# The Value of 2-1-1 Texas Information & Referral Network

## Benefits/Costs Analysis 2011 –2021

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## EXECUTIVE SUMMARY

This study estimated the costs and benefits of the Texas 2-1-1 Information and Referral Network (TIRN). Costs and benefits were estimated for 2011, using current data, and then projected for the next ten state fiscal years (2012 to 2021). The study used standard methods for benefits/cost analyses. Prior benefits/costs analyses conducted for 2-1-1s across the United States were reviewed to ensure appropriate and relevant methods and measures were used. Data compiled to create the analysis were obtained from multiple sources including the State of Texas, local AICs, reports from national associations, and peer-reviewed published studies.

In Texas, the benefits of the statewide 2-1-1 exceed the costs by 50 percent or more, depending on the year. In the baseline year, net value reaches nearly $9.3 million. Over a ten year period, it is estimated that net present value benefits exceed the costs by over $155 million dollars. Over this period, the benefit to cost ratio grew from 1.50 in 2011 to 1.77 in 2021. The benefits grew faster than the costs because of economies of scale on the cost side.

This estimate, however, includes only those benefits that may be reasonably reduced to dollar amounts—a relatively small subset of all possible benefits. Many of the benefits, such as the development of social capital and the frequently cited "relief and reassurance" value of 2-1-1, cannot be expressed in monetary terms. For this reason, the net values and benefit to cost ratios underestimate the true comprehensive value of 2-1-1.

**Net Value of 2-1-1 Texas Information and Referral Network**

| | 2011 | Ten Year Sums | Ten Year Present Values |
|---|---|---|---|
| Total Benefits | $27,806,481 | $403,861,001 | $358,970,943 |
| Total Costs | $18,519,089 | $228,017,731 | $203,350,267 |
| Excess of Benefits over Costs | $9,287,392 | $175,843,271 | $155,620,676 |
| Benefit/Cost Ratio | 1.50 | 1.77 | 1.77 |

The above table (Table 6 from the body of the report) shows both a sum of the benefits over the ten-year projection period, and a discounted present value of the stream of benefits and costs. The discounted present value was computed using a 2 percent discount rate. Larger discount rates reduce the present value of both costs and benefits, and lower rates increase the present value. However, since the costs and benefits are produced at about the same time, the benefit to cost ratio is not much affected by the choice of a discount rate

The analysis concludes that TIRN is poised to further enhance the range, depth, and value of its information and referral services, particularly in the areas of public health; emergency response; and information management, reporting, and planning. Ongoing improvements in information management and related evaluative refinements provide promising prospects for documenting future value, including capacity to estimating returns by specific target groups and by clusters of health and human services.

# SECTION I: INTRODUCTION

## Purpose of Report

This report presents results of an analysis that projected benefits and costs of the 2-1-1 Texas Information and Referral Network (TIRN) over a ten-year period (SFY 2012 through SFY 2021), using SFY 2011 estimates as a baseline. This analysis builds upon approaches from scholarly and practice literatures, including previous 2-1-1 benefits/costs analyses. Based upon available data, and generally accepted economic approaches, the goal of the study was to produce a conservative, yet reliable estimate of the net value of TIRN to society. This document presents the data sources, methodologies, and results of the analysis. Policy Analysis and Program Evaluation Services of Austin, Texas, prepared this benefits/costs analysis of TIRN under a service agreement with the Texas Health and Human Services Commission.

## Benefits/Costs Analysis

Benefits/costs analyses have been widely used for decades as one means of evaluating social services programs. The methods and techniques of benefits/cost analysis are well developed and relatively standardized (e.g., Boardman et al., 2001). Benefits/cost analyses describe, and to the extent possible monetize, the costs to deliver and the benefits that result from a program. When benefits/costs analyses cover a period of years, economists recommend using discounting monetized results to find net present value, or some other means of normalizing the values over time. The monetary result of an analysis, the total net benefit, is the comparison of costs to benefits and it reveals whether the program costs exceed, are similar to, or are less than program benefits (Yates, 1999). The estimated total net benefit, expressed in terms of discounted present values, is the key figure of interest from a benefits/cost analysis, and in tandem with the benefits/cost ratio, helps guide policymakers in the decision to pursue or withdraw support for a particular program or intervention.

It is important to recognize that the value of a social services program often cannot be justified in financial terms only; by attempting to do so, intangible benefits (e.g., increased well-being, improved quality of life) are under-valued (Duff, 2007). Less tangible benefits must also be recognized, despite being resistant to monetization, in discussing total value to society. A public investment may still be desired by policymakers, even when the analysis indicates that the net present value of measurable costs exceeds those of measurable benefits. Benefits/cost analysis is inherently a tool limited by what can be measured. Policymakers must make the ultimate decision to invest or not based on intangible, as well as tangible net benefits.

A number of benefits/cost analyses of 2-1-1s have been conducted. The Ray Marshall Center for the Study of Human Resources at the Lyndon B. Johnson School of Public Affairs

at the University of Texas at Austin produced the first 2-1-1 benefits/costs analysis in 1998 for the Texas Health and Human Services Commission (King, O'Shea, & Betsinger, 1998). At least eight additional benefits/costs analyses have been conducted at the state level: Arkansas, Hawaii, Maryland, Michigan, Nebraska, Texas (2000), and Washington. One national benefits/costs analysis has also been conducted to date (O'Shea et al., 2004).

**Descriptive Overview of 2-1-1 TIRN**

TIRN is a leader among states in the delivery of information and referral for health and human services. Since 2005, TIRN has directed a comprehensive, fully operational network of 25 AICs that have handled nearly 14 million calls and provided access to well over 60,000 programs and services in the state/local system. In addition to handling an array of caller needs for utility assistance, food pantries, community clinics, and other information and referral services, 2-1-1 TIRN has emerged as a major asset to critical needs response during disaster events (including hurricanes, floods, fires, tornados, and disease pandemics), as well as a conduit for child care, veteran services, government programs, and other special initiatives.

The AICs provide universal coverage across 254 Texas counties that encompass six of the nation's most populous cities, as well as broad expanses of sparsely populated regions of the state. TIRN enters service delivery contracts with each of the AICs to operate call centers and maintain local area resource databases. AICs are administered by a variety of entities including local United Way agencies, Community Councils, regional Councils of Government, and local Workforce Development Boards. TIRN and the 25 AICs comprise 2-1-1 Texas.

TIRN also maintains a searchable website: www.211Texas.org. The website combines the databases of the local AICs and provides universal, self-directed access to information and referral services. Website visits have increased steadily, rising from under 500,000 visits in 2008 to nearly 800,000 website visits in 2011.[1]

Other key features of 2-1-1 Texas include:

- Telecommunications software and hardware for a system that runs on a scalable Internet Services Gateway network with high call volume capacity, multi-functionality, and system resiliency that enables 24/7 access and efficient response time;

[1] According to the spreadheet *2011 monthly report card.xls* provided by TIRN (November, 2011). See also the *2-1-1 Texas Information and Referral Network Action Summary* covering 2011 found at http://www.hhsc.state.tx.us/reports/2012/211-Action-Summary-2011.pdf. The *Action Summary* reports nearly 3.2 million *web-page* visits for the year.

- After hours call rerouting to one of the three call centers providing 24-hour service. Regular hours calls that are not answered in a timely manner are “rolled-over” into the network to an area in which a call specialist is available;

- Gateway access to multiple services through the three-digit 2-1-1 telephone number in addition to standard information and referral, including SNAP (Food Stamps), Medicaid, Children’s Health Insurance Program (CHIP), evacuation assistance, and critical emergency information;

- Compliance with national standards established by the Alliance of Information and Referral Systems (AIRS), assuring quality and consistency in service delivery; and,

- Ongoing and event-driven contractual and collaborative operational arrangements with five state government agencies within the Health and Human Services Commission, and several external entities, including the Texas Workforce Commission, the Texas Department of Agriculture, and the Texas Division of Emergency Management, as well as private foundations.

In Texas, 2-1-1 serves as a comprehensive source not only for information and referral, but also for other services. After callers indicate their language preference, they are offered four standard options and a fifth additional option for emergency information and special services initiatives. These options automatically redirect the calls to the appropriate service:

> Option 1: The entry point for information and referral on all health and human services available to the caller, which are redirected to (“handled by”) one of the 25 AICs.
>
> Option 2: The entry point for intake and eligibility determination for state/federal benefits programs (SNAP, CHIP, Medicaid), which are redirected to the contracted vendor of these services by the Health and Human Services Commission Office of Eligibility Services.
>
> Option 3: The entry point for fraud and abuse of state resources reporting, which are handled by the Office of the Inspector General.
>
> Option 4: The entry point for access to the Transportation Assistance Registry (TAR), which is the database of vulnerable populations that may need evacuation assistance in case of a natural disaster, for use by for local emergency management offices.
>
> Option 5: The intermittent access point for emergency information and special initiatives. Calls may be directed to an AIC or to a centralized temporary call center

(aka, the 26th AIC) activated in response to a critical need or event and staffed with personnel specialized in the relevant field.

These options are a structural feature of Texas 2-1-1, and each has a distinctive relationship with services provided by the AICs. Call Specialists conduct primary information and referral services under Option 1. These workers also handle the estimated 25 percent of all calls from individuals who have mistakenly selected Option 1 rather than Option 2. Call Specialists redirect them to the proper source, but take the opportunity to help callers who may have needs or circumstances for which 2-1-1 resources may be useful. Call Specialists have no role with Option 3; these calls directly flow to the Office of Inspector General. Call Specialists handle Option 4 calls for TAR, and provide similar services via Option 1 resources. Call Specialists and supportive specialists are deployed selectively when Option 5 is activated in response to an emergency.

**Accomplishments of TIRN**

TIRN has continuously expanded and improved operational capacity and services since its inception in 1997. The following are but a few recent and current examples of the breadth and depth of TIRN in the fabric of public life across the state.

- Emergency response is a prominent area in which TIRN has become an essential asset. TIRN has been active in shaping information dispersion (evacuation routes, shelters, etc.) as well as disaster relief for successive hurricanes: Emily, Katrina, and Rita (2005); Dean and Humberto (2007); and Dolly, Edouard, Gustav, and Ike (2008).

- TIRN helped to assure public health and well-being during the 2009 H1N1 flu pandemic by collaborating with the Department of State Health Services in the establishment of a temporary call center staffed by medical professionals to provide accurate information.

- In 2008 TIRN received a grant from the Permian Basin Foundation for outreach and resource development for military personnel and their families. The Texas Resources for Iraq and Afghanistan Deployment (TRIAD) initially operated in six AICs. The effort has since rolled out statewide and—based on the lessons learned from the initial effort—expanded the capacity to serve all active and former military personnel and their families.

- TIRN provides child care information and referral services under contract with the Texas Workforce Commission. In addition to helping locate resources and tracking unmet needs, the information specialists purposely attempt to address secondary needs of families and children with other available resources. The service is also available online and applications for care at available childcare providers can be submitted electronically.

- Since 2005, TIRN has been providing seasonal information and referral for the Summer Nutrition Program for all children less than eighteen years of age in low income families who qualify for school lunch programs during the school year.

- In 2010 TIRN initiated acquisition of a single statewide resource data management system that became operational in March, 2012. The single system promises enhanced efficiencies and effectiveness for 2-1-1.

Many other statewide or regional initiatives exemplify the value of 2-1-1 in Texas communities. For example, the South Central AIC in the greater Austin/Travis County area serves as the gateway to the local Medical Assistance Program (MAP), which provides health care to indigent, low income individuals and families who fail to qualify for other public programs. TIRN has become increasingly engaged with regional Area Agencies on Aging in elder care services, supporting access to timely assistance for a growing population that may be particularly at risk of being under-served in rural areas of the state. AICs continue to target and improve access to services for veterans of recent wars and their families. In every region of the state, local AICs complement the public funds provided through the State with significant amounts of in-kind and other monetary resources for operational costs, indicating the perceived value of 2-1-1 to resident populations and funding entities.

**Organization of Report**

Section II presents the data sources and methodology applied to this study, including the approaches used to determine costs and benefits, as well as principal elements of the analytic framework. Section III presents the research results and contains figures for estimated costs, benefits, and net value of 2-1-1 Texas. The last section contains final observations regarding the accomplishments and continuing prospects of TIRN.

## SECTION II: METHODOLOGY AND DATA SOURCES

Benefits/costs proponents have acknowledged that there is no single method of performing a benefits/costs analysis. A well-designed analysis must take "a broad view that includes all costs and all benefits over time…whether the costs are incurred now but the benefits accrue in the distant future" (Buxbaum, 1981, p. 457). This section presents the methodology and data sources that constitute the approach to benefits/costs analysis adopted for this study.

### Document and Data Review

Prior to conducting the analysis, researchers collected from TIRN available documentation, including 2-1-1 budget and expenditure data for the state office and AICs, management reports, contracts, component descriptions (telephony, resource and call database), and studies related to 2-1-1 Texas. Researchers combed the scholarly and practical literatures for related benefits/costs studies that could provide insights and approaches to strengthen the analysis, particularly those regarding benefits that were monetized and less tangible benefits that resist monetization, but nonetheless exhibit plausible and probable links with significant outcomes. Discussions were conducted with TIRN's Manager and staff, and site visits were conducted with the Gulf Coast AIC (Houston area) and the South Central AIC (Austin area) to further engage operational practices and gather anecdotal evidence regarding services and outcomes. Both sites provided access to their calls and referrals database, as well as their complete Big Count data extracts.[2] Researchers also reviewed a matrix of data elements contained in the follow-up surveys, and with guidance from TIRN, selected five AICs from which researchers collected and reviewed reports. Researchers prepared a background report that compiled results of the formative tasks and sketched options available to the current analysis.

For most social service programs, calculating the cost of a program is fairly straightforward and includes tabulating the financial and in-kind resources necessary to establish, operate, maintain, and improve services. TIRN provided documentation and data regarding state and local budgets and expenditures for 2-1-1, including grants and contracted services, as well as additional costs incurred during SFY 2011, i.e., the cost of the new single statewide database.

The greater challenge centers on how to value benefits, that is, the "who, what, and how much questions" integral to attribution and monetization estimates. Among the challenges particularly relevant to estimating 2-1-1 benefits were identifying users, the absence of standard approach in the collection of follow-up survey data, and the attributable role of 2-1-1 in achieving outcomes, particularly mid- and long-term outcomes filtered by other

[2] The Big Count comprises 16 standardized service categories developed by AIRS for use in state and local areas for common data reporting.

events and processes. This analysis draws from the literature of 2-1-1, including earlier state-level studies and the national 2-1-1 benefits/costs and relevant studies in related areas to address these issues and other concerns. Efforts have been made to efficiently use available data and produce a conservative, yet reliable report within the parameters of the service agreement.

