A Community-Based Participatory Research Model and Web Application for Studying Health Professional Shortage Areas in the United States

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ABSTRACT

Health Professional Shortage Areas (HPSA) are still associated with “worse general health status and poor physical health” (Jiexin, 2007) in the United States today. Meanwhile, limitations still exist in HPSA studies for multiple reasons, including limited data resources and availability, lack of efficient way to share and collaborate, and lack of community participation and public awareness. To overcome these limitations, we proposed a Community-Based Participatory Research (CBPR) approach for HPSA studies that allows researchers to share and collaborate on HPSA related data, and allows the general public to learn about HPSA and participate in survey and discussions that help supplement researchers’ data. Through CBPR, effective and location-appropriate research, planning, and awareness can be achieved (O’Fallon & Dearry, 2002). We then described a Web application, which was designed based on our CBPR model, through the use of Google Fusion Table and Geocoding.

Keywords: Geographic Information System, Health Informatics, Human Computer Interaction, Software as a Service (SAAS), Web Applications

1. INTRODUCTION

Today in the United States, health professional shortage areas are still associated with “worse general health status and poor physical health” (Jiexin, 2007), particularly in rural areas - only 9% of physicians practice in rural areas where 20% of the population live (Grobler et al., 2009). Despite the absence of reliable evidence, governments and medical schools have implemented numerous strategies aimed at addressing the shortage of healthcare professionals practic-
ing in underserved areas, including educational, financial, regulatory and supportive strategies (Grobler et al., 2009). Rigorous evaluation of the effectiveness of various strategies is required to determine the true impact of these interventions and to better inform future policy. Meanwhile, limitations still exist in HPSA studies for multiple reasons including limited data resources and availability, lack of efficient ways to share and combine datasets to support multifaceted research studies, and lack of community participation and public awareness. To overcome these limitations of existing resources related to previous HPSA studies, and to promote community awareness and collaboration on HPSA issues, we proposed a CBPR-based research model for HPSAs. Through CBPR, effective and location-appropriate research, planning, and awareness can be achieved (O’Fallon & Dearry, 2002). To demonstrate the application of this model, we designed a Web application that supports community-based viewing, searching, sharing, collaborating and analyzing HPSA data through the use of Google Fusion Table and Geocoding.

There are three primary goals of our proposed solution:

- To enable viewing, searching, relating, and analyzing spatial and non-spatial factors regarding healthcare professional shortage areas in the United States;
- To support community-based sharing and collaboration in HPSA studies;
- To build a network that connects researchers with the general public to create new insights that contributes to HPSA studies.

2. HEALTH PROFESSIONAL SHORTAGE AREAS (HPSA)

2.1. HPSA Designation

Currently the official data source provider for HPSA in the United States is the Health Resources and Services Administration (HRSA) division (www.hrsa.gov) under U.S. Department of Health and Human Services. HRSA develops shortage designation criteria and uses them to decide whether or not a geographic area, population group or facility is a HPSA or a Medically Underserved Area or Population (HRSA, 2012).

HPSAs may be designated as having a shortage of primary medical care, dental or mental health providers. They may be urban or rural areas, population groups or medical or other public facilities.

Each year, the U.S. Department of Health and Human Services prepares listings of designated HPSAs and areas that need to be updated to maintain their designation. The listings are sent to each State Primary Care Office (PCO). Copies are also sent to the Primary Care Associations and other interested parties. The PCOs have a few months to submit designation updates for their States. After review and consideration of all comments, the Secretary designates Health Professional Shortage Areas (HPSAs) and withdraws the designations of areas determined to no longer meet the criteria for designation.

To determine the designation criteria, HRSA uses a methodology considering factors including: Rational area for the delivery of Services, Population count, Counting of practitioners, Determination of unusually high needs for medical care services, Determination of insufficient capacity of existing care Providers, and Contiguous area considerations.

As of November 16, 2012, there are:

- 5,805 Primary Care HPSAs with 55.3 million people living in them. It would take 15,431 practitioners to meet their need for primary care providers (a population to practitioner ratio of 2,000:1).
- 4,534 Dental HPSAs with 44.6 million people living in them. It would take 8,962 practitioners to meet their need for dental providers (a population to practitioner ratio of 3,000:1).
- 3,760 Mental Health HPSAs with 89.3 million people living in them. It would take 5,972 practitioners to meet their need for mental health providers (a population to practitioner ratio of 10,000:1).
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