

2016

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Recommended Citation

Pothen, Joshua Jeremy, "Improving Community Health with Affordable Internet Access" (2016). *Family Medicine Clerkship Student Projects*. Book 184.
<http://scholarworks.uvm.edu/fmclerk/184>

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Improving Community Health with Affordable Internet Access

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Rotation 2: May 9-June 17, 2016

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Problem Identification and Need

- People of low socioeconomic status (SES) use the Internet for diverse purposes, including for health-related purposes. Increased Internet use is associated with increases in health information seeking (McCloud et al, 2016) and benefits in health status (Feinberg et al, 2016).
- Nevertheless, many in lower socioeconomic areas in the United States still lack Internet access. In regions of the US with lowest median income, only 50% of individuals have Internet access (July 2015 Issue Brief, White House Council of Economics Advisors).
- Making Internet access available can lead to significant increases in its use among individuals of low SES (Viswanath et al, 2013).

Public and Local Community Health Costs

- Currently, scarcity of empirical studies on how Internet access impacts health (Chou et al, 2012).
- Nevertheless, people without access to the Internet have significant disadvantages. For instance, they cannot use telemedicine to access healthcare unavailable in their region, better navigate the health care system or use the Internet to research health issues (such as early warning signs of conditions that benefit from early treatment) (Shapiro, Center on Budget and Policy Priorities, 2015).
- Internet survey data indicated 23.6% of people in Newport, VT lacked access to the Internet at home (InternetAccessLocal.com).
- Average cost of Internet in Newport anecdotally estimated at around \$70 per month (anecdotal from Diane Peel and Colleen Moore de Ortiz). Costs of a new Internet connection through Comcast started at \$79.99 per month with a 2-year agreement (from xfinity.com on 2016 June 8).

Public and Local Community Health Costs (2)

- In the city of Newport VT, 34% of residents in the Newport trade area have a yearly household income less than \$25,000 (2014 Newport City Market Analysis).
- Orleans County (which contains Newport) is currently ranked as the least healthy county in Vermont (2016 Vermont County Health Rankings).
- Relative to state averages, the region has increased rates of heart disease deaths, COPD and diabetes-related deaths; greater percentages of smokers, obese adults, and children under 18 living in poverty; increased asthma hospitalizations; an increased teen birth rate; lower birth weights; and increased percentages of residents lacking health insurance (Vermont County Profiles for Health Professions Students and Residents 2015, AHEC).
- Furthermore, 17% of adults do not have a regular primary care provider, and 31.8% of primary care physicians are limiting or not accepting new patients (Vermont County Profiles for Health Professions Students and Residents 2015, AHEC).

Community Perspective on Issue

- Residents of Newport are interested in using the Internet for health information seeking.
- Toni L.A. Croteau –Librarian at Goodrich Memorial Library in Newport, VT (part of the neighborhood studied in this project):
 - “The library has a free high-speed wireless Internet connection. It is the only free high-speed connection in this section of town.”
 - “People here are definitely interested in using the Internet for health-related purposes. Patrons often come in and use our connection to look up health information, both on the library [desktop] computers and on their phones.”
 - “Since our library has a printer, people often also print out health information so they can take it home with them.”

Community Perspective on Issue (2)

- Internet access has the potential to lead to multiple types of public health benefits.
- Diane Peel, RN—member of NEK 99%, full-time nurse at North Country Hospital, owner of The 99 Art Gallery, long-term Newport resident:
 - “For many of the lower socioeconomic class in Newport, even \$50 a week is a luxury. Lots of people in this region can’t afford it.”
 - “There are so many reasons why giving people Internet access is a good idea, including from a health standpoint. It also gives the residents a greater sense of acting as a community.”
- Colleen Moore de Ortiz, RN, FNP—School Liaison/Public Health Nurse at Women, Infants and Children (WIC), part of Vermont Department of Health (VT DOH), long-term Newport resident:
 - “Orleans County is the least healthy county in Vermont. Downtown Newport City, being the largest urban area and concentration of rental units in the region, is particularly prone to the lower income strata.”
 - “Think about what could happen if the Internet was more affordable and accessible. There are many facets to how their lives could be healthier beyond health information seeking. It can help children succeed at school. The savings from the Internet also represent several hours less that parents need to work, which could be used towards engaging in family activities, helping decrease family stress. ”

