

Lighting the pathway through FHIR To Optimized Care Plans A Case Study with MyHealthVet



John Moehrke
Standards Architect
*By Light Professional
IT Services LLC*

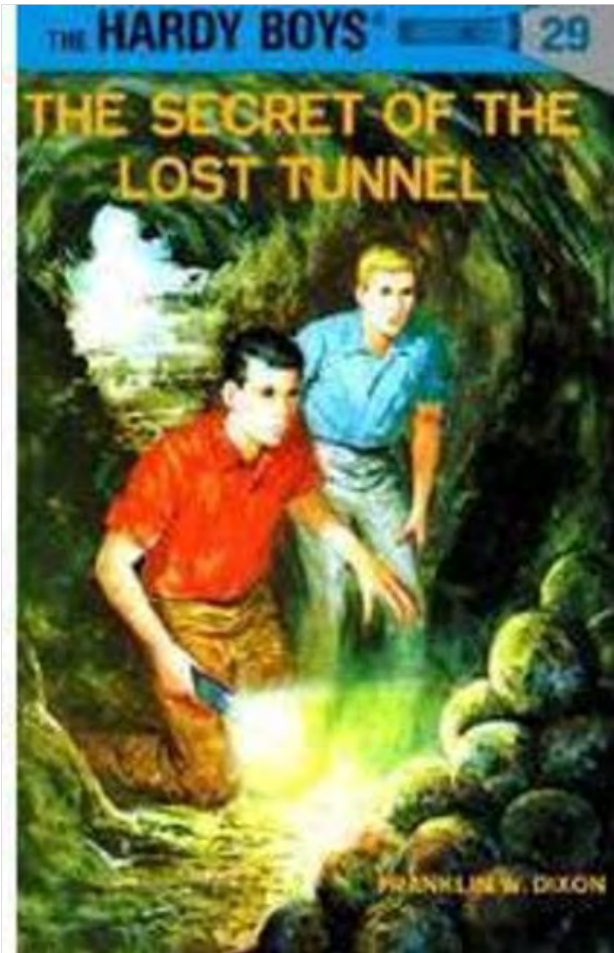
Summary: Shining a Light beyond FHIR

The HL7 FHIR standard is gaining quick acceptance in the USA and globally. Every major EHR vendor now supports FHIR for Patient access of their own data using SMART-on-FHIR and Argonaut implementation guides. Many applications are being written to access this data, including the much heralded Apple HealthKit.

The result could be an overwhelming nightmare, or you can lead the way on a pathway to better care. In this talk I will inspire on how FHIR CarePlan can enhance Patient outcomes, Patient conformance, and lower overall Clinician impact through intelligent software agents.

The presentation will explore how this might look at a Patient portal, like VHA MyHealthVet. The patient would be actively encouraged and automatically tracked, tasks prepared and results viewable, with consistent interaction with the care team.

FHIR enables, but does not solve, these advancements in care.



Learning Objectives

1. Describe FHIR, and how it is a good basis to build upon
2. Show how Care Plans in FHIR are a win-win for Clinician, Organization, Payers, and Patient
3. Develop a Library of Care Plan Patterns
4. Orchestrate the patient's treatment plan given a Pattern
5. Automate with Intelligent services promoting specific actions and conformance
6. Use Care Plan pattern specific apps that leverage Care Plan standards

