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## **Bright Futures As-Is Assessment: How Child-Serving Practices, Health Systems, and the State of Maine Use and Exchange Specific Clinical Data Related to Child Health Quality Measures**

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# Maine's Improving Health Outcomes for Children (IHOC)

## Bright Futures As-Is Assessment:

*How Child-Serving Practices, Health Systems, and the State of Maine Use and Exchange Specific Clinical Data Related to Child Health Quality Measures*

September 12, 2012



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***How Child-Serving Practices, Health Systems, and the State of Maine  
Use and Exchange Specific Clinical Data Related to Child Health Quality  
Measures***

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## About this Study

This report was written by Kyra Chamberlain and Martha Elbaum Williamson at the Cutler Institute of Health and Social Policy, Muskie School of Public Service at the University of Southern Maine, and by Jonathan Ives and Jin Liao at the Maine State Office of Information Technology.

The Improving Health Outcomes for Children work is being conducted under a Cooperative Agreement between the Maine Department of Health and Human Services and the Muskie School of Public Service at the University of Southern Maine and is funded by a grant from the Centers for Medicare and Medicaid Services (CMS) through Section 401(d) of the Child Health Insurance Program Reauthorization Act (CHIPRA). This document was developed under grant CFDA 93.767 from the U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services. However, these contents do not necessarily represent the policy of the U.S. Department of Health and Human Services, and you should not assume endorsement by the Federal Government.

For further questions regarding the study please contact Kyra Chamberlain at [kchamberlain@usm.maine.edu](mailto:kchamberlain@usm.maine.edu).

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## EXECUTIVE SUMMARY

Improving Health Outcomes for Children (IHOC) is a five-year child health quality improvement project paid for by a grant from the Centers for Medicare and Medicaid Services (CMS) through Section 401(d) of the Child Health Insurance Program Reauthorization Act (CHIPRA). Maine's Department of Health and Human Services' Office of MaineCare received this grant in partnership with the Maine Center for Disease Control and Prevention, the Muskie School of Public Service at the University of Southern Maine, Vermont's Medicaid Program, and the University of Vermont. Maine IHOC's Health Information Technology (HIT) initiative includes HealthInfoNet as an instrumental partner in developing and advancing IHOC's mission to expand Maine's HIT and health information exchange (HIE) capacity in support of child health quality improvement and better health outcomes for children in Maine, with a particular focus on preventive and follow-up care delivered by primary care providers during Well Child Visits.

MaineCare—Maine's Medicaid program—uses the American Academy of Pediatrics' (AAP) Bright Futures standard of care to implement its federally-mandated Early and Periodic Screening, Diagnosis and Treatment (EPSDT) Program for children and adolescents. MaineCare policy identifies specific covered services for preventive and routine follow-up care—known as EPSDT benefits—based on Bright Futures guidelines. Providers participating in MaineCare agree to deliver EPSDT services to their MaineCare patients who are eligible for these benefits (currently, this includes MaineCare members under the age of 21). MaineCare is required to periodically report rates of certain EPSDT services to CMS, and so data related to these services must be collected. Sometimes referred to as Bright Futures data, EPSDT data reflect clinical information about preventive care delivered during Well Child Visits (such as screenings, tests, patient and family education, preventive treatments, and referrals). Examples of EPSDT data include those related to immunizations, oral health risk assessment, fluoride varnish, Body Mass Index assessment, and patient education on nutrition and physical exercise. EPSDT data are captured, stored, and exchanged in a variety of ways, including through claims systems, state registry systems, electronic health records (EHRs), and registries at practices and health systems. This “As-Is” document summarizes Maine's current HIT environment as it relates to the use and exchange of EPSDT data between pediatric primary care providers, HealthInfoNet (HIN, Maine's designated health information exchange), and the State of Maine, prior to changes implemented by IHOC.

The IHOC Final Operational Plan identifies tasks and deliverables to be completed within the grant period. Maine's HIT Task B-1 is to “Collaborate & coordinate with Health Systems & FQHC's<sup>1</sup> to determine interface specifications in order for them to participate in the automation & exchange of EPSDT data (Bright Futures).” Building on Maine Task B-1 is Maine Task B-6: “Design and implement an integrated electronic data system for Bright Futures (EPSDT in Maine) that links practices' EHR systems to DHHS, pilot with PCMH<sup>2</sup> Pilot pediatric practices and then stage roll out in practices that have a high volume of MaineCare patients.” To gather information pertinent to planning and implementation of these tasks, an IHOC work group conducted a structured assessment of five pediatric primary care practices, the health systems associated with these practices, and

1 “FQHC's” refers to Federally Qualified Health Centers.

2 “PCMH Pilot” refers to the multi-payer Maine Patient Centered Medical Home Pilot.

HealthInfoNet. IHOC invited all four pediatric primary care practices involved in Phase 1 of the Maine Patient Centered Medical Home Pilot (a multi-payer program) to participate in the assessment. The fifth practice was invited because it serves a large volume of children covered by MaineCare and is associated with a major health system in Maine not otherwise represented in the assessment. All five practices agreed to participate and the results are presented in this report, which is the deliverable for the following IHOC task:

FOP B-1.1: “As Is Assessment: Identify workflow processes of how providers currently use and submit EPSDT data to MaineCare Services.”

During this assessment, IHOC learned that pediatric practices and health systems use several different information systems that are relevant to the calculation and reporting of measures using EPSDT data. Systems include electronic health records (EHR), electronic medical records (EMR), patient registration, and data registries at practices and/or health systems. The terms EHR and EMR are often used interchangeably to refer to an electronic patient health record. While many providers use the term EMR, this document uses EHR to be consistent with terminology adopted by CMS.

