3 June 2016

Karen DeSalvo, MD
National Coordinator for Health Information Technology
Department of Health and Human Services
200 Independence Avenue, SW
Washington, DC 20201

Dear Dr. DeSalvo,

RE: Office of the National Coordinator for Health Information Technology (ONC)
Medicare Access and CHIP Reauthorization Act of 2015 (MACRA)
Request for Information Regarding Assessing Interoperability for MACRA

Thank you for the opportunity to comment on this RFI. We believe it is vital to focus on assessment of interoperability and interoperation. This is a long-ignored subject that should ultimately serve to validate the billions of taxpayer $$$s expended to achieve the objective of ubiquitous interoperability/interoperation of EHR/HIT systems and health data/records.

Interoperability does not just facilitate one way (single direction) exchange, but rather the ability for software interoperation (two or more ways) across two or more EHR/HIT systems.

Measuring interoperability is much more than counting transaction volumes (quantitative assessment) but rather it's about achieving much more (full qualitative assessment) – ultimately and consistently yielding gold nuggets from an avalanche of often irrelevant exchanged data fragments. The true "gold nuggets" in health data/records must be readily discoverable, bear evidence of truth, be shown in full context, be fully relevant (to the condition/task at hand) and be immediately actionable. This is where interoperability and interoperation come to full fruition.

Our comments follow. Thank you for your consideration.

Regards,

Gary Dickinson
Director, Healthcare Standards, CentriHealth
Co-Chair, Health Level Seven (HL7) Electronic Health Record (EHR) Work Group
Co-Facilitator, HL7 EHR Interoperability Work Group

[Submitted electronically.]

"ONC is issuing this RFI is to solicit input on the following three topics...
"(1) Measurement population and key components of interoperability that should be measured;
"(2) Current data sources and potential metrics that address section 106(b)(1) of the MACRA; and
"(3) Other data sources and metrics ONC should consider with respect to section 106(b)(1) of the MACRA or interoperability measurement more broadly."

"Section 106(b)(1)(B)(ii) of the MACRA defines interoperability as the ability of two or more health information systems or components to:
"(1) exchange clinical and other information and
"(2) use the information that has been exchanged using common standards to provide access to longitudinal information for health care providers in order to facilitate coordinated care and improve patient outcomes."

A. Interoperability and Interoperation

Interoperability is the term used yet interoperability in this context seems to involve one-way transmission of health data/records (source → receiver), as identified by the focus on exchange/use. EHR/HIT systems that are interoperable should in fact be capable of interoperation as a two-way engagement of software functionality (source ←→ receiver). Consider:

Interoperability/interoperation is engaged...		
Collect (at source of truth)	**Share**	**Use** (if fit and trusted)
Human, System/Device, Enterprise 1	One Way → ← Both Ways →	Human, System/Device, Enterprise 2,3,4...
← Single System domain (if universal, ubiquitous) →		
Human (User) 1	Transmitting to → ← Interacting with →	Human (User) 2,3,4...
System/Device 1	Transmitting to → ← Interoperating with →	System/Device 2,3,4...
Enterprise 1		Enterprise 2,3,4...

B. Basic Interoperability Assessment 1 – Across Point(s) of Exchange

Whereas...

"ONC intends to consider metrics that address the specific populations and aspects of interoperable health information as described above and in section 106(b)(1)(B) of the MACRA. Thus, ONC plans to assess interoperability among 'meaningful EHR users' and clinicians and health care providers with whom they exchange clinical and other information — their exchange partners. Note that the exchange partners do not have to be 'meaningful EHR users' themselves. Additionally, ONC plans to measure interoperability by identifying measures that relate to both exchange of health information as well as use of information that has been exchanged using common standards. More specifically, ONC seeks to measure the interoperable exchange and use of information by examining the following: electronically sending; receiving; finding (e.g., request or querying); integrating (e.g., incorporating) information received into a patient's medical record; and the subsequent use of information received electronically from outside sources."

We believe...