**Basic Parameters**

Parameters underlying the 2-1-1 TIRN benefits/cost analysis are as follows:

**Perspectives**. Four primary perspectives for gauging benefits and costs are relevant for this analysis:

- Participants, comprising individuals and families;
- Organizations, comprising AICs, health and human services providers, employers, and other entities that use or benefit from 2-1-1;[3]
- Government, primarily state and local, but including federal (to the degree that federal funds are commingled with state and local funds in service delivery configurations); and,
- Society as a whole, which is the sum of participants, organizations, and government.

**Time Frame for Analysis**: The base year is State Fiscal Year (SFY) 2011 and benefits and costs are projected over a ten-year period through SFY 2021.

**Discount Rates:** A discount rate of two percent was used to produce present value figures. This rate is typical of the rates customarily used in cost-benefit research. The effect of the discount rate on costs and benefits was analyzed. For all reasonable values of discount rates, researchers found that the benefit to cost ratio was virtually unchanged. While the choice of a discount rate is critical to some studies, it has little effect in the present study because the costs and benefits have about the same distribution over time.

**Call Data**

There are two primary call data systems used within TIRN. Each system is the basis for producing various reports produced by TIRN to better manage 2-1-1 Texas. One is the statewide system that contains the telephony call data of the Internet Services Gateway network, that is, elements related to the technological dynamics of the telephone call itself. These include the number of calls, the location that handled the calls, response time, abandonment rate, and other call statistics. Telephony data can be used to monitor activity and identify trends, including seasonal variations, and “spikes” in activity associated with

[3] For determining net value, individual and group perspectives are considered together as “local costs.”

distinct events, such as natural disasters or the number of calls handled at the emergency call center. This system is centrally administered by the state office of TIRN.

The second call data system is the decentralized system of call content data administered separately by each of the 25 AICs. This system contains data regarding the number of calls handled by the AICs, and the types of calls categorized by need, and totals of requests and referrals offered during the telephone conversation between the caller and the information specialists. Call data fields available at the local level across all AICs conform to the national AIRS standards.

Only a portion of the decentralized call data migrates to the state level for reporting purposes. TIRN aggregates this data at the state level to produce reports, including the AIRS "Big Count," the "Top Ten Caller Needs," and "Top 10 Unmet Caller Needs." The "Big Count" contains 16 major categories of caller needs (e.g., Food & Meals, Income Support & Assistance, Employment, Health Care) compiled from lower order groupings in the AIRS taxonomy. The two "Top Ten" reports are similar, but the fields are comparatively more narrowed and direct (e.g., Utilities, Food, Housing, Medical Assistance, Tax Assistance).

TIRN also monitors the usage of www.211Texas.org. Web search topics on the site are categorized the same as caller needs, enabling direct comparison of phone requests and internet searches. The 2-1-1 website also keeps a running log of the top ten most frequent search terms. Information on the site is regularly updated to maintain accuracy.

For this project, TIRN provided the complete statewide automated call data set to researchers. The Gulf Coast AIC, which accounts for 30 percent of all calls handled in the state, as well as 64 percent of after hours calls, and South Central AIC provided their complete call data base and their Big Count reports. Both of these AICs serve mixed large urban/small urban/rural territories and diverse demographic populations, and can be deemed as representative of the state. Analysts used actual call volumes and descriptions from the telephony database and statewide projections from the combined Gulf Coast and South Central databases to estimate calls and referrals by type and volume.

Both data systems are essential elements of the benefits/costs call analysis. Once potential benefits are identified that are associated with specific types of calls, the availability of accurate or reliable call data provides the basis for determining how many units of which types of information and service requests are actually available for quantification. Quantification subsequently feeds measurement formulas to monetize selected benefits or to estimate the magnitude of intangible benefits that resist monetization. For example, "School Supplies" is one of the usual Top 10 Caller Needs, and thus a prospective source of benefit. A precondition of estimating the benefit is the total number of calls handled for that need. If no accurate call number is available (or no reliable estimate of that number), the benefit could not be selected, nor subjected to a valuation formula. If the number is available, it would be part of a valuation formula that may include total calls for that need, estimated number receiving school supplies, estimated value of the school supplies, and estimated value of some share attributable to the referral (needs met ratio), less the cost of

the call, to calculate the estimated value of the benefit—a reasonably sound, short term benefit. If information and referrals to Head Start and Early Childhood Education would be selected as a prospective source of long term benefit regarding reduced chances of incarceration or increased earnings over a life time, the volume and costs of the call .

**Costs Data**

The study presents the total costs of operating 2-1-1-Texas for SFY 2011, which include all identified state and local costs.[4] TIRN provided state and local budget and expenditure documentation for 2-1-1, including reports, grants and contracted services, and the cost of the new single statewide database. Expenditure categories included personnel costs (salaries and fringe), travel, equipment, rent, materials and supplies, contractual costs, and other costs (software, marketing, etc.). Since the startup costs for TIRN and the AICs were incurred in the distant past, startup costs are not included only current operational costs.

The TIRN budget includes the costs of the statewide telecommunications system and its information technology component, collectively referred to as telephony costs. AIC costs are funded by state cost reimbursements and local match. TIRN encourages, but does not require a local match to draw down state resources.[5] One major variant among AICs is the level of local match contributed towards total expenses. *Local match* is the combined total of "in-kind" and "other" resources. "In kind" resources are the value of locally contributed goods and services, and may include volunteer services or costs that have been absorbed by the partner entity that operates the AIC. "Other" resources include cash donations and local funding sources, exclusive of state or federal monies. The assignment of other and in-kind value to expenditure categories varies quite significantly across the 25 AICs in any given year, as well as significantly within expense categories between years for any single AIC. Researchers estimated SFY 2011 match amounts based on trends in reported match for the four years prior.[6]

**Cost Analysis**

The cost analysis includes current costs (SFY 2011) and those projected for a ten-year period beginning SFY 2012. In the earlier, *ex ante* Texas studies, costs were expected to grow as the 2-1-1 Texas expanded services and access, and call volume increased. It was expected that eventually 2-1-1 would attain a "steady state," after which call volume would increase at the equivalent rate of population growth. Currently, growth in call volumes has significantly out-paced population growth. However, it can be argued that call volume will

[4] State costs include federal contributions to the extent that funds are comingled.

[5] In the early 2-1-1 Texas benefits/costs analysis, TIRN required a local match of 25 percent with the expectation that the match rate would increase by 5 percent a year, until reaching 50 percent five years out from start-up.

[6] TIRN provided an AIC report, *2-1-1 TIRN Fiscal Report of Area Information Centers' "Other" and "In-kind" Funding Source for FFY 2007-2010*, which served as a basis for estimating local match in SFY 2011.

only marginally affect costs. The Scalable Internet Services Gateway feature of the TIRN telephony network automatically rolls over calls from any AIC that is not responding in a timely manner to an available Call Specialist at another AIC. According to TIRN staff, currently there is almost always excess capacity among the 250 operating licenses within 2-1-1 Texas, and Texas leads the nation in call response time.[7] Given the rising use of 2-1-1, the analysis assumes that increased personnel will be needed when systemic capacity is exceeded. Meanwhile, there is concern that call response time will deteriorate as call volume increases without increasing the number or distribution of call specialists.

Other than personnel and inflationary costs, there should be no considerable increase in costs or any unanticipated capital investments. Indeed, increased call volumes may result in reduced cost per call, which in turn may increase the net values projected into the future. To account for inflationary costs, the cost analysis addresses expected cost differences in typical budget categories such as personnel costs, travel, equipment, rent, materials, and supplies.

Factors that have shaped call volume in recent years include:

- **Public awareness**. Hurricanes and other disaster events have heightened public awareness of 2-1-1.
- **Human error**. Option 2 (State Benefits) has generated additional and short calls to 2-1-1 Option 1.
- **Growth in needs.** Heightened needs and hardship from the recession have pushed more residents to seek assistance through 2-1-1.
- **Web usage**. Increased internet access and use may be diverting even greater increases in 2-1-1 phone calls.

**Identifying and Estimating Benefits**

The model for identifying outcomes and estimating benefits has been improving over the years. Prior 2-1-1 benefits/costs studies have helped to shape a temporal approach for outcomes and associated benefits, as well as the estimation of values. In their promising approach, Saxton and colleagues argued that, like other human services programs, the outcomes of 2-1-1s are realized over time (Saxton, Naumer, & Fisher, 2007). Their work expanded the 2-1-1 benefits/cost model to reflect outcomes over short-, mid-, and long-term timeframes. The temporal approach has been included in this benefits/costs framework (Figure 1). Saxton and his colleagues' work additionally corroborates many of

[7] These transfer calls are simulating a new spatial geography for the AICs.

the benefits valued in earlier 2-1-1 benefits/costs analyses, adding credibility to these analyses and providing empirical support for the use of benefits previously identified.

A central assumption to the present approach is that the information and referral function is one role within a chain of activities that helps individuals address needs. Information and referral has been called the "glue that connects questions to appropriate answers. If the answers are not forthcoming, one is unable to move forward" (McKinley & Netting, 1994, p. 27). Experience in public health valuation provides guidance for how to conceptualize 2-1-1's interconnected role in connecting people to services. Researchers argue that value must be defined and measured as part of the overall value of their chain, rather than their isolated role (Jacobson & Neumann, 2007). Thus, it is appropriate for roles within interconnected sequences to claim some portion of value from the successes of the entire chain. Many of the valuation formulas contained herein apply this approach.

Identifying users remains a challenge regarding personal demographic characteristics (age, race, income, etc.). This is closely aligned with the issue of identifying the beneficiaries of the call, as well as the outcomes. Is the caller seeking assistance for themselves, another person, a family or household? Are they calling from the workplace? Did the caller act on the referral? Where the needs met?

Researchers have relied on follow-up data and reports from the AICs to partially address these questions. TIRN provided a master matrix of all of the data elements collected in each of the AICs. Researchers reviewed variables of interest, consulted with TIRN, and requested follow-up data and supporting reports from key AICs. Although all AICs conduct follow-up, the surveys are not standardized. Researchers combined survey results of five AICs to estimate caller characteristics, needs, and outcomes in terms of needs met for some benefits, but relied largely on survey data results from the South Central AIC and the Gulf Coast AIC as variables for estimating the value of several benefits, having deemed their data informative, reliable and drawn from fairly large samples.

Lastly, a benefits assessment must also consider the growing role 2-1-1 is playing in prevention and disaster response activities. In this role, 2-1-1 may be providing information and resources beyond what users may have originally expected. In one study, callers to 2-1-1 received additional, unsolicited information about cancer screening (Eddens, Kreuter, & Archer, 2011). Since 2-1-1 callers tend to be low income, 2-1-1 was a productive channel for reaching this population, who typically experience greater health needs. In Texas, 2-1-1 information specialists are also encouraged to probe children and family needs and provide useful referrals to misdirected calls to Option 1 (information and referral) rather than Option 2 (state benefits). As a byproduct of human error, call specialists may locate basic or ancillary services that help to meet the caller's immediate needs or at least to provide them with access knowledge for future needs. For disaster response and recovery, the 2-1-1 infrastructure expands beyond meeting individual needs to simultaneously address community-wide needs.

**Expanding the Approaches to 2-1-1 Benefits/Costs Analysis**

One approach introduced by this study is the clustering of benefits within three categories—systemic, structural, and direct services information and referral. These three categories introduce the distinct design and operational features of 2-1-1 TIRN into the analysis.[8] *Systemic* refers to those benefits (and associated values) attributed to the deeply integrated functioning of the constituent components of 2-1-1 Texas as a singular entity: comprehensive statewide geographic coverage, 24/7 availability by phone or internet, consistency of service supported by compliance with AIRS operating standards, the inclusive resource and call databases, and the public/private, state/local partnerships that comprise TIRN. Collectively, these combined elements support the entire 2-1-1 enterprise as a system, with value greater than the sum of its parts.

*Structural* refers to those benefits associated with unique components themselves, apart from the systemic value, such as the telephony and the technological infrastructure, including interactive voice response-caller options (IVR), assisting state benefits and fraud reportage, and the Warm Center/emergency call center. These support basic functions of 2-1-1 Texas. Systemic and structural benefits are closely aligned concepts and have "soft" borders between them. Nevertheless they are included in this analysis to introduce an additional lens through which 2-1-1 benefits can be viewed.

*Direct services information and referral* refers to the benefits attributed to the more commonly addressed relationship between callers, their immediate needs, the referrals offered, and outcomes, that is, the more "traditional" focus of information and referral costs/benefits analysis.

Additionally, the analysis attempts to cut a new path by (very) preliminarily estimating the value 2-1-1 avails to specific target groups (young children, the aging population, and military veterans and their families) as well as the systemic and direct services value that accrue within the 16 "Big Count" categories. The target group benefit estimates are based on the estimated shares of all calls handled for the specific group as a share of all benefits accruing to participants. To estimate values within Big Count categories, researchers assigned all monetized direct referral benefits to the appropriate category. Additionally, each category received a share of total systemic value proportionate to call volume in that category, based on the assumption that each call is inherently part of the system.

Given the status of current available data, it is not possible to conduct more detailed target group analysis. Nevertheless, researchers deemed it a useful exercise to present these preliminary estimates to advance 2-1-1 analyses. The core of the analysis remains the statewide net value of the TIRN, but these additional elements are included to suggest

[8] O'Shea et al. (2004) incubated an approach to systemic value in the national 2-1-1 benefits/costs analysis by estimating the benefits of centralized, hybrid, and decentralized state system models, as suggested earlier by Cunningham et al. (2003).

future directions that 2-1-1 benefits/costs analyses may pursue, especially as data collection and management capacity improves for capturing information regarding target groups and outcomes in Texas and elsewhere.

**Selected Benefits**

Researchers have reviewed benefits used in previous studies and identified additional benefits through the approach just described to create the 2-1-1 Texas Benefits Framework (Figure 1). This figure presents an extensive array of outcomes and benefits associated with 2-1-1 information and referral. Valuation formulas have been developed only for those outcomes for which a reasonable method for assigning a share of the outcomes as a measurable benefit can be ascertained from available data or prior investigations.[9] These should be considered a small subset of all benefits with which 2-1-1 is associated. Almost every individual referral could be associated with an outcome that could be monetized, if available data supported a reasonable method for attribution and valuation. This is not yet the case in the field of 2-1-1 information and referral.

