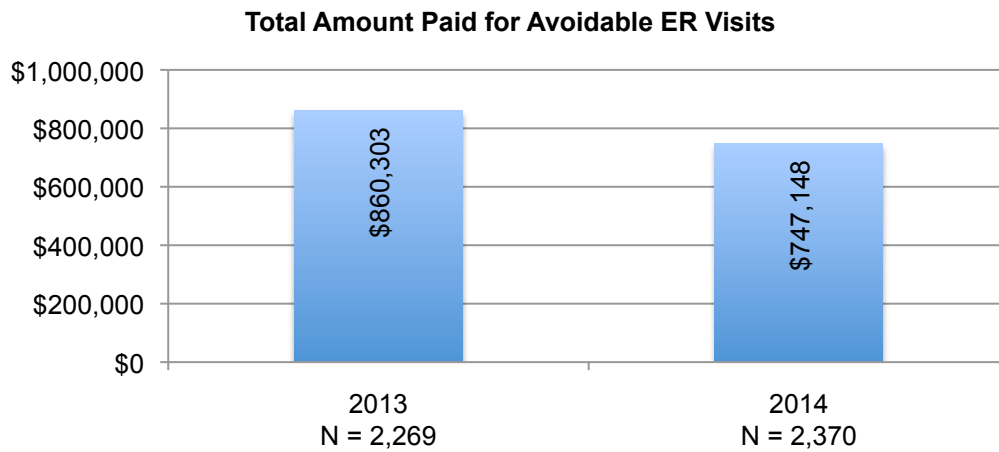


Attachment 5: Avoidable Emergency Room Visits (continued)

PSE

	2013	2014
Avoidable ER Visits* Total \$	\$860,303	\$747,148
Avoidable ER Visits Mean \$	\$379	\$315
Avoidable ER Visits N	2,269	2,370

*Refer to Appendix VI for definition of Avoidable Emergency Room visits.



Attachment 6: Colon Cancer Screenings Resulting in Biopsy or Removal of Suspicious Polyps or Tumors

ASE

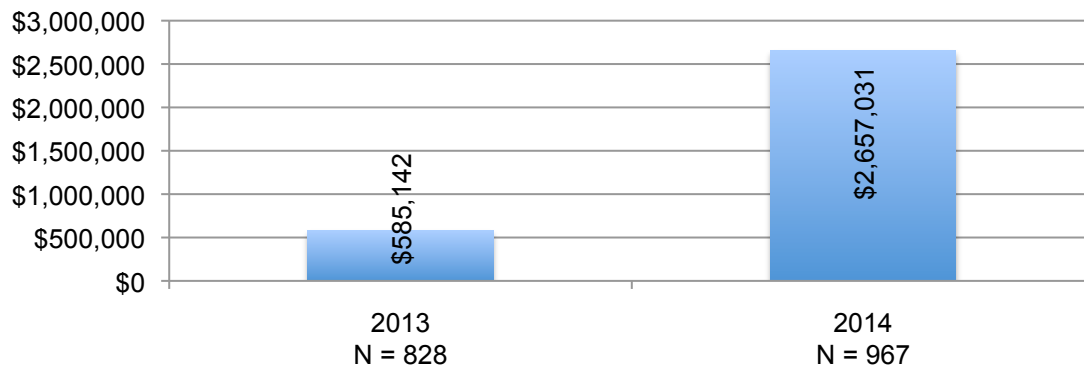
An analysis was performed to identify colon cancer screenings that resulted in the biopsy or removal of suspicious polyps or tumors*. The following table and chart identify the total and mean cost and the number of individuals associated with these procedures.

	2013	2014
Total \$	\$585,142	\$2,637,031
Mean \$	\$707	\$2,748
N	828	967
Number of Cancer Diagnoses Identified After Colon Cancer Screening Occurred**	16	15

*This analysis identified the following procedure codes linked to preventive ICD-9 code V76.51 (Special screening for malignant neoplasms of colon): 45380, 45383, 45384, and 45385.

**This analysis identified cancer diagnoses that presented in the claims data after the colonoscopy occurred. It is plausible, although not certain, that the cancer diagnosis resulted from the colon cancer screening.

