

Beyond EHR --“Rise of the Middleware”



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History of EHR: Early Development.

- Computers started entering healthcare space in the 1960's.
- Limited processing and low storage power



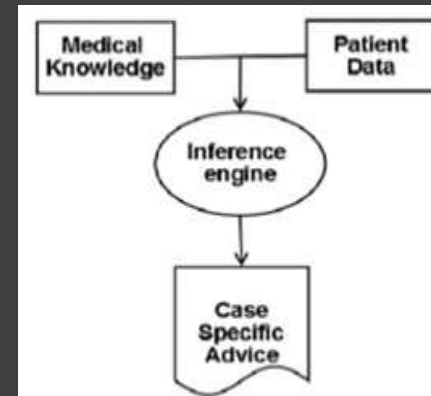


- Development on Mainframes
--focused on **revenue producing departments**
 - Patient registration, billing, and accounting.
- **Clinical Support Subsystem**
developed years later on Minicomputers (1970s)
 - Lab, Pharmacy, Radiology

Early Computerized Systems: In-Patient Environment (Mainframe and Minicomputers)

Early Clinical Decision Support Systems

- Gathering of paper-based information and then manual entry into dedicated computer system (i.e. Mycin)



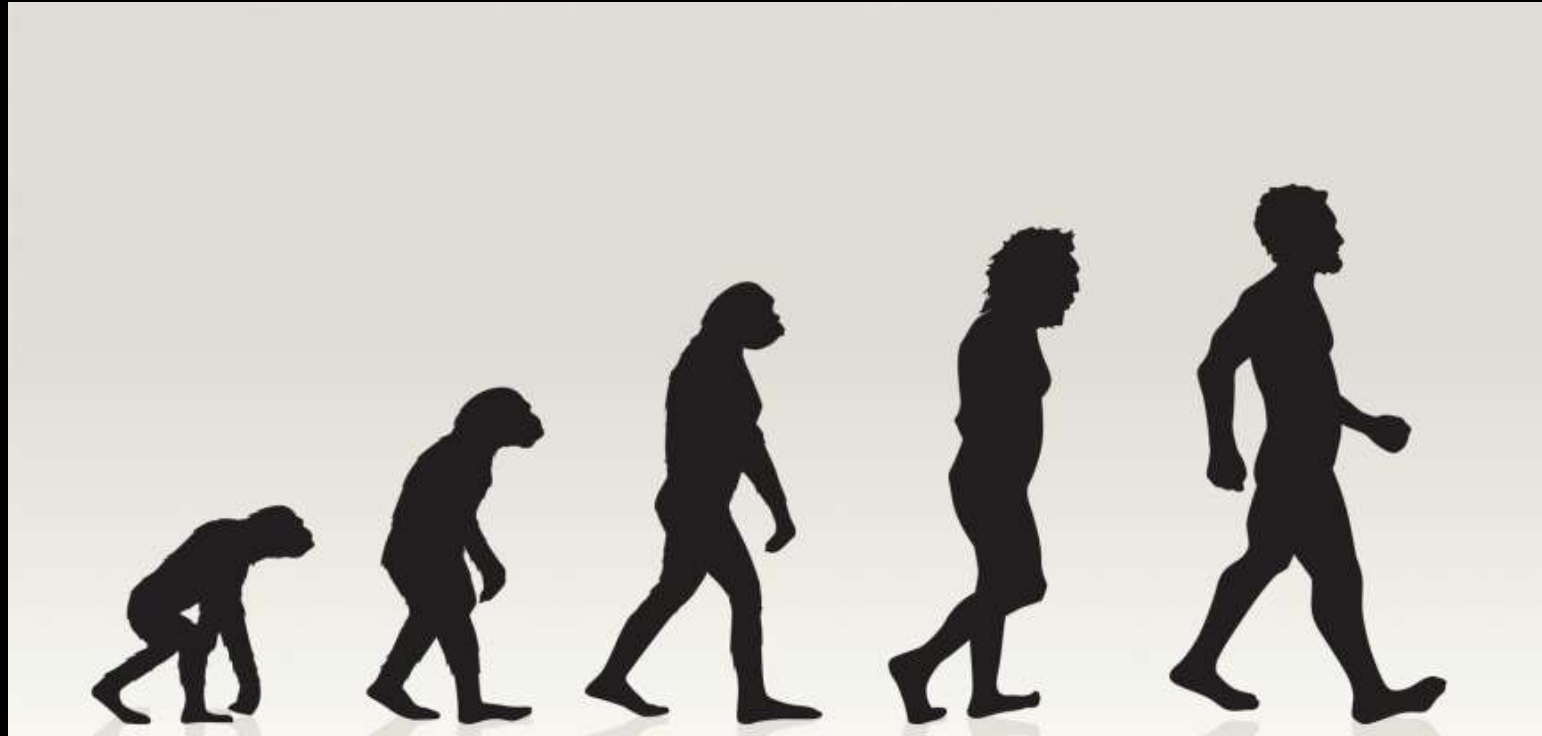
Manual entry of Data
(Patient info and Lab results)



Levels of Interoperability

- **Transport:** Data transported from one system to another without regard to its content or purpose. For example a Fax, Email, Paper Record.
- **Structured Interoperability:** Places specific data fields in positions that indicate their purpose. The receiving EHR can detect that a particular field is the name of a specific laboratory test, or its result, or optionally, a code for the test because each of these bits of information is in a prespecified field.
- **Semantic Interoperability:** Ability of computer systems to exchange data with unambiguous, shared meaning. Requires that data that includes context and knowledge of both sender and receiver.

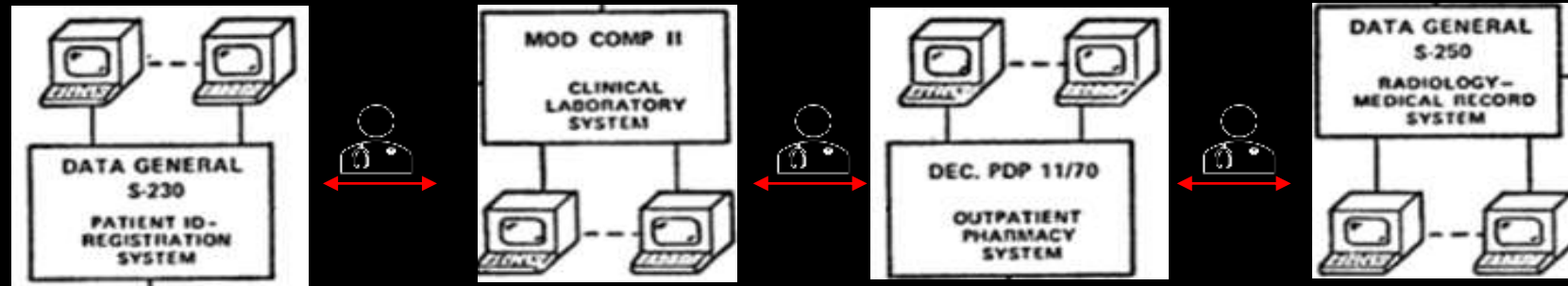
Evolution of EHR Interoperability



Transport
(Manual Entry of Data
into various systems)

First Iteration of Interoperability: Manual Entry of Data into Various Systems

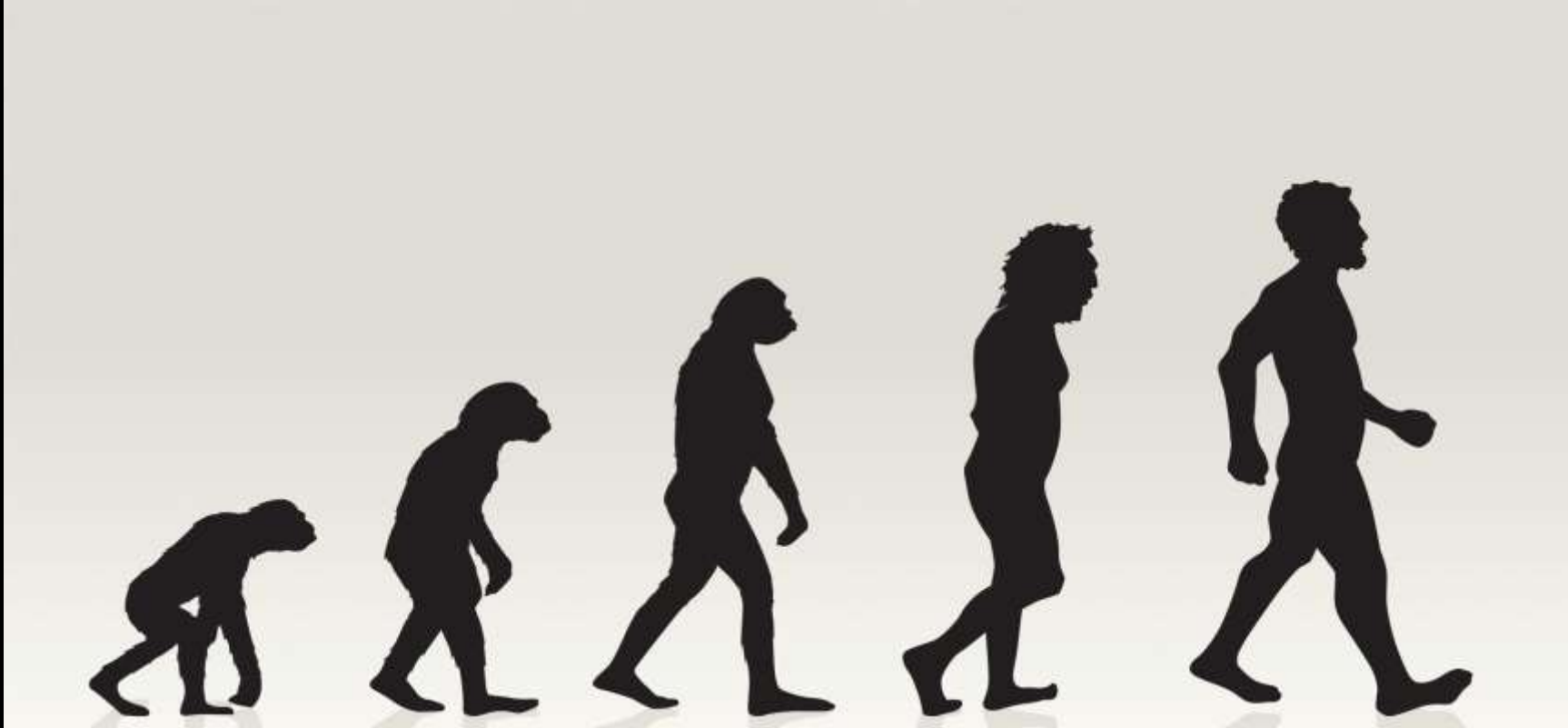
Transport level of interoperability



- Everything done to patients that was billable needed to flow from the nurse's station to billing.
 - Admission information.
 - Medication orders to pharmacy.
 - Lab Orders.



