

EHR Reporting Program Draft Developer Measures

HITAC Meeting
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Overview

- Timeline
- Domains and measure concepts
- Cross-cutting issues affecting measure specifications
- Example of detailed specification for public health measures (e.g., numerators, denominators, timing)
- Appendix slides for Task Force meetings
 - Detailed specifications for all other core measures and potential future measures
 - Lists of potential measures considered but not selected
- ***HITAC and task force need to focus on improving and optimizing these draft measures, while other measures can be considered in future iterations***

Timeline

- September 14, 2021: End of 60-day public feedback period on draft developer-reported measures
 - Public comment information can be found on the Urban Institute's website on July 14, 2021: <https://www.urban.org/policy-centers/health-policy-center/projects/ehr-reporting-program>
- December 2021: Urban/HTS to finalize measures
- 2022: Measures likely introduced in rule-making
- 2024-2025: Measures likely take effect

Draft Domains and Measure Concepts



- **Patient access**
 - Use of different methods for access to electronic health information
 - Use of 3rd party patient-facing apps
 - Collection of app privacy policy
- **Public health information exchange**
 - Sending vaccination data to Immunization Information Systems (IIS)
 - Querying of IIS by health care providers using certified health IT
- **Clinical care information exchange**
 - Viewing summary of care records
 - Use of 3rd party clinician-facing apps
- **Standards adoption and conformance**
 - Use of FHIR profiles by clinician-facing apps (adjusted by #patients and #apps)
 - Use of FHIR profiles by patient-facing apps (adjusted by #patients and #apps)
 - Use of FHIR bulk data

Measurement Domain: Patient Access



• Motivation

- Assess the implementation of health IT provisions of the 21st Century Cures Act by providing insight regarding whether individuals are electronically accessing data and whether they are taking advantage of 3rd party apps to do so.
 - Currently, only have insights into apps that are in the public galleries which likely represent a subset of apps. And we have no insight into the usage (authorization) of those apps.
 - Little information available to guide ONC/OCR regarding privacy policies among patient-facing apps
 - Applies to certification criteria [\(e\)\(1\)](#) and [\(g\)\(10\)](#)
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- Draft measures address the following questions:
 - How are patients accessing their health information electronically (i.e., patient portal and 3rd party apps)? To what extent is usage sustained by method?
 - To what extent are 3rd party patient-facing apps registered via (g)(10) being used? How many apps have sustained usage (vs. drop off after download)?
 - To what extent do registered 3rd party patient-facing apps include comprehensive, publicly available privacy policies?

Measurement Domain: Public Health Information Exchange

- Motivation
 - Helps ONC assess health care providers engagement in public health exchange beyond CMS Promoting Interoperability Program measurement, which would be critical during a pandemic or other public health emergencies.
 - Data not typically available to CDC; existing survey data limited
 - Applies to certification criteria (f)(1)
- Draft measures address the following questions:
 - How frequently are providers using their certified health IT to send immunization/vaccine information to IIS?
 - How frequently are providers using their certified health IT to query IIS for immunization forecasts and histories?

Measurement Domain: Clinical Care Information Exchange

- Motivation
 - Provides insight as to whether users are using certified health IT to view and use data received from external sources.
 - Provides insight into the availability and use of clinician facing apps
 - Applies to certification criteria [\(b\)\(1\)](#), [\(b\)\(2\)](#), and [\(g\)\(10\)](#)
- Draft measures address the following questions:
 - Use of clinical data received from external source
 - Is clinical data received using certified health IT being used and viewed?
 - Of the total number of unique summary of care records received using certified health IT, how many of those were parsed and integrated and then viewed by end users/clinicians?
 - Usage of clinician facing 3rd party apps
 - How many clinician-facing apps are registered via (g)(10) and to what extent are these apps used?

Measurement Domain: Standards Adoption and Conformance

- Motivation
 - Provides a measure of the use of FHIR profiles which can help guide updates to US Core and provide insights into volume and types of data used by app users
 - Assess the implementation of health IT provisions of the 21st Century Cures Act by providing insight into usage of bulk FHIR overall, and for different use cases
 - Applies to certification criteria [\(g\)\(10\)](#)
- Draft measures address the following questions:
 - What FHIR Core and non-Core profiles are requested by providers and consumers when using apps?
 - How frequently are bulk FHIR transactions occurring overall and by type?