The flow of data between each of these systems is fairly similar across the practices but can differ in small but important ways. While EHRs are a primary source of clinical information, patient registration systems often contain both inpatient and outpatient data related to demographics, scheduling, and billing as well as clinical information such as height and weight, diagnoses, procedures, and allergies. Data registries—often located at health systems but sometimes at the practice level too—are typically populated with data from both the EHR and the patient registration system. Additional data exists in associated hospital HIT systems such as the Computerized Physician Order Entry system, laboratory information systems, and radiology information systems. In some cases, data from these systems are made available in the practice EHR as well.

The adoption and development of EHRs has opened new pathways for collecting data from practices and health systems. To be useful for reporting quality measures—such as those related to EPSDT—the data must be captured with a high level of consistency within and across all EHRs. While clinical workflow appears quite similar at the practices we visited, workflow processes may not always lead to consistent data capture during well child visits (WCV). Variations in consistency—regardless of the source—affect whether the same data elements can be collected within and across practices; and whether the data collected from different sources can be used to calculate measures that are truly comparable.

Workflow processes that can lead to inconsistent data entry include variations in the EHR itself as well as in how it is used. Most practices use templates within their EHR to enter data related to the WCV, but the types of fields and method of entry can vary widely from free text to pre-defined drop down selections to check boxes. Not only do the types of fields vary, but some EHRs offer more than one way to enter the data and practices differ in their emphasis on consistent data entry methods. Furthermore, values entered represent the individual provider’s interpretation of Bright Futures standards. For example, what constitutes “moderate” for one provider may constitute “mild” for another.

The extent to which a practice employs their EHR for data capture can vary, too. Most of the practices enter the majority of EPSDT data directly into distinct fields in their EHR and these fields have the potential to be electronically searched—or “queried”—for data collection and reporting. However, one practice completes a hard copy Bright Futures WCV form and then scans the document into the EHR as an image which cannot be

queried. For more information about the use of hard copy Bright Futures forms by paper-based practices and practices without a fully implemented EHR system, see the Maine IHOC *As-Is Assessment: Bright Futures Forms Submission Process* report<sup>3</sup>.

State registry systems also play a role in data collection and reporting. For example, all practices participating in Maine's Universal Vaccines for Children Program now use the state's immunization registry, ImmPact, for ordering and managing vaccine inventory. To participate, the practice must enter the number of doses they gave of each vaccine into ImmPact. This data entry occurs on a regular basis—usually daily—but does not contain per-patient dose data required for calculating immunizations measures. However, three practices use ImmPact—rather than their EHR—as the primary system for entering per-patient dose data. Because ImmPact contains doses given by other providers, these practices consider it to be the “gold standard” of immunization status for their patients. At least one practice enters per-patient doses into both their EHR and ImmPact—an example of double data entry that is burdensome to providers.

We also learned that practices and health systems are currently developing electronic connections for data exchange that facilitate timely, efficient, and effective patient care. For example, some practices are exchanging data captured during the WCV internally (between the practice EHR and the practice or health system registry) and externally (with HIN and/or state registry systems). Practices are using data from these information systems to support point-of-care treatment and care coordination and to create reports used to improve workflow and support disease management, care management, and provider/group performance. As a result, practices and health systems may emphasize the standardized collection of certain data elements over others, based on their own data exchange and reporting priorities.

Identifying differences in HIT systems, clinical workflow, data exchange, and reporting helps inform IHOC's plan for data collection and measure calculation across practices and systems in Maine. Details about the background and findings of the assessment are presented in the body of this report, including:

- Overview, purpose, scope, and methodology
- Graphical representations and narrative text describing the findings
- Discussion about how the findings may inform the “To Be” for Maine Tasks B-1 and B-6

For additional information about the Maine IHOC project, please see the IHOC HIT Charter Document and supporting documents including the IHOC Final Operational Plan (FOP) and the Maine IHOC Pediatric Measures Master List<sup>4</sup>.

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<sup>3</sup> Contact the IHOC Project Director, Joanie Klayman, at [jklayman@usm.maine.edu](mailto:jklayman@usm.maine.edu) or 207-780-4202.

<sup>4</sup> Contact the IHOC Project Director, Joanie Klayman, at [jklayman@usm.maine.edu](mailto:jklayman@usm.maine.edu) or 207-780-4202.

## INTRODUCTION

### Overview

Maine's Medicaid program (MaineCare) has adopted the American Academy of Pediatrics' (AAP) Bright Futures standard of care to implement its federally-mandated EPSDT (Early and Periodic Screening, Diagnosis, and Treatment) Program for children and adolescents. Bright Futures is also widely accepted by child-serving providers as the standard of care for all children in Maine. During Well Child Visits, primary care providers perform assessments and treatments based on Bright Futures guidelines. As they document this care, providers capture specific elements of clinical information—referred to here as EPSDT data—that are required to calculate several child health quality measures. Maine IHOC plans to design and implement a method for the electronic exchange of EPSDT and other clinical data between providers and the State of Maine for the purpose of calculating and reporting child health quality measures related to childhood screenings and risk assessments, preventive and ongoing treatments, patient education, and referrals. In order to develop an implementation plan, IHOC must first assess the current Health Information Technology (HIT) environment at the State, practice, health system, and health information exchange (HIE) levels.

Analysis for the Maine IHOC *Bright Futures As-Is Assessment: How Child-Serving Practices, Health Systems, and the State of Maine Use and Exchange Specific Clinical Data Related to Child Health Quality Measures* was conducted between February 2012 and June 2012 with a focus on clinical workflow, data flow, and information systems currently employed by selected pediatric practices and their associated health systems, the State of Maine, and the state's designated HIE, HealthInfoNet (HIN). After developing a protocol to guide the process, an IHOC work group conducted site visits and interviews to collect information from the practices, health systems, and HIN. In accordance with Maine IHOC's Final Operational Plan, the practices and health systems were selected based on their involvement in the Maine Patient Centered Medical Home (PCMH) Pilot. One additional practice was selected because they serve a high volume of children covered by MaineCare, and they are associated with a major health system in Maine not otherwise represented in the assessment. HIN was selected due to its status as Maine's state-designated HIE. The practices and health systems included in this assessment are listed in Table 1.

