popHealth Transition Strategy Document

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Prepared for the Office of the National Coordinator for Health Information Technology by:

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Executive Summary

The Office of the National Coordinator for Health Information Technology (ONC) is currently planning to transition popHealth from being a primarily government-funded piece of software to one that is primarily governed, developed, and supported by the open source community of users.

popHealth (projectpophealth.org) is an open source software tool that automates the calculating, reporting, and visualization of clinical quality measures (CQMs). ONC has been the primary funder for the governance, development, and support of popHealth through a contractual relationship with the Mitre Corporation (the Veterans Administration has recently begun to contribute resources as well).

There is a large and diverse group of users who are employing popHealth (and/or parts of the technology) for a variety of use cases. Most notably, a version popHealth recently received certification as a 2014 EHR module via the efforts of open source developers from Northwestern Medicine (part of Northwestern University). These uses of the technology will set the stage for the application's long-term utility.

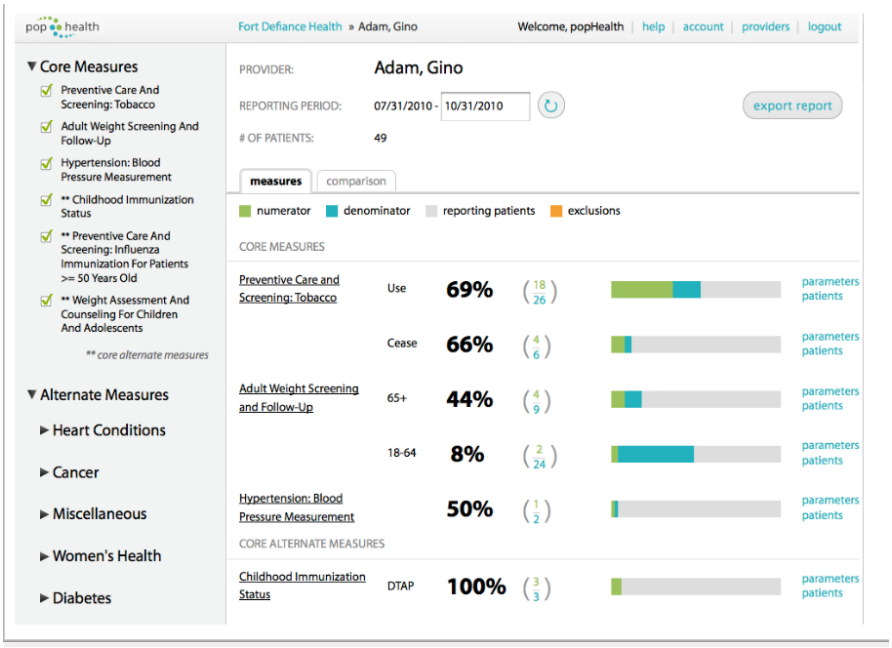
This strategic planning document is intended to facilitate the transition of popHealth to the open source community by describing the following:

- Background on popHealth;
- ONC's vision and aspirations for popHealth;
- Aspects of the transition process;
- Results of the environmental scan;
- Potential future use cases;
- Community-identified goals and objectives for popHealth; and
- Governance transition considerations, including straw man models.

Background

popHealth is an open source reference implementation software tool that automates the calculating and reporting of Meaningful Use clinical quality measures. popHealth integrates with a healthcare provider's electronic health record (EHR) system using certain file types depending on the tool's version, including continuity of care records (CCDs) and quality reporting data architecture (QRDA) Category I files. popHealth also displays clinical quality measures via a visually satisfying user interface. An example is show in Figure 1, with other examples available at: http://projectpophealth.org/screen_shots.html

Figure 1: popHealth screen shot of a single provider dashboard.



The application has been developed and maintained thus far under the open source Apache 2.0 License. The application code has been developed in collaboration with the community. The application has been under development for the last four years and is currently at version 2.1.2. Version 1 of the application was developed for Meaningful Use Stage 1 (until version 1.4). The current version (v2.1.2) is designed for the 2014 CQMs. Version 1.4 was certified for 2011, but will likely not be certified for 2014 (since it does not contain the 2014 CQMs). Version 2.1.2 is in the process of being certified to the 2014 criteria for all of the hospital and provider CQMs.

When created, popHealth was envisioned as an off-the-shelf-type tool that could be downloaded and used by non-technical providers for CQM reporting and visualization, enabling them to receive EHR incentive payments. ONC eventually learned that this was not the most viable use case because use of the tool required significant technical expertise. As a result, ONC decided to broaden its efforts. popHealth has subsequently been used as a reference implementation for developers. The tool has also proven valuable for its component parts, including its standardized data importer/exporter and its user interface. EHR and HIE developers have utilized the complete tool as well as its components in different ways to improve their own products.