Draft Measure Concepts for Future Consideration

- Measurement Domain: Public Health Information Exchange
 - Extent to which data is being submitted to public health agencies via third-party apps (e.g., eCR Now) or APIs
- Measurement Domain : Patient Access
 - Extent to which 3rd party patient-facing app users are using write-back functionality (patient-level measure), OR
 - Number of patient-facing apps with users that are using write-back functionality (app-level measure)
- New Measurement Area: Data Quality and Completeness
 - Completeness of key socio-demographic and geographic data needed for patient matching and health equity efforts e.g., race/ethnicity, DOB, address, name, gender, and mother's maiden name.

Cross-Cutting Issues for Discussion



- **How frequently should reporting occur (e.g., annually, 2x a year or quarterly)?**
- **How should the results be reported?**
 - Are proposed sub-groups appropriate (e.g., demographic characteristics, setting)?
 - What are the implications of including measures that require data from developer's customers (e.g., reporting by characteristics)?
 - Does the level of reporting make sense (e.g., client, product- vs. developer-level)?
 - Should reporting consist of distributional estimates (which show variation within developer) vs. a single value per developer?
- **What is the appropriate look back period for numerator/denominator? For example, active patients seen within the last 12 or 24 months.**
- **Are other aspects of the numerators and denominators accurately specified?**
- **How feasible is it for developers to access, analyze, and report data, particularly for capturing subgroups? If not feasible today, what could be feasible by the timeframe for data collection in several years?**
- **How to address potential interpretation challenges?**
 - Degree to which measures reflect quality rather than quantity or volume? More is not necessarily better for volume-based measures.
 - Extent to which measures reflect characteristics of geographic areas or clients (e.g., providers, app developers) as opposed to product itself?
- **Is there any potential burden on users of certified health IT? Would reporting unduly disadvantage small / startup developers?**
- **Value of the measure to provide insights on interoperability, including to multiple stakeholders?**

Specification Example: Public Health Information Exchange Measures

Measures	Reporting elements and format
<p><u>1. Vaccinations/Immunizations</u>: Percentage of vaccinated individuals whose immunization data was sent electronically to immunization information system (IIS)</p> <p>Num: Number of individuals whose immunization information was electronically submitted to the registry (e.g., via HL7v2.5.1 transactions)</p> <p>Den: Number individuals with an immunization administered</p>	<p>For each measure, collect numerator and denominator counts by:</p> <ul style="list-style-type: none"> • State • State and setting (e.g., inpatient vs. outpatient) • State and age group (adults, adolescents, child/infant) <p>Require developers to report numerators and denominators, not just percentages</p> <p>EHR developer would need to construct the measure at the client-level, then roll-up into aggregated groups.</p>
<p><u>2. Immunization Forecasts</u>: Percentage of IIS queries made per individuals with an encounter</p> <p>Num: Number of immunization forecasts and histories received from IIS into EHR</p> <p>Den: Number of individuals with an encounter</p>	<p>Quintiles may not be of value for these measures because (1) would provide only variation within developers that would not be comparable across developers; (2) would result in reporting of many estimates by state and subgroups that may be burdensome to generate.</p> <p>Frequency of reporting (e.g., annually) and look back period (e.g., in the past calendar year) for numerators and denominators to be determined.</p>

Public Health Information Exchange Discussion

- Which individual characteristics should we collect the measures by? Would health IT developers have access to data on these patient characteristics (e.g., age)?
- Queries via portals would be excluded from measure #2. To what extent is this a limitation?
- For measure #2, should the denominator be “encounters”, E&M visits, or vaccinated individuals?



EHR Reporting Program Appendix: Measure Specifications

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Potential Future Measure: Submission of data to public health via third-party apps or APIs

Motivation: Helps us understand the extent to which APIs are used to support transmission of public health data to public health agencies

Measure	Reporting elements and format	Questions
<p>Num: Number of EHR installations submitting data to PHAs using APIs or third-party apps (i.e., eCR Now) related to (f)-criteria:</p> <ul style="list-style-type: none"> • Immunizations (f)(1) • Reportable labs (f)(3) • Syndromic surveillance (f)(2) • Electronic case reports (f)(5) • Antimicrobial use and resistance reporting (f)(6) <p>Den: Number of health IT installations</p>	<p>Gather numerator and denominator counts by:</p> <ul style="list-style-type: none"> • State • State and setting • State and age group for immunizations only (adults, adolescents, child/infant) 	<p>Forward looking measure? The only FHIR API that exists now is one for electronic case reporting.</p> <p>Should we ask about APIs broadly (SOAP and FHIR) or FHIR only?</p>