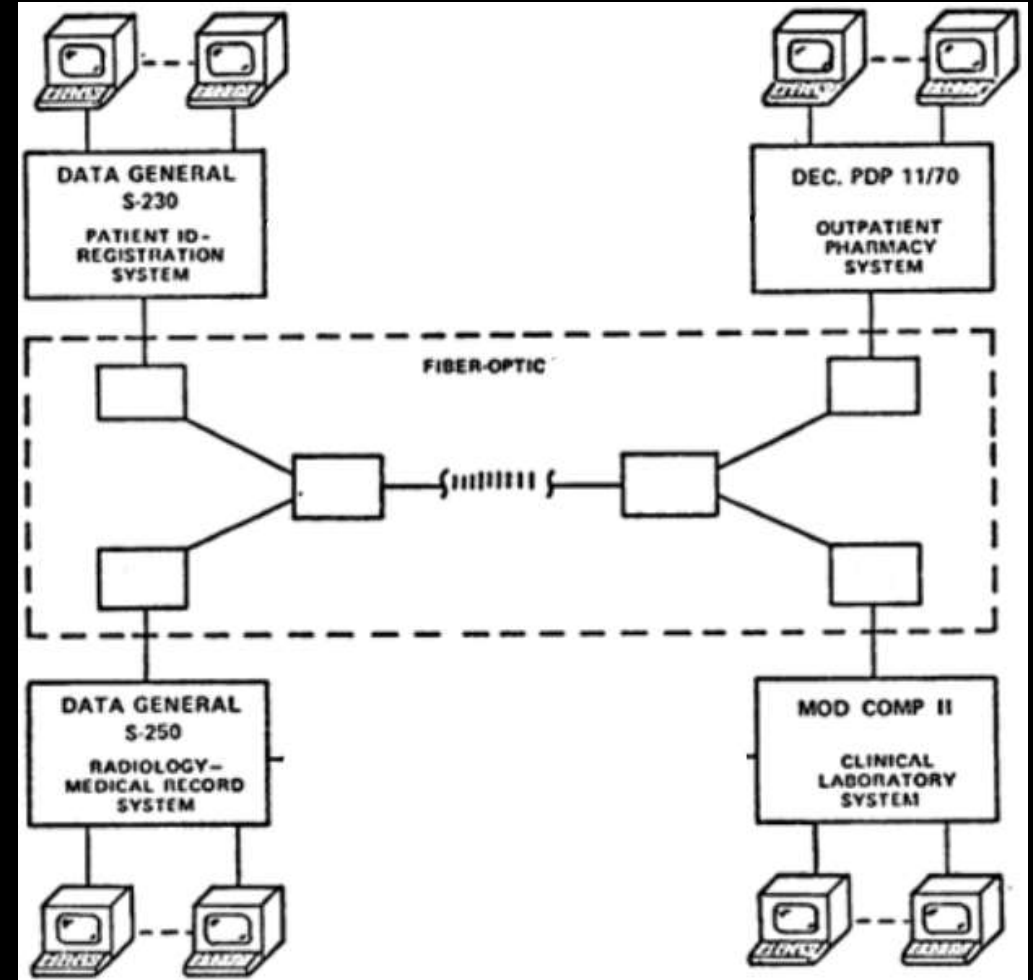
Progression of Evolution of EHR Interoperability



Structural Interoperability
(UCSF X12, HL7 V1/V2/V3)

X12 Protocol at UCSF

- In this example 4 different Hospital Systems are interconnected by a fiber optic back end, a set of programming translators organized the data so each system could communicate.



Health Care Interoperability: International Standards HL7 (Structured Interoperability)