The popHealth tool was initially developed and supported solely by ONC through a contract with the Mitre Corporation. The Veterans Health Administration (part of the Veterans Administration) recently entered into a contract with Mitre to support nine of the 2014 EP clinical quality measures in popHealth v2.1.2.

In early 2013, ONC started the planning process to transition popHealth from a primarily government-funded piece of software to one that is primarily governed, developed, and supported by the open source community of users. Part of the planning process was to hire Audacious Inquiry[1] (Ai) to assist with the transition. Ai's contract with ONC includes the following activities:

- Environmental Scan / Identifying and Recruiting Stakeholders: Ai conducted interviews and discussions with various stakeholders for the project, as documented in the Environmental Scan section of this document. The intent was to understand the ways the community currently uses popHealth and how they hope to use the tool in the future. The research was also meant to inform ONC's strategy going forward.

- Developing this Strategic Planning Document: The intent of the strategic planning document was to accomplish several goals: to summarize the stakeholder research, to outline ONC's vision and transition plan, and provide resources/suggestions for the community to facilitate the transition.

- Facilitating Stakeholder Meetings: Ai will facilitate one in-person meeting and several virtual-only stakeholder meetings. The in-person meeting is meant to allow for ONC to present its strategy and initiate discussions with the community regarding the transition. ONC and Ai will be conducting the in-person meeting in Washington DC on January 21, 2014. Several virtual stakeholder meetings will take place over the following months.

- Creating Governance and Technical Development Plans: AI will work with the community through the spring of 2014 to develop governance and technical development plans for the future of popHealth.

ONC's Vision & Aspirations for popHealth

As noted above, ONC expects to transition popHealth from being a primarily government-funded piece of software to one that is primarily governed, developed, and supported by the open source community of users. **ONC's vision is that this transition occurs in the best manner possible**.

Defining what "best" means will be an iterative and evolving process that will occur through engagement with the community over the next several months. Regardless of such a definition, ONC aspires to the following as a future end state for popHealth:

[1] Ai is a management and technology consulting firm that works with government agencies and private industry to develop healthcare solutions, with a focus on health information systems, master data management, health information exchange (HIE), and Meaningful Use.

- **ONC hopes that popHealth becomes a sustainable tool that supports viable use cases and serves the needs of its current and potential users.**

ONC is also committed to the following process goal throughout the transition process:

- **ONC has been and will continue to be committed to an open and inclusive process.**

Transition Process to Open Source Governance

ONC expects to transition popHealth from being a primarily government-funded piece of software to one that is managed, developed, and supported by the open source community of users.

Key ONC/popHealth Factors: The following are the key factors regarding ONC and popHealth's current situation that will drive the transition.

- *Intellectual Property*: ONC owns the IP behind popHealth, and has made the code available under an open source license (an Apache 2.0 license).

- *Trademarks*: ONC owns the trademark for the name "popHealth" and the popHealth logo. ONC has not yet determined the future of the trademarks. There are several potential options: ONC could give up the name entirely, license it with strict terms, or license it with loose terms.

    - NOTE: Transition discussions about the trademark will be distinct from discussions concerning the IP for the code.

- *Related IP:* ONC is committed to maintaining the Cypress tool, which is the Meaningful Use clinical quality measure testing and certification tool. Cypress and popHealth share the code which provides the key component of popHealth, the quality measure engine. Cypress is also made available under an Apache 2.0 open source license.

- *ONC Budget*: ONC does not have a budget for popHealth development or support and will not have a budget in the future. ONC currently only has a small budget for the facilitation of the transition of popHealth to the open source community. This is the current contract with Ai, detailed above.

    - NOTE: The Veterans Health Administration (part of the VA) has recently entered into a contract with Mitre to support popHealth for nine of the EP eCQMs. The limited scope of this work does not include support for other eCQMs or for development or support of the user interface.

Facilitation: ONC, working with its contractor Ai, is committed to engaging with the community of popHealth users in order to identify current/future use cases, current/future resource considerations, and to facilitate the creation of governance and technical development plans. This has already begun via one-on-one discussions and will continue via a large in-person stakeholder meeting and several ongoing virtual stakeholder meetings.

Handoff: Once the governance and technical development plans have been developed by the community, ONC expects that some form of governance entity will be created. ONC plans to work with that entity to determine an acceptable agreement on how to transfer popHealth to that entity.

