Policy | brief

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Achieving a Better State of Public Health Information Technology

Using the Public Health IT Maturity Index for Assessment and Strategic Decision-making

The Need for Improved Information Technology in Public Health

The promise of information technologies to inform and catalyze fundamental changes and improvements in the public health system is significant. There is ongoing consequential national attention regarding the opportunities that health information technology, notably electronic health records (EHRs), in conjunction with analytics, surveillance systems, registries, administrative systems, health information exchange, consumer digital resources and related information systems offer to improve the health of individuals, communities and populations. However, limited guidance exists for how technology strategies in support of public health objectives may be developed and desired outcomes achieved.

Public health practice involves a diverse set of services and activities, which may require information management and coordination across primary care, behavioral health, dental care and social services, as well as for surveillance, policy-making and other data-intensive uses. Information technologies influence the effectiveness, efficiency and outcomes of public health strategies delivered at local, state and national level. Public health systems service some of the most medically complex and socioeconomically challenged individuals. This is especially true with behavioral health, where quality care coordination and administration of these cases frequently requires managing information across multiple parties internal and external to the public health department. How information technologies may be best leveraged for public health practice is a key question in the public health systems and services research domain.

In response to these issues, this policy brief shares insights from recent research leading to the development the Public Health IT (PHIT) Maturity Index. The PHIT Maturity Index is designed to help public health systems and stakeholders gauge their position in relation to a set of stages that progressively and incrementally detail better use of information technologies to effectively and efficiently achieve the public health mission.

About the Research

This research was conducted in partnership between academic, public health and health care partners[1], and used a mixed methods approach. An extensive literature review of past work regarding maturity models and maturity of information systems broadly, and within the public health systems and services research context specifically was conducted. Peer reviewed published literature and reports from multi-stakeholder organizations such as The National Association of County and City Health Officials (NACCHO), Institute of Medicine, Public Health Accreditation Board and the PHSSR Consortium were assessed. Structured content analysis was performed and key measure categories were synthesized, defined and scoring for categories developed.

This research includes a detailed study of a natural experiment enabled by the public health IT transformation efforts of Montgomery County, Maryland, a large suburban county. The experiences of implementing PHIT and the factors important to achieving value from the IT were distilled and assessed for Index inclusion. Survey data was analyzed using factor analytic strategies to assess the reliability of subscales and their conceptual structure, and t-tests and multivariate regression provided inferential insights. Further, a Delphi exercise was conducted with experts representing public health systems at the state and local level and multi-stakeholder national groups.

What is Public Health Information Technology?

Public health information technology (PHIT) consists of the information systems supporting the public health mission. The 7 primary information technology systems that public health departments use include:

- Administrative
- Surveillance
- Electronic Health Records and Practice Management Systems
- Registries
- Digital Consumer Resources
- Health Information Exchange
- Analytics & Business Intelligence

[1] This research project was conducted by the Center for Health Information & Decision Systems, Robert H. Smith School of Business and the School of Public Health at the University of Maryland in collaboration with the Montgomery County Department of Health & Human Services and the Primary Care Coalition of Montgomery County, with support from the Robert Wood Johnson Foundation.

PHIT systems may be viewed as transformational tools that can address multiple systemic deficiencies in public health system service delivery and population health management. These systems must interact and work together in synchronicity to optimize their value to public health practice. The systems must support the essential services of public health, including:

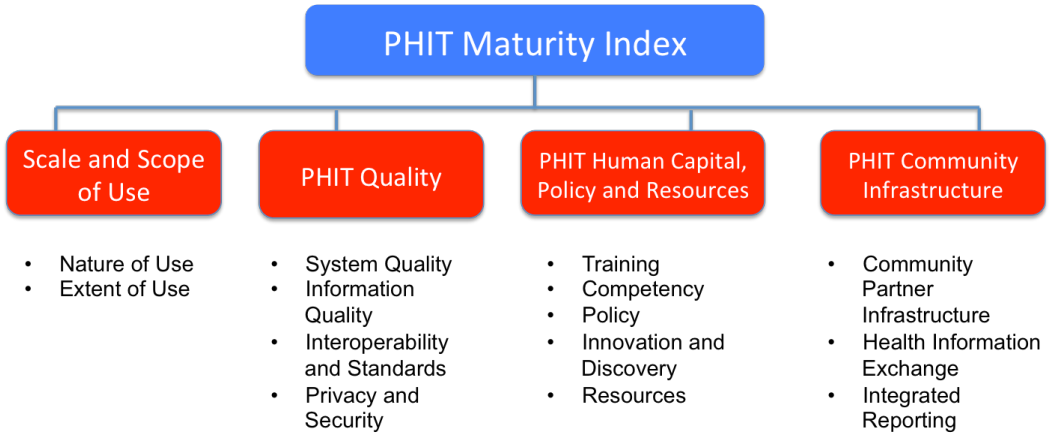
- Monitor health status to identify and solve community health problems
- Diagnose and investigate health problems and health hazards in the community
- Inform, educate, and empower people about health issues
- Mobilize community partnerships and action to identify and solve health problems
- Develop policies and plans that support individual and community health efforts
- Enforce laws and regulations that protect health and ensure safety
- Link people to needed personal health services and assure the provision of health care when otherwise unavailable
- Assure competent public and personal health care workforce
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- Research for new insights and innovative solutions to health problems

Assessing Public Health IT Maturity

The maturity of PHIT, or for any system or process, addresses the extent to which it has evolved in response to environmental factors and is able to better address the key objectives for which it was originally designed. In the context of information systems and processes, maturity reflects progress from initial IT adoption to greater value producing activities from system use and development. A maturity index can show the transformation and improvement of an organization over time and may be used to establish goals for achieving and measuring progress, benchmarking with peers, supporting decision-making and fostering continuous improvement.

