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Consumerism in the Age of Apple, Amazon/JPM/Berkshire ~ Journey to Safe, Secure, Actionable Navigation Decision Support

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Mic Drop ☺ (And Agenda)

1. The Coming Era of CDx
2. Implications for Interop
3. Collaborative Model to Value

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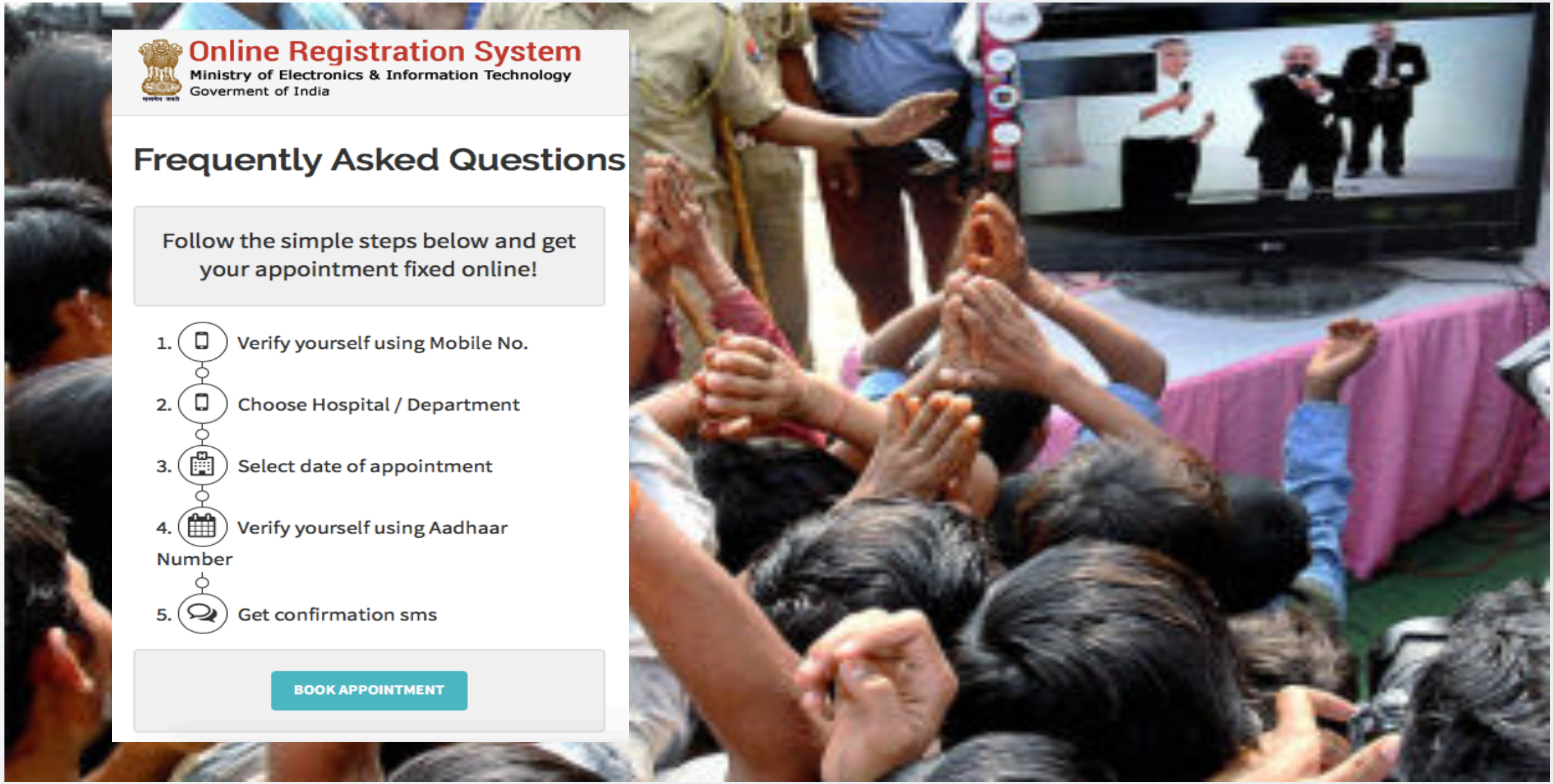
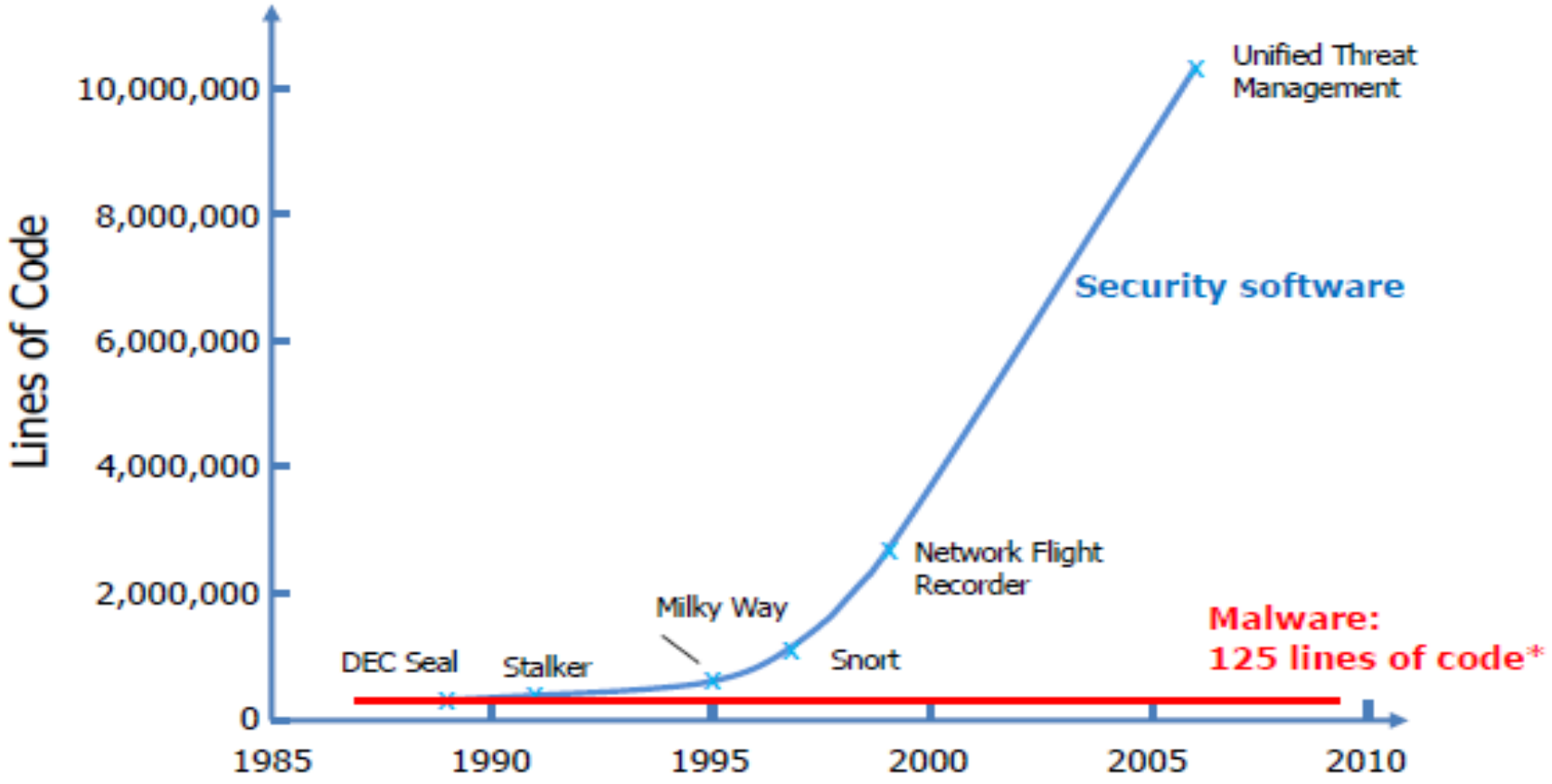


