CLEARINGHOUSE
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Army Community Service Survivor Outreach Services (SOS) Cost-Benefit Analysis Report

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Executive Summary

The Army Community Service's (ACS) Survivor Outreach Services (SOS) program is designed to provide long-term support to families of Fallen Soldiers. SOS is a Total Army Program with Active Component, Army National Guard (ARNG) and US Army Reserve (USAR) SOS offices. The goal of SOS is to help survivors cope with the loss of a loved one and ensure that survivors feel like a part of the Army family for as long as they desire. For this report, the Clearinghouse for Military Family Readiness at Penn State (Clearinghouse) conducted a Cost-Benefit Analysis (CBA) of SOS to assess the program costs and the impact of the SOS program.

SOS is designed to prevent the development of bereavement related grief complication by providing ongoing instrumental (e.g., access to services) and emotional support (e.g., opportunities for social support) to survivors of Fallen Soldiers. Complicated or prolonged grief is defined as grief that occurs six months after the loss of a loved one, past the healthy bereavement period, that results in individual distress and impaired functioning. Individuals experiencing complicated grief encounter a more intense and lengthy grieving process that can result in functional impairment.

Indeed, individuals suffering from complicated grief may feel a sense of disbelief about the death, feel anger and other recurring painful emotions, or be preoccupied with thoughts about the deceased, and exhibit avoidance type behaviors (Lobb et al., 2010; Shear, Frank, Houck, & Reynolds, 2005). Complicated grief can result in long-term negative psychological, social, occupational, and physical health consequences (Guldin, Jensen, Zachariae, & Vedsted, 2013). The overall prevalence rate for complicated grief in the United States civilian population is estimated to be between 7%-20%. By calculating the number of deaths per year in the United States and the number of people experiencing bereavement as a result, estimates suggest that more than one million people per year experience complicated grief (Shear, Frank, Houck, & Reynolds, 2005). Civilian survivors closely associated to the deceased (e.g., parents, spouses and children) have been found to experience complicated grief at rates of 57%-80% (Mitchell, Kim, Prigerson & Mortimer-Stephens, 2004; Young, et al., 2012). Thus, successful prevention of complicated grief could demonstrate improvement in the lives of survivors, particularly families, as well as provide a positive return on investment (ROI) for the Army to society, allowing for a win-win for the Army.

Findings

Cost Analysis. As part of this report we conducted a cost analysis of SOS, and found that in 2015 the Army spent $7.17 million on SOS across all 68 Army garrisons. The average garrison received roughly $105,498 to carry out the program. Of the total costs, 88.8% was spent on civilian personnel pay. The remaining 11.2% was spent on materials, marketing, and space rental. In 2015, 15,594 survivors (i.e., parents, dependents or children of deceased who were eligible for SOS services) were located in the Active Component's area of responsibility[1]. Of those survivors,

[1] According to FY15 data, a total of 68,527 Survivors have been supported by the Army SOS program since its inception. For the purposes of this assessment, only Survivors contacted for the first time in FY15 were included in the analysis.

5,483 (35.2%) were new Army Survivors who participated in, or received initial contact from SOS. Thus, the program successfully reached a third of eligible participants by receiving contact for the first time in FY15. This equates to an average cost of $1,308 per participating survivor. SOS recipients participate for an average of three years with an average of 531 minutes of service received. This represents a lifetime SOS cost of $3,924 per survivor (on average) at a rate of about $7.39 per minute of service provision.

Cost-Benefit Analysis. We also conducted a CBA that compares costs to carry out a program to the actual costs saved or generated by the program. A CBA requires calculated program costs combined with program outcomes that are measured in dollar amounts. For instance, the analyst will determine the monetary benefits associated with preventing individuals from affliction with complicated grief (e.g., through increased productivity or avoidance of costly mental health services) compared to those not receiving SOS. These monetary benefits are then contrasted with the cost to deliver the program. If the costs saved or generated exceed the amount to deliver the program, the program provides a positive return-on-investment (ROI).

To prepare to conduct the CBA, we built off the evaluation effort of Davis et al. (2015) that compared SOS users and non-SOS users on the outcomes reported in the SOS program logic model (page 22), and conducted further in-depth analysis examining how participating in SOS impacts the development of complicated grief. For this in-depth analysis, probability weights were used to account for selection into the SOS through propensity score analysis.[2] This analysis indicated that participating in the SOS program significantly reduced the likelihood of meeting the clinical threshold of complicated grief. Similar to rates of complicated grief among surviving civilian families (54%-80%; Mitchell, Kim, Prigerson & Mortimer-Stephens, 2004), about 74% of military survivors met the criterion for complicated grief. Those who received SOS services experienced complicated grief at a rate of about 61%. *In other words, for every 100 recipients of SOS there are about 13 fewer cases of complicated grief.* Based on these findings, of the 5,483 new participants in SOS in 2015, 717 fewer cases of complicated grief would be expected.

