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Public Health Communication Technology

A Case Study in Michigan Long-Term Care Settings

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Abstract: Research focusing on a technology based approach to health communication has primarily been limited to the study of individuals rather than communities even in the midst of a booming technology industry and subsequent research. The Information Communication Technology (ICT) which assists management of health or government agencies has rarely been discussed in the context of health communication at the organizational-societal level. This paper focuses on how ICT implemented at the state level impacts public health effectiveness and efficiency. Michigan is one of seven states that received funding from the United States Department of Health and Human Services, Centers for Medicare and Medicaid Services (CMS) to participate in the legislatively mandated background check pilot program intended to prevent abuse. Participation in this initiative will influence future United States federal policy designed to provide optimum services and support for the nation's most vulnerable citizens. Michigan's Workforce Background Check (MWBC) system will serve as a model for other states that must implement a standardized, multiple- system process of background checks to prevent unfit persons from gaining access to vulnerable populations. The MWBC project is examined as a case study that illustrates how ICT is essential for public health management by enhancing organizational level communication practices. The contribution of the MWBC project can be summarized in the following dimensions: (1) improving communication among organizations, (2) serving as an interactive decision support system, and (3) providing a better tool for public health practices.

Keywords: Public Health Communication, Information Communication Technology, Usability, Case Study, Long-Term Care

HEALTH COMMUNICATION IS increasingly recognized as a critical element of efforts to improve public health (*Healthy People*, 2000). Health communication refers to "the use of communication techniques and technologies to (positively) influence individuals, populations, and organizations for the purpose of promoting conditions conducive to human and environmental health" (Maibach & Holtgrave, 1995, p. 219). According to this operational definition, health communication includes not only communication activities or interventions at the individual level, but also organizational-level communication activities or interactions that contribute to public health. This macro perspective provides benefits to public health management because public health requires diverse and multifaceted intervention strategies (Maibach & Holtgrave, 1995).

In general, health communication studies have mainly focused on individual-level approaches to health communication, even though some scholars suggest approaching health communication by linking individual to the societal level (Salmon, Post, & Christensen, 2003; Maibach & Holtgrave, 1995; Maibach, Parrott, Long, & Salmon, 1994). Expanding health communication encourages public health professionals and scholars to acknowledge the interaction between micro- and macro-level health communication activities.

There has been growing interest in the relationship between Information Communication Technology (ICT) and public health communication. Scholars have proposed telecommunication and computer technology as one of the approaches to enhance health communication (Bandura, 2002; Eysenback & Jadad, 2001; Friede, Blum, & McDonald, 1995; Maibach & Holtgrave, 1995; Rodrigues, 2000). In fact, most areas of health communication increasingly rely on new technologies. Research on technology-based approaches to health communication has grown dramatically over the last decade (Suggs, 2006). However, previous studies are mostly limited to the use of technologies at the individual level. The information technology systems that assist management of health or government agencies have rarely been discussed in the context of health communication.

ICT facilitates the management of private and public health organizations. It plays an important role in public health communication and intervention

by: assisting health organizations' and policy makers' decision making; enhancing organizational communication; promoting inter-and intra-organizational collaboration; and building capacity for emergency management. Moreover, the adoption of technologies by communities and organizations may have significant implications on the individual-level health communication efforts. Certain characteristics of technology infrastructure in a society will influence individuals' adoption and use of technologies. Accordingly, an individuals's communication and information environment will depend on the implementation of technologies at the societal/community level.

This study discusses how ICT implemented at the organizational- and community/societal-level, as a part of a public health communication system, impacts public health. The Michigan Workforce Background Check (MWBC) project is examined as a case study to illustrate this idea. The MWBC is a project funded by the United States Department of Health and Human Services (DHHS) to prevent unfit persons from gaining access to vulnerable populations through employment in long-term care settings. Unfit persons include those with certain criminal histories or inappropriate past work behavior deemed harmful to patients and residents receiving long-term care. Such behaviors include abuse, neglect, and exploitation. In this project, ICT resides at the heart of policy implementation to protect vulnerable populations. By analyzing the MWBC project as a case study, ICT will be discussed as an organizational-level function fundamental to the overall health of the public.

