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# Measuring Associations of the Department of Veterans Affairs' Suicide Prevention Campaign on the Use of Crisis Support Services

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Campaigns have become popular in public health approaches to suicide prevention; however, limited empirical investigation of their impact on behavior has been conducted. To address this gap, utilization patterns of crisis support services associated with the Department of Veterans Affairs' Veterans Crisis Line (VCL) suicide prevention campaign were examined. Daily call data for the National Suicide Prevention Lifeline, VCL, and 1-800-SUICIDE were modeled using a novel semi-varying coefficient method. Analyses reveal significant increases in call volume to both targeted and broad resources during the campaign. Findings underscore the need for further research to refine measurement of the effects of these suicide prevention efforts.

Despite increased national attention and calls for action, suicide claims more American lives each year than motor vehicle accidents (Rockett et al., 2012). While mortality from other leading causes of death has decreased, suicide rates in the United States have climbed (Xu, Kochanek, Murphy, & Arias, 2014). Identifying effective strategies that encourage individuals to seek help is an urgent public health priority,

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and communication campaigns were recognized for their potential as such interventions in the 2012 National Strategy for Suicide Prevention (U.S. Department of Health and Human Services [HHS] Office of the Surgeon General and National Action Alliance for Suicide Prevention, 2012). While there is evidence that these efforts can motivate health behaviors across targeted populations (Hornik, 2002; Noar, 2006; Snyder et al., 2004; Wakefield, Loken, & Hornik, 2010), investigation of their use for suicide prevention is limited (Chambers et al., 2005).

Campaigns typically work to impart information that influences key behavioral determinants such as knowledge and attitudes to promote healthy practices (Ajzen, 2012; Fishbein & Yzer, 2003). Therefore, messaging can be seen as an integral component of suicide prevention efforts by shifting individual characteristics (e.g., awareness, attitudes) that increase the likelihood to seek help, and facilitate behaviors such as the use of available resources. While the corpus of research is small, the findings are promising and suggest that suicide prevention campaigns can increase awareness of crisis support services, shape positive perceptions of help-seeking, and encourage crisis line use across different groups (Daigle et al., 2006; Dumesnil & Verger, 2009; Jenner, Woodward Jenner, Matthews-Sterling, Butts, & Williams, 2010; Karras, Stephens, Kemp, & Bossarte, 2014; Oliver et al., 2008). Crisis lines are a readily available service that provide timely care and act as an important conduit to local support for those in need. Given their significant role in addressing suicide risk (Wilson, Bushnell, & Caputi, 2011), further examination of efforts to endorse crisis line use is needed.

Prior studies have primarily employed standard regression techniques and measured associations of "specific periods of time" (e.g., pre-/postcampaign) and "number of calls to crisis lines" for select geographic areas (e.g., pilot cities) to determine changes in utilization surrounding suicide prevention campaign implementation (Bossarte et al., 2014; Jenner et al., 2010; Oliver et al., 2008). While existing results provide important initial insights, analyses to date have not fully considered the different ways in which communication may generate calls to crisis lines or accounted for naturally occurring variability in call volume that may impact the measurement of campaign effects. As such, the use of novel methods to model the complexity of this type of data and communication processes over time is warranted.

In this article we address existing gaps by assessing outcomes associated with the Veterans Crisis Line (VCL) suicide prevention campaign implemented by the Department of Veterans Affairs (VA). More specifically, we examine the relationships between call volume to crisis lines and the VCL campaign using a semi-varying coefficient model. This method extends prior research by considering temporal covariates and multiple conditions in which campaigns may prompt individuals to call crisis lines. While campaign messages are expected to endorse specific behaviors (i.e., VCL use among veteran populations), there is some evidence that such promotion may induce related health behavioral changes among targeted audiences (Elder, Karras, & Bossarte, in press). Therefore, we assess utilization patterns for both targeted and general crisis support services associated with messaging activity.