Interoperability Assessment measures (at minimum)...		
Collect (at source of truth)	**Share**	**Use** (if fit and trusted)
Input – Health data/records as collected (originated/retained)	= (identical) or ≠ (not)	Output – Health data/records as received, integrated and ready for use
What originated (began as)		What transpired (resulted in)
What the human (author) sees		What the human (user) sees

↑ **Assessment Measures and Allows Comparison** ↑

C. Basic Interoperability Assessment 2 – Round-trip Exchange

This assessment is based on a simple round-trip exchange of health data/records...

System A	Exchange	System B
1. Extracting from source health record entries, sends a clinical payload using any single or combination of exchange artifact(s)	→ → →	**2.** Instantiates payload in health record entries
4. Instantiates payload in a new set of health record entries	← ← ←	**3.** Extracting directly from those health record entries, sends the same clinical payload back using any single or combination of exchange artifact(s)
Assessment: Is there any loss of content, context or fidelity when comparing original System A record entries to System A record entries resulting from the round-trip?		

Other Patterns: 1) Reverse Roles of Systems A & B 2) System A → System B → System C → System A
Exchange Artifact(s): e.g., HL7 or NCPDP messages, HL7 CDA/CCDA documents, HL7 FHIR resources

[Note that Assessment 2 was developed in collaboration with the Health Record Banking Alliance (HRBA) and members of the US Technical Advisory Group (TAG) to ISO TC215.]

D. Interoperability is Purpose-Based and Driven

Interoperability can only be described, measured and achieved if first understood as to its scope (what) and purpose (why).

What: are we striving to make interoperable?
1) Personal health and healthcare data/records?

2) Provider healthcare data/records?
3) Integration/incorporation of data/records received from an external source?
4) Health data/record flows: point to point and/or end to end?
5) Data/record flows integral to process (work) flows?

Why: for what purpose(s)?
6) To support primary use: clinical care, interventions and decision-making?
7) To support secondary use: most everything else?
8) To ensure interoperation across functions of two or more EHR/HIT systems?
9) To ensure integrity of the clinical process, of the healthcare delivery process?
10) To ensure patient safety?
11) To render a facsimile representation of data/records (e.g., fax, photocopy, PDF) that is human readable?
12) To render a computable representation of data/records that is software process-able?
13) To render a precise copy of the original source provider health record: i.e., provider business and evidentiary record for legal purposes?

E. "Fitness for Use" is the Vital Achievement of Interoperability/Interoperation

Achievement of interoperability/interoperation must ensure fitness for use (purpose) at each ultimate point of health data/record access/use. The following table shows the challenging paradigm of data/record exchange between heterogeneous systems and the risk to fitness (for use/purpose) posed by data transformations. Double transformations often occur during the course of exchange when health data/record content is transformed to/from exchange artifacts – once by the source/sending system and once again by the receiving system. Exchange artifacts include those required in US MU and MACRA regulations, e.g., HL7 v2 messages, NCPDP messages, HL7 CDA/CCDA documents and now HL7 FHIR resources. See also graphics at Appendices A and B.

Use	Purpose	Health Record Content Exchange			Post Exchange Fit for Use/Purpose?
		Source	→ → →	Receiver	
Primary	Clinical Care, Interventions and Decision Making	Without Transformation (maintains/ensures fidelity to source)			**YES**
		With Transformation(s)			**Often NO**
Secondary	Most Everything Else	With Transformation(s)			**Often YES**

F. Interoperability has a Source of Truth and Anchor Point

The source of truth is content captured at the point of health data/record origination. This is the anchor point for the chain of trust and is crucial to the achievement of interoperability. There can be no dispute there. For primary use – clinical care, interventions and decision-making – the source of truth is unaltered source health data/record content. The receiving provider will first and always trust (rely on) this direct evidence of clinical facts, findings and observations.

Data integrity (including fidelity to source) is fundamental to all aspects of interoperability/ interoperation, clinical integrity and most importantly, patient safety. From the perspective of the end user, the chain of trust starts at the point of health data/record origination/capture and continues to each point of access/use, traceably and without interruption.

If not anchored to the source of truth, interoperability assessment is meaningless.

