Return on Investment in Women's Recovery Services in Minnesota

An Initiative of the Minnesota Department of Human Services Alcohol and Drug Abuse Division (ADAD)

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Prepared by: Jose Y. Diaz

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Acknowledgments

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Wilder Research staff contributors include: Monica Idzelis Rothe, Rebecca Schultz, Michelle Decker Gerrard, and Richard Chase.

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Summary

This study demonstrates the economic value of the five-year Women's Recovery Services initiative, funded by the Minnesota Department of Human Services Alcohol and Drug Abuse Division (ADAD), which provides comprehensive, gender-specific, family-centered treatment support and recovery services for pregnant and parenting women who have substance use disorders, and their families. The 10 programs served a total of 951 clients with 1,931 children in year four, the basis for this study. A separate outcomes report provides a full description of clients and outcomes.

Conservative estimates detailed in this report show that the benefits generated by these programs providing Women's Recovery Services will add up to $22.8 million over the lifetime of participants. The investment required to generate these benefits totals $5.5 million, for a return of $4.17 for every dollar spent on the program. When comparing the ADAD grant of $4 million to the $4.5 million in benefits to taxpayers, the direct return of the state grant is $1.13 for every dollar spent.

	Society
Benefits	$22.8 million
Costs	$5.5 million
Return on Investment (benefits/cost)	**$4.17***

* ROI is rounded dollars

Benefits come from the following improved outcomes:

	Benefits to society (millions)
The value of increased personal earnings (after tax)	$18.3
The value of increased tax revenues	$2.0
Savings from reduced emergency room visits and hospitalizations	$1.4
Savings from reduced child welfare costs	$1.1
Savings from reduced crime	$0.03
Total benefits	**$22.8**

Introduction

This study demonstrates the economic value of the Women's Recovery Services grant funded by the Minnesota Department of Human Services, Alcohol and Drug Abuse Division (ADAD). The initiative includes 10 grantees across Minnesota providing treatment support and recovery services for pregnant and parenting women who have substance use disorders, and their families. Through this initiative, known as Women's Recovery Services, grantees provide comprehensive, gender-specific, family-centered services for the clients in their care. Women's Recovery Services is a five-year initiative (July 2011-June 2016). This Return on Investment (ROI) was computed using Year 4 findings (June 2014-May 2015).

General methods and definitions

Wilder Research economists place the outcomes generated by the programs funded through the Women's Recovery Services initiative in a cost-benefit framework for defensibly measuring the Return on Investment (ROI) in this type of intervention. The cost-benefit analysis consists of estimating the economic benefits of the program and comparing them to the investment made by society. We consider the costs and benefits from the perspective of the whole society, which includes: participants, taxpayers or government, and other groups or individuals, such as foundations and donors.

In this framework, we assess only the economic benefits of a subset of outcomes, following two criteria: 1) the impact of the program on the outcome is reasonably well-measured in the outcomes report, usually by comparing results for a matched group of clients at time of entry, exit, and/or follow-up; and 2) sufficient information is available to monetize the outcome (for example, per diem cost of incarceration in Minnesota is available). The benefits included in this ROI are:

- The value of increased personal earnings
- Savings from reduced child welfare costs
- The value of increased tax revenues
- Savings from reduced crime
- Savings from reduced emergency room visits and hospitalizations

The costs, or the amount invested by society to generate these benefits, come primarily from the Women's Recovery Services grant. However, we also incorporated costs associated with other private and public funds that are used to serve participants in the programs.

The value of the benefits is divided by the value of the costs to compute the return on investment ratio. The ROI ratio is expressed as the dollar amount that society receives in return for every dollar invested in the grant. A ROI number that is greater than "$1" implies that the benefits of the program are greater than its cost.

The ROI estimates are based on program outcomes assessed during the period June 2014 through May 2015.[1] Outcomes reported during this period include comparisons between program entry and exit and follow-up surveys at 6 and 12 months.

We compute the monetary benefits per-participant using the sample of respondents for each outcome included in the ROI. We then compute the total benefits of the program by multiplying the per-participant benefits by the 631 women who exited the program ("closed cases"[2]) during the period studied.

