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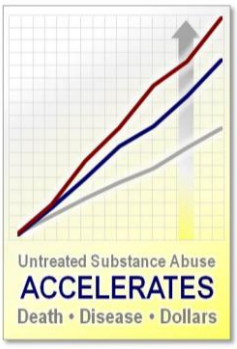

The Health Impact of Substance Abuse: Accelerating Disease Progression and Death

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Report to the Washington State Department of Social and Health Services, Aging and Disability Services Administration, Division of Behavioral Health and Recovery, David Dickinson, Director

SUBSTANCE ABUSE IS A KEY DRIVER of adverse outcomes across the spectrum of health and human services delivery systems. In the areas of medical service utilization and potentially avoidable medical costs, research has shown that substance abuse 1) increases the risk of injuries, accidents, and overdoses requiring hospitalization,[1] 2) increases the risk of acquiring infectious diseases such as HIV/AIDS or hepatitis,[2] and 3) causes drug-seeking behavior associated with extreme Emergency Department (ED) utilization.[3] Prior research has also shown that providing treatment to persons with substance use disorders reduces inpatient admissions, ED utilization, and medical costs.[4]

This study documents another pathway through which untreated substance abuse increases medical costs: by increasing the risk of onset and accelerating the progression of cardiovascular disease. This study leverages multi-year longitudinal data available in the DSHS Integrated Client Database to analyze long-term patterns of onset of hypertension, risk of progression from hypertension to more serious cardiovascular disease, medical costs, and mortality.

Key Findings

This report compares three groups of Medicaid disabled clients: 1) those without identified substance abuse, 2) those with substance abuse who received treatment early in the seven-year study period, and 3) those with substance abuse who did not receive treatment in the study period. We find that:

1. Substance abuse is a key driver of mortality, hypertension and cardiovascular disease onset, progression of cardiovascular disease, and increased medical expenditures.
2. Alcohol/drug treatment curbs the risk of mortality, hypertension/cardiovascular disease onset, and the progression of cardiovascular disease for substance abusers over the study period.
3. Receipt of alcohol/drug treatment is associated with significantly lower average annual Medicaid medical costs among those with identified substance abuse. By keeping clients who died during the seven-year study period in the analysis, we demonstrate that a significant cost savings associated with treatment persists even though 1) medical expenditures fall to zero after a client has died and 2) untreated substance abusers are more likely to die than those who receive early treatment.

1 World Health Organization (2011). Global status report on alcohol and health. WHO Press: Geneva, Switzerland.

2 Milloy, MJS, et al. (2010). Inability to access addiction treatment and risk of HIV infection among injection drug users recruited from a supervised injection facility. Journal of Public Health, vol. 32:342-349.

3 Nordlund, D., Mancuso, D., and Felver, B. (2004). Chemical Dependency Treatment Reduces Emergency Room Costs and Visits. Olympia, WA: DSHS Research and Data Analysis Division, http://publications.rda.dshs.wa.gov/887/.

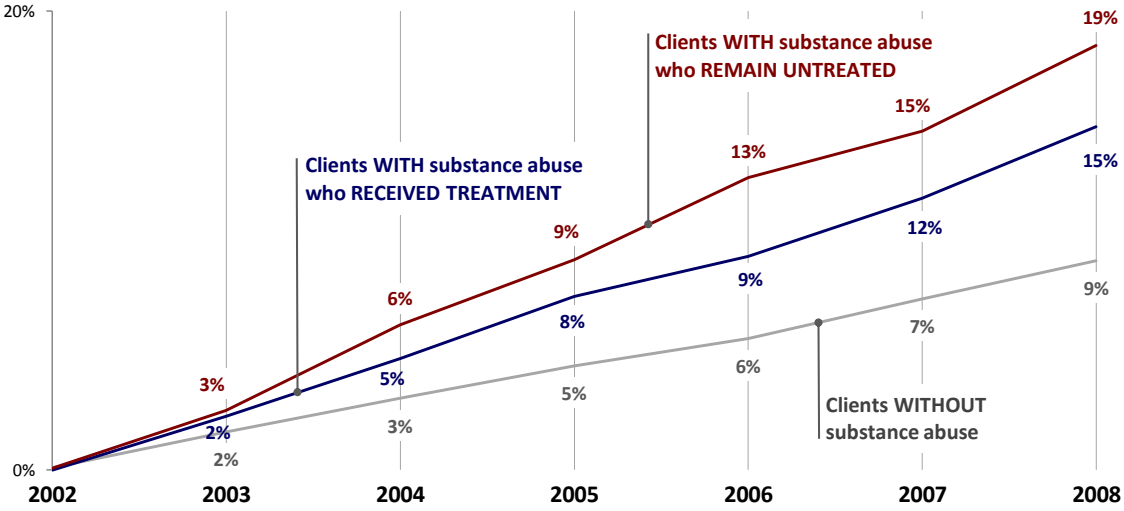
4 For example, see Mancuso, D. and Felver, B. (2010). Bending the Health Care Cost Curve by Expanding Alcohol/Drug Treatment. Olympia, WA: DSHS Research and Data Analysis Division, http://publications.rda.dshs.wa.gov/1417/.

