

Economic Benefits of the Triangle Residential Options for Substance Abusers (TROSA) Program to the State of North Carolina

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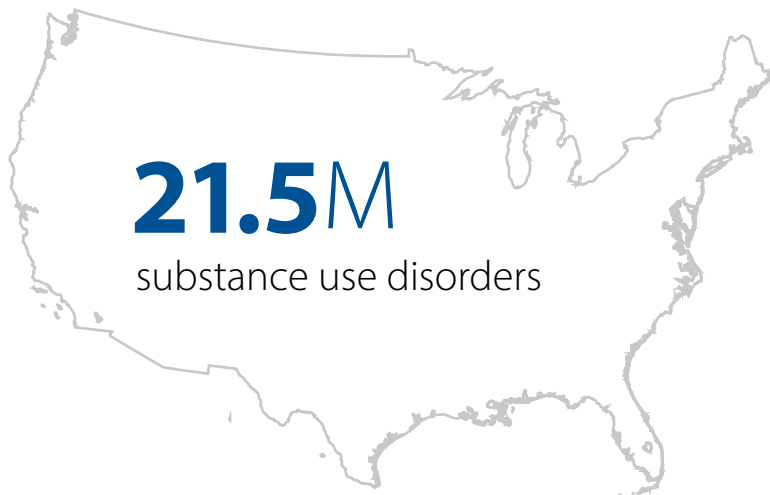
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Substance abuse and dependence can be disabling disorders that are often associated with criminalized behaviors and justice system interaction (National Drug Intelligence Center, 2011). In 2014, approximately 21.5 million people aged 12 years or older in the United States had substance use disorders in the past year (Substance Abuse and Mental Health Services Administration, 2015).

Research provides some support for the effectiveness and associated cost savings associated with treatment (Sasso, Byro, Jason, Ferrari, & Olson, 2012; Zarkin et al., 2012). However, without targeted research, the impacts of specific treatment program are unknown. This study examines the economic benefits of Triangle Residential Options for Substance Abusers (TROSAs), a comprehensive residential substance abuse recovery program located in Durham, North Carolina. This study was conducted without charge by RTI International at the request of TROSA, which wished to have an independent estimate of any benefits to North Carolina that accrue because of the availability of their program.

TROSA Savings to North Carolina

- Total 12-month savings of more than \$7.4 million, mostly from reduced arrests and incarcerations
- 12-month savings of \$17,496 per resident

TROSA has provided substance abuse treatment and job training to thousands of residents since 1994. TROSA's services include providing housing, food, clothing, counseling, health care, vocational training, and continuing care. TROSA residents do not pay for their stay, but do participate in a variety of roles, including in TROSA's administrative offices or income-generating businesses (moving and storage, lawn care, thrift stores, and Christmas tree lots). These jobs provide vocational training as well as life skills, such as time management, while supporting the program.





50%
growth

87%
NC residents

85%
male

Since 2008, TROSA's capacity has grown more than 50% to more than 500 beds. TROSA receives between 90 and 120 calls per day from individuals interested in the program (TROSA, 2017). In 2015, TROSA implemented a waitlist for its services for the first time in over a decade. Of the TROSA residents who entered the program in 2016, most were North Carolina residents (87%) and male (85%); the average age was 34.

To estimate savings, RTI researchers surveyed TROSA residents to identify criminal justice, health system, and homelessness experiences in the 12 months prior to entering the program; identified economic cost measures from the literature; and analyzed administrative data collected by TROSA to identify criminal justice and health costs during a 12-month period in the program. (A more extensive description of methods is included in the appendix.) Total savings for North Carolina exceeded \$7.4 million. The largest savings were derived from reduced criminal justice system costs, but benefits were also observed for health care. The estimates are conservative and compare costs for a TROSA population during the 12-month period before entering the program and the 12-month period after entering the program.