Based on this in-depth analysis of the 2015 evaluation data, a cost-effectiveness assessment involving an analysis of what the costs are to achieve a certain effect indicated that SOS could prevent a case of complicated grief for roughly $25,400. On average complicated grief is estimated to cost about $47,000 a case from increased morbidity or mortality, and reduced productivity (Greenberg, 2015; Greenstone, 2012). A 95% confidence interval (CI) indicates that SOS' cost effectiveness ranges between $11,710 and $35,560 per case prevented. A simulation model (Prigerson et al. 2009) estimated that the *SOS program resulted in 205 fewer cases of depression in 2015*.[3]

Downstream impacts of complicated grief can be anticipated to have an effect on morbidity, mortality, and productivity. On average, these include a *per-person lifetime reduction of $269 in mental health service utilization costs and an increase of $499 in labor market productivity* (i.e., morbidity; Greenberg, 2015). Based on a lower-bound estimate of the likelihood of death

[2] Detailed information on the approach taken may be found in Appendix A.
[3] See Appendix A for more detail on simulation of costs and benefit estimates.

by suicide (3.5%) among a depressed population, models indicated that the *SOS program is likely to save about seven lives a year* (i.e., mortality; Greenstone, 2012). When considering a conservative Value of a Statistical Life (VSL) at $3 million[4] (Greenstone, 2012), this equates to an average societal benefit per recipient of SOS of about $4,509 from reduced mortality (i.e., the total benefits divided among the number of SOS recipients). These combined morbidity and mortality reductions as well as productivity gains result in an average societal benefit to military families of about $5,278 (CI = $3,903-$6,428).

The net benefit of a program is the societal benefit once the costs of the program are subtracted. The ROI is the ratio of how much return is expected from every dollar invested. When considering the cost of SOS, models indicate a net benefit of *$1,960 on average or about $1.59 for every dollar invested*.

In order to understand the uncertainty in this model, a risk analysis was undertaken. Risk analyses seek to model the likelihood that an intervention will lead to a positive ROI. These analyses are based on thousands of simulations that re-sample the uncertain values in the models (e.g., costs and effects) to determine possible outcomes, thereby enabling probabilities to be calculated. The risk analyses, based on estimates indicated above, ascertained that SOS has a 77% chance of producing a positive return to society for this investment. Conversely, there is a 23% probability SOS would not lead to a societal benefit. *Thus, SOS is more than three-quarters likely to provide a positive return on investment.*

Highlights & Recommendations

- For every 100 recipients of SOS there are about 13 fewer cases of complicated grief.
- SOS resulted in 205 fewer cases of depression in 2015.
- The net benefit of SOS is about $1.59 for every dollar invested.
- SOS has a 77% chance of producing a positive return to society for this investment.

Recommendation 1. Overall, the program's reach (i.e., program awareness and participation) of 35.2% of eligible participants is excellent compared to other social services; nevertheless, continuous and targeted messaging efforts using social and digital media (e.g., Facebook) may prove effective for continuing to grow program awareness and participation.

Recommendation 2. As noted in the 2015 SOS evaluation report (Davis et al.), the SOS program could be improved by standardizing financial counseling across SOS offices. If implemented and found effective, the ROI associate with SOS would likely increase significantly.

Recommendation 3. The SOS program could be improved by regularly collecting ongoing quality assurance data, or process evaluation data, using qualitative and quantitative approaches to assess customer feedback and improve program delivery.

[4] The VSL is used to determine the tradeoff between accepting more wealth in exchange for a higher risk of death. The VSL estimate for Active Duty Soldiers is between $3 and $4 million (Greenstone, 2012).

Introduction

The Army Community Service's (ACS) Survivor Outreach Services (SOS) program is designed to provide long-term support to survivors of families of Fallen Soldiers. SOS is a Total Army Program with Active Component, ARNG and USAR SOS offices. The goal of SOS is to help survivors cope with the loss of a loved one and ensure that survivors feel like a part of the Army family for as long as they desire.

The SOS program, with the assistance of SOS Support Coordinators and Financial Counselors, provides resources and education, assists with financial planning, monitors and advocates for survivor benefits, coordinates support groups, and manages survivor events. These services seek to minimize survivors' transitional stress after the death of their loved one and to promote positive outcomes in social support, financial well-being, and behavioral health/resilience. For a comprehensive review, see the SOS program logic model in Appendix B.

Promoting these positive outcomes can mitigate the risks associated with grief that may extend beyond a healthy bereavement period. Inattention to the issues surrounding bereavement can be costly to grieving individuals and society. While the Army is dedicated to supporting surviving families, there are also practical considerations for promoting healthy grieving processes and healthy functioning of survivors. Providing additional support to survivors through the bereavement process boosts social support, helps the survivor maintain a connection to the Army, and eases the stress the survivor may feel after the loss of his or her loved one.

In 2015, the Army Public Health Command (USAPHC) and the Clearinghouse for Military Family Readiness at Penn State (Clearinghouse) collaborated to develop an evaluation plan and, subsequently, assess SOS for program effectiveness (Davis, LaPergola, El-Beshti, & Perkins, 2015). This report provides findings of an assessment of the SOS program and its impact. Further, a projection model that considers the potential economic benefits of the SOS program is described for other impacts currently not examined.

Background on Key Outcomes

In research, there are key distinctions between grief and bereavement. Grief is the emotional reaction to a loss. Bereavement refers to the situation of losing a loved one (Stroebe, Schut, & Stroebe, 2007) which almost everyone experiences at some point. Thus, while individual reactions and coping responses vary, bereavement is a normal experience that most individuals are able to overcome (Schut & Stroebe, 2005; Stroebe, Schut, & Stroebe, 2007). The possible negative outcomes associated with bereavement are well established in the research literature. Bereaved individuals are more likely to experience negative mental and physical health outcomes (Stroebe, Schut, & Stroebe, 2007). These difficulties include an increased risk of mortality, depression, and other mental health disorders (e.g., anxiety, Post-Traumatic Stress Disorder [PTSD]); increased use of prescription medications; and a higher frequency of doctor visits (King et al., 2013; Stroebe, Schut, & Stroebe, 2007).

