

# **A Report on the Status of Wireless Access to 2-1-1**

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## I. Introduction

The rapid diffusion and adoption of cell phone use in the United States indicates that 2-1-1 providers should consider developing wireless options for offering health and human service referral. Cell phones have one of the fastest growth rates of any electronic medium. There are an estimated 138 million wireless subscribers in the U.S., accounting for roughly a fifty percent penetration rate,<sup>1</sup> and one significant trend in the growth of cell phone usage is using it as a replacement for a landline phone. It is estimated that between 3 to 5 percent of U.S. homes have opted for wireless phones over landline service.<sup>2</sup> Additionally, a number of payphone providers report that increased use of wireless services correlates to decreasing payphone profits.<sup>3</sup> As cell phones replace both landlines and payphones, the need for wireless access to 2-1-1 will become essential. Cell phones are no longer restricted to the financially well-off, especially as new calling plans have been implemented that make the service very friendly to lower income users.

Even though these trends suggest a growing choice for cell phones over landline phones, many 2-1-1 providers report great difficulty in pursuing wireless options given the task of instituting landline infrastructures.<sup>4</sup> Obstacles preventing landline implementation of 2-1-1 include lack of cooperation on the part of local exchange carriers (LECs) and lack of interest from state Public Utilities Commissions (PUCs).

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<sup>1</sup> See <http://www.wow-com.com> (November 1, 2002)

<sup>2</sup> See Implementation of Section 6002 (b) of The Omnibus Budget Reconciliation Act of 1993 and Annual Report on the Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services (“*Seventh Report*”), FCC, Released July 3, 2002, p. 32.

<sup>3</sup> See *Seventh Report*, p.33

<sup>4</sup> This information is based on phone interviews conducted by the Telecommunications and Information Policy Institute at the University of Texas at Austin from July-August 2002.

However, our research suggests that support of PUCs is one of the key elements in facilitating 2-1-1 implementation.<sup>5</sup>

Wireless customers should not be excluded from the benefits of 2-1-1 services. Potential users of 2-1-1 services may find it preferable or necessary to access 2-1-1 from their cell phones instead of from landline phones. Cell phones provide mobility for those relocating to a new community and not settled into their new residences. These individuals can benefit from valuable assistance provided by 2-1-1 services, including help finding food, housing, or money to pay electric bills. Also, victims of domestic violence may not feel safe dialing 2-1-1 from their homes. In these cases, cell phones provide an alternative for accessing Information and Referral (I&R) services. The wireless industry understands this dynamic: many companies participate in cell phone donation programs to victims of domestic violence, allowing access to emergency response services offered through 9-1-1. Long-term advantages of wireless access include cost benefits and efficient use of services. State investments in developing infrastructure for 2-1-1 will not be fully realized unless wireless customers can also access services. By providing 2-1-1 callers with wireless options, the 2-1-1 system as a whole will become more effective and widely used.

The goal of this report is to examine aspects of requiring that wireless carriers implement access to 2-1-1. Should such access be required, the FCC could provide guidelines to wireless carriers about how best to execute the technical aspects of the service (the three-digit translation). FCC involvement would provide leverage for I&R

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<sup>5</sup> See *2-1-1 State By State: A Periodic Report on the National Implementation of Three Digit-Accessed Telephone Information and Referral Services*. <http://www.2-1-1.org/documents/TIPIaug02.pdf> Telecommunications and Information Policy Institute, University of Texas at Austin. August 2002.

agencies and PUCs in order to ensure the rapid and easy implementation of wireless access to 2-1-1 services.

To date, Connecticut is the only state to require mandatory statewide wireless access to 2-1-1. Nevertheless, the state of Minnesota has worked successfully with Qwest to offer wireless access to 2-1-1 without the involvement of state entities. Four other local communities, including Knoxville, Tennessee, Montgomery, Alabama, Albuquerque, New Mexico, and Sioux Falls, South Dakota have negotiated with wireless carriers to provide wireless access on a local and regional level. These examples demonstrate that wireless 2-1-1 is both technically feasible and valuable.

This report will provide information on the status of U.S. implementation of 2-1-1 and an overview of the wireless industry, explore the example of E911 as a model for successful wireless access, review status of pending federal legislation regarding 2-1-1, and offer three effective models of I&R agencies that have implemented wireless 2-1-1. This report concludes that the involvement of the FCC will ease both landline and wireless access to 2-1-1.