### Purpose and Scope

The purpose of the As Is assessment is to provide a description of Maine's current HIT environment specifically pertaining to how EPSDT and other clinical data are entered, used, and exchanged electronically through information systems at pediatric practices, health systems, the State of Maine, and HIN. This information will inform plans currently under development by IHOC for electronic data exchange and child health measure calculation.

The scope of the As-Is assessment is to gather information about specific data elements in three key areas of

electronic data exchange and measure calculation:

1. Clinical workflow and data capture
2. The flow of data within and across systems
3. Reporting of quality measures

The IHOC workgroup developed a list of approximately 30 data elements to include in the assessment, based on their relevance to calculating a sub-set of the quality measures in the Maine IHOC Pediatric Measures Master List. Specifically, these are measures identified as having potential for collection through information systems such as electronic health record (EHR) systems and practice or health system registries, as opposed to measures that are currently collected and calculated using data from claims systems or state data registries.

## Methodology

To conduct the assessment, IHOC developed a semi-structured interview protocol and administered it in group meetings at the practice and health system. In order to gain feedback and insight from multiple perspectives, attendees at each group meeting included clinical, administrative, quality, and information technology personnel at the practices and systems selected. When possible, the site visits included a tour of the practice's EHR system. In addition to the practices, IHOC met with two other key stakeholders: the Maine Primary Care Association (MPCA, the voluntary association for FQHCs) and HIN, both of whom play a significant role in data exchange and/or quality reporting. Information from the visits was documented and then, using Visio, diagrams were developed to provide visual descriptions of the clinical workflow for a typical WCV and the data flow between practices, health systems, and HIN. Drafts of the final report were provided to participants for review, and feedback was incorporated to ensure accuracy of the findings.

## Limitations

The primary limitation of the assessment is that the practices selected are not necessarily representative of all child-serving practices in the state of Maine. Four of the five practices are voluntarily participating in the Maine PCMH Pilot, which may indicate a high degree of practice interest in quality initiatives and capacity to report data from information systems. In addition, all of the practices selected are pediatric practices and may differ in important ways from family practices that serve both children and adults. It is also important to note that at the time of this assessment, the FQHC practice interviewed was unsure of future enhancements to its current connection with MPCA. Because of these uncertainties, this report does not focus on the exchange of data between that FQHC and MPCA.

**TABLE 1: PRACTICES AND HEALTH SYSTEMS/ASSOCIATIONS**

| <b>Practice</b>                      | <b>Health System/Association</b>                                  |
|--------------------------------------|---|
| Winthrop Pediatrics (PCMH)           | MaineGeneral Health   |
| Westbrook Pediatrics (PCMH)          | MaineHealth   |
| Husson Pediatrics (PCMH)             | Eastern Maine Healthcare  |
| Penobscot Pediatrics (PCMH and FQHC) | Penobscot Community Health Care<br>Maine Primary Care Association |
| Central Maine Pediatrics             | Central Maine Healthcare  |

## BACKGROUND

### Maine IHOC Pediatric Measures Master List & Bright Futures Data

In February 2010, Maine and Vermont were awarded a five-year demonstration grant from the Centers for Medicare and Medicaid Services (CMS) to improve the quality of health care for children insured by Medicaid and the Children’s Health Insurance Program (CHIP). Maine’s Department of Health and Human Services’ Office of MaineCare received this grant in partnership with the Maine Center for Disease Control, the Muskie School of Public Service at the University of Southern Maine, Vermont’s Medicaid Program, and the University of Vermont. In Maine, IHOC brings together public and private child health stakeholders to standardize the delivery of preventive and follow up care for children and to meet quality improvement goals of health systems and the Office of MaineCare.

The Maine IHOC Pediatric Measures Master List was developed with stakeholder input as a framework for measuring child health care quality across the state. The list of 52 measures includes 24 measures from the CHIPRA Initial Core Set—which were identified by a federal panel of experts and published by the Agency for Healthcare Research and Quality and CMS under terms of the CHIPRA legislation—plus additional clinical measures identified by Maine’s provider community as important for tracking and improving the quality of child health care in Maine. Aligned with stakeholder priorities, the list includes several measures derived from Bright Futures/EPSTD guidelines. Examples of data related to EPSTD measures include information about immunization status, assessment of Body Mass Index, oral health risk assessments, and patient education on nutrition and physical activity.

The Maine IHOC Pediatric Measures Master List supports the effort to standardize high quality preventive and follow up health care for Maine's children. However, providers and the State need ways to collect and report these measures. Many of the measures can be collected using claims data, state registry and vital statistics data, or data from hospital EHRs. One of the measures is derived from results of a patient experience of care survey. Of the 52 IHOC measures, 15 were selected for the focus of the assessment primarily because the data elements required to calculate these measures may best be derived from EHRs. Furthermore, IHOC is working to establish an HIT infrastructure that will allow EPSDT and other clinical data related to these measures to be shared securely between health systems, HIN, and the State of Maine. During IHOC's Grant Year 3, IHOC plans to pilot the calculation of at least three measures with an existing electronic measure specification (known as an eMeasure) using this HIT infrastructure and data from at least one EHR. IHOC plans to extend the pilot to include the calculation of at least one additional measure using a customized electronic measure specification. The learning from the overall effort will inform future data collection, calculation, and reporting.

