Wilder Research

The Return on Investment of Women's Recovery Services

An Initiative of the Minnesota Department of Human Services Behavioral Health Division (BHD)

What value does the Women's Recovery Services (WRS) initiative provide to women, their families, and society? This Return on Investment (ROI) analysis adds up a selected set of quantifiable benefits, including increased earnings (with corresponding tax revenue), and compares them to the costs of the program. ***Findings show that each dollar invested in WRS generates a net benefit of at least $4.05 for society.***

Funded by the Minnesota Department of Human Services Behavioral Health Division (BHD), WRS provides comprehensive, gender-specific, family-centered treatment support and recovery services for pregnant and parenting women who have substance use disorders, and their families. This analysis is based on the first four years of the five-year grant cycle (FY 2016-17 through FY 2019-20). During this four-year period, a total of 2,826 women with 5,431 children exited the 12 funded programs. Please see the WRS cumulative report, "Women's Recovery Services in Minnesota: Key Findings from 2017-2021" for a complete description of the women served and their outcomes.

Benefits of WRS programs

In this analysis, Wilder Research estimates the monetary value for as many of the benefits of WRS as possible. Many of the benefits of WRS programs simply can't be captured in dollars – the value of improved mental health, of stronger relationships between mother and child, of better quality of life for the women and their families, for example. However, the quantifiable and monetizeable benefits of these programs show that society gains at least $4.05 for every dollar invested in them. Based on conservative estimates of program impacts on a selected set of outcomes, the annual societal benefits of Minnesota's Women's Recovery Services add up to at least $50 million over the lifetimes of the programs' clients (Figure 1).

1. Estimated annual monetary benefits of WRS programs

	Estimated benefits for…		
	Individuals (including clients)	**Taxpayers/ Government**	**Society overall**
Increased earnings	$51,610	-	$51,610
Taxes on increased earnings	-	$10,965	$10,965
Avoided costs of crime	$1,035	$1,052	$2,087
Avoided health care costs	$482	$1,470	$1,952
Reduced costs for child welfare system	-	$1,767	$1,767
Other public savings[a]	-	$2,253	$2,253
Total benefit per woman served	**$53,127**	**$17,507**	**$70,634**
Aggregate benefits (annual)	**$37,826,400**	**$12,465,000**	**$50,291,400**

Note. Aggregate benefits are based on N=712, the estimated annual average number of women who met the following three criteria: (1) were involved with the program for at least 14 days, (2) received at least one service, and (3) exited in fiscal years 2016-17 through 2019-20.

[a] "Other public savings" include reduced costs of homelessness and reduced grade repetition costs for children of participants in parenting education.

These benefits are described in Figure 2 below. The bulk of these benefits accrue from the higher expected earnings for the women served, a result of their educational attainment and employment outcomes in the first six months after exiting the program. These increased earnings (which average out to over $51,000 per woman served, over the course of her lifetime) also benefit others around them as the women contribute more in taxes. Society also benefits as the participants have lower health care costs, a lowered arrest rate, reduced child protection involvement, and a lower likelihood of homelessness compared to before they began participating in a WRS program.

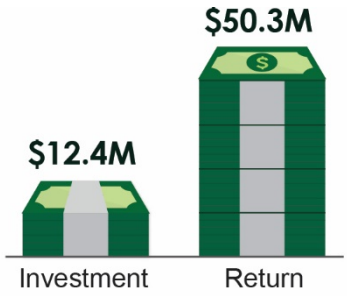
2. Description of benefits included in the ROI

Category	Description
Increased individual earnings	Due to educational attainment, employment gains, improved productivity, and the impact of parenting education on children's future earnings, WRS programs have a substantial impact on present and future earnings for the women and their children.
Taxes on increased earnings	A portion of the increased earnings are paid to federal, state, and local governments, generating additional tax revenue.
Avoided health care costs	Women require fewer emergency room visits, and also avoid some health care costs associated with opioid use. In addition, because of parenting education, health care costs are reduced for children (lower incidence of disruptive behavior disorder) and mothers (lower incidence of depression).
Avoided costs of crime	Due to fewer arrests, society avoids both the costs of incarceration and the costs to the victims of crime.
Reduced costs to child welfare system	Society avoids costs due to reduced involvement with Child Protection and reunification of mother and children (resulting in avoided foster care costs).
Other public savings	Reduced incidence of homelessness, resulting in avoided costs for public agencies; lower education costs due to reduced likelihood of special education and grade repetition among children whose mothers complete parenting education

Comparing benefits with program costs

Stacked against the programs' estimated annual costs of $12.4 million (including about $8 million that grantees raise each year, in addition to the estimated $4.4 million in grant funds provided by BHD), these benefits translate to a return of $4.05 for every $1 invested in WRS (Figure 3).

