

Setting AMDIS on FHIR

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Mitigating Interoperability Issues in a clinical setting requires Continuous Processes

Speaker: Mario Hyland Senior Vice President, AEGIS.net, Inc.

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AMDIS 2016 Ojai, CA

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Assuring Interoperability

....in an Information Sharing Environment





Why so Serious @Interopguy (Batman)?

Interopguy: Because Interoperability is a Serious Issue, and one which the industry needs to address on a Continuous Basis.

Avoid the One-and-Done approach.



What would happen if airlines practiced "One and Done" Testing? *How Important is Patient Safety?*



Overview



Consider for a moment:

If implementing <u>Industry based Standards</u> is viewed as a path towards <u>Interoperability</u>, why then are Organizations developing <u>unique</u> testing approaches?

There is a <u>National ROI</u> many organizations are realizing through the use of Shared Services such as Testing as a Services (TaaS) in a Cloud based ecosystem

Healthcare Robustness Principal **Ge**Standards Continuous Who is AEGIS? Standards Standards Testing Service Patients a Integration OMG Safety Global Policy Policy a FHIR ctor Sponsor CMMI ILT B DIL arequality Quality Assurance Cloud Global OMG HIMSS Gold Healthcare Pro eq Iect Testing Sequoia Project NwHIN / NHIN Global Quality Assurance Safety HL7 Benefactor Sponsor ANSI ISOGlobal Continuous Testing DI Ο Strategic Safety Cloud ISO Testing Carequality Strategic OM Standards Touchstone Continuous AEGIS FHIR Testing-as-a-Service FHIR ess Policy Strategic Policy Interoperability International ISO HIMSS Gold ANSI Test Platform eHealth Exchange Carequality FHIR Healthcare OMG Integration Test Platform Global

INTEROPERABILITY



REALITY

It is a "Point in Time"

OBJECTIVE

to achieve "Continuous Interoperability"

What is Interoperability



Definition: The IEEE Standard Computer Dictionary defines interoperability as "the ability of two or more <u>systems</u> or components to exchange information and to use the information that has been exchanged."¹

That means that there are two parts to the definition of interoperability:

- The ability of two or more systems to <u>exchange</u> information
- The ability of those systems to <u>use</u> the information that has been exchanged

* 1: See IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries (New York, NY: 1990).



Robustness Principle

"Be conservative in what you send, be liberal in what you accept"

http://en.wikipedia.org/wiki/Robustness_principle

Conservative – Happy Path (Ideal World) Liberal – Negative and Exception Path (Things that happen everyday in the Real World)

Why Interoperability is Challenging



Systems Interoperability Challenges

- Organizational exchange of information
- Interpretation thru Implementation
- Common Testing Approach (Happy Path)
- Limited Exception Negative Testing (due to dependence on Peer-to-Peer testing)
- Multiple versions of standards to support (yes, there will be change), future proofing

Standards will be put under new intense pressure.

Industry Research



Gartner

Document ID: G00275801



Document ID: 2889417





FHIR Resources



General:

- AllergyIntolerance 1
- Condition (Problem) 2
- Procedure 1
- FamilyMemberHistory 1
- ClinicalImpression 0
- DetectedIssue 1

Care Provision:

- CarePlan 1CareTeam 0
- Goal 1
- Goal 1
- Protocol 0
- ReferralRequest 1
- ProcedureRequest 1
- NutritionOrder 1
- RiskAssessment 0
- VisionPrescription 0

Medication & Immunization:

- Medication 1
- MedicationOrder 1
- MedicationAdministration 1
- MedicationDispense 1
- MedicationStatement 1
- Immunization 1
- ImmunizationRecommendation 1
- ImagingExcerpt 0
- ImagingObjectSelection 1

- Diagnostics:
- Observation 3
- DiagnosticReport 3
- DiagnosticOrder 1
- Specimen 1
- Sequence 0
- BodySite 0
- ImagingStudy 2