## HealthInfoNet: State-Designated Health Information Exchange

Maine's designated health information exchange is HealthInfoNet. The term health information exchange encompasses the electronic sharing of health-related information among organizations and technology services to enable this sharing process. A health information exchange facilitates access to and retrieval of clinical data to provide safer and more timely, efficient, effective, and equitable patient-centered care, and to support the efforts of physicians and clinicians to meet high standards of care. HealthInfoNet is an operational query-based<sup>5</sup> health information exchange connecting hospitals, FQHCs, and ambulatory practices across Maine. The goal is to have 100% of hospitals and 80% of ambulatory providers connected to HIN by 2015.

## Domains Explored

This section of the report briefly describes each of the following domains explored through structured interviews with key informants, and why the domains were important to the assessment:

1. clinical workflow and data capture
2. reporting out and data exchange
3. reporting to practices

### Clinical Workflow and Data Capture

This domain refers to the clinical workflow of a typical Well Child Visit and how related data are captured. An understanding of clinical workflow is important because accurate calculation of child health quality measures depends largely on the consistent integration of data entry into the clinical workflow. Specifically, this domain

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5 Per the Office of the National Coordinator, query-based exchange "...permits providers to search for data that could help them diagnose and treat a patient." <http://www.fiercehealthit.com/story/oncs-health-information-exchange-strategy/2012-03-14#ixzz25eyxZwLU>

addresses the accuracy and frequency of data entry as well as whether data are entered into unique fields that support queries for measure calculation and reporting. These are important considerations when using data to calculate quality measures for activities such as practice improvement, benchmarking, and payment incentives.

### Reporting Out and Data Exchange

This domain includes information about how data are reported out from EHRs and practice/health system registries, and for what purposes. Understanding how and why practices and health systems report data out increases our understanding of the value and utility of calculating specific child health quality measures. This domain also includes information about practice participation in HealthInfoNet and how those connections contribute to the process of reliable and interoperable electronic health-related information sharing in Maine.

### Reporting to Practices

This domain includes information about data reported back to practices—for example from the health system affiliated with the practice, an insurer, or another external entity—and how (or whether) the individual providers, practices, and health systems use these reports. For example, practices and health systems can use quality reports to compare themselves to state or national benchmarks and to target practice improvement activities accordingly. Understanding how practices and health systems use reports increases our understanding of the value and utility of creating reports with specific child health measures. For the purpose of this assessment, the focus was placed on reports that use data from an EHR or practice/health system registry, rather than data from other sources (such as claims or state registry systems).

## FINDINGS

### Overall Findings

#### Information Systems Currently in Use

Each of the practices visited had two or three of the following supporting information systems that are of interest to the IHOC project: a patient registration system, an electronic health record (EHR), and a registry. The *patient registration system* typically includes inpatient and outpatient information and is used for maintaining patient demographics as well as billing and scheduling information. Patient registration systems also include some clinical information such as current and/or prior diagnoses, allergies, and a history of procedures. An *electronic health record (EHR)* is a patient health record maintained electronically in a health care provider organization such as a hospital (inpatient EHR) or physician's office (outpatient EHR). A *registry* is an organized system to collect, store, analyze and disseminate information on individual patients who have a particular disease or condition (for example, diabetes) as well as to generate reports for quality improvement among broader groups such as for patients of one practice within a system, or patients of one provider within a practice.

While practices use the same types of supporting information systems, there are variations in the vendors, products, and versions used (see Table 2). For example, three of the practices use two different versions of a Centricity outpatient EHR, and no two practices use the same patient registration system. In cases where the same version of a product is employed in more than one setting, those products are often customized to meet the unique needs of each practice or health system. For example, three practices use Meridios as a patient registry but these registries have been customized to meet the needs of their associated health systems; and one practice uses a customized registry developed by the health system. For one practice that has no registry, reports are generated using an independent report server.

**TABLE 2: SPECIFIC INFORMATION SYSTEMS IN USE AT PRACTICES**

| Registration Systems   | Electronic Health Records  | Registries   |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Cerner</li> <li>• Centricity Practice Solution</li> <li>• Centricity 11</li> <li>• McKesson</li> <li>• Groupcast</li> </ul> | <ul style="list-style-type: none"> <li>• Centricity 9.5</li> <li>• Centricity 11</li> <li>• EPIC 2010</li> <li>• Allscripts</li> </ul> | <ul style="list-style-type: none"> <li>• Meridios (with customizations)</li> <li>• Custom-designed registry</li> </ul> |

## Clinical Workflow and Data Capture

### Clinical Workflow Similar Across Practices

Clinical workflow—the set of tasks performed in the delivery of a WCV—appears to be fairly similar at the practices visited. Figure 1 depicts a high-level summary of the clinical processes that take place during a WCV. Typically, administrative staff confirms or enters patient demographics and insurance information into the registration system when the appointment is scheduled. At check-in for the appointment, the patient or parent/guardian completes screening forms and questionnaires indicated for this WCV. The clinical visit begins when clinical support staff (usually a medical assistant or nurse) performs indicated measurements and enters the values into the EHR (height, weight, blood pressure, temperature, etc.). Next, the physician or mid-level provider reviews patient data in the EHR, elicits additional information from the patient or parent/guardian, and examines the patient with a focus on clinical assessments based on the age and health status of the child. In some cases, the EHR contains an age-specific visit guide with prompts and flags indicating the standard of care for that visit. During the exam and sometimes subsequent to the exam, data are entered into the EHR by the examining physician or mid-level provider and/or clinical support staff. If laboratory tests are ordered or procedures are performed (such as vaccinations), that information will also be documented in the EHR.