For the taxpayers who contribute the $4.4 million that funds the WRS grant each year, the initiative generates almost $12.5 million in benefits, a return of $2.82 for every $1 invested.



3. Estimated monetary benefits of WRS programs

	Estimated value for…		
	Individuals (including clients)	**Taxpayers/ Government**	**Society overall**
Annual grant costs		$4,423,000	$4,423,000
Annual supplemental costs (estimated)			$7,989,000
Total annual program costs (estimated)		$4,423,000	$12,412,000
Total annual program benefits	$37,826,400	$12,465,000	$50,291,400
Return on Investment ($ benefits/dollar invested)	**N/A**	**$2.82**	**$4.05**

Note. Aggregate benefits are based on N=712, the estimated average number of women who exited a WRS program per year in fiscal years 2016-17 through 2019-20.

Methods

This analysis relies on the following data sources:

- Intake and closing data from the WRS database, provided by program staff for each woman as they entered and exited a WRS program
- Follow-up interviews with women served by WRS programs conducted six months after exiting the program
- U.S. Census data on earnings by age and educational attainment
- The Washington State Institute for Public Policy's Technical Documentation of their cost-benefit analysis methods, as well as their estimates of the benefits of parenting education
- Numerous other high-quality studies in the existing literature that have quantified the value of these outcomes and/or the impact of WRS programs on those outcomes (for complete list, see the Appendix)

For additional details on the computations used to estimate these benefits, please see the Appendix.

WRS Grantees

In 2016, the Women's Recovery Services initiative initially included the following 12 grantees, all of which were included in the ROI analysis:

- American Indian Family Center – Wakanyeja Kin Wakan Pi "Our Children are Sacred"
- Avivo – Mothers Achieving Recovery for Family Unity (MARFU)
- St. Cloud Hospital Recovery Plus – Journey Home-Family Unity
- St. Stephens Human Services – Kateri Residence
- Ramsey County Community Human Services – Mother's First
- Perspectives – Hand in Hand
- Hope House of Itasca County – Project Clean Start
- Meeker-McLeod-Sibley Community Health Services - Project Harmony
- RS EDEN – Women and Children's Family Center
- Fond du Lac Reservation – Tagwii
- Wayside – Rise Up in Recovery
- Wellcome Manor Family Services

Two grantees – St. Stephen's Human Services (Kateri Residence) and St. Cloud Hospital Recovery Plus (Journey Home-Family Unity) – have since closed operations, bringing the total number of Women's Recovery grantees to 10 as of July 1, 2020.

Appendix: Computations and assumptions

The following Appendix contains details of computations and assumptions for the Return on Investment Analysis of Women's Recovery Services. Estimated program costs and benefits are based on the first four years of the five-year grant cycle (FY 2016-17 through FY 2019-20).

Women served

During this four-year period, a total of 2,826 women with 5,431 children exited the 12 funded programs. Please see the WRS cumulative report, "Women's Recovery Services in Minnesota: Key Findings from 2017-2021" for a complete description of the women served and their outcomes.

The average number of women served per year is an essential parameter in the computation of the program's total annual benefit per dollar spent. As a result, we make two adjustments to this count, to arrive at an estimate that more accurately represents the full number of women who have benefited from WRS programs in an average year during this grant cycle. These two adjustments are described below.

First, we limit our count to those who received services, have both intake and closing data on file, and were involved with the program for a minimum of 14 days. (This ensures that we are not assuming program-related benefits for women with limited program involvement.) A total of 2,525 women met these criteria in the four years covered in this analysis.

Second, we correct for limited data collection during the first year. Due to timing related to the initiation of the evaluation contract, the database only captured those who exited during the last five months of the grant's first year from January 1, 2017 – May 30, 2017 (277 women who met the criteria above). Recognizing that this number is far too low, we estimate the first year count and overall annual average as follows:

- We first compute the annual average number of exits for years 2-4: 749 women (=2248 / 3)
- As a conservative estimate, we assume that the first year count is (at least) 80% of this annual average for years 2-4: 599 women
- For this analysis, the assumed total number of women served over this 4-year period is 2,847, and the assumed average annual number of women served is 712 (= 2847 / 4)

Estimating the benefits of WRS programs

This section reviews the assumptions and computations for each of the benefits included in this analysis.

We assume that, in the absence of the program, we would not expect to see substantial shifts (over time) in the average woman's employment, likelihood of homelessness, likelihood of arrest, frequency of emergency room use, or likelihood of involvement with Child Protection. We do not anticipate that the program would worsen the likelihood or frequency of these occurrences, so the analysis of each outcome sets aside those who already fit into that outcome's lower-cost (or higher-benefit) group at intake. For each type of cost or benefit being analyzed, we focus on the before-and-after picture for those in the higher-cost (or lower-benefit) group at intake: those who were unemployed, those who had been recently arrested, those who were homeless, those who had used the ER recently, and those who were involved with Child Protection. We quantify the number of women who shifted from each outcome's higher-cost group to the lower-cost group between intake and the six-month follow-up interview. These women with changed statuses form the basis of our estimated benefits on these outcomes. (Reviewing one or more of the employment, crime, child welfare, homelessness, or emergency room sections should help to clarify how this is applied.)