Total Amount Paid for Colonoscopy with Biopsy or Removal of Suspicious Polyp or Tumor



Attachment 6: Colon Cancer Screenings Resulting in Biopsy or Removal of Suspicious Polyps or Tumors (continued)

PSE

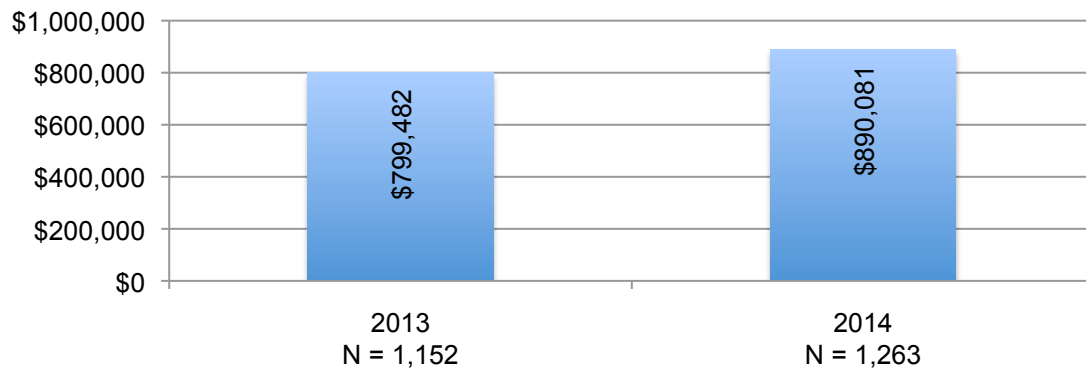
An analysis was performed to identify colon cancer screenings that resulted in the biopsy or removal of suspicious polyps or tumors*. The following table and chart identify the total and mean cost and the number of individuals associated with these procedures.

	2013	2014
Total \$	\$799,482	\$890,081
Mean \$	\$694	\$705
N	1,152	1,263
Number of Cancer Diagnoses Identified After Colon Cancer Screening Occurred**	17	25

*This analysis identified the following procedure codes linked to preventive ICD-9 code V76.51 (Special screening for malignant neoplasms of colon): 45380, 45383, 45384, and 45385.

**This analysis identified cancer diagnoses that presented in the claims data after the colonoscopy occurred. It is plausible, although not certain, that the cancer diagnosis resulted from the colon cancer screening.

Total Amount Paid for Colonoscopy with Biopsy or Removal of Suspicious Polyp or Tumor



Attachment 7: Diabetes Compliance & Diabetes Complications

Diabetes Compliance and Diabetes Complications

In 2013, the PSE data included 7,996 individuals with a diabetes diagnosis.

In 2014, the PSE data included 8,189 individuals with a diabetes diagnosis.

- Overall, the compliance rate is in the 13 to 20 percent range.
- The rate with which diabetes-related complications occur is (approximately 30%) higher in the noncompliance groups.
- The rate of compliance was close to the same for 2013 and 2014.

Statins

- Of the 2,757 who took a statin drug in 2013, 424 (15.4%) had diabetes-related complications.
- Of the 5,239 who did not take a statin drug in 2013, 1,048 (20.0%) had diabetes-related complications.
- Of the 2,832 who took a statin drug in 2014, 376 (13.3%) had diabetes-related complications.
- Of the 5,367 who did not take a statin drug in 2014, 993 (18.5%) had diabetes-related complications.

Ace Inhibitor

- Of the 2,075 who took an Ace-Inhibitor in 2013, 328 (15.8%) had diabetes-related complications.
- Of the 5,921 who did not take Ace-Inhibitor in 2013, 1,144 (19.3%) had diabetes-related complications.
- Of the 1,881 who took an Ace-Inhibitor in 2014, 232 (12.3%) had diabetes-related complications.
- Of the 6,308 who did not take Ace-Inhibitor in 2014, 1,137 (18.0%) had diabetes-related complications.

ARB

- Of the 278 who took an ARB in 2013, 38 (13.7%) had diabetes-related complications.
- Of the 7,718 who did not take ARB in 2013, 1,434 (18.6%) had diabetes-related complications.
- Of the 221 who took an ARB in 2014, 34 (15.4%) had diabetes-related complications.
- Of the 7,968 who did not take ARB in 2014, 1,335 (16.8%) had diabetes-related complications.