## METHOD

### *VA VCL Suicide Prevention Campaign*

In 2007, the VA launched the VCL (formerly the National Veterans Suicide Prevention Hotline) to provide specialized care to veterans and active duty military in crisis and resources for their families and friends. This resource can be accessed through multiple methods including by phone through a number shared with the National Suicide Prevention Lifeline (Life-

line; 1-800-273-8255/TALK), and pressing "1." In 2009, the VA implemented the campaign assessed in this study to increase awareness and use of the VCL. Messages specific to military culture were developed, which included imagery (e.g., soldier, American flag) and language (e.g., warrior, strength) germane to veterans and emphasized the use of the "press 1" option to reach the VCL. The slogan "It takes the courage and strength of a warrior to ask for help. ... If you're in emotional crisis call 1-800-273-TALK press '1' for Veterans" was displayed across print campaign materials (i.e., placards, billboards) that were placed on mass-transit including buses (interior and exterior), bus shelters, rail cars, and stations across the United States. The campaign ran from May through November 2009. Some preliminary evaluation of pilot messaging was conducted; however, results were limited and did not consider the methodological challenges associated with analysis of daily call data (Bossarte et al., 2014).

### *Data*

Campaign messages displayed the shared number with Lifeline; however, the VCL was also accessible during the study period by calling 1-800-SUICIDE and also pressing "1." While the 1-800-SUICIDE calls were subsequently routed to Lifeline, examination of the use of different crisis services has important implications for understanding how suicide prevention campaigns influence behavior. As such, calls to the VCL, Lifeline, and 1-800-SUICIDE were included in this study.

De-identified data were obtained for the crisis lines and included all calls received from November 1, 2007 through August 31, 2010, and were grouped into four categories for analyses: (1) calls to Lifeline; (2) calls to the VCL via Lifeline "press 1"; (3) calls to 1-800-SUICIDE; and (4) calls to the VCL via 1-800-SUICIDE "press 1." The total number of daily calls was tabulated for each category and indicators for day of week, season, and campaign period (from May 11, 2009, to November 16, 2009) were included in the data set. Data were then modeled using an autoregressive conditional varying coefficient model adapted from Bui, Huggins, Hwang, White, and Erbas (2010). All analyses were conducted in R statistical software (R Development Core Team, 2015).

### *Modeling Approach and Analyses*

The semi-varying coefficient model accounts for both parametric and nonparametric structures in the data. This method allows for the ability to make inferences with limited available information on factors that may impact crisis line use, including those that are unstudied (e.g., unrelated promotional activity) by permitting call volume to smoothly vary with time (vs. fixed or constant).

For the purpose of the current analyses, let $t$ index the days in the study period ($1 \leq t \leq T$). Let $Y_t$ denote the number of calls in the $t$th day, and $F_t$ signify the history of calls up to and including the $t$ day so that observations over time are $F_t = \{Y_1, Y_2, \ldots, Y_t\}$. Thus, the equation for the conditional mean of daily number of calls to the crisis lines given the history $F_t$ can be defined as:

$$E(Y_t|F_{t-1}) = Y_{t-1}(\alpha_t + \mathbf{X}_t^T\boldsymbol{\beta}) + \mathbf{Z}_t^T\boldsymbol{\gamma}, 1 \leq t \leq T$$

where $\mathbf{X}_t$ and $\mathbf{Z}_t$ represent two sets of covariates, parameters are expressed by $\boldsymbol{\theta} = (\alpha_t, \boldsymbol{\beta}^T, \boldsymbol{\gamma}^T)^T$, and $\mathbf{A}^T$ indicates the transpose of matrix $\mathbf{A}$. This model includes two parts, where the first term $Y_{t-1}(\alpha_t + \mathbf{X}_t^T\boldsymbol{\beta})$ is the number of calls made by those who were considering calling, but did not make the call until $t$th day (represents "contemplative" callers), and the second term $\mathbf{Z}_t^T\boldsymbol{\gamma}$ is the number of calls from individuals who were not considering calling prior to day $t$, but did so on the $t$th day (represents "impromptu" callers).

The first term of the model $Y_{t-1}(\alpha_t + \mathbf{X}_t^T\boldsymbol{\beta})$ consists of both parametric and nonparametric parts. The parametric term $Y_{t-1}\mathbf{X}_t^T\boldsymbol{\beta}$ allows us to examine the

impact of covariates $\mathbf{X}_t$ on the number of calls from the contemplative callers. $Y_{t-1}\alpha_t$ represents the nonparametric component of the model and is used to account for variation not already explained for both the contemplative ($Y_{t-1}\mathbf{X}_t^T\boldsymbol{\beta}$) and impromptu ($\mathbf{Z}_t^T\boldsymbol{\gamma}$) callers.