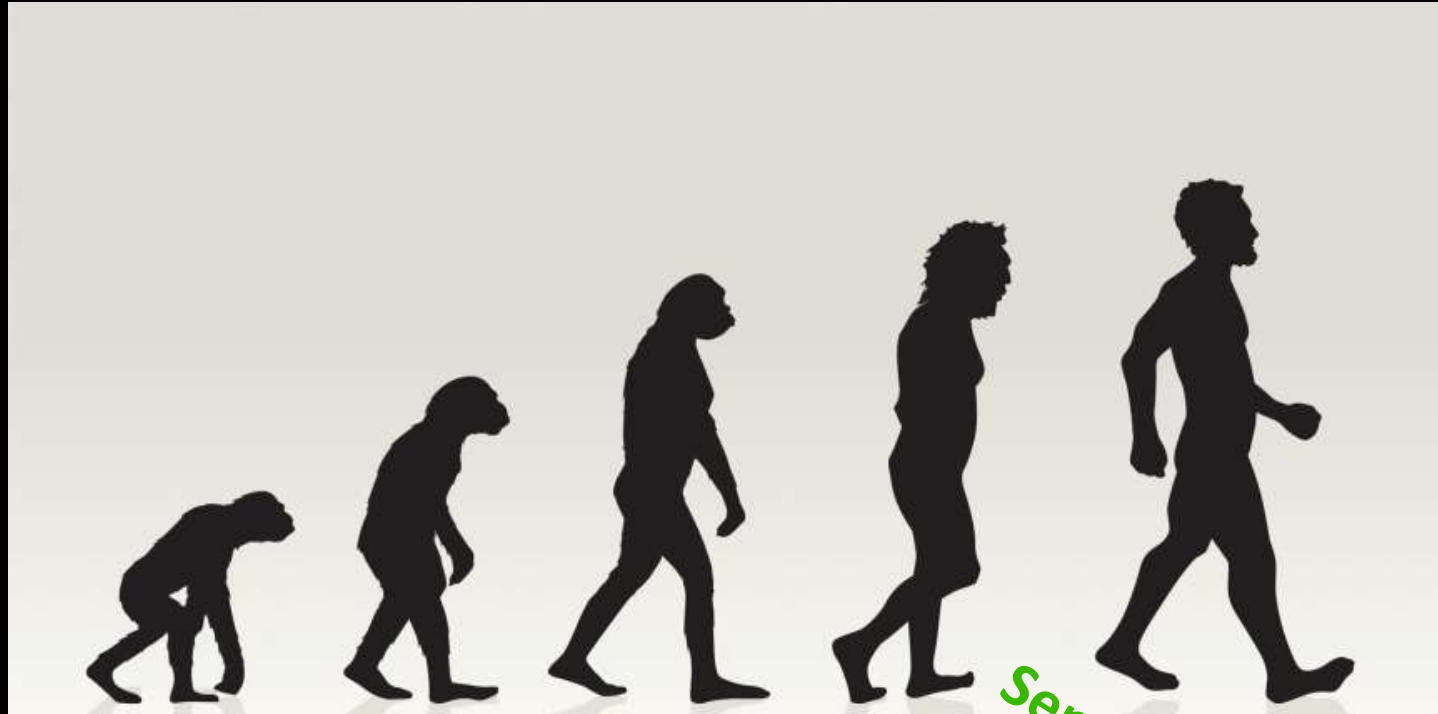
- HL7 V1, V2 were essentially refinements of the UCSF protocol.
- V2 is still in wide use today.

```

MSH|^~\&|LABGL1||DMCRES||199812300100||ORU^R01|LABGL1199510221838581|P|2.3
||NE|NE
PID||6910828^Y^C8|Newman^Alfred^E||19720812|M|W|25 Centscheap Ave^^
Whatmeworry^UT^85201^^P||(555)777-6666|(444)677-7777|M||773789090
OBR||110801^LABGL|387209373^DMCRES|18768-2^CELL COUNTS+DIFFERENTIAL TESTS
(COMPOSITE)^LN||199812292128||35^ML|||||
IN2973^Schadow^Gunther^^^^MD^UPIN
|||||||Once|||||CA20837^Spinosa^John^^^^MD^UPIN

OBX||NM|4544-3^HEMATOCRIT (AUTOMATED)^LN||45||39-49
||||F||199812292128||CA20837
OBX||NM|789-8^ERYTHROCYTES COUNT (AUTOMATED)^LN||4.94|10*12/mm3
|4.30-5.90||||F||199812292128||CA20837
  
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Evolution of EHR Interoperability



Transport
(Manual Entry)

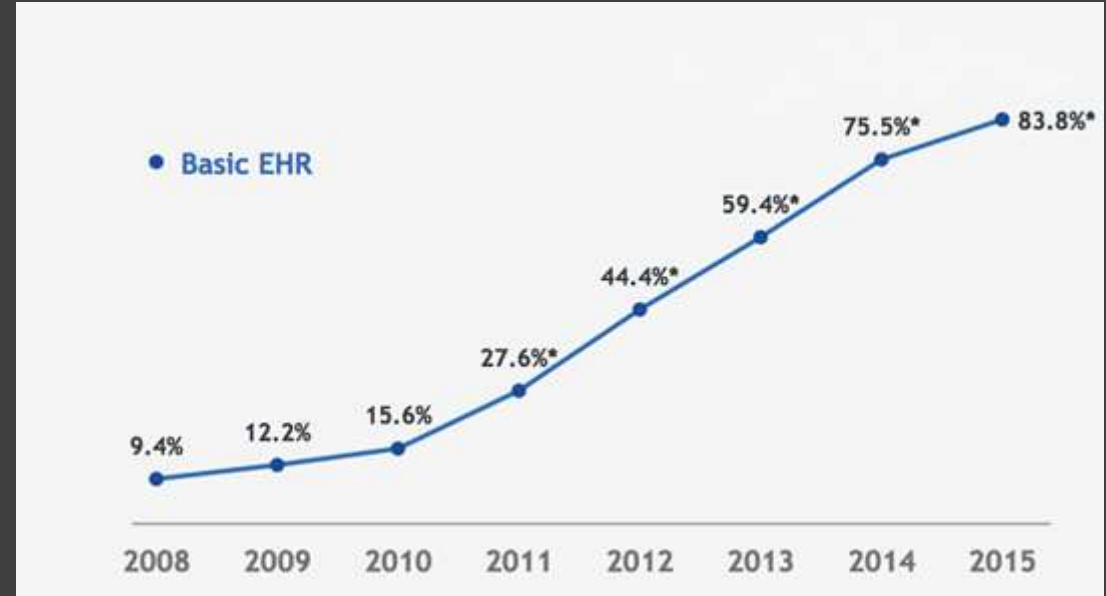
Structural Interoperability
UCSF X12, HL7 V2/V3

Semantic
Interoperability
(FHIR/SMART on
FHIR)

HITECH ACT & impact to EHR adoption

- Very successful in terms of implementation. 9.4% penetration in 2008 and 83.8% in 2015.
- Major EHR manufacturers won without much competition as health systems rushed to accept EHRs in order to qualify for the time limited incentives.

EHR Adoption in US



HITECH Act Shortfalls

- **Failed:**
 - To push interoperability
 - To advance Clinical Decision Support into EHRs

Present Day EHR Challenges

EHR's are now seen as a major cause of professional burnout.

"Prescriptive design, use, and certification demands by the federal government have driven the design of EHRs to focus on CMS reporting requirements, largely ignoring the needs of physicians and patients."

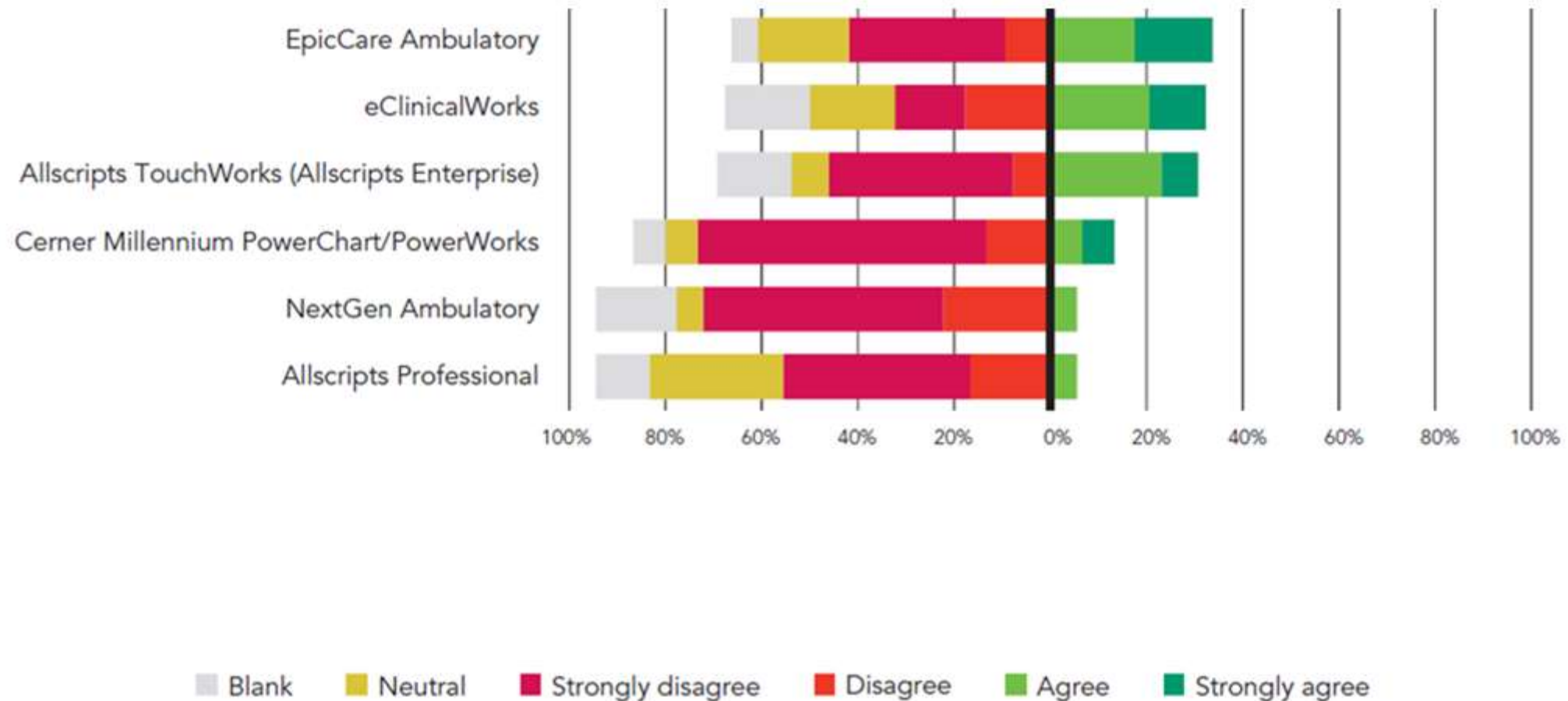
Clinicians spend almost half their professional time typing, clicking, and checking boxes, only 33% of their work hours on direct clinical work.

Clinician makes ~4000 clicks during a 10 hour ED shift.

Harvard Business Review estimated this cost was over \$365 billion dollars a year.

Only 28% of physicians would agree that productivity has increased because of EHR.

AGREEMENT WITH THE STATEMENT "I AM HAPPY WITH OUR NEW EHR SYSTEM"



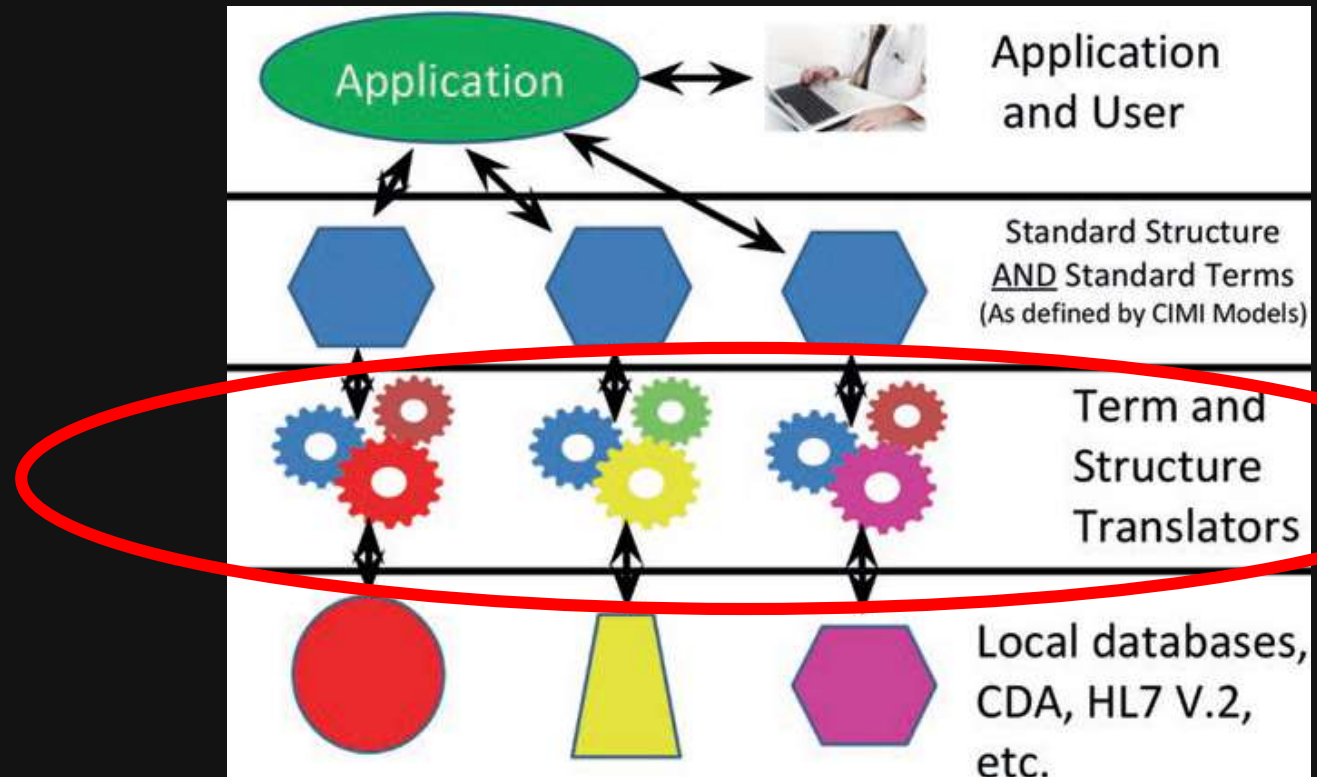


There is hope...

advancements in
interoperability

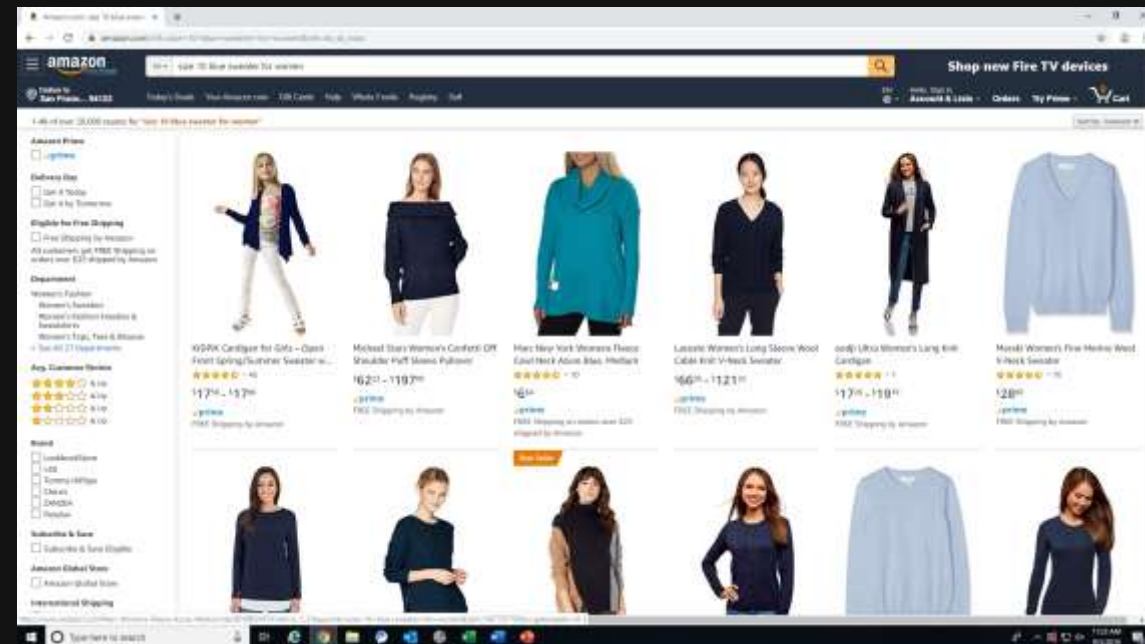
“FHIR”

FHIR: Solution to Semantic Interoperability



https://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Daps&field-keywords=size+10+blue+sweater+for+women

Representational
State Transfer
(REST).



HL7: FHIR (Fast Healthcare Interoperability Resources) Standard

- Interoperability based on REST (REpresentational State Transfer) API.

[http://hapi.fhir.org/baseDstu3/Condition?code= http://snomed.info/sct|73211009](http://hapi.fhir.org/baseDstu3/Condition?code=http://snomed.info/sct|73211009)

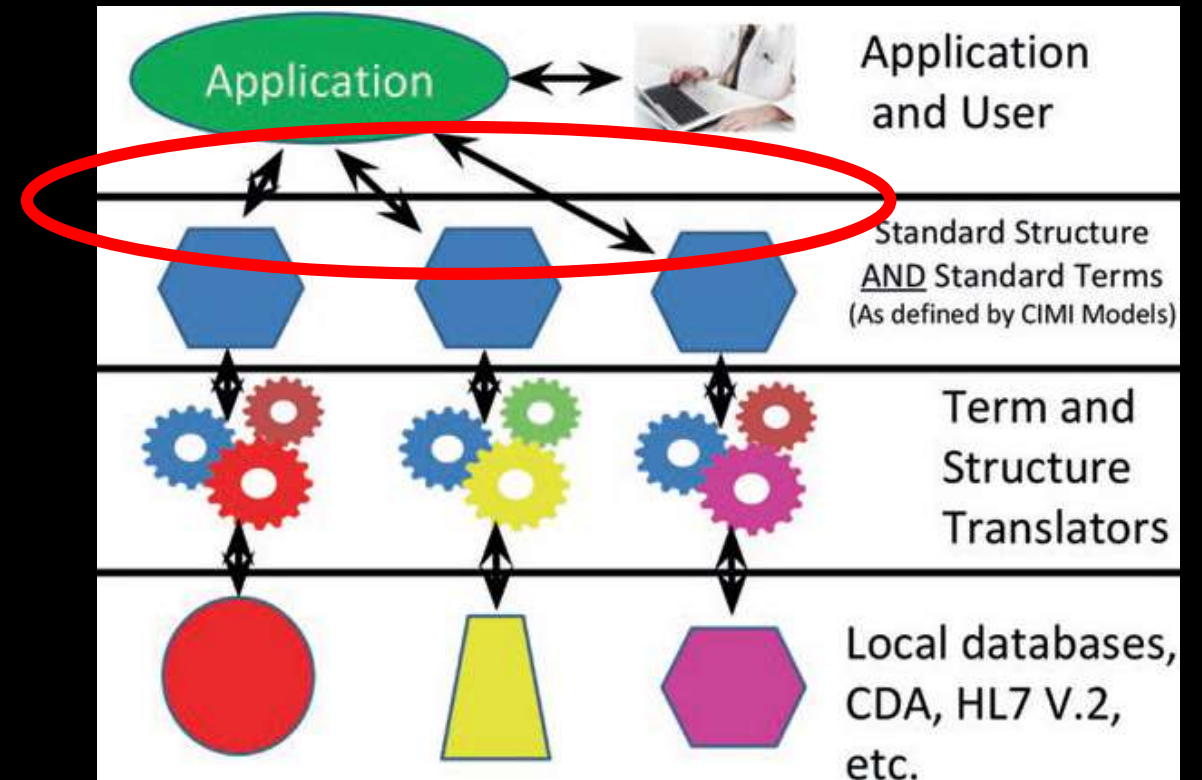
Blue: Specifies the server where the info is stored.

Green: Specifies the resource that is desired

Yellow: provides sufficient info for the server to retrieve the correct resources.

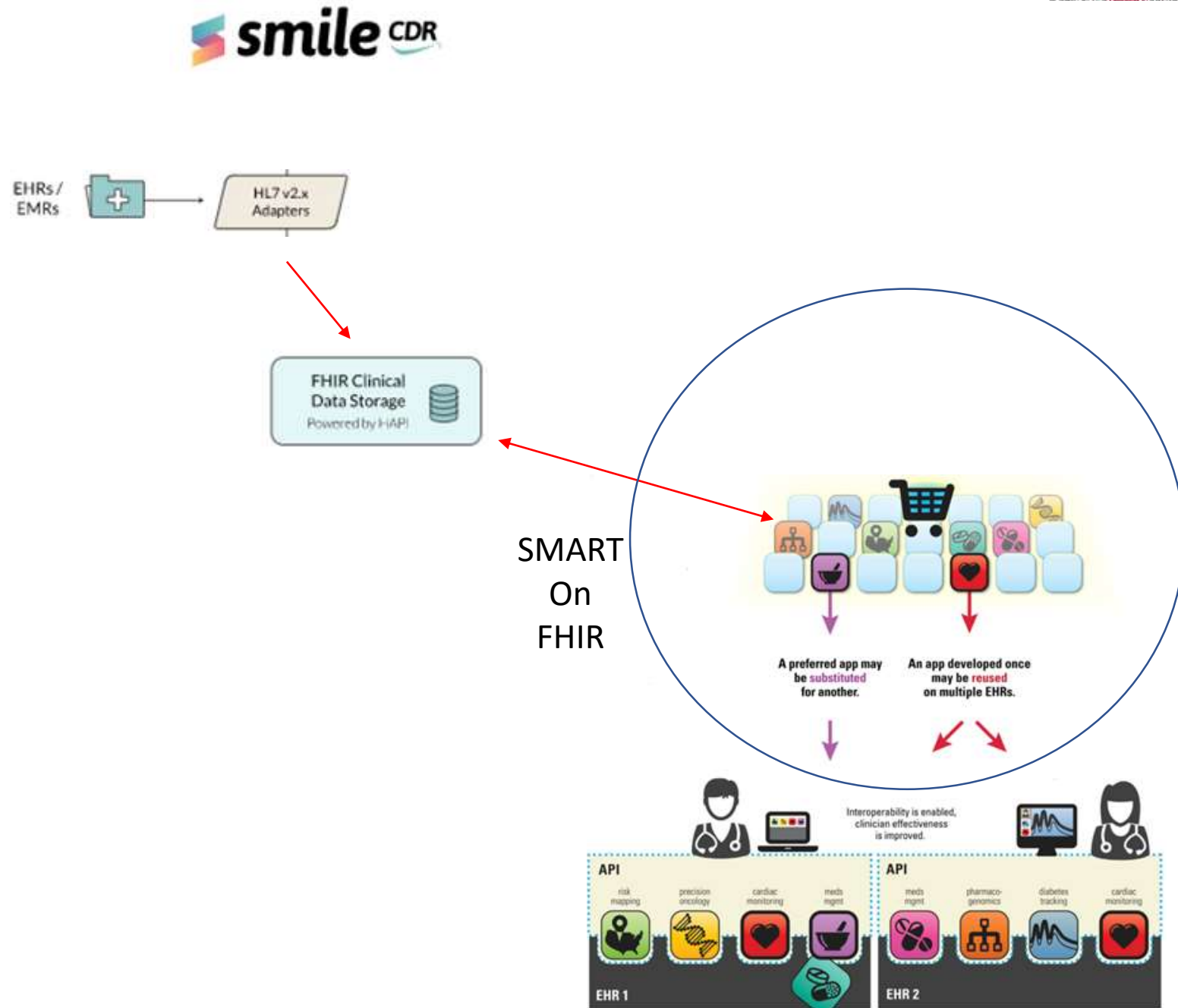
- This API is asking for all patients on a specified FHIR server who have a diagnosis (Condition) SNOMED CT-coded as 73211009 (diabetes)

FHIR: Solution to Semantic Interoperability



Vision of the Future:

- Get our EHR to be fully FHIR enabled and/or
- Third Party Integrator “SMILE CDR” to Extract the NEXT Gen database into a FHIR CDR.
- Once in a FHIR standard we can develop our own apps/middle ware, leveraging our clinical experience, especially in the area of workflows.



Best Practices NextGen Summits aka Koi Underground



Common Goals

- Identifying challenges/pain points shared by organizations using NextGen
- Sharing best practices on customized templates, workflows, and innovations
- Presenting as a collective voice to NextGen EHR Leadership Team

Participating Organizations:

- El Rio Community Health Center
- Lone Star Circle of Care
- Mariposa Community Health Center
- Presbyterian Medical Services
- Waianae Coast Comprehensive Health Center
- North East Medical Services

Best Practices NextGen Summits

- March 23rd-24th, 2019 Summit #1
- May 19th, 2019 Technical call
- June 14th, 2019 Summit #2

First Summit: March 23rd-24th, 2019

- Each organization shared:
 - IT infrastructure
 - NextGen layout (version, integrations, customizations)
 - Each organizations' commitment to and outlook on NG
 - Successful enhancements/innovations
 - Pain points, challenges
 - Most wanted features



Summary of Challenges:

- Functionality of Patient Portal
- User interface - too many clicks and templates
- Templates take too long to load; editing flexibility
- Lack of integration
- Lack of order sets
- License structure
- Not intuitive
- Not at the forefront of innovations
- Stability on system performance
- Fixing issues with “patches” which can affect other pieces
- Upgrades - especially for 24/7 facilities

Summary of Wanted Features:

- Improve user experience
- More robust Patient Portal
- More comprehensive templates
- Web interface / Mobile base
- Better application load time
- Tighter EDR integration
- More comprehensive API
- Ease of interoperability set up
- Improved clinical decision support tools
- Fill & Sign forms in PAQ
- Fill Dates in Med Module
- Order Sets including medication
- CDS Engine
- AI/Machine Learning

Behavioral Health Template at PMS

BEHAVIORAL HEALTH