The bulk of the benefits calculations are based on short-term benefits. Mid- to long-term benefits have been identified, but little valuation has been assigned at these time frames. Many of these benefits, such as social capital and social cohesion, resist monetization. Others, such as the assignment of long-term value to educational advancement, lifetime earnings, and reduced incarceration frequently associated with participation in Head Start and other early childhood interventions, have been avoided, even though significant returns and cost avoidance are recognized in the benefits/costs literature of such services.

[9] Appendix B contains a narrative of benefits and the formulaic description of those monetized.

**Figure 1. 2-1-1 Texas Benefits Matrix**

| | Outputs | Short-term | Mid-Term | Long-Term |
|---|---|---|---|---|
| **Participants** | **Systemic**<br>• Comprehensive and accurate information and referrals<br>• Ease of access | **Outcomes:**<br>• Immediate information of available options<br>• Tailored referrals to articulated needs<br>• Needs met<br><br>**Benefits:**<br>• Time saving seeking I&R<br>• Time saving & cost avoidance related to unnecessary travel | **Outcomes:**<br>• Enhanced challenge resolution/personal empowerment<br>• Expanded social service networks<br><br>**Benefits:**<br>• Improved basic needs and livelihood prospects | **Outcomes:**<br>• Social capital/Social cohesion<br><br>**Benefits:**<br>• Improved quality of individual and family life across and throughout communities |
| | **Structural**<br>• Access to state benefits service/ Automated pass through to Integrated Eligibility and Enrollment (Option 2) | **Outcomes:**<br>• Eligibility determination and enrollment in state benefits services<br>• Offer of ancillary services to callers who mistakenly key Option 1 I&R<br><br>**Benefits:**<br>• Ability to meet basic needs | **Outcomes:**<br>• Alleviated need for public assistance through awareness and provision of alternative services<br><br>**Benefits:**<br>• Satisfaction of basic needs and improved | **Outcomes:**<br>• Enhanced capacity for self-sufficiency/economic independence<br><br>**Benefits:**<br>• Improved quality of individual and family life |

| | Outputs | Short-term | Mid-Term | Long-Term |
|---|---|---|---|---|
| | | • Provision of I&R to meet ancillary and immediate needs of those seeking public assistance | livelihood prospects | across and throughout communities |
| ***Participants (continued)*** | • Access to Transportation Assistance Registry (Option 4) | **Outcomes:**<br>• Identification of transport dependent population<br><br>**Benefits:**<br>• Enhanced safety and security /successful evacuations | **Outcomes**:<br>• Disaster preparedness and evacuation assistance<br><br>**Benefits:**<br>• Value of relief and recovery assistance | **Outcomes**:<br>• Disaster preparedness and evacuation assistance<br><br>**Benefits:**<br>• Value of relief and recovery assistance |
| | • Access to Emergency Response (WARM) Center/Disaster Kit (Option 5) | **Outcomes:**<br>• Response and Recovery I&R<br>• Disaster/epidemic relief and recovery assistance<br><br>**Benefits:**<br>• Time saved/efficient evacuation routes & accessing services | **Outcomes:**<br>• Disaster/epidemic relief and recovery assistance<br><br>**Benefits:**<br>• Knowledge of preparedness, relief, and recovery | **Outcomes:**<br>• Disaster preparedness and evacuation assistance<br><br>**Benefits:**<br>• Value of individual relief and well-being in advance and during emergency |

| | Outputs | Short-term | Mid-Term | Long-Term |
|---|---|---|---|---|
| ***Participants (continued)*** | **Direct Services I&R**<br>• Comprehensive and accurate information and referrals regarding thousands of health and human services/providers | **Outcomes:**<br>• Comprehensive and accurate information and referrals<br>• Tailored referrals to articulated needs<br>• Needs met<br><br>**Benefits:**<br>• Value of utility bill assistance<br>• Value of rent assistance<br>• Value of low income housing assistance<br>• Value of prescription aid<br>• Value of community clinic services<br>• Value of dental clinics<br>• Value of food pantries<br>• Value of Head Start/early childhood intervention<br>• Value of seasonal resources<br>• Value of disaster assistance<br>• Value of child care | **Outcomes:**<br>• Enhanced challenge resolution/personal empowerment<br>• Enhanced health and well-being<br><br>**Benefits:**<br>• Improved basic needs and livelihood capacity<br>• Cost avoidance/costly downstream affects | **Outcomes:**<br>• Social capital/Social inclusion<br><br>**Benefits:**<br>• Improved quality of life<br>• Health, income, and well-being enhancements |

| | Outputs | Short-term | Mid-Term | Long-Term |
|---|---|---|---|---|
| | | • Value of tax assistance<br>• Value of tax returns/EITC | | |
| **Organization** | **Systemic**<br>• Comprehensive and accurate information and referrals<br>• Ease of access<br>• Community needs assessment data | **Outcomes:**<br>• Immediate information of available options<br>• Tailored referrals to articulated needs<br>• Needs met<br>• Better services and target resource<br><br>**Benefits:**<br>• Value of time saving seeking I&R<br>• Value of 2-1-1 as local planning tool<br>• Value of cost avoidance through shared resource database<br>• Value of cost avoidance for staffed information call lines<br>• Value of cost avoidance due to inappropriate requests<br>• Value of afterhours services | **Outcomes:**<br>• Expanded social service networks<br>• Improved organizational capacity<br><br>**Benefits:**<br>• Value of improved organizational capacity<br>• Increased productivity | **Outcomes:**<br>• Social capital/Social cohesion<br>• Organizational efficiency and effectiveness<br><br>**Benefits:**<br>• Value of better collaborations throughout communities |

| | Outputs | Short-term | Mid-Term | Long-Term |
|---|---|---|---|---|
| | | • Value of reduced absenteeism | | |
| ***Organization (continued)*** | **Direct Services I&R**<br>• Comprehensive and accurate information and referrals regarding health and human services/providers | **Outcomes:**<br>• Comprehensive and accurate information and referrals<br>• Tailored referrals to articulated needs<br>• Needs met<br><br>**Benefits:**<br>• Value of volunteer recruitment/placements | **Outcomes:**<br>• Expanded social service networks<br>• Improved organizational capacity<br><br>**Benefits:**<br>• Improved basic needs and livelihood capacity<br>• Cost avoidance/costly downstream affects | **Outcomes:**<br>• Social capital/Social cohesion<br>• Organizational efficiency and effectiveness<br><br>**Benefits:**<br>• Improved quality of life<br>• Health, income, and well-being enhancements |
| **Government** | **Systemic**<br>• Comprehensive and accurate information and referrals<br>• Ease of access<br>• Agency needs assessment data | **Outcomes:**<br>• Immediate information of available options<br>• Tailored referrals to articulated needs<br>• Needs met<br>• Better services and target resources | **Outcomes:**<br>• Expanded social service networks<br>• Improved agency capacity | **Outcomes:**<br>• Social capital/Social cohesion<br>• Organizational efficiency and effectiveness<br>• Governance capacity |

| | Outputs | Short-term | Mid-Term | Long-Term |
|---|---|---|---|---|
| | | **Benefits:**<br>• Value of time saving seeking I&R<br>• Value of increased management and planning capacities<br>• Value of cost avoidance through information services and staffed call lines | **Benefits:**<br>• Value of expanded social service networks<br>• Value of enhanced government capacity | **Benefits:**<br>• Value of expanded social service networks<br>• Value of enhanced government capacity |
| ***Government (continued)*** | **Structural**<br>• Access to fraud and abuse reporting (Option 3)<br>• Access to Transportation Assistance Registry (Option 4)<br>• Access to Emergency Response (WARM) Center/Disaster Kit (Option 5) | **Outcomes:**<br>• Increased fraud and abuse reporting<br>• Registry services<br>• Enhanced emergency response capacity<br><br>**Benefits:**<br>• Cost recovery/fraud<br>• Cost avoidance/registry intake<br>• Cost avoidance/disaster kit maintenance and deployment | **Outcomes:**<br>• Disaster preparedness, response and relief<br>• Civil safety<br><br>**Benefits:**<br>• Value of emergency assistance | **Outcomes:**<br>• Disaster preparedness, response and relief<br>• Civil safety<br><br>**Benefits:**<br>• Value of emergency assistance |

| | | | | |
|---|---|---|---|---|
| **Society** | • Widely accessed public resource<br>• Knowledge base | **Outcomes:**<br>• Informed use of I&R services across society<br><br>**Benefits:**<br>• Sum of net benefits to individuals, organizations, and government | **Outcomes:**<br>• Informed public<br>• Social capital<br>• Efficient governance<br>• Disaster infrastructure<br><br>**Benefits:**<br>• Social value of addressing basic needs, improving livelihood/well-being prospects, and resource allocation efficiencies | **Outcomes:**<br>• Social capital/Social cohesion<br>• Social services efficiency and effectiveness<br>• Governance capacity expansion<br><br>**Benefits:**<br>• Social value of addressing basic needs, improving livelihood/well-being prospects, and resource allocation efficiencies |

Adapted from Saxton et al., 2007

## SECTION III: COSTS, BENEFITS AND NET VALUE OF 2-1-1 TIRN

Section III presents the costs, benefits, and net value estimates of TIRN for the baseline year (SFY 2011), as well as the ten-year projections, reduced to net present value. Additional explanations are provided regarding data sources and procedural parameters used to produce the estimates.

### Data Sources

Data on statewide call volume and website visits were provided by the state TIRN office. The data included, in addition to the total number of calls, totals for various kinds of calls—short calls, service-level calls, abandoned calls, and handled calls. In addition to call counts, the data included average call durations, hold time, and talk time. This data provided the basis on which future calls and web site visits were projected.

Statewide and AIC-specific data on referrals were also provided by TIRN. These data show referrals made in 2011 using the 16 "Big Count" Categories. These data were used primarily for the purpose of obtaining ratios of referrals to total calls. The ratios were used to project future referrals.

The "Big Count" data was not detailed enough to use in making projections of referrals for some of the benefits. In these cases, researchers relied on detailed call tabulations provided by two large AICs—The Gulf Coast AIC (Houston), and the South Central AIC (Austin).

The Gulf Coast call tabulations were provided in the form of an Access® hierarchical data base. The main tables of interest in this data were a table of contacts, and a table of contact actions. The contacts table contained 835,693 rows, each row representing a contact of a caller with a call specialist during SFY 2011. Some contacts contained more than one action. For example, the call specialist might supply a referral for utility bill assistance and another one for rent assistance in the same call. This contact would result in two contact actions. The contact action table contains 1,334,554 contact actions. These two tables were used to create ratios of referrals to calls that were later used to project calls by type. For example, in the Gulf Coast data there were 145,429 referrals for utility bill assistance. The fraction 145,429/835,693=0.174 represents the referral rate for utility bills in the Gulf Coast. This rate, averaged with the rate from the South Central AIC was multiplied by projections of future statewide call volume to produce an estimate of statewide referral volume for utility bill assistance.

The South Central call tabulations included totals for SFY 2011 of calls broken out by Big Count categories, and within the Big Count categories by detailed subcategories. For example, within the Big Count category "Food/Meals" there were 22 subcategories including "Food Pantries," "Food Vouchers," "WIC Application or Certification," "Summer Food Programs," and so on. As with the Gulf Coast data, researchers formed referral rates for detailed types of actions. In the South Central data, the number of referrals for Utility

Bill Assistance was 14,551. The total number of calls was 267,606. Dividing results in 0.054 as the rate of utility bill assistance referrals.

The weighted average of the referral rates from the Gulf Coast and South Central AICs was calculated as the sum of their referrals divided by the sum of their call volumes. Specifically, the formula for utility bill assistance was:

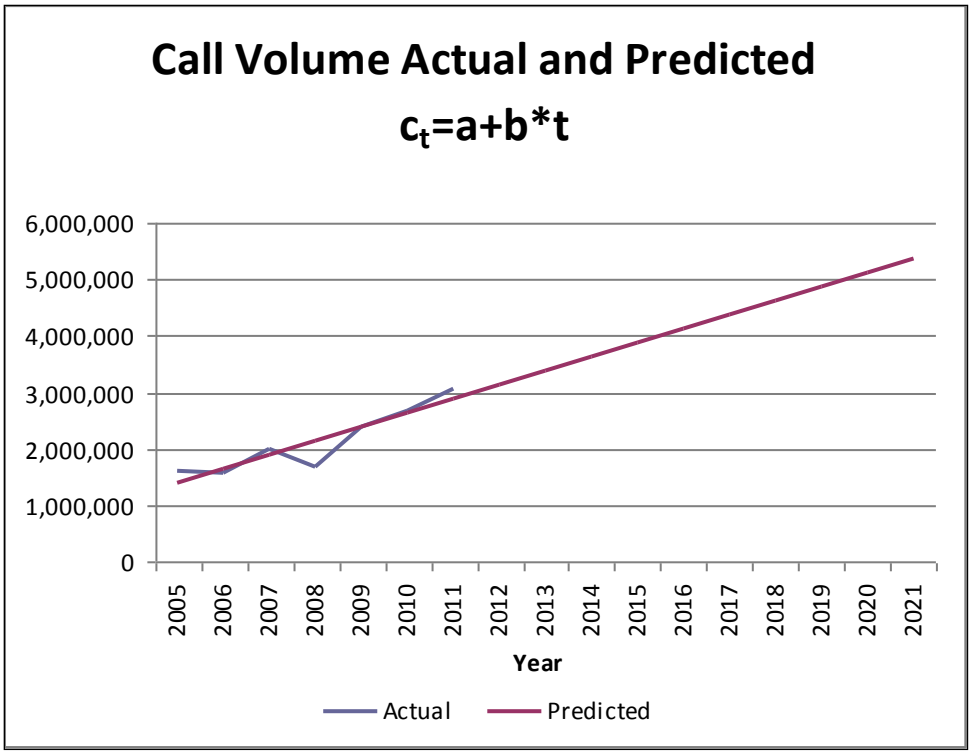
$$\frac{145429 + 14551}{835693 + 267606} = \frac{159980}{1103299} = 0.145$$

**Procedures to Generate Benefit Projections**

Projecting future call volumes and referrals was the first step in building the cost and benefit tables shown below. The number of future referrals for a particular type of information service was multiplied by the ratio of referrals whose needs were met to total referrals, and by a money value of the met need.

Projecting future call volume was done as a straight-line extrapolation of past call volumes. (Figure 2) Researchers performed statistical procedures using population as the driver for call volume, but these results showed that past call volume is not very well correlated to population. Over the period 2005 to 2011, while call volume grew 92 percent, the Texas population grew only 16 percent. Researchers assume that call volume is growing faster than population because of an increase in the public's awareness of the existence 2-1-1, the multiple options on the interactive voice response (especially Option 2), and the expansion of human needs in recent years. At some future date these induced effects may diminish, and the growth rate of call volume will decline and possibly stabilize. This decline is not anticipated within the 10-year projection period.