## **II. Current U.S. Implementation of 2-1-1**

2-1-1 addresses citizens' basic needs, including food, shelter, and physical and mental health. As of September 2002, 17 states have implemented 2-1-1,<sup>6</sup> and nearly every state has a plan to implement 2-1-1. There are 54 call centers serving roughly 32 million people, or almost 12% of the U.S. population.<sup>7</sup> The increase in the number of call centers can be attributed to collaboration and sharing of information among 2-1-1

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<sup>6</sup>See "2-1-1 State by State"

<sup>7</sup>See <http://www.2-1-1.org> (November 1, 2002)

providers. Table 1 illustrates the number of call centers that have opened each year since 1997.

**Table 1. Annual Number of New 2-1-1 Call Centers**

<b>Year</b>	<b>Number of Additional Call Centers</b>	<b>Total Number of Call Centers</b>
1997	1	1
1999	1	2
2000	3	5
2001	18	23
2002	33	56

The goal of 2-1-1 providers is to assure access for at least 50 percent of America's 280 million citizens by 2005.<sup>8</sup> As detailed in a prior study, ten states are in Development Stage 2, or the collaboration stage, and sixteen states are in Development Stage 3, or the negotiation phase of implementation. Characteristics of Development Stage 2 (collaboration) include formation of collaborative groups and a concerted effort to develop operational models, formation of relationships with Utilities Commissions and Local Exchange Carriers (LECs). Also, database and technology issues are considered. Characteristics of Development Stage 3 (negotiation) include adoption of a viable business plan, indicating technical requirements to LECs, efforts by the LECs to provide cost estimates, and determining call center locations and technical specifications. In addition to 26 states in the collaboration or negotiation stages, 2-1-1 collaboratives in 13 states have been designated by their PUCs as the primary group responsible for 2-1-1 services. This PUC involvement has proven invaluable in the smooth implementation of 2-1-1.

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<sup>8</sup> See <http://www.2-1-1.org> (November 1, 2002)

Legislation pursued or passed at the federal level involving 2-1-1 can carry clear benefits for state- or locally-based implementation efforts. A twofold purpose is served by such legislation. The first benefit gleaned from passage of federal 2-1-1 legislation, predictably, is that of considerable funding appropriations which can aid in easing the almost universal financial burdens faced by social service and I&R services. Almost more importantly, federal 2-1-1 legislation places issues of 2-1-1 implementation within a national forum of discussion, thereby creating both a higher profile for implementation projects and a precedent for the continued presence of 2-1-1 as a viable issue. On October 11, 2001, Senator Hillary Rodham Clinton (D-NY), Senator Christopher Dodd (D-CT), and Congresswoman Louise Slaughter (D-NY) introduced legislation “Protecting America’s Children Against Terrorism Act” (S.1539), which included language to authorize funding for 2-1-1 implementation and development. Key elements of this bill, including specific language authorizing funding for 2-1-1 were moved to “The Bioterrorism Preparedness Act,” (S.1765) introduced on December 4, 2001, by Senator Bill Frist (R-TN). This legislation (S.1765) would among other provisions, create a \$667 million State Bioterrorism and Response Block Grant to help fund the development of anti-bioterrorism and bioterrorism response programs nationwide. On June 12, 2001, President Bush signed the final version of this bill, the “Public Health Security and Bioterrorism Preparedness and Response Act of 2002” (PL107-188) which authorized a state block grant and specifically mentions 2-1-1 as an allowable use of funds. Since then, the Senate Labor-Health and Human Services-Education (Labor-H) Subcommittee of the Senate Appropriations Committee has reported legislation that funds the “Public Health and Social Services Emergency Fund.” This allocation provides funding to the

Centers for Disease Control and Prevention (CDC) for upgrading state and local bioterrorism preparedness and response capacity at \$940 million – the same amount appropriated in last year’s emergency bioterrorism supplemental. As of this publication (November 2002), it is anticipated that the House will pursue a similar course of action. This means that the Senate did not fund the authorizing legislation of the “Public Health Security and Bioterrorism Preparedness Act” (PL107-188) which specially mentioned 2-1-1 as an allowable use of funds. However, funding for 2-1-1 remains likely, as preparing a “plan for risk communication and information dissemination” remains a critical benchmark for states preparing their bioterrorism preparedness plans and states have no constraints in building these plans. Current information on the progress of national legislation impacting 2-1-1 efforts can be found at [www.211.org](http://www.211.org).