G. Standards Focused on EHR/HIT System Functionality and Trusted End-to-End Information Flow as the Basis for Interoperability

There is a strong case to be made for trusted end-to-end health data/record management (in the form of EHR/HIT system functionality) – as the basis for achievement of interoperability/interoperation – and thus interoperability assessment. This is reflected in key US and international standards, such as ISO/HL7 10781 Electronic Health Record System Functional Model (EHR-S FM) Release 2 (2015), ISO 21089 Trusted End-to-End Information Flows (first in 2004, now an ISO Draft Technical Specification (DTS), preparing for ballot this summer), and the HL7 FHIR Record Lifecycle Event Implementation Guide (FHIR RLE IG).

ISO/HL7 10781 EHR-S FM is a key reference for national and regional EHR adoption programs around the world, for EHR system developers and EHR system procurements. EHR-S FM R2 is available as "free IP" from HL7: http://www.hl7.org/implement/standards/product_brief.cfm?product_id=269

Since its initial ballot and publication by ISO TC215 in 2004, ISO 21089 Trusted E2E has stood as a key reference for interoperability of health data/records across EHR/HIT systems, encompassing data/record lifespan with intervening lifecycle events. [ONC has been forwarded a copy of ISO DTS 21089 for consideration in context of this RFI and other ONC initiatives. Permission for this purpose of use was granted by Lisa Spellman, AHIMA and ISO TC215 Secretariat. This copy is not to be circulated outside ONC without further permission.]

With the advent of HL7 Fast Health Interoperable Resources (FHIR), there has been a keen interest in showing how health data/record management requirements of ISO/HL7 10781 EHR-S FM and ISO 21089 Trusted E2E can be fulfilled in FHIR implementations. For this purpose, the FHIR RLE IG was developed: http://hl7.org/fhir/ehrsrle/ehrsrle.html

The HL7 FHIR RLE IG was balloted and published as part of FHIR DSTU-2 in September 2015.

H. Interoperability that Isn't

Under Meaningful Use (2011, 2014 and 2015 Editions), we've well demonstrated that a health data/record exchange scheme of standards-based messages and documents across multiple disparate EHR/HIT systems often achieves something far short of integration, interoperability or interoperation. These exchange artifacts are routinely created as odd assemblages of fragmented, disjoint data sets/elements lacking clinical context, chronology, consistency, useful classification and comparability. (For example, observe the typical live mash-up of CCDA-based patient summaries from multiple disparate sources inbound to a EHR system, subject to review and interpretation by a clinical user.)

Given the ONC Interoperability Roadmap and the assessment strategy outlined in this RFI, there is scant evidence that these thriving points of failure will soon be overcome, but at least measurement is likely to shine intense light on current shortcomings of the MU (and now MACRA) exchange schemes.

I. Interoperability via Transformation and Fragmentation?

Substantial amounts of health data/record content are now captured – at the point of service/point of care – and retained as source content in integrated provider EHR/HIT systems. This data is immediately available and seamlessly interoperable with a broad range of other information within that domain. The

essential qualities of truth are established and the trust decision is most always affirmative. This is the case BEFORE exchange occurs.

We then take that same information and rend it from its integrated and interoperable habitat – slicing, dicing, fragmenting and transforming source health data/record content into the form and format required for the standards-based exchange artifact. Structured content becomes unstructured and vice-versa, data types are transformed, coded values are mapped (often incorrectly, or even if correctly, losing important context) into the classification conventions of various external code/value sets and vocabularies. Code and value set derived data is mapped one to many and many to one. Some source data attributes lack corresponding attributes in the exchange artifact and must be dropped. Some codes have no equivalent value and are not included. [See table at Appendix B.]

In patient summary oriented exchange artifacts, data relationships are often sundered. For example, clinical content, chronologies, correlations, trends and relationships between encounters, problems, assessments, clinical decisions, diagnoses, orders, medications, results, diagnostics, interventions, observations, therapies and care plans are lost or become unrecognizable.

