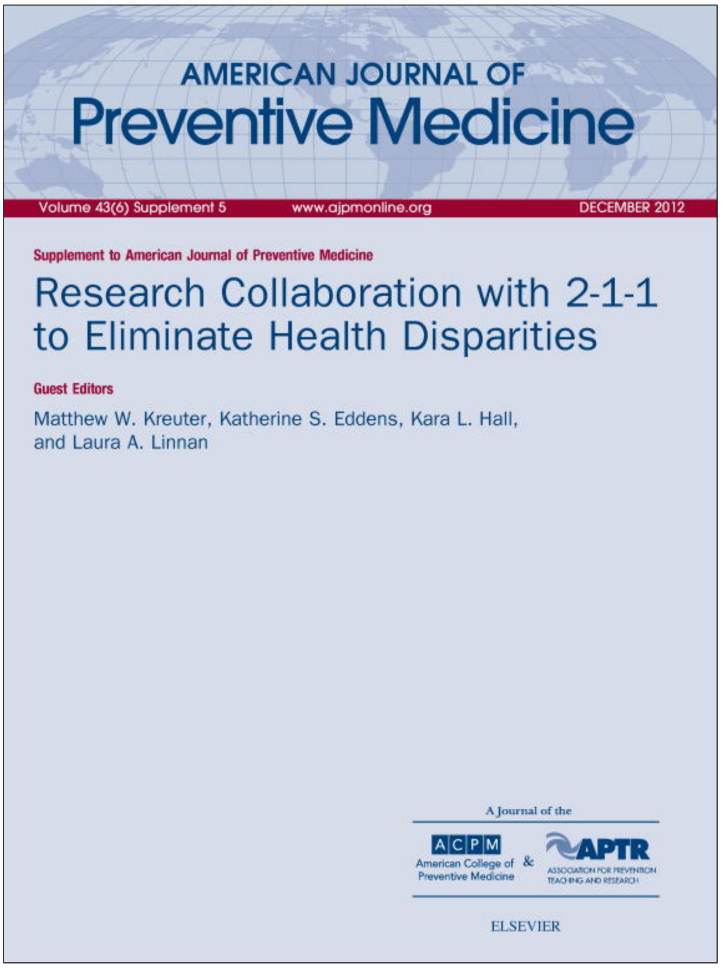
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Public Broadcasting, Media Engagement, and 2-1-1

Using Mass Communication to Increase the Use of Social Services

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Background: The 2008–2009 subprime mortgage crisis was catastrophic, not only for the global economy but for families across the social spectrum. The resultant economic upheaval threatened the livelihoods, well-being, and health of many citizens, who were often unsure where to turn for help. At this critical juncture, public broadcasting stations worked to connect viewers to support resources through 2-1-1.

Purpose: This study was designed to evaluate the ability of public broadcasting to increase the use of information and referral services.

Methods: Autoregressive integrated moving average (ARIMA) modeling and regression analysis document the relationship between public broadcasting initiatives and 2-1-1 call volume in 35 highly affected U.S. markets. Time-series data from St. Louis MO were collected and analyzed in 2008. Station-level data from across the nation were collected during 2009–2010 and analyzed in 2010.

Results: ARIMA results show a distinct linkage between the timing and duration of Channel 9 in St. Louis MO (KETC) programming and a subsequent (approximately 400%) increase in 2-1-1 calls regarding financial services and assistance. Regression path analysis not only found evidence of this same effect nationally but also showed that differences in the broadcaster's orientation and approach mediated effects. Specifically, stations' orientations toward engagement were mediated through strong outreach strategies to increase 2-1-1 use.