Intervention and Methodology

- A local non-political community organization called NEK 99%, with connections to the Newport branch of the VT DOH, is creating a Newport Wireless Mesh network that will serve as a “pay what you can” wireless Internet network for a neighborhood in downtown Newport.
 - Mesh networks are an economical way of providing wireless internet to communities (Wired, 2014).
 - These networks have already been implemented in areas such as the Red Hook neighborhood in Brooklyn, where 70% of the population lives in housing projects (New York Times, 2014), as well as multiple neighborhoods in Pittsburgh by a group called Meta Mesh (MetaMesh.org)
- The neighborhood covers a pentagonal region from the region of the city bounded between Central and Coventry St, and Clermont Terrace.
- Individuals in NEK 99% have existed in this community for many years and have established relationships with its residents. They estimate the total number of households in this region to be around 350.

Intervention and Methodology (2)

- Residents in this area include the elderly, disabled, as well as people with low income, without cars, or with mental health conditions. They are also within walking distance of the Northeast Kingdom Community Action food shelf (anecdotal from Diane Peel).
- According to 2000-2013 data from city-data.com:
 - 48.5% of the children in this region of Newport are below the poverty line.
 - Median income in this region is \$51,000, but when outliers are removed, this drops to \$20,500.
 - Residents have lived in this neighborhood for an average of 8-11 years.
- NEK 99% will distribute routers to individuals in this neighborhood that opt into the program, thereby ensuring every resident has access to the wireless network.
- Routers are configured with specialized software so that they only connect to the Newport Wireless Mesh network, thereby reducing the likelihood of the routers being taken and/or sold.

Intervention and Methodology (3)

- The router software can be configured so that individuals utilizing the network view a splash page whenever they connect to the network (similar to a welcome page that loads when individuals connect to a wireless network at a coffee shop or airport).
- This splash page can be updated regularly by the DOH to provide information such as health tips and local health events.
- This mesh network thus provides both 1) an intervention that could impact the health of the community, and 2) a unique way for the VT DOH Newport branch to increase health awareness within this community.

Initial Review

- NEK 99% conducted a survey of 38 households in the Newport neighborhood:
 - 19 households had Internet access in the home (50%).
 - 11 had no Internet access, but would like to (29%).
 - 8 had no Internet access and had no interest (21%).
- NEK 99% also conducted a pilot study of a mesh network in this neighborhood using 10 households for 1 year.
 - Study showed that such a network is feasible, with connection speeds that enabled streaming of media without interruptions.
 - Participants comments indicated that the network was used for multiple purposes: Children were using the Internet for homework, and individuals in the study asked questions regarding using the network for online banking.
- Discussions with an IT individual at NEK 99% and with an IT individual from Meta Mesh (Pittsburg's mesh network, which uses the same router software as the Newport project) confirmed that it is feasible to design a splash page for the network that the VT DOH could update regularly with content.

Initial Review (2)

- Tentative ideas from VT DOH Newport branch about information they would share on the Newport Wireless Mesh network splash page:
 - Health Information
 - Developmental milestones for children
 - Information on lead and radon
 - Food resource guide
 - Access to childcare
 - Emergency Preparation Information
 - Where to find local Alcoholics Anonymous / Narcotics Anonymous groups
 - Health-related Events
 - Community meal times
 - Nutritional classes
 - Community events
 - Community building activities
 - Free radon testing
 - School delays and closings

Evaluation of Effectiveness and Limitations

- NEK 99% will host a “router” party to both distribute routers to interested residents, and to educate them as to how to use them.
 - Since many in this neighborhood lack access to the Internet, one limitation addressed by these parties is that many lack information regarding how to use Internet routers.
 - Instead of traditional survey meetings, NEK 99% has history of gathering information through neighborhood parties that provide food, good music and childcare/activities for children.
 - Diane Peel states that she has found these to be the most effective means of hearing from residents in this community, and that the parties are successful.
- Following router distribution, NEK 99% will also host mesh network parties on a regular basis to gather feedback from the community.
 - While the frequency of these parties is to be determined, these could potentially happen at least on an annual basis.