And so far we've only described what happens on the source/sending side of exchange. On the receiving side, all of the above slicing, dicing, fragmentation and transformation occurs once again, as receiver health data/record are populated with content from the exchange artifacts.

It is a simple fact that transformations to/from exchange artifacts often create (introduce) alterations, omissions and errors in health data/record content. Data items that were integrated and seamlessly interoperable in the source system are no longer so. Data once fit for primary (clinical) use may now only be fit for secondary use (or maybe not). [See graphic at Appendix A.]

As an industry we've also demonstrated that in practice, standards-based exchange artifacts mostly yield to the lowest common denominator benchmark. This has proven sufficient to support some very limited health data/record secondary uses but not primary use (clinical care, interventions and decision-making).

Health data/record content fragmentation, transformation and loss of context are substantive barriers to interoperability and thus are crucial areas of focus to any serious attempt at interoperability assessment.

Questions and Responses

Question 1a
Should the focus of measurement be limited to ''meaningful EHR users,'' as defined in this section (e.g., eligible professionals, eligible hospitals, and CAHs that attest to meaningful use of certified EHR technology under CMS' Medicare and Medicaid EHR Incentive Programs), and their exchange partners?

Measurement should be limited to health data/record interoperability/interoperation but not just to "meaningful EHR users".

Question 1b
Alternatively, should the populations and measures be consistent with how ONC plans to measure interoperability for the assessing progress related to the Interoperability Roadmap?

This would create a distinction without a difference – unless it can be shown that there are specific interoperability requirements that apply to one category and not the other. We don't believe this is so and thus the interoperability measures should be the same.

Question 2
How should eligible professionals under the Merit-Based Incentive Payment System (MIPS) and eligible professionals who participate in the alternative payment models (APMs) be addressed?

They should be addressed identically. See response to Question 1b.

Question 3
ONC seeks to measure various aspects of interoperability (electronically sending, receiving, finding and integrating data from outside sources, and subsequent use of information electronically received from outside sources). Do these aspects of interoperability adequately address both the exchange and use components of section 106(b)(1) of the MACRA?

The problem is that the MACRA definition of interoperability is based on the long outdated (1990) IEEE exchange/use definition. The IEEE definition was never intended to describe the interoperability of health data/records nor interoperation of EHR/HIT systems. This definition leaves out the vital source of truth, to which everything downstream (or subsequent) – sending, receiving, finding, integrating, using – must be anchored.

Accordingly, the 2015 ONC Interoperability Roadmap extends the scope of interoperability to "collect, share and use", and thus establishes that the point of collection (capture, origination) is the key source of truth (anchor point) for health data/record interoperability.

Interoperability Assessment (Measurement) follows basic Collect, Share and Use patterns...		
Collect (at source of truth)	**Share**	**Use** (if fit and trusted)
Collect Source Record content →	Share unaltered source data/record content →	Use source data/record content
	Share content transformed: to/from exchange artifact (message, document, FHIR resource) →	Use transformed data/record content
	Share BOTH unaltered and transformed content →	Use source along with transformed data/record content

Question 4a
Should the focus of measurement be limited to use of certified EHR technology?

No. It should be limited to the collection, sharing and use of health data/records but not strictly to certified EHR/HIT technology. See response to Question 1a.

Question 4b
Alternatively, should we consider measurement of exchange and use outside of certified EHR technology?

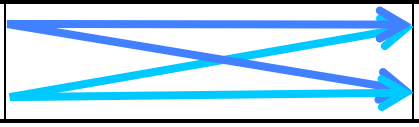
As described in response to Question 3a, it is important to expand measurement beyond "exchange and use" to "collect, share and use" (per the ONC 2015 Interoperability Roadmap).

Indeed the need for complete and accurate interoperability assessment (measurement) is essential and should be (able to be) universally applied.

Question 5
Do the survey-based measures described in this section, which focus on measurement from a health care provider perspective (as opposed to transaction-based approach) adequately address the two components of interoperability (exchange and use) as described in section 106(b)(1) of the MACRA?

The “health care provider perspective” is crucial but will always boil down to truth and trust.