Industry Standards Development



This resource is referenced by ClaimResponse and ExplanationOfBenefit FHIR DSTU 2 7.1.2 Resource Content Oct 24, 2015 Structure UML XML **JSON** All Structure FHIR DSTU 2 1 This resource is referenced by ClaimResponse and ExplanationOfBenefit Name Flags Card, Type Description & C 7.1.2 Resource Content 6 Dec 11, 2015 Claim Σ DomainResource Claim, Pre-deter - type Σ institutional | ora 1..1 code ClaimType (Requ UML All · (identifier Structure XML **JSON** Σ 0..* Identifier Claim number - 🛈 ruleset Σ Codina Current specifica 0.1 Structure Name Flags Card. Type **Description & Constraints** Claim 5 DomainResource Claim, Pre-determination or Pre-authorization Goods and Servi - item 5 0.* BackboneElement - type Σ 1...1 code institutional | oral | pharmacy | professional | vision - sequence Σ 1..1 positiveInt Service instance ClaimType (Required) - () type Σ Coding Group or type of 1..1 - () identifier Σ 0..* Identifier Claim number ActInvoiceGroup - nuleset Σ Coding Current specification followed r provider Reference Responsible prac 0..1 Σ 0..1 (Practitioner) Ruleset Codes (Example) - 🧰 diagnosisLinkId 0..* positiveInt Σ Diagnosis Link OriginalRuleset Original specification followed Σ 0..1 Coding Ruleset Codes (Example) () service Σ Coding Item Code 1..1 - Created Σ Creation date USCLS Codes (E 0..1 dateTime - serviceDate Date of Service Σ 0..1 date - 🕥 quantity Σ 0..1 SimpleQuantity Count of Product - () unitPrice Σ 0..1 Money Fee, charge or co - 🛅 item Σ 0..* BackboneElement Goods and Services - factor Σ decimal Price scaling fact 0.1 - sequence Σ 1..1 positiveInt Service instance - points Σ 0..1 decimal Difficulty scaling - 🛈 type Σ 1..1 Coding Group or type of product or service - 🕥 net Total item cost Σ 0..1 Money ActInvoiceGroupCode (Required) -- 🕥 udi Σ 0..1 Coding Unique Device Id r provider Σ 0..1 Reference Responsible practitioner UDI Codes (Exan (Practitioner) bodySite Service Location 5 0..1 Coding - 🧰 diagnosisLinkId Σ 0..* positiveInt Diagnosis Link service Σ Coding Item Code 1...1 USCLS Codes (Example) serviced[x] 5 0..1 Date or dates of Service servicedDate date servicedPeriod Period D place Σ 0..1 Coding Place of service Example Service Place Codes (Example) () quantity Σ 0..1 SimpleOuantity Count of Products or Services



How to Mitigate Interoperability Risk

- > A way to Mitigate Interoperability Risk
 - Because we do face Interoperability Issues

Interoperability Strategies

- Standards-based Testing (SDO feedback loop)
- Test Early and Test Often
- Infuse Interoperability into the Development
 Cycles thru TDD (Test Driven Development)
- Embrace the goal of "Continuous Interoperability" through process

How to Integrate TDD into Agile Process





Touchstone Project

Touchstone Project	https://www.touchstone.com
A Test Definitions	A Attention Argonaut Project, FHIR Genomics and HSPC users: Please have your organizations request membership in "Argonaut Project", "FHIR Genomics" and "Healthcare Services Platform Consortium (HSPC)" Org Groups here if
Touchstone Totals	you haven't already done so.
Users: 176 Organizations: 63 Test Systems: 67 Test Scripts: 676 Tests Script Executions: 10,819 Test Executions: 63,279	The Touchstone Project - an AEGIS Developers Integration Lab (DIL) Initiative The Touchstone Project is an infrastructure as a Service (laaS) and Testing as a Service (TaaS) Open Access Solution for health information exchange. Touchstone strives to live up to its dictionary definition - a criterion for determining the quality or genuineness of a thing - by offering over 1500 tests in an easy-to-use system for determining a test system's conformance and interoperability against published specifications, standards, and profiles, including templates and implementation guides. The Touchstone Project • allows for automated, internet-based interoperability testing against the HL7 FHIR specifications and standards. • tests interoperability with other FHIR Server and FHIR Client implementations. • has been engineered from the ground up to leverage the new FHIR TestScript resource. • has been featured at HL7 FHIR Connectathons and is being leveraged in a continuous testing environment by numerous leading HL7 FHIR • plays an active role in the HL7 Conformance Testing community, the HL7 Argonaut Project, and the HSPC Implementation community.
Message exchanges: 75,520	Touchstone Updates
	> Touchstone 2.2.0 released 📟 Mar 24, 2016 Enhancements:

- > Test Script and Fixture Versioning.
 - Changes to Test Script and Fixture sources are preseved as separate versions. Users are informed of new Test Script and Fixture versions on Test Execution screens.
- Capture Test System conformance statement for each test execution.
 - Users can now see the conformance statement of each test system involved in test execution at the time of execution on Test Execution screens.
- > Improvements in conformance checks and display of conformance statements.
- > Validations are now performed for multiple FHIR specification versions.

Please see the release notes for more details.

Touchstone Project an AEGIS Developers Integration Lab (DIL) Initiative



Touchstone Project								HL7 FH	ir 👻 🚦	Organizati	ons 👻	😫 Users	Admin v	Mario -
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	11/12/2015 02:25:02PM	Test Setup for Demo Purposes	AEGIS WildFHIR - http://wildfhir.aegis.net/dstu2	Richard Ettema	AEGIS.net, Inc.	××	Passed 11 02	/12/2015 :25:07PM	55	1	4	4		
	11/11/2015 04:21:24PM	Connectathon11-Track1-Patient-Server- WildFHIR	AEGIS WildFHIR - http://wildfhir.aegis.net/dstu2	Richard Ettema	AEGIS.net, Inc.	××	Passed 11 04	/11/2015 :21:38PM	13s	4	18	18 📕		
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	11/09/2015 09:32:27AM	BasicOperations - All	AEGIS WildFHIR - http://wildfhir.aegis.net/dstu2	Tareq Nabeel	AEGIS.net, Inc.	××	Passed 11 09	/09/2015 :36:51AM	4m 24s	64	448	448		

Touchstone Project

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Touchstone Project

Test Script Execution - /BasicOperations/Sequence/Client Assigned Id/Sequence-client-id-json



Setup [show]

Tests

Test Name	Description	Status	Duration
Test: Step1-CreateNewSequence	Create a new Sequence in JSON format where the client assigns the resource id.	Passed	0.084s
Test: Step2-ReadSequence	Read the Sequence in JSON format created in step 1.	Passed	0.349s
Test: Step3-UpdateSequence	Update the Sequence in JSON format created in step 1 then Read it again for verification.	Passed	0.299s
Test: Step4-SequenceHistoryInstance	Retrieve the updated Sequence instance's history in JSON format.	Passed	0.063s
Test: Step5-SequenceVersionRead	Retrieve a specific version of a Sequence instance in JSON format.	Passed	0.059s
Test: Step6-SequenceSearchType	Search for Sequence resources in JSON format with a variationid = \${searchParamVariationid}.	Passed	0.075s
Test: Step7-SequenceDelete	Delete a Sequence instance in JSON format.	Passed	0.069s



How Important is Patient Safety?



Contact Us

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Healthcare Interoperability and FHIR Customer Snapshot

Austin Awes – National Director, Clinical Integration, Infor June 22 2016



FHIR in the Real World

Hackensack University Medical Center (HUMC) – New Jersey USA



- **Problem**: As soon as the patient walks into a care center, they are presented with a clipboard to answer questions.
- **Solution**: Give a the patient a way to communicate more easily using a mobile app. Enhance the patient experience.
- Solution is in production today! Approx 5000 transactions/day.
- Use FHIR underneath to enable the mobile technology and allow disparate systems to communicate more effectively
- Mix of DSTU-1, DSTU-2, XML, JSON, and proprietary integration