### **III. Overview of Wireless Industry**

There are six mobile telephone companies providing nationwide service: AT&T Wireless Services, Inc. (“AT&T Wireless”), Sprint PCS, Verizon Wireless, LLC (“Verizon Wireless”), VoiceStream Wireless Corp. (“VoiceStream”), Cingular Wireless, LLC (“Cingular”), and Nextel. A wireless company is considered to provide nationwide coverage if services extend to at least some portions of the western, Midwestern, and eastern United States. In addition to these six companies, the industry includes *large regional companies*, *combinations* (joint ventures which allow companies to share customers in certain regions), *spin-off companies* (separation from a parent company to become an independently-traded company), and *affiliations* (a family of operating companies, granting smaller companies exclusive right to offer mobile services in select areas).

A number of indicators measure wireless industry performance, including subscriber growth, average monthly minutes of usage by subscribers, and average revenue generated per subscriber. All reflect a growing demand for wireless services.<sup>9</sup> For example, Mediamark Research, Inc. found in 2002 that 32 percent of U.S. households used cell phones, a 4 percent increase from 2001.<sup>10</sup>

Many cell phone companies have adapted their service plans to attract landline customers. These adaptations include lowering costs for wireless subscriptions, extending local and long distance coverage areas, and plans that include both local and long distance calling. In addition, optional services, such as call waiting, caller ID, and voicemail are often included in basic wireless phone service while they are added expenses for landline service. Finally, cell phone companies are attracting new customers by providing pre-paid options. Customers can “pay as they go” for wireless services, allowing flexibility for customers in a variety of income ranges. By the end of 2001, 10 percent of wireless subscribers were pre-paid,<sup>11</sup> and industry officials project that this number will increase to 30 percent by the end of 2006.<sup>12</sup>

In turn, users may opt for cell phones in order to achieve privacy and mobility. Cell phones provide privacy because cell numbers do not appear on caller ID systems. Cell phones provide mobility, allowing users communications access both inside and outside of their homes.

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<sup>9</sup> The Cellular Telecommunications and Internet Association (CTIA) has conducted semi-annual surveys on U.S. wireless usage since 1985. CTIA is considered the leader in industry statistics. CTIA collects information from service providers including number of cell sites, total service revenues, average local monthly bill, and average length of call. CTIA reports can be found at [www.wow-com.com](http://www.wow-com.com)

<sup>10</sup> See *Multi Cell-Phone Households Multiply Over Last 12 Months*, News Release, MediaMark Research, Inc., July 2, 2002.

<sup>11</sup> See *Seventh Report*

<sup>12</sup> See *Can U.S. Carriers Become Profitable in Wireless Prepaid?* News Release, Yankee Group, April 2002

For these reasons, consumers are beginning to “cut the cord,” or rely on wireless phones as their sole form of telecommunications. The Telecommunications Research and Action Center (TRAC), a nonprofit organization that addresses the needs of residential telephone customers, predicts the groups most likely to “cut the cord” and switch to wireless include young adults, empty nesters (those who no longer have children at home), and customers who desire a second line where the first is used for accessing the Internet.<sup>13</sup> As this becomes the trend, wireless access to 2-1-1 will become a necessity.

Several nationwide companies are resistant to implementing 2-1-1.<sup>14</sup> For example, nationwide companies were resistant to Connecticut’s request for 2-1-1 translation. As a result, Connecticut pursued regulatory intervention mandating wireless carriers’ compliance. The most accommodating companies appear to include affiliations and spin-off companies, as was the case in Knoxville, Tennessee. There, Cricket Communications, a regional wireless carrier, began offering wireless services in September 2001. It may be that regional companies have a better sense of the true costs and the community benefits of providing 2-1-1 access.

#### **IV. Possibilities for three-digit wireless access**

It is technically feasible for wireless carriers to provide 2-1-1 translation and the success of three-digit wireless accessibility can be evidenced in the example of 9-1-1. The cooperation between the FCC and the wireless industry following the ruling mandating that wireless carriers provide translation to 9-1-1 provides a model for implementing 2-1-1. There are significant differences in the structures of 9-1-1 and 2-1-1, the main one being that 9-1-1 is a location-sensitive emergency response system while 2-

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<sup>13</sup> See <http://www.trac.org/tips/wiretips.html> (October 29, 2002)

<sup>14</sup> See *Petition for Reconsideration of FCC Docket 92-105*, filed by CTIA in March 2001

1-1 is used to access health and human service information and referral and does not require location information. For precisely that reason, wireless infrastructure for 2-1-1 will be easier to implement than was 9-1-1.

The FCC and the Federal Government consider wireless access to 9-1-1 a necessity. In 1996, the FCC required all wireless carriers to forward 9-1-1 calls.<sup>15</sup> In turn, the Senate passed the Wireless Communications and Public Safety Act in 1999. This act intended to assist states in implementing seamless 9-1-1 networks.