The number of participants used in the per-participant computations varies by outcome. In some cases, the sample of respondents was relatively small; thus, interpretation of findings (per-participant and total benefits) should be considered in light of potential limitations around the evaluation, including missing or inaccurate data, program model differences among the grantees, and small sample sizes, in some cases. In the same fashion, the extrapolation to obtain total benefits is not based on statistical inference. This incorporates a degree of uncertainty in the total benefits and the final ROI. To account for the potential bias of the results (especially an overestimation of the true impact of the program), we compute a sensitivity analysis to show how robust results are to changes in the impact of the program. The sensitivity analysis shows that the ROI results remain positive even when the impact of the program is overestimated.

The ROI results refers to a one-year investment in the program compared to benefits that occur within 12 months of exiting the program, except for the earnings associated with increased education, which span the working life of participants (to age 65).

Detailed procedures and assumptions are summarized in the Appendix of this report.

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1 Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings. Retrieved from http://www.wilder.org/Wilder-Research/Publications/Studies/Women's Recovery Services/Women's Recovery Services in Minnesota - Year Four Findings, Full Report.pdf

2 Closed cases include participants who received services after intake and were open 15 or more days during the period from June 2014 through May 2015.

Benefits

The evaluation of the Women's Recovery Services initiative found it had a positive impact on several social outcomes including: reduced substance abuse, improved health, family stability, stable housing, and progress in other areas of social and personal life.[3] Most of these outcomes have economic consequences for society. For instance, sober participants are less likely to commit crimes, generating savings to the justice system associated with reduced arrests and incarceration costs. In addition, participants in recovery are more likely to find and retain jobs. They may also have more stable families, reducing costs associated with child welfare.

Figure 1 shows the total economic benefits to society generated by the Women's Recovery grant activities from June 2014 through May 2015. The total benefit reaches $22.8 million. About 80 percent of these benefits ($18.3 million) come from increased personal earnings from improved employment and education of participants. Taxpayers accrue $4.5 million in benefits or 20 percent of the total benefits.

1. Economic benefits to society

	Benefits to society (millions)
The value of increased personal earnings (after tax)	$18.3
The value of increased tax revenues	$2.0
Savings from reduced emergency room visits and hospitalizations	$1.4
Savings from reduced child welfare costs	$1.1
Savings from reduced crime	$0.03
Total benefits	**$22.8**

The details for each benefit are shown in Figures 2-7 below.

[3] Wilder Research (2016). *Women's Recovery Services in Minnesota: Year Four Findings*. Retrieved from http://www.wilder.org/Wilder-Research/Publications/Studies/Women's **Recovery** Services/Women's **Recovery** Services in Minnesota - Year Four Findings, Full Report.pdf

The value of increased personal earnings and tax revenues

The largest economic benefit of the initiative is the increase in participants' earnings and tax contributions. We estimate the additional personal earnings of participants from two sources: short-term earnings from employment and long-term earnings derived from increased educational achievement.

Earnings from increased number of employed participants

Wilder Research collected employment data for 70 participants from program entry to 12 months after exit.[4] The number of people employed increased 30 percentage points (Figure A1). These women worked an average of 31 hours per week for 13.5 months. Based on the increased number of employed women in this group and assuming that they earn at least minimum wage, their annual per person income would be $7,729. Based on the results from this sample, we estimate that additional expected earnings for the 631 closed participants would total $4.9 million within 12 months after participating in the program.

Increased educational level

A small proportion of participants was also more likely to enroll in school and obtain academic degrees after exiting the program. This educational achievement will raise the expected future earnings of those participants for the rest of their working lives.[5]

For program participants, the increased probability of obtaining a GED/high school diploma is about 6 percent, and for the increased probability of attending college or earning an associate's degree is about 1 percent. Earning a bachelor's degree after the 12-month follow-up period is less likely, with only a 0.1 chance (Figure 2; see also Figures A2 and A3 in the Appendix for detailed parameters and computations). However, note that the one-year follow-up period after exiting the program may not be long enough to accurately measure the likelihood of earning these degrees; therefore, these probabilities may underestimate the true impact of the program, especially for those who have only had the chance to enroll in school but not to finish their training.

The expected additional lifetime earnings associated with increased educational achievement average $24,456 per participant. For the 631 clients who exited the program in Year 4, the total expected future earnings from increased education total $15.4 million.

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4 See Figure 39 in Wilder Research (2016). *Women's Recovery Services in Minnesota: Year Four Findings*.

5 Lifetime earnings are estimated from age of entry into program to age 65. Totals are net present values discounted at a 3 percent rate.