- The BH suite of templates consist of customized templates that ensure the required documentation is completed before the clinician can submit billing.
- Each client will have a completed BHA, an order for service(s), a goal established for each service, and a generated note for each visit. Documentation and time entered codes claim

Patient Name: Melissa H Test DOB: 06/17/1971 Gender: F Age: 47 Years Patient Program: ☐ IOP ☐ MST ☐ ACT ☐ No Program ☒ RTC ☐ Treat First

Specialty: Behavioral Health Visit type: Follow up BHA Rendering Provider: Deborah Bankson LCSW J Alerts

Status: ☐ New patient ☒ Established patient Historian Translator RTC Shift Document

BH Home BHA Progress Specialty Progress Psych Pharm Service Plan Billing RTC Note

Reason(s) for Visit

Problem List 6 ☐ Show chronic ☐ No active problems View Mappings ☐ Show my tracked problem

Last Addressed	Problem Description	Onset Date	Chronic	Secon
	Generalized anxiety disorder		N	
02/13/2019	Bipolar 1 disorder		Y	

Referring MD | PCP Info Patient Service Info Advance Directives Primary Language Spoken Spanish Tobacco MU Status Light tobacco smoker Tobacco Use Status yes, cigarette Last Updated 03/08/2019

click "Tobacco Use" >> Tobacco Use Add Edit

Health Home Template at PMS

ACA SECTION 2703 – HEALTH HOME

- This suite of templates allows for compliance with Section 2703-Health Homes; Care Coordinators complete a Comprehensive Needs Assessment and an individualized Care Plan for each enrollee.
- The templates also meet the requirements for the state Carelink NM Health Home program.

Specialty ▼ Care Management Visit Type ▼ Care Management

CC PROGRESS CC CNA CARE PLAN (NG) CC BILLING

Care Guidelines | TYPE OF CARE COORDINATION ☒ PHP ☐ Carelink ☐ Care Coordination Panel Control:

CARE COORD DETAILS

FROM PHP ☐ Initial CNA not performed by PMS
HRA Received ☐ Yes ☐ No HRA Received Date 06/01/2018 If Patient established with CareLink prior to 4/16/2018 Click the "YES" ☐ YES Already in CLNM with PMS
HRA Performed Date // By clicking the YES you will be able to manually enter the Initial and Repeat --Dates and Level of Care

PMS CARE COORDINATOR first name last name
Assigned Care Manager Deborah Correnti, RN

PMS CNA DETAILS AND DATES (completed when doing the CNA)
Initial CNA Due Date 07/01/2018 Initial CNA Performed ☐ Yes ☐ No Initial CNA Performed Date 06/11/2018
Initial Level of Care Level 3 Initial NFLOC ☐ Yes ☐ No Initial CNA Interval 6 Months
Repeat CNA Due Date 12/11/2018 Repeat CNA Performed ☐ Yes ☐ No Repeat CNA Performed Date //
Repeat Level of Care Repeat NFLOC ☐ Yes ☐ No Update CNA Interval
Reason for Repeat Reassessment/CNA

MEMBER DETAILS
Not Engaged/Uncooperative ☐ Yes ☐ No
Refuses Care Coordination ☐ Yes
Unable to Contact ☐ Yes
Attempted Contact Dates 1. // 2. //

LAST APPOINTMENTS
Last Medical Appointment // For At
Last BH Appointment // For At

NEMS Customized Templates

- Templates (~80 customized templates as of last upgrade Feb 2018)
- Provider alerts at checkout template. Currently 26 alerts.
- Diseases Registries: DM, HTN, TOB, Hep B

Anna Test (F) DOB: 12/28/1986 (32 years) Weight: 125.00 lb (56.70 Kg) Alerts 6 Allergies 43 Problems 49 Diagnoses 723 Medications 42

Address: 123 4TH ST
INVALID, CA 99999
Contact: (111) 111-1111 (H)...

Pref. Language: Vietnamese
Patient Portal:

Pt Type: Y
GYN:
DEN: Cordelia Achuck DDS

PCP: Tam, Michelle MD
Referring:
Rendering: Chan, Maymie DC

Enc. Insurance: PMGSJ Commercial

OBGYN Details Preferred Pharmacy Sticky Note Referring Provider HIPAA Advance Directives Screening Summary

03/21/2019 11:08 AM : "**Checkout" x

Specialty Internal Medicine Visit Type Office Visit Care Team Contagion Risk 0 Pt Type: Y CCM: Unenrolled DM Hep B HTN

Intake Histories SOAP Finalize Checkout

Demographics Order Management Document Library Tobacco Cessation Counseling Flu Questionnaire My Plan

Care Guidelines Ins1: PMGSJ Commercial Ins2: Ins3:

Patient Status (EPM): Outside PCP Status Reason: Moved Out of Area

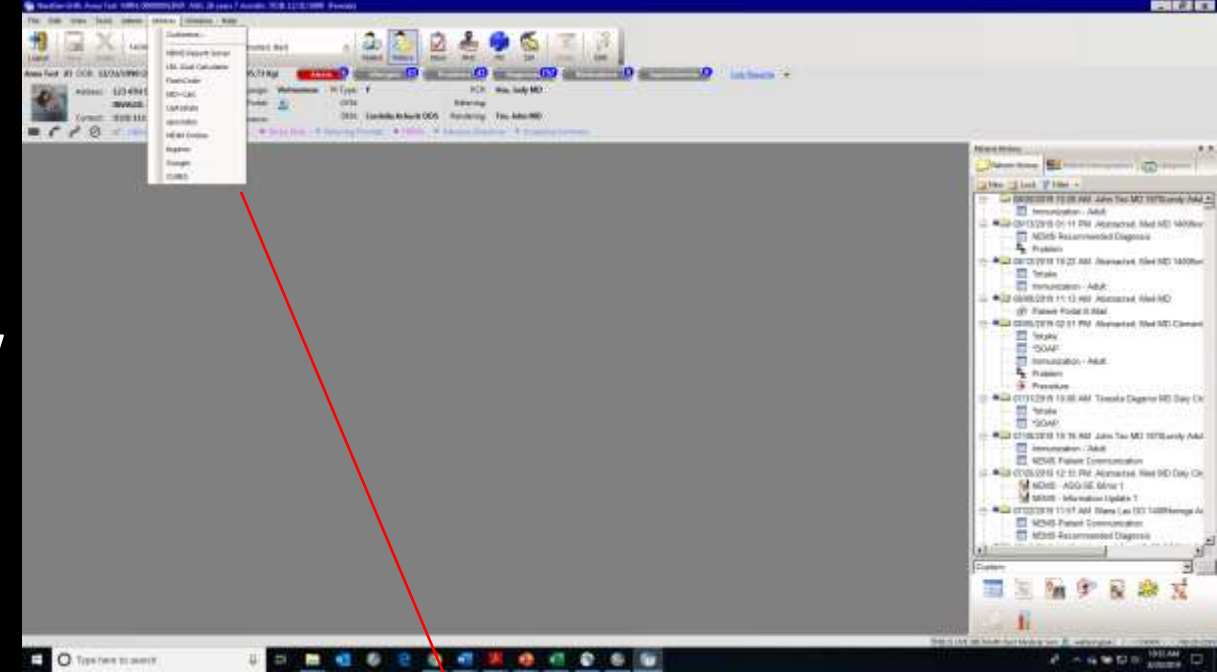
Provider Alert Action ☐ Make Today's Encounter Confidential

Medication Reconciliation is needed - CCD Received
Allergy Review not done
No follow up visit has been ordered.
Vital signs not entered
Missing PE or ROS components

Action Refresh

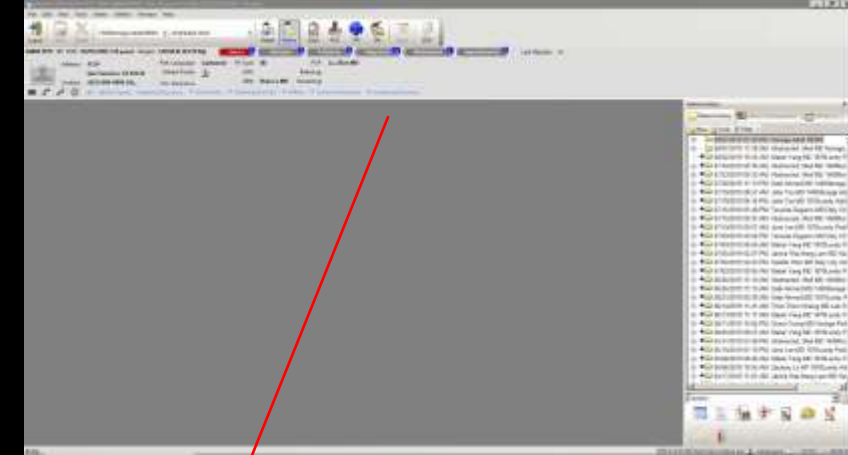
CDS at NEMS (Utilities)

- Consists mainly of a pull-down window “Utilities”
- Once selected opens a separate non-integrated web page.
- All patient data needs to be reentered into these systems.
- Many need separate log-ins to access.
- Physicians are basically stuck with a template driven system mimicking paper records.

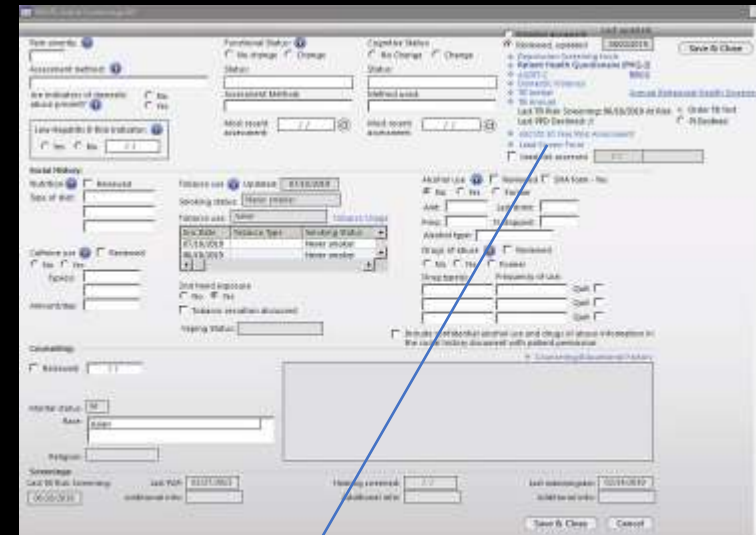


CDS at NEMs: ASCVD Risk

- Hard to integrate into template based systems.
- Atherosclerotic Cardiovascular Disease (ASCVD) Estimator band aid.
- Multiple clicks to arrive at ASCVD calculator.



Screening Summary



ASCVD 10 Year Risk Assessment

ASCVD Risk Assessment

Pt Type: B+Y HTN
CCM: Eligible

Age 70 Sex F
Race WH

Total Cholesterol (mg/dL) 209
From Apr 4 2019 9:56AM

HDL Cholesterol (mg/dL) 38
From Apr 4 2019 9:56AM

Systolic Blood Pressure 123
From Aug 21 2019 3:49PM

☐ Diabetic
☐ Smoker
☒ Treatment for High Blood Pressure

Comments

Calculate

12.7 Your 10-Year ASCVD Risk (%)

6.9 10-Year ASCVD Risk (%) for Someone Your Age with Optimal Risk Factor Levels

39 Your Lifetime ASCVD Risk* (%)

8 Lifetime ASCVD Risk (%) for Someone at Age 50 with Optimal Risk Factor Levels