There are three binary covariates $\mathbf{X}_t$ included in the model: (1) day of the week ($X_{t\text{Mon}}, X_{t\text{Tues}}, \ldots, X_{t\text{Sat}}$); (2) season ($X_{t\text{Spring}}$, $X_{t\text{Summer}}$, $X_{t\text{Autumn}}$); and (3) campaign ($X_{t\text{Campaign}}$). Sunday, winter, and "no campaign" serve as the reference category for all analyses, respectively. We then set $\mathbf{Z}_t$ equal to $\mathbf{X}_t$. Taken together, the model used to examine the number of daily calls to the crisis lines given the history $F_t$ is given by:

$$\begin{aligned}E(Y_t|F_{t-1}) = {} & \alpha_t Y_{t-1} + \beta_1 Y_{t-1}X_{t\text{Mon}} \\ & + \beta_2 Y_{t-1}X_{t\text{Tues}} + \ldots, \\ & + \beta_6 Y_{t-1}X_{t\text{Sat}} + \beta_7 Y_{t-1}X_{t\text{Spring}} \\ & + \beta_8 Y_{t-1}X_{t\text{Summer}} \\ & + \beta_9 Y_{t-1}X_{t\text{Autumn}} \\ & + \beta_{10} Y_{t-1}X_{t\text{Campaign}} \\ & + \gamma_1 X_{t\text{Mon}} + \gamma_2 X_{t\text{Tues}} + \ldots, \\ & + \gamma_6 X_{t\text{Sat}} + \gamma_7 X_{t\text{Spring}} \\ & + \gamma_8 X_{t\text{Summer}} + \gamma_9 X_{t\text{Autumn}} \\ & + \gamma_{10} X_{t\text{Campaign}}\end{aligned}$$

The parameters in this model correspond with the covariates so that $\beta_1$–$\beta_6$($\gamma_1$–$\gamma_6$) reflects day of week, $\beta_7$–$\beta_9$($\gamma_7$–$\gamma_9$) relates to seasonal variation, and $\beta_{10}$($\gamma_{10}$) is indicative of the campaign for contemplative (impromptu) callers. The parameters $\beta$ account for influence on the total number of calls on the previous day or season (i.e., impact on contemplative callers). The parameters $\gamma$ represent the fixed daily, seasonal, or campaign effects (i.e., the impact on impromptu callers) and reflect changes in daily calls with no consideration of those made on the prior day/season.

Inferences about the parameters in this model were based on the method of maximum likelihood (Huggins, Hall, Yip, & Bui, 2007); however, overdispersion was confirmed with significant formal regression tests at $p < .001$ (not shown). Therefore, a nonparametric bootstrap method (Field & Welsh, 2007) was employed to estimate standard errors in order to correct for overdispersion.

## RESULTS

We fit the varying coefficient models to the daily number of calls for the four categorized crisis lines and included the covariates of interest (day of week, season, and campaign period). All deviance $R^2$ were above .76, indicating that the data fit the models reasonably well. The estimated parametric effects on Lifeline and the VCL accessed via Lifeline are highlighted in Table 1 (the number promoted in the campaign), while those pertaining to 1-800-SUICIDE and use of the VCL via this crisis line are reported in Table 2 (*not* intentionally promoted in the campaign).

### *Influence on the Promoted Phone Number: Lifeline and VCL*

The positive $\beta$ estimates for day of week are shown in Table 1, which indicates that more calls to Lifeline and the VCL were received during the week (or the first half of the week for the VCL) than on Sunday ($p < .001$). However, seasonal changes in calls differed for each crisis line. More specifically, Lifeline's daily call volume peaked in the spring from the winter (0.028, $SE = 0.002$, $p < .001$), and then declined in the summer (−0.028, $SE = 0.002$, $p < .001$) and autumn (−0.025, $SE = 0.002$, $p < .001$). These results support prior research that the use of telephone counseling services has seasonal cycles (Driscoll & Stillman, 2002). Conversely, the daily number of calls to the VCL increased from winter to spring (0.129, $SE = 0.006$, $p < .001$), summer (0.040, $SE = 0.004$, $p < .001$), and autumn (0.090, $SE = 0.005$, $p < .001$) with the largest estimate reported during the spring. However, this change may be indicative of