2. Additional personal earnings from increased education

	High school diploma/GED	Some college, or certificate	Associate's degree	Bachelor's degree	Per participant lifetime earnings*
Increased probability of educational achievement (N=179)	6.2%	1.0%	1.1%	0.1%	
Expected future earnings per participant	$14,407	$2,865	$6,224	$960	$24,456

* Total per person earnings is the weighted average lifetime earnings by participant's age times the increased likelihood of earning a degree. See Figures A2 and A3 in the Appendix for details.

Total earnings and taxes

The earnings from short term employment and additional education reach $32,185 per participant, and total $20.3 million for the 631 closed participants.

Taxes are estimated using the total additional earnings and the effective tax rates for each corresponding income level as reported by the Minnesota Department of Revenue for income taxes (local, state, and federal) and sales and property taxes.[6] The total additional tax revenues associated with the increased personal earnings are $2 million. After taxes, the total earnings associated with the 631 closed cases could reach $18.3 million 12 months after finishing the program (Figure 3).

3. Additional personal earnings from increased education and employment

	Employment (12 months)	Education (Working lifetime)	Total
Per participant earnings	$7,729	$24,456	$32,185
Total expected earnings (N=631)	$4,876,869	$15,431,912	$20,308,781
Total taxes from additional earnings (N=631)	$468,179	$1,525,472	$1,993,651
After tax earnings (Earnings minus taxes)	$4,408,690	$13,906,440	$18,315,130

[6] Minnesota Department of Revenue. *2015 Tax Incidence Study*. Retrieved from http://www.revenue.state.mn.us/research_stats/Pages/Tax_Incidence_Studies.aspx

Savings from reduced child welfare costs (foster care)

By program exit, 112 children were reunited with their mothers after a formal placement.[7] Assuming that these children would have had to remain in foster care, taxpayers would have paid $10,112 per child. The total avoided costs of foster care for the 112 reunited children totals $1.1 million.[8] [9]

Savings from reduced emergency room visits and hospitalizations

During the six months prior to exiting the program compared with the six months prior to entering the program, 162 clients did not have a visit to the emergency room.[10] Participants averaged 2.08 visits during these periods, thus the number of avoided visits totals 337. The average expense in emergency room visits in the Midwest area is $1,451.[11] Therefore, the total avoided costs associated with these avoided emergency room visits is $488,929 (Figure 4).

Similarly, two clients avoided hospitalizations after entering the program.[12] The average expense in hospital inpatient services per person for stays longer than four days in the U.S. is $18,816.[13] Assuming only one hospitalization of about 6.5 days per participant during the six-month period, we estimate the potential savings from avoided hospitalizations to reach $37,632.

In addition, for those who were hospitalized, they tend to spend nearly three fewer days hospitalized after entering the program than before the program. There were 141 women with a hospitalization during the six months prior to closing. The average duration of these hospitalizations was 3.3 days compared to the 6.5 days average stay at intake. The cost of these shorter stays is $5,985 less than for stays that last more than four days.[14] The savings from shorter hospitalizations reach $843,885.

The total savings from avoided health care costs totals $1.37 million.

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7 See Figure A61 in Wilder Research (2016). *Women's Recovery Services in Minnesota: Year Four Findings*.

8 These savings assume average monthly payments per child in foster care in Minnesota of $585, and an average stay in foster care of 26.7 months minus assumed 12 months of time already spent in out of home placement.

9 There are also potential savings from reduced child abuse and neglect cases. However, we do not have sufficient information to compute this benefit at this time.

10, 12 See Figures A58c and A58d in Wilder Research (2016). *Women's Recovery Services in Minnesota: Year Four Findings*.

11, 13, 14 Center for Financing, Access and Cost Trends, Agency for Healthcare Research and Quality (2013). *Medical Expenditure Panel Survey*. Retrieved from https://meps.ahrq.gov/mepsweb/37632+

4. Savings from reduced health care costs (6 months)

Avoided emergency room costs	$488,929
Avoided hospitalizations costs (avoided and shorter hospitalizations)	$881,517
Total savings from reduced health care costs	$1,370,446

Savings from reduced crime

Benefits from reduced crime come from two sources: savings to the justice system from reduced incarcerations costs and from reduced losses to victims of crime.