Timeline: ONC expects to complete its facilitation of the development of the governance and technical development plans by March 2014. ONC hopes that shortly thereafter a governance entity is formed. ONC expects to complete the transition by spring 2014.

Environmental Scan

Ai reached out to the stakeholder community, via the popHealth listserv to solicit participants for the environmental scan. Ai subsequently interviewed a number of organizations via in-person meetings and phone calls, to determine their current and future uses for popHealth, as well as their thoughts on the best governance models for the community. The interviews were informal in nature and typically included the organization's project lead and technical developers.

DocuTAP

DocuTAP provides EHR solutions for urgent care centers. They are currently working with popHealth v2 to provide Meaningful Use support to their users. DocuTAP does not plan to integrate the popHealth tool directly into their EHR platform, but will manage the tool for their users, who will send data to DocuTAP, who will calculate CQMs and send the QRDA Category 3 files back to the end user.

eHealthConnecticut

eHealthConnecticut is the Regional Extension Center (REC) for Connecticut. As part of Meaningful Use and the REC activities, for the last two years, eHealthConnecticut has been supporting FQHCs through funds contributed to a pool by the FQHCs. eHealthConnecticut spent the first year of the project learning about popHealth. They have spent the last year working with vendors to extract CCDs from their EHR systems and developing their branch of popHealth v1, which allows them to maintain one database but present role-based views of data to each FQHC. In total 13 FQHCs are working with eHealthConnecticut and four are live with test data.

In the future, eHealthConnecticut would like to have "build-your-own" measure capabilities that would allow the FQHCs to use the existing database and popHealth to generate measures for other grants. eHealthConnecticut is also evaluating using popHealth to support multiple use cases, including: CDC grants, supporting the Department of Corrections, supporting PCMH programs, HCCN grants, and supporting quality improvement organizations (QIOs).

FEi Systems, Inc.

Under a Substance Abuse and Mental Health Services Administration (SAMHSA) grant, FEi Systems developed the Web Infrastructure for Treatment Services (WITS) to allow state and county health departments to collect substance abuse and mental health service data electronically. When the grant ended in 2004, WITS was transferred to a semi-open source development process. FEi maintains WITS for a consortium of 27 states and counties.

In 2011, FEi began working towards certification for Meaningful Use Stage 1. Rather than develop the CQMs within the WITS product, FEi received certification with popHealth v1 as relied upon software. Since they are not able to segregate the data for each user, FEi maintains a single instance of popHealth, and calculates the CQMs within popHealth upon their user's request. The CQM calculations are then sent to the user via email. Since most of FEi's users are not eligible for Meaningful Use and not requesting 2014 certification, FEi does not currently have plans to receive 2014 certification.

Illinois Department of Public Health, Healthy Hearts

The Illinois Department of Public Health (DPH), Healthy Hearts campaign is funded through a community transformation grant from the Centers for Disease Control (CDC) with a goal of improving cardiovascular care throughout the state. By the end of 2016, DPH must work with 30 federally qualified health centers (FQHCs) and rural hospitals to report eight core quality measures and three menu quality measures related to cardiovascular and diabetes care. The quality measures align with the CMS CQMs in popHealth v1.4.

DPH is currently working with five FQHCs and over the last year has worked with the practices and their vendors to extract CCDs from the EHR to feed to the popHealth tool. DPH maintains the popHealth tool, and does not currently allow the practices direct access, since there is no segregation of data within the tool.

Moving forward, DPH would like to use popHealth to support the FQHCs with not only the Healthy Hearts grants, but also with meeting Meaningful Use. They would like to have the ability to segregate the data by practice to allow them to directly view their results (i.e., create security enhancements to popHealth), and would like to have other file types accepted by the popHealth tool (e.g., CSV files), since EHR vendors are slowly moving towards QRDA formats.

Northwestern University

Northwestern Medicine, part of Northwestern University, is composed of multiple hospitals and ambulatory practices, utilizing eight to ten different EHR vendors. Since multiple systems are in use, Northwestern has built a centralized data warehouse that receives data from each hospital and practice. The data warehouse is used for Meaningful Use reporting, including the Clinical Quality Measures. Northwestern has worked with popHealth v2.4 and the associated measure definitions (SNOMED CT bundle), to build all of the 2014 hospital CQMs, and is in the process of building all of the provider CQMs.

Northwestern received 2014 certification from CCHIT in January 2014 (CHPL CC-2014-781600-3) to import, calculate, and electronically submit the hospital CQMs. They anticipate receiving 2014 certification for the provider CQMs in early 2014. To build the 2014 certified version of popHealth, Northwestern branched the code, as they receive certification, they plan to commit the code back to the master branch.