Attachment 8: Regression of Amount Paid by Chronic Disease

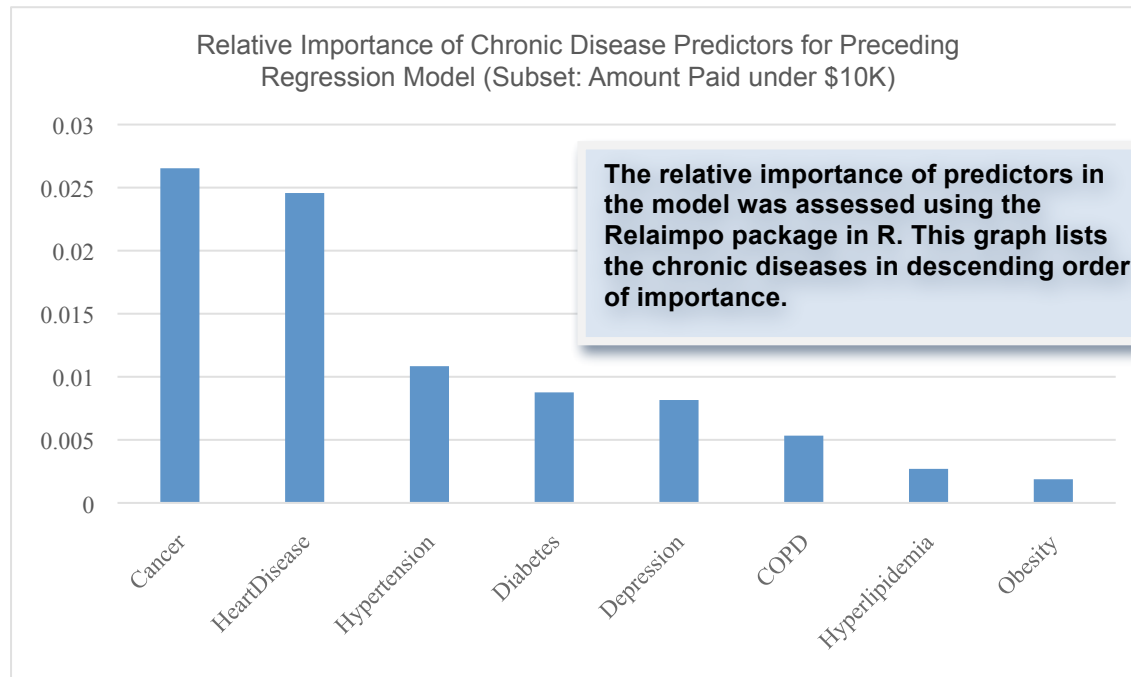
Regression of Amount Paid by Chronic Disease (PSE 2013 & 2014 combined; Subset: Amount Paid under \$10,000)*

	Estimate	SE	t	p-value
(Intercept)	785.9	4.9	160.4	< .001
Diabetes	416.5	14.9	28.0	< .001
Heart Disease	888.4	16.2	54.9	< .001
Cancer	817.1	13.0	62.9	< .001
Hypertension	309.9	10.8	28.8	< .001
Hyperlipidemia	63.4	13.4	4.7	< .001
Depression	804.3	21.5	37.4	< .001
COPD	885.4	36.8	24.1	< .001
Obesity	610.8	36.0	17.0	< .001

All chronic diseases were statistically significant predictors (all p-values < .001) of total amount paid (for the subset). In total, 8.8% of the variation in total amount paid was accounted for by this set of chronic diseases.

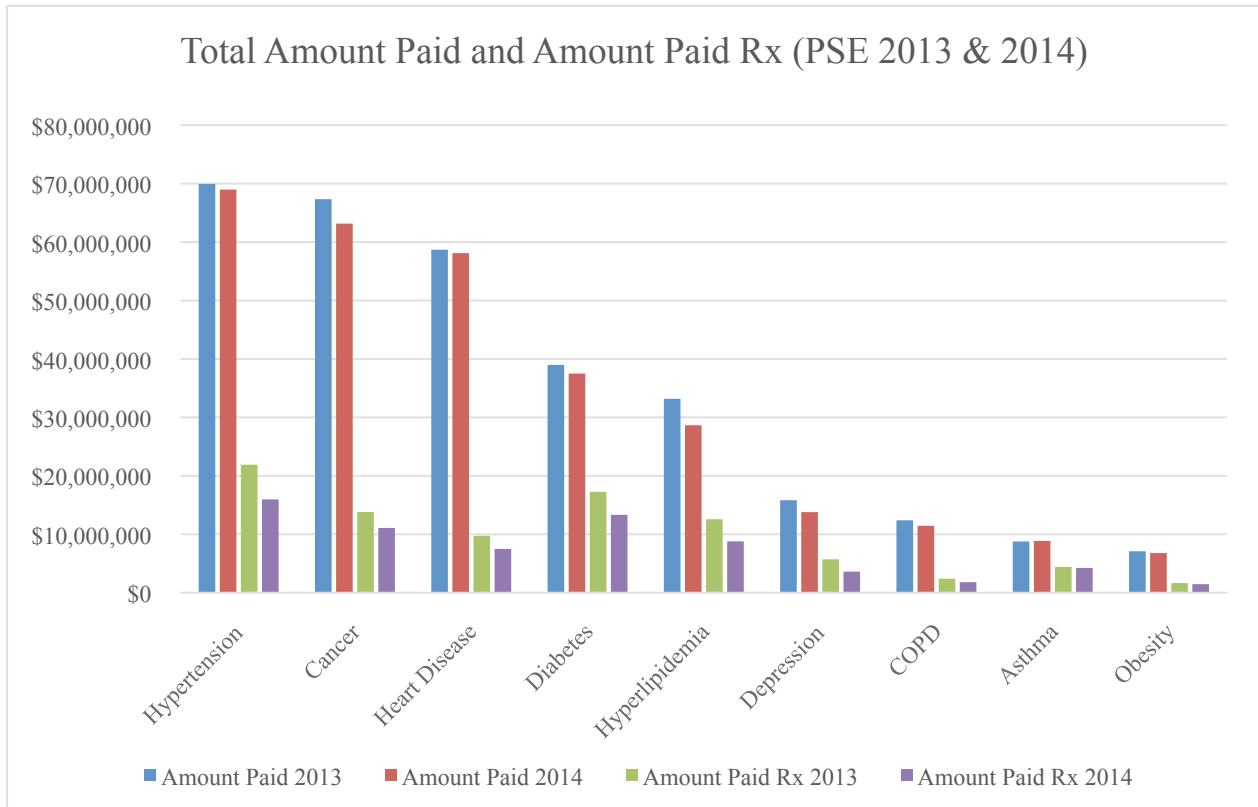
R² = .088 (Explained variation = 8.9%)