The long-term impact of bereavement can extend beyond the individual with costs incurred by healthcare providers and society (Guldin, Jensen, Zachariae, & Vedsted, 2013). A recent study on the economic cost of bereavement in Scotland found the cost of inpatient stays for bereaved spouses to be between $26.6 million to $38.3 million (USD) to the healthcare system per year. Furthermore, the study indicated that bereaved people were significantly less likely to be working within two years, post-bereavement. Compared to non-bereaved matched controls, bereaved individuals reported significantly higher levels of distress in the year after their loss and continued to report higher levels of distress over 10 years after the loss of their loved one (Stephen et al., 2014).

Complicated Grief. Bereavement patterns that continue beyond a healthy period (i.e., six months) can disrupt an individual's emotional, physical, and financial health. Complicated or prolonged grief is defined as grief that occurs six months after the loss of a loved one that results in individual distress. Individuals experiencing complicated grief encounter a more intense and lengthy grieving process that can result in functional impairment. Individuals suffering from complicated grief may feel a sense of disbelief about the death, feel anger and other recurring painful emotions, or be preoccupied with thoughts about the deceased, and exhibit avoidance type behaviors (Lobb et al., 2010; Shear, Frank, Houck, & Reynolds, 2005). Complicated grief can result in long-term negative psychological, social, occupational, and physical health consequences (Guldin, Jensen, Zachariae, & Vedsted, 2013)[5]. The prevalence rate for complicated grief in the overall civilian population is approximately 7%-20% (Cozza et al., 2016; Kersting et al., 2011; Middleton, Burnett, Raphael, & Martinek, 1996; Shear, Frank, Houck, & Reynolds, 2005). By calculating the number of deaths per year in the United States and the number of people experiencing bereavement as a result, estimates suggest that more than one million people per year experience complicated grief (Shear, Frank, Houck, & Reynolds, 2005). Civilian survivors closely associated to the deceased (e.g., parents, spouses and children) have been found to experience rates of complicated grief at rates of 57%-80% (Mitchell, Kim, Prigerson & Mortimer-Stephens, 2004; Young, Iglewicz, Glorioso, Lanouette, Seay, Illpakurti & Zisook, 2012).

Grief and Military Families. The majority of literature on grief and bereavement discussed thus far lies outside the context of the military. However, these topics have been the focus of recent research efforts with military families. Military families who experience a war-related loss have similar difficulties to those of civilians who experience the loss of a loved one, including an increased risk of mental health difficulties (e.g., depression, anxiety, and PTSD) (Kristensen et al., 2012; Pivar & Field, 2004). With regard to adjustment, the research notes that social support and one's ability to reach an understanding and find a sense of meaning around the loss can help survivors adapt during these difficult times (Keesee et al., 2008). While the evidence is limited, military families may also benefit from remaining connected to other families who understand their loss, particularly when this loss is in the context of combat (Faber, 2014).

[5] A disorder related to complicated grief is persistent complex bereavement disorder, requiring a 12-month time window post loss for a diagnosis (Cozza et al., 2016). This disorder has recently been included in the DSM-5.

Survivors with more bereavement experience are less likely to experience complicated grief (Frye & Duchac, 2014). Survivors with Service members lost in recent conflicts (i.e., OIF; OEF) are younger, on average, and may have less experience with bereavement outside of military culture. Significant stress can be caused when the Survivor must disassociate with the military and move off-base (Frye & Duchac, 2013). Thus, these younger families may be at a greater risk for experiencing complicated grief. Furthermore, survivors who have been designated to handle the Service member's affairs (i.e., Primary Next of Kin) may be overwhelmed by the decisions that need to be made following the Service member's death (Davis, et al., 2015, p. 7-8; Harrington-LaMorie & McDevitt-Murphy, 2011).

Survivor Outreach Services

The National Defense Authorization Act for Fiscal Year 2006, Pub. L. No. 109-163 § 562 directed that the Secretary of Defense establish a system for uniform provision to survivors of military decedents of personalized, accurate and integrated information on the benefits and financial assistance available to them. Thus, the SOS program was developed and is housed within Army Community Service (ACS). Active Component SOS offices are located on Army Garrisons; ARNG and USAR SOS offices are located in Armories, State Joint forces Headquarters and Family Centers. SOS is designed to provide ongoing instrumental and emotional support to survivors of Fallen Soldiers. In terms of instrumental support, SOS aims to (a) increase survivors' awareness of, and access to, available resources, (b) increase knowledge of, and help manage benefits to which survivors are entitled, (c) assist survivors with formulating short-term and long-term financial plans, and (d) educate survivors regarding money management skills. Related to emotional support, SOS Support Coordinators (SCs) are available to listen to survivors' needs and concerns, direct them to the appropriate services and resources, and create opportunities for survivors to meet and support one another. The SOS engages in three categories of intervention activities to achieve these goals: (1) behavioral health and resilience, (2) social support, and (3) transitional stress and financial well-being activities.

Behavioral Health and Resilience Activities. These SOS activities include assessing survivor needs for program planning; providing life skills education workshops; offering information and referrals, including linking survivors with outside resources/services; and arranging for non-clinical support. Therefore, these activities seek to assess survivor needs for services, provide non-clinical support, and refer survivors to workshops and outside resources/services. In the short-term, survivors are given the opportunity to practice healthy coping skills, which can help build the foundation for effective grief management in the long-term. Effective grief management reduces the occurrence of complicated grief and co-occurring mental health problems (e.g., depression and suicidality). Moreover, improving survivors' abilities to care for their children is a short-term and long-term outcome of the SOS program.