In addition, we employ the following general assumptions and methods that apply across all estimated benefits unless otherwise noted:

- Positive changes that occur between intake and the six-month follow-up interview are attributed to the program.[1] These estimated benefits are **not** based on an experimental study and we cannot be certain that this before-and-after measurement yields an accurate count of the program's impacts.
- In addition, we generally do not "blame" the program for backward steps taken by clients (e.g., if a client becomes homeless while participating in the program). We assume that these poor outcomes would have been just as likely to occur (if not more so) if the client had not been participating in the program.
- To our knowledge, the notes above represent the only aspect of our methodological approach that might not be considered conservative. However, we contend that (1) experimental approaches that would yield more conservative estimates would also withhold needed services from a control group, raising ethical questions and (2) this not-so-conservative aspect of our approach should be more than offset by the many ways in which this analysis underestimates benefits, as described throughout this document.
- This analysis excludes numerous benefits. Some excluded benefits are concepts that cannot be (or at least have not yet been) monetized. These include the value of improved relationships between mother and child, greater quality of life, increased self-esteem, and numerous other important benefits. Other benefits simply haven't been documented in WRS data (for example, reductions in the number or length of hospitalizations).
- As noted in several of the sub-sections below, when discretion is involved in the choice of assumptions, the general rule is to err on the conservative side.

For most impacts included in this analysis, we have included a benefit only for a short period of time (between 52 days and three years), with timelines chosen to be justifiable (based on available data) and conservative in nature, as detailed in the sub-sections below. The benefits of educational attainment, however, are computed over the assumed career of the participating individuals (also detailed below). When benefits accrue over more than one year, benefits are discounted at an annual rate of 3% to yield an estimate of the present value of all lifetime benefits for a typical participant in WRS programs. For each woman who exits, the program generates benefits (over her lifetime) totaling more than $70,000 in today's dollars.

Aggregate benefits are computed by multiplying this total per-participant value by the average number of women who exit in a given year. The aggregate values can therefore be interpreted as the present value of the lifetime benefits of program participation for the cohort of women who exit in an average year.

All parameters have been adjusted to 2020 U.S. Dollars. Probabilities are rounded to three decimal places (e.g., 0.232 or 23.2%) while counts of people and dollars are rounded to the nearest integer.

[1] The six-month follow-up data offer our best available view into the program impacts that extend beyond exit. However, one might argue that those who complete the six-month interview are a sample that's biased toward stronger results. We cannot fully control for this possibility. However, for most outcomes, the rate for the full population was actually found to be better than for the follow-up population, so we concluded that it was generally unnecessary to make adjustments to correct this potential bias. The employment outcome was the exception, and so the parameters for employment were adjusted to account for this, as described in the Employment section.

Employment

We estimate that, of the women who were unemployed at intake, 37.1% will gain a job between intake and approximately six months after exit.2 Given that 83.8% of the full population was unemployed at intake, we estimate that (37.1% * 83.8% =) 31.1% of all women in the program will gain a job between intake and approximately six months after exit, and we attribute their subsequent year's worth of earnings to the program.

The parameters for the estimates of employment-related gains are shown in Figure A1 below.

Annual wages for newly employed women were computed using the following assumptions:

- The average employed woman works 25 hours per week (intended to be a conservatively low assumption)
- Wage data are based on self-report from an interview in which the response options were wage ranges. To estimate a woman's earnings, we multiply the lower bound of her reported wage range by 25 hours and then by 52 weeks to reach an annual value. However, if the woman also reported total annual earnings that were less than this value, we instead used the lower bound of her selected annual income range.

Based on these computations, the average annual wage for a newly employed woman (unemployed at intake and employed at six-month follow-up) is an estimated $13,693.

[2] As noted above, we generally found the full population of women served to be fairly comparable at intake to those who were reached for six-month follow-up interviews. Employment was the only outcome for which this was not the case. As a result, we have adjusted the impact parameter to account for this. Of the women who were unemployed at intake, 56.2% were employed at six-month follow-up. The full population of women was only 66% as likely as the six-month follow-up group to have a job at intake, so we assume the unemployed women in the full population would be only 66% as likely to gain jobs, compared to the group whose employment outcomes were captured in six-month follow-up interviews, hence the estimated rate of 37.1%.

Because an estimated 31% of participants will achieve this employment outcome and gain these earnings, the average employment-related gains per participating woman are $13,693 * 31% = $4,259.