→ Basic Perspective 1: If I use health data/records that were previously collected and shared, I must be assured of their fitness for use and therefore that I can trust the content.

Interoperability encompasses...		
Collect (at source of truth)	**Share**	**Use** (if fit and trusted)
By Human (user, professional) By Software (system, device)		By Human (user, professional) By Software (system, device)

→ Basic Perspective 2: Evidence of truth is the basis for trust...

Truth	As evidence for...	Trust
✔ Identity is evident	→→→	Establishing: • Belief (believability) • As a conscious human conclusion (conviction) • Based on – and manifest in – evidence presented • Always traceable to the “source of truth” Resolving to: • Certainty: sureness • Reliance: placing trust in
✔ Actions are evident: e.g., actions taken to support individual health and provide healthcare		
✔ Who took what action when, where and why is evident		
✔ Action facts, findings and observations are evident		
✔ Source, origination and provenance is evident		
✔ Attestation (signature) is evident (confirming accuracy/completeness)		
✔ Signature/content binding is evident		
✔ Who authored what when, where and why is evident		
✔ Content is un-altered		
✔ Context is evident		
✔ Completeness (or not) is evident		
✔ Update(s) to original content are evident		
✔ Chain of Trust is evident ✔ From source to use		
✔ Transformation(s) are evident (e.g., to/from exchange artifacts)		
✔ Original “Source of Truth” is evident		

Question 6

Could office-based physicians serve as adequate proxies for eligible professionals who are “meaningful EHR users” under the Medicare and Medicaid EHR Incentive Programs (e.g. physician assistants practicing in a rural health clinic or federally qualified health center led by the physician assistant)?

[Not sure how to answer this question as the individual roles in the question (office-based physician) don’t seem to match the roles cited in the example (physician assistant(s)).]

Question 7a

Do national surveys provide the necessary information to determine why electronic health information may not be widely exchanged?

National surveys may offer some perspective on "why electronic health information may not be widely exchanged", but the real issue is where is the demand coming from? Are providers demanding externally-sourced electronic health information before committing to the provision of care, undertaking clinical interventions or making clinical decisions? Is the demand coming from patients, payers, public health agencies, et al, or is the demand coming from government regulators?

And are, in fact, regulators demanding quantity over quality? [See our response to Question 5.] Show us that health data/records are being exchanged (as a numerical statistic) without condition of fitness for use, or in fact, evidence of actual use.

Question 7b
Are there other recommended methods that ONC could use to obtain this information?

The metrics must ultimately be built into certified EHR/HIT systems that collect, share and allow access/use of health data/records (even if the certification is voluntary). Software can account for actions, whether initiated by a human user, rules engine or algorithm, following each progressive step in the chain of trust as health data/records are collected, then shared, then used. Following is an example:

	Health Data/Record Chain of Trust from Point of Collection to each ultimate Point of Use to Support the Affirmative Trust Decision for Primary Clinical Use					
	Flow	Point of Health Data/Record…	(For primary clinical use)	Audit Event	Provenance Event	Original Content
		Source System				

COLLECT	↓	Collection (Capture, Origination)
		• Source of Truth
		• Anchor Point for Chain of Trust
			• Clinical facts, findings and observations are captured
			• Clinical context is captured
			• Provenance is captured:
			  • Who, what, when, where, why
			• Identities are established:
			  • Patient: subject of care
			  • Provider: organization, individual
			  • Author of data/record content
				X	X	Is captured

	↓	Retention	Of Source Record Entry	X		Is retained
	↓	Attestation	• Application of Signature • Bound to data/record content	X	X	Is attested/ signed
SHARE	↓	Transformation	From Source Record Entry to Exchange Artifact: e.g., HL7 message or document	X	X	Is carried
	↓	Transmission	Of Exchange Artifact	X		Is carried
		Receiving System				
	↓	Receipt	Of Exchange Artifact	X		Is carried
	↓	Transformation	From Exchange Artifact to Receiver Record Entry	X	X	Is carried
	↓	Retention	Of Receiver Record Entry	X		Is retained
USE	↓	Access, view • Trust Decision	By End User 	X		Is accessed, viewed

Note that Columns 5&6 denote AuditEvent and Provenance, as would be implemented in HL7 FHIR.