Evaluation of Effectiveness and Limitations (2)

- To evaluate 1) if this community uses the network for health information and 2) how the network affects the health of the community in multiple aspects, we can ask series of questions to attendees at post-distribution NEK 99% network parties:
 - “Have you been using the Newport Wireless Mesh Internet? Why or why not?”
 - “If you have, what do you use the mesh network for?”
 - “Since using the Newport Wireless Mesh network...”
 - “Have your children been doing better in school?”
 - “Do you feel you have a better sense of your health and how to live healthy?”
 - “Have you used health services more frequently?”
 - “Have you looked up health information more frequently?”
 - “Has your home environment been less stressful?”
 - “Have you been able to save more money in your household?”
 - “Has managing your money and paying your bills been easier?”
 - “Have you had more hours per day for leisure time and/or family time?”
 - “Have you read or heard information from WIC or the VT DOH more frequently?”
 - “Have you been more aware of events sponsored by WIC or the VT DOH?”

Evaluation of Effectiveness and Limitations (3)

- A potential limitation is that a greater number of individuals in neighborhood than anticipated may not want access to Internet.
 - NEK 99% can use their connections to the community to continue building trust and relationship with these individuals, and explain how the Internet has the potential to improve their lives, and how the Internet is helping their neighbors.
- Though some individuals in this community have smartphones, many do not have computers (anecdotal from Diane Peel and Colleen Moore de Ortiz). This may impede their ability to use the network for health purposes.
 - NEK 99% is addressing this by gathering donated laptops and desktops to distribute to residents.
 - Another possibility would be to distribute Raspberry Pis, functional computers that are significantly cheaper.

Evaluation of Effectiveness and Limitations (4)

- Network could conceivably have connectivity issues when expanded to the community, thus impeding its use to the community.
 - NEK 99% IT staff monitoring the mesh network can observe how many devices are connected to it and utilizing it.
 - Furthermore, due to their presence within the neighborhood, NEK 99% staff can receive daily feedback on the network to determine how best to maintain it.
- Network must have enough revenue from community to sustain annually.
 - Due to their established connections in the community, NEK 99% can remind community members to donate what they can.
 - Can also ask the “outlier” members of this neighborhood who have substantially more income to donate more to the network.
- Due to the timecourse of this project, we were unable to design the splash page and show the VT DOH Newport branch how to update it.
- Splash page may not be most effective means of distributing health information to the community, as individuals may ignore it and thus be unaware of the information on it.
 - Alternative possibilities for sending information exist. For example, with some effort, the router software can also be configured to include a local community board and a messaging system that could be used to send information directly to the network users (Anecdotal from Diane Peel and NEK 99% IT individual).

Evaluation of Effectiveness and Limitations (5)

- Individuals in this community may potentially be suspicious of information from WIC and the VT DOH, or of information from reputable health websites.
 - As research by Viswanath et al indicates, and as anecdotally stated by Diane Peel, pre-existing trust and relationship are key to individuals of low SES utilizing health services.
 - NEK 99% can continue to introduce and foster connections between individuals from the VT DOH Newport branch and this neighborhood community. These individuals can be the ones to update information on the page and publically attach their names to it, so that residents know how is providing the information.
 - Both these individuals and the NEK 99% can educate users as to which health information websites can be trusted.
- We were unable to complete this assessment due to the timecourse of this rotation, and thus we do not definitely know the efficacy and utility of these questions.
 - However, the questions were evaluated by Colleen Moore de Ortiz, who indicated that they would be helpful for the VT DOH Newport branch to evaluate the health of this community.

Recommendations for Future Interventions

- Inform other healthcare providers and organizations utilized by members in this neighborhood about the mesh network, and encourage them to send these individuals to VT DOH (healthvermont.gov) and other appropriate websites for health information.
- Inform mesh network users of social media websites for VT DOH (including Twitter for VT DOH and Facebook for Newport branch), providing alternate means of informing network users about health information and health events.
- If project successful, consider implementing other mesh networks in other neighborhoods in Newport VT with high populations of individuals of low SES.

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