Reporting Out Example: Transmitting Vaccine Data to IIS

% of Vaccines administered that are electronically submitted to IIS

		Overall	By Age Categories			By Setting	
EHR Developer		National Avg	Adult	Adolescent	Infant/Child	Inpatient	Outpatient
A	numerator	50	20	10	20	NA	50
	denominator	100	50	25	25	NA	100
	Percentage	50%	40%	40%	80%	NA	50%
B	numerator	600	400	75	125	50	550
	denominator	1000	600	100	300	100	900
	Percentage	60%	67%	75%	42%	50%	61%
National (across developers)	numerator	650	420	85	145	50	600
	denominator	1100	650	125	325	100	1000
	Percentage	59%	65%	68%	45%	50%	60%
Developer B: Alaska	numerator	60	40	10	10	20	40
	denominator	100	60	20	20	40	60
	Percentage	60%	67%	50%	50%	50%	67%

Other Public Health Information Exchange Measures Considered

- “Write” measures e.g., number of individuals for whom there was a write-back eCR, eLR, immunization
- How long it took the EHR developer to onboard to the IIS
- Number of different registries the certified health IT is connected to
- Percent of individuals who had information (outside immunizations) sent to a public health agency e.g., registry reporting, syndromic surveillance, case reporting, electronic lab reporting
- Bulk export FHIR for public health reporting
- Number or percent of individuals with available social determinants of health (SDOH) data
- Percent of immunization gaps that are addressed

Patient Access Measures

Measures	Reporting elements and format
<p>1. . <u>Patient access to electronic health information</u>: Percentage of patients who access their electronic health information using different methods and continue using those methods</p> <p>Num #1: Number of patients that accessed their electronic health information:</p> <ul style="list-style-type: none"> • 1a. Via 3rd party app only (authorization as a proxy for use) • 1b. Via patient portal or app given by health care provider for portal use only • 1c. Neither (did not use patient portal or authorize access via an app) <p>Num #2: Number of individuals that accessed their data <i>more than once</i> (i.e., sustained use) by method listed above</p> <p>Den: Number of individuals with an encounter (e.g., active patient)</p>	<p>Report overall and by patient characteristics</p> <ul style="list-style-type: none"> • Age group • individual vs. caregiver • Race and ethnicity <p>Require developers to report numerators and denominators, not just percentages.</p> <p>Aggregated by developer</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

Patient Access Measures



Measures	Reporting elements and format
<p><u>2. Sustained usage:</u> Percentage of 3rd party, registered patient-facing apps with a minimum number of users (i.e, patients who have authorized access to their EHR data) and extent to which those apps continue to be used</p> <p>Num #1: Number of 3rd party registered patient-facing apps with a minimum number of patients who authorized access to their data (by category).</p> <p>Num #2: Number of 3rd party, registered patient-facing apps where majority of users (>50%) did NOT re-authorize app within a given time frame (by categories listed in Num #1)</p> <p>Den: Number of 3rd party patient-facing apps that are registered via § 170.315(g)(10)(III) (Application Registration – Enable an application to register with the Health IT Module’s “authorization server”).</p>	<p>Numerator#1 and #2 reported by following categories: #apps with at least one user; #apps with at least 1000 users; #apps with at least 10,000 users; #apps with at least 100,000 users.</p> <p>Require developers to report numerators and denominators, not just percentages.</p> <p>Numerators Aggregated by developer</p> <p>Possibility of asking developers to report the actual names of registered apps.</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