Conclusions: This study documents the ability of public broadcasting to help citizens in need connect with social resources through 2-1-1 services. By focusing attention on the mortgage crisis and its attendant consequences, and by publicizing 2-1-1 services as a gateway to supportive resources, public broadcasters fostered linkages between those in need and social resources. Moreover, the level of a station's commitment to engaging citizens had a strong bearing on the success of its programming initiatives and community partnerships with organizations such as 2-1-1.
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Introduction

Mass media have the ability to increase the reach of 2-1-1 and thereby expand use of critical social services, especially among the underserved. Such efforts have the potential to address critical health and social service issues by increasing utilization of resources directed to those in need while also enhancing the visibility of 2-1-1 as a community partner. Public media, such as the PBS stations that spearheaded and participated in the effort considered here, are particularly well positioned to foster "media engagement" around issues of community concern and available social services. In this case, public media and 2-1-1 cooperated to

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address the mortgage crisis and the rise of home foreclosures, but the potential of this work extends to a wider range of issues.

The subprime mortgage crisis and the resulting recession beginning in 2008 have had widespread economic consequences, including a tightening of available credit, a cascading loss of property values, a reduction of tax revenues for health and social services, and a weakened housing and employment market that has yet to recover.[1] The repercussions of this crisis have not been limited to financial outcomes, but extend to a range of mental and physical health problems.[2] People facing foreclosure and job loss face higher rates of anxiety disorders, depression, hypertension, alcoholism, and suicide.[2,3]

Public broadcasting responded to this crisis by engaging in concerted efforts to inform citizens of resources available to avoid foreclosure through 2-1-1. After piloting an effort at the local level in St. Louis, a nationwide initiative leveraged the power of public television and radio stations in 35 markets, all partnering with 2-1-1 services, most United Way funded. This provided critical guidance to homeowners hoping to avoid foreclosure and address other financial concerns. The research reported here provides evidence of this initiative's effectiveness and offers a model for how public media can partner with 2-1-1 to respond to other public health challenges facing local communities.

The Mortgage Crisis and Its Consequences

The U.S. mortgage crisis can be traced to banks making "subprime" loans to high-risk borrowers without much regulatory oversight. These loans, often adjustable-rate mortgages requiring little or no down-payment, encouraged borrowing predicated on the assumption that housing prices would continue to rise. When the housing bubble burst and mortgage rates rose, many homeowners could no longer afford their payments. A stagnant real estate market left many struggling homeowners unable to sell their houses, further contributing to the decline of mortgage-backed securities. The federal government took steps to address the economic crisis including the (Troubled Asset Relief Program (TARP) efforts and various economic stimulus packages.

At the height of the crisis, in late 2008 into 2009, one in ten homeowners was at least a month behind in mortgage payments, with a *third* of these mortgage holders headed toward foreclosure. The percentage of homeowners facing foreclosure or walking away from "underwater" mortgages (i.e., where the amount owed by home owners is less than the market value of the property) moved into the double digits in the most adversely affected communities. Foreclosure filings rose to nearly 4 million homes annually by 2009, with delinquencies, defaults, and foreclosures rising to 14.4% of home mortgages.[4,5] Rates of defaults have remained high, with more than 3.2 million in 2010, well over the 1.2 million annual rate from 2006.[6] The resultant turmoil has sent ripples through the economy, stifling consumer confidence and employment.

Although the broad economic impact of the mortgage crisis has been monumental, the human impact arguably has been more devastating, with many of them preventable. Many families have experienced lost jobs, lost homes, and lost financial security. The costs extend beyond financial conditions by tearing away at the social fabric that makes for successful communities and families.[7] Moreover, the loss of jobs and homes has been found to affect psychological health in terms of anxiety, stress, and insecurity[2]; physical health in terms of hypertension, cardiovascular disease, kidney disease, and arthritis[3,8,9]; and broader health concerns such as suicide and alcoholism.[8] Although certainly a financial calamity, the mortgage crisis also can be understood as a preventable public health issue. Further, the trail of devastation left by the mortgage crisis has strained community institutions and resources available to help communities, families, and individuals cope with the consequences, exacerbating these medical issues.