Literature Review

Conceptualization of ICT for Public Health

ICT within the health context can be defined from various perspectives. In a narrow perspective, public health ICT may indicate specific types of technological media, instruments, or applications that are used directly by consumers, physicians or caregivers to deliver health services or information. For example, Eng et al. (1999) suggested the concept of Interactive Health Communication (IHC), which refers to "the interaction of an individual-consumer, patient, caregiver, or professional – with or through an electronic device or communication technology to access or transmit health information or receive guidance and support on a health-related issue" (p. 10). In their conception, IHC provides numerous functions including: relaying information; enabling informed decision-making; promoting healthy behaviors; promoting peer information exchange and emotional support; promoting self-care; and managing demand for health services. The terms cyber-health, telemedicine, or e-health would also fall into the same category.

On the other hand, ICT supports and contributes to public health communication and management at the organizational level. In fact, several definitions of public health ICT that reflect this broad perspective are available in the previous literature. For example, Eysenbach (2003) suggested the concept of "Population Health Technology," which he used as the overarching term for "technology applications that have a population focus and the potential to improve public health" (p. 1). Similarly, Friede et al., (1995) introduced the term, "Public Health Informatics." Public Health Informatics are conceptualized as "the application of information science and technology to public health practice and research" (Friede et al., 1995, p.240). It includes any innovative use of various types of information communication technologies "to support the mission of disease prevention and health promotion" (p. 240). Maibach and Holtgrave's (1995) concept of Interactive Decision Support Systems (IDSS) would also fall into this category. According to the authors, IDSS refer to the systems through which various types of custom-tailored information are made available interactively to meet the user's needs, greatly enhancing access to important databases that inform planning and decision-making, as well as supporting rapid dissemination of timely public health information (Maibach & Holtgrave, 1995, p. 232). In these conceptualizations, public health ICT includes technologies that support the management of public health challenges effectively by public health organizations and practitioners.

In summary, ICT may serve as the primary means of health intervention and communication utilized by health practitioners or consumers. ICT may also serve as a supporting tool for public health management systems. For purposes of this study, we define public health Information Communication Technology (ICT) as the electronic means of communication for primary, secondary, and tertiary public health interventions.

The Role of ICT for Public Health Intervention

As information technologies evolve, they are used for various purposes in public health initiatives. According to Friede et al. (1995), ICT makes at least three contributions to public health: (1) by assisting information-driven decision based on data and information systems; (2) by improving communication through enhancing, speeding up, and simplifying the flow of information; and (3) by providing better tools for public health practices. These functions of ICT in public health again can be examined at the indi-

vidual level and the organizational/societal level. At the *individual level*, ICT can function as a tool to provide information to assist individual's decisions, improve communications between consumers and care providers, and assist individuals in practicing healthy behaviors. For example, the interactive nature of the Internet provides tailored and personalized information, which is expected to increase consumers' understanding and comprehension of health messages and risks (Bandura, 2002; Rimal & Adkins, 2003; Strecher, Greenwood, Wang, & Dumont, 1999).

While ICT has a direct impact on the outcomes of health initiatives at the individual level, it also influences public health through its impacts on broader *organizational- and community/societal-level* health management systems. The function of ICT as a tool for public health system management is addressed by Chandrasekhar and Ghosh (2001). They suggest the role of ICT lies in "delivering specific health services and of serving as a tool that can help reorganize the health system and render it more efficient" (p. 851). While ICT can contribute to public health by functioning as an educational instrument or delivery mechanism of health information, its primary function also includes increasing the transparency and efficiency of public health governance systems (Chandrasekhar & Ghosh, 2001, p. 851). The Canadian Heart Health Initiative (CHHI) is one such example. The CHHI incorporates existing structures at both the provincial and community level to meet informational needs for public interventions for heart health (Cameron, Walker, Gough, & McDonald, 2000). Another example would be the early detection and fostering of global collaboration that was made possible by ICT throughout the SARS (Severe Acute Respiratory Syndrome) epidemic (Eysenbach, 2003). Global Public Health Intelligence Network (GPHIN), which is a part of WHO's (The World Health Organization) Global Outbreak Alert and Response Network, provided some of the earliest alerts to the outbreak in China by scanning more than 400 international news sources (Eysenbach, 2003).