Measures	Reporting elements and format
<p>3. Privacy policy: Percentage of 3rd party, registered patient-facing apps that include a publicly available privacy policy</p> <p>Screening Questions: Does health IT developer collect whether 3rd party patient-facing apps have a publicly available privacy policy as part of the registration process? If Yes, proceed to report on Num#1.</p> <p>Num #1: Number of registered, 3rd party patient-facing apps that include a publicly available privacy policy</p> <p>Num #2: Number of registered, 3rd party patient-facing apps that include publicly available privacy policies that align with 5 elements described in the 21st Century Cures Act: Interoperability, Information Blocking, and the ONC Health IT Certification Program Rule*</p> <p>Den: Number of patient-facing apps that are registered via § 170.315(g)(10)(III) (Application Registration – Enable an application to register with the Health IT Module’s “authorization server”).</p>	<p>Require developers to report on screening question. If able to answer screening question, require developers to report numerators and denominators, not just percentages.</p> <p>Aggregated by developer</p> <p>For numerator #2 option to include “Do not know”. Numerator #2 could also be proposed as a future measure.</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

*<https://www.federalregister.gov/documents/2020/05/01/2020-07419/21st-century-cures-act-interoperability-information-blocking-and-the-onc-health-it-certification#p-1934>

Reporting Out Example: Usage of Patient-Facing Apps

Developer A

Minimum # users	#apps	% of total registered apps (n=11)	#Apps where majority of users didn't reauthorize	% of total registered apps (n=11)
1	10	91%	4	36%
1000	8	73%	2	18%
10000	5	45%	1	9%
100000	1	9%	0	0%

Developer B

Distribution of users by app	#users	#users that didn't re-authorize	Percentage of users that didn't reauthorize
App 1	100,000	20,000	20%
App 2	90,000	60,000	67%
App 3	5,000	3,000	60%
App 4	4,000	2,000	50%
App 5	1,000	500	50%
App 6	700	500	71%
App 7	500	300	60%
App 8	40	20	50%
App 9	20	10	50%
App 10	2	1	50%
App 11	-	-	NA
Across all apps	201,262	86,331	43%

Patient Access Measures Discussion

- What are the appropriate categories for number of users and reauthorized users?
- Does assessing whether patients accessed their data *more than once* during the calendar year (i.e., sustained use) provide valuable insights beyond looking at access by method? Similarly, does looking at the number of apps that were not reauthorized by a majority of users provide useful insights into apps that are valued?
- What is the appropriate threshold for the number of times a patient should access their data within a 12-month period to be considered “sustained use”? Is 12 month appropriate for the re-authorization measure or should it be longer (e.g., 18 months)?
- By which patient characteristics should we collect the measures? Would health IT developers have access to data reflecting these characteristics?
 - Currently proposed: age, individual vs. caregiver, race and ethnicity
 - Are the data from EHRs (e.g., race and ethnicity) reliable for reporting?

Potential Future Measure: Patient Access

Measure	Reporting elements and format	Questions
<p><u>Percentage of patients using write-back functionality on 3rd party, registered patient-facing apps</u></p> <p>Num: Number of patients who have used write-back functionality on 3rd party, registered patient-facing app</p> <p>Den: Number of patients who have authorized access to their information via 3rd party patient-facing apps (this number also collected via numerator from first individual Access measure)</p>	<p>We considered an app-level measure as well:</p> <p>Num#1: Number patient-facing apps where write-back is used by a minimum number of users (See categories in Patient Access measure #2)</p> <p>Den: Number of patient-facing apps with minimum number of users (See categories in Patient Access measure #2)</p> <p>The concern is that apps can have vastly different numbers of users, so could skew overall picture of how many patients are using write-back.</p>	<p>How can we better define scope and specificity around write-back? Should it exclude scheduling and administrative matters?</p> <p>If we see very little usage, is it because the API was not enabled to allow individual write-back, or because individuals aren't doing it? How can we differentiate/measure this—looking at apps/APIs that support write back?</p> <p>Do we expect more developers will have write-back on proprietary APIs?</p> <p>We understand many <i>clinicians</i> use write-back on proprietary APIs – should we try to capture that too?</p>

Clinical Care Information Exchange Measures



Measures	Reporting elements and format
<p><u>1. Summary of care records</u>: Percentage of summary of care records viewed by end users/clinicians (break out by parsing/integration of records)</p> <p>Num 1: Number of unique summary of care records received using certified health IT that are viewed by end users/clinicians</p> <p>Den 1: Number of unique summary of care records received using certified health IT</p> <p>Num 2: Number of unique summary of care records received using certified health IT that are parsed, integrated and viewed by end users/clinicians</p> <p>Den 2: Number of unique summary of care records received using certified health IT that are parsed and integrated</p>	<p>Viewing rates may differ based on whether data is integrated.</p> <p>Consider one denominator with multiple numerators to capture total number and then those that were parsed and integrated.</p> <p>Require developers to report numerators and denominators, not just percentages.</p> <p>For each measure, collect numerator and denominator counts by setting (e.g., inpatient, outpatient)</p> <p>Aggregated by developer</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