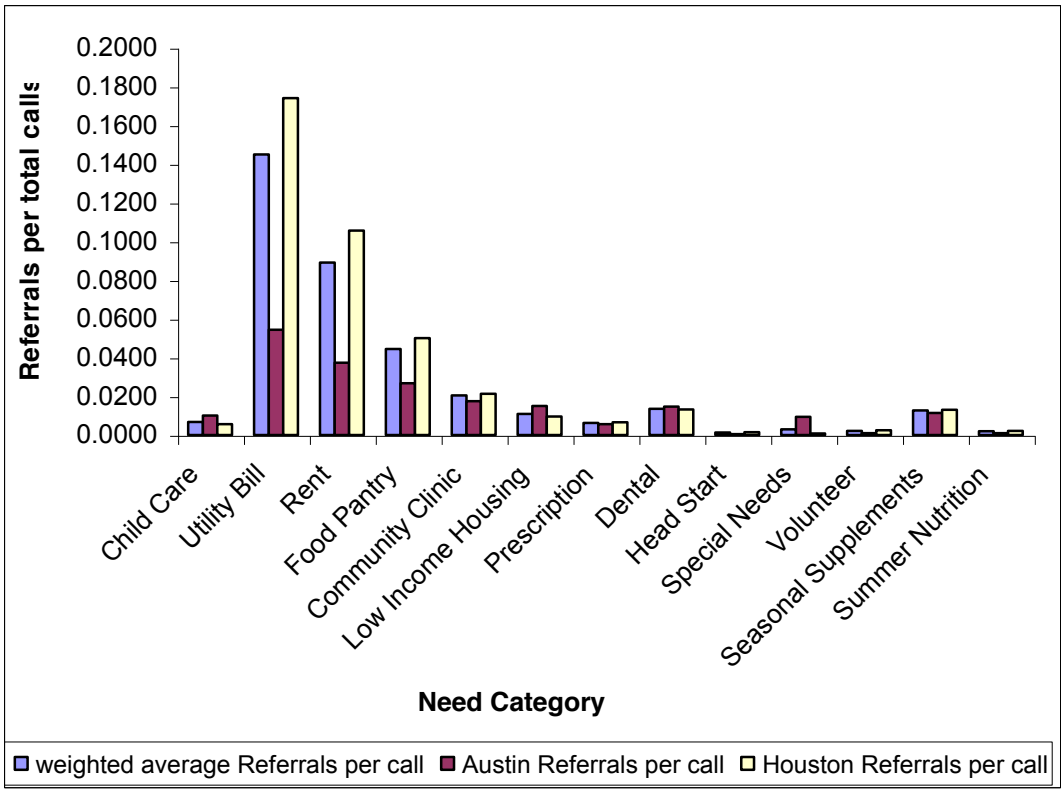
**Figure 2. Straight-Line Extrapolation of Call Volume**




As Figure 1 previously portrayed, researchers approached benefits to individuals, organizations, and government as residing within systemic, structural, and direct referral categories. The methodological approach to benefits associated with direct referral—the more traditional benefits of information and referral networks—are discussed first, followed by a description of the approaches used for systemic and structural benefits, the additional sub-categories introduced for this report. Researchers postulated reliable and plausible benefits based on available data.

**Direct Referrals**. The benefit of direct referrals is dependent on the number of referrals, the rate at which referrals were met, and the value of the information, goods, or services attributed to the met referrals. The number of direct referrals by type was estimated by multiplying statewide call volume by the referral rate. For the example of Utility Bill Assistance, the 2011 estimated statewide call volume was 3,053,756. Multiplying this datum by 0.145 gives an estimate of 442,795 referrals for utility bill assistance statewide in SFY 2011. Referral rates for the other referral types are shown in Figure 3.

**Figure 3. Referral Rates Used to Project Benefits**




The issuance of a referral does not ensure that the recipient of the referral has had the need met. Researchers combined follow-up survey results of five AICs to estimate caller characteristics, needs, and outcomes in terms of needs met for some benefits, but relied largely on survey data results from the South Central AIC and the Gulf Coast AIC as variables for estimating the value of several benefits. Table 1 shows data from follow up interviews provided by the South Central AIC. The "% Met" rates shown in Table 1 were used to project the number of callers whose needs were met after having received a referral for this array of requests. Continuing with the utility bill assistance example, the number of callers whose needs were met was 442,795*0.398=176,233.

**Table 1. Met Need Rates**

| Referral Type | # Met | # Un-Met | # Referral | % Met |
|---|---|---|---|---|
| Utility Bill Assistance | 151 | 228 | 379 | 39.80% |
| Rent Bill Assistance | 120 | 199 | 319 | 37.60% |
| Food Pantries | 100 | 51 | 151 | 66.20% |
| Community Clinic | 32 | 26 | 58 | 55.20% |
| Low Income Housing | 26 | 32 | 58 | 44.80% |
| Prescription Expense Assistance | 23 | 18 | 41 | 56.10% |
| Dental Care | 19 | 19 | 38 | 50.00% |

Source: "Board Highlights: Helpline Statistics from Jan-Dec 2010 to Jan-Dec 2011,"

The procedure outlined above was applied to all of the benefits tabulated in this report that depend on call volume. In cases where the needs-met ratio was not available for a particular benefit, an overall met rate of 0.485 was used. This met rate is the weighted average met rate for all referrals in a sample of follow-up interviews conducted in the South Central and Gulf Coast AICs. For others, researchers used an adjusted met rate. For example, South Central's follow-up report indicated a met rate of 0.552 for Community Clinics. Because South Central is very well advanced in health-related services at the local level, researchers reduced the met rate by half (0.2759) for estimating the statewide benefits of such referrals, conservatively assuming that other AICs were minimally achieving that rate. Alternatively, the average met rate of all five AICs (0.740) was used for referrals to the Summer Nutrition Program and Seasonal Supplements (school supplies, seasonal gift and food baskets) for which needs met rates are assumed to be high.

By definition, each time a need is met a benefit has been received. The value of a benefit is typically based on a portion of its cost or market value. In the case of utility bill assistance, for example, the benefit is estimated as $93, the average monthly electric bill for Texas residents using 1000 kWh of energy.[10] Given that this benefit was conferred upon an estimated 176,234 callers, the aggregate benefit received by all callers was $16,389,762. Of course, 2-1-1 cannot count this entire sum as a benefit of 2-1-1. However, by the supply chain argument described earlier, 2-1-1 can claim one fifteenth of this value as a benefit of 2-1-1. Thus, the benefit credited to 2-1-1 for utility bill assistance is $16,389,762÷15=$1,092,651.

The benefits listed in Table 2 are based on call volume multiplied by the met rate, multiplied by the benefit value, multiplied by the supply chain coefficient. The values for these parameters are displayed in Table 2.

[10] Texas Public Utility Commission, http://www.lowerelectricbilltoday.com/texas/average-texas-electric-bill.html

**Table 2. Referral Rates, Met Rates, Benefit Values, and Supply Chain Coefficients for Benefits Projected with These Parameters**

| Referral Type | Referrals per call | % Met | Benefit Value | Benefit Rationale | Supply Chain Coefficient |
|---|---|---|---|---|---|
| Utility Bill Assistance | 0.14500 | 0.3980 | 93.00 | Average of one month electric bill in Texas | 1/15 |
| Rent Bill Assistance | 0.08910 | 0.3760 | 613.00 | Value of one month rental voucher | 1/15 |
| Food Pantries | 0.04439 | 0.6620 | 150.00 | $25 per pantry visit. six visits | 2/15 |
| Community Clinic | 0.02042 | 0.2759 | 165.00 | 1 health check-up | 1/15 |
| Low Income Housing | 0.01098 | 0.3330 | 11,748.00 | Median payment for a housing voucher from HUD study | 1/30 |
| Prescription Expense Assistance | 0.00636 | 0.2805 | 91.00 | 1 prescription | 1/15 |
| Dental Care | 0.01360 | 0.2500 | 97.00 | 1 dental visit | 1/15 |
| Head Start (incl Early HS) | 0.00131 | 0.4850 | 495.00 | 3 Health check-ups | 1/30 |
| Head Start Child Care Component | 0.00131 | 0.4850 | 3,711.09 | 7.53 months of care | 1/30 |
| Child Care | 0.00676 | 0.4850 | 2,957.04 | six months of care | 1/8 |
| Seasonal Supplements | 0.01272 | 0.7400 | 25.00 | $25 per event | 2/15 |
| Summer Food | 0.00191 | 0.7400 | 162.50 | Value of meals=five per week * 10 weeks * $3.25 per meal | 1/15 |
| Volunteerism | 0.00211 | 0.4850 | 335.56 | Value of one year of a volunteer's hours | 1/30 |

Variations of these parameters were applied to estimate the benefits of direct referrals for disaster calls and income tax assistance. Benefits attributed to disaster calls have been estimated using the assumption that 45 minutes of time may be saved during these critical events and that time has been valued at the average hourly wage in Texas. The estimated benefit of Income tax assistance has been derived using a locally produced outcomes report (Neighborhood Centers, Inc., 2012).

Researchers estimated three benefits related to income tax assistance. Instead of counting referrals and multiplying by a met rate to get the number of beneficiaries, researchers directly observed the number of beneficiaries. In the Gulf Coast area, Neighborhood Centers, Inc. reported that their voluntary income tax assistance effort had filed 24,747 returns and that 2-1-1 was the third largest source of referrals (2011). From this, researchers estimated that 20 percent found out about the service through 2-1-1. Thus, 2-1-1 induced the benefit to 4,949 tax filers. With a call volume of 835,693 in the Gulf Coast area in 2011, the ratio of beneficiaries to calls is 0.00592.

The three benefits associated with income tax assistance are, (1) the value of filling out the return, (2) the value of tax refunds received, and (3) the value of Earned Income Tax Credits (EITC) payments received. The value of filling out the return was set at $150, a typical fee for a simple tax return done by a storefront tax preparer. The value of refunds is based on a three-year average refund received by the taxpayers being assisted in the Gulf Coast area, $1,625.93. Similarly, the value of the EITC payments is estimated to be the percent of the filers who qualified for EITC (32 percent) times the average EITC payment of $1,801 per qualifier. Under the supply chain rationale explained above, 2-1-1 claims credit for one fifteenth of the aggregate benefit received by the taxpayers who received these benefits.

**Systemic and Structural Benefits**. Unique approaches were developed and applied to systemic and structural benefits. The most outstanding systemic benefit is the value of time (and travel to some extent) saved by users based on the ease of access to 2-1-1, the quality provision of information, and the comprehensive resource database. The value of this benefit is based on survey results of the national benefits/costs analysis (O'Shea et al., 2004). Other systemic and structural benefits are largely expressions of cost avoidance by agencies resulting from 2-1-1, including its use as a planning tool, and the reduction or elimination of costs providing information services, as well as time-savings fielding inappropriate requests for information or services. Specific parameters for each are contained in Appendix B.

Having derived a baseline year value of benefits, projections of this estimate to later years were made in which the value of the benefit increases over time as a function of inflation and call volume. For the purposes of this study, inflation was assumed to remain fairly low throughout the projection period, specifically one half percent from 2012 to 2014 and one percent thereafter. Call volume was projected as shown in Figure 2.

### Costs of 2-1-1 Texas Information and Referral Network

The data on costs are much easier to determine and analyze than the data on benefits. This difference in accessibility exists because the institutions supporting the 2-1-1 system are required to keep records of the money they spend. There are limited numbers of institutions funding 2-1-1, but hundreds of thousands of users who benefit from services.

Much of the funding for 2-1-1 comes from the state government, the expenditure records of which are available to the public. TIRN provided detailed tabulations of their operating budget and expenditures (Table 3). The largest item, operating costs, consists primarily of funds sent from the state to the AICs. Much of this funding is for personnel costs.

The entry for "operating cost savings due to enhanced database" is zero for 2011 because the enhanced database was not yet fully operational. Starting in SFY 2012, the database is expected to save $775,000 per year, adjusted for inflation, by reducing expenses for local database administration (site, recipient, taxonomy management, etc.), improved data analysis and reporting, and potential cost recovery through data sharing arrangements with state and local government agencies. The cost of building the data system is estimated to total approximately $481,000. This cost is amortized over the period 2011 to 2015. The operating cost of the new database is estimated to be $300,000 per year, and this cost begins in 2012.

All of the costs were adjusted for inflation in the same manner as the benefits. However, not all of the costs were adjusted for call volume. For example, the telephony costs are assumed to be constant regardless of call volume because as long as it has enough capacity to handle the calls, the system will cost the same amount regardless of the amount of

capacity that is idle. The costs for travel, rent and utilities, summer food, child care, and all local funds were adjusted by inflation only, and not call volume. Salaries and wages, and operating costs were the only two costs that were adjusted for both call volume and inflation.

The present values in Table 3 and subsequent tables were computed using a discount rate of 2 percent. The effect of different discount rates on costs and benefits is presented in Appendix A.

**Table 3. Costs**

| | 2011 Cost | Ten Year Projected Cost | Present Value of Projected Cost |
|---|---|---|---|
| **State Government** | | | |
| The TIRN operating budget | | | |
| Salaries & Wages | $555,562 | $8,105,076 | $7,201,760 |
| Operating Costs | 9,809,904 | 143,116,417 | 127,166,007 |
| Operating Cost Saving Due to Enhanced Database | 0 | -11,261,311 | -10,002,085 |
| Travel | 26,826 | 279,680 | 250,848 |
| Rent and Utilities | 9,303 | 96,993 | 86,994 |
| Fringe | 133,967 | 1,954,437 | 1,736,614 |
| **TIRN Total** | **$10,535,562** | **$142,291,293** | **$126,440,139** |
| Telephony Costs | 2,000,000 | 20,851,206 | 18,701,664 |
| Summer Food | 25,000 | 260,640 | 233,771 |
| Child Care | 961,523 | 10,024,458 | 8,991,041 |
| Database Development | 96,296 | 3,497,305 | 3,157,963 |
| **Total State Funding** | **$13,618,382** | **$319,216,195** | **$283,964,716** |
| **Local funds** | | | |
| Other | 2,900,725 | 30,241,812 | 27,124,196 |
| In-Kind | 1,999,982 | 20,851,017 | 18,701,494 |
| **Total Local funding** | **$4,900,707** | **$51,092,829** | **$45,825,690** |
| **Total Costs** | **$18,519,089** | **$370,309,023** | **$329,790,406** |

Source: Public Records, PAPES estimates.