In particular, the adoption of ICT at the organizational level becomes an important environmental factor for public health communication and interventions. As suggested by Friede et al. (1995), ICT assists governmental agencies in making information-driven decisions based on data and information systems; improves collaboration within and across organizations by improving communications; and provides more effective intervention tools for public health. In this sense, organizational-level communication activities relevant to public health management should be included as a part of the public health communication system and the role of ICT in improving organizational-level communication activities should be discussed within the public health communication framework.

ICT for Vulnerable Populations

The issues of health and technology disparities among vulnerable/underserved populations have gained increasing attention in the domain of public health. Health care disparities exist among people in lower socioeconomic classes, people with low literacy, rural areas residents, the elderly, and people with disabilities (*Healthy People*, 2000; Smedley, Stith, & Nelson, 2002). The AMIA 2003 Spring Congress was convened to develop "a framework for a national agenda in information and communication technology to enhance the health and health care of underserved populations" (Chang et al., 2004, p. 448). Because people who are vulnerable are at greater risk for adverse health outcomes, they are particularly in need of health information support (Chang et al., 2004, p. 449). Experts have suggested the potential role of information communication technology in reducing health disparities in underserved populations (e. g., Gustafson et al., 2002). Increasing Internet access among the vulnerable and underserved population became one of the major goals of Healthy People 2010. However, the use of ICT to decrease health disparities in vulnerable populations is still considered to be in its infancy (Chang et al., 2004). More importantly, these groups lack skills to utilize technologies, and thus also experience technology disparity. Therefore, to address the health issue of vulnerable and underserved populations, the adoption of ICT at the organizational level is especially important.

Overall, we have discussed how ICT adopted at the organizational level assists public health management by improving the public health communication system. We also suggested that utilization of ICT for vulnerable populations would benefit from taking an organization level adoption approach. To demonstrate how the adoption of ICT at the state level enhances health communication systems, reduces risk factors, and promotes public health, we provide an exemplar: the Michigan Workforce Background Check (MWBC) project. The MWBC project is a case study that demonstrates a positive change can be affected in public health through the facilitation of communication between organizations and the state and federal government agencies. The direct care workforce for vulnerable populations is ultimately improved by adopting an information communication technology at the organizational level. We first introduce the background, goals, and characteristics of the project and then discuss how the MWBC system addresses public health issues

through the utilization of information communication technology.

Case Study

Background of MWBC Project

Adults receiving long-term care (LTC) services are at considerable risk of abuse due to vulnerabilities stemming from both physical and mental health needs (Coyne, Reichman, & Berbig, 1993). The bulk of institutional abuse is perpetrated against elders as they disproportionately utilize LTC services. Elder abuse is an increasingly important public health topic given that the population aged 65 years or greater is estimated to double by the year 2030 (Post et al., 2006). Outcomes of elder abuse at the individual level include diminished quality of life, worsened functional status, psychological decline, progressive dependency, and poorly rated self-health (Dong, 2005). At the societal level, elder abuse stresses existing health care systems due to higher rates of utilization including increased emergency room visits and hospitalizations (Dong, 2005).

As elder abuse increasingly becomes a public health issue, it requires solutions and interventions generated within government, public health, and community sectors. Recent federal mandates dictated increased attention geared towards reducing abuse in LTC settings to prevent an increase in elder abuse projected by the changing population age structure and decreasing financial resources. In 2002, the Center for Diseases Control and prevention (CDC) convened an expert panel to address elder abuse in the public health perspective (Ingram, 2003). Among various recommendations generated by the panel, coordination of efforts among various social actors were emphasized. Elder abuse is a complex issue because it is often complicated by other types of abuse, crime, or social issues. Therefore, coalitions involving multiple organizations and multi-disciplinary efforts were thought to be essential for successful intervention. As a result, information and communication technologies must to be utilized to support this collaborative effort. In addition, technology literacy is a barrier for the elderly and disabled besides the access barrier. Therefore, although it would be an important issue to find ways to help elderly individuals access and utilize ICT, adopting ICT in a broader way to protect the elderly could be a more efficient intervention strategy.