Solution overview





Log in to MyChart to Schedule Your Appointment	MyChart Username	Password	Log in and Schodulo Itl
	Forgot MyChart username?	Forgot passw	ord?
OR			

Schedule as a G	uest NotaM	lyChart user? Con	plete the inform	ation.
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- 1. Scheduling event generates a non-FHIR XML transaction from Epic myChart with an ID only
- 2. Cloverleaf queries back to Epic to get all IDs for the patient (FHIR ID, MRN, and Encounter)
- 3. With FHIR ID, Cloverleaf queries Epic using FHIR DSTU-1 encounter and patient resources
- 4. Patient and encounter responses are **bundled** into DSTU-2 JSON message bundle and sent to mphRx questionnaire application.

Workflow – Questionnaire and back to Epic



- 5. mphRx generates questionnaire to patient. Patient verifies demographics and answers questions tailored to area of care
- 6. Answers generate a DSTU-2 JSON questionnaire response, which is posted to Cloverleaf
- 7. Response is split into a demographic update to Epic and a flowchart update to Epic. These are posted to Epic via the non-FHIR Epic API XML/SOAP. (Epic supports FHIR read-only).
- 8. Other operations that occur Text message is generated to patient requesting that they rate their experience



What's next for Hackensack: Cancer Outcome Tracking App (COTA)

- Today
 - Developed in house SQL server application
 - · Used for reports to state agencies / other
 - Manually entered data
- April 2016
 - Expand Reporting system
 - Add automation for registering patients from anywhere
 - Including external sources to HUMC
 - Add allergies and medications to system reporting
 - Enable CPOE
 - Use open architecture, API's and data structure standards: FHIR

- FHIR Enablement
 - Provide an FHIR API layer to external and internal applications
 - Translate Database Stored
 Procedure calls to and from FHIR
 - Speak FHIR to front end
 - Speak database to back end
- FHIR Resources
 - Patient
 - Condition
 - DiagnosticReport
 - MedicationAdministration
 - MedicationPrescription
 - Observation
 - Procedure



Conclusion



Why use an Integration platform?

- Speed of development / speed to deploy
- Clinical System neutral ecosystem
- Ability to centrally maintain and monitor your interfaces
- Ability to **speak different standards** in case above, the platform speaks a mixture of proprietary, DSTU-1, DSTU-2, XML and JSON.
- FHIR-enable legacy applications
 - HL7 v2 <-> FHIR lots of discussion on this
 - Database <-> FHIR planned at Hackensack
 - Proprietary <-> FHIR live at Hackensack
- A central solution allows you to scale effectively and manage growth effectively



Key Take-Aways

- Traditional integration specifically HL7 v2 is not going away
- FHIR is designed to be simple and fast to implement
- FHIR is designed to cover a broad spectrum of applications
 - From simple, small mobile apps using a single resource to enterprise applications using message bundles
 - Resource types cover broad topics Clinical, Administrative, Infrastructure, and Financial
- Key for wearables and mobile applications



Questions and Answers

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Additional Resources:

1. HUMC testimonial video: <u>http://progressive.uvault.com/2361/2016/customer/015-164-InforNext-SanDiego-HackensackUMC-720-1pt3-5.mp4</u>

2. Hackensack Case Study Document: <u>http://www.infor.com/content/casestudies/hackensack-university-medical-center.pdf/</u>

3. Dr. Shafiq Rab's video on Infor/ FHIR: https://t.co/dpit9C9IHd

4. Article from Health Data Management: <u>http://www.healthdatamanagement.com/news/hackensack-university-follows-fhir-enabled-route-to-data-exchange</u>

5. CHIME Innovator of the Year Award: <u>https://chimecentral.org/hackensack-university-medical-center-cio-named-chime-innovator-of-the-year/</u>

6. Informational link on "SMART on FHIR": <u>http://smarthealthit.org/smart-on-fhir/</u>

7. Auth 2.0 Standard: http://oauth.net/2/

8. Article "Hackensack (N.J.) University Medical Center has been selected <<u>http://www.prnewswire.com/news-</u>releases/hackensack-university-medical-center-accepts-white-house-call-to-action-to-advance-the-precision-

<u>medicine-initiative-300124088.html</u>> by the White House to participate in its Precision Medicine Initiative, a research effort aiming to revolutionize the delivery of healthcare."