Social Support Activities. These SOS activities include developing resources for survivors, coordinating support groups and events, leveraging governmental and non-governmental organization (NGO) support to expand resources and events for survivors, marketing of the program, and conducting command and unit briefings. These undertakings employ Army,

government, and NGO resources to create a support net for survivors and encourage survivors' use of them. These activities are designed to develop and enhance survivors' connection with SOS and other survivors, facilitate survivors' interactions with civilian agencies and community-based resources, and increase survivors' awareness of and participation in SOS and survivor communities. Long-term outcomes include engaging volunteers for SOS and ensuring survivors remain a part of the Army family for as long as they desire.

Transitional Stress and Financial Well-being Activities. These SOS activities include monitoring survivor benefit milestones, assisting survivors in managing transitions, identifying needed financial services, assisting with short-term and long-term financial planning, staying current with case management to meet survivors' needs in a timely manner, helping survivors by advocating for benefits, and providing pre-deployment education on finances and benefits. These activities aim to identify survivor needs, educate survivors on financial transitions and benefit milestones, and assist survivors as they navigate these milestones across a short-term and long-term period. Short-term and long-term outcomes include enhancing survivors' financial planning and job retention as well as helping survivors navigate relocation costs, the legal and benefit process, and other important milestones.

The Resources to Implement SOS

The 2015 budgetary files for all ACS programs, were obtained from 68 military garrisons, which enabled an assessment of direct costs on SOS. These budget documents included all garrisons and central administration spending on Army and civilian personnel costs, non-personnel costs for supplies, equipment, space, and other key resources. Client Tracking System (CTS) reports from the same period provided data on usage. This system provided key information on the number of survivors who received SOS services and the number of minutes of SOS services delivered.

The cost analysis found that in 2015 the Army spent $7.17 million on SOS across all 68 Army garrisons. The average garrison received roughly $105,498 to carry out the program. Of the total costs, 88.8% was spent on civilian personnel pay. The remaining 11.2% was spent on materials, marketing, and space rental. In 2015, 15,594 survivors (i.e., those eligible for SOS services) were located in the Active Component's area of responsibility. Of those survivors, 5,483 (35.2%) were new Army Survivors who participated in, or received initial contact from SOS. Thus, the program successfully reached a third of eligible participants by receiving contact for the first time in FY15. This equates to an average cost of $1,308 per participating survivor. SOS recipients participated for an average of three years with an average of 531 minutes of service received. This represents a lifetime SOS cost of $3,924 per survivor (on average) at a rate of about $7.39 per minute of service provision.

Table 1. Costs and Usage of SOS (based on 2015 reports)

Cost of SOS	
Number of Army Deceased	9,746
Estimated Number of Army Survivors	15,594
Estimated Number of New Army Survivors Receiving SOS	5,483
Total Army Minutes Across all SOS Contacts	972,843
Total Army Minutes by Army Survivor Contacted	177
Total SOS Costs (ACS Cost Report)	$7,173,855
Total SOS Costs by Army Survivor	$1,308
Total Cost to Provide 1 Minute of SOS Services	$7.39
Cost of SOS per Survivor (Three Year Utilization)	$3,924

Considering SOS Costs versus Benefits

The SOS program resources are designed to ensure that services are sufficiently available to families who have lost Service members. Thus, funding levels are set based on local needs assessments rather than cost effectiveness. In addition, many of the targeted outcomes in the program logic model are difficult to monetize and thus were not addressed in the outcome evaluation (e.g., sensitivity by civilian agencies when dealing with survivors). However, for those program outcomes that can be valued in dollar amounts, examining cost effectiveness is sensible. If SOS can improve the lives of those it serves, while also providing at least a partial ROI, then the program provides a win-win for the Army. A precedent also exists for effective programs that address family bereavement and provide a positive ROI (e.g., the Family Bereavement Program, see Porter, 2011).

Two types of economic assessment can be considered for a program like SOS. A cost-effectiveness assessment involves an analysis of what the costs are to achieve a certain effect (e.g., costs required to reduce a certain number of survivors afflicted with long-term complicated grief). A cost-effectiveness assessment can be carried out whenever there are costs calculated to carry out a program and measured effects on any outcome. Alternatively, a cost-benefit assessment compares costs to carry out a program to the actual costs saved or generated by the program. A cost-benefit assessment requires calculated program costs combined with program outcomes that are measured in dollar amounts. For instance, the analyst will determine the monetary benefits associated with preventing individuals from affliction with complicated grief (e.g., through increased productivity or avoidance of costly mental health services, compared to those not receiving SOS). These monetary benefits are then contrasted with the cost to deliver the program. If the costs saved or generated exceed the amount to deliver the program, the program provides a positive ROI.

SOS may have positive impacts on several targeted outcomes. Nevertheless, only a subset of those outcomes may be monetized. A program can provide a ROI based on certain affected outcomes. Thus, a cost-benefit approach might be considered when certain targeted outcomes are known to be linked to large costs.

The analyses of this study build upon prior work that examined the effectiveness of the program (Davis et al., 2015) and demonstrated SOS's potential positive impact on reducing grief. Other targeted outcomes, such as financial well-being, are not considered in this study because of the lack of measurement for program impact. Thus, the impact of SOS on reducing the prevalence of those suffering from complicated grief was examined. Because data comparing SOS users to non-SOS users were quasi-experimental (i.e., individuals were not randomly assigned to receive the program), a causal modeling approach, known as propensity score analysis, was used to achieve new program effect sizes for complicated grief.

The next section summarizes results from this analysis and then presents results from cost-benefit and cost-effectiveness projection models. Projection models estimate the economic benefit that is associated with effects through a modeling approach that incorporates the range of uncertainty that can be expected.