Northwestern has found that while the technical build of popHealth was difficult, potentially more problematic is the lack of discreet data being recorded in the originating EHRs. Significant workflow changes need to take place with their providers to ensure that data used to calculate CQMs is not

stored in a text box, but rather in a discreet data field. Without this, the CQM calculations will be inaccurate, not due to technology issues but rather to a lack of data.

While Northwestern has built the popHealth code to accept QRDA Category 1 files, as required for certification, the tool can accept additional file types, such as JSON. This is particularly beneficial because not only does it enable organizations to input data using JSON, which is an extremely simple format compared to QRDA, but also opens the door to adding additional input mechanisms like CSV, simple XML, and potentially other EHR specific adapters. There is a limitation with CCDA files, predominantly that all of the data needed to calculate the 2014 CQMs does not reside in the CCDA. Additionally, Northwestern is working on a "build-your-own" measure functionality that would allow them to build quality measures for other programs.

Wyoming Department of Health

The Wyoming Department of Health (WDH) is in the process of developing a PCMH program that will include 29 practices that are working towards National Committee for Quality Assurance (NCQA) accreditation. Part of the PCMH program is supported by a CMMI innovation grant, and as such must capture quality measures from participating practices. Rather than creating a separate quality measure reporting requirement, WDH made the decision to align the PCMH quality reporting with the CMS CQMs. WDH modified their state level registry (which practices already use for attesting to Meaningful Use) and will allow practices to report using HL7 submissions or by performing manual direct entry into the website, using popHealth v2.1.2 as the base code. In the future, WDH plans to use popHealth and to fully automate the process for the state level registry to receive CQMs using patient level QRDAs from Wyoming providers and provide payment incentive to providers for quality improvement.

Veterans Administration

The Veterans Administration currently has a contract with Mitre to support popHealth version 2 for nine eligible professional (EP) CQMs.

Potential Future Use Cases

The following are general categories of future use cases based on the current uses discovered through the environmental scan. This list is not meant to be exhaustive, but is an aid to understanding the potential future trajectory of popHealth.

Hospitals /Clinics

For the hospitals that have EHRs capable of generating CCDs, QRDA I files, or JSON files, the popHealth tool can extract the quality measures from the data provided and create a QRDA III file that can be used to attest for Meaningful Use.

The hospitals have various other needs to collect and report quality measures to different organizations as well as for quality improvement. The popHealth tool can be enhanced to cater to all those quality measures and provide an ability to select the quality measures to be used in a particular instance.

Public Health Agencies

Several public health agencies are already using the popHealth tool to aggregate various quality measures at a local and state level. As the popHealth tool matures, the public health agencies can use the tool to not only as a tool to provide access to providers to view and analyze their quality metrics, but also can be potentially used for reporting the quality metrics to wider population as appropriate.

Researchers

The popHealth tool can provide a way for researchers to condense clinical information for a large patient population into a synthesized summary of data that can be used for population research. Although the current version of the application is specific to Meaningful Use CQMs it certainly can be expanded to additional quality measures that are relevant to the researchers.

Federal, State, and Local Agencies

There are multiple use cases for the government agencies depending on the role they play. In case they play any of the above mentioned roles, the uses are equally relevant to the government agencies. In addition, there are state and local agencies that can potentially utilize an enhanced version of popHealth as a tool to accept the data from the reporting organizations.

Community-Identified Goals and Objectives

Through the environmental scan process, the community has described various specific ideas and general themes that Ai has filtered into a series of goals and objectives. Those are outlined in the following charts. The in-person meeting will allow for discussion and modification and enhancement of this chart. It is not intended to be definitive, but rather to facilitate the coalescing of the community.

Short Term Goals – 6 Months

Goal	Objective
Increase Developer Participation	• Improve documentation by adding detailed information about design and code for new developers to use. • Add simple installation guide for installing on various development platforms. Possibly create a unified installation script. • Create downloadable virtual machine boxes for platforms like VirtualBox, VMWare and Vagrant.
Increase Stability	• Increase rails framework test suite coverage.

Long Term Goals – 1 to 2 Years

Goal	Objective
Increase User Participation	• Develop marketing materials that help others understand and thus adopt the tool. • Develop new features and tools. • Support the recruitment and acculturation of newer contributors by encouraging a welcoming environment. • Support user groups and meet ups to increase community cohesion and commitment to the projects. • Give wider visibility to these efforts through multiple communication channels.
Improve Quality	• Systematically collect input from users and developers. • Develop and maintain documentation of best practices, design, standards, and metrics.