Michigan is one of seven states that received funding from the United States Department of Health and Human Services, Centers for Medicare and Medicaid Services (CMS) to participate in the legislatively mandated background check pilot program aimed at preventing abuse. Section 307 of the United States Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003 (PL 108-173) directed the Secretary of Health and Human Services to establish a program to identify efficient, effective and economical procedures to conduct background checks on prospective employees of LTC facilities or providers with direct access to patients, thereby increasing the safety of Michigan's elders and persons with disabilities. Participation in this initiative will influence future United States federal policy designed to provide optimum services and support for the nation's most vulnerable citizens. The MWBC system will serve as a model for other states that must implement a standardized multiple system process of background checks of employees in facilities and agencies. In 2006, Michigan legislators passed a series of bills that significantly increase the number of employees subject to background checks. The system became operational in April 2006, and the project's aim is to improve and expand the scope of background checks, increasing the number of registries checked, standardizing the background checks process, and facilitating the exchange of information among LTC providers and government agencies. A majority of the facilities and agencies view this as a risk management issue, and appear to be supportive of the new requirements.

Characteristics of the New Background Check Process. The new legislation in Michigan broadens the categories of workers requiring background checks from persons who provide "direct services" to persons who have "direct access." This broader category includes housekeeping, dietary, clerical, and other peripheral staff, as well as student nurses and interns who may have exclusionary factors that put patients at risk of abuse, neglect, or exploitation. Also, the expansion of background checks will extend coverage beyond the almost 5,000 nursing homes, homes for the aged, county medical care facilities, and adult foster care facilities to include direct access staff in long-term care hospitals, Intermediate Care Facility for people with Mental Retardation (ICF/MRs), psychiatric hospitals, hospices, home health agencies, personnel care agencies and individual personal care providers, and the approximately 20,000 individual personal care providers who are not associated with personal care agencies. These categories may expand further based on the Michigan State Governor's current efforts in LTC.

The new MWBC process enables more thorough background checks. Michigan State University has developed a state-of-the-art Web-based process that integrates various databases and registries on abuse and neglect, misappropriation, sexual offenses, licensure, criminal records (FBI and Michigan State Police), and other relevant records into a cohesive user-interface design, enabling LTC providers to perform comprehensive background checks on their prospect-

ive employees. Refer to Figures 1and 2. The MWBC system checks systems, databases, registries, and other relevant records; feeds information via the Web to an integrated system; and passes data to a fingerprint scanning process for accurate criminal history searching. The user interface also complies with U.S. Section 508 web accessibility standards expeditiously enacted to eliminate barriers in information technology, to make available new opportunities for people with disabilities, and to encourage development of technologies that will help achieve these goals (*Center for IT Accommodation - 508 Law*, 2002). It is hypothesized that this screening will result in better care for seniors and other vulnerable adults, a more qualified workforce, and will ultimately prevent incidents of abuse, mistreatment, and exploitation.

Figure 1: Michigan Workforce Background Check System Home Page

Figure 2: Michigan Workforce Background Check System Registries Screen

MWBC Project as a Public Health Communication System

The MWBC project illustrates how ICT provides a protection system for the elderly at the societal level rather than the individual level. Based on the notions of Friede et al.'s (1995), the contribution of MWBC can be summarized in the following dimensions: (1) improve communication among organizations, (2) serve as an interactive decision support system, and (3) provide a better tool for public health practices. Figure 3 presents the way the MWBC project enhances public health infrastructure and functions as a part of a health communication system in long-term care settings.