#3: Opening Up While Locking Down

IRS Get Transcript service accessed by 23+M consumers;
hackers inappropriately accessed digital service by successfully answering authentication questions

Source: http://abcnews.go.com/GMA/video/criminals-allegedly-hack-irs-steal-taxpayers-personal-data-31330191;
https://www.irs.gov/uac/Newsroom/Additional-IRS-Statement-on-the-Get-Transcript-Incident

Opening Up While Locking Down: APIs Embed Policy and Access into Token

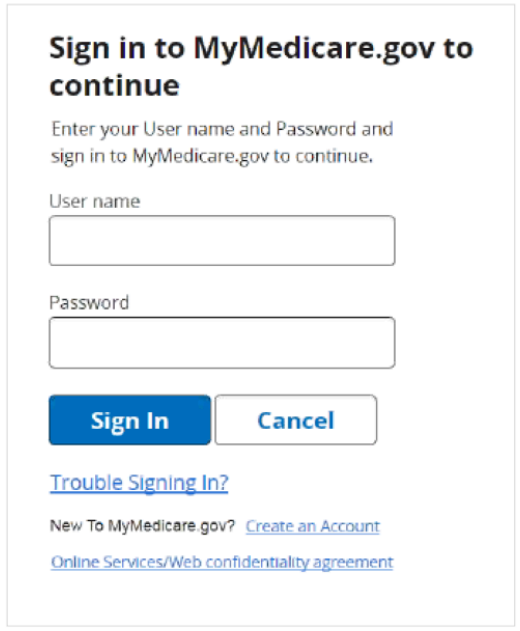


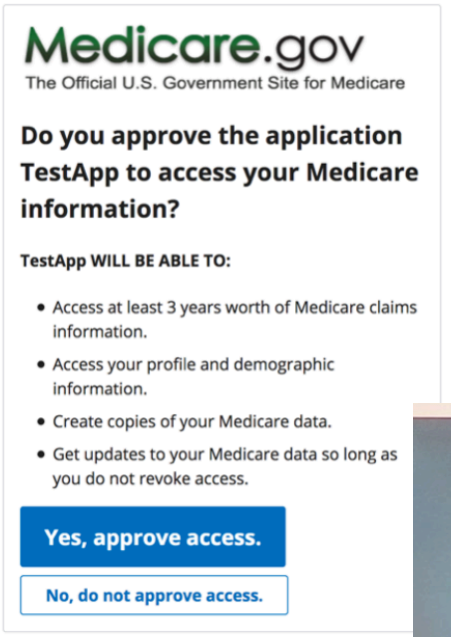
* Public sources of malware averaged over 9,000 samples (collection of exploits, worms, botnets, viruses, DoS tools)

- Cyber R&D Priorities include the use of "tailored trustworthy spaces"
- APIs, as contracts, embed policy and access via tokens, which can dynamically respond to emerging threats
- API controls allow rate-limiting, quotas based on app risk

Source: DARPA 2011 11 07 Cyber Analytical Framework.pdf

CMS Blue Button 2.0 Adds MA Regs (& Hold the Date 8/13 for BBDC!)





CMS challenges MA plans to “meet or exceed” Blue Button FHIR API (EOB Resource) by CY2020 voluntarily, else, will evaluate alternative actions; CMS API opens up “linked A/B/D” claims to complement QE, VRDC, ACO, PUF Files

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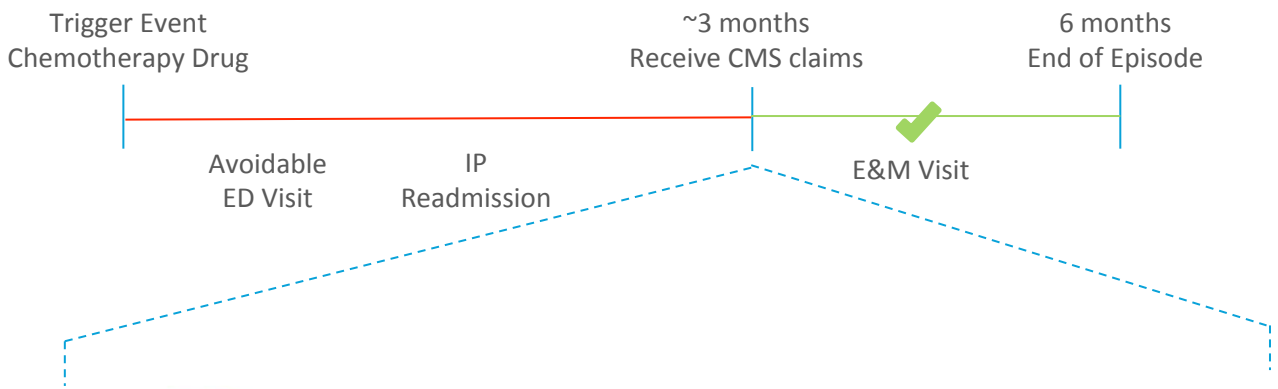
Bundles, ACO Participants Can Access More Timely CMS Data