The state incurs nearly 75 percent of all costs, most of which are costs of reimbursement for local expenses. For SFY 2011, TIRN initiated cost-reimbursement payment, replacing the prior fixed grant approach for providing public funds to the AICs. Approximately $9.3 million of TIRN's $10.9 million operating budget passed to AICs in SFY 2011.

It is not possible to separate the cost of web visits from the costs of calls because both web visits and calls share databases and other resources. If one assumes that a call uses the same amount of resources as a web visit, then the $18.5 million cost can be divided by the sum of web visits and calls to get the cost of a call or web visit. There were 755,000 web

visits in SFY 2011 and 3.05 million calls.[11] The cost per call or web visit works out to be $4.86. Over time, as the call volume increases faster than the cost, the cost per call falls. By the end of the projection period in 2021 the cost per call has fallen to $3.76. Earlier research generally puts the cost of a call higher than the estimates in this study. In a 2004 study (O'Shea et al., 2004) comparing costs among eleven 2-1-1 operations in different states, the cost per call ranged from a low of $3.39 in Minnesota, to a high of $19.34 in Michigan. Of the sites studied, only two of them had costs per call that were smaller than the Texas cost of $4.86 estimated for SFY 2011. Much of the variation in cost per call in the 2004 study is due to diseconomies of small scale. Since the Texas 2-1-1 system is large and integrated, the cost is kept low in part by economies of scale.

**Benefits of 2-1-1 Texas Information and Referral Network**

Table 4 shows the benefits analyzed in this report. In 2011, estimated benefits total $27.8 million. Eighty-nine percent of these benefits ($24.7 million) were received by individuals and families, with organizations receiving 8 percent and government receiving the remaining 3 percent. The largest benefit among the individual and family benefits is the value of time saved. Saving time by making information easy to find is the main purpose of the 2-1-1, so it is not unexpected to see it coming in as the largest benefit observed. Time was also saved by organizations and government. The total of all of the time savings benefits in 2011 was $8.2 million, about 29 percent of total benefits.

The two next largest benefits among the individual and family benefits are utility bill and rent assistance. It is not surprising that these benefits are large. Homelessness and poverty are serious social issues in large urban areas. Not only are there many referrals for these services, but the benefit per recipient is large.

The child care benefit is the fourth largest benefit. This benefit is bestowed on working heads of family. Because these individuals have jobs, they are generally better off than the homeless or the very poor, but this benefit is still primarily concentrated on families with low and moderate incomes.

Many of the other individual and family benefits enumerated in the table are also related to poverty—utility bill assistance, food pantries, seasonal supplements, EITC, community clinics, and so on. Benefits to the poor constituted almost three fifths of total benefits.

Among the benefits to organizations, the largest benefit was the $720,000 value of time saved. However, the three cost avoidance benefits taken together are even larger at $826,000. The same is true for the benefits to government. The value of time saved by government was estimated to be $379,000, and the cost avoidance benefits total nearly $463,000.

[11] TIRN reports that there were 3.1 million *page views* associated with these web visits in 2011 (Texas Health and Human Services Commission, 2012).

**Table 4. Benefits Summary**
**Panel 1, Benefits Received by Individuals and Families**

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| **Individuals/Families** | | | |
| ***Systemic*** | | | |
| Travel miles saved | $423,709 | $6,181,474 | $5,492,545 |
| Time saved | 5,796,182 | 84,560,332 | 75,136,033 |
| ***Direct Services I&R*** | | | |
| Utility bill assistance | $1,092,651 | $15,940,659 | $14,164,063 |
| Rent bill assistance | 4,181,109 | 60,998,077 | 54,199,805 |
| Low income housing | 4,374,161 | 63,814,520 | 56,702,354 |
| Prescription expense assistance | 33,049 | 482,149 | 428,413 |
| Community clinic | 189,245 | 2,760,897 | 2,453,193 |
| Dental care | 67,147 | 979,606 | 870,428 |
| Food pantries | 1,794,602 | 26,181,394 | 23,263,462 |
| Head Start, health check component | 31,940 | 465,969 | 414,036 |
| Head Start, child care component | 239,457 | 3,493,433 | 3,104,088 |
| Caller time savings--disaster calls | 1,227,848 | 21,860,969 | 19,424,551 |
| Child care | 3,700,603 | 53,987,987 | 47,970,994 |
| Seasonal supplements (school supplies, holiday gifts, holiday meals, etc.) | 95,808 | 1,397,741 | 1,241,962 |
| Summer food | 46,641 | 680,444 | 604,608 |
| Tax assistance | 90,422 | 1,319,167 | 1,172,145 |
| Taxes recovered | 980,143 | 14,299,283 | 12,705,620 |
| EITC received | 342,545 | 4,997,381 | 4,440,420 |

**Table 4. Benefits Summary**
**Panel 2, Benefits Received by Organizations**

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| **Organizations** | | | |
| ***Systemic*** | | | |
| Time Saved | $720,207 | $10,507,085 | $9,336,065 |
| 211 as local planning tool | 625,000 | 6,516,002 | 5,844,270 |
| Value of shared database | 500,000 | 5,212,802 | 4,675,416 |
| Cost avoidance for staffed phone lines and reduced numbers of inappropriate calls | 207,271 | 2,160,926 | 1,938,157 |
| Workplace loss avoidance/ after hours services | 118,948 | 1,735,334 | 1,541,930 |
| ***Direct Services I&R*** | | | |
| Volunteer recruitment | 34,955 | 509,962 | 453,127 |

**Table 4. Benefits Summary**
**Panel 3, Benefits Received by Government**

| | 2011 Benefits | Ten Year Projected Future Benefits | Present Value of Benefits |
|---|---|---|---|
| **Government** | | | |
| ***Systemic*** | | | |
| Time saved seeking information and referrals | $379,256 | $5,532,948 | $4,916,298 |
| 211 as a government planning tool | 50,000 | 521,280 | 467,542 |
| Cost avoidance for staffed phone lines and reduced numbers of inappropriate calls | 337,810 | 4,928,307 | 4,379,044 |
| ***Structural*** | | | |
| Cost avoidance/special needs registry intake (TAR) | 50,771 | 740,700 | 658,149 |
| Cost avoidance/disaster kit maintenance and deployment | 75,000 | 1,094,173 | 972,227 |

**Table 4. Benefits Summary**
**Panel 4, Total Benefits by Perspective**

| | 2011 Benefits | 10 Year Projected Benefits | Present Value |
|---|---|---|---|
| Individuals | $24,707,261 | $364,401,481 | $323,788,720 |
| Organizations | $2,206,382 | $26,642,111 | $23,788,964 |
| Government | $892,837 | $12,817,409 | $11,393,259 |
| Society | $27,806,481 | $403,861,001 | $358,970,943 |

Individuals, at $24.7 million, by far reap the majority of benefits from 2-1-1. Organizations accrue a benefit of $2.2 million. Government, at $893,000, receives the smallest share of benefits. Total benefits to Society as a whole reach $27.8 million.

Table 5 presents estimated benefits distribution by operational categories. Systemic features account for about one-third of estimated benefits and Direct Services referrals account for about two-thirds of total benefits. The majority of the telephony value has been captured by its contribution to ease of access and time-saved. The structural value of the IVR and various caller options alone as part of 2-1-1 is comparatively small.

**Table 5. Estimated Benefits by Systemic, Structural, and Direct Services Categories**

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| Systemic | $9,158,383 | $127,856,490 | $113,727,299 |
| Structural | $125,771 | $1,834,873 | $1,630,376 |
| Direct Services | $18,522,327 | $274,169,638 | $243,613,269 |

**Net Value of 2-1-1 Texas Information and Referral Network**

Table 6 summarizes the benefit and cost estimates described in the previous sections, and compares them. The excess of benefits over costs is an estimate of the net monetized value of the 2-1-1 system. As explained above, many of the benefits of 2-1-1 are not monetizable, so the net value in the table underestimates the true value of 2-1-1. For the same reason, the benefits/cost ratio is biased downward.

**Table 6. Net Value of 2-1-1 Texas Information and Referral Network**

| | 2011 | Ten Year Sums | Ten Year Present Values |
|---|---|---|---|
| Total Benefits | $27,806,481 | $403,861,001 | $358,970,943 |
| Total Costs | $18,519,089 | $228,017,731 | $203,350,267 |
| Excess of Benefits over Costs | $9,287,392 | $175,843,271 | $155,620,676 |
| Benefit/Cost Ratio | 1.50 | 1.77 | 1.77 |

The net value of TIRN for SFY 2011 is estimated at about $9.28 million, roughly half of the $18.52 million in costs. The total estimated ten-year projected net value is $155.62 million in present value dollars. The baseline benefits/cost ratio is 1.50 in the baseline year, indicating an estimated $0.50 return in benefits for every $1.00 in costs. For the ten-year projections in nominal and present value dollars, the benefits/cost ratios are equivalent at 1.77.

## SECTION IV: CONCLUDING OBSERVATIONS

The Texas Information and Referral Network began its development in 1997 as a conscious policy response to the highly fragmented and duplicative environment in which information and referral for health and human services had been operating for decades. Prior benefits/costs analyses indicated the positive net value to society generated by this effort (King et al., 1998, 2000). This report confirms earlier findings: the monetary value of 2-1-1 exceeds its costs. This section presents observations regarding additional and emerging prospects for continuing and expanding the positive contributions of TIRN in the future.

### Value of Non-monetized Benefits

Information and referral services are most commonly perceived as providing access to assistance and programs to help users address their immediate needs and problems. The estimated net present value of TIRN presented in the previous section indicates the magnitude and value of a select subset of monetized benefits. Equally important, yet understated in this report, TIRN produces significant values that are not readily subject to monetization, particularly values that accrue in the mid- to long-term time frames. To mention but a few:

- The value of lives saved and harm avoided by disaster readiness, response, and recovery efforts facilitated by 2-1-1.
- The value of timely access to health care assistance which may preclude emergency room visits and avoid later, more advanced and costly medical interventions.
- The value of information and access to education supports positively associated with grade advancement, graduation rates, increased earnings and inversely related to incarceration rates.

Conservative estimates of these three benefits alone would yield additional monetized value in the millions of dollars.

From a social theory perspective, TIRN contributes to immense value through other recognized and significant outcomes. 2-1-1 TIRN may be viewed as a learning community that binds communities of interest at different spatial scales for a common good, re-enforcing capacity for collective response to challenges and opportunities in the field of health and human services. This broader and longer-term perspective encompasses its benefits as a creator of opportunity wherein individuals and other users grow in the capacity to meet challenges in a self-empowered manner. Quite simply stated, information and referral systems produce social capital, the value generated by facilitating and enhancing the capacity of users to develop, navigate and access an array of programs and services to meet their needs and expand their livelihood prospects. The provision of accurate, timely information and referrals to accessible resources that 2-1-1 provides is an important basis for building social capital over time.

Individuals and families, organizations, and government agencies as participants in the 2-1-1 network may enhance social capital by means of the shared endeavor to match needs and resources. Individuals and families acquire social capital by more informed engagement of the resources available to them locally. Organizations and government agencies gain knowledge of their client base and the resources required to address their needs for information and services, as well as opportunities to more closely align their service orientations with their missions. In doing so a parallel outcome is enhanced which may be called social cohesion, which is the innate sense of positive participation in a community of shared experience in pursuit of a common good, that good being the general well-being of a society.

The values of social capital and social cohesion cannot be monetized, but they are central ingredients of a well functioning society and participatory democracy. 2-1-1, as such, potentially contributes in important, yet subtle ways to enhance the public good, the purpose of governance, and basic requirements of civil society. Researchers have placed no monetary value on the mid- to long-term values of social capital and social cohesion attributable to 2-1-1, but the potential and latent benefits of the systemic approach in the State must be acknowledged.

**Public Health and Health Care Reform**

Referrals to public health and health care resources have always been a component of 2-1-1 services. Callers to 2-1-1 frequently need basic services and, it may be concluded, are low income, a population particularly vulnerable to health risks (Muennig, 2008; Urban Institute, 2009) and more likely to be uninsured (Kaiser Family Foundation, 2010). In some areas of the nation, 2-1-1 call specialists are emerging as a conduit for public health promotion and prevention. Just as 2-1-1 entities serve as public information dissemination site for emergencies, some 2-1-1 entities are disseminating public health information to callers.

In one study, callers to 2-1-1 were asked whether they would be willing to participate in a cancer risk assessment; 58% agreed and 85% of those completing the assessment needed at least one service (Eddens et al., 2011). When participants were later asked whether they thought 2-1-1 should be asking callers about their health, 56% said yes, 37% said no, and 7% were unsure. All reported that receiving health information and referrals from 2-1-1 made the service somewhat (59%) or much more (41 %) appealing. Only two participants (<5%) felt the health questions were too personal or private. The results of this study are early indications that 2-1-1 may play a valuable role in promoting public health information.

Another study found that the majority of 2-1-1 callers has one or more cancer control needs and is eligible for community-based services to address these needs. The study concluded:

> *Given its wide reach, unique expertise, and considerable experience working with this population, 2-1-1 has the potential to be a key player in eliminating health*

*disparities. The leadership and staff of many 2-1-1 systems are capable, willing, and enthusiastic partners in health research and referral to health services. Their high level of professionalism and openness to collaboration not only made this study possible, but also bode well for future partnerships aimed at reducing health disparities. Nationally, the 2-1-1 system holds great promise for delivering cancer communication interventions designed to reduce, and ultimately eliminate, cancer disparities disfavoring low-income and racial and ethnic minority populations. (Purnell et al., 2012, p. 765)*

**Emergency Response**

TIRN and its state and local partners have successfully coordinated efforts to improve the efficiency and effectiveness of emergency response in Texas. AICs will continue to perform lead functions and be recognized as the primary source for client information during catastrophic events (Stys, 2009). With TIRN operations and its strong local ties part of the state emergency management plan, 2-1-1 insures accurate and timely information is provided. As in the area of health care, TIRN is uniquely positioned to provide services to those in need during critical and often life-threatening times. This emergency response capability was demonstrated in the recent H1N1 epidemic, when the 2-1-1 system handled thousands of epidemic-related calls, as well as during the destructive barrage of late summer wildfires of 2011 in Texas.

**Advanced Information Management, Reporting, and Planning**

TIRN collects a wealth of data about the needs of Texans and has used the data to promote 2-1-1 and to educate policymakers about trends and growth in types of caller needs. The new statewide database supports more consistent and reliable data collection for future evaluation and management purposes. Moreover, it offers enhanced prospects for greater data sharing and exchange between stakeholder agencies at the state and local levels. This analysis has indicated that it also has the potential to promote cost recovery of the initial state investments through potential data sharing agreements. Knowledge and responsiveness to health and human services needs of residents deepens the array of systemic benefits attributable to TIRN. By adopting this new system, TIRN maintains the State's prominence as a leading agent of 2-1-1 efforts nationwide.