### Variations in Data Capture

While data are captured in the EHR during the clinical workflow at all practices, we learned that workflow processes may not ensure consistent data capture. Variation occurs across practices and within practices and is due to a number of factors related to clinical workflow and information system design. For example, differing

patterns of data entry exist among staff—both at the role level and at the individual level. Some physicians consistently check a box that indicates patient education—such as counseling on nutrition and physical activity—has been delivered. However, checking that box may not be part of another physician’s practice even though the counseling did occur.

Variation can also occur when an EHR allows for the same clinical data to be entered into more than one field or in more than one way. For example, nutrition counseling can be documented in the EHR by checking a box, or it can be documented in the EHR by filling out a text box with clinical notes from the visit. One practice also noted that the units of measure in the EHR may not match those displayed by the practice’s instrumentation. For example, a scale may display the child’s weight in pounds (often more meaningful to patients and parents) but the value is entered into the EHR after it is converted to kilograms. In addition, some workflow processes involve writing measurements on a form or separate piece of paper and entering them into the EHR later, while other workflow processes involve entering values directly into the EHR. In some practices, vital sign values are imported directly into the EHR from the instrumentation, such as a digital thermometer linked to the EHR.

Variation may also be the result of customizing fields in the EHR based on provider or practice preferences for data entry format (e.g., a check box versus a drop down selection versus a field for free text). While text fields have the potential to be queried, variations in provider language and terminology create barriers to using these fields for measure calculation. Practices that use a combination of EHR and paper documentation also face data collection challenges. For example, scanning hard copy forms into the EHR as an image does not support electronic collection of distinct data elements.

Inconsistent data capture can complicate data collection from EHRs and registries and can cause problems for reporting. When the same data is entered into multiple fields within one EHR, an incomplete data set will result unless the system extracting the data knows all of the fields that need to be queried for that measure, which fields contain the correct information, and how to reconcile discrepancies (see Quality Reporting below). In addition, differences in coding practices employed by providers can affect how data are recognized electronically. Coding refers to the process where data elements are entered into fields using specific “tags” (codes) for recognition by software programs. HIN is currently working to reconcile local coding standards with national coding standards, which will improve data consistency in this respect.

Practices are aware of data inconsistencies and are working to solve these issues through quality improvement efforts regarding clinical workflow to ensure accurate, timely, and consistent documentation in the EHR. For example, one practice stated that their WCV workflow and data entry has been standardized through clear expectation-setting around how, when, and where data is to be entered into the EHR. Ultimately, data entry inconsistencies will remain unless creating uniformity is a priority of the practice or health system. This type of practice change is time and resource intensive and requires buy-in from providers and support staff. Therefore, practices and health systems focus their efforts on the data elements that are relevant to collection and reporting activities of value to them.

### Information Systems Used to Capture Data from Well Child Visits

Figure 2 depicts an overview of the information systems used to exchange data between practices, health systems, and HIN. Clinical data related to a WCV are captured in two information systems at the practice or health system: 1) patient registration systems, where patient demographic, appointment, and billing informa-

tion is normally entered during scheduling encounters, and 2) outpatient EHRs, where clinical information is entered during the WCV. In addition, although it is not depicted in Figure 2, per-patient immunization dose data can be entered into either the practice EHR, the State’s immunization registry (ImmPact), or both the EHR and ImmPact.

## Data Exchange

The exchange of two types of data is of interest to IHOC: demographic data and clinical data. Both types of data are exchanged between practices and their health systems, and between practices, health systems, and HIN.

### Data Exchange within a Practice and Health System

At the selected practices, demographic data typically flow from patient registration systems to the EHR, and then clinical and demographic data from the EHR flow to the health system registry where it is used for a variety of purposes at the practice or system level (see Figure 2).

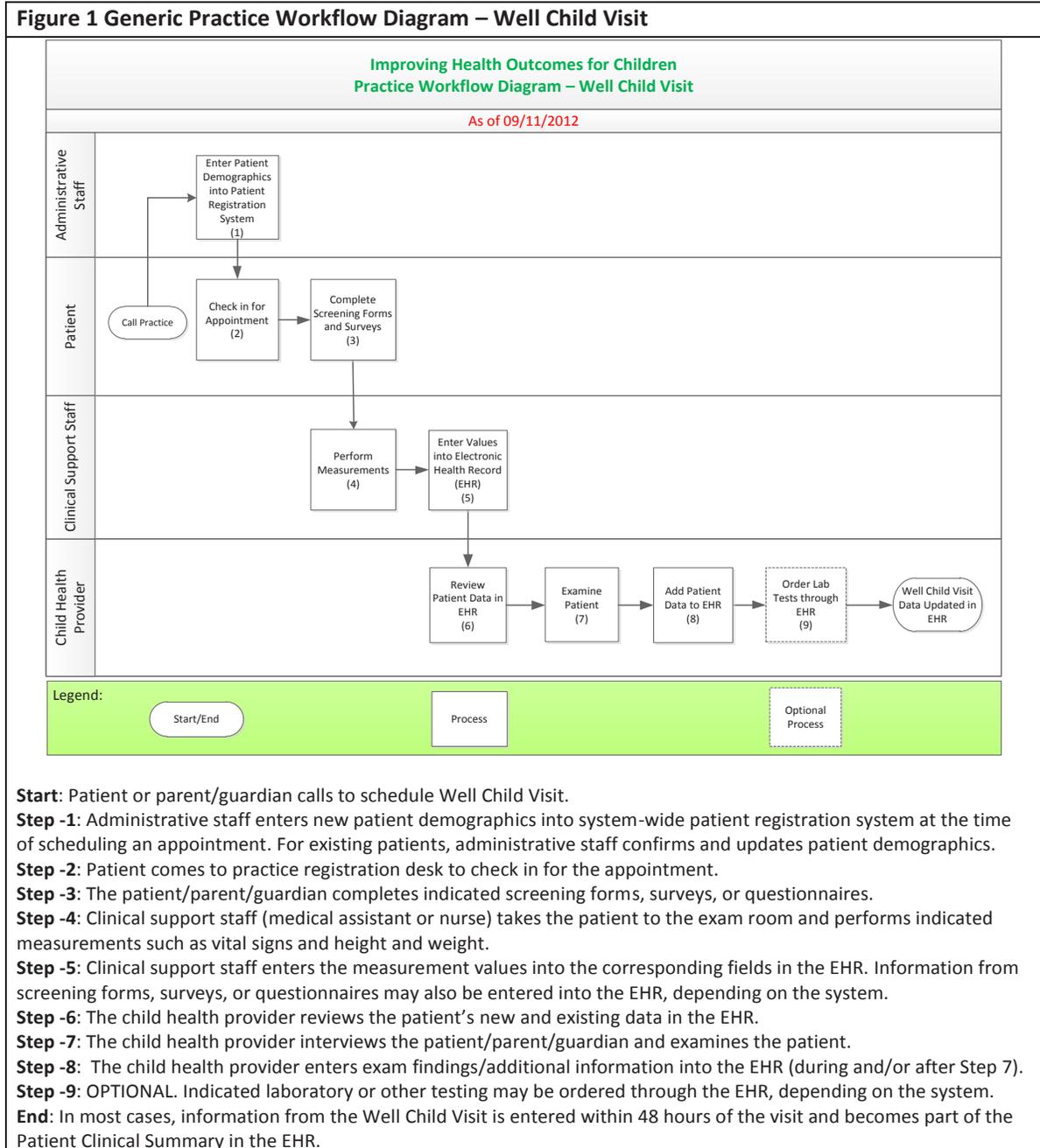
### Data Exchange between Practices and HealthInfoNet