Community institutions like public broadcasting and 2-1-1 stepped into this gap to support cities and regions dealing with the consequences of the mortgage crisis. They worked to spread knowledge about concerns like the dangers of excessive borrowing and the pitfalls of adjustable-rate mortgages. They also connected people with resources for assistance in dealing with the economic and psychological consequences of the crisis. The effectiveness of these efforts at a local and national level is the focus of this inquiry.

Public Media Responds

This effort began with one public broadcasting station, KETC (Channel 9 in St. Louis MO), and the partnership it forged with the local 2-1-1 service to respond to the challenges of the mortgage crisis. As the most widely watched public broadcasting station in the country in terms of per capita audience, KETC was well positioned to address this crisis with its ability to reach audiences with trusted messages "on air, online, and in person." Its contributions were much needed too, as the St. Louis Metro area was among the most adversely affected in the country. Home prices fell more steeply than the national average, coupled with double-digit rises in foreclosure rates in 2008 and 2009.

In Spring 2008, KETC was entrusted by the Corporation for Public Broadcasting (CPB) with the responsibility (1) to inform homeowners facing foreclosure of the resources available to them through federal and regional programs and (2) to mobilize citizens equipped to provide support to those affected by the crisis. The station's efforts around the mortgage crisis resulted in a seven-part initiative that included:

- on-air messages about available resources;
- story segments in existing programs;
- multiple call-in shows focusing on the community needs;
- specialized content on KETC's website;
- KETC-posted content on YouTube;
- articles in the St. Louis Beacon online newspaper; and
- information sharing at community events.

This work was geared toward driving audiences to talk about foreclosure solutions with those in need and encouraging calls to 2-1-1 from those struggling with mortgage defaults and related financial difficulties. KETC and United Way had shared a long relationship working together on early childhood health and development issues in the community. Although known as an important community asset within health and social services and public broadcasting networks, 2-1-1 was not well known throughout the community at that point. Recognizing that KETC did not have the expertise or capacity to connect people to resources, discussions were launched with the leadership of the two organizations. Both immediately recognized the value of the partnership and joined together for this effort. Evidence of effectiveness was gathered and preliminary analysis conducted (e.g., longitudinal analysis connecting message placement with call volume to 2-1-1). Based on this preliminary evidence, a larger national effort was launched at the end of 2008 in 35 other adversely affected markets using KETC's approach as a model, extending this utilization of 2-1-1 services.

The national initiative was based on the success of the efforts in St. Louis. Striving to replicate the effects observed in St. Louis, the Corporation for Public Broadcasting provided grants to 33 community broadcasters, many of which were joint licensees, combining TV and radio stations. These stations had applied to participate in the mortgage crisis initiative and were required, when selected, to partner with their local 2-1-1 to direct residents toward financial services resources.

This national effort invited participating TV and radio stations to mobilize their audiences in three ways: (1) to seek information resources regarding the crisis; (2) to communicate with others about the crisis; and (3) to refer those in need to community partners to address the crisis. There was considerable variance in the approaches adopted by stations, yet 2-1-1 was a key partner in all 35 markets. On average, the most-active participating station aired over 1300 minutes of programming and generated more than 6600 page views of content devoted to the mortgage crisis during the 3-month period of the initiative. Paralleling this attention, 2-1-1 services in the most-active markets received 11,000 additional calls, on average, for financial assistance during this period. Across the 35 participating markets, more than 300,000 homeowners are estimated to have sought support from 2-1-1 they would not have otherwise, with many qualifying for assistance programs.

The impact that public broadcasting and 2-1-1 had on the mortgage crisis can be understood in two ways, across two contexts. Examination of the St. Louis effort focuses on a time-series analysis, specifically autoregressive integrated moving average (ARIMA) modeling, to assess the impact of KETC's programming initiatives on the volume of mortgage-crisis phone calls to local 2-1-1 services. For the national programming initiative, results of regression path analysis connect station approaches and actions to 2-1-1 call volume. This analysis focuses on variation in station strategies and efforts, treating each community as the unit of analysis and examining how differences contributed to the volume of calls seeking economic assistance into 2-1-1 centers.