Clinical Care Information Exchange Measures

Measures	Reporting elements and format
<p>2. <u>Clinician-facing apps</u>: Percent of registered, 3rd party clinician-facing apps with active users (as defined by end users/clinicians authorizing access)</p> <p>Num 1: Number of registered 3rd party clinician-facing apps with a minimum number of users (see potential categories/subgroups).</p> <p>Other potential numerators: Average number of apps deployed by customer; or average number of apps by product</p> <p>Den: Count of 3rd party clinician-facing apps that are registered via § 170.315(g)(10)(III)</p>	<p>Authorization of the app is a proxy for usage.</p> <p>Potential numerator categories for users: by average number of end/users/clinicians using each app across a developer; number of users (e.g., at least 1, 10, 100, 10,000, 100,000);</p> <p>Require developers to report numerators and denominators, not just percentages.</p> <p>Aggregated by developer</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

Clinical Care Information Exchange Discussion

- Need definition of end users/clinicians.
- For measure 1:
 - To what extent is this data recorded in activity logs that the health IT developer has access to?
 - What challenges exist due to varying workflows in the viewing of summary of care records?
 - Concern that duplicates would be counted if we do not collect 'unique' summary of care records received.
- For measure 2:
 - How should usage of clinician-facing apps be measured? Do clinicians need to authorize 3rd party apps?
 - What categories should be selected for minimum number of users to provide variation and comparability across developers? Should multiple categories be selected or just one minimum (e.g., 10 users)?
 - Should other numerators be considered (e.g., number of apps deployed by customer and/or product)? Do these provide additional insights of value?

Other Clinical Care Information Exchange Measures Considered

- Connection to national networks
- Time-to-implementation to onboard to a new national network
- Percent of referral or transition summaries viewed by clinicians
- Percent of external data (such as labs, immunizations) incorporated in the EHR
- Percent of clients that can view an integrated encounter list
- Percent of clients that can view an integrated medication list
- Percent of ED notification that are viewed by clinicians/clinical staff
- Percent of ED notifications that resulted in some type of follow-up with the individual by clinicians/clinical staff
- Percent of discharge summaries that are viewed by clinicians/clinical staff
- Percent of discharge summaries that resulted in some type of follow-up with the individual by clinicians/clinical staff
- % of individual matches accepted into the system for query requests to external providers to return specific individual health information

Standards Adoption and Conformance Measures

Measures	Reporting elements and format
<p><u>1. Requests for FHIR profiles by clinician-facing applications:</u> Number and percentage (relative share) of calls for individual Core and non-Core FHIR profiles.</p> <p>Num: Number of calls by clinician-facing registered apps for each distinct FHIR profile (both Core and non-Core FHIR profiles)</p> <p>Den #1: Number of active patients associated with a FHIR call (alt: total number of active patients)</p> <p>Den #2: Number of clinician-facing 3rd party apps that are registered via § 170.315(g)(10)(III) with minimum # users (see measure #2 clinical exchange)</p>	<p>The reported data could be used in combination to create a range of measures that provide indications of the adoption and use of FHIR and associated insight into the relative use of USCDI elements.</p> <p>EHR developer would need to capture the data elements at the client-level, then roll-up into aggregated groups.</p> <p>Normalization of call frequency would be needed to control for bulk FHIR and automatic refresh calls.</p> <p>More than one denominator is appropriate in order to provide insight into (a) the relative share and frequency for individual FHIR Core profile calls amortized over the number of applications in use and (b) the relative share and frequency for individual Core profile calls as a percentage of aggregate calls being made.</p>
<p><u>2. Requests for FHIR profiles by patient-facing applications:</u> Percentage (relative share) of calls for individual Core and non-Core FHIR profiles.</p> <p>Num: Number of calls by clinician-facing apps for each FHIR profile (both Core and non-Core FHIR profiles)</p> <p>Den #1: Number of active patients associated with a FHIR call (alt: total number of active patients)</p> <p>Den #2: Count of patient-facing 3rd party apps that are registered via § 170.315(g)(10)(III) with minimum #users (see measure #2 patient access)</p>	<p>These measures can be reported as counts and distributions including within quintiles (across clients)</p> <p>Require developers to report numerators and denominators, not just percentages.</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