Current Analytics via OCM Model

OCM Patient Timeline



CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

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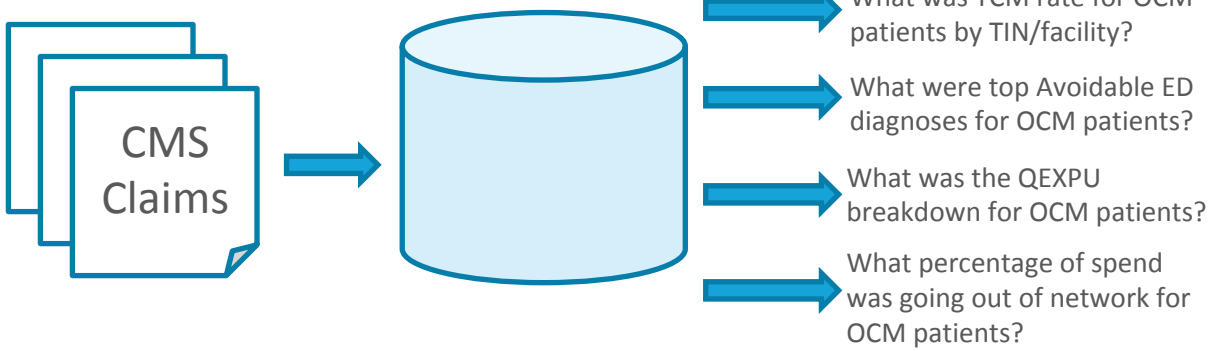
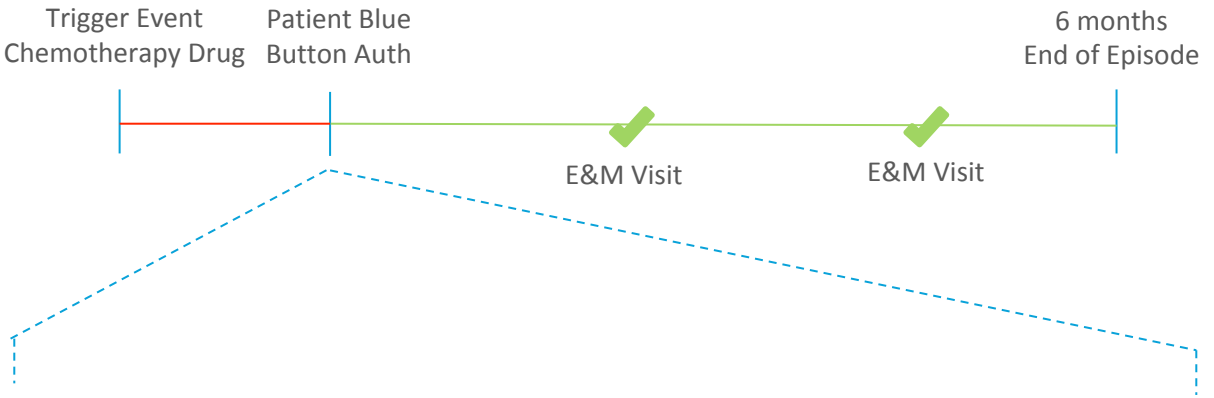


Increased Capabilities Via Blue Button

OCM Patient Timeline



CMS Blue Button 2.0

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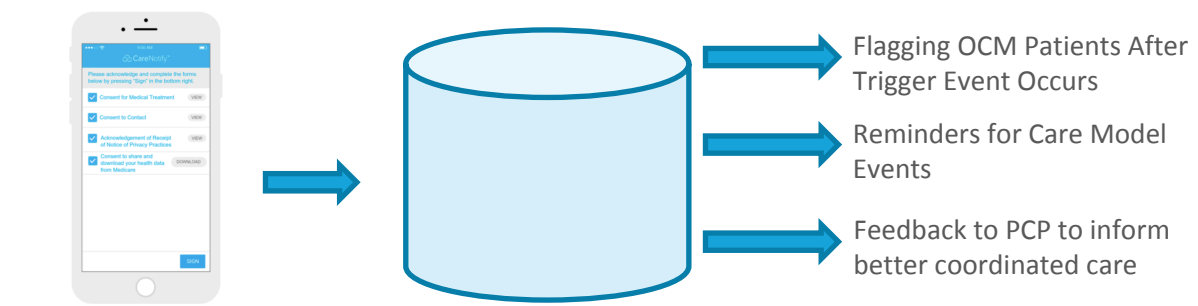