The PHIT Maturity Index includes four primary measurement categories and 14 subdimensions associated with 55 questions and a scoring rubric. Figure 1 summarizes the PHIT Maturity Index's components.

Figure 1. PHIT Maturity Index



The **Scale and Scope of Use** category captures the types of systems being used, the activities to which they are being applied, and the breadth of system use. The *Nature of Use* subdimension refers to the types of systems used and how the information systems are being used, while the *Breadth of Use* subdimension refers to how much use of IT is occurring within the public health services areas of an HD, leveraging the 10 essential services as the basis.

The **PHIT Quality** category seeks to capture the degree of excellence embedded in the PHIT. Four sub-dimensions contribute to PHIT Quality measurement including: *System Quality,* which is measured in terms of ease of use, system usefulness, learnability, user satisfaction, reliability, and support services; Information Quality, which is measured by availability of relevant information, information accuracy, information usefulness and timeliness; *Interoperability and Standards*, which measures the extent to which technical standards are available, implemented and adhered to, and the extent of multi-system interoperability; and the *Privacy and Security* sub-dimension, which assesses a HDs development and use of privacy and security practices.

The **PHIT Human Capital, Policy and Resources** category includes: the *Human Capital* sub-dimension, which refers to the set of skills and knowledge that are essential for the public health workforce to have productive interactions with technology-based tools and the existence and effectiveness of courses, curriculum or other training to prepare for PHIT implementation and improve the PHIT competency of the workforce on an ongoing basis; the *Policy* subdimension, which measures the degree to which certain IT-and data innovation-supportive policy mechanisms have been defined and implemented; and the *Resources* subdimension, which measures the extent to which adequate financial support is available to support the PHIT needs of a health department.

The **PHIT Community Digital Infrastructure** category refers to how "wired" a community is. The *Community Partner Infrastructure* subdimension refers to the IT capabilities of partners in the public health ecosystem, notably the hospitals, that are complementary to the HD and the partners' ability to exchange information electronically with the HDs. The level of *Health Information Exchange Use* with the HD and the ability for *Integrated Reporting* with state systems subdimensions are also assessed in this category.

The Index scoring is based on 55 questions that each consist of four multiple choice answers corresponding to each of the four maturity stages. The categories are weighted as follows, reflecting the degree of impact the category has on IT maturity and the relative control a health department has to effect change in the category:

- Scale and Scope of Use: 3.5
- Quality of PHIT: 3.0
- PHIT Human Capital, Policy and Resources: 2.0
- PHIT Community Infrastructure: 1.5

The total score generated by summing the weighted average category scores results in a number from 10-40. The scoring bands to approximate the PHIT Maturity Index level are:

- Level 1: 10-14 points
- Level 2: 15-24 points
- Level 3: 25-34 points
- Level 4: 35-40 points

A total score may be an instructive approximation, but each category and each question should be reviewed independently to understand positioning of the health department (HD) along the specific subdimension elements as a way to assess the current status of IT development, set specific goals for progress, and foster a cycle of continuous improvement.

Over time, as additional benchmark data become available, the Index can enable a comparative assessment of PHIT maturity in relation to other HDs and public health systems across the country, allowing one to longitudinally link outcomes to better understand which PHIT configurations and services may offer the most value for individual public health system types across different regions, structures and scenarios.

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Key Takeaways

- ✓ Public health information technology adoption and use offers a range of opportunities to improve the effectiveness and efficiency public health services, but a wide range of decisions and factors will ultimately determine one's value realization from PHIT.

- ✓ Use the PHIT Maturity Index to assess technology strategies for public health, aid decision-making, set specific goals for progress, and foster a cycle of continuous improvement.

- ✓ When implementing PHIT, the information system's usability, customization to public health service area needs and training are key areas HDs should pay particular attention to when selecting and implementing PHIT as deficiencies in these areas can obstruct attainment of system benefits.

Additional materials on the research, design, use and scoring of the PHIT Maturity Index, including a web-based questionnaire, can be found at http://go.umd.edu/phitmaturityindex

Tips to Drive Successful Implementation of EHRs in Public Health

- ✓ Use the PHIT Maturity Index Questionnaire to assess one's status and potential IT roadmap

- ✓ Recognize the unique needs a public health department has and thoroughly document what the system needs to do, including: information fields; screening tools; reporting needs; user types and their needs; information flows across systems internal and external to the department.

- ✓ Document the feature wish list including all desired features; requirements for actual implementation will be adjusted based on priorities, cost, and other local factors.

- ✓ Test the usability of systems with many actual to-be users before purchase decision using real-world scenarios.

- ✓ Strike a balance between customization and standardization. Customize where appropriate to meet unique requirements of service areas, but enforce consistency in processes used to record, manage, communicate and report information.

- ✓ Schedule extensive hands-on training opportunities pre-implementation, including practice sessions mimicking the actual scenarios of work.

- ✓ Budget resources for extra support during the first month of implementation in order to enable timely remedies to issues.

- ✓ Create a shared learning environment so that issues and solutions are transparent to all users. If one user faces issue, likely many users are facing that issue. Communicate issues and resolutions thoroughly and often.

- ✓ Use consultants that have expertise in public health IT integration. Understand that primary care EHR implementation experience and hospital EHR implementation experience does not mean that consultants are well versed in the needs of public health department service areas and the technical requirements of services areas.