Wireless 9-1-1 is also known as E911, which stands for “enhanced 9-1-1.” E911 encompasses a fully integrated electronic system that provides three major enhancements to basic 9-1-1 services; selective routing forwards 9-1-1 calls based on a caller’s location; automatic number identification locates the number of the cell site from which the call was placed; and automatic location identification reveals the actual number of the wireless caller.

Implementation of E911 is divided into Phase I and Phase II. Phase I requires carriers, upon request by a local Public Safety Answering Point (PSAP), to report the telephone number of a wireless 9-1-1 caller and the location of the antenna from which the call was received. Phase II requires wireless carriers to provide more precise location information, in most cases within 50 to 100 meters. Carriers are required to comply with Phase I, unless they receive an exemption from the FCC. In turn, Phase II has a four-year rollout, beginning in October 1, 2001 with completion by December 31, 2005.

The implementation of E911 required the development of new technologies and upgrades to local 9-1-1 infrastructure. Phase II requires coordination among public safety agencies, wireless carriers, technology vendors, equipment manufacturers, and LECs.

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<sup>15</sup> See FCC Docket 94-102

Since the FCC ruling, a number of technical difficulties were cited in the implementation of E911, prompting the FCC to adopt rules to improve the accessibility of 9-1-1 services. In 1999, the FCC adopted a ruling intended to “improve 9-1-1 reliability, increase the probability that 9-1-1 calls will be efficiently and successfully transmitted to public safety agencies and help ensure that wireless service will be maintained for the duration of the 9-1-1 call.”<sup>16</sup> The Commission ordered three methods to ensure 9-1-1 services, including automatic A/B roaming-intelligent retry,<sup>17</sup> adequate/strongest signal,<sup>18</sup> and selective retry.<sup>19</sup> While there are still some problems with wireless access to 9-1-1, including unintended 9-1-1 calls, the FCC continues to take an active role in addressing them.<sup>20</sup>

Despite these technical problems, E911 has been both effective and widely used. In 2001, 57 million wireless calls were placed to 9-1-1.<sup>21</sup> The FCC’s active involvement in addressing technical issues and requiring cell phone companies to report on their progress has aided the rapid diffusion of E911. When applied to 2-1-1, this model could prove invaluable.

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<sup>16</sup> See [http://www.fcc.gov/Bureaus/Wireless/News\\_Releases/1999/nrw19016.html](http://www.fcc.gov/Bureaus/Wireless/News_Releases/1999/nrw19016.html)

<sup>17</sup> When a consumer dials 911, the handset would seek to complete the call with the customer’s calling service. If the handset does not receive a signal, the handset would seek to complete the call via a different calling service and continue to scan until the call is completed. “Intelligent Retry” refers to the handset providing feedback that it is trying to complete the call and that it only spends 17 seconds looking for the caller’s preferred carrier.

<sup>18</sup> In this method, the handset would scan the caller’s carriers’ channels to determine whether the carrier offered the strongest signal. If the signal was not adequate, then the call would be completed with the carrier that provided the strongest signal.

<sup>19</sup> Selective retry requires a separate button on the cell phone that would route the 911 call. By pushing the 911 button, the handset would attempt to complete the call. If the carrier is not able to complete the call, or the call is not adequate, then the caller can push the 911 button again and the call would be completed with another carrier.

<sup>20</sup> On December 12, 2001, the National Emergency Number Association (NENA) sent out a press release about unintentional 911 calls. NENA recommended that wireless carriers change production procedures to remove the automatic 911 dialing feature to avoid future problems. In turn, NENA recommended that sales representatives inform customers about how to turn off this feature.

<sup>21</sup> See <http://www.wow-com.com/industry/stats/e911> (August 20, 2002)

## **V. The Wireless Providers' Reaction to 2-1-1: Petition for reconsideration of FCC Docket 92-105**

Even though wireless carriers have worked vigorously to implement E911, many argue that implementing 2-1-1 would be too complicated and expensive. Wireless carriers often cite the original FCC ruling on 2-1-1 as justification for their exemption, since when the FCC originally ruled on abbreviated N11 services authorizing the use of 2-1-1 for social service information and referral, the Commission did not specifically require wireless carriers to provide 2-1-1 access.<sup>22</sup> While this ruling did not specifically require wireless carriers to provide wireless translation, the ruling also did not imply that they were exempt from this process.