To estimate the avoided cost of incarceration, we start with the reduced involvement with the criminal justice system that participants experienced in the 12 months after exiting the program. Not all cases involved with the justice system result in incarcerations. Thus, we should only include in the ROI the reduced number of incarcerations. We know that 42 percent of clients were arrested in the 12 months after leaving the program (n=179). Of those arrested, 57 percent (n=42) were charged with crimes or violations of a law, and 67 percent of those charged became incarcerated (n=24), (Figure 5).[12] The resulting expected chance of an incarceration from all who have been arrested is 0.09 (24% x 57% x 67%). The overall average reduction in involvement is 4 percent from intake to the 12-month follow-up survey (Figure 6).[13] If we multiply the number of the expected chance of an arrest resulting in an incarceration (0.09) by the impact of the program on reducing contact with the justice system (4%), we obtain the reduced chance of an incarceration associated with the program (-0.004).

5. Figures used to calculate reduced cost of criminal justice involvement

Clients arrested (N=179)	Clients charged (N=42)	Clients incarcerated (N=24)	Expected chance of incarceration	Reduced chance of incarceration due to program*
42 (24%)	24 (57%)	16 (67%)	0.09	-0.004

* Reduced arrests refer to follow-up data at 12 months.

[12] See Figures E33, E34, and E35 in Wilder Research (2016). *Women's Recovery Services in Minnesota: Year Four Findings*.

[13] Note that for this statistic the sample size is small (N=100). This is also the case for the other crime statistics used in this section. Thus, caution should be used when analyzing this result. We implement a sensitivity analysis to account for this type of limitation in the data and other uncertainties in the calculations.

6. Other figures used to calculate reduced cost of criminal justice involvement

	Intake	Closing	12-month	Average impact
Involvement with criminal justice system (N=100)	39%	33%	37%	
Change compared to intake		-6%	-2%	-4%

Source. Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings. Figure 42

To determine the dollar value of the expected reduced incarcerations, we multiply 0.004 by the average number of times clients were charged (1.7), and the average number of days spent in jail (31), and the daily cost of incarceration (jail) in Minnesota ($126). Using these statistics, we determine that the expected value of avoided incarcerations for these avoided incarcerations is $11,544.[14] Potential victims of these crimes would avoid losses in the order of $15,424 (Figure 7). These savings include tangible and intangible losses.[15] The total savings associated with reduced crime are $26,968.

7. Savings from reduced crime (12 months)

Savings to the justice system (incarceration)	$11,544
Saving to victims	$15,424
Total	**$26,968**

[14] See Figure 15 in the Appendix for sources of data and detailed procedures.

[15] We use estimations of victims' costs from Vermont Center for Justice (2014). *Criminal Justice Consensus Cost-Benefit Working Group, Final Report*. Retrieved from http://www.leg.state.vt.us/reports/2014ExternalReports/301407.pdf. In this report authors follow a standard method for estimating tangible and intangible costs developed by McCollister, French & Fang (2010). The Cost of Crime To Society. *Drug and Alcohol Dependence* 108: 98-109.

Costs

The costs portion of the ROI consists of the cash value of all resources invested in the services. Taxpayers (or government) finance the Women's Recovery Services through a grant from the Minnesota Department of Human Services Alcohol and Drug Abuse Division (ADAD) with funds from a federal block grant. During the period from July 2014 to June 2015, $4 million in funding was awarded to 10 organizations across Minnesota.

The ADAD grant does not cover all the costs of providing services to participants. Providers also use private donations and grants (in-kind or in cash) and other subsidies to cover the full cost of services. These secondary sources add up to about $1.5 million or 28 percent of the total costs of services (Figure 8).

The total costs associated with the grant, then, amount to $5.5 million.

8. Costs for one year of Women's Recovery Initiative programming

	Cost (millions)
Grant funds*	$4.0
Other sources**	$1.5
Total costs* **	**$5.5**

* Federal funding

** Other sources

*** Society

Return on investment

To compute the return on investment ratio, the value of the benefits is divided by the value of the costs. An ROI equal to one indicates that benefits and costs are equal, or that the program is breaking even. An ROI of greater than one indicates that benefits are greater than costs, and, therefore, the program is generating enough economic benefits to cover the required investment and also add economic value to society.