9. Article "Hackensack University Medical Center 'FHIR-Enables' Its Clinical Data" <u>http://www.healthcare-informatics.com/article/hackensack-university-medical-center-fhir-enables-its-clinical-data></u>

10. Article "Life of a healthcare CIO: HackensackUMC's Dr. Shafiq Rab on humility and the need to speak softly": <u>http://www.beckershospitalreview.com/healthcare-information-technology/life-of-a-healthcare-cio-hackensackumc-s-</u> <u>dr-shafiq-rab-on-humility-and-the-need-to-speak-softly.html</u>





Geisinger Experience with FHIR

Alistair Erskine MD Chief Strategic Information Officer

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International Profiles of Health Care Systems, 2015

EXHIBIT ES-1. OVERALL RANKING

COUNTRY RANKINGS											
Top 2*											
Middle			_		_	NZ.	_		_		
Bottom 2*		*				× ≈ ~ . •					
	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING (2013)	4	10	9	5	5	7	7	3	2	1	11
Quality Care	2	9	8	7	5	4	11	10	3	1	5
Effective Care	4	7	9	6	5	2	11	10	8	1	3
Safe Care	3	10	2	6	7	9	11	5	4	1	7
Coordinated Care	4	8	9	10	5	2	7	11	3	1	6
Patient-Centered Care	5	8	10	7	3	6	11	9	2	1	4
Access	8	9	11	2	4	7	6	4	2	1	9
Cost-Related Problem	9	5	10	4	8	6	3	1	7	1	11
Timeliness of Care	6	11	10	4	2	7	8	9	1	3	5
Efficiency	4	10	8	9	7	3	4	2	6	1	11
Equity	5	9	7	4	8	10	6	1	2	2	11
Healthy Lives	4	8	1	7	5	9	6	2	3	10	11
Health Expenditures/Capita, 2011**	\$3,800	\$4,522	\$4,118	\$4,495	\$5,099	\$3,182	\$5,669	\$3,925	\$5,643	\$3,405	\$8,508

Notes: * Includes ties. ** Expenditures shown in \$US PPP (purchasing power parity); Australian \$ data are from 2010.

Source: Calculated by The Commonwealth Fund based on 2011 International Health Policy Survey of Sicker Adults; 2012 International Health Policy Survey of Primary Care Physicians; 2013 International Health Policy Survey, Commonwealth Fund National Scorecard 2011; World Health Organization; and Organization for Economic Cooperation and Development, OECD Health Data, 2013 (Paris: OECD, Nov. 2013).

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From Legacy Systems...

(DR)	PHYSICIAN	RETRIEVAL	
(TEST RES	ULTS)	(NURSING)	
►ALL LAB		▶IV'S ▶MEDIC	ATIONS
CLINICA	L CHEM LAB	▶ALL NURSING	DATA
COMPARA	TIVE LABS	(MISC DATA)	
LAB BY	DEPARTMENT	►ADVANCE DIR	ECTIVES
►ALL DIA	G RADIOLG	▶ALLERGIES	
►ANCILLA	RY BY DEPT	▶ANCILLARY N	OTES
(CURRENT	ORDERS)	▶CONDITION	
►ALL CUR	RENT	▶DEMOGRAPHIC	DATA
▶BY TYPE	OF ORDER	▶DIAGNOSES, A	CUTE
(ALL ORDE	RS-BY TYPE) ▶DIAGNOSES, C	HRONIC
▶ REVERSE	CHRON SEQ	▶DISCHARGE I	NFO
▶CHRONOL	OGICAL SEQ	▶FAMILY HIST	ORY
FOR SPE	CIFIC DATE	▶MED RECORD	STATUS
TRANSCRI	PTIONS	▶MISC CLINIC	AL HX
(PREVIOUS	VISITS)	▶PHYSICIANS/	SERVICE
▶SELECT	A VISIT	▶PROBLEM LIS	
▶SPECIFY	SEARCH	▶ PROCEDURES /	SURGERY
CRITERI	A	▶PT PROFILE	
RETURN		MASTER R	EVIEW
ERR	ТҮРЕ	RETRIEVE	