The selected practices are currently developing data exchange with HIN. At four of the five practices, direct connection between the practice and HIN was established or was being established, as of June 2012. One of the practices does not currently connect their outpatient information systems with HIN and did not identify plans to do so. However, the inpatient EHR in the associated health system does currently connect to HIN. Typically, data from both the patient registration system and the EHR flow to HIN. HIN connects to the source of the data and so by policy, they do not currently connect to registries.

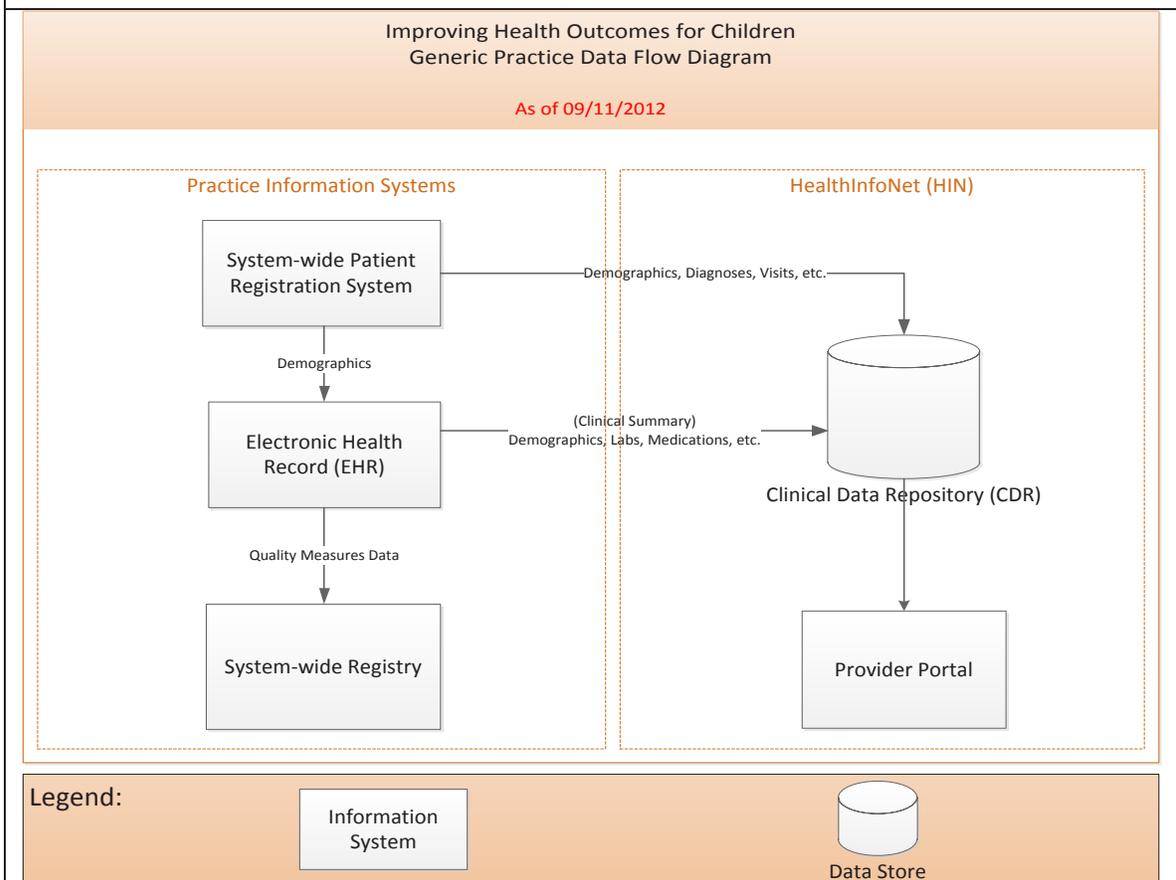
At one of the practices, patient demographics flow from the patient registration system to HIN on a continuous, real time basis. This practice is also sending specific data from the EHR to HIN, such as encounter history, immunizations, problem list, medications, and text documents. These data elements form the basis of the national standard called the Continuity of Care Record (CCR) or Continuity of Care Document (CCD).