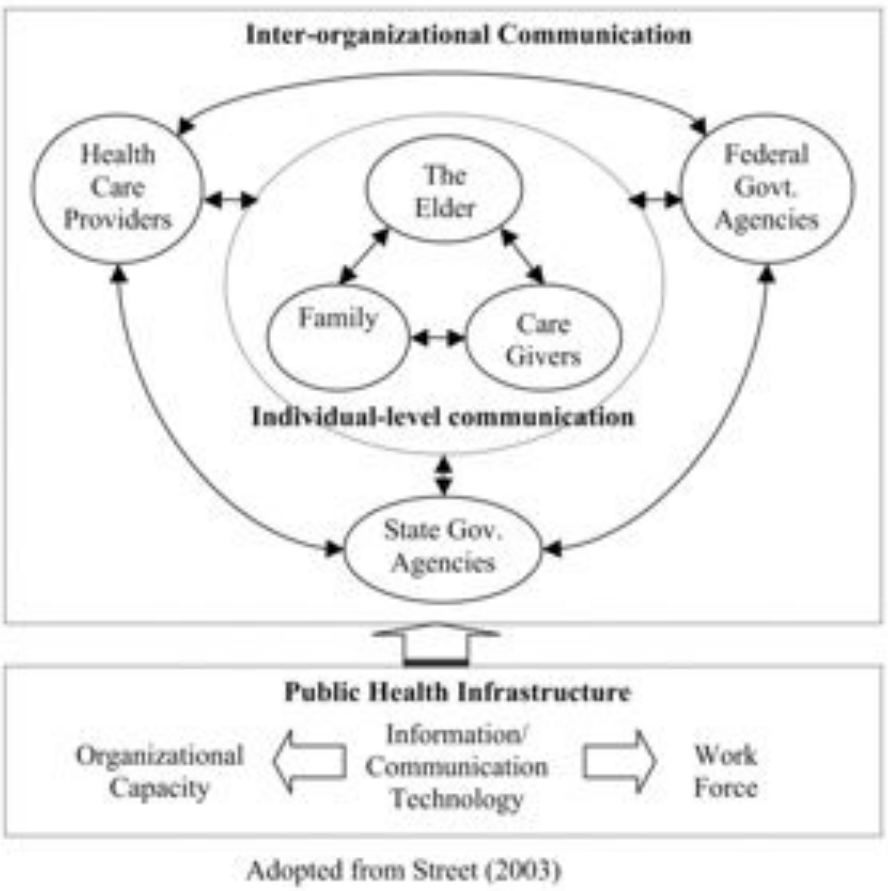

Figure 3: Public Health Communication System in Long-Term Care Settings

MWBC project contribution to communication efficiency. The MWBC system contributes to health communication for elderly care by enhancing, speeding up, and simplifying the flow of information among government agencies and health care providers. The aims of the MWBC are to implement an integrated process linking disparate groups, organizations, federal and state agencies, policy makers, long-term care providers, information systems, registries, information with clearly established administrative rules and procedures, as well as improved communication via technology. The efficacy of this project rests on its ability to network these entities. Numerous organizations must be networked and integrated in the research, design, architecture, and implementation of the new process to facilitate communication, integrate systems and registries, and to make the MWBC process more efficient and effective. The organizations and departments that oversee the various aspects of the background check system are listed in Table 1.

Table 1: Organizations Involved in the MWBC Project

- Centers for Medicare and Medicaid Services (CMS)
- Michigan Department of Community Health (MDCH)
- Michigan Department of Human Services (DHS)
- Michigan State Police (MSP)
- Michigan State University (MSU)
- Michigan Department of Information Technology
- Long-Term Care Providers: Nursing Homes, Homes for the Aged, County Medical Care Facilities, and Adult Foster Care Facilities, Long-Term Care Hospitals, ICF/MRs, Psychiatric Hospitals, Hospices, Home Health Agencies, Personnel Care Agencies, and Individual Personal Care Providers

By integrating various registries, systems and databases into a cohesive user-centered interface, the MWBC system enhances communication of background checks information among various govern-

ment agencies. Currently, different government agencies supervise and license different types of providers, depending on the type of service they provide. For example, nursing homes are under the governance of the Michigan Department of Community Health (MDCH), while Adult Foster Care Facilities and Homes for the Aged are governed by the Michigan Department of Human Services (DHS). This complex governance system requires networking among various government agencies in order to process the background checks consistently and effectively. Now that the new background check system is operational, the exact procedures for the background checks can be applied to the care providers that are governed under the different regulatory agencies.