Background

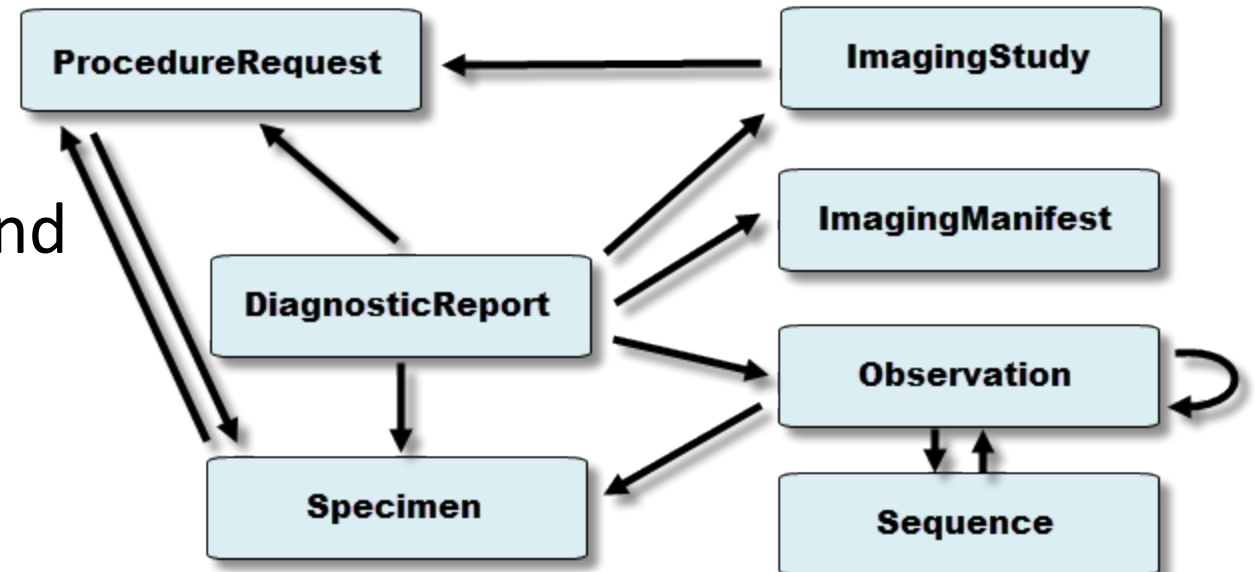
- Given progress in FHIR – Standard Maturity, Service Availability
- Given Patients often need coordination of care beyond institution
- Care Plans often need to coordinate care with many providers
- Often Patients have more than one Care Plan outstanding

Paper → FHIR → Empowered

- Decades ago: Patient had one Primary Doctor, and may have received Paper instructions.
- Now: Patient has a Primary Doctor, and many support specialties. Patient has a Portal with read-only access to CDA
- Soon: Patient can engage “applications” with a copy of their data using FHIR
- Future: Patient is center of their care. They are actively creating data as well as engaging software and device agents. Clinician empowering software agents take care of mundane, so that Clinicians can focus on adding value that is not automatable.

FHIR (*Fast Health Interoperability Resources*)

- Uses modern technology and security
- Designed based on HL7 history
- Designed to be used
- Comprehensive to care and beyond
- Controlled expansion to new use
- Enabled for Constraints
- Modes of use: REST, Messaging, Documents, Services, etc.
- Includes vocabulary mechanism



Basic Patient access to their data (bluebutton)

CCDS Data Element	FHR Resource
Patient demographics and Identity	Patient
Smoking status	Observation
Problems	Condition
Medications	Medication, MedicationStatement, MedicationOrder
Medication allergies	AllergyIntolerance
Laboratory test(s)	Observation, DiagnosticReport
Laboratory value(s)/result(s)	Observation, DiagnosticReport
Vital signs	Observation
Procedures	Procedure
Care team member(s)	CareTeam
Immunizations	Immunization
Unique device for a patient's implantable device(s)	Device
Assessment and plan of treatment	CarePlan
Goals	Goal
Health concerns	Condition

The Lack of Care Plan

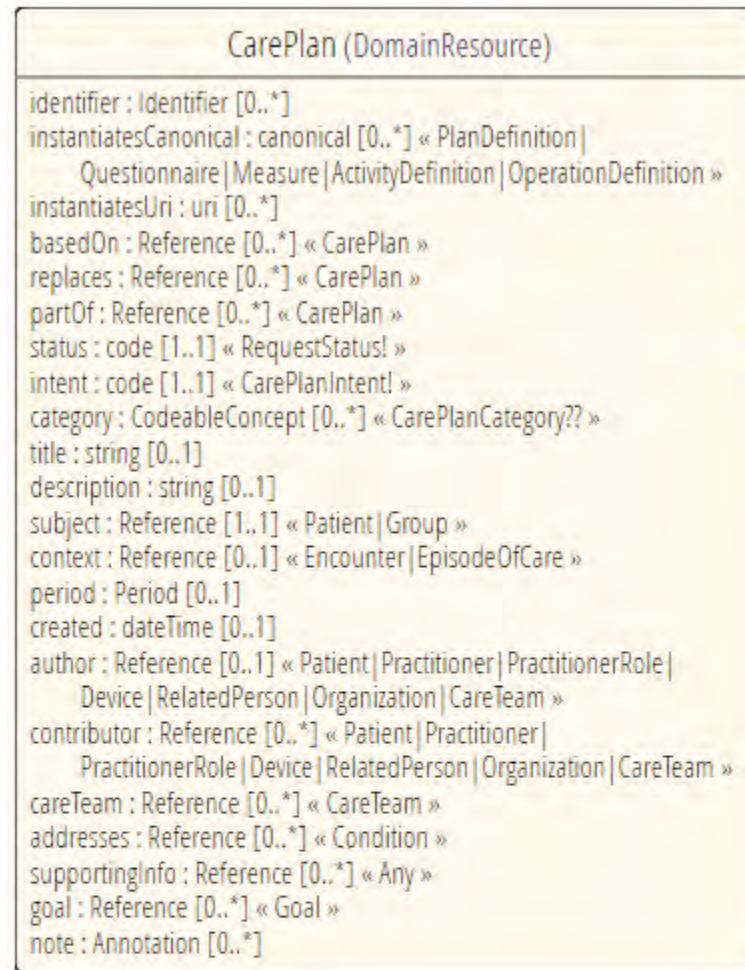
- Patients are suffering from an increasing number of complex or chronic health conditions which require frequent episodes of care involving multiple providers. With this complexity, it is difficult to plan care for patients
- There need to be a means of defining how care planning ‘interventions’ can be derived from clinically relevant order sets, protocols, clinical practice guidelines, etc as part of the clinical workflow.
- A Paper based CarePlan will not work
- A Care Plan that depends on the Patient alone will not work