Add Screening Assessment

Lab Results History

Date of Lab Test	Total Cholesterol	HDL Cholesterol
04/04/2019	209	38
10/08/2018	180	36
05/03/2017	177	39
10/25/2016	204	43
02/17/2016	190	31
03/02/2015	189	44
09/23/2014	204	39
10/17/2012	188	42
08/19/2011	177	38
03/21/2011	183	

Blood Pressure History

Encounter Date/Time	Vital Signs Time	Blood Pressure	Measured By
08/21/2019 03:45 PM	3:49 PM	123/71	Sally(SaiHong) Wong,
07/18/2019 02:15 PM	1:55 PM	119/72	Sally(SaiHong) Wong,

Medication List

Generic Name	Start Date	Date Last Refilled
amlodipine besylate	01/16/2019	01/16/2019
aspirin	01/16/2019	01/16/2019
calcium carbonate/vitamin D3	01/16/2019	01/16/2019
gabapentin/hydrochlorothiazide	02/19/2018	

Assessment History

Encounter Date	Documented BP Date/Time	Instrument	Score	Sev
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CDS at NEMs (ASCVD Risk Assessment)

- Auto populates patients age, blood pressure readings and lipid labs.
- Gives a 10 year ASCVD risk.
- But no recommendations.

10-Year ASCVD Risk
12.7% calculated risk

6.9% risk with optimal risk factors

Lifetime ASCVD Risk
Lifetime Risk Calculator only provides lifetime risk estimates for individuals 20 to 59 years of age.

Recommendation

Based on the data entered (assuming LDL-C < 190 mg/dL (4.92 mmol/L), no ASCVD, not on LDL-C lowering therapy)

Moderate intensity statin is recommended for patients with LDL-C 70-189 mg/dL (1.7 to 4.8 mmol/L), if decided upon as part of a clinician-patient discussion. LDL-C should be reduced by at least 30%, (I,A)

- Presence of risk enhancing factors or certain comorbidities favor statin initiation.
- ASCVD risk enhancers include family history of premature ASCVD; persistently elevated LDL-C ≥ 160 mg/dL; CKD; metabolic syndrome; conditions specific to women; inflammatory diseases; ethnicity factors; persistently elevated triglycerides (≥ 175 -499 mg/dL); hs-CRP ≥ 2.0 mg/L; Lp(a) levels ≥ 50 mg/dL or ≥ 125 mmol/L; apo B ≥ 130 mg/dL. See recommendations below for more details.
- If the decision to use statins remains uncertain after risk assessment and discussion, it is reasonable to use a CAC score as part of the decision-making process. (IIa, B)

Lifestyle Recommendations

Inputs

Sex: Female
Age: 70
Race: Other

Total Cholesterol: 209 mg/dL
LDL-C: 160 mg/dL

Examples of SMART on FHIR in EHR

- Duke Universities “Cardiac Risk” SMART on FHIR.
- Runs within Cerners power chart HER(FHIR compatible)
- The app is accessed from an entry in the same menu physicians used to do other charting.
- Appears to be part of EHR, but actually a web app running on separate server.
- Integrated with EHR, so when open patients data autopopulates.

Gromeko, Amalia | DOB: 02/13/1944 | Age: 71 years | Sex: Female | Allergies: Penicillins
Weight: 187 lbs. | MRN: 200365448 | FIN: 1005-63251

Menu - All | Patient Information | Data Reconciliation | Multimedia Manager + Add | I-view new | Allergies | SMART CommonWell Viewer | SMART Bilirubin | SMART Growth Chart | SMART BP Centiles | SMART Medication | SMART VisualDx | **SMART Cardiac Risk** | SMART Healthwise | SMART Health Ally | SMART Crimson Care Mgmt | SMART ExpertCONNECT | SMART enrG Rheum | VDpA MPage for Comp & Can/DC... | MAR | Intake and Output | Clinical Notes | Flowsheet | Overview | ICU Flowsheet | Task List | Discern Report | MAR | Intake and Output | Vitals

SMART Cardiac Risk

Bloodwork Cardiology Result

Patient info
NAME: Amalia Gromeko
GENDER: F AGE: 71 DOB: 1944-02-13

Note: these results are valid for non-diabetics only!
● Current smoker?
○ Family history of heart attack?
Systolic blood pressure

1 About this test
This report evaluates your potential risk of heart disease, heart attack, and stroke.

2 Your Results

CRP level test
Low risk 0 mg/L | Average 1-3 | High risk of cardiovascular disease 3-10
3.4

Total cholesterol level
Desirable 0 mg/dL | Borderline 200-239 | High 240+
220

LDL "bad" cholesterol
Optimal 0 mg/dL | Near Optimal 100-129 | Borderline high 125-159 | High 160-199 | Very high 200+
180

HDL "good" cholesterol
Low 0 mg/dL | Normal 100-129 | High 129-159
32

3 Your risk You show an elevated risk of cardiovascular disease

If you're a smoker with normal blood pressure (130 mm/Hg) but family history of heart attack before the age of 60 (one or both parents) your risk over 10 years is:

35%

Your risk would be lowered to:
20% if your blood pressure were 120mm/Hg
4% if you didn't smoke and all levels were optimal
17% if you quit smoking

Use your test results to calculate your risk of a cardiovascular event at ReynoldsRisk.org

4 What now?

- Diet and exercise can improve your cholesterol levels
- Quitting smoking can decrease your heart disease risk by 50% or more
- Ask your doctor about statins or other medications that can lower cholesterol
- Consider retesting in 1 or 2 weeks to exclude a temporary spike in blood levels

Original Design: David McCandless & Stefanie Posavec for Wired Magazine // informationisbeautiful.net
Reynolds Risk Score Calculator // ReynoldsRiskScore.org
Development and validation of improved algorithms for the assessment of global cardiovascular risk in women: The Reynolds Risk Score. Ridker et al. JAMA 2007;297:811-818
C-reactive protein and parental history improve global cardiovascular risk prediction: The Reynolds Risk Score for Men. Ridker et al. Circulation 2008;118:2243-2251

1400Noriega Adult NEMS Abstracted, Med