Mortality | Untreated substance abuse is a key driver

Among Medicaid Disabled clients with diagnosed hypertension at baseline (SFY 2002), those with untreated substance abuse were far more likely to die over a seven-year period compared to those with no substance abuse identified. Untreated substance abusers were also more likely to die than those who had identified substance abuse but received early alcohol/drug treatment in SFY 2002 or 2003.

Percent dying by end of the state fiscal year

Among Medicaid Disabled clients (non-dual Medicare) age 18-59 diagnosed with hypertension in SFY 2002, not age adjusted

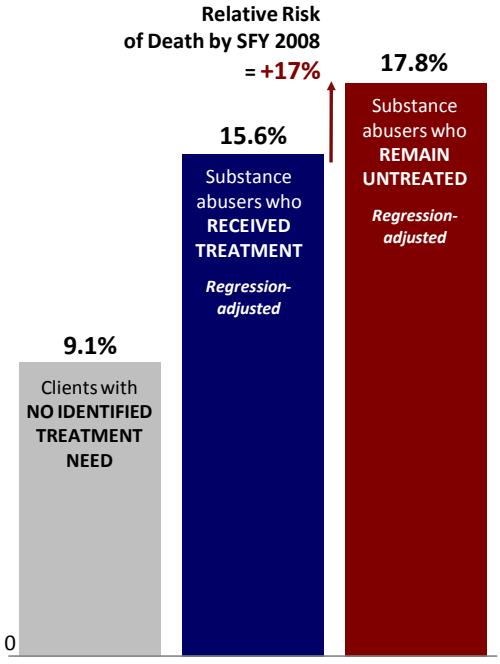


Impact of substance abuse and treatment by SFY 2008

We estimated logistic regression models to measure the impact of substance use problems on mortality risk while controlling for age, gender, and baseline physical health risk. Clients with no identified substance abuse served as the "reference group," which was compared to treated substance abusers and untreated substance abusers.

Substance abuse increased mortality risk. Among clients with no identified substance abuse, 9.1 percent died by the end of SFY 2008. On a regression-adjusted basis, 15.6 percent of clients receiving early substance abuse treatment and 17.8 percent of untreated substance abusers had died by that point in time.

Alcohol/drug treatment curbed the risk of dying. Over the seven-year period, untreated substance abusers were twice as likely to die as clients with no indication of a substance use problem, after controlling for baseline differences in age, gender, and physical health risk. Among substance abusers, regression results translate into a relative risk of dying that is 17 percent higher for *untreated* substance abusers relative to those who received treatment early in the study period.