Analysts recommend three actions that TIRN and the AICs might focus upon to advance said purposes:

1. **Compile caller need and refer data at a more granular level.** The new database could enable improved performance measurement through improved data collection of caller needs and referrals. For SFY 2011 caller needs and referrals were decentralized to the AIC level. The Big Count tallies were the only statewide aggregations and these were limited to understanding trends within very broad categories, subject to local selection variances. For planning and valuation purposes,

the ability to centrally aggregate and sort requests and referrals at different spatial scales in real time at higher levels of detail will improve future analyses for management and evaluative purposes.

2. **Define target groups and collect standardized information**. Texas is experiencing demographic and social transitions, the effects of which on human needs might be better understood and served by 2-1-1. TIRN and the AICs have taken some preliminary, yet somewhat disparate steps to address specific target groups (e.g., young children, the aging population, and military veterans and their families) at the front-end of the call. Developing standard definitions and data collection statewide and at the AIC level of the needs and circumstances of these and other significant sub-populations would assist policymakers and providers to better respond to target group specific needs.

3. **Standardize follow-up surveys to callers**. One of the persuasive and elemental questions AICs could answer is "Do people actually get the help they need?" AICs, in accord with AIRS standards, regularly conduct follow-up with callers. Unfortunately, TIRN and the AICs do not have a standardized method or survey for this activity, thus severely limiting the possibility for data aggregation of the results. TIRN and its stakeholder partners would significantly improve information management, reporting, and planning capacity through more and better data regarding users and outcomes captured by means of consistent and standard follow-up procedures.

**Continuing Improvement in Evaluative Efforts**

Researchers prepared the following two examples as indicators of future analytic capacity that the new database, better target group identification, and standard follow-up procedures would facilitate. Although these are very preliminary efforts that would require refinement, the initial results of these approaches indicate promising pathways for future benefits/costs analysis of 2-1-1.

The first of these is a summary of benefits by Big Count categories. For estimating values, researchers assigned all monetized direct referral benefits to the attributed category. Additionally, each category received a share of total systemic value proportionate to call volume in that category, based on the assumption that each call is inherently part of the system. (The comprehensive table containing assigned benefits is found in Appendix A.)

**Table 7. Summary of Benefits by Big Count Category**

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| Arts, Culture and Recreation | $26,624 | $378,643 | $336,648 |
| Clothing/Personal/Household Needs | 175,806 | 2,500,265 | 2,222,961 |
| Disaster Services | 1,436,934 | 24,862,079 | 22,092,216 |
| Education | 412,055 | 5,959,798 | 5,296,657 |
| Employment | 98,855 | 1,405,879 | 1,249,953 |
| Food/Meals | 3,224,177 | 46,529,506 | 41,354,399 |
| Other Government/Economic Services | 46,104 | 655,670 | 582,950 |
| Health Care | 1,102,564 | 15,786,634 | 14,033,457 |
| Housing/Utilities | 11,673,186 | 169,555,951 | 150,674,413 |
| Income Support/Assistance | 6,703,367 | 97,246,574 | 86,419,873 |
| Individual, Family and Community Support | 496,962 | 7,067,644 | 6,283,772 |
| Information Services | 1,311,899 | 16,284,874 | 14,529,678 |
| Legal, Consumer and Public Safety | 587,027 | 8,348,515 | 7,422,582 |
| Mental Health/Addictions | 282,422 | 4,016,512 | 3,571,041 |
| Transportation | 162,622 | 2,312,753 | 2,056,246 |
| Volunteers / Donations | 65,876 | 949,705 | 844,097 |
| **Total** | **$27,806,481** | **$403,861,001** | **$358,970,943** |

Although preliminary, a few observations might be offered. As might be anticipated, the largest shares of the monetized benefits are found in basic needs categories such as Housing/Utilities, Income Support/Assistance, and Food/Meals. Information Services, a major purpose of 2-1-1, accounts for a large share of calls and a notable share of total estimated value. Health Care and Disaster Services, the latter driven by intermittent events, are significant as well. The values of Education and Mental Health/Addictions are likely understated given the lack of attribution and the mid- to long-term nature of outcomes, which nonetheless can be identified and generally accepted as significant in terms of livelihood prospects, well-being, and cost avoidance.

**Table 8. Benefits Summarized by Target Group**

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| Elderly | 4,393,424 | 63,810,038 | 56,717,409 |
| Military | 2,474,777 | 35,943,629 | 31,948,414 |
| Children | 1,195,679 | 17,366,023 | 15,435,751 |

Table 8 presents a preliminary estimate of the monetized benefits by select target groups: the elderly (persons over 60 years of age), young children (under 9 years of age), and military veterans and their families. The target group benefit estimates are based on the estimated shares of all calls offered by and handled for the specific group (based on South Central follow-up data) as a share of all benefits accruing to participants. Again, estimates such as these may be refined with more and better data in the future. These simple results suggest that these three target groups capture more than 25 percent of the total estimated benefits. TIRN appears to be successfully serving these significant populations.

**Final Statement**

The positive net value and benefits/costs ratios of TIRN for SFY 2011 and ten-year projected net present values indicate that individuals, families, organizations, and government in Texas are well-served by the public and private investments that support this effort.

## REFERENCES


Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. (2001). *Cost benefit analysis: Concepts and practice*, 2nd ed. Upper Saddle River, NJ: Prentice Hall.

Buxbaum, C. B. (1981). Cost-benefit analysis: The mystique versus the reality. *The Social Service Review, 55*(3), 453-471.

Cunningham, C., Pelletier, E., & Strover, S. (2003). 2-1-1 State by state: A periodic report on the national implementation of three-digit-accessed telephone information and referral services. Austin, TX: Telecommunications and Information Institute, The University of Texas at Austin.

Duff, P., & Dolphin, C. (2007). Cost-benefit analysis of assistive technology to support independence for people with dementia – Part 1: Development of a methodological approach to the ENABLE cost-benefit analysis. *Technology and Disability, 19*, 73-79.

Eddens, K. S., Kreuter, M. W., & Archer, K. (2011). Proactive screening for health needs in United Way's 2-1-1 information and referral service. *Journal of Social Service Research, 37*, 113-123.

Jacobson, P. D., & Neumann, P. J. (2007). Measuring the value of governmental public health systems: Final report. Retrieved from: http://www.sph.umich.edu/cleh/pdfs/final%20report.pdf

Kaiser Family Foundation. (2010). The uninsured: A primer. Author: Menlo Park, CA. Retrieved from: http://www.kff.org/uninsured/7451.cfm

King, C. T., O'Shea, D., & Betsinger, A. M. (1998). The value of a comprehensive Texas information and referral network. Austin, TX: Center for the Study of Human Resources, Lyndon B Johnson School of Public Affairs.

King, C. T., O'Shea, D., & Betsinger, A. M. (2000). The value of a comprehensive Texas information and referral network: August 2000 update. Austin, TX: Center for the Study of Human Resources, Lyndon B Johnson School of Public Affairs.

McKinley, A. H., & Netting, F. E. (1994). Information and referral: Targeting the rural elderly. In J. A. Krout (Ed.), *Providing community-based services to the rural elderly* (pp. 23-41). Thousand Oaks, CA: Sage Publications.

Muennig, P. (2008). Health selection vs. causation in the income gradient: What can we learn from graphical trends? *Journal of Health Care for the Poor and Underserved, 19*, 574–579.

Neighborhood Centers Inc. (2012). Report on the 2011 Tax Season. Retrieved from: http://www.neighborhood-centers.org/news/news.aspx?id=297&year=0

O'Shea, D., King, C.T., Greenfield, S., Shelton, E., Sullivan, L., Taber, E., & Olson, J.A. (2004). National Benefit/cost analysis of three digit-accessed telephone information and referral services. Austin, TX: Center for the Study of Human Resources, Lyndon B Johnson School of Public Affairs.

Purnell, J. Q., Kreuter, M., Eddens, K., Ribisl, K., Hannon, P., Williams, R.S., Fernandez, M.A., Jobe, D., Gemmel, S., Marti Morris, M., & Fagin, D. (2012). Cancer control needs of 2-1-1 Callers in Missouri, North Carolina, Texas, and Washington. *Journal of Health Care for the Poor and Underserved,* 23, 752–767.

Saxton, M. L., Naumer, C. M., & Fisher, K. E. (2007). 2-1-1 information services: Outcomes assessment, benefit-cost analysis, and policy issues. *Government Information Quarterly, 24*, 186-215. doi: 10.1016/j.giq.2006.02.013

Stys, J. (2009). Greater Houston area non-profit involvement in disaster preparation response and recovery. Regional Catastrophic Preparedness Grant Program.

Texas Department of State Health Services and Health/Health Preparedness and Texas Health and Human Services Commission/2-1-1 Texas Information and Referral Network. (2011). 2-1-1 Texas Connecting People and Services. Austin, TX: Texas Information and Referral Network.

Texas Health and Human Services Commission. (2012). 2-1-1 Texas Information and Referral Network: Action summary January-December 2011. Retrieved from: http://www.hhsc.state.tx.us/reports/2012/211-Action-Summary-2011.pdf

United Way Capital Area (2012). United Way Navigation Center 2011 Community needs and trends report. Retrieved from: http://www.unitedwaycapitalarea.org/get_help_2-1-1/documents/2011_cnt.pdf

Urban Institute (2009). Low-income working families: Updated facts and figures. LIWF Fact Sheet. Author: Washington DC. Retrieved from: http://www.urban.org/UploadedPDF/411900_LIWF_fact_sheet.pdf

Yates, B. T. (1999). *Measuring and Improving cost, cost-effectiveness, and cost-benefit for substance abuse treatment programs*. (NIH Publication No. 99-4518). Rockville, MD: National Institutes of Health. Retrieved from: http://archives.drugabuse.gov/IMPCOST/IMPCOSTIndex.html

## APPENDIX A: TECHNICAL ATTACHMENTS

**Table A 1. Generic Needs Met Rate**

| AIC | Participants | Callled Number | Percent Called | Needs Met | Percent with Needs Met |
|---|---|---|---|---|---|
| **South Central** | 1223 | 1137 | 93.0% | 578 | 50.8% |
| **Gulf Coast** | 946 | 863 | 91.2% | 392 | 45.4% |
| **Total** | 2169 | 2000 | 92.2% | 970 | 48.5% |

## Net Present Value Analysis

Benefits and costs that occur in the future need to be compared using their present value. The use of present value is well established in the cost-benefit literature, (Boardman 2001, Chapter 6) and its virtues will not be discussed at length here. In all of the cost and benefit tables presented above the discount rate was set to two percent. This rate was chosen because current interest rates are low, and can be expected to remain low for the foreseeable future. However, because there is no consensus regarding the "correct" interest rate to use in cost-benefit studies, we prepared Table A2. The table shows the effect of changing the discount rate on the present value of total benefits and costs. The larger the discount rate, the smaller the present values become because future funds are less valuable when they are more heavily discounted. For this reason, both the discounted benefits and costs decline by about twenty percent when the discount rate is increased from 0.5% to 6.5%. Their difference also declines by about the same amount. The benefits/cost ratio is almost unchanged by the discount rate because both the numerator and denominator are shrunk by about the same amount.

In many cost-benefit studies the discount rate is critical because the costs often come before the benefits. In such a case, a higher discount rate reduces the present value of benefits more than it reduces the present value of costs because the benefits are discounted over a longer period. In this study, however, the benefits and costs are projected as smooth functions of call volume and inflation. Since the benefits and costs have about the same time distribution, the discount rate does not have much effect on the analysis. For all values of the discount rate within the range 0 to 6.5 percent net value is positive, and benefits exceed costs by about 75 percent.

## Table A2. The Effect of Using Different Discount Rates

| Discount Rate | Discounted Costs | Discounted Benefits | Net Value | Benefit/Cost Ratio |
|---|---|---|---|---|
| 0.5% | $203,350,267 | $358,970,943 | $155,620,676 | 1.7653 |
| 1.0% | 215,183,504 | 380,493,212 | 165,309,707 | 1.7682 |
| 1.5% | 209,147,805 | 369,512,611 | 160,364,806 | 1.7668 |
| 2.0% | 203,350,267 | 358,970,943 | 155,620,676 | 1.7653 |
| 2.5% | 197,779,621 | 348,847,285 | 151,067,664 | 1.7638 |
| 3.0% | 192,425,203 | 339,121,844 | 146,696,641 | 1.7624 |
| 3.5% | 187,276,920 | 329,775,889 | 142,498,969 | 1.7609 |
| 4.0% | 182,325,215 | 320,791,692 | 138,466,477 | 1.7594 |
| 4.5% | 177,561,036 | 312,152,464 | 134,591,428 | 1.7580 |
| 5.0% | 172,975,806 | 303,842,303 | 130,866,497 | 1.7566 |
| 5.5% | 168,561,395 | 295,846,139 | 127,284,744 | 1.7551 |
| 6.0% | 164,310,096 | 288,149,690 | 123,839,594 | 1.7537 |
| 6.5% | 160,214,599 | 280,739,413 | 120,524,814 | 1.7523 |