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Challenges with Digitalizing Medicine

Electronic documentation E/M coding Copy/Paste Time away from patients Feeding EHR data Impact on care Time spent on measures Enormous burden Incongruent measures Physician burnout Inevitable outcome Impact on quality

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SMART/FHIR EHR WebApps

Traditional EHRs Switching cost too high One-off customization Barrier to small innovator Waterfall vs Agile

API-based economy CMS embracing APIs Argonaut Project Geisinger collaboration New problems to solve App Accuracy/Cert Performance/Reliability Compliance Standards

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Mandl KD et al Driving Innovation in Health Systems through an Apps-Based Information Economy Cell Syst. 2015 Jul; 1(1): 8–13.

Inter-APP-able - Geisinger/xG Health Solutions



App Gallery BETA

🕈 Browse Apps \star Organizations 🗐 Build an App 🛛 About SMART Q Search the gallery Featured Apps -----F Reneral Lowis Receiver Section Information Alex Via Lances, CCR 70 Ad. 2007. way You You Normaniana Normaniana Normaniana Norma anteripis Malacana Norma anteripis Malacana Norma anteripisationa Norma anteripisationa BMJ Best Practice **Recently Updated** Microsophil Microsop **Clinical Care** ÷ a horsen **Patient Education** And H. revenue Chair d Ly Jones Francisco Collectorio Marine Collectorio Francisco Collectorio Marine Collectorio Genomics NUMBER OF STREET 6888 B 688 The second se Particle of the control of the contr **Open Source** 2414 NAME OF TAXABLE ADDRESS. Charles - Minder iPhone and iPad Research to the second se All Apps **Bilirubin Chart BMJ Content Discovery BP** Centiles 12 Name A to Z ٠ cun par asmart Example in the second s nameno Sa Callar Jun Paranaser Acres the last The same second the last same second the E New Constant 18 apps Patient's Right Parlent's Leit 15% Contraction A trainer & transmit A trainer / fritante AND OWNER THE ACCURACE WITE A EDG(1) to No. NUMPER N 107 M-END A **Cardiac Risk** Cerner HIE on SMART the sector state space kePillBox Exercise 103313-23 A Charles tan Babbara nen auf an an and and Morning Islampii 20145 Ge naan Garyan Garyan 🖥 kaleyetti 1910-attakt 🛛 💼 🛛 🌆 kaleyesti 1910-bi, hali qir. 🚥 Assessment in the Color + Minder peril 13 MC On a de la p Neen Distance do 140.11 chession chaste. Chi 🖸 Menanaren do uni izan . 👜 🛛 🧱 azaman osian tempu zitu 🔞 in Miller 3 10141010 1 1000 -----Triancipologie (MCA/. Evening Beneria ve 🗧 Téracheora i MANI Tepes Corra 🛛 🖉 Prospens Congrated (1971) . 💿 Annine ande V sinskels andersense seuten norp one contented Dedtime

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Weekly

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Questionnaire		History Med/FH/SH Ex	cam Measures Tables A/P			
Trends		Measures	Tender Joints	Swollen Jo	bints	
HPI		Tender (0-28) 25 • Swollen (0-28) 25 • Physician Global (0-10) 9 •	Сору ТЈС	to SJC > < Copy SJC	to TJC	
Tasks			2009		2009	
Clinic I Ic	Ori	ginal to FHI	R App \rightarrow 50 lines	s of code	e	
AVS	FH	IR Web serv	er \rightarrow 2000 lines	of code ((GitHub)	
Update From E	Tin	ne to conver	t → 73 6 hours, 4	0 busine	ess days	
Medication Diagnc ses	Co	st to conver	$t \rightarrow$ \$17,859, and	4 web-	app developers	
Lab	Pro	of of Conce	ept → Cerner, Ep	ic, and A	thena	
	Co	mmercializa	tion \rightarrow xG Healt	n (beta ir	n Cerner site)	
Command Prin	Val	ue → EHR "a	agnostic" and rea	I-time ca		
Clinic Note		Legend: O Black Border (Normal Joint) O Red Border (CDAI Joint) O No Clicks (Not Analyzed) I 1 Click (Normal) 2 2 Clicks (Tender/Swollen) 3 3 Clicks (joint replacement)		Check All Normal Check All Tender Check All Swollen Uncheck All		
	Ge	eisinger				43