Impact Evaluation of the SOS Program

Army Public Health Command commissioned the Clearinghouse to conduct an impact evaluation of the SOS program. By using propensity modeling, a matched comparison group approach was employed to evaluate the impact that participation in the SOS program had on the prevention of complicated grief (see Davis et al., 2015).

Sample

To recruit participants for the Davis et al. (2015) evaluation, the U.S. Army Installation Management Command (IMCOM), U.S. Army Office of the Assistant Chief of Staff for Installation Management (OACSIM), U.S. Army Reserves (USAR), and the Army National Guard (ARNG) contacted military families to inform them about the study and provide them with a link to a self-report survey. Links to the anonymous self-report survey were also distributed through email, listservs, newsletters, and social media. To minimize the burden on survivors who were completing surveys, only survivors who had experienced a loss at least one year ago or longer were recruited. Survivors who accessed the link were informed that they could withdraw without penalty from the survey at any time should they feel too uncomfortable to continue. The number and contact information for psychological services was available to all survivors. This evaluation focused on adult (i.e., 18+ years) surviving Primary Next of Kin and Secondary Next of Kin. Survivors were included regardless of the nature of the Soldiers' death (i.e., combat or non-combat related).

A total sample of 368 eligible survivors completed the survey. This included 41% who were a parent, step-parent, or legal guardian; 34% who were a spouse or significant other; 16% who

were a child; 6% who were a sibling; and 3% who were other. Of this sample, 284 received SOS, and 84 did not receive SOS. The participants were survivors for 6.7 years on average (SD = 4.5). Thus, survivors were mostly parents and spouses of Fallen Soldiers. Most indicated that their current relationship status was either married or widowed. Average age was approximately 50 years. Over half of the participants were women, and most had at least some college education. Annual household income for these families was between $20,000 and $60,000. A small percentage of survivors identified as Service members or indicated they were currently in a relationship with a Service member.

Table 2. Characteristics of Survivors Who Have and Have Not Used SOS (*N* = 368)

	SOS User/ Participant (*n* = 284)	Non-SOS User/ Participant (*n* = 84)
	Mean (SD)/%	Mean (SD)/%
Relationship to Soldier		
Parent, Step-Parent, or Legal Guardian	40.9%	40.5%
Spouse or Significant Other	36.3%	26.2%
Child	15.1%	14.3%
Sibling	3.2%	16.7%
Other	3.9%	2.4%
Years as a Survivor	6.4 (4.0)	7.6 (5.9)
Overseas when Soldier passed away	3.2%	3.6%
Age (years)	49.8 (12.4)	50.3 (13.6)
Female	76.4%	78.6%
Education and Household Income		
Some high school or less	1.4%	-
Completed high school/GED	10.9%	16.7%
Some college	23.9%	21.4%
Associate's degree/trade program	18.3%	26.2%
Bachelor's degree	19.4%	22.6%
Graduate or professional education	19.4%	8.3%
Other	0.4%	1.2%
Household income past year		
< $5,000	2.1%	-
$5,000 – 19,999	7.4%	8.3%
$20,000 – 39,999	13.4%	21.4%
$40,000 – 59,999	19.7%	22.6%
$60,000 – 79,999	13.0%	10.7%
$80,000 – 99,999	8.8%	11.9%
$100,000 – 149,999	13.7%	10.7%
≥ $150,000	4.6%	7.1%
Did not know	6.7%	1.2%

	SOS User/ Participant (*n* = 284)	Non-SOS User/ Participant (*n* = 84)
Dependents		
Has dependent children	45.1%	33.3%

Table 3. Military Characteristics of Survivors Who Have and Have Not Used SOS (N = 368)

	SOS User/ Participant (*n* = 284)	Non-SOS User/ Participant (*n* = 84)
	Mean (SD)/%	Mean (SD)/%
Military Characteristics of Survivors		
Has served in the military	18.3%	9.5%
Years served in the military	11.9 (9.7)	19.6 (13.4)
Currently serving in the military	2.1%	1.2%
Military branch served/serving		
Army	13.7%	7.1%
Air Force	1.8%	1.2%
Marines	1.4%	-
Navy	2.5%	1.2%
Coast Guard	-	-
Grade		
E1 to E3	1.4%	-
E4 to E6	9.9%	3.6%
E7 to E9	3.5%	2.4%
W1 to W5	0.7%	1.2%
O1 to O3	1.4%	-
O4 to O6	1.4%	2.4%

Measures

Complicated Grief. A validated and reliable measure of complicated grief was used to assess survivors' mental health (Prigerson et al., 2009). This measure assesses key symptoms of complicated grief to meet a clinical threshold. Further, scores on this scale are highly predictive of the incidence of major depressive disorder. Diverse and wide-ranging measures are included in the propensity model to account for factors that may contribute to family program enrollment and attendance (see Table 2 and Table 3 above).

Analytic Approach

Researchers estimated a propensity for each survivor to receive SOS services using a logistic regression model. Researchers observed substantial overlap[6] between the family program enrollment and no-enrollment distributions; thus, comparison between the two groups is warranted. A key part of this process was determining weights for individual cases. For a more technical explanation of this, please see the short description provided in Appendix A.