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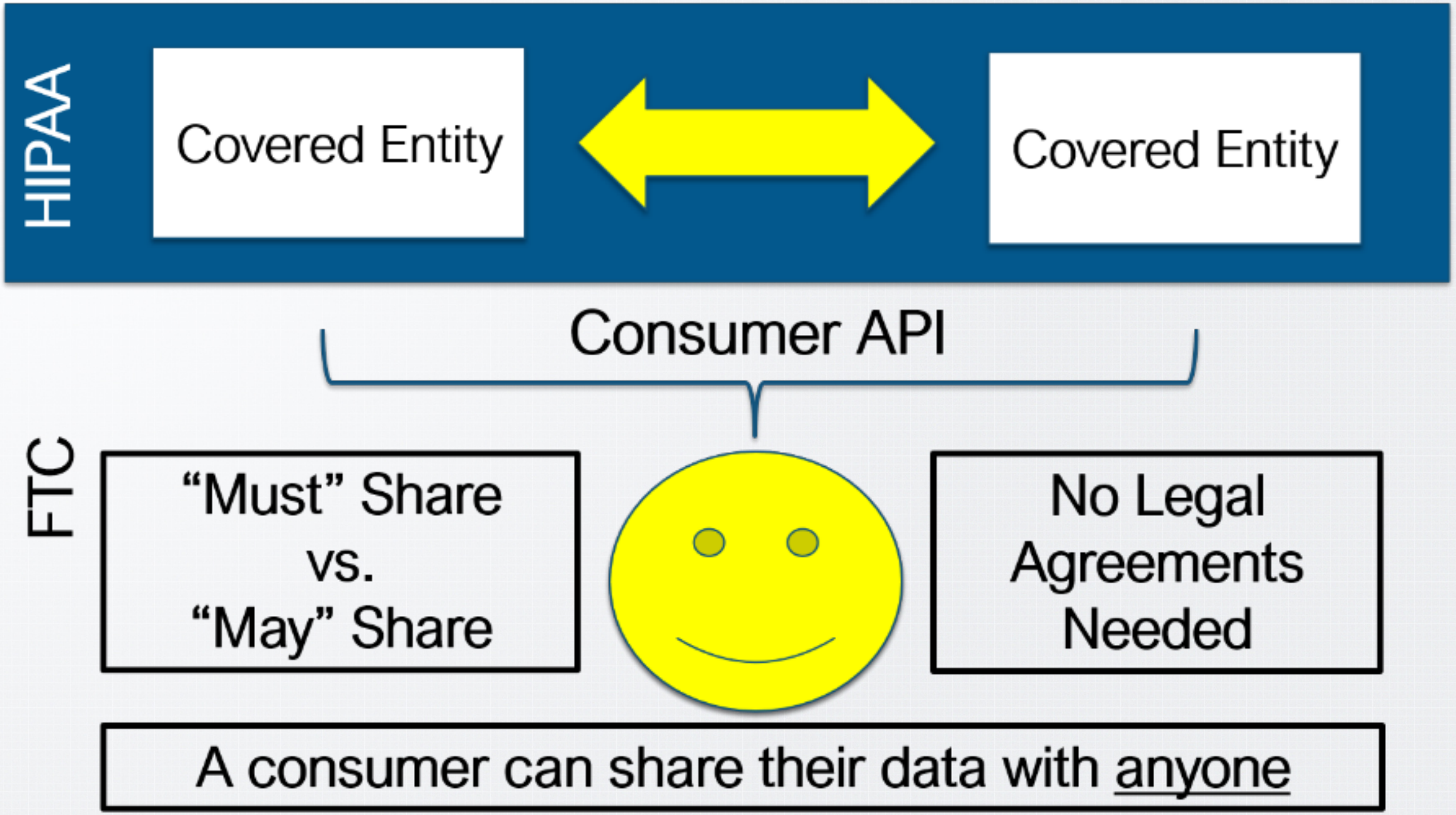
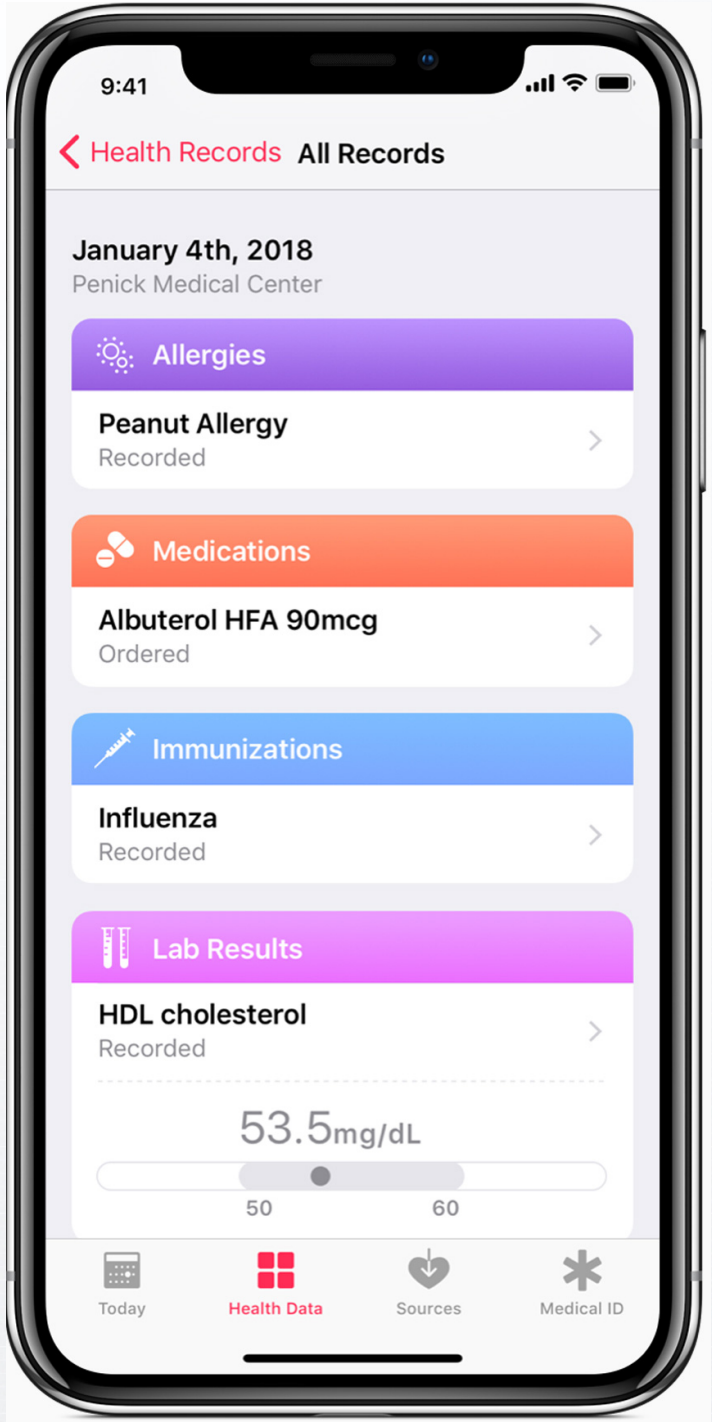