Governance

The governance plan will be generated by the community. This work will require careful consideration of the elements that are necessary for popHealth's long-term sustainability. These elements will also be used to assemble the right set of stakeholders that will be responsible for implementing the governance plan.

ONC will facilitate conversations with various stakeholders and ensure that there is wide stakeholder participation. To enable that, ONC is providing the following straw man governance models that may be used by the community as a starting point to develop the governance plan.

Each of the following governance models can be formalized under a legal entity as "For Profit" or "Non-Profit" depending on what the community thinks would provide the best resources to the project.

Straw man Governance Model 1: Open Code/Controlled Governance

- Structure:
  - The product direction is set by a very small group.
  - Code contribution is solicited from a wide group but is chosen to be included by a single authoritative architect or small group of committers.

- Since the direction and code merging is done by a small group, the quality is high and focused. On the other hand the use cases addressed by the project are limited.
- Example: Linus Torvalds is the project coordinator for Linux Kernel. He actively solicits code contributions from all over the world, but he has the final say on what gets included into the kernel code.

Straw man Governance Model 2: Open Code/Open Governance

- Structure:
  - The product direction is set collectively by a group through public voting or public comments.
  - Code contribution is solicited from a wide group and is chosen to be included by peer review process and voting by the community.
  - Commit access is given to developers who have met a threshold for contributing high quality code.
  - The code addresses a wide range of use cases but also leads to a fragmented market. Management of branches and versions can also become a challenge.
- Example: An example of this would be an Apache HTTPD server.

Straw man Governance Model 3: Controlled Code/Open Governance

- Structure:
  - The community selects an authoritative developer or a group of developers who develop the code.
  - The community collectively decides on the project priorities by voting and active feedback.
  - Typically needs a champion who can provide resources and funding from the projects.
  - There is high dependency on the funding source and benefactors who provide the resources.
- Example: Apache OODT is developed by a core group of developers with feedback from the community.

Straw man Governance Model 4: Hybrid Governance and Coding

- Structure:
  - A hybrid approach where a group of developers actively seek community participation and rally the developers to address the community needs.
  - Needs a funding source than can sustain the management and logistics.
- Example: Canonical Ltd manages the Ubuntu Linux development. They share the development responsibilities with a group of developers and provide commit access to members of the community they feel have provided valuable input and code in the past.

Other Governance Considerations

There are a variety of other key governance considerations, which are detailed here.

Resource Commitments / Finances: Perhaps the most important governance question will be regarding resource commitments. This could include strictly dollar commitments or in-kind resources. However, it could also be measured by quantity and quality code contributions. Overall financial management of such commitments would need to be considered as well.

Marketing Efforts: An important part of making popHealth an ongoing success is marketing the tool to the right users. The community will need to consider the best marketing materials to develop and the best methods for disseminating the materials to each audience. The marketing efforts will likely feature market research, cost analyses, and the materials and channels for dissemination.

Organizational Efforts: To facilitate the vision and development of popHealth, the community will need to create workgroups to support the various use cases and technical development efforts. The workgroups will need to determine meeting schedules, frequency, and locations.

Operational Considerations

Some of these items may also fall under "Other Governance Considerations" above. Regardless, these are other key issues that likely need to be addressed prior to handoff.

Commit Access: The technical development plan will likely need to identify roles for the code owners who will have access to the github code. Commit access will be granted/transferred to the members identified.

> Note: Details of the technical governance are expected to be included in the Technical Development Plan after discussions with the community. A straw man Technical Development Plan with placeholders for yet to be detailed sections will be developed by Ai to facilitate that discussion.

Website Management: The domain and the hosted website for the popHealth project is currently owned by ONC. The governance entity will need to identify a mechanism to manage the domain and the web hosting responsibilities to their purview. The governance considerations here could include how broad activity is allowed on the website. For example, are there discussion boards that allow for non-dues-paying members to participate?

User Groups: Currently the listservs are managed and coordinated under ONC. A user group has been created and managed by eHealthConnecticut. The governance group will need to identify a mechanism to govern all user groups to enable communication and discussions regarding popHealth.

Demo Server: If the community decides to have a demo server of the popHealth tool, the group will need to identify and provision appropriate resources. The governance group will need to also decide which version of the popHealth tool is hosted since multiple versions are being used by the

stakeholders. The key governance question here is: Who owns or has rights to the server and ensures it is maintained?

popHealth Name: The popHealth name and logo are trademarked by ONC. ONC has several options for the future of the name. The governance group will need to evaluate and propose to ONC what it considers would be the best option for the name popHeatlh, or if a new name should be selected and trademarked.