Care Plan

- A Care Plan is a “Pathway of pathways”.
- Coordinates many people who are assisting to a clinical goal
- Includes tasks, milestones, metrics, decision branching
 - Who does What When – like a Calendar
- Like a Project Management plan for a specific patient
- Patient Portals will guide the Patient actions – MyHealthVet
- EHR and specialty systems will guide Clinicians
- Pharmacy will engage on Prescriptions
- Smart software agents can detect deviations or conflicts

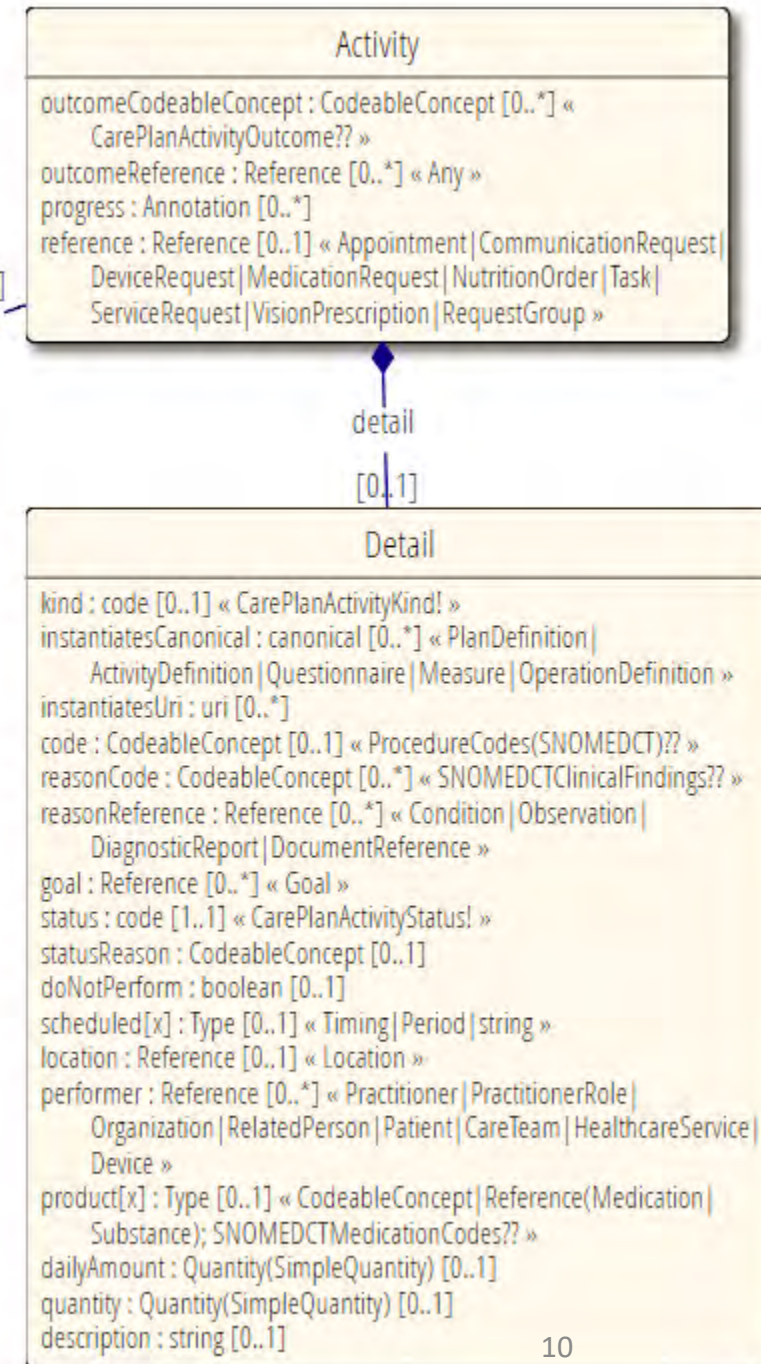
FHIR CarePlan

- Purpose of
- Background
- History & Physical
- Team members
- List of Activities
- What should be done
- What was done
- Who/Where/When



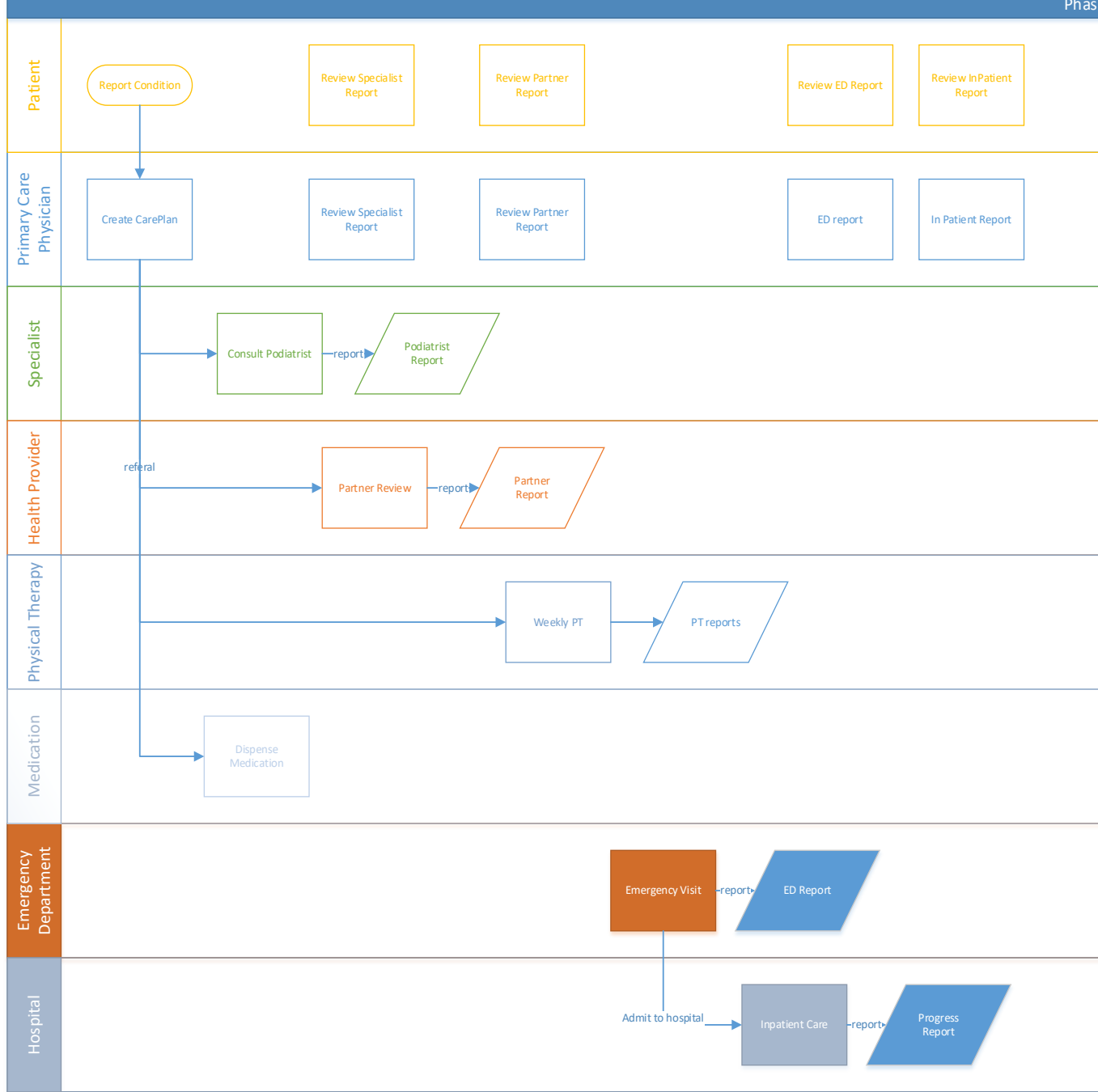
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Sample CarePlan Actors – The Care Team