In addition, the work of the Data Provenance (DPROV) Initiative under the Standards and Interoperability (S&I) Framework offers a detail progression following the collect/share/use pattern. See one page matrix attached to this response.

Question 8
Given some of the limitations described above, do these potential measures adequately address the "exchange" component of interoperability required by section 106(b)(1) of the MACRA?

"Measures [to] adequately address the 'exchange' component of interoperability" are crucial but lacking in what is proposed. Maybe there's a quantitative measure of exchange (e.g., transaction volumes) that might be adequate if achieving satisfaction of numerical objectives. The qualitative measure is much more important and requires more than the specified surveys will yield. This is noted in many of our comments.

Achievement of interoperability/interoperation is based on truth and trust, as described in response to Question 5. How well did the exchange artifact convey the identity, content and context of the source record itself? Does the health data/record as viewed by the author (at the point of collection/origination) maintain fidelity as it transits (may be transformed) to the view of the ultimate user (at the point of access/use)?

Question 9a
Do the reconciliation-related measures serve as adequate proxies to assess the subsequent use of exchanged information?

Reconciliation is but one use of health data/records that have previously been collected and shared. Assume a determination is made as to whether received health data/records are fit for use – for the purpose of reconciliation. The same determination must be made at each point of use – particularly as the purpose of use may vary (e.g., doing a general assessment of patient health history vs. making a clinical decision and placing an order based on that information).

Question 9b
What alternative, national-level measures (e.g., clinical quality measures) should ONC consider for assessing this specific aspect of interoperability?

Following our response to Question 5, in terms of Basic Perspective 2, and regarding evidence of truth is the basis for trust. We believe conveyance of truth (and its source origination) is the vital achievement of interoperability and measuring truth is key to interoperability assessment. The point of health data/record collection (capture, origination) is invariably the source of truth. Software can measure truth (as represented in source health data/records), and can ensure that same "truth" is collected, shared and made available at each ultimate point of access/use.

[Continues on next page.]

Thus, we propose the following "alternative, national-level measures [to be considered by ONC] for addressing this specific aspect of interoperability"...

Collect	**Share**	**Use**
Truth (at source, point of data/record origination)	via Exchange Artifact or elsewise	Trust Decision (by end user at point of access/use)
✔ Identity is evident	Is each relevant point of truth (left column) shared in the exchange artifact? Is each point of truth incorporated in receiver (EHR/HIT system) record entries resulting from the exchange?	Is health record/data content – derived from the exchange artifact – fit for use? • For primary (clinical) use? • For secondary use? Is there a risk to clinical integrity? Is there a risk to patient safety?
✔ Actions are evident: e.g., actions taken to support individual health and provide healthcare		
✔ Who took what action when, where and why is evident		
✔ Action facts, findings and observations are evident		
✔ Source, origination and provenance is evident		
✔ Attestation (signature) is evident (confirming accuracy/completeness)		
✔ Signature/content binding is evident		
✔ Who authored what when, where and why is evident		
✔ Content is un-altered		
✔ Context is evident		
✔ Completeness (or not) is evident		
✔ Update(s) to original content are evident		
✔ Chain of Trust is evident ✔ From source to use		
✔ Transformation(s) are evident (e.g., to/from exchange artifacts)		
✔ Original "Source of Truth" is evident		

Question 10a
Can state Medicaid agencies share health care provider-level data with CMS similar to how Medicare currently collects and reports on these data in order to report on progress toward widespread health information exchange and use?

Assuming like measures, with the same basis and methodology, resulting in consistency and comparability of interoperability assessment measurement.

Question 10b
If not, what are the barriers to doing so?

Basic differences in focus, purpose, administration and implementation of (Medicare vs. Medicaid) measures is probably the biggest barrier.

Question 10c
What are some alternatives?

A unified approach and application.