The total estimated benefits for society associated with the Women's Recovery Services initiative reach $22.8 million for participants during year 4 of the program. About 80 percent of these benefits come from additional earnings of participants from increased employment and education. Taxpayers accrue benefits from increased taxes ($2 million), reduced health care costs ($1.4 million), reduced child welfare ($1.1 million), and reduced crime ($11,544). The rest of society also benefits from avoided costs to victims of crime ($15,424). Most of these benefits occurred during the year after participants exited the program; however, personal earnings from increased education will accumulate over the working life of participants.

The investment required to generate these benefits is $5.5 million per year. The return to society for every dollar invested in the Women's Recovery Services initiative, then, is $4.17 (Figure 9). Most of these returns are accrued by participants via benefits from increased earnings over their lifetime; taxpayers' returns are accrued within a year of participation[16]. The net benefit (benefits minus costs) equals $17.4 million.

9. Return on investment

	Society	Participants	Taxpayers
Benefits	$22.8 million	$18.3 million	$4.5 million
Costs	$5.5 million	$2.0 million	$5.1 million
Return on every dollar invested* (benefits divided by cost)	**$4.17**	**$9.19**	**$0.88**

* ROI is rounded. Returns are for one year of investment generating benefits that span from 12 months after exit to lifetime of participants. Note that costs to society are not the sum of participants' and taxpayers' costs since participants' cost include taxes paid.

[16] See next section for breakeven analysis for taxpayers.

Participants gain the highest return with a ROI of $9.19 and accrue total benefits of around $18.3 million, or about $29,000 per participant from increased earnings.[17] This was expected due to the redistributive nature of the program and low direct costs paid by participants.

Taxpayers invest $5.1 million through the ADAD grant and other subsidies[18], and receive direct benefits in the order of $4.5 million from: increased taxes ($2 million), reduced child welfare costs (1.4 million), reduced health care costs ($1.4), and savings in the criminal justice system ($11,544). The direct return to taxpayers is $0.88 per every dollar invested in the program.

Break-even analysis for taxpayers

When comparing the ADAD grant of $4 million to the $4.5 million in benefits to taxpayers, the direct return of the federal grant is $1.13. This implies that from the perspective of the federal government, the grant is generating 13 cents of benefits over every grant dollar invested. That is, the Women's Recovery initiative is generating enough benefits to taxpayers to cover the direct investment via the ADAD grant.

The providers still require an additional investment of $1.5 million to deliver services associated with the grant. About 75 percent of this amount comes from other public sources. This implies that about $1.1 million in taxpayers' money is not covered by the short-term benefits generated by the program. Note, however, that some benefits accrued by taxpayers will materialize years after participants exit the program. For instance, participants will be less likely to commit crimes in the future, and those with improved health will continue to avoid emergency rooms and hospitalizations. If we assume that a third of the benefits from reduced health care and crime will occur each year in the future, it will take between two and three years for taxpayers to recover the $1.1 required additional investment.

[17] The only cost to participants included is the taxes paid from additional earnings. There may be other costs accrued by participants such as increased health care costs paid out of pocket, educational costs (tuition and room and board) for those obtaining additional education, and other non-identified opportunity costs. These costs may reduce the participants' ROI as well as society's ROI, but we do not expect that the ROI would be affected significantly. There may be other benefits accrue by participants that are not accounted for in this analysis due to lack of data and evidence; for instance, savings from reduced mortality and other long-term benefits from improved health and reduced addiction.