Criminal Justice Costs

Criminal justice costs were estimated by summing the estimated costs of arrests, incarceration, and probation or parole. Residents reported nearly 2.5 arrests, on average, in the 12 months prior to admission to TROSA (Table 1). Assuming that an arrest costs about \$1,402, then total arrests cost about \$3,478 per person or a total of about \$1.5 million. Residents also reported spending an average of about 118 days in jail during the 12 months prior to TROSA admission, for an average cost of \$13,213 per person or a total cost of more than \$5.6 million. In addition, residents reported spending an average of about 114 days on probation or parole during the 12 months prior to TROSA admission, at an estimated cost of \$532 per person and \$227,000 total. These results combined suggest that criminal justice costs attributable to North Carolina TROSA residents in the 12 months prior to admission totaled more than \$7.3 million. While in TROSA, the sample had no arrests or jail admissions and incurred approximately \$356,000 in probation or parole supervision costs. Comparing the before- to during-TROSA cost estimates suggests criminal justice cost savings to be about \$7 million.

Table 1. Estimated Criminal Justice Costs in the 12 Months Prior to and in TROSA

Event	12 Months Prior to TROSA			12 Months in TROSA		
	Mean (standard deviation)	Cost per Person	Total Cost	Mean (standard deviation)	Cost per Person	Total Cost
Arrests	2.48 (5.74)	\$3,478	\$1,485,170	0 (0)	\$0	\$0
Jail (days)	118.42 (145.80)	\$13,213	\$5,642,081	0 (0)	\$0	\$0
Probation/ Parole (days)	114.26 (150.45)	\$532	\$227,356	178.85*	\$833	\$355,879
TOTAL			\$7,354,607			\$355,879

*About 46% of TROSA residents who entered the program in 2016 were on probation or parole; this assumes they remained on parole for 12 months while in TROSA.

\$7M

criminal justice savings





Health Care Costs

Most residents reported that they did not have insurance in the 12 months prior to TROSA admission, suggesting that when they received health care it was paid for either by the government or by charity care. Emergency department usage was high during the 12 months prior to TROSA admission, with residents reporting an average of 1.8 visits. This average is much higher than the average number of emergency department visits per person in the United States, which was 0.42 in 2013 (CDC, 2013). Assuming \$773 per visit, these visits cost an average of \$1,414 per person annually or a total of nearly \$604,000 (Table 2). Residents also reported an average of more than 2 outpatient doctor visits in the 12 months prior to TROSA admission, yielding a cost of \$293 per person annually or a total cost of \$125,166. Residents receive health care while in TROSA through in-house medical staff and arrangements with community providers. During the initial 12 months in TROSA, health care usage shifts dramatically to more outpatient care provided by TROSA and away from emergency department usage. Specifically, visits to the emergency department average about 0.3 annually per person—or about \$106,000 in total costs—and visits to outpatient providers average about 8—or about \$484,000 in total costs. Estimated health care costs are about \$150,000 less during 12 months in TROSA than the 12 months before entering TROSA. In addition, there is less reliance on emergency department services and greater use of scheduled care through doctors and other medical providers, which may translate into future cost savings as people stabilize their health.


Table 2. Estimated Health Care Costs in the 12 Months Prior to and in TROSA


Event	12 Months Prior to TROSA			12 Months in TROSA		
	Mean (standard deviation)	Cost per Person	Total Cost	Mean (standard deviation)	Cost per Person	Total Cost
Emergency Department	1.83 (2.40)	\$1,414	\$603,881	0.32 (0.68)	\$247	\$105,597
Outpatient Doctor	2.09 (3.45)	\$293	\$125,166	7.91 (7.19)	\$1,109	\$483,896
TOTAL			\$729,047			\$589,492

Homeless Services Costs

Residents reported an average of 62.3 homeless days in the 12 months prior to TROSA admission. Using the average per-person expenditure for the City of Durham for homeless services as a cost estimate, the average cost per person is \$779 or a total of \$332,526 annually (2016). These costs are entirely saved while residents are in TROSA because the program provides housing and other services.