Patient History Inbox PAQ PM DM Close EDR

DOB: 04/01/2001 (18 years) Weight: 140.00 lb (63.50 Kg)
 Alerts ²
Allergies ²
Problems ⁵
Diagnoses ³¹
Medications ⁷
Appointments ⁰
Lab Results

Address: 4124
 San Francisco, CA 94134
 Contact: (415) 999-9999 (H)

Pref. Language: Cantonese
 Patient Portal:

Pt Type: (B)
 GYN:
 DEN: Zhen Lu MD

PCP: Lu, Zhen MD
 Referring:
 Rendering:

Enc. Insurance:

[OBGYN Details](#) | [Preferred Pharmacy](#) | [Sticky Note](#) | [Referring Provider](#) | [HIPAA](#) | [Advance Directives](#) | [Screening Summary](#)

NextGen (NEMs Traditional EHR)

- Template based mimics paper-based charting.
- “Dumb Database”
- NOT FHIR enabled/compatible
- In order to review the patient's medical history.
 - Provider needs to scroll through a large list of previous visits.
 - There is no intuitive way to know what the visit is, for example the previous visits are organized by date and only the clinician name that opened the previous encounter is given. There is no indication of whether it's a specialists, or type of visit.

Patient History

[Patient History](#)
[Patient Demographics](#)
[Categories](#)

[New](#)
[Lock](#)
[Filter](#)

08/07/2019 01:00 PM	Noriega Adult NEMS
08/07/2019 11:28 AM	Abstracted, Med MD Noriega
08/02/2019 10:54 AM	Mabel Yang MD 1870Lundy P
07/30/2019 09:39 AM	Abstracted, Med MD 1400Nor
07/23/2019 09:33 AM	Abstracted, Med MD 1400Nor
07/20/2019 11:13 PM	Sabi Ahmed MD 1400Noriega
07/19/2019 08:57 AM	John Tso MD 1400Noriega Ad
07/18/2019 04:14 PM	John Tso MD 1870Lundy Adul
07/15/2019 01:48 PM	Teresita Degamo MD Daly Cit
07/15/2019 09:25 AM	Abstracted, Med MD 1400Nor
07/10/2019 09:27 AM	June Lee MD 1870Lundy Pedi
07/09/2019 02:04 PM	Teresita Degamo MD Daly Cit
07/09/2019 08:56 AM	Mabel Yang MD 1870Lundy P
07/05/2019 02:27 PM	Jackie Wai-Hang Lam MD Nor
07/05/2019 02:23 PM	Sandar Htun MD Daly City Ad
07/02/2019 09:05 AM	Mabel Yang MD 1870Lundy P
06/25/2019 11:12 AM	Abstracted, Med MD 1400Nor
06/24/2019 11:13 AM	Sabi Ahmed MD 1400Noriega
06/21/2019 09:36 AM	Sabi Ahmed MD 1870Lundy A
06/14/2019 11:41 AM	Thinn Thinn Khaing MD Lab S
06/13/2019 11:17 AM	Mabel Yang MD 1870Lundy P
06/11/2019 12:04 PM	Grace Fuong MD Noriega Ped
06/05/2019 08:47 AM	Mabel Yang MD 1870Lundy P
05/31/2019 03:36 PM	Abstracted, Med MD 1400Nor
05/10/2019 01:10 PM	June Lee MD 1870Lundy Pedi
05/08/2019 08:46 AM	Mabel Yang MD 1870Lundy P
05/06/2019 10:05 AM	Zachary Lo NP 1870Lundy Ad
04/17/2019 11:01 AM	Jackie Wai-Hang Lam MD Nor

Custom

THIS IS LIVE DB | North East Medical Serv | wahpingluk | CAP | NUM | SCRL | 08/08/2019

Juxly Timeline:SMART on FHIR App

Patients visit data is presented in a timeline format chronologically.

The screenshot displays the Juxly Timeline:SMART on FHIR App interface. The main timeline shows a chronological list of patient encounters and events. On the right, there are expandable sections for Allergies, Medications, Surgical History, Problems, Social History, and Immunization History. The bottom status bar shows various filters and the Juxly logo.

Timeline Events:

- 10/14/2014 8:44 am:** Inpatient at Baseline East Medical Center, BE Hospital. Event icon: Hospital bed. Associated with a long list of medical staff including McCurdy, Michael, Wilks, Josh, Lockwood, Tina, Houde, Darrell, Thomas P, Olenginski-Like MD, Strecker, Bradley, SYSTEM, SYSTEM, Argonaut, Test, Dx, On, Dickey, Doug, Zafar, Shahzad, O'keeffe, Jim, Tweten, Michael, Green, Rebecca, McCready, Tim, Hanusch, Paul, Gadre, Kaustubh, Vincent, Kelly, PCTAUT, DocsB, PCTAUT, DocsD, Cutty, Lisa, Timilsina, Manisha, Schile, Matt, At Home RN, Care, Davis, Kim, Nelson, Scott, Howdeshell, Tami, Hopper, Grace, Christi, Davis, Portal, Portal, Hanov, Yegor, Rani, Uma, Michael, Yops, PctAudit, Test5, Burden, Crystal, Henkes, Matt, Howdeshell, Greg.
- 10/13/2014 11:12 am:** Outpatient Message at Baseline East Medical Center. Event icon: Phone. Associated with Franks, Stacey.
- 10/7/2014 12:28 pm:** Medication event for aspirin (aspirin 1 g oral powder). 1 packets, Oral, Daily, 2 packets, PRN: Instruct. Stopped: 10/7/2014 -. Associated with Henkes, Matt.
- 10/6/2014 12:13 pm:** Medication event for lisinopril (lisinopril 40 mg oral tablet). 1 tabs, Oral, Daily, 30 tabs, PRN: Instruct. Stopped: 10/6/2014 - 6/10/2016. Associated with Dickey, Doug.
- 10/5/2014 11:00 pm:** Outpatient at Baseline East Medical Center. Event icon: Person. Associated with Howdeshell, Tami, Matcuk, Josh, Franks, StaceyPhys, Franks, Stacey.
- 10/2/2014 1:26 pm:** Medication event for NS 1000 mL. 30 mL/hr, IV. Associated with Davis, Kim.

Right Panel Details:

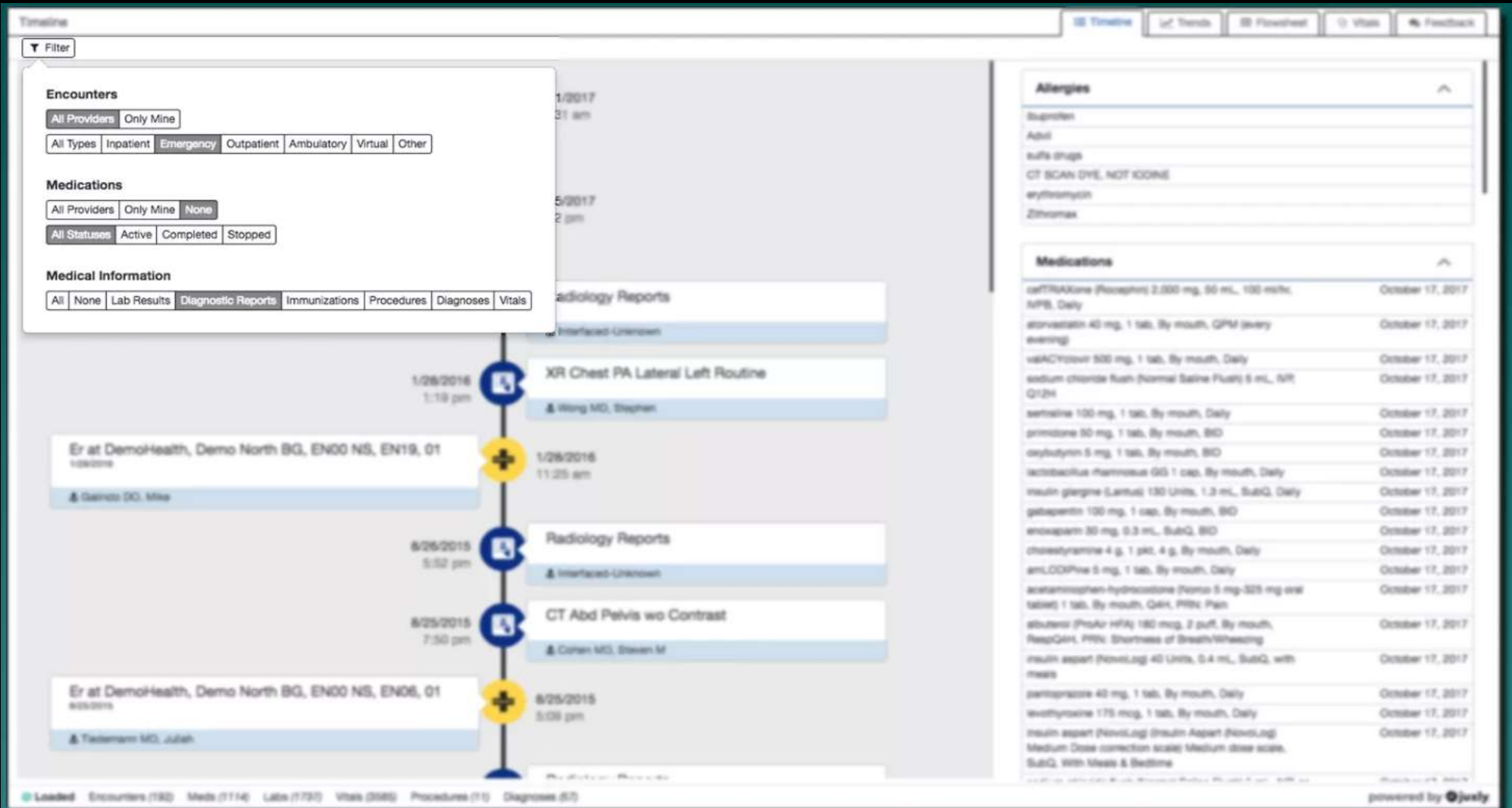
- Allergies:** (Empty)
- Medications:** (Empty)
- Surgical History:** (Empty)
- Problems:** (Empty)
- Social History:**
 - Exercise Duration: 23, Frequency : 1-2 times/week
 - Employment/School Status: Employed, Activity level: Occasional physical work, Highest education level: High school, Hazardous equipment operation: Yes, Work hazards: Hazardous materials
 - Alcohol Current, Type: Beer, Wine, Liquor, Daily, 3 drinks/episode average, 10 drinks max/episode, Started age: 15 Years, Previous treatment: None, Interferes with work or home: No, Drinks more than intended: No, Ready to change: No, Household concern: No
 - Tobacco Never smoker, Type: Chewing tobacco, Cigarettes, Pol per day, Household concerns: No, Total pack years: 6, Previous treatment: Counseling, Hypnosis,