Standards Adoption and Conformance*

Measures	Reporting elements and format
<p>3. <u>Number of calls using SMART/HL-7 FHIR bulk data access:</u> Usage of SMART/HL7 FHIR bulk data access to enable data export in enterprise-to-enterprise transactions.</p> <p>Num #1: Number of SMART/HL-7 FHIR bulk calls across EHR installations.</p> <p>Num #2: Number of SMART/HL-7 FHIR bulk calls related to export data on all individuals across EHR installations</p> <p>Num #3: SMART/HL-7 FHIR bulk calls related to export all data for individuals within a specified group (e.g., accountable care cohort, research group, health plan members)</p> <p>Num #4: Number of SMART/HL-7 FHIR bulk calls related to full system-level export of all resources</p> <p>Den: Number of distinct EHR installations</p>	<p>EHR developer would need to construct the measure at the client-level, then aggregate.</p> <p>The functionality to measure this is not currently available.</p> <p>The numerator could be artificially inflated due to technical or configuration factors.</p> <p>These measures can be reported as counts and distributions including within quintiles.</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

*Mandl, K.D., Gottlieb, D., Mandel, J.C. et al. Push Button Population Health: The SMART/HL7 FHIR Bulk Data Access Application Programming Interface. npj Digit. Med. 3, 151 (2020). <https://doi.org/10.1038/s41746-020-00358-4>

Reporting Out Example: Usage of FHIR Profiles

	Developer A				Developer B			
	#calls among provider-facing apps (read)	#Patients	#Apps	Rate (#calls/users/apps)	#calls among provider-facing apps (read)	#Patients	#Apps	Rate (#calls/users/apps)
	US Core AllergyIntolerance Profile	2,700	30	1	90	10,200	20	5

US Core Allergy Intolerance Profile (across clients)	Developer A Rate (#calls/users/apps)
Top Quintile	150
2nd Quintile	120
3rd Quintile	90
4th Quintile	60
Bottom Quintile	30

Standards Adoption and Conformance Discussion

- To what extent do bulk and automatic refresh calls distort the ability to interpret these measures?
- Does “commonly requested” or frequency of calls for specific profiles depend upon what an application is programmed to do and not necessarily reflect the action of a clinician or individual?
- Do specific EHR technologies make all FHIR resources available?
- Would it be useful to refine bulk FHIR transactions to groups/population exports as well as all data exports?
- What are the appropriate thresholds for number of individual and number of clinician users?

Other Standards Adoption and Conformance Measures Considered

- FHIR-based vs. Proprietary Clinician-facing 3rd party apps registered to certified API technology
- FHIR-based vs. Proprietary patient-facing 3rd party apps registered to certified API technology
- Use of structured data within document-based exchange as measured by CCDA Scorecard results across EHR installations
- Number of Applications a developer has registered
- Number of conformance errors in the CCDA
- Use of FHIR APIs that are in draft USCDI but not yet final (for both individual and provider-facing APIs).
- Percentage of records sent via CCDA vs FHIR

Potential Future Measure: Data Quality and Completeness

Measures	Reporting elements and format
<p><u>1. By data element, percent of data complete (e.g., not missing).</u></p> <p>Num: For each data element selected, number of active patients with complete information for that data element.</p> <p>Den: Number of individuals with an encounter (e.g., active patient)</p>	<p>Data elements for consideration: race/ethnicity, DOB, gender, address, mother's maiden name, first name, last name. Others?</p> <p>Require developers to report numerators and denominators, not just percentages.</p> <p>Aggregated by developer</p> <p>Potential subgroup by client (reported out by quintiles)</p> <p>Frequency of reporting and look back period for numerators and denominators TBD.</p>

Data Quality and Completeness Discussion

- To what extent do the provider/client processes drive the capture of these data?
- Should distinctions be made between data captured within a system/organization and those from external sources?
- To what extent does the regional/local characteristics for information exchange affect this measure?
- Could duplicate measures be counted and distort this measure?
- To what extent does the use of third-party applications/middleware shape the performance relative to this measure?