**TABLE 1**
*Parametric Effects on Daily Total Calls by Day of Week, Season, and During the Department of Veterans Affairs VCL Campaign[c] to the Promoted Phone Number (1-800-273-8255): National Suicide Prevention Lifeline and the Veterans Crisis Line ("Press 1"), USA, November 1, 2007–August 31, 2010*

| | Coefficient | | *SE*[a] | | *P* value | |
|---|---|---|---|---|---|---|
| Parameter[b] | Lifeline | VCL | Lifeline | VCL | Lifeline | VCL |
| $\beta_1$ (Mon) | **0.148** | **0.176** | **0.005** | **0.009** | **<.001** | **<.001** |
| $\beta_2$ (Tues) | **0.688** | **0.560** | **0.003** | **0.006** | **<.001** | **<.001** |
| $\beta_3$ (Wed) | **0.114** | **0.137** | **0.004** | **0.006** | **<.001** | **<.001** |
| $\beta_4$ (Thurs) | **0.055** | **−0.137** | **0.005** | **0.006** | **<.001** | **<.001** |
| $\beta_5$ (Fri) | **−0.047** | **−0.257** | **0.005** | **0.009** | **<.001** | **<.001** |
| $\beta_6$ (Sat) | **0.022** | **−0.072** | **0.004** | **0.006** | **<.001** | **<.001** |
| $\beta_7$ (Spring) | **0.028** | **0.129** | **0.002** | **0.006** | **<.001** | **<.001** |
| $\beta_8$ (Summer) | **−0.028** | **0.040** | **0.002** | **0.004** | **<.001** | **<.001** |
| $\beta_9$ (Autumn) | **−0.025** | **0.090** | **0.002** | **0.005** | **<.001** | **<.001** |
| $\beta_{10}$ (Campaign) | **−0.054** | **−0.150** | **0.002** | **0.004** | **<.001** | **<.001** |
| $\gamma_1$ (Mon) | **4567.156** | **847.822** | **34.003** | **14.204** | **<.001** | **<.001** |
| $\gamma_2$ (Tues) | **4703.853** | **1694.877** | **39.828** | **21.213** | **<.001** | **<.001** |
| $\gamma_3$ (Wed) | **6040.204** | **1757.493** | **38.597** | **23.189** | **<.001** | **<.001** |
| $\gamma_4$ (Thurs) | **5042.125** | **1644.726** | **37.696** | **12.592** | **<.001** | **<.001** |
| $\gamma_5$ (Fri) | **6061.962** | **1691.138** | **23.720** | **11.347** | **<.001** | **<.001** |
| $\gamma_6$ (Sat) | **4747.469** | **1052.119** | **41.973** | **20.718** | **<.001** | **<.001** |
| $\gamma_7$ (Spring) | **94.499** | −13.099 | **15.450** | 10.120 | **<.001** | .173 |
| $\gamma_8$ (Summer) | **97.387** | **303.467** | **17.120** | **11.220** | **<.001** | **<.001** |
| $\gamma_9$ (Autumn) | **−45.975** | **120.394** | **17.036** | **13.291** | **.011** | **<.001** |
| $\gamma_{10}$ (Campaign) | **1547.564** | **677.113** | **19.689** | **12.839** | **<.001** | **<.001** |

Note. Bold values represent statistically significant findings.
Lifeline = National Suicide Prevention Lifeline; VCL = Veterans Crisis Line.
[a]Bootstrap estimates of standard error based on 5,000 bootstrap samples.
[b]Reference categories for analyses include Sunday, winter, no campaign.
[c]VCL Campaign = Veterans Crisis Line suicide prevention campaign implemented by the Department of Veterans Affairs from May 2009 to November 2009.

the overall increase in call volume to the VCL since its inception in 2007. A negative campaign β estimate was also found, and despite tailoring messages toward veterans, it was larger for the VCL (−0.150, $SE = 0.004$, $p < .001$) than Lifeline (−0.054, $SE = 0.002$, $p < .001$).