Source: PAPES estimates

## Table A3. Detailed Benefits Summary by Big Count Categories

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| **Arts, Culture and Recreation** | | | |
| Allocation | 26,624 | 378,643 | 336,648 |
| Total | 26,624 | 378,643 | 336,648 |
| **Clothing/Personal/Household Needs** | | | |
| Allocation | 175,806 | 2,500,265 | 2,222,961 |
| Total | 175,806 | 2,500,265 | 2,222,961 |
| **Disaster Services** | | | |
| Allocation | 134,087 | 1,906,937 | 1,695,439 |
| Caller time savings--disaster calls | 1,227,848 | 21,860,969 | 19,424,551 |
| Cost avoidance/disaster kit maintenance and deployment | 75,000 | 1,094,173 | 972,227 |
| Total | 1,436,934 | 24,862,079 | 22,092,216 |
| **Education** | | | |
| Allocation | 140,658 | 2,000,396 | 1,778,532 |
| Head Start, health check component | 31,940 | 465,969 | 414,036 |
| Head Start, child care component | 239,457 | 3,493,433 | 3,104,088 |
| Total | 412,055 | 5,959,798 | 5,296,657 |
| **Employment** | | | |
| Allocation | 98,855 | 1,405,879 | 1,249,953 |
| Total | 98,855 | 1,405,879 | 1,249,953 |
| **Food/Meals** | | | |
| Allocation | 1,382,935 | 19,667,668 | 17,486,329 |
| Summer food | 46,641 | 680,444 | 604,608 |
| Food pantries | 1,794,602 | 26,181,394 | 23,263,462 |
| Total | 3,224,177 | 46,529,506 | 41,354,399 |
| **Other Government/Economic Services** | | | |
| Allocation | 46,104 | 655,670 | 582,950 |
| Total | 46,104 | 655,670 | 582,950 |
| **Health Care** | | | |
| Allocation | 813,123 | 11,563,983 | 10,281,423 |
| Prescription expense assistance | 33,049 | 482,149 | 428,413 |
| Community clinic | 189,245 | 2,760,897 | 2,453,193 |
| Dental care | 67,147 | 979,606 | 870,428 |
| Total | 1,102,564 | 15,786,634 | 14,033,457 |
| **Housing/Utilities** | | | |
| Allocation | 2,025,265 | 28,802,695 | 25,608,191 |
| Utility bill assistance | 1,092,651 | 15,940,659 | 14,164,063 |
| Rent bill assistance | 4,181,109 | 60,998,077 | 54,199,805 |
| Low income housing | 4,374,161 | 63,814,520 | 56,702,354 |

| | 2011 Benefits | Ten Year Projected Benefits | Present Value of Projected Benefits |
|---|---|---|---|
| Total | 11,673,186 | 169,555,951 | 150,674,413 |
| **Income Support/Assistance** | | | |
| Allocation | 1,493,846 | 21,245,014 | 18,888,732 |
| Child care | 3,700,603 | 53,987,987 | 47,970,994 |
| Seasonal supplements (school supplies, holiday gifts, holiday meals, etc.) | 95,808 | 1,397,741 | 1,241,962 |
| Tax assistance | 90,422 | 1,319,167 | 1,172,145 |
| Taxes recovered | 980,143 | 14,299,283 | 12,705,620 |
| EITC received | 342,545 | 4,997,381 | 4,440,420 |
| Total | 6,703,367 | 97,246,574 | 86,419,873 |
| **Individual, Family and Community Support** | | | |
| Allocation | 496,962 | 7,067,644 | 6,283,772 |
| Total | 496,962 | 7,067,644 | 6,283,772 |
| **Information Services** | | | |
| Allocation | 686,899 | 9,768,872 | 8,685,408 |
| 2-1-1 as local planning tool | 625,000 | 6,516,002 | 5,844,270 |
| Total | 1,311,899 | 16,284,874 | 14,529,678 |
| **Legal, Consumer and Public Safety** | | | |
| Allocation | 587,027 | 8,348,515 | 7,422,582 |
| Total | 587,027 | 8,348,515 | 7,422,582 |
| **Mental Health/Addictions** | | | |
| Allocation | 282,422 | 4,016,512 | 3,571,041 |
| Total | 282,422 | 4,016,512 | 3,571,041 |
| **Transportation** | | | |
| Allocation | 162,622 | 2,312,753 | 2,056,246 |
| Total | 162,622 | 2,312,753 | 2,056,246 |
| **Volunteers / Donations** | | | |
| Allocation | 30,921 | 439,742 | 390,971 |
| Volunteer Recruitment | 34,955 | 509,962 | 453,127 |
| Total | 65,876 | 949,705 | 844,097 |

## APPENDIX B: BENEFITS OF 2-1-1 TEXAS INFORMATION AND REFERRAL NETWORK

**Systemic benefits selected at the Participant level**

*Value of time saved through ease of access and quality of referrals for individuals and families that call 2-1-1.* This benefit is the bedrock of 2-1-1. Fully 44 percent of those surveyed for the national benefits/cost study stated that they or their family had save time, including time at work, by using 2-1-1 services.[12] Since this benefit applies to all callers, the value has been shared between individuals and families (85 percent), organizations (10 percent) and government (5 percent).

The formulaic expression of this value is:
=0.85*Call Volume*fraction of calls with time savings *time saved per call*average hourly wage
=0.85*3053756*0.44*0.25*20.3
=5796181.5758

Note that in the above formula, numbers that are computed values are generally expressed to the level of precision used by the computer hardware, generally twelve or more significant digits. Obviously, the actual number is not this precise. We have left these numbers unrounded so that individuals who may be interested in replicating our procedure will have a very exact representation of our estimates.

Also note that the formulae presented here produce the estimated datum for SFY 2011. Projected values for 2012 to 2021, the ten year projection period, are based on the 2011 datum projected forward by inflation and/or call volume, as explained in the main body of the report. The one exception to this rule is the disaster call projection which is based on a 2012 value, as explained below.

*Value of reduced travel miles to access services*. Quality referrals and accurate information assist callers to avoid unnecessary travel to service locations at which services are inappropriate or resources are not available to meet their needs. For example, providers such as housing assistance or food banks commonly inform 2-1-1 that their resources have been depleted or fixed times when they are available. Moreover, callers are referred to providers that may be more conveniently located to home or work and whose services more effectively meet the callers' needs. This benefit has been widely recognized in earlier studies as well, and is estimated at the state mileage reimbursement rate and 5 miles per met referral.[13]

[12] See O'Shea et al. (2004) Appendix D: Conversations with 2-1-1 Customers Protocol and Results. This measure was also used in King, et al (1998 and 2000).
[13] Rural and urban distances will often vary. Furthermore, many individuals use public transportation, for which the mileage value is equivalent.

The formulaic expression of this value is:
=fraction of calls with travel savings*travel miles saved per call*Mileage rate
=3053756*0.05*5*0.555
=423708.645

**Structural benefits selected at the Participant level**

*Access to state benefits eligibility services through Option 2*. Three-digit access to state eligibility services has given those with substantial needs access to Integrated Eligibility and Enrollment call centers, operated by a private sector vendor under contract with HHSC. This structured access expands the usefulness of three-digit services in Texas. Researchers have not monetized this benefit. The structure does however frequently provide initial access to 2-1-1 I&R services, in instances where callers inadvertently select Option 1 instead of Option 2 in the IVR. Call specialists redirect such callers to Option 2, but take the opportunity to question whether there are any immediate or other needs 2-1-1 may assist them with, and do so if the caller expresses need and interest. The number of such transactions has not been determined; such referrals are monetized within the values assigned to Direct Services.

*Access to Transportation Services Registry through Option 4.* These calls, which enhance the safety and security of dependent populations, are handled directly by call specialists. The value of these calls has been included in the Direct Services I&R with other disaster services. (Structural benefits have been assigned for organizations and government).

*Access to Emergency Response Center through Option 5*. Similar to the above, the value of these calls has been bundled with the Direct Services I&R for disaster services. Researchers have estimated the additional calls attributable over time to disaster events, such as hurricanes and wildfires, as well as public health emergency response like that which occurred during the H1N1 virus.

**Direct Services benefits selected at the Participant level**

The following array presents benefits from direct service referrals, often the primary concern of many stakeholders in 2-1-1. All accurate information and every met referral provide some benefit to individuals and families calling 2-1-1. Researchers have applied the supply chain model for estimating the value of selected benefits. Basically this can be described as an assignment of value based on the estimated time of making the referral as a share of the time to administer the service (i.e., apply, enroll, or provide the service) multiplied by the estimated met rate for the specific referral and the estimated value of the

goods and services provided to meet the caller or family needs.[14] In some instances, the value is assigned as single point in time event (e.g., rent assistance, school supplies, income tax assistance). In others, the value is associated with continuous receipt of services over an extended period of time (e.g., low-income housing assistance, child care).

*Access to utility bill assistance.* Electric, gas, and water utility assistance are leading request and includes an estimated 443 thousand referrals in SFY 2011. Researchers have selected the average cost of one month electrical bill as the equivalent value of this assistance and assigned 1/15 of that value. (4 minutes for a referral as a share of 60 minutes to authorize assistance). A met rate of .398 has been extracted from the follow-up data.

The formulaic expression of this value is:

=Call volume*referral rate for utility bill assistance*average cost of one month's electric bill*supply chain coefficient*needs met rate
=3053756*0.145001490982952*93*(4/60)*0.398
=1092651.23953696

*Access to rent payment assistance*. Rent payment assistance is another leading request; TIRN handled more than 272 thousand referrals regarding rent aid in SFY 2011. Researchers applied the equivalent value of 1/15 of an average month rent for a one-bedroom apartment ($613) with a met rate of .376 to estimate this benefit.

The formulaic expression of this value is:

=Call volume*referral rate for rent bill assistance*average cost of one month's apartment rent*supply chain coefficient*needs met rate
=3053756*0.0891045854296977*613*(1/15)*0.376
=4181108.59569581

*Access to low income housing assistance*. AICs made an estimated 34 thousand referrals to low income housing assistance during the baseline year. Although a met rate of .448 has been identified, researchers deem that a large share of these individuals would have been placed on waiting lists, but up to .333 may have received housing assistance in the short-term, based on the follow through with the referral. Researchers selected for the median value of a HUD housing voucher ($979) for a twelve month period, assigning 1/30 of the value to 2-1-1.

[14] National average I&R call time ranges between 3-7 minutes (Texas Health and Human Services Commission, 2012). The supply chain co-efficient is based on the estimated times of making a referral, which may vary from 2 minutes for a Seasonal Resources referral to 15 minutes for a Child Care referral that includes preliminary intake and eligibility screening.

The formulaic expression of this value is:

=Call volume*referral rate for low income housing assistance*median value of HUD housing voucher*supply chain coefficient*needs met rate
=3053756*0.0109843297238555*11748*(1/30)*0.333
=4374161.47084219

*Access to prescription assistance*. The AICs made an estimated 19,422 referrals to prescription assistance resources. Researchers estimated this benefit with a met rate of .280 (one-half the met rate reported by South Central) at 1/15 of a share of the average prescription value ($91).

The formulaic expression of this value is:

=Call volume*referral rate for prescription assistance*average prescription value*supply chain coefficient*needs met rate
=3053756*0.00636001664100122*91*(1/15)*0.280487804878049
=33048.8766504289

*Access to community health clinics*. 62 thousand callers sought community health services and received referrals to local clinics. Researchers applied a met rate of .276 (one-half the met rate reported by South Central)[15] and a single event service value equal to the cost of a regular health check-up ($165) at 1/15 of that value to estimate the benefit. (Four minutes for an appropriate referral as a share of the one hour visit.)

The formulaic expression of this value is:

=Call volume*referral rate for community clinics*cost of a health check-up*supply chain coefficient*needs met rate
=3053756*0.020422387766145*165*(1/15)*0.275862068965517
=189245.484393686

*Access to dental care*. The benefit of 42,534 referrals to free or low-cost dental care is estimated as the cost of one dental check-up ($97) factored by 1/15 referral (4 minute) to dental chair time (60 minutes) ratio at a .250 met rate.

The formulaic expression of this value is:

[15] The South Central AIC, operated by United Way for Greater Austin, has developed very close relationships with public and non-profit healthcare providers in the area. Notably, the call center administers a separate phone line for pre-eligibility screening for the Medical Assistance Program (MAP), a county-sponsored network of clinics and providers for low-income and indigent residents of Travis County. Health-related met rates are based on South Central's met rate. Since the call center is at such an advanced stage in the provision of health care referrals, the met rate has been reduced by 50 percent for statewide estimation purposes.

=Call volume*referral rate for dental care*cost of one dental check-up*supply chain coefficient*needs met rate
=3053756*0.0136010274639966*97*(1/15)*0.25
=67146.9877460235

*Access to Head Start and Early Head Start programs*. 2-1-1 plays a significant role in helping families access Head Start and other early childhood programs. Two types of benefits have been assigned to referrals to these programs: the benefit of the extensive health care services provided to the children, and the benefit of enrollment as no cost day care for the family. Children enrolled in the Head Start programs are provided health and developmental screens, including assessment of dental needs, and appropriate servicing of those needs is required free of charge to the families. For valuation purposes, researchers selected the value of three physical examinations at $165 each, factored by 1/30 referral and enrollment time ratio at a .485 met rate for estimating these health benefits. The value of childcare referrals to families is estimated as 1/30 of 7.53 months of childcare at $492.84 per month also with a .485 met rate for the estimated 4000 referrals in SFY 2011.

The formulaic expression for the health exam component of this benefit is:

=Call volume*referral rate for head start*cost of three physical examinations*supply chain coefficient*needs met rate
=3053756*0.00130698931114775*495*(1/30)*0.485
=31939.7896729536

The formulaic expression for the child care component of this value is:

=Call volume*referral rate for head start*7.53 months of care*cost of a month of care*supply chain coefficient*needs met rate
=3053756*0.00130698931114775*7.53*492.84*(1/30)*0.485
=239457.132821032

*Access to childcare services*. The AICs made an estimated 20,643 referrals to childcare services and Child Care Management Services (CCMS), the state and local brokerage for child care services that TIRN and the AICs provide under contract with the Texas Workforce Commission. Access to childcare information and referral is also available on the www.211Texas.org website. Researchers estimate the time committed to childcare referrals as fifteen minutes to handle the call, which includes assessing basic need and eligibility before referring to a likely or prospective provider with available openings, who then completes enrollment within two hours. Thus the formula is the number of referrals at a .485 met rate multiplied by the estimated cost of six months of child care and a 1/8 value attribution ratio.

The formulaic expression of this value is:

=Call volume*referral rate for child care*6 months of care*supply chain coefficient*needs met rate
=3053756*0.00675972696431339*6*492.84*(1/8)*0.485
=3700602.5065741

*Access to food banks*. The most common request for food assistance is for food bank or food pantry information and referral. Information and referral call specialists handled 135,544 calls for food banks, South Central reported a .662 met rate. Researchers estimated that the average value of food provided is $25 per visit and that the referral may lead to 6 or more visits associated with the referral. The value share ratio is 2/15 (4 minutes for the referral and 30 minutes to collect the goods).

The formulaic expression of this value is:

=Call volume*referral rate for food pantries*average value of food provided*supply chain coefficient*needs met rate
=3053756*0.0443859733399559*150*(2/15)*0.662
=1794601.66501215

*Seasonal access to supplemental resources*. AICs play an important role informing their communities about the location and availability of seasonal goods and services. These include school supplies, holiday gifts, toys, and food baskets, electric fans, heaters, and summer food programs. In SFY 2011, the number of referrals for these programs was estimated to be 38,841. The value of the seasonal goods benefit is estimated as 2/15 times the cost of the goods ($25) times the met rate of .740 times the number of referrals.