In March 2001, the Cellular Telecommunications and Internet Association (CTIA), an international organization of wireless communication industry members, filed a petition for reconsideration of the FCC's original ruling on abbreviated N11 services. Nextel Communications (Nextel), Qwest International Corporation (Qwest), Sprint PCS and Verizon Wireless (Verizon) followed CTIA's lead and also filed petitions. This petition primarily argued for the reconsideration of the 2-1-1 ruling, but also argued against the designation of 511, which is currently used for transportation information. CTIA argued that the FCC ruling does not explain how carriers should manage the 2-1-1 code. Instead, CTIA claimed that this ruling requires carriers to implement translation upon receipt of request from I&R agencies. This ruling, then, forces telecommunications entities to take any steps necessary, such as reprogramming software, to complete 2-1-1

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<sup>22</sup> FCC Docket No. 92-105. *The Use of N11 Codes and Other Abbreviated Dialing Arrangements.*

calls in specified service areas. CTIA contends that translation is too costly for telecommunications carriers.

Since Commercial Mobile Radio Service (CMRS) networks are designed without regard to state, municipal, or other political boundaries, service often covers more than one state. A caller may drive through many different jurisdictions during a single call, and thus the structure of CMRS is complicated for completing 2-1-1 translations. For this reason, wireless carriers need clarification on how to route calls. If geographic coverage areas for 2-1-1 services are defined too narrowly, calls could be misdirected. If carriers were required to provide access to multiple entities within a county, i.e. multiple call centers, the switching could be burdensome. Based on these reasons, CTIA argued that wireless carriers should not be required to implement 2-1-1 translation.

The CTIA petition also stated that the FCC's ruling did not provide sufficient specificity to enable wireless carriers to implement 2-1-1 translation with minimal operational difficulties. For example, carriers need to know if they are required to route 2-1-1 calls to more than one number within an operating territory based on the location of the caller. CTIA also argued that carriers need to know how to make necessary network changes to allow translations of N11 codes based on cell site locations, stating that this process is burdensome, complex, and expensive. Thus implementation requires extensive effort to coordinate routing. CTIA recommended that the FCC implement guidelines so carriers can comply as efficiently as possible. However, since these guidelines are not currently available, CTIA argued that the FCC should reconsider its requirements that CMRS carriers provide 2-1-1 translation until the Commission provides a greater degree of specificity regarding implementation.

In June 2001, the United Way filed additional information to the FCC to counter CTIA's petition. The United Way argued that the CTIA petition was not timely since the FCC originally sent out a call for comments when it was deciding the status of FCC Docket 92-105 in 2000. The United Way also insisted that the FCC ruling was not a rulemaking, but a number assignment. The United Way stated that I&R providers wanted the fewest burdens for affected carriers and that providers would take an active role in working with wireless carriers to implement 2-1-1. The United Way suggested that states coordinate for statewide implementation and approach legislatures and state utilities commissions in order to alleviate translation problems. Finally, The United Way suggested that 2-1-1 providers work toward statewide integration of databases in order to ease technical problems worrying the wireless carriers.

To counter CTIA's claim that it is not feasible to implement wireless 2-1-1 because of geographic and routing issues, the United Way contended that if calls were misdirected, referrals could be handled by another call center or transferred to the appropriate call center. The United Way insisted that cooperation between I&R agencies would ease the problem of misdirected calls.

The examples provided later show that wireless implementation of 2-1-1 is technically feasible. The Commission, in its original decision, noted that some routing, roaming, and billing problems may apply to a N11 call. However, switches can be modified to handle translation to a 7 or 10 digit call and need not be a problem. In order to account for additional costs due to roaming calls, the United Way recommended that wireless carriers hand off 2-1-1 calls to local landline carriers for call completion. For

example, if a roaming caller dials 2-1-1 in an area that provides 2-1-1, the caller would be connected to the local call center and billed as a local call.

In conclusion, the United Way argued that the benefits of 2-1-1 outweigh the costs incurred by wireless carriers. The United Way recommended that the FCC adopt National Standards for 2-1-1 call centers to smooth 2-1-1 translation, and CTIA's own petition supports the same FCC intervention to facilitate delivering 2-1-1 services.

## **VI. Three Models of Wireless 2-1-1 Implementation**

There are three models of wireless 2-1-1 implementation: mandatory statewide, voluntary statewide, and voluntary local. The following case studies illustrate these three models.<sup>23</sup> It is important to note that localities and state I&R agencies have to evaluate which of these three models are best for their specific cost and infrastructure needs.