MWBC application as an interactive decision support system. The MWBC application functions as an interactive decision support system for health care providers in that it assists with information-driven decisions based on data and information systems. The system provides greatly enhanced access to important databases, such as Public Sex Offender Registry or Federal Bureau of Investigation IAFIS (Integrated Automated Fingerprint Identification System). Refer to Table 2 for the list of registries included in the MWBC system. When health providers make hiring decisions, the system provides timely access to the information from these databases, reducing the possibility that health providers have a conditional employee working in their facilities who may have a criminal history (with exclusionary findings for the position). Furthermore, the associated informational Web site for the MWBC system (www.miltcpartnership.gov) provides a vehicle for government agencies to disseminate timely news reports related to policies or industry trends in vulnerable adult care. This will help the health providers make managerial decisions considering changing social contexts.

Table 2: Registries and Databases Included in the MWBC System

Names of Database	Descriptions
MDCH	The Michigan Department of Community Health database
MDHS	The Michigan Department of Human Services database
MSP	The Michigan State Police databases includes: Internet Criminal History Access Tool (ICHAT) State of Michigan Automated Fingerprint Identification System (AFIS)/LiveScan.
PSOR	Michigan Public Sex Offender Registry (PSOR)
OIG	U.S. Health and Human Services Office of the Inspector General Exclusion List
NAR	Nurse Aide Registry
OTIS	Offender Tracking Information System (OTIS)
FBI IAFIS	Federal Bureau of Investigation IAFIS (Integrated Automated Fingerprint Identification System)

MWBC system as an advanced tool for public health practices. The MWBC project serves as a public health intervention where the new system functions as an advanced tool for elder care. The efficacy of health interventions that focus on promotion of individual health behaviors are limited, especially for vulnerable populations, such as the elderly, who often do not have the ability to utilize such tools. A community/societal level approach should be more effective and efficient overall. The MWBC system moves health intervention practices from providing a cure (secondary and tertiary prevention) to primary prevention. The MWBC system adopted information communication technology to enhance the overall public health communication system in long-term care settings, thus enhancing the effectiveness of elderly care management.

Potential Impacts of MWBC Project on Elderly Care

Baker et al. (2005) suggested three key dimensions of public health infrastructure: work force, information and knowledge system, and organizational capacity (refer again to Figure 3). They identified the key issues for each dimension. In relation to the dimension of information and knowledge systems, they identified inconsistent applications of information technology as a challenge followed by public and private organizations' capacity to survey, manage, and respond to public health issues. Finally, the work force quality and training issues were identified as important indicators of robustness of the public health infrastructure.

In a sense, the MWBC project contributes to all of the three dimensions of public health infrastruc-

ture. First, the MWBC expands the information technology infrastructure for health care for vulnerable populations. The system provides a base for the extension of the background check system to protect other segments of vulnerable populations such as children. By integrating systems which have operated independent of each other, the project solves the issue of inconsistent application of information technology and regulations. Second, the project contributes to capacity building for each organization. Government agencies will have the capacity to oversee health care providers and elderly issues with minimal effort. Finally, it strengthens the work force infrastructure for elderly care, as the new background check process is expected to contribute to workforce quality thorough screening of unqualified individuals.

Additionally, the MWBC system serves as a public health intervention that involves various health communication activities, such as media advocacy and government-public communication. By increasing the visibility of the project and the elderly care issue in the media, the project attempts to reach a social consensus and mobilize public attention. The project also involves the training of health care professionals on the identification and prevention of elder abuse, neglect and exploitation. The whole MWBC project, not only the technology adopted, has various implications to health communication management.

Conclusion

Information technology and telecommunication assist agencies in overcoming problems of coordination and control within and beyond their organization. The MWBC project is an exemplary application of using communication technologies to reduce morbidity, mortality and exploitation via the networking of disparate systems, information, and agencies into an integrated, usable system. The multidisciplinary nature of the MWBC team and the emphasis on intergroup and government agency communication also provides increased efficiency in the dissemination of information and increases efficiency in the background check process, resulting in more accurate and comprehensive information for LTC job applicants.

The MWBC system provides an example of how a health communication system can influence the outcomes of public health management and play a key role in enhancing organizational-level communication practices. This case study demonstrates why inter-organizational communication should be considered as a part of public health communication. Adopting ICT to improve public health outcomes, especially for vulnerable populations, is more efficient because it focuses on improving organizational level health communication systems and goes beyond focusing on individuals' usage of technologies.

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