The formulaic expression of this value is:

=Call volume*referral rate for seasonal resources*average value of resources provided*supply chain coefficient*needs met rate
=3053756*0.0127191269093872*25*(2/15) *0.74
=95808.0716152796

*Access to Summer Nutrition Program*. AICs received a total grant of $25,000 distributed by population and need to provide information and referral to the federal program to feed children who normally qualify for free school lunches. In SFY 2011, the AICs handled an estimated 5818 referrals for this program. Researchers estimated the benefit of these referrals as the product of the share of referrals with needs met (.740) valuated as 1/15 of the value of the meals provided ($162.50 for five $3.25 meals a week for ten weeks).[16]

[16] USDA's Food and Nutrition Services set reimbursement rates or vended urban sites for breakfast at $1.90; lunch or supper at $3.25; and snack at $.78. http://www.fns.usda.gov/cnd/summer/FAQs.htm.

The formulaic expression of this value is:

=Call volume*referral rate for seasonal resources*average value of resources provided*supply chain coefficient*needs met rate
=3053756*0.00190519523719318*162.5*(1/15)*0.74
=46640.97778378

*Access to voluntary income tax assistance*. VITA programs are common throughout metropolitan areas in Texas. In SFY 2011, the AICs handled an estimated 18,084 referrals for voluntary income tax assistance. Based on reported outcomes in the Gulf Coast area regarding sources of referrals, tax returns, Earned Income Tax Credits, researchers identified three benefits and estimated associated values for the value of tax assistance, the value of taxes recovered, and the value of EITC received.[17]

The value of tax assistance is estimated as a 1/30 (two minute referral, one hour to prepare the return) share of the value of market-based income tax preparation ($150) multiplied by the estimated share of referrals that actually completed and filed their return.

The formulaic expression of this value is:

=Call volume*ratio of tax assistance casecount to call volume*market value of tax preparation service*supply chain coefficient
=3053756*0.00592203117652056*150*(1/30)
=90422.1911874335

The value of taxes recovered is estimated as a 1/30 share of the average refund per tax return multiplied by the estimated share of referrals that actually completed and filed their return. The average tax refund was estimated to be $1626.

The formulaic expression of this value is:

=Call volume*ratio of tax assistance casecount to call volume*average refund*supply chain coefficient
=3053756*0.00592203117652056*1625.94482065141*(1/30)
=980143.289554394

The value of EITC received is estimated as a 1/30 share of the average credit received multiplied by the estimated share of referrals that actually completed and filed their return. The average EITC received was estimated to be $1776.

The formulaic expression of this value is:

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[17] Source: Neighborhood Centers, Inc., 2012

=Call volume*ratio of tax assistance clients with EITC to call volume*average EITC*supply chain coefficient
=3053756*0.00189504997648658*1775.75905665333*(1/30)
=342545.119836851

*Access to disaster services.* 2-1-1 has emerged as a primary conduit for preparation, response and recovery to natural and other disasters including hurricanes, floods, fires, tornados, and disease pandemics. 2-1-1 delivers information about evacuation routes, emergency shelters and goods distribution centers, as well as a direct role on the Transportation Assistance Registry and evacuation/rescue information for natural disasters, and pertinent medical information for disease amelioration. The majority of callers receive accurate and useful information at a critical needs time. Researchers estimate that .740 of the callers save significant time and effort through information and referral to meet their immediate and short-term needs, which usually extend beyond the caller to include the household and neighbors. The value of at least 45 minutes saved is estimated at the equivalent of the average hourly wage has been assigned to the met calls rate to monetize this benefit.

The formulaic expression of this value is:

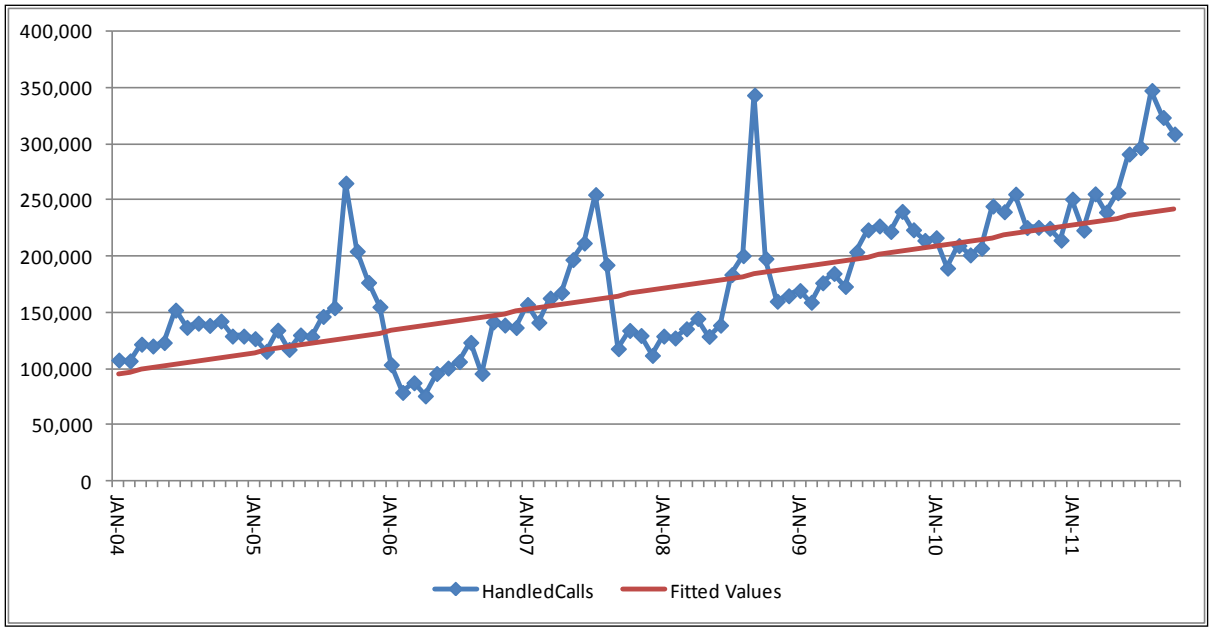
=Estimated Disaster Call volume*0.75 hours*hourly wage*needs met rate
=108982.184311868*0.75*20.3*0.74
=1227847.77954966

It is difficult to estimate the number of calls attributable to disasters. While the Big Count statistics have a separate category for disaster calls, it is not clear that all disaster-related calls are tabulated there. For example, a refugee from the disaster may call 2-1-1 from a refuge city and ask for, say, food bank locations in that city. This call would likely be tabulated as a food call, not a disaster call. To achieve a more realistic estimate of disaster calls, the researchers fitted a trend line to monthly call data in which the disaster months were deleted. Then the number of disaster calls was estimated by counting the number of calls in the disaster months and subtracting the corresponding values of the trend for those months. The call data and the trend line are shown in Figure 4. The disaster months are obvious from viewing the peaks. The peak in late 2005 is the result of Hurricanes Katrina and Rita. The peak in the middle of 2007 is Hurricane Dean. The peak in late 2009 is Hurricane Ike. And finally, the peak in the summer of 2011 resulted from the wildfires that were burning throughout the state.

For the disaster months, the excess of calls over the trend was 726,485 for the entire period. The total number of calls over the same period was 16,597,359. Thus, if we assume future years will have about the same number of disasters as the period 2004 to 2011, the number of disaster calls can be estimated by multiplying the call volume for the year by the ratio of disaster calls to total calls. That ratio is 0.044.

Note that in the main body of this report, the datum for 2011 is the actual number of calls in SFY 2011. In the years 2012 to 2021, the number of disaster calls is computed by the procedure described in this appendix

**Figure 4. Call Volume and No-Disaster Trend**




**Systemic benefits at the Organization level**

*Value of time saving seeking information and referrals*. Employers may call to seek assistance for or regarding one of their employees. Case managers and employment specialist working for non-profit and community-based organizations call to seek ancillary or supplemental support services for their clients. Researchers have assigned 10 percent of the total systemic time saved value and to one percent of all website searches as time saved to estimate this benefit.

The formulaic expression of this value is:

=(0.1*Call Volume*fraction of calls with time savings+0.01*web searches)*time saved per call or web search*average hourly wage
=(0.1*3053756*0.44+0.01*754752)*0.25*20.3
=720207.3788

*Value of 2-1-1 as a local planning resource*. Met and unmet needs, and other data produced by the 2-1-1 AICs have proved to be an asset to local human services planning and community needs assessments. Researchers have assigned an annual benefit of $25,000 to each area for the rich data reporting of 2-1-1 that supports these products. Such data collection from multiple sources or by other means (such as surveys) would be considerably more expensive, particularly in the large metro areas of Texas. Moreover common data

taxonomy insures reliability and comparability over time. Prospects for more and better future data analysis are very positive because of the usefulness of the new statewide database.

The formulaic expression of this value is:

=number of AICs*25000 benefit per AIC
=25*25000
625000

*Value of a shared resource database*. 2-1-1's locally maintained and comprehensive central database frees other non-profit and community based organizations from the cost of individual and frequently duplicative task of development and regular maintenance of a resource directory or internal database. As in earlier Texas studies, researchers assign a very conservative estimate of $20,000 annual cost avoidance per AIC; intuitively, the historic costs of the "silo" approach was much hire in the larger metro areas.

The formulaic expression of this value is:

=number of AICs*20000 benefit per AIC
=20*25000
500000

*Value of cost avoidance for staffed phone lines for information services and reduced numbers of inappropriate calls for services or assistance that an organization does not provide*. Participating organizations no longer must have all or part of an employee's workload dedicated to information services. Additionally, organizations have consistently reported to the AICs that the number of misplaced calls has been significantly reduced since the inception of 2-1-1. The 2-1-1 Texas system has 12,763 participating agencies and organizations statewide.[18] Researchers estimate the value of .25 FTE at average annual salary for .25 of these entities as the benefit of this cost savings.

The formulaic expression of this value is:

=number of participating agencies*12 months per year*1 four minute call per month*average hourly wage
=12763*12*(4/60)*20.3
207271.12

*Value of after hours services*. 2-1-1 Texas is available 24/7, providing access when convenient for callers. After hours calls transfer automatically to one of three call centers that administer this service and account for about 12 percent of all calls annually.

[18] Email confirmation from Deborah Ballard at Texas Information and Referral Network.

Researchers partially valuate this service as a productivity loss avoidance for employers by estimating that 10% of these calls would have been made during working hours in the absence of 24/7 services, and interpreted the productivity loss as the equivalent of ten minutes wages. Moreover, the time and travel saved indirectly benefits the employer in those instances in which an employee must seek assistance for themselves or a dependent during working hours. Lastly, employers benefit also to the extent that timely intervention to address needs through 2-1-1, may pre-empt subsequent more costly and time-consuming help. In this since, 2-1-1 helps to reduce or prevent absenteeism.

The formulaic expression of this value is:

=call volume*fraction of calls that are after-hours*fraction of these calls that otherwise would have taken place during working hours*ten minutes saved per call*average hourly wage
=3053756*0.115127529778067*0.1*(10/60)*20.3
=118948.318532442

**Direct Services benefits selected at the Organization level**

*Value of volunteer recruitment and placement.* Information and referral to volunteer opportunities is an important function of 2-1-1 Texas. In SFY 2011, the number of volunteer-related referrals was estimated to be 6444. Researchers estimated the share of the call volume that resulted in volunteer placements at 0.25%, the average hours of services (16.53) and the wage rate ($20.30 per hour) to monetize this benefit.

The formulaic expression of this value is:

=call volume*fraction of calls that result in volunteer activity*average number of hours a volunteer works in a year*average hourly wage
=3053756*0.0114466690570734
34,955.33

**Systemic benefits selected at the Government Level**

*Value of time saving seeking information and referrals*. Case managers and employment specialist working for state and local agencies call to seek ancillary or supplemental support services for their clients. Researchers have assigned 5 percent of the total systemic time saved value and to one percent of all website searches as time saved to estimate this benefit.

The formulaic expression of this value is:

=(0.05*Call Volume*fraction of calls with time savings+0.01*web searches)*time saved per call or web search*average hourly wage
=(0.05*3053756*0.44+0.01*754752)*0.25*20.3
=379255.5214

*Value of 2-1-1 as a government planning resource*. Data produced by TIRN and the AICs are an asset to government management and planning, and will increasingly be so under the new statewide database. Researchers deem this value at least $50,000 per year, given the value of the rich data on needs and service gaps to the several agencies within the Health and Human Services Commission and the offices of county and city government throughout the state. TIRN will likely capture directly some of this value through data exchange agreements with offices of state government in the near future.

The formulaic expression of this value is:

50,000

*Value of cost avoidance for staff time providing information services and inappropriate calls for services or assistance*. Government agencies, particularly state government, have been able to reduce calls for information services since the inception of 2-1-1. Option 2 is the most apparent redirect for state services, but the rapid rise in call volume experienced in recent years suggest that 2-1-1 is increasingly becoming the "first call for help." This noticeably influences the information service workload at the offices of government, and reportedly the number of misplaced calls has been significantly reduced as well. The 2-1-1 Texas system has 12,763 participating agencies and organizations statewide.[19] Researchers estimate the value of these calls as a share of all government information calls handled by 2-1-1, with the benefits as the value of 5 minutes state labor cost per information call. In SFY 2011, the number of information services referrals was estimated to be 179 thousand.

The formulaic expression of this value is:

=call volume*fraction of calls that are for information services*five minutes saved per call*average wage for state worker
=3053756*0.0585814422228963*(5/60)*22.66
=337810.428261401

**Structural benefits selected at the Government**

*The value of Transportation Assistance Registry (Option 4*). Call specialists enter data provided by caller into a template that is submitted to the University of Texas Center for

[19] Email confirmation from Deborah Ballard at Texas Information and Referral Network.

Space Research, which conducts limited validation and houses the data for local jurisdiction access in emergency events. This represents a cost savings to government for client contact and data entry. In SFY 2011, AICs were estimated to have handled 8,962 referrals for the special needs registry. Researchers estimate the value of this benefit as equivalent to 15 minutes of an intake workers wages per Special Needs referral.

The formulaic expression of this value is:

=call volume*fraction of calls that are for special needs registry*fifteen minutes saved per call*average wage for state worker
=3053756*0.0029348345280835*(15/60)*22.66
=50771.2513308903

*Value of cost avoidance for maintenance and shared deployment of the Emergency Response Center.* Also known as the Disaster Kit or WARM Center, the emergency response phone center can support up to 32 phone lines in case of an emergency like H1N1 or power outages due to hurricanes in coastal AICs. TIRN and the AICs house and maintain the Disaster Kit, and AICs, often with specialized support, operate the emergency center in the field, relieving other public agencies and responders of these costs. Researchers have assigned this value as a fixed annual cost savings to government.

The formulaic expression of this value is:

75000