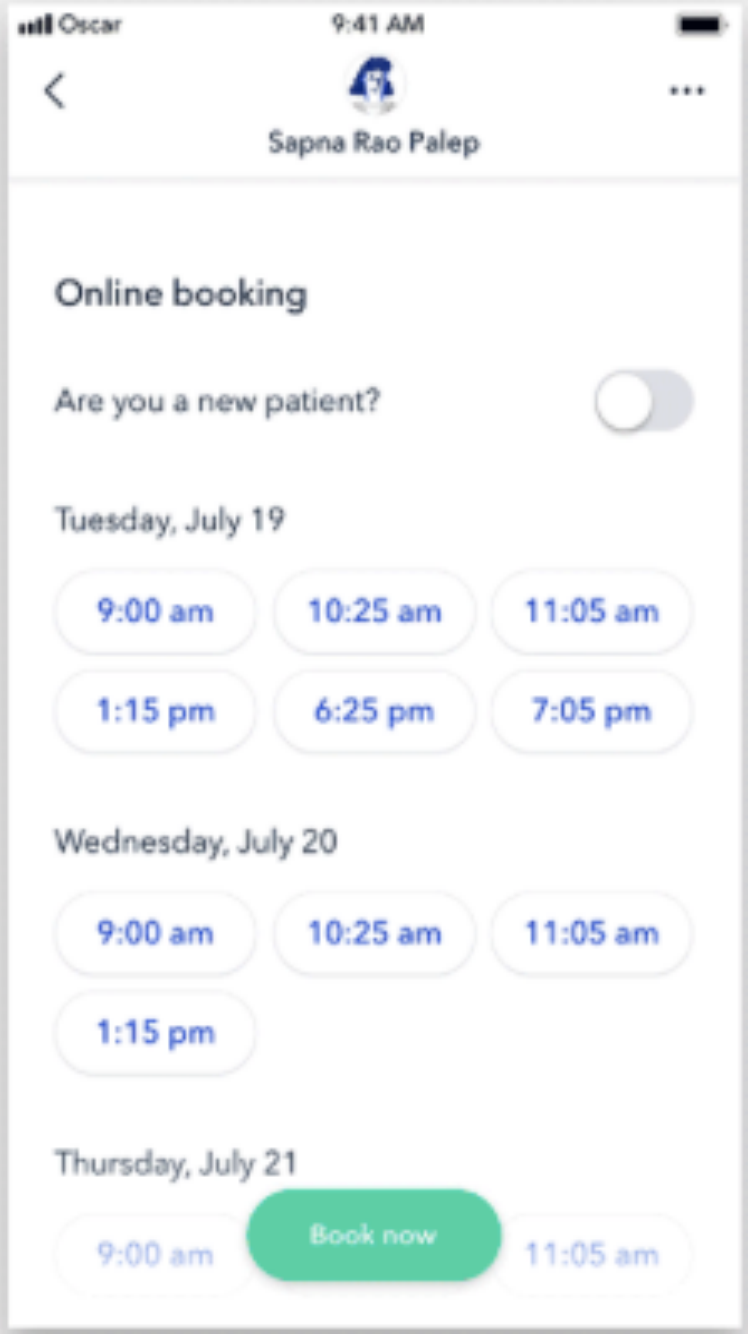
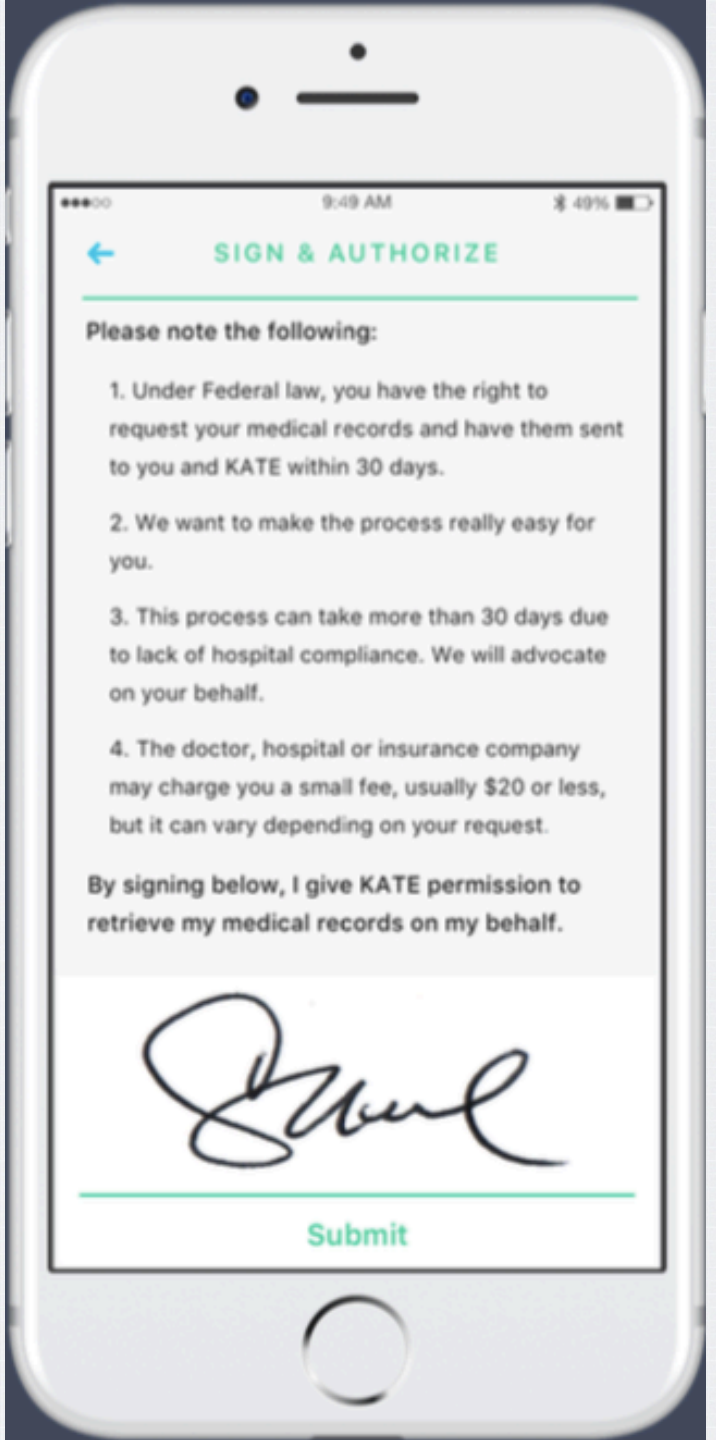