Estimated Program Effectiveness

Next, researchers evaluated how participating in SOS impacts the development of complicated grief. For this analysis, probability weights were used to account for selection into SOS based upon the numerous characteristics of survivors described in Table 2 and Table 3. This analysis indicated that participating in the SOS program significantly reduced the likelihood of meeting the clinical threshold of complicated grief. Similar to rates of complicated grief among surviving civilian families (54%-80%; Mitchell, Kim, Prigerson & Mortimer-Stephens, 2004), about 74% of military survivors met the criterion for complicated grief. Those who received SOS services experienced complicated grief at a rate of about 61%. This reflected a 13% difference in the prevalence of complicated grief. *In other words, for every 100 recipients of SOS there are about 13 fewer cases of complicated grief.* Based on these findings, of the 5,483 new SOS participants in 2015, 717 fewer cases of complicated grief would be expected.

Cost-Effectiveness & Economic Benefits of SOS

After completing the impact analysis, the program effectiveness estimates can be combined with costs to determine cost effectiveness for achieving certain outcomes and the potential costs generated or saved through the program. To determine these estimates, simulation modeling techniques, known as Monte Carlo simulations, were used that take into account uncertainty of program effects and certain relevant costs. This uncertainty can be represented through distributions, or ranges, for these estimates (Briggs, Mooney, & Wonderling, 1999).

As a first step, researchers consider the cost-effectiveness analysis (CEA) estimate for reducing cases of complicated grief due to participation in SOS. This involves determining the incremental amount, relative to a comparison group, for preventing a case of complicated grief among military survivors. Based on the 2015 data, the CEA indicated that SOS could prevent a case of complicated grief for roughly $25,403. A 95% confidence interval (CI) indicates that the SOS's cost effectiveness ranges between $11,712 and $35,563 per case prevented.

As recommended by the 2nd Panel on Cost-Effectiveness in Health and the National Academies Committee on the Use of Economic Evidence for Investing in Children, Youth and Families, findings from CEAs, such as these, should be contextualized and translated for decision makers. Thus, a Monte Carlo analysis was undertaken to project the impact of a change in complicated

[6] Overlap indicates if individuals with similar propensity scores in both SOS and non-SOS groups was evaluated (Rosenbaum & Rubin, 1983).

grief on survivor depression, mental health service utilization, labor market productivity (i.e., absenteeism and presentism), and suicidality. The Monte Carlo simulation model estimated that the SOS program resulted in 205 fewer cases of depression in 2015.

Table 4. Projected Impact of SOS on Survivor Depression

	Estimate	Source
New SOS Participants in 2015	5,483	CTS 2015
Reduction in Prolonged Grief Disorder	717	CTS 2015 & SOS Evaluation
Model-Projected Reduction in Diagnosed Cases of Depression	205	Prigerson et al. 2009

Downstream impacts are expected on morbidity, mortality, and productivity. On average, these include a per-person lifetime reduction of $269 in mental health service utilization costs and an increase of $499 in labor market productivity (Greenberg, 2015). Based on a lower-bound estimate of the likelihood of death by suicide (3.5%) among a depressed population, models indicated that the *SOS program saves about seven lives a year* (Greenstone, 2012). When considering a conservative Value of a Statistical Life (VSL) at $3 million[7], this equates to an average societal benefit per recipient of SOS of about $4,509 from reduced mortality (i.e., the total benefits divided among the number of receipts). The sum of the morbidity and mortality reductions as well as productivity gains result in a societal investment in military families through SOS that equates to a total monetary benefit of about $5,278 on average (CI = $3,903-$6,428).

Table 5 below provides this information in another form. Specifically, the left column identifies different areas likely impacted by the SOS program from reductions in complicated grief and depression. Three categories are considered: medical services, lost productivity, and mortality. The average cost of each potential outcome (e.g., increased service use, lost productivity and mortality) is provided based upon estimates in the literature. Then, the total projected benefit from SOS, as a result of reduced complicated grief is provided. Finally, the estimated average benefit per SOS recipient for each type of benefit is given. The sum of these benefits is described at the bottom of Table 5.

[7] The VSL is used to determine the tradeoff between accepting more wealth in exchange for a higher risk of death. The VSL estimate for Active Duty Soldiers is between $3 and 4 million (Greenstone, 2012).

Table 5. Costs Associated with Depression

	Incremental Cost	Total Monetary Benefit from Prevented Depression (N = 205 fewer cases)	Average Benefit per SOS Participant (N = 5,483)
Morbidity Associated Costs (Greenberg, 2015)		$1,478,218	$270
Inpatient	$1,409	$289,055	$53
Emergency Department	$410	$84,096	$15
Outpatient	$13	$2,673	$0
Other	$854	$175,104	$32
Prescription Drug	$957	$196,324	$36
Other Depression Costs	$580	$118,919	$22
Non-Depression Costs	$2,983	$612,047	$112
Lost productivity (Greenberg, 2015)		$2,737,983	$499
Absenteeism	$2,014	$413,223	$75
Disability	$713	$2,178,921	$397
Presenteeism	$711	$145,839	$27
Prevented Loss of Life (Reduced Mortality; Greenstone, 2012)	$3,442,892	$24,721,144	$4,509
Total Benefit	$3,453,535	$28,937,345	$5,278

Table 6 below includes primary results from the cost-benefit analysis of SOS. These include net benefit and ROI amounts determined through simulation models. The net benefit of a program is the program's societal benefit once the costs of the program are subtracted. The ROI is the ratio of how much return is expected from every dollar invested. When considering the cost of the SOS, models indicate a net benefit of *$1,960 on average or about $1.59 for every dollar invested*.