A1. Employment

Outcome description	Becoming employed (after being unemployed at intake)
Outcome category	Earnings
% of women who became employed between intake and six-month follow-up (A)a	31.1%b,c
Timeline over which benefits are counted	1 year
Description of outcome's monetary value	Employment earnings
Monetary value of outcome per person who achieves outcome:	
...to individuals (including participants) (B)	$12,050 c
...to government/taxpayers (C)	$1,643 d,e
...to society overall (individuals + gov't) (D)	$13,693
Monetary value of outcome per average participant in WRS programs:	
...to individuals (including participants) (=A*B)	$3,748
...to government/taxpayers (=A*C)	$511
...to society overall (individuals + gov't) (=A*D)	$4,259

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.
[b] This refers to data gathered from the Women's Recovery Services database for the full population that meets the criteria described in the "Women served" section. These women have data on file at intake and closing, but may have no follow-up data.
[c] This refers to the combination of data from the Women's Recovery Services database and the six-month follow-up interviews with women who exited WRS programs.
[d] Frankel, 2016
[e] Minnesota Department of Revenue, 2019

Educational attainment

As shown in Figure A2, we compute the benefits associated with two possible forms of educational attainment: completion of a high school diploma or GED, and completion of at least some college. We estimate that, of all participants, 1.5% completed their high school diploma or (more likely) their GED between intake and six-month follow-up, while 8.9% completed at least some college. These values exclude those who were already in school at intake.

Although we are only able to document this small number of individuals with these educational gains (an unfortunate consequence of limited follow-up periods after program exit), the magnitude of education's impact on earnings is quite substantial: nearly $500,000 per person (over the rest of their career) for a high school diploma or GED, and nearly $450,000 per person for completing at least some college. Multiplying the value of these benefits by the likelihood that these educational achievements are completed, we arrive at an average per-participant benefit of $7,675 due to participants completing their high school diploma or GED and a per-participant benefit of $40,801 due to participants completing at least some college.

A2. Educational attainment

Outcome description	Likelihood of completing HS diploma or GED	Likelihood of completing at least some college
Outcome category	Earnings	Earnings
% of women who complete outcome between intake and six- or 12-mo follow-up (A)[a]	1.5%[b,c,d]	8.9%[b,c,d]
Timeline over which benefits are counted	From current age through age 65[e]	From current age through age 65[e]
Description of outcome's monetary value	Difference in earnings between those with HS diploma or GED vs those with less than HS	Difference in earnings between those with at least some college vs those with only a HS diploma or GED
Monetary value of outcome per person who achieves outcome:		
...to individuals (including participants) (B)	$408,666[f,g]	$362,601[f,g]
...to government/taxpayers (C)	$87,761[h,i]	$82,188[h,i]
...to society overall (individuals + gov't) (D)	$496,426	$444,789
Monetary value of outcome per average participant in WRS programs:		
...to individuals (including participants) (=A*B)	$6,319	$33,262
...to government/taxpayers (=A*C)	$1,356	$7,539
...to society overall (individuals + gov't) (=A*D)	$7,675	$40,801

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.

[b] This refers to data gathered from the Women's Recovery Services database for the full population that meets the criteria described in the "Women served" section. These women have data on file at intake and closing, but may have no follow-up data.

[c] This refers to the combination of data from the Women's Recovery Services database and the six-month follow-up interviews with women who exited WRS programs.

[d] This WRS data source refers to the combination of data from the WRS database and the 12-month follow-up interviews with women who exited WRS programs.

[e] Additional earnings generated by educational attainment will vary based on the number of years remaining before age 65. To improve the accuracy of our estimates, the assumed earnings impacts are based on a weighted average of education-related earnings impacts for a set of 5 different age groups.

[f] U.S. Census Bureau, 2014-2018a

[g] U.S. Census Bureau, 2014-2018b

[h] Frankel, 2016

[i] Minnesota Department of Revenue, 2019

Additional assumptions

We estimate the marginal increase in earnings associated with each type of education (HS diploma/GED and "some college"), summed over the careers of the women (through age 65), using U.S. Census Bureau data to measure income by age and education level. Because the women complete their education at different ages (and therefore have different lengths of time over which they will earn their higher income), we have stratified the group into five age categories, and assigned each individual the estimated income impact associated with the average age in their group. For example, in the 30-34 age group, the mean age of the women was 32. We estimated the lifetime impact of a HS diploma/GED for a 32-year-old, and assumed that value of income impact for each person in the 30-34 age group who completed their HS diploma/GED.

"Some college" includes any participation in associates, vocational, 4-year, or graduate education reported during the six-month or 12-month interview. This group also includes two women who had "completed education beyond high school" while in the program, as recorded at closing.