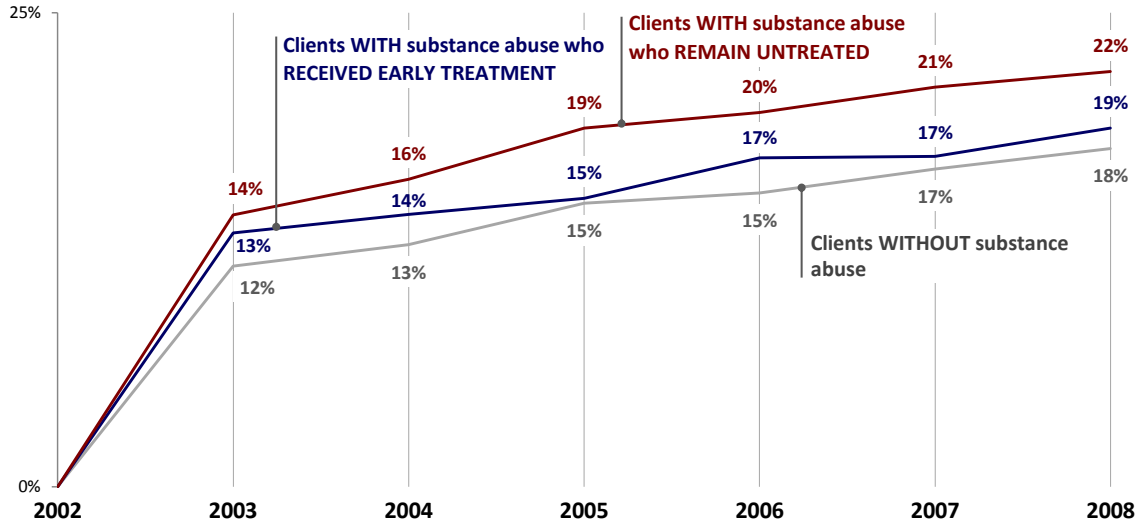


Cardiovascular Disease Onset | Untreated substance abuse is a key driver

Among Medicaid Disabled clients who were *not* diagnosed with hypertension or cardiovascular disease in SFY 2002, those with untreated substance abuse were more likely to be diagnosed with cardiovascular disease (including hypertension) in each year from SFY 2003 to 2008 compared to both non-substance abusers and to substance abusers who received treatment early in the study period. By SFY 2008, 22 percent of untreated substance abusers had been diagnosed with cardiovascular disease.

Percent newly diagnosed with hypertension or cardiovascular disease

Among Medicaid Disabled clients *not* diagnosed with hypertension or cardiovascular disease in SFY 2002

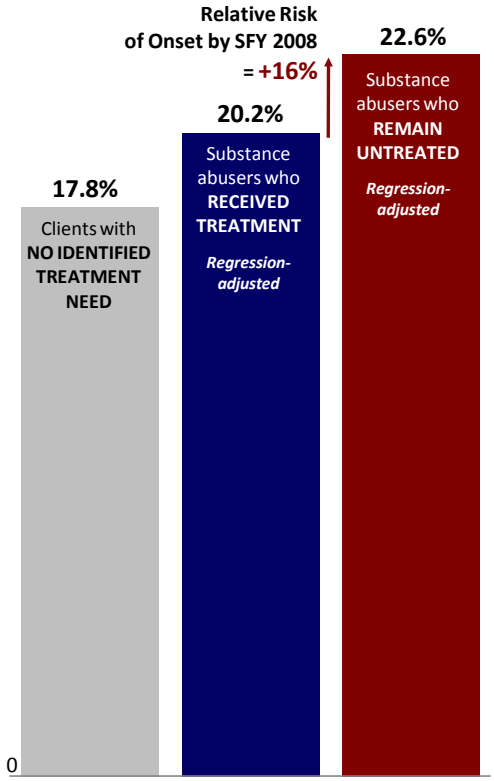


Impact of substance abuse and treatment by SFY 2008

We estimated logistic regression models to measure the impact of substance use problems on being diagnosed with hypertension or cardiovascular disease by SFY 2008 while controlling for age, gender, and baseline physical health risk. Clients with no identified substance abuse served as the "reference group," against which treated substance abusers and untreated substance abusers were compared.

Substance abuse increased the risk of cardiovascular disease onset. Among clients with no identified substance abuse, 17.8 percent had a diagnosis of hypertension or cardiovascular disease by SFY 2008. Regression-adjusted results suggest that 20.2 percent of treated substance abusers and 22.6 percent of untreated substance abusers had diagnosed hypertension or cardiovascular disease by SFY 2008 (2.4 and 4.8 percentage points higher than the reference group, respectively).

Alcohol/drug treatment curbed the risk of developing cardiovascular disease. Among substance abusers, regression results translate into a relative risk of developing cardiovascular disease over a six-year period that is 16 percent higher for clients with untreated substance abuse relative to those who received treatment early in the study period.