 **47%**
probation/
parole costs

 **37%**
probation/
parole costs

Results by Gender

Most TROSA residents are male: in the analysis sample of 427 TROSA residents, 365 were men and 62 were women. Criminal justice and homelessness costs differ by gender, while health costs are similar for the two groups and so are not discussed further. Male residents reported an average of 2.40 arrests in the 12 months prior to TROSA admission for an average cost of \$3,366 and an estimated total cost of \$1.2 million (Table 3). Male residents also reported an average of about 128 days incarcerated (average cost of \$14,270 and total cost of \$5.2 million) and an average of 122 days on probation or parole (average cost of \$570 and total cost of \$208,088). Compared to male residents, female residents reported, on average, more arrests but fewer jail and probation days (Table 4). Female residents reported an average of nearly 3 arrests in the 12 months prior to TROSA admission (average cost of \$4,165 and total cost of about \$258,000), an average of about 61 days incarcerated (average cost of \$6,813 and total cost of \$422,411), and an average of 63 days on probation or parole (average cost of \$294 and total cost of \$18,237). Probation/parole costs were assumed to accrue to 47% of male TROSA residents and 37% of the female residents for in-TROSA total costs of \$137,141 for men and \$14,437 for women.

Table 3. Estimated Criminal Justice Costs in the 12 Months Prior to and in TROSA for Male Residents

Event	12 Months Prior to TROSA			12 Months in TROSA		
	Mean (standard deviation)	Cost per Person	Total Cost	Mean (standard deviation)	Cost per Person	Total Cost
Arrests	2.40 (5.62)	\$3,366	\$1,228,572	0 (0)	\$0	\$0
Jail (days)	127.89 (138.42)	\$14,270	\$5,208,538	0	\$0	\$0
Probation/ Parole (days)	122.34 (154.98)	\$570	\$208,088	171.55*	\$799	\$137,141
TOTAL			\$6,645,198			\$137,141

*About 47% of male TROSA residents who entered the program in 2016 were on probation or parole; this assumes they remained on parole for 12 months while in TROSA.

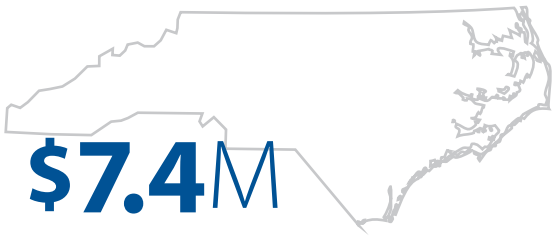


Table 4. Estimated Criminal Justice Costs in the 12 Months Prior to and in TROSA for Female Residents

Event	12 Months Prior to TROSA			12 Months in TROSA		
	Mean (standard deviation)	Cost per Person	Total Cost	Mean (standard deviation)	Cost per Person	Total Cost
Arrests	2.97 (6.58)	\$4,165	\$258,253	0 (0)	\$0	\$0
Jail (days)	61.06 (103.01)	\$6,813	\$422,411	0	\$0	\$0
Probation/ Parole (days)	63.12 (106.37)	\$294	\$18,237	135.05*	\$629	\$14,437
TOTAL			\$698,901			\$14,437

*About 37% of female TROSA residents who entered the program in 2016 were on probation or parole; this assumes they remained on parole for 12 months while in TROSA.

Male residents reported more homeless days on average than female residents (64.4 days versus 47.4 days). Estimated average costs savings were about \$808 for men and \$593 for women or total costs of \$294,920 for men and \$36,767 for women.