In order to understand the uncertainty in this model, a risk analysis was undertaken. Risk analyses seek to model the likelihood that an intervention will lead to a positive ROI, which is indicated by the likelihood of a positive return on investment shown in the last row of Table 6 (i.e., probability). These analyses are based on thousands of simulations that re-sample the uncertain values in the models (e.g., costs and effects) to determine possible outcomes, thereby enabling probabilities to be calculated. For example, the average cost included in Table 6 (i.e., $3,318) is estimated from this model to capture the uncertainty around the time of participation rather than using the actual costs as provided by the budget ($3,923), which does

not capture uncertainty. The risk analyses, based on estimates indicated above, ascertained that the SOS has a 77% chance of producing a positive return to society for this investment. Conversely, there is a 23% probability the SOS would not lead to a societal benefit. *Thus, SOS is more than three-quarters likely to provide a positive return on investment.*

Table 6. Cost-Benefit Results for SOS

	Estimate	Confidence Interval (75%)
Average Benefit	$5,278	$3,903-$6,428
Average Cost	$3,318	$2,376-$4,272
Average Net-Benefit	$1,960	$1,527-$2,157
Average ROI	$1.59	
Probability of a Positive ROI	77.17%	

Additional Program Outcomes

As determined in the prior evaluation (Davis et al., 2015), there were multiple positive impacts from participating in SOS. Several outcomes were not considered for this CBA and CEA because the outcomes could not be monetized. The program demonstrated positive impact on resiliency, social support, and feeling more connected to the Army. These outcomes are likely related to symptoms of complicated grief, so monetized benefits associated with avoided cases of complicated grief and depression likely overlap with these other important effects from the program.

Conclusion

Along with the Army's dedication to supporting surviving families, there are also practical considerations for promoting healthy grieving processes and healthy functioning of survivors. As evidenced within this report, inattention to the issues surrounding bereavement can be costly to grieving individuals and society. Supporting survivors through the bereavement process can help the survivor maintain a connection to the Army, ease the stress the survivor may feel after the loss of his or her loved one, and boost his or her overall social support. Although many of the targeted outcomes in the SOS program logic model are difficult to monetize, or have not been established via rigorous evaluation (e.g., increased financial well-being); one outcome, the positive impact on reducing complicated grief, was able to be monetized. Other demonstrated program outcomes (i.e., positive impact on resiliency, social support, and feeling more connected to the Army) are likely to be related to the prevention of symptoms associated with complicated grief. Although these other important potential benefits were not able to be monetized, they likely overlap with the primary demonstrated effect of the program; prevention of complicated grief. Using the various cost benefit methodologies outlined in this report, a conservative ROI for the SOS program of $1.59 for every dollar invested was established. This ROI represents a demonstrable improvement in the lives of survivors, as well as a positive ROI for the Army to society, allowing for a win-win for the Army.

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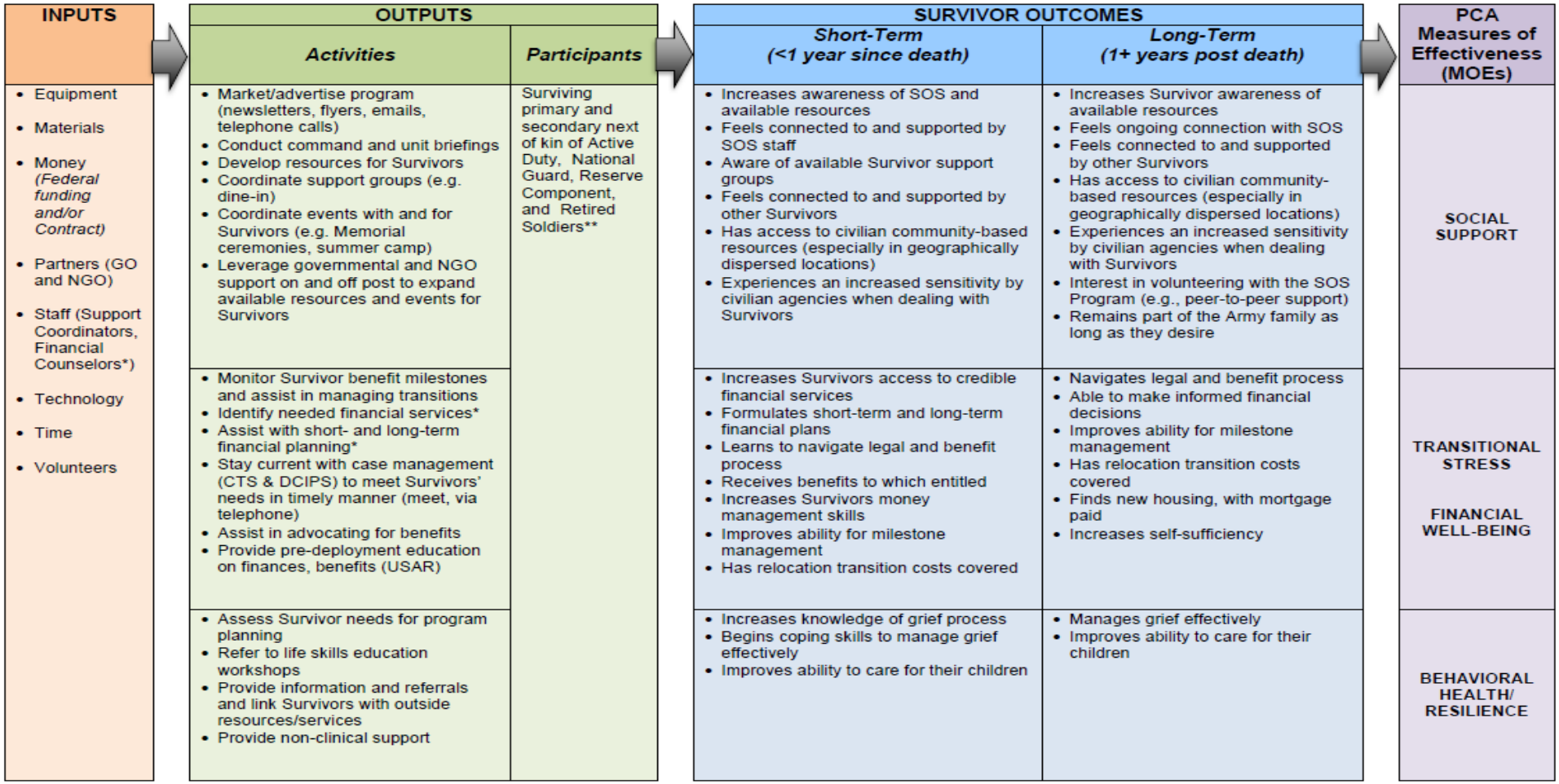
Appendix A: Analysis Details