*A subset of data was used to counteract the effect of outliers; A logarithmic transformation was also used and yielded similar p-values and r². A model using all of the data and no transformation yielded r² = .03.



Attachment 9: Total Medical & Pharmacy Amount Paid by Chronic Category

Note: In the following graph, the amounts paid are not necessarily uniquely associated with each specific diagnosis. Many individuals have more than one chronic disease and are duplicated in each “marked” category.



This graph shows total outlays for 2013 and 2014. The graph is arranged in descending order. Interestingly, hypertension has the highest total cost despite having the next to lowest average cost.

Appendix II: Definition of Terms

The following section provides definitions of terms used throughout this report.

Definition of Terms

- **ICD:** The International Statistical Classification of Diseases is a standard diagnostic coding tool for health classification. The World Health Organization maintains ICD. It provides a set of diagnostic codes for classifying diseases, including nuanced classifications of a wide variety of signs, symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or disease. It is currently in its ninth revision (i.e., ICD-9). A new revision, ICD-10, is scheduled to become the standard in 2015.
- **CPT:** The Current Procedural Terminology code set is a medical code set maintained by the American Medical Association. The CPT code set describes medical, surgical, and diagnostic services and is designed to communicate uniform information about medical services and procedures. CPT coding is similar to ICD-9 coding, except that it identifies the services rendered rather than the diagnosis on the claim.
- **Acute Disease:** A disease with rapid onset and/or short duration.
- **Chronic Disease:** A chronic condition is a health condition or disease that is persistent or otherwise long-lasting. The term *chronic* is usually applied when the disease lasts for more than three months. Common chronic diseases include Diabetes, Heart Disease, Hypertension, Asthma, COPD, and Cancer.
- **Recurrent Disease:** Recurrent diseases relapse repeatedly, with periods of remission in between.
- **Health Disparity:** The presence of disease for an individual.
- **Morbidity:** The presence of a chronic disease for an individual (e.g., Diabetes).
- **Co-Morbidity:** The presence of two or more chronic diseases for an individual (e.g., Diabetes with a co-morbidity of Hypertension). The primary chronic disease is more severe or costly than the secondary chronic disease.
- **Multi-Morbidity:** The presence of two or more primary chronic diseases for an individual (e.g., Diabetes with Heart Disease).
- **Disease-Specific Complication:** A complication related to a specific disease (e.g., Ketoacidosis is a complication of Diabetes, and Angina is a complication of Heart Disease).
- **Evidence-Based Medicine:** The use of high-quality research and best-practice guidelines to make clinical decisions in the diagnosis, investigation, and management of individual patients.
- **Age/Gender Preventive Screenings:** Health screenings related to an individual's gender or age that have been found to help mitigate future risk of disease (e.g., screenings for breast cancer, cervical cancer, and colorectal cancer).
- **Lifestyle Modifiable:** There are approximately 13,000 ICD-9 codes that are used to identify various forms of disease. Some of these codes are defined as Lifestyle Modifiable or as non-communicable disease. Lifestyle Modifiable illness includes forms of heart disease, cancer, diabetes, and various musculoskeletal conditions. Through a healthy lifestyle (e.g., exercise, weight management, nutrition, stress management, etc), these diseases are preventable or their severity is modifiable through therapeutic lifestyle change.
- **Gaps in Care:** Instances where an individual has failed to follow evidence-based guidelines for his or her health care. Examples of gaps in care include failure to comply with prescription medication usage and failure to have age/gender preventive screenings.