While positive γ estimates are reported for each day of the week for both crisis lines (i.e., additional calls are made each day when compared to Sunday), fewer daily calls were made in autumn than in the winter (−45.975, $SE = 17.036$, $p = .011$) for Lifeline. When accounting for the covariates, the campaign had a positive impact on daily calls made to both crisis lines (Lifeline: 1547.564, $SE = 19.689$, $p < .001$; VCL: 677.113, $SE = 12.839$, $p < .001$). As such, the VCL campaign may have been especially important in facilitating help-seeking among those with low intentions to utilize crisis lines. Conversely, the campaign may have also enhanced awareness of the VCL among veterans leading to its increased use, as the service was relatively new during this promotional period.

### *Influence on Broad Resources: 1-800-SUICIDE and VCL*

A positive β estimate for the campaign (0.065, $SE = 0.009$, $p < .001$) showed

**TABLE 2**
*Parametric Effects on Daily Total Calls by Day of Week, Season, and During the Department of Veterans Affairs VCL Campaign[c] to Broad Crisis Resources: 1-800-SUICIDE and the Veterans Crisis Line ("Press 1"), USA, November 1, 2007–August 31, 2010*

| | Coefficient | | *SE*[a] | | *P* value | |
|---|---|---|---|---|---|---|
| Parameter[b] | 1-800-SUICIDE | VCL | 1-800-SUICIDE | VCL | 1-800-SUICIDE | VCL |
| $\beta_1$ (Mon) | 0.002 | **0.244** | 0.005 | **0.010** | .367 | **<.001** |
| $\beta_2$ (Tues) | **0.292** | **0.399** | **0.005** | **0.011** | **<.001** | **<.001** |
| $\beta_3$ (Wed) | **0.091** | **−0.078** | **0.006** | **0.012** | **<.001** | **<.001** |
| $\beta_4$ (Thurs) | **−0.024** | −0.017 | **0.006** | 0.011 | **<.001** | .123 |
| $\beta_5$ (Fri) | −0.008 | **0.186** | 0.006 | **0.014** | .165 | **<.001** |
| $\beta_6$ (Sat) | **−0.309** | **−0.057** | **0.005** | **0.026** | **<.001** | **.039** |
| $\beta_7$ (Spring) | **0.016** | **−0.140** | **0.003** | **0.008** | **<.001** | **<.001** |
| $\beta_8$ (Summer) | **0.035** | 0.022 | **0.002** | 0.013 | **<.001** | .092 |
| $\beta_9$ (Autumn) | **0.059** | **0.150** | **0.002** | **0.017** | **<.001** | **<.001** |
| $\beta_{10}$ (Campaign) | 0.003 | **0.065** | 0.003 | **0.009** | .214 | **<.001** |
| $\gamma_1$ (Mon) | **4141.121** | **472.750** | **47.359** | **12.973** | **<.001** | **<.001** |
| $\gamma_2$ (Tues) | **4392.255** | **424.115** | **70.108** | **8.773** | **<.001** | **<.001** |
| $\gamma_3$ (Wed) | **3877.261** | **326.754** | **58.763** | **21.795** | **<.001** | **<.001** |
| $\gamma_4$ (Thurs) | **4579.857** | **504.379** | **50.415** | **15.075** | **<.001** | **<.001** |
| $\gamma_5$ (Fri) | **4767.408** | **425.012** | **59.526** | **10.716** | **<.001** | **<.001** |
| $\gamma_6$ (Sat) | **3194.909** | **265.904** | **46.702** | **9.406** | **<.001** | **<.001** |
| $\gamma_7$ (Spring) | **−228.029** | **−92.577** | **13.816** | **9.652** | **<.001** | **<.001** |
| $\gamma_8$ (Summer) | **−211.678** | **−98.518** | **14.217** | **7.584** | **<.001** | **<.001** |
| $\gamma_9$ (Autumn) | **−320.941** | **63.542** | **12.433** | **7.945** | **<.001** | **<.001** |
| $\gamma_{10}$ (Campaign) | **−36.330** | **−43.494** | **12.924** | **8.126** | **.008** | **<.001** |

Note. Bold values represent statistically significant findings. Lifeline = National Suicide Prevention Lifeline; VCL = Veterans Crisis Line.
[a]Bootstrap estimates of standard error based on 5,000 bootstrap samples.
[b]Reference categories for analyses include Sunday, winter, no campaign.
[c]VCL Campaign = Veterans Crisis Line suicide prevention campaign implemented by the Department of Veterans Affairs from May 2009 to November 2009.

that daily calls significantly increased only to the VCL among contemplative callers. The $\gamma$ estimates for the campaign were negative for both crisis lines (Lifeline: −36.330, *SE* = 12.924, $p = .008$; *VCL*: −43.494, *SE* = 8.126, $p < .001$). Messaging does not increase use of unadvertised crisis services among those with no prior intention to call (i.e., impromptu callers), and the campaign may simply not have resonated with this group.