Methods

Two types of analysis were conducted to test the association between these public broadcasting initiatives and 2-1-1 use: time-series analysis and path modeling. The time-series data from St. Louis MO were collected and analyzed in 2008. The station-level data from across the nation were collected during 2009–2010 and analyzed in 2010.

Autoregressive Integrated Moving Average Modeling of 2-1-1 Call Volume

A principal aim of KETC's mortgage-related programming was to inform the public of the existence of the 2-1-1 services and encourage their viewers to use the service to seek help with their own mortgage troubles and encourage others to do so. To assess the effectiveness of this effort, a time-series analysis was used, specifically ARIMA modeling techniques, which are the most appropriate analytic approach given the parameters of these data. ARIMA modeling is an econometric technique used in time-series analysis. ARIMA models are fitted to data, such as the variation in 2-1-1 call volume over time in this case, to better understand the factors that explain this variation or predict future points in the series, when forecasting is the goal of the effort.[10,11]

The data used for this analysis included the complete logs of calls to 2-1-1 services for the St. Louis area for the 2 months before and after the start of KETC mortgage-related programming. The focus was on the volume of calls concerning financial services and assistance. Information was collected also from KETC in St. Louis about the timing and duration of mortgage-crisis programming, including full-length programs and the brief interstitial spots (i.e., short vignettes that are shown between programs). ARIMA models require data aggregated into regular time intervals. Thus, the number of 2-1-1 calls per day was aggregated to maintain a workable scale and still capture shifts in call volume, as there was considerable variance.

Model specification starts by examining both the autocorrelation function (ACF) and the partial autocorrelation function (PACF); this statistical procedure shows the regular ebb and flow of calls to 2-1-1 that must be controlled before the number of calls can be related to any potential exogenous predictors. For example, if the service was closed on weekends, which was not the case in Missouri, this would need to be accounted for in the model before a distinction could be made among any potential effects due to the mortgage programming itself. Thus, once an ARIMA model is constructed, its adequacy is tested by producing a time series from the residuals of the model and checking whether the resulting series has no autocorrelation.

Path Model of Station Variation and 2-1-1 Calls

Following the success of the effort in St. Louis, the CPB sponsored a nationwide initiative and data were collected to gauge its success. In June and July of 2009, the stations participating in the "Facing the Mortgage Crisis" initiative were required to submit an interim report on their progress, as mandated by the grant. This interim report asked stations to report their efforts from April 13–June 7 of 2009, including the amount of grant money they had received, staff support and partners for the project, the number of 2-1-1 calls, and their various forms of media engagement in the campaign.

These stations were all asked to complete a final report in December of 2009. (Two of the participating stations did not submit final reports and a third station generated discrepant responses. All three of these stations were excluded from analysis.) This report closely replicated the questions asked in the interim report with an emphasis on station activities in the interval between the interim report and the final report. The information collected included (1) the internal and external resources the station devoted to the project; (2) the number of mortgage-crisis media specials aired; and (3) the audience and media response in terms of 2-1-1 calls and media mentions. The data from these two reports were merged into a final data set to produce a panel data set with two collections.

Measures

The responses from these two reports were combined with contextual data about the communities served by the stations. Based on each station's city, data were collected about the metropolitan population in 2008 (from the 2008 Census, www.census.gov/popest/metro/CBSA-est2008-annual.html); as well as unemployment rate in December 2009 (www.bls.gov/web/laummtrk.htm); and the foreclosure rate for the area (data from Realty Trac). These three variables were used as control variables, with *Community size* based on a standardized measure of a community's population and *Economic instability* calculated as a standardized average of unemployment and foreclosure rate in each community.