Opioid abstinence

Because the productivity losses and health care costs associated with opioid use have been quantified in a recent study (Florence et al., 2021), we have used these estimates to approximate the productivity gains and health care savings associated with opioid abstinence.[3] In using the values reported by Florence et al., we have made the following assumptions and adjustments:

- We assume that only a portion of the losses of opioid abuse can be avoided/recovered when abstinence occurs. Florence et al. reports two sets of costs of opioid abuse: nonfatal and fatal costs (representing costs of opioid abuse that do not result in death and costs of death due to opioid abuse, respectively). Costs due to fatal opioid abuse can be entirely avoided with abstinence, but some portion of the non-fatal costs may linger as the person in recovery may continue to face elevated health care costs and reduced economic productivity for a period after abstinence begins. As a result, we assume that:
  - 50% of estimated nonfatal costs can be avoided with abstinence
  - 100% of fatal costs can be avoided with abstinence
- We convert the aggregate values reported by Florence et al. into estimated costs per user and per fatality by dividing the aggregate values by the estimated numbers of users and fatalities.
- Florence et al. report criminal justice costs, but we have excluded those from our analysis, as we have separately estimated the savings due to reduced arrests. We have also excluded substance abuse costs reported by Florence et al.
- Their reported costs are per user per year. We assume that, in the absence of the program, opioid users would have continued using indefinitely. Unfortunately, with only 12 months of follow-up data for WRS participants, we cannot be certain how long the women remain abstinent (so we cannot estimate how many years of these costs would have been avoided). We estimate this value based on Weiss et al. (2015), who found that 61% of former opioid users remained abstinent 42 months after completing a treatment program.[4] We therefore assume an opioid abstinence rate of 61%, and we assume that the benefits of opioid abstinence will continue for three years.

[3] Although these productivity gains are computed based on per-capita GDP and not actual earnings, we categorize these gains as individual earnings. A portion of these productivity gains will benefit others in the economy (e.g., the woman's employer).

[4] Follow-up WRS data show that, among women for whom opioids were their primary drug of choice, 82% of women remained abstinent at six-month follow-up.

- Florence et al. also report some intangible costs associated with opioid use (the "statistical" value of the lives lost, as well as lost quality of life, both referred to as "intangible" because their economic value is never observed in a concrete way). In our effort to maintain a conservative approach to the analysis, we have not included these as potential savings. If they had been included, their estimated value per average participant in WRS programs would amount to an additional $61,846, nearly doubling the estimated benefits and the ROI.
- We assume that 75% of health care cost savings accrue to the government/taxpayers, while 25% of the savings accrue to the individual.

A3. Opioid abstinence

Outcome description	Productivity gains due to opioid abstinence	Health care savings due to opioid abstinence
Outcome category	Earnings	Avoided health care costs
Assumed % of women who remain abstinent from opioids for 3 years (A)[a]	6.0%[b,c]	6.0%[b,c]
Timeline over which benefits are counted	3 years	3 years
Description of outcome's monetary value	Increased individual earnings due to opioid abstinence	Health care cost savings due to opioid abstinence
Monetary value of outcome per person who achieves outcome:		
...to individuals (including participants) (B)	$113,225[d]	$6,068[d]
...to government/taxpayers (C)	$15,439[d]	$18,206[d]
...to society overall (individuals + gov't) (D)	$152,938	$24,274
Monetary value of outcome per average participant in WRS programs:		
...to individuals (including participants) (=A*B)	$6,793	$364
...to government/taxpayers (=A*C)	$926	$1,093
...to society overall (individuals + gov't) (=A*D)	$7,719	$1,457

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population. The numerator is the number of women who identified opioids as their primary drug of choice and were actively using at intake (9.9% of 2,847 women = 281 women), multiplied by the assumed 3-year abstinence rate of 61% for an estimated 172 of 2,847 women (6.0%) whose abstinence will be attributed to the program.

[b] This refers to data gathered from the Women's Recovery Services database for the full population that meets the criteria described in the "Women served" section. These women have data on file at intake and closing, but may have no follow-up data.

[c] Weiss et al., 2015

[d] Florence et al., 2021

Participation in parenting education

Quantifying the benefits of parenting education is somewhat simpler than the other benefits, because the Washington State Institute for Public Policy (WSIPP) has computed the benefits of the Incredible Years Parent Training program, assumed to be similar in curriculum to the parenting education offered by WRS grantees. Figure A4 lists a selection of these benefits, including only those that are not redundant with benefits captured elsewhere in our analysis.

Over the first four grant years, 43.1% of women completed an evidence-based parenting education program. We therefore assume that 43.1% of program participants receive the benefits quantified by WSIPP and reproduced (after currency conversation) in Figure A4. These benefits add up to about $5,500 per woman for those who complete a parenting education program, and average out to nearly $2,500 for the average woman in WRS programs overall.