 - Substance Abuse Current, Type: Methamphetamines, 1-2 times per week
 - Sexual sexually active: Yes, number of current partners: 1, number of lifetime partners: 1, sexual orientation: Heterosexual, history of sexual abuse: Yes
 - Other
 - Other Drug Addict
 - Home/Environment Lives with: Alone, Living situation: Home with assistance, Home equipment: Glucose monitoring, Alcohol abuse in household: Yes, Substance abuse in household: No, Smoker in household: Yes, Feels unsafe at home: Yes, Safe place to go: No, Name of agencies notified: 23, Family/friends available to help: Yes, Concerns for family members at home: Yes, Major illness in household: Yes, Financial concerns: No, Religious restrictions: Blood products, Concerns over tv/computer/game use: Yes, Environment risks: Does not wear helmet
- Immunization History:**
 - cholera vaccine

Bottom Status Bar:

Loaded Encounters (18) Meds (270) Labs (94) Vitals (2) Procedures (21) Diagnoses (6) powered by juxly

Juxly Vault

All this information can be filtered, by encounter type, medications, even by diagnosis.



The screenshot displays the Juxly Vault interface, which provides a comprehensive view of a patient's medical history. The main timeline shows several encounters, including ER visits and radiology reports, with associated dates and times. A filter menu on the left allows users to narrow down the data by encounter type, medications, and medical information. On the right, a detailed list of medications is provided, including drug names, dosages, and frequencies.

Filter Menu:

- Encounters:** All Providers, Only Mine, All Types, Inpatient, Emergency, Outpatient, Ambulatory, Virtual, Other
- Medications:** All Providers, Only Mine, None, All Statuses, Active, Completed, Stopped
- Medical Information:** All, None, Lab Results, Diagnostic Reports, Immunizations, Procedures, Diagnoses, Vitals

Timeline Encounters:

- 1/26/2016 1:18 pm: XR Chest PA Lateral Left Routine (Wong MD, Stephen)
- 1/26/2016 11:25 am: Er at DemoHealth, Demo North BG, EN00 NS, EN19, 01 (Garcia DO, Mike)
- 6/26/2015 5:52 pm: Radiology Reports (Interfaced-Unknown)
- 6/25/2015 7:50 pm: CT Abd Pelvis wo Contrast (Cohen MD, Steven M)
- 6/25/2015 5:08 pm: Er at DemoHealth, Demo North BG, EN00 NS, EN06, 01 (Tademann MD, Julia)

Medications List:

Medication	Frequency	Date
ceftroxone (Rocephin) 2,000 mg, 50 mL, 100 mg/mL, IVPB, Daily	October 17, 2017	
atorvastatin 40 mg, 1 tab, By mouth, QPM (every evening)	October 17, 2017	
valacyclovir 500 mg, 1 tab, By mouth, Daily	October 17, 2017	
sodium chloride flush (Normal Saline Flush) 5 mL, IV, Q12H	October 17, 2017	
sertraline 100 mg, 1 tab, By mouth, Daily	October 17, 2017	
primidone 50 mg, 1 tab, By mouth, BID	October 17, 2017	
oxycodone 5 mg, 1 tab, By mouth, BID	October 17, 2017	
lactulose 330 mg (GLO) 1 cap, By mouth, Daily	October 17, 2017	
insulin glargine (Lantus) 130 Units, 1.3 mL, SubQ, Daily	October 17, 2017	
gabapentin 100 mg, 1 cap, By mouth, BID	October 17, 2017	
enoxaparin 30 mg, 0.3 mL, SubQ, BID	October 17, 2017	
cholestyramine 4 g, 1 pkt, 4 g, By mouth, Daily	October 17, 2017	
amlodipine 5 mg, 1 tab, By mouth, Daily	October 17, 2017	
acetaminophen-hydrocodone (Pronox) 5 mg-325 mg oral tablet 1 tab, By mouth, Q4H, PRN: Pain	October 17, 2017	
gabapentin (ProAir HFA) 180 mg, 2 puff, By mouth, RespQ4H, PRN: Shortness of Breath/Wheezing	October 17, 2017	
insulin aspart (NovoLog) 40 Units, 0.4 mL, SubQ, with meals	October 17, 2017	
gabapentin 40 mg, 1 tab, By mouth, Daily	October 17, 2017	
levofloxacin 750 mg, 1 tab, By mouth, Daily	October 17, 2017	
insulin aspart (NovoLog) (Insulin Aspart (NovoLog) Medium Dose correction scale) Medium dose scale, SubQ, With Meals & Bedtime	October 17, 2017	

Footer: Loaded: Encounters (192) Meds (1114) Labs (775) Vitals (2085) Procedures (11) Diagnoses (57) powered by Juxly

NEMS HCC Reconciliation

- Another example of rigid template driven system.
- The physician selects the HCC of interest then its populated into another template “todays assessments”.
- This screen then needs to be closed.
- NEMS assessment screen needs to be opened.

NEMS Manage HCC Codes

Manage HCC Codes
This grid is only used to manage diagnoses for HCC coding. All other diagnosis updates should be entered using the Add or Update Assessment template or the Problems module.

Save & Close

HCC Diagnosis History
Note: HCC[Y] = HCC Code not addressed in Current Calendar Year HCC[Y] = HCC Code Addressed HCC[E] = Expired HCC Code

HCC	Code	Description	HCC Score	RxHCC Score	Last Addressed	Provider
[Y]*	G43.519	Migraine aura, persistent, intractable		0.135	2019/04/03	Shuk Fong Tang NP
[Y]	E11.40	Type 2 diabetes mellitus with diabetic neuropathy, without long-term current use of insulin	0.318	0.379	2019/07/23	Abstracted, Med MD
[Y]	E11.22	Type 2 diabetes mellitus with stage 3 chronic kidney disease, with long-term current use of insulin	0.318	0.379	2019/07/15	Teresita Degamo MD
[Y]	Z79.4	Long term (current) use of insulin	0.104	0.249	2019/07/15	Teresita Degamo MD
[Y]	J45.20	Mild intermittent asthma, uncomplicated		0.334	2019/07/15	Abstracted, Med MD
[Y]	I10	Essential hypertension		0.152	2019/07/23	Abstracted, Med MD
[Y]	K21.9	Gastroesophageal reflux disease, esophagitis presence not specified		0.098	2019/07/23	Abstracted, Med MD
	R53.82	Chronic fatigue			2019/07/15	Abstracted, Med MD
	N18.3	Chronic kidney disease, stage 3 (moderate)			2019/07/15	Teresita Degamo MD
	R05	Cough			2019/07/15	Abstracted, Med MD