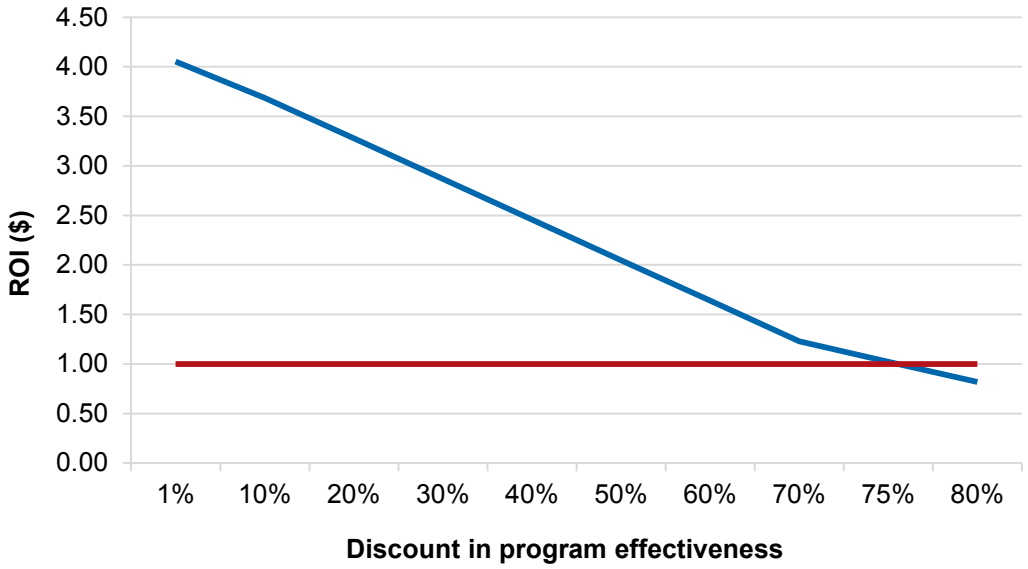
[18] We assume that about 75% of funds from other sources of financing these programs come from public funds.

Sensitivity analysis

Throughout this analysis, we have computed benefits based on changes in outcomes measured using data collected about or from participants at program intake, closing, and at follow-up periods of 6 and 12 months after program exit. However, the representativeness of these measurements may be affected by small sample sizes and other methodological limitations as described in the outcomes report. This implies that the impact of the program is estimated with some level of error, and that the ROI is potentially overestimated.

For this reason, we conduct a sensitivity analysis to show how the ROI would vary when the effectiveness of the program is measured with error (overestimated). Figure 10 shows the ROI associated with different hypothetical levels of effectiveness of the program. By effectiveness of the program, we imply the relative change in an outcome associated with participation in the program. For example, in our estimation of additional earnings, we estimate that participants are 30 percentage points more likely to find jobs during the period studied. The levels of discount shown in the horizontal axis in Figure 10 show hypothetical situations in which participants could be 1 to 80 percent less likely to find a job. In the vertical axis, we show the respective return on investment for each level of effectiveness of the program.

10. Sensitivity of ROI to reduced program effectiveness



The ROI is close to break-even (ROI=1) when the program is only 25 percent as effective as currently measured in this report (a 75% discount). This implies that the ROI will remain positive within a range of 75 percent below the level of the impact parameters used throughout this report. In other words, with regard to employment, the sensitivity analysis shows that participants would have to be less than 7.5 percent more likely to find jobs for the ROI to become negative.

We conclude that the ROI estimation is fairly resilient to changes in the impact of the program on outcomes. Therefore, the likelihood is very small that any errors of measurements from the study's limitations would reverse the positive ROI.

Conclusions

From the comparison of costs and benefits associated with the Women's Recovery grant, we conclude that the positive returns to society make the initiative a worthwhile public investment. That is, the economic resources devoted by society in these programs generate monetary benefits that surpass the costs of this investment. Moreover, the relatively low investment also likely produces positive impacts in many other sectors of society where benefits cannot be easily monetized. The ADAD grant is recovered within a year of the investment; however, the remaining non-ADAD public funds investment will require less than three years to be recovered.

These estimates are conservative in the sense that the benefits are estimated only for short-term outcomes; thus, we may be underestimating the benefits of the program in the future. Other benefits are also estimated conservatively; for instance, crime costs have been limited to incarceration costs, while law enforcement and court system costs have not been included. These costs may add at least 40 percent to the cost of incarcerations. In addition, second generation benefits may also be underestimated since we are not counting potential benefits from reunited families and some health care savings related to future generations of children whose mothers are sober. Furthermore, in many cases, the recovery services will increase the life expectancy of participants. The positive consequences of increasing the chances of survival of a person may be significant, and thus we think that the ROI for the Women's Recovery Services Initiative is conservative.

Appendix

General methods

The ROI is computed following the formula:

$$ROI = \frac{Sum\ of\ benefits\ from\ all\ outcomes}{Total\ investment\ in\ programs}$$

In general, the formula to compute the benefits is:

$$Benefit_{Out1} = \%Impact_{Out1} \times Units_{Out1} \times \$Resource_{Out1} \times \#Clients$$

Where the total benefits from outcome 1 equals the relative impact of the program on the outcome, times the number of units of the resources affected by the outcome, times the monetary value of the resources affected by the outcome. Finally, the result is multiplied by the 631 closed clients (see sections below for detail procedures and actual computations for each outcome).