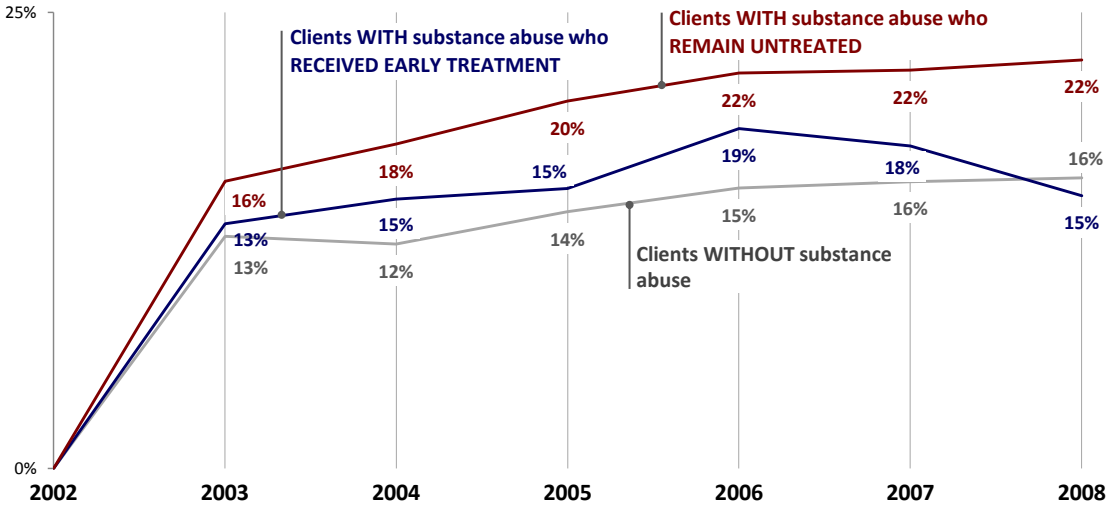


Cardiovascular Disease Progression | Untreated substance abuse is a key driver

Among Medicaid Disabled clients with diagnosed hypertension at baseline, those with untreated substance abuse between SFY 2002 and 2008 were more likely to experience cardiovascular disease progression over a seven-year period compared to those with no substance abuse identified. Disease progression was defined as having a diagnosis for cardiovascular disease that fell into a higher risk category than hypertension based on the Chronic Illness Disability Payment System (CDPS) diagnostic classification system.

Percent progressing from hypertension to major cardiovascular disease (CVD)

Among Medicaid Disabled clients with hypertension but *without* more serious cardiovascular diagnosis in SFY 2002

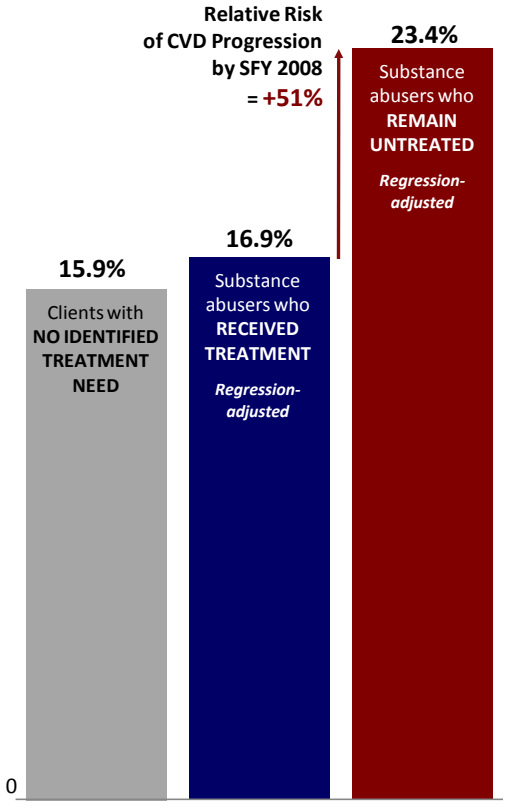


Impact of substance abuse and treatment by SFY 2008

We estimated logistic regression models to measure the impact of substance use problems on cardiovascular disease progression while controlling for age, gender, and baseline physical health risk. Clients with no identified substance abuse served as the "reference group," against which treated substance abusers and untreated substance abusers were compared.

Substance abuse increased the risk of hypertension progressing to more serious cardiovascular disease conditions. Among clients without identified substance abuse, 15.9 percent experienced CVD progression by SFY 2008. Relative to this reference group, 16.9 percent of treated substance abusers experienced CVD progression by SFY 2008 (difference not statistically significant). By contrast, 23.4 percent of untreated substance abusers experienced CVD progression by SFY 2008, a statistically significant difference from clients without substance abuse.