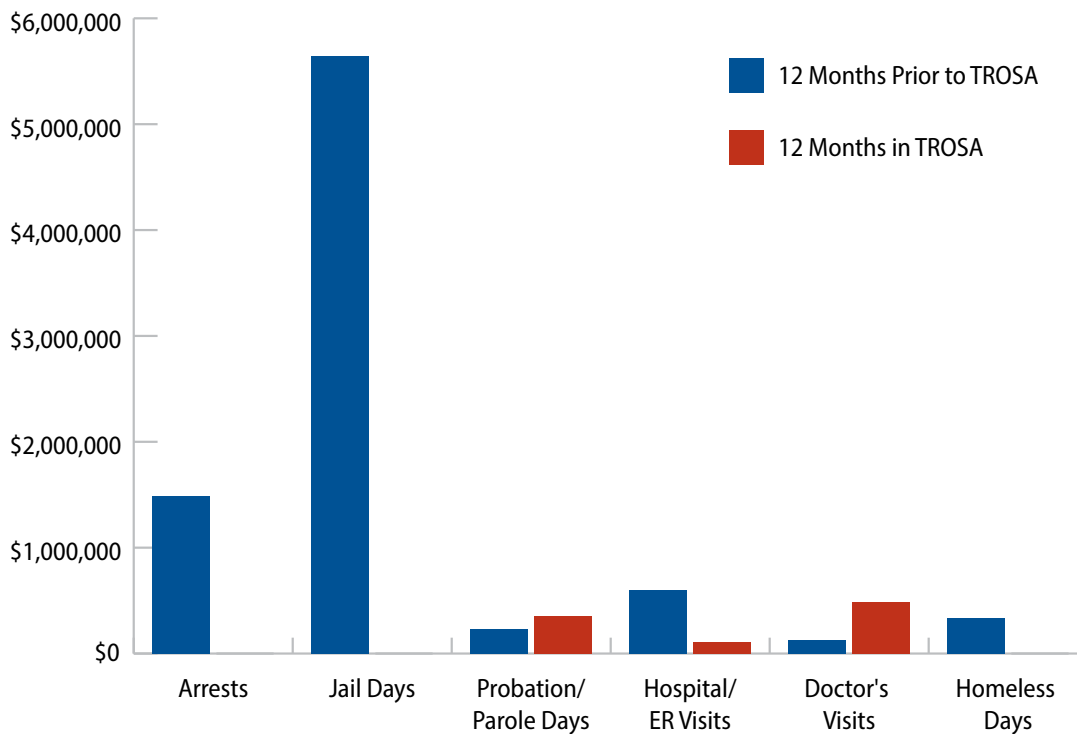


net savings for 12 months

Summary of Results

As shown in Figure 1, when substance abusers leave the community and become TROSA residents, the net savings to North Carolina are more than \$7.4 million for 12 months. These savings include criminal justice system cost savings of about \$6.5 million and more than \$680,000 for the male and female residents, respectively. These estimates do not include the economic benefits of the job training and life skills programming that TROSA provides, nor do they include “downstream” benefits when individuals graduate from TROSA and return to productive roles in their community.

Figure 1. Estimated Costs in the 12 Months Prior to and in TROSA



Conclusions

North Carolina realizes substantial savings as residents enter TROSA and receive treatment, training, and healthy and safe living environments in lieu of being on the street, using drugs, and engaging in criminal activity. This study examined only the costs associated with criminal justice involvement, health care use, and homelessness over a 12-month pre-post TROSA admission time frame. It does not account for many other benefits provided by the program. Evidence has shown that substance abuse treatment reduces recidivism for arrests, drug-related crimes, and violent crimes (Garnick et al., 2014), which suggests out-year benefits in savings from reduced criminal justice involvement among those who go to TROSA. For example, the lifetime benefits of methadone treatment have been shown to outweigh the costs by 37:1 (Zarkin, Dunlap, Hicks, & Mamo, 2005). This study also did not consider future employment by this population. Employment prospects will likely improve after graduating from TROSA because, in addition to being sober, residents receive vocational training and life skills training. Finally, this study does not monetize the benefits to the community, families, and friends of TROSA graduates who return to their homes sober and ready to reengage in a productive life.