There were four independent variables in our model of community-level variation in 2-1-1 call volume. First was *Innovator mindset*, which is based on an expert panel's evaluation of each station's orientation toward engagement, measured on a 4-point scale: (1) retain traditional mindset of seeing this initiative as just another project without full engagement of station or community (eight stations or 24.2% of cases considered); (2) explore possibilities of engagement, skeptically, and so staffing and partner connection remain under-engaged (eight stations or 24.2% of cases considered); (3) form strategic partnerships, internally and externally, but still evolving toward real integration and engagement (eight stations or 24.2% of cases considered); (4) engage and convene community around problem with leadership orientation toward innovation, participation, internal collaboration, engagement, and dialog (nine stations or 27.3% of cases considered).

Second was *FMC and external grant resources* (FMC comes from the Facing the Mortgage Crisis initiative), which was calculated as the total dollar amount of grant support received by the station for use in the FMC initiative from April 13, 2009 to August 31, 2009 (M=\$58,126, SD=\$15,122). This was the combined total of resources received directly from the Corporation for Public Broadcasting as part of the grant provided in support of the FMC initiative and supplemental grants received from other sources in support of this work.

Third was a measure of *Project staffing*, or the number of staff members involved with the project (M=15.7, SD=8.7). To avoid overestimation of staff dedicated to the project, stations were required to provide the names of all staff members who contributed to the initiative, their titles and a brief description of their roles, their e-mail address and phone numbers, and the average number of hours they worked on the project per week.

The final independent variable, *Media engagement*, was calculated as standardized average of the number of community partners, number of reports in existing programs, number of televised town hall meetings, number of call-in programs, number of on-air discussions, and number of online discussions held by the station. This was based on previous research[12] that found this mix of factors was critical to public media efforts to create sustained initiatives centering on community dialog.

Two outcome variables were included in the model. The first was *Citizen resource utilization (2-1-1)*, which measured the total number of calls received by the local 2-1-1 service specifically dealing with finances/home mortgage issues (M=21,355, SD=43,702). Notably, there were both high mean scores, with averages exceeding 20,000 calls, and considerable variance in the number of calls received by each center. The second outcome, *News media attention*, was calculated as the number of mentions of the mortgage crisis initiative in other media (M=6.2, SD=15.7). This was based on self-reports by the station, although they needed to provide clips of the news articles and specific instances of broadcast mentions for verification.

Results

Autoregressive Integrated Moving Average Modeling

Examining the ACF and PACF of the daily volume of 2-1-1 calls showed that substantial lags were visible at 1 day and at 7 days, suggesting that the study needed to control for the 1-day and the 1-week lagged values. When the model was fitted, its adequacy was confirmed using the white-noise test; however, examination of the graphs of the raw data showed that more than having a simple weekly pattern, the days of the week were individually important to model. Special impor-