Alcohol/drug treatment curbed the risk of disease progression substantially. Regression results translate into a relative risk of experiencing cardiovascular disease progression over a six-year period that is 51 percent higher for substance abusers who did not receive treatment compared to those who did.

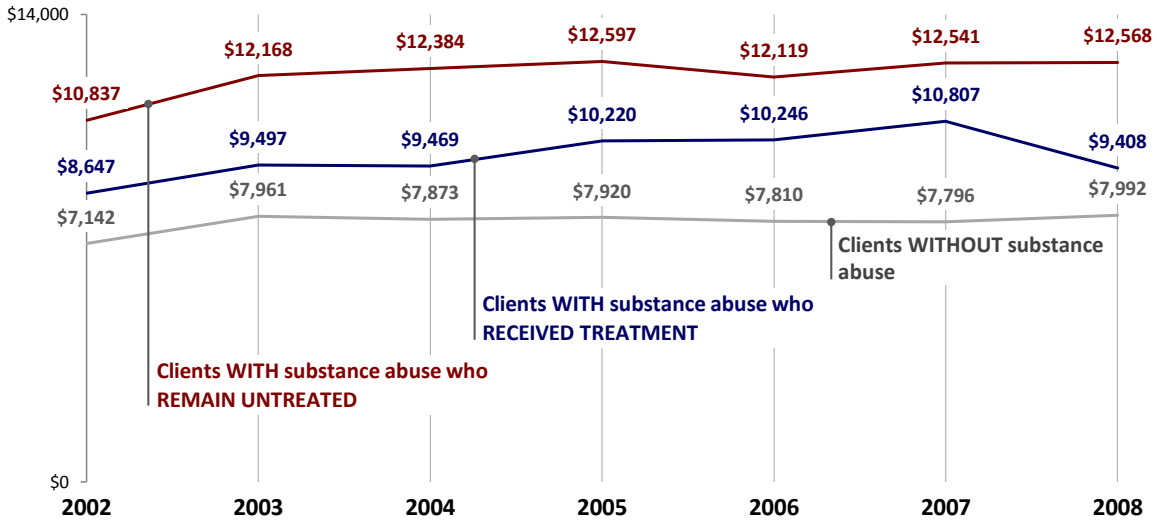


Medical Costs | Untreated substance abuse is a key driver of *medical costs*

Among Medicaid Disabled clients with diagnosed hypertension at baseline, clients with untreated substance abuse experienced higher average annual medical costs—total costs paid by the Medicaid Purchasing Administration—in each year from SFY 2002 to 2008 relative to both treated substance abusers and clients with no identified substance abuse. By 2008, clients with baseline hypertension and untreated substance abuse had average annual medical costs of $12,568 compared to $7,992 for clients without substance abuse and $9,408 for clients who had identified substance abuse but received treatment early in the study period. Notably, the denominator for medical costs includes individuals who died, and untreated substance abusers were much more likely to die during the study period. Accounting for differential mortality would show even higher medical costs among untreated substance abusers who remained alive at the end of the study period, compared to those who received treatment.

Average Medicaid medical expenditures per person per year (all funds)

Among Medicaid Disabled clients diagnosed with hypertension in SFY 2002, including clients who died and those who left Washington State Medicaid coverage prior to SFY 2008.

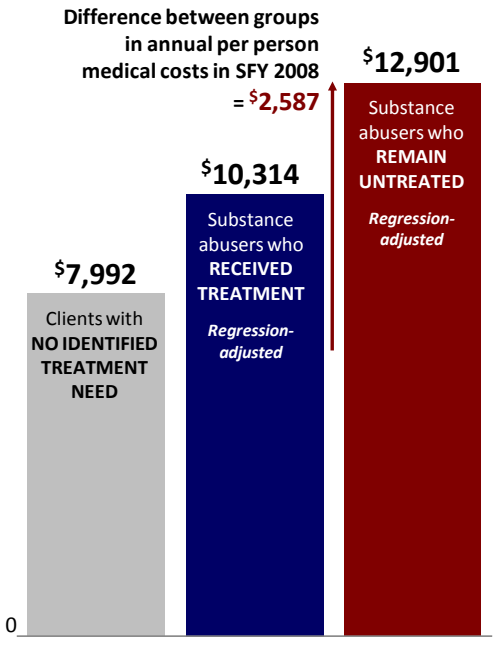


Impact of substance abuse and treatment in SFY 2008

An ordinary least squares regression analysis was performed to estimate the difference in average annual medical costs in SFY 2008 for clients with both treated and untreated substance abuse relative to clients with no identified substance abuse.