### ***Mandatory Statewide***

In early 2001, United Way's Infoline 2-1-1 service in Connecticut entered into a substantial series of negotiations with the Connecticut Department of Public Utility Control (CDPUC) and the wireless industry.<sup>24</sup> The CDPUC's original ruling in December 1998 that ordered telecommunications providers to provide abbreviated 2-1-1 dialing code exempted wireless companies. In February 2001, United Way of Connecticut petitioned CDPUC to reverse this rule, based on the national FCC ruling. They were successful, and the CDPUC ordered "wireless telecommunications service providers to provide an abbreviated 2-1-1 dialing code for subscribers to access Infoline."<sup>25</sup> The

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<sup>23</sup> Information for this section is current as of August 2002

<sup>24</sup> Information on 2-1-1 wireless implementation in Connecticut was gathered from an interview with Mary Hogan, United Way of Connecticut, July 15, 2002.

<sup>25</sup> State of Connecticut Docket No. 92-09-11: Application of Infodial, Inc. for Assignment of an N11 Dialing Code-Reopening, February 14, 2001.

CDPUC ordered wireless companies to identify the current status of technical difficulties experienced in 1998 that prevented wireless carriers from accessing 2-1-1 and to detail how wireless companies have resolved these issues. CDPUC also asked wireless companies to identify current outstanding issues in providing 2-1-1 and to provide an expected timeline of implementation.

Based on this ruling, AT&T declared that it could implement wireless 2-1-1 service within six months of the CDPUC's final mandate. AT&T anticipated little difficulty because Infoline uses one statewide number. AT&T acknowledged that some calls might not be completed because cell sites crossed state borders. However, they agreed to make a good faith effort to minimize misdirected calls. AT&T determined that customers and roamers would be billed for all 2-1-1 calls, which would include airtime and some toll charges, depending on where the call was placed. Calls would appear on customers' bills as the translated local 7-digit number. AT&T also agreed to institute quality controls to ensure switch translations are maintained over time and that customers were billed correctly. AT&T agreed to terminate all calls originating in Connecticut using 2-1-1 to an 800 number that points to a local number, which is provided through Southern New England Telephone Company.

Sprint PCS also anticipated no problems with updating Mobile Switching Centers (MSCs) to translate and route 2-1-1 calls. Sprint PCS acknowledged that there were cross-border routing issues that would result in misdirected calls, but Infoline agreed to assist in mitigating cross-border and mis-referrals across state lines.

Springwhich Cellular Limited Partnership (Springwhich) was the third wireless company affected by the CDPUC mandate. Springwhich anticipated that it could implement the changes within 90 days of the final order.

As of March 2003, Cingular, AT&T, and Nextel have activated 2-1-1 in Connecticut. Agreements have been made with T-Mobile and Sprint. They are currently working on implementation issues. No agreement has been reached with Verizon.

### ***Voluntary Statewide***

Minnesota is the only state in the U.S. to pursue implementation of wireless 2-1-1 without the involvement of state agencies. Transition to wireless 2-1-1 was relatively smooth in Minnesota.<sup>26</sup> I&R agencies in Minnesota pursued landline and wireless infrastructure simultaneously. Qwest agreed to provide both landline and wireless translations simultaneously as the system was being launched.

In the greater Minneapolis-St.Paul Metro area, there is one 2-1-1 call center and ten regional call centers are located throughout the state, with 250,000 calls received annually. Implementation of 2-1-1 in Minnesota was aided by the Minnesota Public Utilities Commission (MPUC) and state legislative entities. MPUC rejected the initial tariff filed by Qwest. Qwest refilled the tariff in February 2001, which MPUC accepted, with no cost per call or ongoing charges. Through the Department of Human Services and Minnesota Board on Aging, a legislative appropriation was approved in the 2001 session to create improved access to seniors for health and human service information. Through this legislation, the Minnesota Board on Aging will work with Greater Twin

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<sup>26</sup> Information about 2-1-1 wireless implementation in Minnesota was gathered from an interview with Kathy O'Connor, Minnesota Alliance of Information and Referral, July 20, 2002.

Cities United Way and First Call Minnesota to expand the statewide database and build a web presence.

I&R agencies provided Qwest with the specific geographic areas where calls should be routed. As of this report, the greater Minneapolis-St. Paul Metro area is able to access 2-1-1 wirelessly, and testing is underway in the greater Minnesota area. Plans to roll out statewide wireless access are being implemented. This model will prove invaluable for those states which have multiple call centers.

### ***Voluntary Local***

Four communities in the U.S. were successfully in achieving local wireless access to 2-1-1: Knoxville, Tennessee; Montgomery, Alabama; Albuquerque, New Mexico; Sioux Falls, South Dakota.