A4. Participation in parenting education

Outcome description	Increased earnings due to parenting education	Avoided health care costs due to parenting education	Avoided education costs due to parenting education
Outcome category	Earnings	Health care cost savings	Other public savings
% of women who completed parenting education (A)[a]	43.1%[b]	43.1%[b]	43.1%[b]
Timeline over which benefits are counted	Child's career	Unclear	Unclear
Description of outcome's monetary value	Increased future earnings for child due to parent's completion of parenting education	Avoided health care costs due to reduced incidence of depression among mothers and reduced incidence of disruptive behavior disorder among children	Avoided education costs for special education and grade repetition because of reduced incidence of disruptive behavior disorder
Monetary value of outcome per person who achieves outcome:			
...to individuals (including participants) (B)	$3,452[c]	$96[c]	-
...to government/taxpayers (C)	$1,470[c]	$339[c]	$117[c]
...to society overall (individuals + gov't) (D)	$4,922	$435	$117
Monetary value of outcome per average participant in WRS programs:			
...to individuals (including participants) (=A*B)	$1,488	$41	-
...to government/taxpayers (=A*C)	$633	$146	$51
...to society overall (individuals + gov't) (=A*D)	$2,121	$187	$51

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.
[b] Wilder Research, 2021
[c] Washington State Institute for Public Policy, 2019

Avoided emergency room visits

This section focuses on the subset of women who reported at least one emergency room (ER) visit in the six months prior to intake but reported no ER visits between closing and the six-month follow-up interview. About one-quarter (27%) of women fall into this category. These women reported an average of 1.9 ER visits in the six months prior to intake.

Assuming these women would have visited the ER an average of 1.9 times over the six months since closing if not for the program, at an assumed cost of $770 per ER visit, we compute that these women avoided an average of $1,463 in ER expenditures per person (for the 27% of women who avoided ER visits that we assume would have occurred if not for the program). When we distribute these benefits across all women who exited, we estimate an avoided cost of $308 per woman served.

A5. Avoided emergency room visits

Outcome description	Avoided emergency room visits
Outcome category	Health care cost savings
% of women with 1+ ER visits in 6 months prior to intake and none between closing and six-month follow-up (A)[a]	27.0%[b,c]
Timeline over which benefits are counted	6 months
Number of reported ER visits prior to intake, per person, among those with ER visits before intake but not after closing	1.9
Assumed cost per ER visit	$770[d]
Description of outcome's monetary value	Avoided health care costs due to reduced number of ER visits compared to pre-intake
Monetary value of outcome per person who achieves outcome :	
...to individuals (including participants) (B)[e]	$366
...to government/taxpayers (C)[e]	$1,097
...to society overall (individuals + gov't) (D)	$1,463
Monetary value of outcome per average participant in WRS programs:	
...to individuals (including participants) (=A*B)[e]	$77
...to government/taxpayers (=A*C)[e]	$231
...to society overall (individuals + gov't) (=A*D)	$308

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.
[b] This refers to the combination of data from the Women's Recovery Services database and the six-month follow-up interviews with women who exited WRS programs.
[c] This refers to the combination of data from the Women's Recovery Services database and the 12-month follow-up interviews with women who exited WRS programs.
[d] Agency for Healthcare Research and Quality (AHRQ), 2020
[e] We assume that 75% of ER expenditures are covered by government/taxpayers, while 25% are covered by the individual.

Savings to the child welfare system

Involvement with Child Protection Services

One in five women (19.6%) reported ending their involvement with Child Protection Services (CPS) between intake and six-month follow-up. Based on the estimated annual state expenditures on CPS (Child Trends, 2018) and the annual number of cases in which Child Protection Services were indicated (Minnesota Department of Human Services,

2019), we estimate the annual cost per CPS case to be $13,400. We make the conservative assumption that, without WRS, a family's involvement with CPS would have begun and ended within a single year. We also assume that a family's one-year CPS costs are reduced by 30% when CPS involvement is no longer required as a result of WRS supports and interventions. We therefore estimate a potential savings of $4,020 per family that is no longer involved with CPS. When these benefits are averaged across all women receiving WRS services, we arrive at the estimated public savings of $788 per woman served.

Out-of-home placement

For every four women who exited WRS programs in years 1-4, one child was reunified with their mother prior to closing (an average rate of 0.26 reunifications per woman served). We use this as our assumed estimate of the program's impact on reunifications, although the program likely contributed to many more reunifications after the women exited.

We use the state's annual expenditures on out-of-home placement (OHP), paired with the number of children who are in OHP at any point during the year (for any length of time), to compute the average annual OHP cost per child who is placed outside their mother's home at some point during the year. We estimate this annual cost to be $12,683 per child.

We cannot be sure how much OHP cost is avoided because of the program's impacts on reunification. Some children may have remained in OHP indefinitely if not for the program, while others may have only had their placement shortened slightly. We conservatively assume that reunification results in the avoidance of 30% of the typical per-child annual costs of OHP. We count these savings for only one year; in other words, we assume that the reunified children would have been in OHP only in one year in the absence of the program (a very conservative assumption). For each child reunified with their mother, we estimate the public savings to be $3,805. Averaged across all women in the program, these public savings come to $979 per woman served.