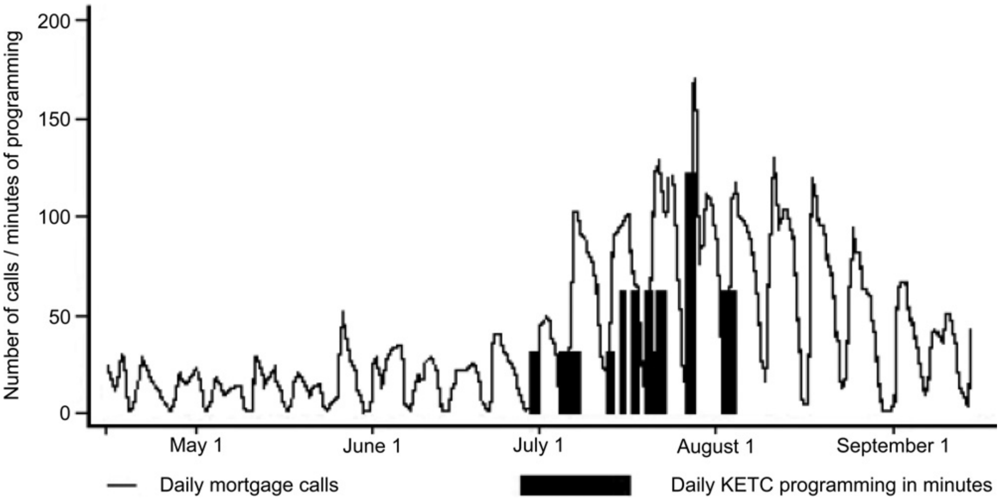

Figure 1. Mortgage call volume to 2-1-1 as a function of KETC programming efforts
KETC, Channel 9 in St. Louis MO

tance was attached to Mondays, which is commonly a high-traffic day for information and referral services. For this reason, the choice was made to forego the seasonal ARIMA model in favor of the typical ARIMA (1, 0, 0) version that incorporated Mondays through Fridays as a set of five dummy variables, with Saturdays and Sundays grouped together as the excluded variable.

With this baseline model established, testing could be done for any significant effects on the volume of answered calls due to the "exogenous shocks" of the KETC programming itself. Although they may have encouraged viewers to watch the full-length programs, the brief on-air messages had no measurable impact on the volume of calls to 2-1-1. The hour-long programs and the Living St. Louis segment, however, were found to have a statistically demonstrable impact on the volume of calls, seemingly resulting in thousands of additional calls over the course of the campaign, with the biggest effects seen the day after the programs aired (Figure 1 and Appendix A).

To put these findings into perspective, before KETC started its mortgage-crisis effort, the 2-1-1 service averaged 15 financial-services calls per day. After KETC began airing mortgage-related programming, mortgage calls increased to 60 per day, a 400% increase. The authors estimate that over the 2.5 months of the community intervention, KETC spurred 3150 additional calls to 2-1-1 on mortgage issues. In terms of financial-service calls, KETC mortgage-crisis programming and its 2-1-1 partnership appear to have generated an additional 5100 calls, for a total of more than 8200 calls into 2-1-1 regarding help with mortgage issues and related financial concerns.

Path Modeling

Regression path modeling examined the relationships between innovator mindset, grant resources, project staffing, media engagement and the outcome variables of citizen resource utilization (2-1-1) and news media attention. Specifically, all models controlled for community size and economic instability of the community under consideration; then the independent variables were arranged theoretically in a series of regression models for testing of the overall model.

Paths were estimated between having an innovator mindset and obtaining grant resources, project staffing, and media engagement. With standardized path coefficients (i.e., betas), as a station moves toward an Innovator Mindset regarding engagement, it is more likely to obtain resources and generate the core elements of media engagement (Figure 2). Likewise, increased resources are linked with additional project staffing that also results in greater levels of media engagement. Finally, media engagement was directly related to increased citizen resource utilization (2-1-1) as well as general news media attention to the project. The regression path model predicting citizen resource utilization (2-1-1) performed well, accounting for a total of 43% of variance, and the model for media attention on this initiative explained 61% of variance.

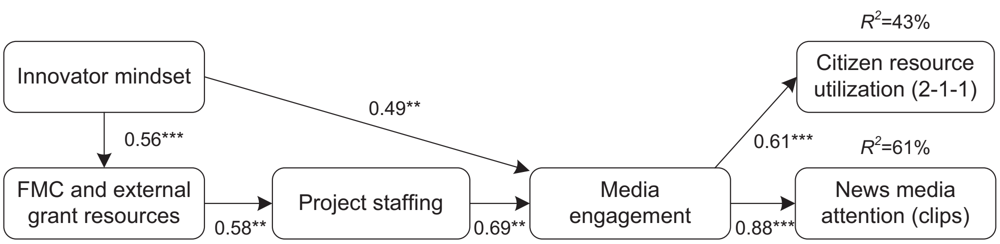

Figure 2. Path analyses of citizen resource utilization (2-1-1) and news media attention
Note: Entries are standardized beta coefficients. All tests control for community size and economic instability.
FMC, Facing the Mortgage Crisis Initiative
*$p<0.05$, **$p<0.01$, ***$p<0.001$