- **Population:** A large body of data about which we want information. It is a collection of individual entities that have something in common. A population of interest or concern is called “target” population.
- **Sample:** A subset of a population. In statistical studies, you analyze the sample to make inferences or draw conclusions about a target population.
- **N:** The number of people in a sample or total population. The N on each chart indicates the number of individuals incorporated within that particular analysis.
- **Participants:** Individuals who took part in a particular program or intervention.
- **Subscribers:** Individuals who are included on the health plan. Not all subscribers on the health plan will have medical claims; only those individuals who utilized health care during the dates included in the analysis will be included in data related to claims expenditures.
- **Regression toward the Mean:** The phenomenon that if a variable is extreme on its first measurement, it will tend to be closer to the average on its second measurement. To avoid making wrong inferences, regression toward the mean must be considered when interpreting data.
- **Mean:** The average of a set of data points. Provides a good measure of central tendency for symmetric distributions. However, the mean can be affected when there are a few values that are either very high or very low (i.e., outliers) compared to the majority of values in a data set.
- **Median:** The midpoint (or middle) of a distribution of values in a data set. 50% of outcomes are on either side of this point. Provides a good measure of central tendency when there are outliers in a data set.
- **Mode:** The most frequently occurring value in a data set.
- **Variance:** The averaged squared distance or deviation of each data point from the mean.
- **Standard Deviation:** The square root of the variance. The most commonly used measure of spread as it converts the variance back into the same units in which the data is measured. If a data set contains values that are all very similar, the standard deviation will be small; if the data set is very spread out, the standard deviation will be large, indicating a greater variability or level of risk.
- **Confidence Interval:** Provides a range of values that is likely to include the actual value of an unknown population parameter. Associated with the interval is a measure of the confidence we have that the interval does indeed contain the parameter of interest.
- **Regression Analysis:** Models relationships between variables and determines the magnitudes of those relationships. The models can be used to make predictions.
- **Correlation Coefficient (p):** Measures the degree of linear association between two variables and is a number between -1 and 1. If there is perfect linear relationship with positive slope between two variables, they have a correlation coefficient of 1. If there is perfect linear relationship with negative slope between two variables, they have a correlation coefficient of -1. A correlation coefficient of 0 means that there is no linear relationship between two variables
- **R-Square (R²):** Square of the correlation coefficient. The proportion of variability in one series that can be explained by the variability of one or more other series in a regression model. It is the measure of quality of fit, with 100% meaning perfect predictability. An R-Square of less than .05 is considered to be statistically significant.
- **Risk:** The potential of loss resulting from a given action. Statistical analyses attempt to predict the degree of uncertainty related to a specific type of risk (e.g., healthcare cost or severity of disease).

Appendix III: Examples of Diagnostic Categories

The following section provides examples of the major diagnostic categories.

Examples of Diagnostic Categories

- **Certain Conditions Originating in the Perinatal Period** - Fetal Alcohol Syndrome, Slow Fetal Growth and Fetal Malnutrition, Failure to Thrive in Newborn
- **Complications of Pregnancy, Childbirth, and the Puerperium** - Ectopic Pregnancy, Pre-Eclampsia, Obstructed Labor
- **Congenital Anomalies** - Spina Bifida, Cleft Palate, Birthmarks, Down Syndrome
- **Diseases of the Blood and Blood-Forming Organs** - Sickle-Cell Anemia, Hemophilia, Elevated White Blood Cell Count
- **Diseases of the Circulatory System** - Rheumatic Fever, Hypertension, Myocardial Infarction, Pulmonary Heart Disease
- **Diseases of the Digestive System** - Gingivitis, Gastro esophageal Reflux, Appendicitis, Hernia, Necrosis of Liver, Pancreatitis
- **Diseases of the Genitourinary System** - Renal Failure, Urinary Tract Infection, Inflammatory Diseases of Prostate, Mastitis
- **Diseases of the Musculoskeletal and Connective Tissue** - Rheumatoid Arthritis, Sciatica, Tendonitis, Osteoporosis, Scoliosis
- **Diseases of the Nervous System and Sense Organs** - Bacterial Meningitis, Sleep Disorders, Alzheimer's, Parkinson's Disease, Chronic Pain, Multiple Sclerosis, Epilepsy, Retinal Detachment, Glaucoma, Strabismus
- **Diseases of the Respiratory System** - Sinusitis, Laryngitis, Pneumonia, Bronchitis
- **Diseases of the Skin and Subcutaneous Tissue** - Cellulitis, Eczema, Dermatitis
- **E Codes (External Causes of Injury)** – Motor Vehicle Traffic Accident Involving Collision with Other Vehicle, Dog Bite, Accident Caused by Firearm
- **Endocrine, Nutritional & Metabolic Diseases, and Immunity Disorders** - Disorders of the Thyroid Gland, Diabetes Mellitus, Hyperlipidemia
- **Infectious and Parasitic Diseases** - Cholera, Tuberculosis, HIV, Syphilis
- **Injury and Poisoning** - Dislocation of Shoulder, Sprains and Strains of Wrist and Hand, Concussion, Open Wound of Finger(s), Black Eye, Burns, Poisoning, Toxic Effect of Alcohol, Frostbite
- **Mental Disorders** - Dementia, Drug Withdrawal, Schizophrenic Disorders, Depression
- **Neoplasms** - Oral Cancer, Lung Cancer, Skin Cancer
- **Symptoms, Signs, and Ill-Defined Conditions** - Coma, Dizziness/Vertigo, Chronic Fatigue Syndrome, Rash (Unspecified), Headache, Sore Throat, Heart Palpitations, Cough, Nausea and Vomiting, Abdominal Pain
- **V Codes (Supplementary Classification of Factors Influencing Health Status and Contact with Health Services)** - Persons with Potential Health Hazards Related to Personal and Family History, Live-Born Infants, Persons Encountering Health Services for Specific Procedures or Aftercare, Persons Encountering Health Services in Other Circumstances, Body Mass Index