Clients with substance abuse experienced higher medical costs. Substance abusers who received treatment in SFY 2002 or 2003 had annual medical costs that were on average $2,322 higher per person relative those without identified substance abuse. Untreated substance abusers had annual medical costs that were on average $4,909 higher per person compared to clients without identified substance abuse ($12,901 compared to $7,992).

Alcohol/drug treatment helped to contain medical costs. On average, substance abusers who received treatment early in the study period had annual medical costs in SFY 2008 that were $2,587 lower per person than substance abusers who remained untreated.



STUDY DESIGN

This study examines outcomes for individuals who had at least one month of Categorically Needy Disabled Medicaid coverage in both state fiscal years (SFY) 2002 and 2003 but were not dually eligible for Medicare. The study population was restricted to clients between the age of 18 and 59 as of June 2002 to limit the degree to which clients included in the analysis became dually eligible for Medicare.

In a set of analyses on cardiovascular disease progression, mortality, and medical cost outcomes, we examine three subgroups of clients, all of whom were diagnosed with hypertension (but were not diagnosed with more serious cardiovascular disease) in SFY 2002:

1. **Clients without identified substance abuse:** disabled Medicaid clients with no indication of a substance use problem,
2. **Clients with substance abuse who received early treatment:** disabled Medicaid clients with substance abuse who received substance abuse treatment in SFY 2002 or 2003. We exclude from the study those clients who first entered substance abuse treatment between SFY 2004 and 2008, because less follow-up time would be available to detect long-term treatment impact for those clients.
3. **Clients with substance abuse who remain untreated:** disabled Medicaid clients with a need for substance abuse treatment identified at some point between SFY 2002 and 2008 who did not receive substance abuse treatment at any point in the study period.

In addition, we analyze the risk of cardiovascular disease *onset* for these same three groups, after restricting the study population to disabled Medicaid clients who did not have a diagnosis of hypertension or other cardiovascular disease in SFY 2002.

For clients with substance abuse who remain untreated, substance use problems were identified based on the following risk indicators: 1) a set of diagnoses (e.g., alcohol or drug dependence) and procedure codes indicating a substance use disorder contained in the Medicaid claims and encounter data, 2) receipt of detoxification services through the DSHS Division of Behavioral Health and Recovery, or 3) a drug- or alcohol-related gross misdemeanor or felony (e.g., driving under the influence or possession of controlled substances).

We present descriptive trend analyses for outcomes over a seven-year period from SFY 2002 to 2008, as well as regression analyses to test differences across subgroups in their SFY 2008 outcomes. Note that we did not require that clients in the study population continue to be enrolled in Medicaid after SFY 2003 in order to remain in the analyses. In particular, we did not remove clients who subsequently died from the analyses of cardiovascular disease onset, cardiovascular disease progression, or medical costs. We made this design choice to ensure that cost comparisons reflect the full long-term average Medicaid cost differences between treated and untreated persons with substance use problems, even after accounting for the fact that untreated substance abuse is associated with an increased risk of death, and the fact that medical expenditures fall to zero after a client has died.

In order to assess the impacts of substance abuse and treatment over time, we conduct descriptive trend analyses over the seven-year study period, and then use logistic regression analysis to estimate, separately, the probability of untreated and treated substance abusers experiencing cardiovascular disease onset, cardiovascular disease progression, and mortality by SFY 2008, relative to clients without identified substance abuse. We use ordinary least squares regression analysis to estimate the difference in average annual medical costs by SFY 2008 for treated and untreated substance abusers relative to clients without substance abuse.

All four regression models control for age, gender, and baseline physical health risk. The baseline risk scores are based on a hybrid model combining the diagnosis-based Chronic Illness Disability Payment System (CDPS) with the pharmacy-based Medicaid-Rx system. Our regression models use a version of these risk scores that remove the components of risk related directly to behavioral health conditions to ensure that the analyses control for baseline differences in the severity of “physical” health conditions.

Copies of this paper may be obtained at www.dshs.wa.gov/rda/
or by calling DSHS’ Research and Data Analysis Division at 360.902.0701.

Please request REPORT NUMBER 4.85

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