- Primary Care Physician: Dr. Patricia Primary
- Patient: Mr. Bob Anyman
- Diabetic Educator: Ms. Edith Teaching
- Dietitian/Nutritionist: Ms. Debbie Nutrition
- Exercise Physiologist: Mr. Ed Active
- Pharmacist: Ms. Susan Script
- Optometrist: Dr. Victor Vision
- Podiatrist: Dr. Barry Bunion
- Psychologist: Dr. Larry Listener
- Emergency Department Physician: Dr. Eddie Emergent
- Hospital Attending Physician: Dr. Allen Attend
- Home Health Services: Nurse Harry Home
- Clerical Staff: Ms. Nancy Notifier

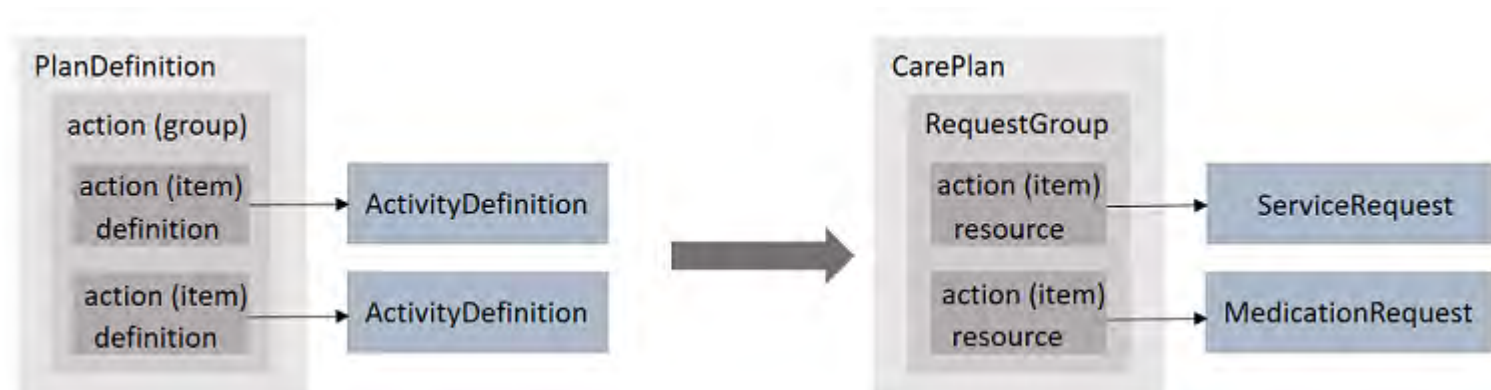


Sample CarePlan swimlanes (abbreviated)

- Patient
- Primary Care Physician
- Specialist
- Out-Patient care
- Physical Therapy
- Emergency Room Clinician
-

Plan Definitions → Care Plan

- Don't start from scratch, start from pre-defined templates
- A plan template consists of predefined “standardized” plan elements which are commonly included when addressing a combination of patient health concerns, health risks and health goals.
- The plan templates could be based on research, clinical evidence or best practices. For example, there could be a plan template to treat patients with diabetes mellitus and cardiovascular disease; these templates could be used by a provider as a starting basis to customize and personalize the care for an individual.



Example Library of Care Plan templates

- Diabetes Type II
- Surgery Preparation thru Recovery
- Chlamydia Screening
- Breast Feeding Intervention
- Obesity Assessment
- Chemotherapy Regimen Kidney Cancer
- Zika Virus Infection Management
- Opioid CDS Recommendation
- Chest Pain Coronary Artery Disease Order Set KNART

Example: Diabetes Type II ‘Protocol or Order set’