*Varying Coefficient Estimate*

Plots of the estimated varying coefficients ($\alpha$) for each crisis line are included in Figures 1 and 2 and represent the nonparametric components to the models (fluctuations in call volume not associated with the measured covariates). While the alphas vary over the study period, there are some increases in calls to the crisis lines surrounding September (suicide prevention month) and May (mental health awareness month). This may reflect other local, regional, or national efforts, including media reporting, that promoted help-seeking and advertised available resources for care. However, trends generally declined during the campaign period, which reinforces that the measured call volume changes may be a result of the VA messaging.

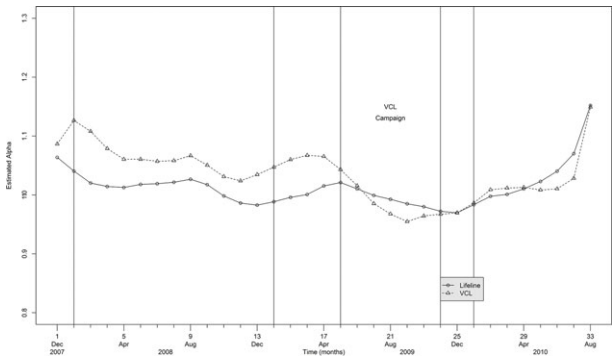


Figure 1. Estimated varying coefficient (α) for monthly calls to the promoted crisis phone number (1-800-273-8255) surrounding the implementation of the Department of Veterans Affairs VCL Campaign: National Suicide Prevention Lifeline (Lifeline) and Veterans Crisis Line ("press 1"), USA, November 2007–August 2010. VCL Campaign = Veterans Crisis Line suicide prevention campaign implemented by the Department of Veterans Affairs from May 2009 to November 2009.

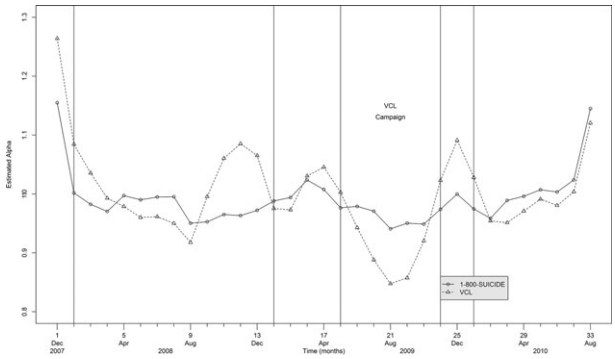


Figure 2. Estimated varying coefficient (α) for monthly calls to broad crisis resources surrounding the implementation of the Department of Veterans Affairs VCL Campaign: 1-800-SUICIDE and Veterans Crisis Line ("press 1"), USA, November 2007–August 2010. VCL Campaign = Veterans Crisis Line suicide prevention campaign implemented by the Department of Veterans Affairs from May 2009 to November 2009.

## DISCUSSION

In this study we report patterns in crisis line use associated with the VA's VCL suicide prevention campaign. We sought to extend prior research by applying statistical methods that consider the characteristics of call data in analyses to elucidate the relationship of call volume and strategic messaging. Results lend empirical support for the use of campaigns to endorse help-seeking and inform the promotion of specific and broad crisis services, but also underscore the need for further research examining related behavioral outcomes.

Measuring associations between campaigns and behavior change can be difficult as messaging is often multifaceted and impacted by a range of factors (Ajzen, 2012; Chambers et al., 2005; Hornik, 2002; Wakefield et al., 2010). The methods employed in this study to examine call data permit a more comprehensive understanding of the relationships between campaigns and service use than those applied in prior investigations. Few studies on suicide prevention messaging and crisis line use have controlled for several exogenous variables or modeled associations for different types of calls/callers. While results from this study are consistent with

initial findings on suicide prevention campaigns, additional exploration of methods to model this type of data is useful to better distinguish messaging effects from other sources of call volume change.