A6. Savings to the child welfare system

Outcome description	Truncated involvement with Child Protection Services	Reunification of mother and child after out-of-home placement (OHP)
Outcome category	Reduced costs for the child welfare system	Reduced costs for the child welfare system
Rate of outcome (A)[a]	19.6%[b,c]	0.26 reunifications per woman served[d]
Timeline over which benefits are counted	1 year	1 year
Description of outcome's monetary value	Avoided CPS costs when involvement with CPS ends	Avoided OHP costs when child is reunified with mother
Monetary value of outcome per person who achieves outcome:		
...to individuals (including participants) (B)	N/A	N/A
...to government/taxpayers (C)	$4,020[e,f]	$3,805[g]
...to society overall (individuals + gov't) (D)	$4,020	$3,805
Monetary value of outcome per average participant in WRS programs:		
...to individuals (including participants) (=A*B)	N/A	N/A
...to government/taxpayers (=A*C)	$788	$979
...to society overall (individuals + gov't) (=A*D)	$788	$979

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.
[b] This refers to the combination of data from the Women's Recovery Services database and the six-month follow-up interviews with women who exited WRS programs.
[c] This refers to the combination of data from the Women's Recovery Services database and the 12-month follow-up interviews with women who exited WRS programs.
[d] Wilder Research, 2021
[e] Rosinsky et al., 2021
[f] Minnesota Department of Human Services, 2019
[g] Casey Family Programs, 2021

Avoided costs of crime

In computing the avoided costs of crime, we assume that a woman who was arrested in the 30 days prior to intake would have been arrested once in the subsequent six months if not for WRS. Additional assumptions related to avoided costs of incarceration and avoided costs to victims are discussed in the subsections below.

Incarceration costs

To compute the avoided incarceration-related costs of crime, we assume the following:

- 27% of arrests are for felony offenses (Minnesota Department of Public Safety, 2021).[5] Due to data limitations, we disregard the costs related to misdemeanor arrests.
- 62% of felony arrests lead to convictions (based on Hennepin County data showing that 69% of felony cases are charged and 90% of them are convicted).
- Of these, 68% of convictions result in jail time (average 92 days) and 24% result in prison time (average 48.4 months)(Minnesota Sentencing Guidelines Commission, 2020).
- We compute the marginal daily cost of jail time ($111) with the help of data covering the expenditures and average daily populations for each county in Minnesota. (Minnesota Department of Corrections, 2019). The marginal daily cost of prison time ($104, after adjusting for inflation) was computed and reported by the Minnesota Department of Corrections (2019).
- Combining these figures, we arrive at costs per typical jail and prison sentence ($10,212 and $153,019, respectively).
- When we factor in the probabilities of the arrest being for a felony, of charges being filed, of conviction, and of being sentenced to jail or to prison, we arrive at an incarceration-related cost per arrest of $27,052.

The reduction in arrests means that for 14.4% of women served society avoids $27,052 in incarceration costs. Averaged across all women served, this amounts to a benefit of $1,052 per person.

[5] This estimate is based on the proportion of 2018 “Part 1” arrests, relative to the total number of arrests overall, as shown in the “arrests by gender and year” tab of the Arrest Dashboard.

Costs to victims of crime

Based on estimated values of victims' costs reported by the Vermont Center for Justice Research (2014), and based on the relative proportions of different types of offenses among cases sentenced in Minnesota in 2019 (Minnesota Sentencing Guidelines Commission, 2020), we have computed a weighted average of the victims' costs for the average felony: $26,609. These costs are avoided when arrests (and the corresponding crime) are reduced, as was the case for 14.4% of women served by WRS. Averaging these gains across the full population served, we arrive at an average of $1,035 in avoided costs to victims per woman served.

A7. Avoided costs of crime

Outcome description	Avoided incarceration costs	Avoided costs for victims of crime
Outcome category	Avoided costs of crime	Avoided costs of crime
% of women who were arrested in 30 days prior to intake and *not* arrested in first six months after exit (A)[a]	14.4%[b,c]	14.4%[b,c]
Timeline over which benefits are counted	Length of average sentence for felony conviction (Jail - 92 days Prison - 48.4 months)	Victim's lifetime (in theory)
Description of outcome's monetary value	Avoided incarceration costs when fewer arrests occur	Avoid costs to victims when fewer arrests (and crimes) occur
Monetary value of outcome per avoided arrest:		
...to individuals (including participants) (B)	N/A	$26,609
...to government/taxpayers (C)	$27,052	N/A
...to society overall (individuals + gov't) (D)	$27,052	$26,609
Monetary value of outcome per average participant in WRS programs:		
...to individuals (including participants) (=A*B)	N/A	$1,035
...to government/taxpayers (=A*C)	$1,052	N/A
...to society overall (individuals + gov't) (=A*D)	$1,052	$1,035

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.
[b] This refers to the combination of data from the Women's Recovery Services database and the six-month follow-up interviews with women who exited WRS programs.
[c] This refers to the combination of data from the Women's Recovery Services database and the 12-month follow-up interviews with women who exited WRS programs.