Lesson Learned

Disruptive to incumbent business models Need middleware until FHIR is fully adopted by EHRs Lack of Web-App ecosystem (other than SMART) No forcing function/regulation to open APIs Contract negotiation for web-apps unlike Apple Store Issues around Reliability, Safety, Security Distraction – too many other initiatives



Vendor status: Epic http://open.epic.com

- Patient
- Practitioner
- Condition
- Observation (Vitals)
- Observation (Lab Results)
- 🗡 Immunization
- 🎁 Diagnostic Report
- Observation (Smoking Hx)
- 🤝 Device (Implants)
- Document Reference
- 🗏 Care Plan
- 🧿 Goal

Observation (Vitals)
Patient

Family Member History Epic 2015 Allergy Intolerance Medication Order read Medication 🛜 Procedure 😝 Medication Statement **Epic 2016** 督 Diagnostic Order Imaging Study read 🔜 Healthcare Service Encounter 管 Episode of Care Location Family Member History write Practitioner

Courtesy of Carl Dvorak, Epic Corp

Vendor status – Cerner <u>http://code.cerner.com</u>

- 85 external app developers who have registered with developer website
- Target FHIR resources required for ONC 2015 Edition Certification API usage (25 in next 12 months)
- There are currently four SMART/FHIR apps in live use.
 - Boston Children's (open source)
 - VisualDx app (commercial version)
 - EnrG | Rheum (xG Health)
- Aggressively participating in the CDS Hooks work
- Sync-4-Science use patient-controlled app to download medical data for the Precision Medicine Initiative

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Alternative: Interface engine option

Use interface engine to produce FHIR

- Need latest version Orion 6.2.1
- Current on 5.5.3, planned upgrade in Nov 2016
- Loaded Orion 6.2.1 in development environment
- Converting Epic webcalls to FHIR via Orion
- APIs need to be built from scratch, unmapped/modeled



Alternative: Middleware option

Use middleware to produce APIs (non FHIR)

- Most complete set of RESTful APIs available
- Mapping completed to Epic, Cerner, Allscripts, Meditech
- Supports common standards LOINC, SNOMED, ICD
- Does not support FHIR today



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Geisinger Unified Data Architecture



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Led by Dr Nick Marko, Chief Data Scientist

Next FHIR: Framework and Data Models



Stanford "Green Button" (ad-hoc EHR queries)

RCT generate evidence-based medicine; however, they

- take time and are costly
- narrow inclusion criteria

EHR could generate practice-based evidence

- by-product of clinical processes
- integrating point-of-care randomization into practice
- Fill gap in knowledge when EBM does not exist



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Longhurst CA et al, Green Button for using aggregate Patient Data at the point of care, Health Affairs 2014, 33 No 7, 1229-1235



Any one see a FHIR extinguisher?

Sameer Badlani, MD FACP

Vice President & Chief Health Information Officer

Sutter Health



Premise

- Open Source is easy and free
- FHIR apps are plug and play
- FHIR apps are so easy to code that my dog can do it while sleeping
- Clinicians will happily move out of their workflow and log onto these outside EHR apps.
- I can take an app from East Coast Children's Hospital and make it work at Super Mountain Healthcare



Reality

- Open Source is not simple and definitely not free
 - Example i2b2
- FHIR apps are not plug and play Not yet at least
 - My personal experience
- Security Issues
- EHR Integration vs Outside workflow
- Getting over the hype and finding FHIRs true value in Health IT

Questions?