References

- Centers for Disease Control and Prevention (CDC). (2013). *National Hospital Ambulatory Medical Care Survey: 2013 emergency department summary tables*. Retrieved April 24, 2017, from <https://www.cdc.gov/nchs/fastats/emergency-department.htm>
- City of Durham (2016). *City of Durham, North Carolina budget fiscal year 2016-2017*. Retrieved February 8, 2017, from <https://durhamnc.gov/209/Final-City-Budgets>
- Cohen, M. A. (1988). Pain, suffering, and jury awards: A study of the cost of crime to victims. *Law and Society Review*, 537–555.
- Durham County Sheriff's Office (2015). *Annual report 2015*. Retrieved February 8, 2017, from <http://dconc.gov/government/departments-f-z/sheriff-s-office/public-information/annual-reports>
- French, M. T., & Martin, R. F. (1996). The costs of drug abuse consequences: A summary of research findings. *Journal of Substance Abuse Treatment*, 13(6), 453–466.
- Garnick, D. W., Horgan, C. M., Acevedo, A., Lee, M. T., Panas, L., Ritter, G. A., . . . Haberlin, K. (2014). Criminal justice outcomes after engagement in outpatient substance abuse treatment. *Journal of substance abuse treatment*, 46(3), 295–305.
- National Drug Intelligence Center. (2011). *National drug threat assessment 2011* (Product No. 2011-Q0317-001). Retrieved April 24, 2017, from <http://www.justice.gov/archive/ndic/pubs44/44849/44849p.pdf>
- North Carolina Department of Public Safety (2016). *Costs of corrections*. Retrieved February 8, 2017, from <https://www2.ncdps.gov/Index2.cfm?a=000003%2C002391%2C002325>
- Sasso, A. T. L., Byro, E., Jason, L. A., Ferrari, J. R., & Olson, B. (2012). Benefits and costs associated with mutual-help community-based recovery homes: The Oxford house model. *Evaluation and program planning*, 35(1), 47–53.
- Substance Abuse and Mental Health Services Administration. (2015) *Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health* (HHS Publication No. SMA 15-4927, NSDUH Series H-50). Retrieved April 24, 2017, from <http://www.samhsa.gov/data/>
- TROSA (2017). *Meeting the demand for TROSA's substance abuse treatment services in NC*. Durham, NC: Author.
- U.S. Department of Housing and Urban Development. (2016). *2016 AHAR: Part 1 – PIT estimates of homelessness in the US: 2007 – 2016 point-in-time estimates by CoC* [Data file]. Retrieved February 8, 2017, from <https://www.hudexchange.info/resource/5178/2016-ahar-part-1-pit-estimates-of-homelessness/>
- Zarkin, G. A., Dunlap, L. J., Hicks, K. A., & Mamo, D. (2005). Benefits and costs of methadone treatment: Results from a lifetime simulation model. *Health Economics*, 14(11), 1133–1150.
- Zarkin, G. A., Cowell, A. J., Hicks, K. A., Mills, M. J., Belenko, S., Dunlap, L. J., . . . Keyes, V. (2012). Benefits and costs of substance abuse treatment programs for state prison inmates: Results from a lifetime simulation model. *Health Economics*, 21(6), 633–652.

Appendix—Methods

This study, conducted by RTI International without charge at the request of TROSA, provides an estimate of cost savings attributable to residents leaving drug use in the community for treatment and training in TROSA. This study primarily takes the perspective of costs accruing to North Carolina governments. We gathered cost data across six domains: emergency room visits, outpatient doctor visits, arrests, probation/parole, jail days, and homelessness. We used estimates from the literature for the unit cost of emergency room visits and outpatient doctor visits (French & Martin, 1996). Cohen (1988) estimated the weighted average of arrest costs by separate cost components. We summed the following components as the average price of arrest: investigation, arrest, and booking components. The North Carolina Department of Public Safety (2016) provides per-offender, per-day cost estimates for probation/parole. Because TROSA is in Durham County, we used the Durham County Sheriff’s Office (2015) cost per inmate per day at the Durham Detention Facility for jail day costs. To estimate the unit cost of homelessness, we divided the annual funds budgeted to the City of Durham’s homeless programs by the average number of homeless individuals in Durham (City of Durham, 2016; U.S. Department of Housing and Urban Development, 2016). All costs were converted to 2016 dollars using the Consumer Price Index. The unit costs for each of the six domains are presented in Table A.

Table A. Prices and Data Sources

Cost Domain	Unit Cost (2016\$)	Unit
Emergency room visits	\$772.81	Visit
Outpatient doctor visits	\$140.25	Visit
Arrests	\$1,402.48	Arrest
Probation/parole	\$4.66	Probationer/day
Jail days	\$111.58	Inmate/day
Homelessness	\$12.50	Person/day



297
surveys completed



59.64%
response rate

Self-administered surveys were used to obtain the data for events in the 12 months before entering TROSA. Surveys were administered during the first quarter of 2017 separately for male and female residents during their scheduled quarterly meeting. A total of 297 surveys were completed for a response rate of 59.64%. Means and standard deviations were calculated for the number of emergency room visits, outpatient doctor visits, arrests, days incarcerated, and days spent homeless.

Administrative data from those who entered the program in 2016 were used to determine health care utilization and the number of residents on probation or parole. Means and standard deviations were calculated for the number of emergency room visits and outpatient doctor visits. Frequencies of residents on probation or parole were used to calculate the average number of probation/parole days during the 12 months in TROSA for those who entered the program in 2016, assuming they remained on parole for 12 months while in TROSA.



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