• Medications

- First Line Monotherapy (ADA 2017)
 - MetFORMIN HCl - 500 MG Oral Tablet; TAKE one TABLET Twice daily with meals; Qty: 60; Tablet; Days Supply: 30; Refill: 2
 - MetFORMIN HCl - 850 MG Oral Tablet; TAKE one DAILY WITH MEALS; Qty: 30; Tablet; Days Supply: 30; Refill: 2
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- Alternative Monotherapy
 - Glimepiride 1 MG Oral Tablet; TAKE one TABLET DAILY WITH BREAKFAST.; Qty: 30; Tablet; Days Supply: 30; Refill: 2
 - GlipizIDE XL 5 MG Oral Tablet Extended Release 24 Hour; Take one daily 30 minutes before breakfast.; Qty: 30; Tablet; Extended Release 24 Hour; Days Supply: 30; Refill: 2
 - Pioglitazone HCl - 15 MG Oral Tablet; TAKE one TABLET Daily; Qty: 30; Tablet; Days Supply: 30; Refill: 2
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• Diabetic Supplies

- Blood Glucose Monitor System w/Device Kit; USE AS DIRECTED.; Qty: 1
- Fingerstix Lancets Miscellaneous; USE AS DIRECTED.; Qty: 1; 200 EA 200 EA Box; Refill: 2
- Ketostix In Vitro Strip; USE AS DIRECTED.; Qty: 1; 100 EA 100 EA Box; Refill: 2
- ...

• Initial Labs

- Basic Metabolic Panel
- Blood Glucose - Fasting
- Blood Glucose - Fingerstick
- Blood Glucose - Random
- Comprehensive Metabolic Panel
- Hb A1c
- Serum Thyroid Stimulating Hormone (TSH)
- ...

• Immunizations

- Hepatitis B; INJECT one ML Intramuscular
- Influenza (Split PF); INJECT 0.5 ML Intramuscular
- Pneumovax 23 25 MCG/0.5ML Injection Injectable; INJECT 0.5 ML Intramuscular
- Prevnar 13 Intramuscular Suspension; INJECT 0.5 ML Intramuscular

• Reminders

- Basic Metabolic Panel; Every 1 years
- Basic Metabolic Panel; Every 3 months
- Comprehensive Metabolic Panel; Every 1 years
- Diabetic Foot Examination; Every 1 years
- Hb A1c ; Every 6 months
- Hb A1c ; Every 3 months

• Hypoglycemia Rescue Therapy

- Blood Glucose Test In Vitro Strip; USE AS DIRECTED.; Qty: 1; 100 St Box; Refill: 2
- Glucagon Emergency 1 MG Injection Kit; INJECT 1 MG Once PRN as needed for hypoglycemia; Qty: 1

• Screening for Complications

- Diabetic Foot Examination
- Examination of Retina
- Macular Exam
- Monofilament Foot Sensation Test
- Pedal Pulse Taking

• Screening for Comorbidities

- Adult Depression Screening (age >= 18 yrs)
- Sleep Study
- Suicide Risk Assessment

• Dietary Recommendations

- Diabetes diet, specified calories; Follow a diabetic diet with 1500 calories.
- Diet, DASH; We want to put you on the DASH diet for {count1} calories.
- Diet, high fiber; Start eating more fiber.
- Diet, low sodium; Restrict the salt in your diet by avoiding highly salted foods.
- Diet, low sodium, specified; Restrict your sodium (salt) intake to 2 grams per day.
- Diet, Mediterranean; We recommend that you follow the "Mediterranean diet."
- Diet, TLC; We want you to follow the Therapeutic Lifestyle Changes (TLC) diet.

• Follow Ups

- Follow Up in 1 Month
- Follow Up in 2 Months
- Follow Up in 3 Months
- Follow Up in 6 Months
- Follow Up in 6 Weeks