Most benefits included in this ROI occur during the time covered by the study. That is, between 5 and 17 months (average time in program + up to 12 months after exit). Longer-term benefits are not estimated. Net present values are computed whenever benefits and costs occur over a period longer than two years (mainly for lifetime earnings from increased educational attainment).

The total investment in the program consists of the total grant disbursement for the period studied plus the funds from other sources used by the programs to provide services to clients of the Women's Recovery Services initiative.

Computation of additional earnings from employment

$$Total\ additional\ earnings\ from\ employment$$
$$= \%Impact \times Total\ person's\ earnings$$
$$\times\ Average\ gain\ in\ personal\ earnings\ of\ former\ users\ vs.\ current\ disordered\ users$$
$$\times\ 631\ total\ closed\ participants$$

Where,

% Impact = 49% - 19%= 30%, from Figure 10.

$$Total\ person's\ earnings\ = Worked\ weeks \times$$
$$mean\ num.\ of\ hours\ worked\ per\ week \times asummed\ minimum\ wage$$

A1. Employment parameters

Employed at intake*	19%
Employed at 12-month follow-up*	49%
Worked hours (12-month follow up)	1807.65
Worked weeks (12-month follow up)	58.5
Assumed minimum wage	$9
Number of hours worked per week in last month (mean)**	30.9
Average gain in labor market earnings for former vs current disordered users, lognormal probability density distribution parameters***	-1.58

* Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings. Figure 39

** Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings. Figure E15

*** Washington State Institute for Public Policy (2016). Benefit-Cost Technical Documentation. http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf Exhibit 4.50

Computation of additional earnings from increased educational achievement

$$Total\ lifetime\ earnings\ from\ education = Impact\ of\ program\ on\ prob.of\ educational\ achievement \times Lifetime\ earnings\ per\ person\ \times 631\ part.$$

Lifetime earnings per person is the sum of the weighted average impact of the program on earnings (sum from last row in Figure A2). The weights used to compute the average are the age of participants at intake. The earnings data in Figure A2 is computed from United States Census data on earnings in Minnesota by age and educational attainment. We follow the Washington State Institute of Public Policy procedures to compute lifetime earnings.[19]

A2. Lifetime earnings per person by educational achievement

		Additional lifetime earnings			
Average age at intake	%	High school/GED	Some college, or certificate	Associate's degree	Bachelor's degree
17	0.1%	$278,058	$373,549	$681,080	$1,196,241
21	24%	$296,766	$414,339	$754,357	$1,346,380
30	54%	$203,346	$243,868	$487,032	$970,248
42	21%	$242,374	$290,485	$545,207	$1,095,916
57	1%	$82,014	$100,315	$183,056	$311,458
Weighted average impact of program on earnings		$14,407	$2,865	$6,224	$960

[19] Technical appendix: http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf

The impact of the program on the probability of earning a particular degree is computed using:

$$\textbf{Program Impact on } \frac{\textbf{HS}}{\textbf{GED}} = \%No\ education\ at\ closing \times \%Additional\ education\ at\ 12\ month\ follow\ up \times \%Obtained\ HighSchool\ diploma\ or\ GED\ at\ 12\ month\ follow\ up$$

$$\textbf{Program Impact on some college or certificate} = \%At\ least\ HS\ or\ GED\ at\ closing \times \%Additional\ education\ at\ 12\ month\ follow\ up \times \%Obtained\ some\ college\ or\ professional\ certificate\ at\ 12\ month\ follow\ up$$

$$\textbf{Program Impact on associate degree} = \%At\ least\ HS\ or\ GED\ at\ closing \times \%Additional\ education\ at\ 12\ month\ follow\ up \times \%Obtained\ associate\ degree\ at\ 12\ month\ follow\ up$$

$$\textbf{Program Impact on four year degree} = \%At\ least\ HS\ or\ GED\ at\ closing \times \%Additional\ education\ at\ 12\ month\ follow\ up \times \%Obtained\ 4\ year\ college\ degree\ at\ 12\ month\ follow\ up$$