Dx description:
Code:
Status:
Side:
Site:

Impression/Assessment Comments:
Reason for Resolve:
Add
Resolved

Recommended Diagnosis
Reporting Period:

Code	Description	Comments	Coder Name	Response	Status	Source	Tr

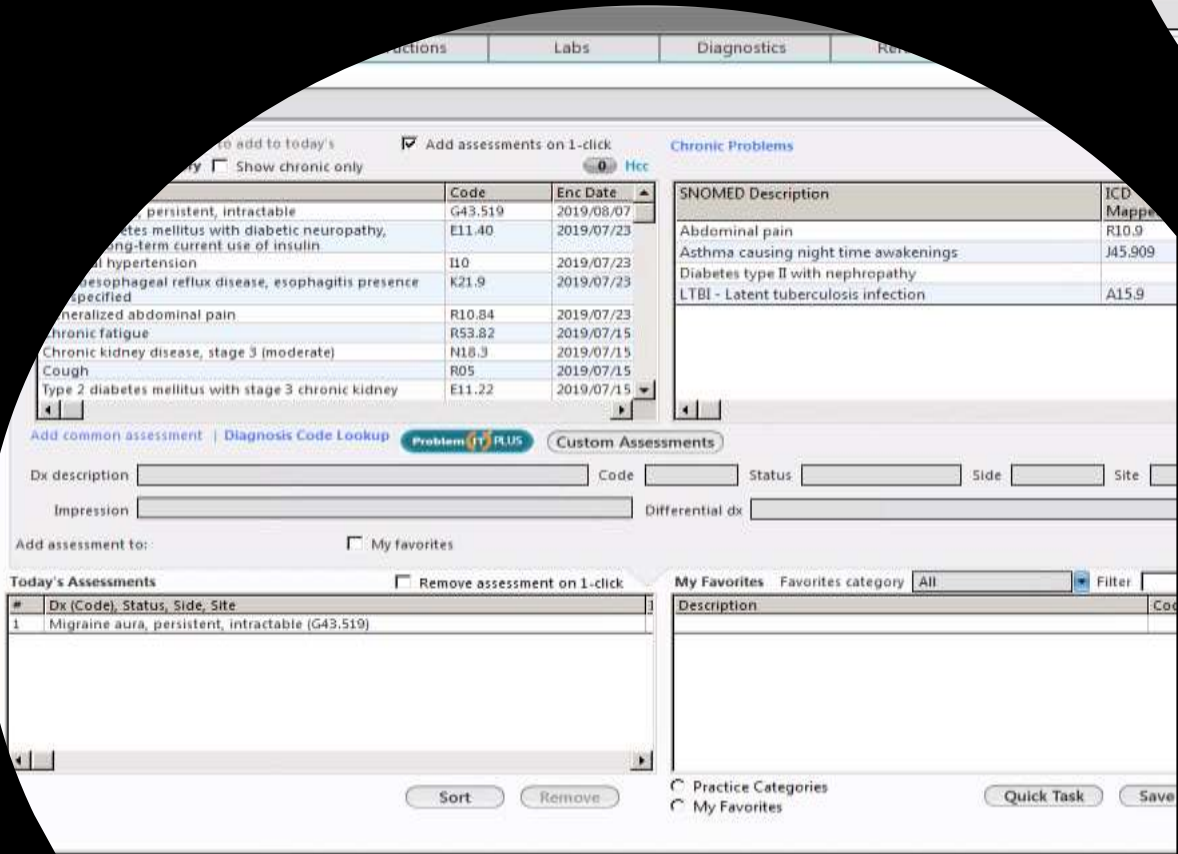
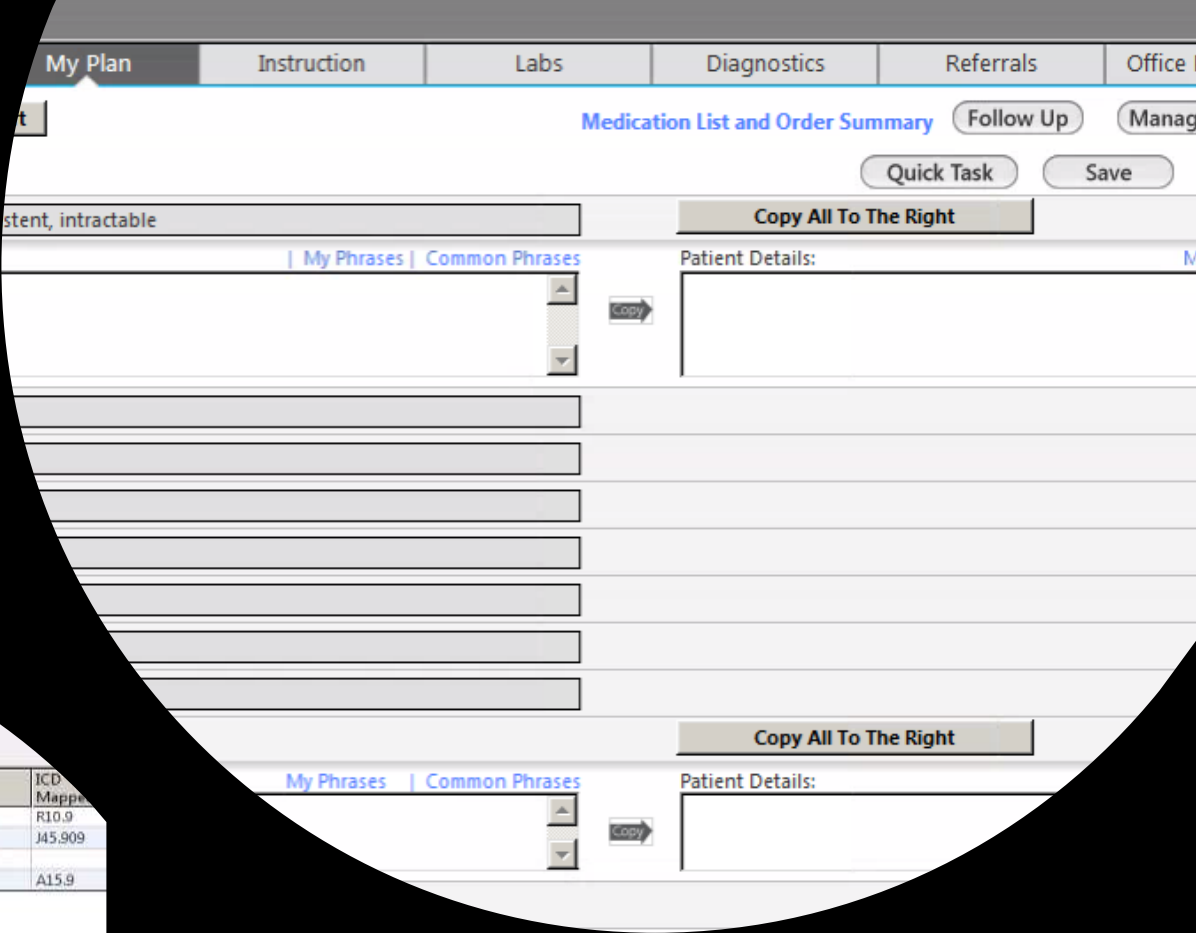
Provider Response:
☐ No Evidence of Disease
☐ Accepted
☐ Work-Up

Dx description:
Code:
Status:
Side:
Site:

Impression/Assessment Comments:
Add/Update

NEMS HCC Reconciliation

- The Documentation needs to be free typed; this template driven process is non-intuitive.



Juxly Vault:SMART on FHIR HCC Reconciliation

- HCC Conditions are clearly organized.
- Green is already reviewed
- Yellow needs documentation

The screenshot displays the 'Juxly Vault:SMART on FHIR HCC Reconciliation' interface. At the top, there is a navigation bar with a 'Less Healthy →' button and a search bar labeled 'Search HCC Problems (HCC ICD-10 Codes)'. The main content area is titled '2018 HCC Conditions' and is divided into two sections: 'This Visit' and 'Other Visits'. Each section contains a list of conditions with their corresponding ICD-10 codes and descriptions. The 'This Visit' section shows four conditions: 'Acute diastolic (congestive) heart failure' (I50.31, green), 'Chronic atrial fibrillation' (I48.2, yellow), 'COPD type A' (J43.9, green), and 'Facial bones fracture' (S02.92XA, yellow). The 'Other Visits' section shows two conditions: 'Major depressive disorder, single episode, in full remission' (F32.5, yellow) and 'Melanoma in situ of unspecified ear and external auricular canal' (D03.20, green). A legend at the bottom indicates that a blue circle represents a 'Non-HCC Code'. On the right side of the interface, there are additional filters and controls, including 'Prior', 'Cur', and 'Hist' buttons, each with a search icon.

Section	ICD-10 Code	Condition Description	Status
This Visit	I50.31	Acute diastolic (congestive) heart failure	Reviewed (Green)
	I48.2	Chronic atrial fibrillation	Needs Documentation (Yellow)
	J43.9	COPD type A	Reviewed (Green)
	S02.92XA	Facial bones fracture	Needs Documentation (Yellow)
Other Visits	F32.5	Major depressive disorder, single episode, in full remission	Needs Documentation (Yellow)
	D03.20	Melanoma in situ of unspecified ear and external auricular canal	Reviewed (Green)

✓ ICD-10 J43.9 COPD type A

Close

Save

Conditions

Help

2018 HCC Con

This Visit

✓ I50.31

Acute

✓ I48.2

Chro

✓ J43.9

COPD

502.92XA

Facia

Other Visits

↑ F32.5

Major

↑ D03.20

Melan

MEAT Documentation

Monitoring

Well-Controlled Controlled Poorly-Controlled Uncontrolled

Compensated Responding Deteriorating Progressing Regressing

Evaluation

Med Records Reviewed Lab Tests Reviewed X-rays Reviewed

Physical Exam Reviewed

HCC Documentation

Juxly HCC Documentation
DOS: 06-11-2018
Monitoring: Well-Controlled
Evaluation: Med Records Reviewed
Assessment: Stable/Unchanged
Treatment: Discussed Risks and Benefits of X-rays

Assessment

Stable/Unchanged Improving Worsening In Full Remission In Partial Remission

Well-Controlled on Meds Controlled on Meds Poorly Controlled on Meds Uncontrolled on Meds At Goal Near Goal Not At or Near Goal

Treatment

Labs:

Discussed Risks and Benefits of Labs

Discussed Ordered Lab Tests Lab Tests Ordered

X-rays:

Discussed Risks and Benefits of X-rays

Discussed Ordered X-rays X-rays Ordered

Treatment:

Discussed Risks and Benefits of Treatment

Discussed Ordered Treatment Treatment Ordered

Patient Referred for Treatment

Initiate Medications:

Discussed Risks and Benefits of Meds

Discussed Ordered Meds Medications Ordered

Manage Medications:

Discussed Side Effects of Meds Discontinue Meds

Continue Meds Same Dose

Continue Meds Increase Dose

Continue Meds Decrease Dose

Teaching:

Discussed Tobacco Cessation

Discussed Alcohol Intake

Discussed Diet or Exercise Discussed Care Plan

Patient Given Educational Info

Records:

Medical Records Received from PCP Records Requested from Provider Letter Sent to PCP Letter Sent to Provider

Problem Details

Juxly Vault: SMART
on FHIR HCC
Reconciliation

CDS support: Guided documentation of
HCC conditions to fulfill M.E.A.T Criteria

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Conclusions on First Summit:

- Future collaborations on:
 - Sharing of workflows using scribes
 - Customized templates
 - Telemedicine development
 - Kiosks/tablets information collection
- Collective voice to meet with NG Leadership on improvement on:
 - API interoperability
 - EDR integration
 - patient portal & user experience enhancement
 - Reporting and analytics
- Formation of a LLC aka “Koi Underground” for intellectual property for customized templates, EMR agnostic middleware, innovations



Second Summit: June 14th, 2019

- Meeting with NG Chief Solutions Officer & EVP, John Beck
 - Embrace NextGen as partners
 - High level tactical roadmap of NG
 - Hold NG accountable within timeframe
 - Focus on what and when, resources/efforts, roadmap/results
 - Talk to the right person/subject matter expert
 - Ultimately tie everything back to improving patient care
 - Voice Koi UG top 5 challenges

Conclusion and follow up:

- NG offered Koi UG
 - Collectively a single voice account executive;
 - FHIR running on top of Enterprise API in fall of 2019;
 - Formal responses to collective questions and concerns;
 - Meeting with the Dream Team @ NG at a future date

Questions?