• Referrals

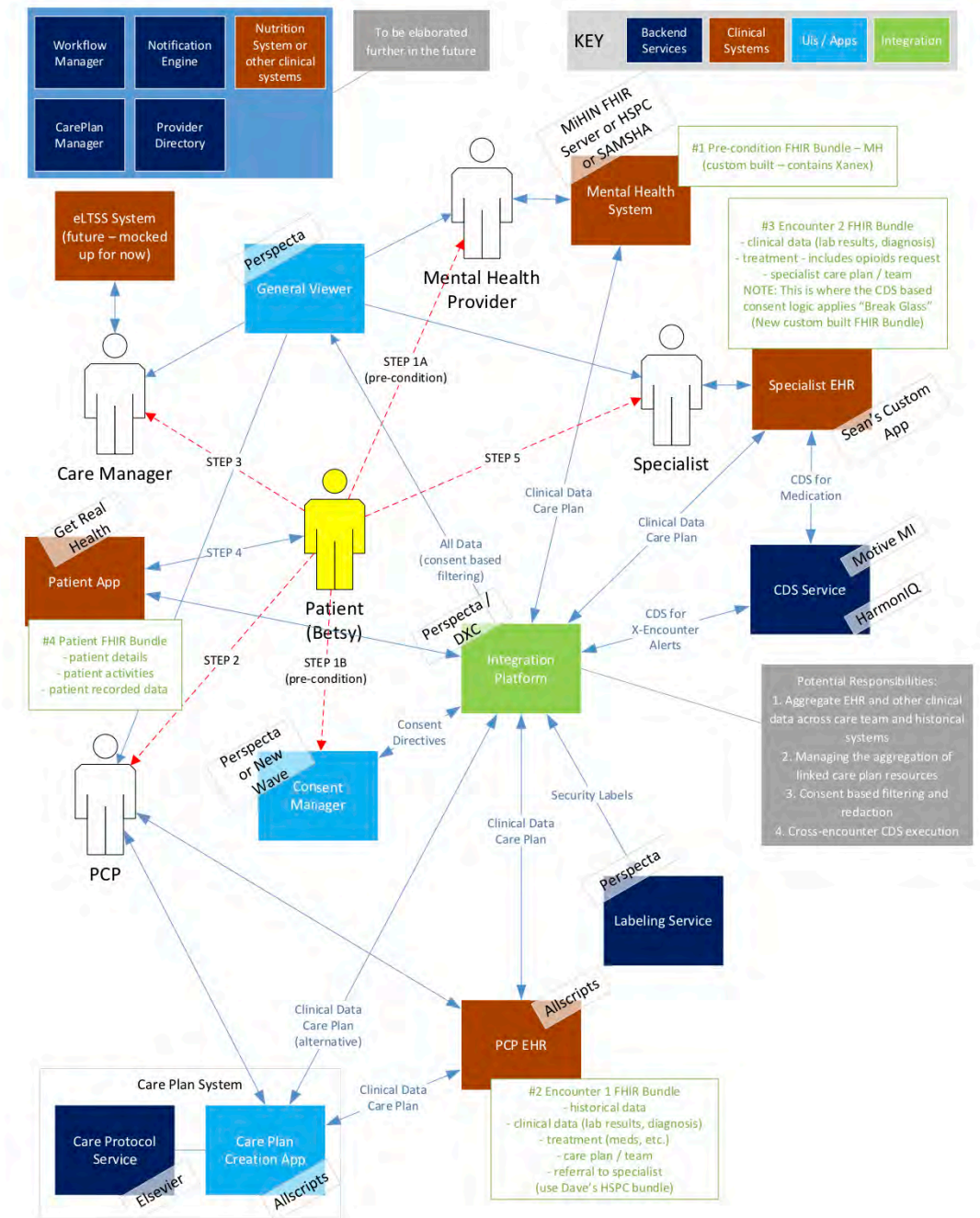
- Diabetes Educator Referral
- Dietician Referral
- Endocrinology Referral
- Mental Health Counselor Referral
- Nephrology Referral
- Ophthalmology Referral
- Optometry Referral
- Podiatry Referral

Start a CarePlan – Care Planning

- Pick from library of templates
- Customize to your Patient needs
- Fill in team members, or indicate team membership needs
- Set milestones, deadlines, and measurement goals

Coordination

- Notify care team of their roles
- Get Consent for all actions
- Schedule Labs
- Kick off Prescriptions
- Confirmation of responsibilities
 - Specialist accepts Referral
 - Patient App accepts exercise plan
 - ...
- Continuous reporting of results
- Continuous review of progress
- Etc...