A3. Educational parameters

No additional education at closing	88%
Additional education at 12-month follow up	37%
Obtained HS/GED at 12-month follow up	19%
Probability of HS/GED at 12-month follow up	6.2%
At least high school or GED at closing	12%
Some college or prof. certificate	22%
Probability of some college, or certificate at 12-month follow up	1.0%
Associate's degree at 12-month follow up	25%
Probability of associate's degree at 12-month follow up	1.1%
4-year degree at 12-month follow up	2%
Probability of 4-year degree at 12-month follow up	0.1%

Note. Source of outcome parameters: Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings. Figure A50c

Computations of savings from reduced child welfare

A4. Child welfare parameters

Incidence of out-of-home care*	0.08
Adjusted (up) incidence due to high risk population served	0.145
Average stay (Assumes 26.7 months of average stay minus 12 month of time already spent in OHP)	1.23
Assumed monthly payments per child in MN**	$585
Estimated annual payments per child in MN**	$7,020
Present value additional payment	$8,321
Life time cost of foster care	$10,112

* Children and Family Services (August 2011).*Minnesota's Child Welfare Report 2010 Report to the 2011 Minnesota Legislature August 2011*. https://edocs.dhs.state.mn.us/lfserver/Public/DHS-5408C-ENG

** *Children's rights (n/d). HITTING THE M.A.R.C. Establishing Foster Care Minimum Adequate Rates for Children.* http://www.childrensrights.org/wp-content/uploads/2008/08/mn.pdf

Computations of savings from reduced crime

Reduced incarcerations

$$Savings\ from\ reduced\ crime\ =$$
$$\%Change\ in\ involvement\ with\ criminal\ justice\ system\ \times$$
$$\%Client\ has\ been\ arrested\ \times Marginal\ daily\ cost\ of\ jail\ incarceration\ MN\ \times$$
$$\%Client\ has\ been\ charged\ with\ any\ crimes\ or\ violations\ of\ a\ law\ since\ leaving\ the\ program\ \times$$
$$Mean\ Num,of\ times\ charged\ \times \%Incarcerated\ of\ those\ charged\ \times$$
$$Mean\ time\ spent\ incacerated\ \times Num.Closed\ participants$$

Where,

% Change in involvement with criminal justice system = 4 percent (see Figure 6).

Marginal daily cost of jail incarceration in Minnesota computed by regressing total expenditure by institution in Minnesota during 2009 on average daily populations (ADP). 2015 dollars. Data available at: http://www.doc.state.mn.us/pages/files/8913/8142/3580/MCORP_Evaluation_Final_DOC_Website.pdf

A5. Parameters used in the computation of reduction of crime

Outcomes measured at 12-month follow-up	
Client has been arrested for any reason since leaving the program (N=179)*	24%
Client has been charged with any crimes or violations of a law since leaving the program (N=42)**	57%
Mean number of times charged (Of those charged, N=24)**	1.7%
Clients incarcerated since leaving the program (N=24)***	67%
Mean time spent incarcerated (days) (N=16)**	30.8%

Source. Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings.

* Figure E33

** Figure E34

*** Figure E35

Computation of savings from reduced emergency room visits and hospitalizations

A6. Savings from reduced emergency room visits (ER)

	Parameter	Value	Computation
(1)	Any ER visits in the six months prior to intake?*	284	
(2)	Any ER visits in the six months prior to closing?**	122	
(3)	Reduced number of clients with ER visits	162	(1)-(2)
(4)	Average number of ER visits***	2.08	
(5)	Total number of ER visits avoided	337	(3) x (4)
(6)	Average expense in ER per person in the Midwest is $1,451	1,451	
	Total avoided ER costs	488,929	(6) x (5)

Source. Wilder Research (2016). Women's Recovery Services in Minnesota: Year Four Findings.

* A58b

** A58d

*** *A58c*

A7. Savings from reduced hospitalizations

	Parameter	Value	Computation
(1)	Any hospitalization in the six months prior to intake?*	143	
(2)	Any hospitalization in the six months prior to closing?**	141	
(3)	Reduced number of clients with hospitalization	2	(2)-(1)
(4)	Assumed number of hospitalizations per person for the period***	1	
(5)	Average expense in hospitalizations per person in the Midwest is $1,451****	1,451	
(6)	Total avoided hospitalization costs	2,902	(4) x (5)

* A58c

** A58f

*** Assumed

**** Center for Financing, Access and Cost Trends, Agency for Healthcare Research and Quality: Medical Expenditure Panel Survey, 2013.