All the data that HIN receives from patient registration systems and EHRs is stored in the Clinical Data Repository (CDR), which is an Orion Health product. HIN uses additional ORION, IBM, Surescripts, and Health Language Incorporated products to enable providers to log in and review patient clinical data stored in the CDR. Once logged in to HIN, participating providers can also download a CCD which includes a patient clinical summary. Data in CCDs can be translated by popHealth—a data analytic software tool which has recently been installed in HIN to support quality measurement reporting for CMS’ Meaningful Use of Health Information Technology Program<sup>6</sup>.

<sup>6</sup> “The [Medicare and Medicaid EHR Incentive Programs](#) provide a financial incentive for achieving ‘meaningful use,’ which is the use of certified EHR technology to achieve health and efficiency goals.” [http://www.healthit.gov/providers-professionals/ehr-implementation-steps/step-5-achieve-meaningful-use?utm\\_source=google&utm\\_medium=cp-c&utm\\_campaign=implementing%2Behrs](http://www.healthit.gov/providers-professionals/ehr-implementation-steps/step-5-achieve-meaningful-use?utm_source=google&utm_medium=cp-c&utm_campaign=implementing%2Behrs)



**Figure 2 Generic Practice Data Exchange Diagram**



**System-wide Patient Registration System:** A practice’s patient registration system is usually used by multiple practices across the same health system/organization, including associated hospitals. During clinical visits, administrative staff enters demographic information into the patient registration system and this data then flows to Electronic Health Record (EHR) systems and in most cases, to HealthInfoNet. At one of the practices visited, outpatient information does not flow from the patient registration system to HealthInfoNet.

**Electronic Health Record (EHR):** Clinical data is manually entered into corresponding data fields by clinical support staff and child health providers. Additionally, scanned documents may be added as images to the EHR. Patient clinical data in practice EHRs flow to HIN on a real-time basis from four of the five practices visited. EHR data also flows to practice/health system registries to support reporting needs.

**System-wide Registry:** A single registry frequently supports multiple practices within one health system. Registries pull specific data from EHRs and/or patient registration systems to create specified reports. These reports may be used to support quality improvement activities at the practice and/or health system level. In some cases, reports are sometimes submitted to external entities. One of the five practices does not have a registry and uses an independent report server to generate reports.

**HealthInfoNet Clinical Data Repository:** The Clinical Data Repository (CDR) stores demographic and clinical data received by HealthInfoNet (HIN) from EHRs and patient registration systems. HIN does not typically receive data from registries.

**HealthInfoNet Provider Portal:** HIN’s Provider Portal allows authorized child health providers to view a patient’s clinical summary through display of the Continuity of Care Document and categorized clinical information. The Provider Portal is accessed either through the provider’s EHR or through HIN, external to the EHR.

## Quality Reporting

Practices and health systems use child health data from their information systems—such as EHRs and registries—to measure aspects of quality of care often included in nationally-recognized measures such as those in the Maine IHOC Pediatric Measures Master List. Reports are generated to include selected measures and may be used for internal purposes such as practice improvement activities and payment incentives at the health system level. In addition, these reports may be used externally to meet reporting requirements of public and private payers and to participate in payment incentive programs, benchmarking activities, and accreditation processes. Practices may also receive quality measure reports from their health system (typically using registry data) and public and private insurers (typically using claims data).

### Quality Reports Generated by Practices and Systems

Practices and health systems generate reports for a variety of purposes. Some reports are generated for internal use within the practice or system, while others are generated for reporting to external entities (such as Clinical Quality Measure reporting for CMS' Meaningful Use). Three of the practices use their registries for reporting; a fourth practice uses the health system's report server; and the fifth practice has built quality reporting functions into their EHR. Generally, quality and practice improvement committees at the practice and health system govern which measures are included in registries based on requirements of the reports they choose to generate.

Practices and health systems use reports for three main purposes: 1) to improve provider or practice performance; 2) to analyze workflow and data capture; and 3) to support care management. For example, reports summarizing data on particular quality measures are often used to gauge provider or practice performance against standards or goals. Results may be used in setting priorities for a practice or health system or to evaluate physician and group performance. Reports are also used to identify inaccuracies in data capture that in turn can be used to design improvements in workflow to address the inconsistencies. The practices also use reports to monitor patients with certain conditions, such as diabetes, to ensure that those patients are receiving recommended care. Increasingly, quality reports are being used in the management of preventive care. For example, reports on immunizations are used to identify trends in rates of immunizations as well as individual patients that are behind on their immunizations.

The practices we visited noted that they regularly report quality data to external entities such as public and private payers. Practices use data from their EHRs for this reporting, but it requires manually extracting and analyzing the data to construct the reports which are typically submitted through a portal external to their EHR. This process is burdensome to practices but is often tied to incentive payments and so they continue to participate. According to key informants, a lack of alignment of measure specifications can also create burden. One health system has been planning a customization of their EHR which would incorporate a prompt for the lead risk assessment questionnaire and/or blood lead testing at specified WCVs. An EHR customization like this is designed to increase the practice's rates for these preventive services, and can also increase the consistency with which those data elements are captured in the EHR. However, the age range guidelines for these measures vary between the U.S. Centers for Disease Control and Prevention (US CDC) and CMS. The discrepancy has created confusion and has delayed the completion of the customization.

## Reporting to Practices

While reports are very often produced at the practice or system level, practices may also receive reports from other sources such as the statewide immunization registry (ImmPact). Several practices indicated that they receive reports from payers on particular quality measures as a method for ensuring adherence to standards of care mandated through the payer's provider agreements. Practices may also receive quality measure reports as part of quality improvement initiatives, and reports generated from MaineCare claims which in some cases are used to calculate incentive payments for meeting quality of care standards.