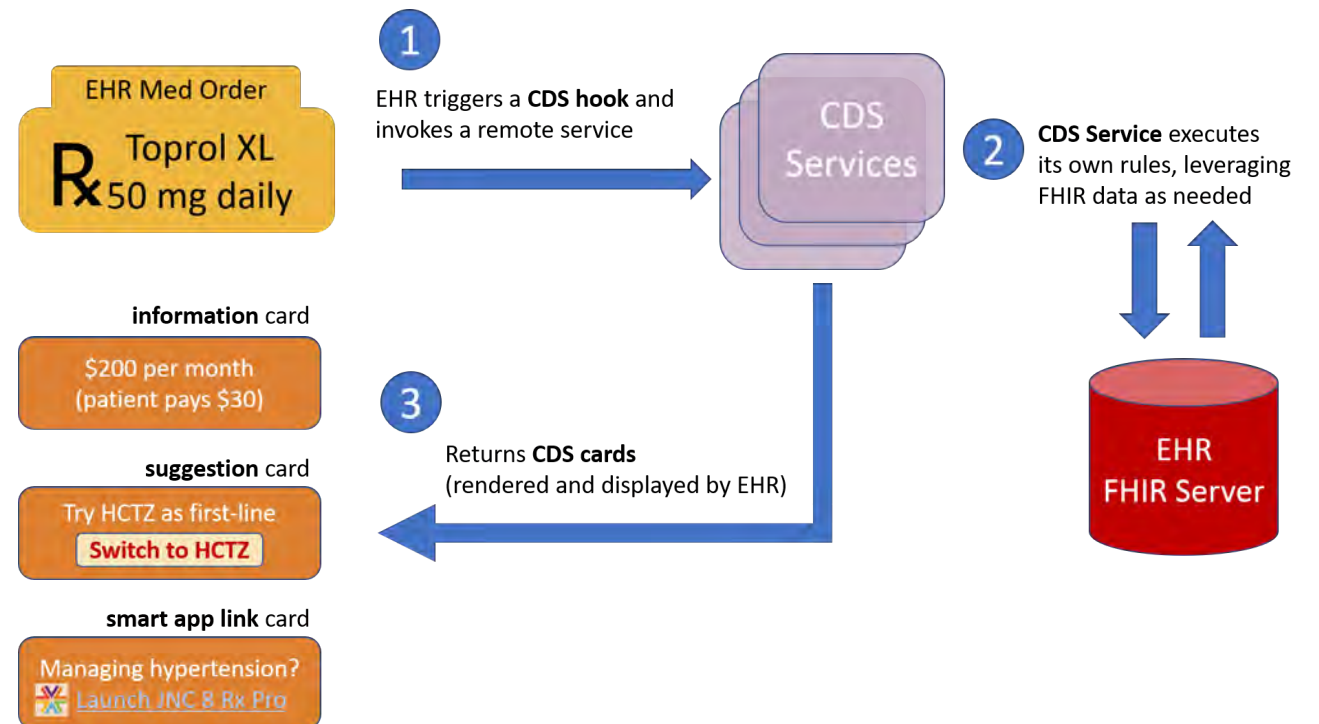
Intelligent Software Agents

- Agents will monitor CarePlan progress
- Look for conflicts
- Look for non conformance
- Look for lagging milestones
- Send reminders to Patient, Clinicians, etc
- Enables clerical support
- Alert Primary Care Physician at appropriate times

Software Agents aid with mundane, so that humans can focus on value

CDS Hooks -- enabling API for Intelligent Agents

- API mechanism designed parallel with FHIR
- Synchronous, workflow-triggered CDS calls
 - Return Information to be displayed (e.g. education, analysis, finances)
 - Return Suggestions of actions to take (e.g. Alternative prescriptions)
 - Return Applications to use



Progress is tracked

- As the Patient, or a Care Team member do 'something'
- Update the CarePlan so it is always fresh
- Attach output or reports as appropriate
- Attach communication needs, and communication actions
- Patient reported measurements
- Automated Patient device (fitbit) reported measurements

So that

- Patient knows what to do and is encouraged to be compliant
- Team members know what to do and can see how it relates
- Primary Care Physician can see all
- But, Intelligent software agents do grunt work
- Which enables better outcomes with less churn

VHA Patient Portal

- MyHealtheVet is the largest Federal Patient Portal in the world
 - We have led the path in the first few steps of care plan optimization
 - Patient can access all their medical data including documents and imaging
 - Patient can see Schedule and submit Scheduling requests
 - Secure messaging with care-team and patient
 - Patient manages their view of the care team
 - Patient reported measurements for vital signs and some lab results
 - These are just the first steps but no one else has done these things at ALL to our knowledge
- We propose the next few steps using...
 - Build CarePlan capability into MyHealtheVet portal to get patient engaged and measured
 - Build Clinician applications that have specific purpose with minimal mundane actions
 - Build Intelligent software agents that monitor and encourage the right thing to do
 - Build a library of templates of approved Care Plans for consistency and completeness

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Questions?

John Moehrke

By Light Professional IT Consulting

Standards Architect to the VHA My HealthVet

John.Moehrke@bylight.com

<https://healthcaresecprivacy.blogspot.com/>