2-1-1 of Knoxville, Tennessee (formerly Just Ask!) began offering wireless access to 2-1-1 for customers of Cricket Communications in September, 2001.<sup>27</sup> 2-1-1 of Knoxville does not gather statistics about how many calls are placed using cell phones. However, there are no indications that callers have encountered problems such as misdirected calls. Negotiations with U.S. Cellular Corporation and Cingular Wireless are pending.

The Volunteer and Information Center (VIC) in Montgomery, Alabama currently offers wireless access to 2-1-1 to customers of Knology, a local regional cable and wireless provider, and Cingular. Knology also offers switchboard access to 2-1-1.<sup>28</sup> Thus, a caller can now access 2-1-1 from inside a building where a switchboard requires

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<sup>27</sup> Information about 2-1-1 wireless implementation in Knoxville, Tennessee was gathered from a phone interview with Charlie Grey, Board Chair, 2-1-1 of Knoxville, July 20, 2002.

<sup>28</sup> Information about 2-1-1 wireless implementation in Montgomery, Alabama was gathered from a phone interview with Doci Haflam, VIC, July 10, 2002.

“9” to dial an outside number. I&R providers are currently negotiating with Cellular One for wireless access to 2-1-1.

The VIC receives about 1,200 calls per month and is open 24 hours a day, 7 days a week. Cingular also provided VIC with cell phones for phone coverage on evenings and weekends. In these off-hours, students from local colleges manage calls with laptop computers that provide access to the referral database. VIC anticipates expanding its services to operate six call centers.

Both Cingular and Knology provide 2-1-1 translation free of charge. Cingular was promoted as a community sponsor in exchange for this service, and VIC held a press conference to advertise this new service.<sup>29</sup> As of this report, there are no indications of technical problems.

The United Way of Central New Mexico successfully negotiated with Qwest wireless to provide wireless access to 2-1-1.<sup>30</sup> Just as in the cases of Alabama and Tennessee, there are no indications of misdirected calls. Translation was completed free of charge.

In the Sioux Falls area, callers are able to dial 2-1-1 from Sprint, UniceL, Nextel and \*2-1-1 from Cellular One phones.<sup>31</sup> All of these companies completed switching to the local call center, HELP!Line, free of charge. Sprint and UniceL were able to activate 2-1-1 within one month of an initial query. Cellular One took seven months to complete the translation and then only translated the number to \*2-1-1. Nextel was able to complete translation within three months from initial contact with HELP!Line. In these

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<sup>30</sup> Interview about 2-1-1 wireless implementation in Albuquerque, New Mexico was gathered from an interview with Mike Swisher, United Way of New Mexico, July 25, 2002.

<sup>31</sup> Information about 2-1-1 wireless implementation in Sioux Falls, South Dakota was gathered from email correspondence with Janet Kittams-Lalley, Help!Line Center, August 6, 2002.

cases, customers are not billed for the 2-1-1 calls. Instead, they use their air minutes when they dial 2-1-1.

Few misdirected calls have been reported since the implementation of wireless 2-1-1 in Sioux Falls. Most of the misdirected calls occurred when Cellular One switched over to \*2-1-1, since \*2-1-1 was formerly used as a number for customer service.

In most of these case studies, wireless routing issues are rendered somewhat less complex because 2-1-1 service providers operate single call centers providing centralized services for their respective locations. A single point-to number is utilized and therefore the programming of MSCs is made more direct. While there are some misdirected calls, the agencies plan to actively work with wireless carriers to alleviate these problems.

In Minnesota, where routing is planned to multiple call centers, switching is a little more complex. Minnesota plans to roll out statewide services shortly. For locations in which multiple call centers are planned, the development of broadened database resources *and* the development of telephone infrastructure between call centers will be crucial for successful wireless access to 2-1-1. If a wireless call is “misdirected” to a distant call center, that call center should have the capability either to provide I&R services to the caller, or (preferably) to “transparently” direct the call to the appropriate center. In a fully integrated 2-1-1 system, these capabilities are readily available. Alternately, an integrated 2-1-1 system may have the capability to specify a single “point-to” number for statewide 2-1-1 calls. In this instance, a wireless network would be more easily programmed to route 2-1-1 calls to the landline-based 2-1-1 network or wide-area network, which would then be routed appropriately.