Avoided public costs of homelessness

Approximately 12% of women were housed at six-month follow-up after being homeless for the 30 days prior to intake. We assume that the program shortened their expected duration of homelessness by 52 days, based on our conservatively low assumption that the average duration of homelessness is 82 days (author's computations using data from the 2018 Minnesota Homeless Study, as described in the notes below Figure 8) and the fact that the women had already been homeless during the 30 days prior to intake.

We estimate the public costs of homelessness using Spellman et al. (2010; details provided in the notes below Figure 8), and find that the expected savings are $17,903 per previously homeless woman who remains housed after exit. When the benefits of avoiding homelessness are spread across all women served, they average out to $2,202 per woman served by WRS programs.

Note that this analysis does not include the individual's costs of homelessness, which to our knowledge have not been quantified in the existing literature. These avoided individual costs could be substantial.

A8. Avoided costs of homelessness

Outcome description	Remaining housed six months after exit (for those who were homeless at intake)
Outcome category	Other public savings
% of women who were homeless at intake but housed at six-month follow-up (A)[a]	12.3%[b,c]
Timeline over which benefits are counted	52 days[d]
Description of outcome's monetary value	Avoided public costs associated with homelessness
Monetary value of outcome per person who achieves outcome:	
...to individuals (including participants) (B)	N/A
...to government/taxpayers (C)	$17,903[e]
...to society overall (individuals + gov't) (D)	$17,903
Monetary value of outcome per average participant in WRS programs:	
...to individuals (including participants) (=A*B)	N/A
...to government/taxpayers (=A*C)	$2,202
...to society overall (individuals + gov't) (=A*D)	$2,202

Note. Contributing data sources are indicated with superscripted numbers, with additional information shown in the "Data sources" section below. Most values are author's computations based on data from the listed sources. All reported currency values have been adjusted from published values to 2020 U.S. Dollars.

[a] Percentage of women completing outcome is based on a denominator of the full population.
[b] This refers to the combination of data from the Women's Recovery Services database and the six-month follow-up interviews with women who exited WRS programs.
[c] This refers to the combination of data from the Women's Recovery Services database and the 12-month follow-up interviews with women who exited WRS programs.
[d] Average duration of homelessness was estimated based on data from the 2018 Minnesota Homeless Study (Wilder Research, 2019). The available data on duration are limited in detail, as they are based on duration ranges (less than 1 month, 1-12 months, 12+ months). We assumed a single value for each category (10 days, 65 days, 366 days), and used the single-night values and duration estimates to extrapolate the number of homeless individuals in each category in a given year. We combined these figures to compute the average duration of homelessness: 82 days. We then subtract the 30 days of homelessness that we assume have already occurred at the time of intake.
[e] This value is based on the simple average of the following estimates of the public costs of homelessness from Spellman et al. (2010), Exhibit 4: costs for individuals in Houston, individuals in Des Moines, families in Kalamazoo, and families in Houston (the populations and locations that were most comparable to the population of interest for this study). The monthly cost estimates provided by this source were then converted to the costs of a 52-day period to align with the assumed duration of homelessness avoided.

Program costs

The program costs are the estimated annual average of all funds dedicated to WRS programs by the 12 WRS grantees during years 1-4 of the 5-year grant cycle (to be consistent with the time frame for the estimated benefits). They include the annual average of WRS grant funds ($4.4 million), combined with the annual average of funds that grantees raised from other sources ($8 million).

A9. Program costs

Funding source	Estimated cost
Annual WRS grant costs[a]	$4,423,000
Additional funds raised annually by grantees	$7,989,000
Total annual program costs (estimated)	$12,412,000

[a] This includes the 2-year State Targeted Response (STR) grants averaged over five years to create an annual estimate of cost.

Limitations

The key limitations to this analysis can be distilled down to two countervailing factors:

- The analysis credits the program with all measured positive changes (within the monetizeable set of outcomes) that occurred between intake and the six-month follow-up interview. The program may not have been the cause of all of these positive changes.
- The analysis includes the monetary value of only a subset of the benefits of WRS programs. Numerous other benefits most certainly exist, and may be quite large.

We cannot be certain how the impacts of these two limitations compare to one another. We contend that the former would likely be entirely offset by the latter, and then some. That is, the potential value of overstated benefits may be much smaller than the value of benefits that could not be captured, because the latter is effectively unbounded.

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