The VCL campaign was associated with small yet statistically significant increases in daily calls to crisis lines when adjusting for other sources of known variability. These findings are promising given the potentially limited visibility or market saturation of the messages. This may suggest that campaigns, despite their intensity, play an important role in suicide prevention, and reinforce the broader health communication literature that argue even modest messaging efforts can translate into population-level effects on behavior (Noar, 2006; Snyder et al., 2004; Wakefield et al., 2010).

While the VCL campaign was tailored to endorse a specific behavior, results suggest that messaging encouraged the use of both targeted and broad resources. One of the greatest challenges campaigns face is reaching their intended audience (Hornik, 2002), yet changes in VCL daily call volume (targeted resource) were evident during the VA campaign period indicating increased use among targeted groups. Calls were generated from both the promoted resource and by unadvertised crisis lines (1-800-SUICIDE). Viewing messages may have primed some veterans already considering calling to pay increased attention to the VCL ("press 1") rather than the specific phone number, ultimately using 1-800-SUICIDE to access it rather than that promoted. Such findings underscore the continued need to raise awareness of available resources to facilitate help-seeking and demonstrate the utility of campaigns to do so.

Calls also increased to the Lifeline (broad resource) during the campaign. While veterans may have contributed to this rise in call volume, campaign materials were placed in public venues not specific to the veteran community. The broader population was more than likely exposed to messages that displayed the shared number and may have generalized the promoted behavior by calling Lifeline instead of the VCL. Measures of both intended and secondary effects should be included in evaluation strategies for suicide prevention messaging as a single campaign may have an extensive "reach" and activate help-seeking across multiple audiences.

However, increases in the use of the promoted crisis line number (Lifeline and VCL via Lifeline) were only evident during the campaign among impromptu callers; that is, among those with little prior intention to call. Intentions are often a function of knowledge, attitudes, and norms—individuals are more disposed to engage in a behavior if they believe it is beneficial, achievable, and perceived as acceptable (Ajzen, 2012; Fishbein & Yzer, 2003). The VCL campaign may contribute to shaping or improving such characteristics and encouraged behavior change (i.e., call the crisis line) among this type of caller. Such findings warrant further investigation as the identification of strategies to facilitate service use are an important priority for suicide prevention, particularly among those with low intentions to seek help (HHS Office of the Surgeon General and National Action Alliance for Suicide Prevention, 2012). In contrast, there was a small decrease in number of calls to the promoted phone number among contemplative callers, suggesting that these individuals may not require additional motivation to prompt this behavior or reinforce its value. These results should be considered when designing campaign messages that aim to create new attitudes or behaviors versus reinforce/strengthen existing ones.

### *Limitations and Next Steps*

Limitations of this research should also be acknowledged. Direct measure of the association between message exposure and calls to the crisis line was not possible with our data. Future research should consider expanding campaign variables to include marketing metrics and direct assessments of

exposure. The campaign ran for approximately 6 months; however, it is possible that material remained posted beyond the end date. As such, future exploration of lagged effects is warranted. The VCL campaign was part of the VA's broader effort to reduce suicide risk among veterans. Callers may have also been exposed to other interventions that encouraged the use of the crisis line. While the nonparametric portion of our model would have accounted for this in analyses, potential dose–response effects could be examined as next steps to determining message impact. Information on callers (e.g., demographics; VA service use) to the crisis lines was not available to include in the analyses, and their inclusion in future research may tease out the potential influence of messaging among caller subpopulations. Finally, while varying coefficient models consider the dynamic features of complex data to better model relationships, this method is less useful when applied to smaller data sets with rare outcomes. Therefore, use of the model to examine different suicide prevention campaigns may be limited and methods may not be replicable for smaller initiatives. Next steps may include application of this modeling approach (if possible) to other VA mental health-related campaigns to determine and/or compare their relationship with the use of different health care services.

## CONCLUSION

This study provides empirical evidence of the ability for campaigns to promote the use of crisis lines. Novel methods were employed to account for several alternative explanations for changes in call patterns during promotional periods. Results emphasize the need for further examination of campaigns and their potential to support suicide prevention efforts.

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