## **VII. Conclusion**

Requiring wireless carriers to complete 2-1-1 translation upon request of I&R agencies would facilitate the deployment of this service. Wireless carriers have proven that they are willing to comply with translation, but they have indicated that they need direction from the FCC on how to route calls. However, as we have shown in this report, local and state authorities need to evaluate routing alternatives that will best fit with their agencies.

There are two options for routing wireless 2-1-1 calls: statewide routing or local routing. At this time, cost estimates for these two processes are not available because they vary across carriers. However, as all the case studies above have shown, U.S. wireless carriers have been willing to complete translation without incurring any costs to 2-1-1 providers.

In the case of statewide routing, calls would be forwarded to one centralized number. The forwarding of the cell phone call would vary depending on the level of infrastructure at the call center. If call centers shared databases, operators could provide a caller from any area in the state with needed information. If call centers do not share databases, operators will hand off the call to the appropriate call center through their internal systems. However, if call centers do not have the capability to forward calls, operators would have to provide the caller with the 10-digit number of the appropriate call center.

Statewide routing alleviates confusion for wireless carriers since only one point-to-number is utilized. This option could allow efficient implementation. However, some

states do not have the statewide infrastructure to effectively handle these types of calls. While many states are moving toward shared database systems, this option will require both coordination among I&R agencies and investment in improving infrastructure. Over time, however, this option has the potential to improve both landline- and cellular-based 2-1-1 services.

The second option, local routing of wireless calls, requires cooperation between carriers and 2-1-1 providers. In this case, 2-1-1 providers would work with carriers to map out regions to which calls should be routed. Barriers to this approach include problems that may arise among multiple carriers. For example, multiple carriers often define geographic coverage and zoning by different criteria. However, this option would allow for immediate implementation in states that have regionalized call centers.

Both options, however, require compliance on the part of wireless carriers. As was shown in the Connecticut example and in the case of E911, when state and federal agencies intervene, wireless carriers are more likely to rapidly implement access. Therefore, there appears to be ample justification for FCC intervention in the matter of requiring wireless carriers to work with 2-1-1 systems. The public interest would best be served by ensuring the smooth operation of these services, and having 2-1-1 available via landline but not via cellular would be confusing to the people 2-1-1 is intended to serve. The state systems are steadily launching – indeed, the statistics cited earlier in this report do not include Texas’ new call centers launched in fall of 2002, which considerably increase the numbers of people being served. Several state utility commissions have functioned to broker arrangements in their states between carriers and 2-1-1 organizations, but insofar as wireless systems are outside of their purview, it falls to the

FCC to determine whether it should follow suit with wireless vendors. The state commissions' efforts have been very functional for speeding up the launches of various 2-1-1 services, and for insuring that this important system is able to operate on reasonable terms. The FCC is capable of achieving similar outcomes with wireless carriers.

## **Appendix A. How Wireless Networks Work**

A cellular system divides geographic areas into smaller cells, called cell sites. Each cell site has a base station with a tower that contains radio equipment. Cell sites encompass about ten square miles, the composition of which looks like a hexagonal grid. When a caller moves from one cell site to another, the signal is passed from cell to cell, using the same frequency that is transferred from each of the radio towers. Frequencies are reused by numerous callers because the cellular handset uses a low power level, thus allowing little interference during calls. The cell site sends and receives information from the cellular phone and a mobile switching center (MSC). MSCs are connected to cell sites via T1 lines or microwave systems. A wireless system is comprised of many cell sites that are connected back to the MSC. The MSC processes the call and connects it to the public switched telephone network (PSTN). The MSC maintains subscriber data, call routing information, and billing information.

Cellular communication uses spectrum or “radio” communication. When a caller turns on the handset, the handset is assigned a radio frequency and searches for the nearest cell phone tower. When a caller using a wireless phone nears the boundary of one cell and the signal gets weaker, the signal is handed off to the next cell. When a caller enters a cell site covered by another company’s MSC, the call is considered “roaming” and will incur charges. When a caller talks into the cell phone, the sound is converted to radio frequency energy, also known as radio waves. Radio waves travel through the air until they reach the receiver at MSC. The MSC then sends the call through the landline network.

One of the main differences between landline and wireless networks is that cellular networks are not often set up according to generally established political (either county or state) or conventional telephone service (i.e., exchanges or local access and transport areas, called LATAs) boundaries. Thus, wireless carriers can allow customers to call from anywhere within a large geographic area and from changing locations. Also, cell sites may serve more than one exchange or LATA, or may serve several parts of several regions, making it difficult to route calls based on conventional political boundaries or communities. It is possible that wireless calls placed from slightly different locations will be received by different MSCs and routed in different manners.