## Limitations of Quality Reports

During our site visits, we learned that reports are only useful to providers if the data is perceived as accurate and if the measures are considered meaningful to the provider's practice. Provider perceptions of the usefulness of reports vary according to factors such as familiarity with the data source and analytic process; integrity or influential power of the organization that promotes the measure (the measure steward); relevance to current practice issues experienced by local providers; and confidence that a provider's behavior can improve the results of the measure, or that such a change will positively affect the health outcomes of their patient panel.

We learned that quality reporting requires effort, commitment, and ongoing support of providers. In addition, health system registries do not contain all the data found in an EHR. Health systems, often (but not always) in collaboration with practices, determine which measures to focus on based on their unique priorities and then build their registries accordingly. Therefore, registries contain limited data sets and sometimes do not contain all the data that an individual practice would like to collect or analyze. For example, providers at one practice were not able use the registry to look at more than one past visit. That practice is considering features of HIN that could serve as registry functions for their practice in the future.

## CONCLUSION

### Implications for the To-Be—Building an HIT Infrastructure

This As-Is Assessment allowed us to develop a picture—as of June 2012—of the HIT environment in Maine as it relates to the use and exchange of EPSDT and other clinical data between practices and health systems, HealthInfoNet, and the State of Maine. Much of what we learned will inform the “To-Be” planning for implementation of Maine Tasks B-1 and B-6, as described in previous sections.

### Data Exchange Required for Measure Calculation

We learned important details about existing data exchange connections between practice EHRs, health system registries, and HIN that are relevant to our plans to build an integrated HIT infrastructure. For example, the exchange of data between health systems and HIN occurs in real time versus in a nightly or weekly batch data

flow, which is an important characteristic to understand. If the data feed occurred in batches, sequencing of data collection would be required to make sure the data were complete at the time of collection. Because the exchange is real time, we can be reasonably confident that HIN reflects the most up to date data and this greatly simplifies the process for measure calculation. However, we also learned that while the real time flow of data to HIN adds value for measure calculation, HIN may not necessarily include all data elements required for calculation of child health measures. Furthermore, we must understand how and to what extent historical data exist in HIN's Clinical Data Repository, and assess the implications for measure calculation especially pertaining to reporting requirements where a look-back period is pre-defined.

### Details about Data Elements

The protocol used to guide this As-Is Assessment included a list of 30 data elements that are required—in various combinations—to calculate the measures in the IHOC Pediatric Measures Master List that are expected to be collected through electronic linkages between the information systems at health systems and/or practices, HIN, and the State of Maine (as opposed to through claims or state registry systems). During this assessment, we learned three important lessons about these data elements.

First, the level of effort required to fully understand the details of how these data elements are entered, stored, and exchanged is significant. As described in previous sections, understanding these details and the variations within and across practices and health systems is critical to developing a successful plan for piloting the calculation of measures. However, because practices and health systems are constantly changing their clinical workflow processes and data management practices, these details will need to be assessed as close to implementation as possible. Once pilot measures are selected, IHOC will conduct a thorough assessment of the specific data elements required to calculate them. This assessment will also include a determination of whether and to what extent historical data exists for the pilot measures. Child health quality measures are constructed to measure data for a specific reporting period, rather than for a moment in time. Therefore, we will need to determine if adequate historical data exists in HIN, or if a waiting period is required to allow the data to populate the Clinical Data Repository.

The second important learning about data elements is that the practice's EHR alone does not constitute a complete medical record, and so we cannot consider the EHR as one source of all data elements required for measure calculation. While not all data elements exist in the EHR itself, the elements do exist in other places such as patient registration and billing systems, hospital EHRs, outpatient EHRs at other practices, laboratory and pharmacy data systems, and state registries. We also learned that HIN gets feeds from some of these other data sources. The scope of measures that can be calculated could be broadened significantly if an HIT infrastructure is developed that can access a more dynamic data set with potentially fewer limitations for measure calculation than a single EHR alone. However, we will need to determine if receiving data from multiple sources presents a measurement challenge of duplicative or contradictive data.

Finally, we learned that the ability to report on measures that require payer information (for example, MaineCare eligibility status) is limited. MaineCare has several federal reporting requirements that include identification of continuous eligibility during the specified reporting period to build the denominator of the measure. While some information systems (patient registration systems, some state registries, and HIN) contain information about a patient's MaineCare eligibility status, it is usually captured as a yes/no and does not provide the information about ongoing coverage required for these measures. Therefore, a method for identifying the cohort

and matching individuals within these information systems will need to be developed, until ongoing coverage can be captured in more automated ways.

### **Variability**

Perhaps most importantly, we learned that while there are many similarities within and across practices and health systems regarding their information systems and methods of capturing data, it is important to recognize that there is variability in how data are entered into an EHR and that variability creates challenges when collecting data for measure calculation. As described in previous sections, variability exists within and across practices and health systems, including from individual to individual. Variability can stem from differences in clinical workflow and the standardization of data entry; the use of different information systems and/or the customization of the same information system; and inconsistencies in how data are coded and recognized electronically. As we move forward with planning and implementation, all of these aspects of variability will need to be considered.

### **Open Questions**

During the document review process for this As-Is report, several open questions were identified by participants, IHOC stakeholders, and work group members. These questions primarily revolve around the interaction between practices and health information systems in Maine, and how those interactions can be leveraged to support collecting and reporting child health measures for a variety of purposes. These open questions will be investigated further to inform “To-Be” planning and implementation of Maine IHOC Tasks B-1 and B-6 going forward.