Appendix IV: Examples of Complications of Diabetes

The following section provides examples of complications associated with diabetes.

Examples of Complications of Diabetes

- **Cardiovascular** - Atherosclerosis, Hyperlipidemia, Fibrosis and Hypertrophy of Myocardium, Coronary Artery Disease
- **Cerebrovascular** - Stroke (Transient Ischemic Attack)
- **Nephropathy** - Damage to or disease of a kidney; Nephrosis is non-inflammatory nephropathy. Nephritis is inflammatory kidney disease.
- **Neuropathy** - Autonomic Neuropathies (i.e., affects nerve function in bladder, bowel, heart, and sexual function) and Peripheral Neuropathies (i.e., affects nerves in hands, feet, legs, arms, and toes)
- **Peripheral Vascular Disease** - Commonly referred to as Peripheral Artery Disease (PAD) or Peripheral Artery Occlusive Disease (PAOD) or Peripheral Obliterative Arteriopathy; refers to the obstruction of large arteries not within the coronary, aortic arch vasculature, or brain. PVD can result from atherosclerosis, inflammatory processes leading to stenosis, an embolism, or thrombus formation. It causes either acute or chronic ischemia (i.e., lack of blood supply). Often PVD is a term used to refer to atherosclerotic blockages found in the lower extremity.
- **Retinopathy** - Due to persistent or acute damage to the retina of the eye. Ongoing inflammation and vascular remodeling may occur over periods of time where the patient is not fully aware of the extent of the disease. Frequently, retinopathy is an ocular manifestation of systemic disease as seen in diabetes or hypertension

Appendix V: Definition of Wellness Program Participation

The following section provides a definition of wellness participation under the ARBenefitsWell program.

Definition of Wellness Program Participation

(Source: <http://portal.arbenefits.org/Pages/ARBenefitsWell.aspx>)

Participation in the ARBenefitsWell program is defined as completion of a wellness visit between January 1, 2013 and October 31, 2014. The wellness visit consists of an office visit with a doctor and one or more preventive service (refer to codes listed below). Only current active Arkansas State Employees and Public School Employees are eligible for the program for the 2015 plan year. Spouses, dependents, and retirees are not eligible.

Eligible Office Visit and Preventive Codes:

(List of codes provided by Arkansas Employee Benefits Division)

The member may have a claim with any one of the following Preventive Health Codes:

99381; 99382; 99383; 99384; 99385; 99386; 99387; 99391; 99392; 99393; 99394; 99395; 99396;
99397; 99401; 99402; 99403; 99404; 99429; G0402; G0438; G0439

The member may have an Office Visit/E&M Code that must be accompanied by one or more of the following Service codes.

Office Visit/E&M Codes:

99201; 99202; 99203; 99204; 99205; 99211; 99212; 99213; 99214; 99215; 99218

Service Codes:

80050 85025; 85027 80055; 82947; 82948; G8777; 3044F; 3045F; 3046F; 83036; 3011F; 80061;
82465; 68593; 83719; 83721; 83718; 84478; 81000; 81001; 81002; 81003; 81005; 81007; 81015;
80061; 3011F; 84479; 84443; 3511F; 3512F; G0450; G9228; 3292F; 3268F; 84152; 84153;
84154; G0103; 80048; 80050; 80053; V72.31; 80069; 82270; 82272; 99204; 99205; 99215;
99218; 99245; 2040F; 3016F; 4158F; G0442; G0443; G0444; 99408; 99409; 3351F; 3512F;
3755F; 3351F; 3352F; 3353F; 3354F; 3725F; G8431; G8510; G8511; 2002F; 2003F; 2004F;
2014F; 2016F; 2018F 2029F; 0001F; 0513F; 2000F; 2010F; G8783; 2001F; 2010F; 0500F;
0502F; 0503F; 0501F; 0513F; 1000F; 1001F; 1003F; 99078; G0447; G0449; 4000F; 4001F;
4004F; 4019F; 4158F; 4159F; 4163F; G0436; 99406; 99407; 1031F; 1032F; 1033F; 1034F;
1035F; 1036F; 4019F; G8780; 1003F ; 3017F; G0328; 1100F; 1101F; 1130F; G8730; G8731;
3015F; G0101; G0101; S0613; 99384; 99385; 99386; 99387; 99389; V163; V8410; V103; G8401;
G8633; G8634; 4005F; 4163F; G0102; V28.3; G0389; 76700; 76705; S0610; S0612; S9470;
3014F; 4035F; 4037F; 4040F; 4154F; 4155F; 4156F; 4157F; 80048; 80053; 80069; 82950;
87110; 87270; 87320; 87490; 87491; 87800; 87801; 87810; 80055; 86592; 86780; V73.88;
V73.98; V74.5; V69.2; 86689; 86701; 86703; 87389; 87390; 87535; G0432; G0433; G0435;
S3645; V76.44; 88141; 88142; 88143; 88147; 88148; 88150; 88152; 88153; 88154; 88164;
88165; 88166; 88167; 88174; 88175; G0101; G0123; G0124; G0141; G0143; G0144; G0145;
G0147; G0148; P3000; P3001; Q0091; S0610; S0612; V72.31; V72.32; V76.2; 82274; G0328;
45330; 45331; 45333; 45338; 45339; 45378; 45380; 45381; 45383; 45384; 45385; 82270; 82274;
88305; G0104; G0105; G0121; G0328; V76.41; V76.51; V79.1; V81.1; V77.8; 59400; 59425;
59426; V22; V23; 99406; 99407; G0436; G0437; V84.01; 77080; V82.81; 77051; 77052; 77055;
77056; 77057; G0202; G0204; G0206; V76.11; V76.12

Appendix VI: Definition of Avoidable Emergency Room Visits

The following section provides a definition of avoidable Emergency Room visits.

Definition of Avoidable Emergency Room Visits

For this analysis, the following codes were identified as avoidable Emergency Room visits:

110.5; 112.0; 112; 112.1; 112.2; 112.3; 112.8; 112.82; 112.84; 112.85; 112.89; 112.9; 133; 133.0; 133.8; 133.9; 372; 372.0; 372.00; 372.01; 372.02; 372.04; 372.05; 372.10; 372.1; 372.11; 372.12; 372.13; 372.14; 372.15; 372.2; 372.20; 372.21; 372.22; 372.3; 372.30; 372.31; 372.39; 372.03; 373.33; 382; 382.00; 382.0; 382.01; 382.1; 382.2; 382.3; 382.4; 382.9; 383.02; 460; 462; 465.0; 465; 465.8; 466.59; 4660; 466; 472.0; 472; 472.1; 472.2; 473.0; 473; 473.1; 473.2; 473.3; 473.8; 473.9; 474.0; 474.00; 474; 474.01; 474.02; 474.1; 474.10; 474.11; 474.12; 474.2; 474.8; 474.9; 595; 595.0; 595.1; 595.2; 595.3; 595.4; 595.8; 595.81; 595.82; 595.89; 595.9; 599.0; 616; 616.0; 616.1; 628.8; 698.8; 698.9; 705.1; 724.2; 724.5; 724.7; 724.8; 784.0; V67; V67.0; V67.00; V67.01; V67.09; V67.1; V67.2; V67.3; V67.4; V67.5; V67.51; V67.59; V67.6; V67.9; V68; V68.0; V68.01; V68.09; V68.1; V68.2; V68.8; V68.81; V68.89; V68.9; V70; V70.0; V70.1; V70.2; V70.3; V70.4; V70.5; V70.6; V70.7; V70.8; V70.9; V72; V72.0; V72.1; V72.11; V72.12; V72.19; V72.2; V72.3; V72.31; V72.32; V72.4; V72.40; V72.41; V72.42; V72.5; V72.6; V72.7; V72.8; V72.81; V72.82; V72.83; V72.84; V72.85; V72.86; V72.9; 520.6; 520.7; 520.8; 521.0; 521.00; 521.01; 521.02; 521.03; 521.08; 521.09; 521.20; 521.30; 521.31; 521.34; 521.81; 522.0; 522.1; 522.4; 522.5; 522.6; 522.7; 522.8; 522.9; 523.0; 523.00; 523.01; 523.10; 523.11; 523.20; 523.30; 523.31; 523.33; 523.40; 523.5; 523.8; 523.9; 524.09; 524.10; 524.30; 524.33; 524.34; 524.60; 524.62; 524.69; 525.10; 525.11; 525.12; 525.19; 525.20; 525.40; 525.50; 525.60; 525.63; 525.64; 525.71; 525.73; 525.79; 525.8; 525.9; 526.0; 526.2; 526.4; 526.5; 526.89; 526.9; 528.00; 528.01; 528.09; 528.79; 290.42; 290.43; 291.0; 291.00; 291.10; 291.20; 291.30; 291.40; 291.81; 291.89; 291.90; 292.0; 292.00; 292.11; 292.12; 292.20; 292.81; 292.82; 292.84; 292.85; 292.89; 292.90; 293.0; 293.81; 293.82; 293.89; 293.9; 294.11; 294.8; 294.9; 295.0; 295.00; 295.10; 295.13; 295.14; 295.20; 295.24; 295.30; 295.32; 295.33; 295.34; 295.40; 295.42; 295.43; 295.44; 295.50; 295.60; 295.62; 295.63; 295.64; 295.70; 295.72; 295.73; 295.74; 295.80; 295.82; 295.83; 295.84; 295.90; 295.92; 295.93; 295.94; 295.95; 296.0; 296.00; 296.04; 296.10; 296.20; 296.21; 296.22; 296.23; 296.24; 296.26; 296.30; 296.31; 296.32; 296.33; 296.34; 296.35; 296.36; 296.40; 296.42; 296.43; 296.44; 296.45; 296.50; 296.51; 296.52; 296.53; 296.54; 296.55; 296.60; 296.61; 296.62; 296.63; 296.64; 296.7; 296.80; 296.81; 296.82; 296.89; 296.90; 296.99; 297.0; 297.1; 297.8; 297.9; 298.0; 298.1; 298.2; 298.3; 298.8; 298.9; 299.0; 299.00; 299.80; 299.90; 300.0; 300.00; 300.01; 300.02; 300.09; 300.10; 300.11; 300.12; 300.13; 300.15; 300.19; 300.20; 300.21; 300.22; 300.29; 300.3; 300.4; 300.5; 300.81; 300.89; 300.9; .13; 301.3; 301.51; 301.6; 301.7; 301.81; 301.83; 301.89; 301.9; 302.50; 302.70; 302.72; 302.89; 302.9; 303.0; 303.00; 303.01; 303.02; 303.90; 303.91; 303.92; 303.93; 304.0; 304.00; 304.01; 304.03; 304.10; 304.11; 304.20; 304.21; 304.22; 304.23; 304.30; 304.31; 304.33; 304.40; 304.41; 304.60; 304.61; 304.70; 304.71; 304.80; 304.81; 304.90; 304.91; 305.0; 305.00; 305.01; 305.02; 305.1; 305.20; 305.21; 305.30; 305.31; 305.40; 305.42; 305.50; 305.51; 305.52; 305.53; 305.60; 305.61; 305.62; 305.70; 305.71; 305.72; 305.90; 305.91; 305.92; 305.93; 306.0; 306.1; 306.3; 306.4; 306.8; 306.9; 307.0; 307.1; 307.20; 307.23; 307.42; 307.43; 307.45; 307.46; 307.47; 307.50; 307.51; 307.54; 307.59; 307.6; 307.7; 307.81; 307.89; 307.9; 308.0; 308.2; 308.3; 308.9; 309.0; 309.1; 309.24; 309.28; 309.29; 309.3; 309.4; 309.81; 309.89; 309.9; 310.0; 310.1; 310.2; 310.8; 310.9; 311; 312.0; 312.00; 312.01; 312.02; 312.03; 312.10; 312.20; 312.23; 312.30; 312.33; 312.34; 312.35; 312.39; 312.4; 312;81; 312.82; 312.89; 312.9; 313.3; 313.81; 313.89; 313.9; 314.0; 314.00; 314.01; 315.8; 315.9; 316; 318.1; 319; 648.33; 648.43; 965.0; 965.00; 965.01; 965.02; 965.09; 965.1; 965.4; 965.5; 965.61; 965.7; 965.8; 965.9; 967.0; 967.1; 967.8; 967.9; 968.0; 968.2; 968.3; 968.4; 968.5; 969.0; 969.1; 969.2; 969.30; 969.40; 969.5; 969.6; 969.70; 969.8; 969.9; 970.1; 970.8; 970.9; 971.0; 971.1; 971.2; 971.3; 971.9; 975.1; 975.2; 975.3; 975.4; 975.5; 975.7; 976.1; 976.3; 977.0; 977.3; 977.9; 980.0; 980.1; 980.2; 980.3; 980.8; 980.9; 982.0; 982.8; 987.0; 987.1; 987.2; 987.5; 987.6; 987.8; 987.9; V6284; V70.2; V70.20; V7101; V71.02; V710.9; V7.99