Discussion

The model of media engagement with community issues advanced here has important implications for preventive health, and equally important insights into the future of public broadcasting. The evidence clearly indicates that the efforts of public broadcasting stations can lead to substantial increases in call volume to 2-1-1 services around issues of social and medical concern. Although it was not possible to assess the effects of these efforts on the cascading consequences of job and home loss on psychological and physical health, from anxiety, stress, and hypertension to cardiovascular disease, suicide, and alcoholism,[2,3,8,9] the immediate impact of public broadcasters' efforts on resource-seeking through 2-1-1 suggests that these sorts of initiatives and partnerships could help reduce the secondary health consequences that can accompany personal and family economic crises.

The evidence of this impact comes in two forms. First, the on-air efforts of public broadcasters in St. Louis were shown through ARIMA modeling to predict shifts in 2-1-1 call volume over the course of the pilot initiative. Second, analysis of differences in station approach and levels of media engagement predicted variation in call volume experienced by 2-1-1 services when taking into account the size of the community, which would explain proportional differences in calls, and economic instability in the community, which would explain situational differences in calls. Taken together, these analyses point to the power of public media to center a community's attention on issues such as the mortgage crisis that have far-reaching social and health implications.

More important, perhaps, is that the comparison across the range of stations that participated in the national initiative provides important insights into the factors that differentiate the stations that are more successful at spurring utilization of 2-1-1 as compared to the stations that are less so. Beyond the orientation of station leadership and grant resources, the dedication of staff and a commitment to media engagement are key to encouraging calls to the 2-1-1 service. The last of these, media engagement, may be most important, because it specifies the need for a mix of communications.

That is, media engagement combined a range of factors that speak to the centrality of on-air, online, and in-person efforts sponsored by the station. Equally important is the notion that public broadcasting efforts centering on community outreach work best when supported by strong partnerships with service organizations in the community, including 2-1-1. Reports in existing programs, televised town hall meetings, and call-in programs, coupled with on-air and online discussions all appear to be critical for resource utilization. As such, stations interested in partnering with 2-1-1 on other preventive health issues such as childhood obesity, drug addiction, and the like should work to develop a full repertoire of tools to help the audience find the message.

The value of an ongoing partnership between public broadcasters and 2-1-1 services may be critical to the health of both organizations, as public media look for ways to demonstrate their relevance to private funders and government officials and 2-1-1 services seek ways to broaden the use of their resource networks and scope of care. In some respects, the mortgage-crisis case serves as an ideal model of how public media can use the power of on-air messages, coupled with opportunities for dialog, to spur action and encourage community involvement around issues of shared concern.

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Appendix A: ARIMA model predicting 2-1-1 mortgage crisis call volume

Sample: July 1–September 15, 2008 Log likelihood = −339.469		Observations = 77 Wald $\chi^2(7)$ = 192.92 p-value > χ^2 = 0.00		
	Coefficient	SE	z	Prob. > |z|
Weekday dummy variables				
Monday	71.12	6.09	11.67	0.00
Tuesday	64.91	8.96	7.24	0.00
Wednesday	64.67	10.43	6.20	0.00
Thursday	62.49	10.33	6.05	0.00
Friday	39.65	9.91	4.00	0.00
KETC mortgage broadcasts				
First lag	0.35	0.10	3.20	0.001
constant	13.32	8.93	1.49	0.136
ARIMA				
AR, first lag	0.55	0.10	5.48	0.00
Portmanteau white noise test				
Q statistic = 46.10				
p-value > χ^2 = 0.12				

ARIMA, autoregressive integrated moving average; KETC, Nine Network of Public Media