Question 11
These proposed measures evaluate interoperability by examining the exchange and subsequent use of that information across encounters or transitions of care rather than across health care providers. Would it also be valuable to develop measures to evaluate progress related to interoperability across health care providers, even if this data source may only available for eligible professionals under the Medicare EHR Incentive Program?

Again focus on "exchange and subsequent use" misses the source of truth as the vital anchor for any/all assessment of health data/record interoperability. "Measures [to] evaluate interoperability... across health care providers" are crucial to any valid assessment.

Question 12a
Should ONC select measures from a single data source for consistency?

Not sure what is meant by "a single data source for consistency". Clearly, if appropriate guidelines, administration and evaluative steps are in place, consistency should be achievable across "a variety of data sources".

Question 12b
Or should ONC leverage a variety of data sources?

Yes, assuming consistency and comparability across these data sources.

Question 12c
If the latter, would a combination of measures from CMS EHR Incentive Programs and national survey data of hospitals and physicians be appropriate?

Appropriate but not sufficient, as outlined in prior comments.

Question 13
What, if any, other measures should ONC consider that are based upon the data sources that have been described in this RFI?

See our responses above, particularly Items B&C, and to Questions 3, 5, 7b and 9b.

Question 14
Are there Medicare claims based measures that have the potential to add unique information that is not available from the combination of the CMS EHR Incentive Programs data and survey data?

Not sure what "claims based measures" might have this potential.

Question 15
If ONC seeks to limit the number of measures selected, which are the highest priority measures to include?

Should not limit. Some may be more applicable/appropriate to particular settings than others.

Question 16a
What, if any, other national-level data sources should ONC consider?

Not sure.

Question 16b
Do technology developers, HISPs, HIOs and other entities that enable exchange have suggestions for national-level data sources that can be leveraged to evaluate interoperability for purposes of section

106(b)(1) of the MACRA (keeping in mind the December 31, 2018 deadline) or for interoperability measurement more broadly?

It is unclear that proper interoperability assessment can be met, nor should be constrained, by an arbitrary deadline.

Question 17a
How should ONC define "widespread" in quantifiable terms across these measures?

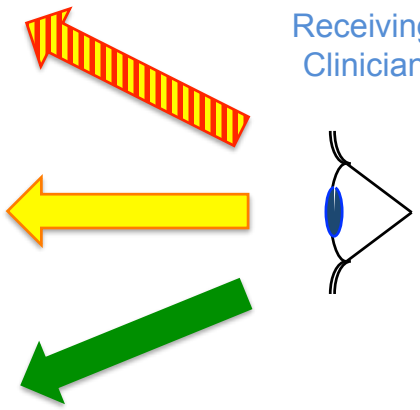
At least 2/3 majority should be considered the minimum threshold for "widespread".

Question 17b
Would this be a simple majority, over 50%, or should the threshold be set higher across these measures to be considered "widespread"?

>50% allows the claim of "most" but not "widespread". See our response to Question 17a.

Appendix A – Trust and the End User Perspective

Transforms	Primary Use – Clinician View
1, 2, 3, 4…	1 2 3 4 Blind Transforms View Last (Sum) Result Use with Extreme Caution! 1 2 3 4 Visible Transforms View each Result Be Aware!
0	View Unaltered Source Health Record Content Be Assured!



Appendix B – Transformation Disjunctions

Examples	Source Clinical Content is/has…	Likely Disjunction	
Mismatched	Incorrectly matched • Including Patient or Provider identity	Error	
	Structured content mapped to/from unstructured content	Error or	Alteration
	Disjoint data types: e.g., integer vs. decimal	Error or	Alteration
	Codes/values mapped one to many	Error or	Alteration
Incomplete or missing	No corresponding target data element	Omission	
	No corresponding code/value in target code/ value set	Omission or	Alteration
Less Precise	Source codes/values mapped many to one	Error or	Alteration
	Less digits/characters, rounding/truncation	Error or	Alteration
Skewed	As the effect of multiple transforms • 1 off + 1 off + 1 off + 1 off	Error or	Alteration