Inverse-Probability Weights (IPWs) were calculated reflecting likelihood of receiving SOS in order to better equate users and non-users to improve statistical comparisons. IPWs are similar to survey weights. They allow evaluators to adjust the sample data to account for selection effects that influence participant enrollment by upweighting those that are underrepresented and downweighting those that are overrepresented (Hirano & Imbens, 2001). Researchers evaluated the balance of the different groups—before and after weighting—to ascertain whether the adjustment using the IPWs successfully resulted in equivalence between the SOS and non-SOS groups on the modeled confounders (Harder et al., 2010). This evaluation included a comparison of the standardized mean differences (SMDs) of the unweighted sample to the weighted sample for each of the confounders included in the propensity model. This allowed researchers to determine whether the SMDs decreased after weighting (i.e., effect size comparison). It is recommended that these differences be less than .2 (in absolute value), which is considered a *small* effect size (Harder et al., 2010).

To estimate this effect, logistic regression models were used to test the odds of experiencing complicated grief using the IPW estimation method. Researchers estimated the model using PROC GLIMMIX in SAS 9.1 (SAS Institute, 2004), in which the outcome was the indicator of whether the participant received the SOS program. PROC GLIMMIX uses the logit link function for dichotomous outcome data and error terms for non-normally distributed dependent variables (in this case binomial).

Appendix B: SOS Logic Model



INPUTS	OUTPUTS		SURVIVOR OUTCOMES		PCA Measures of Effectiveness (MOEs)
	Activities	*Participants*	*Short-Term (<1 year since death)*	*Long-Term (1+ years post death)*	
• Equipment • Materials • Money *(Federal funding and/or Contract)* • Partners (GO and NGO) • Staff (Support Coordinators, Financial Counselors*) • Technology • Time • Volunteers	• Market/advertise program (newsletters, flyers, emails, telephone calls) • Conduct command and unit briefings • Develop resources for Survivors • Coordinate support groups (e.g. dine-in) • Coordinate events with and for Survivors (e.g. Memorial ceremonies, summer camp) • Leverage governmental and NGO support on and off post to expand available resources and events for Survivors	Surviving primary and secondary next of kin of Active Duty, National Guard, Reserve Component, and Retired Soldiers**	• Increases awareness of SOS and available resources • Feels connected to and supported by SOS staff • Aware of available Survivor support groups • Feels connected to and supported by other Survivors • Has access to civilian community-based resources (especially in geographically dispersed locations) • Experiences an increased sensitivity by civilian agencies when dealing with Survivors	• Increases Survivor awareness of available resources • Feels ongoing connection with SOS • Feels connected to and supported by other Survivors • Has access to civilian community-based resources (especially in geographically dispersed locations) • Experiences an increased sensitivity by civilian agencies when dealing with Survivors • Interest in volunteering with the SOS Program (e.g., peer-to-peer support) • Remains part of the Army family as long as they desire	SOCIAL SUPPORT
	• Monitor Survivor benefit milestones and assist in managing transitions • Identify needed financial services* • Assist with short- and long-term financial planning* • Stay current with case management (CTS & DCIPS) to meet Survivors' needs in timely manner (meet, via telephone) • Assist in advocating for benefits • Provide pre-deployment education on finances, benefits (USAR)		• Increases Survivors access to credible financial services • Formulates short-term and long-term financial plans • Learns to navigate legal and benefit process • Receives benefits to which entitled • Increases Survivors money management skills • Improves ability for milestone management • Has relocation transition costs covered	• Navigates legal and benefit process • Able to make informed financial decisions • Improves ability for milestone management • Has relocation transition costs covered • Finds new housing, with mortgage paid • Increases self-sufficiency	TRANSITIONAL STRESS FINANCIAL WELL-BEING
	• Assess Survivor needs for program planning • Refer to life skills education workshops • Provide information and referrals and link Survivors with outside resources/services • Provide non-clinical support		• Increases knowledge of grief process • Begins coping skills to manage grief effectively • Improves ability to care for their children	• Manages grief effectively • Improves ability to care for their children	BEHAVIORAL HEALTH/ RESILIENCE

*National Guard does not have SOS Financial Counselors, therefore, financial counseling is provided by outside resources.
**Although not actively targeted, extended family and friends of deceased Soldiers and Survivors from different service branches may also participate in the SOS program.

SOURCES: PCA logic models for Active Component, ARNG, and USAR; 2013 SOS Operations Manual; SOS Staff Guide by UGA; Discussions with SOS Partners representing all components; and SOS Support Coordinators and Financial Counselors at select SOS offices.