9:41
Health Records
All Records
January 4th, 2018
Penick Medical Center
Allergies
Peanut Allergy
Recorded
Medications
Albuterol HFA 90mcg
Ordered
Immunizations
Influenza
Recorded
Lab Results
HDL cholesterol
Recorded
53.5mg/dL
50
60
Today
Health Data
Sources
Medical ID


Oscar
9:41 AM
Sapna Rao Palep
Online booking
Are you a new patient?
Tuesday, July 19
9:00 am
10:25 am
11:05 am
1:15 pm
6:25 pm
7:05 pm
Wednesday, July 20
9:00 am
10:25 am
11:05 am
1:15 pm
Thursday, July 21
9:00 am
Book now
11:05 am


9:49 AM
49%
SIGN & AUTHORIZE
Please note the following:
1. Under Federal law, you have the right to request your medical records and have them sent to you and KATE within 30 days.
2. We want to make the process really easy for you.
3. This process can take more than 30 days due to lack of hospital compliance. We will advocate on your behalf.
4. The doctor, hospital or insurance company may charge you a small fee, usually $20 or less, but it can vary depending on your request.
By signing below, I give KATE permission to retrieve my medical records on my behalf.
Submit

Culture, Culture, Culture

Organization Name	Production FHIR Base URL
Altru Health System	https://epicsoap.altru.org/fhir/api/FHIR/DSTU2/
Bellin Health	https://arr.thedacare.org/BLN/FHIR/api/FHIR/DSTU2/
Carle Foundation Hospital & Physician Group	https://epicsoap.carle.com/FHIR/api/FHIR/DSTU2/
Cedars-Sinai Health System	https://cslinkmobile.csmc.edu/fhirproxy/api/FHIR/DSTU2/
CentraCare Health and Affiliates	https://epicmobile.centracare.com/fhir/api/FHIR/DSTU2/
Covenant HealthCare	https://epichaiku.chs-mi.com/FHIRPRO
Hackensack Meridian Health	https://mepic.hackensackumc.net/fhir/a
Hattiesburg Clinic and Forrest General Hospital	https://soapprod.hattiesburgclinic.com/
Hospital for Special Surgery	https://epicproxy.et0927.epichosted.co
Johns Hopkins Medicine	https://epicmobile.johnshopkins.edu/FH
JPS Health Network	https://fhir.jpshealth.org:4431/api/FHIR/
Martin Health System	https://prodrx919.martinhealth.org/FHIF
Medisys Health Network	https://eprescribe-p.medisys.org/fhir-pr
MemorialCare	https://fhir.memorialcare.org/fhir/api/FH
Mercy Health System - WI	https://epicproxy.mhsjvl.org/FHIRproxy/
Nebraska Medicine	https://ocsoapprd.nebraskamed.com/F
North Oaks	https://soapproxyprd.northoaks.org/noh
Norton Healthcare	https://epicsoap.nortonhealthcare.org/F
Ochsner Health System	https://myc.ochsner.org/FHIR/api/FHIR/
Overlake Hospital Medical Center	https://sfd.overlakehospital.org/FHIRpro
Rockford Memorial Hospital	https://haiku.rhsnet.org/FHIRProxy/api/
Rush University Medical Center	https://epicproxy.rush.edu/fhir-prd/api/F
Salem Health	https://prd.salemhealth.org/fhir/api/FHI
Sanford Health	https://eprescribe.sanfordhealth.org/FH
Sansum Clinic	https://wavesurescripts.sansumclinic.or
SSM Health	https://fhir.ssmhc.com/fhir/api/FHIR/DS
SSM Health WI Dean Medical Group and Affiliates	https://deanrx.deancare.com/fhir/api/FH
St. Elizabeth Healthcare	https://sehproxy.stelizabeth.com/arr-fhir
TempleHealth	https://epicaccess.templehealth.org/Fhi
Texas Children's Hospital	https://mobileapps.texaschildrens.org/F
The Portland Clinic	https://tpc-shield.tpcllp.com/FHIR/api/FHIR/DSTU2/
ThedaCare	https://arr.thedacare.org/TC/FHIR/api/FHIR/DSTU2/
UF Health	https://epicsoap.shands.ufl.edu/FHIR/api/FHIR/DSTU2/
UNC Health Care	https://epsoap.unch.unc.edu/FHIR/api/FHIR/DSTU2/
UW Health And Affiliates - Wisconsin	https://epicproxy.hosp.wisc.edu/FhirProxy/api/FHIR/DSTU2/
Weill Cornell Medicine	https://epicmobile.med.cornell.edu/FHIR/api/FHIR/DSTU2/
Yuma Regional Medical Center	https://ymccare1.yumaregional.org/FHIR/api/FHIR/DSTU2/

Objective	Performance	Exclusion
E – copy of health information	93%	54%
E – copy of discharge Instructions	93%	53%
Patient education resources	77%	N/A

Source: https://open.epic.com/MyApps/Endpoints; ONC

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A Growing Ecosystem of Industry Collaboratives

HL7® FHIR®
ARGONAUT PROJECT

SMART

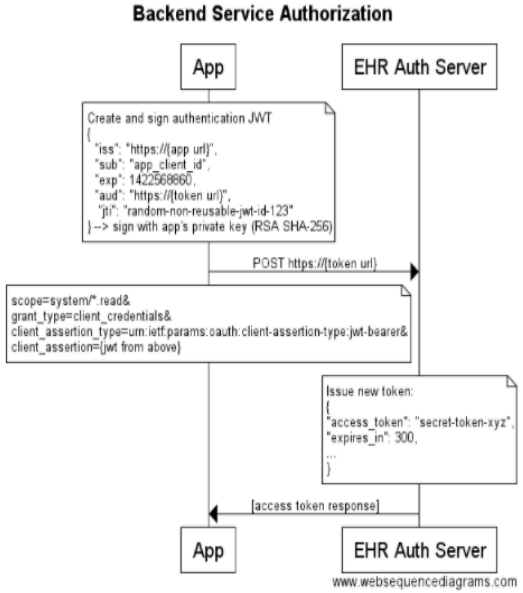
carin
Creating Access to Real-time Information Now through Consumer-Directed Exchange

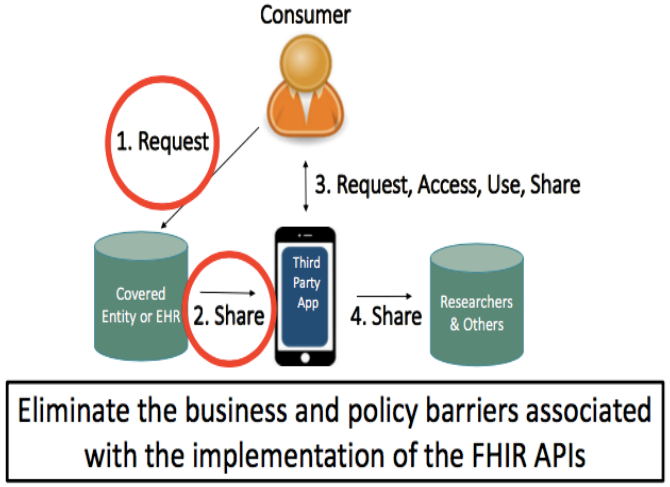
1. Consistent access to data (Common Clinical Data Set)
2. Consistent schema in returned data (Data Access Framework)
3. Open Implementation & Testing Framework (Sync for Science)

Obtaining an access token

By the time a backend service has been registered with the EHR, the key elements of organizational trust are already established. That is, the app is considered "pre-authorized" to access clinical data. Then, at runtime, the backend service must obtain an access token in order to work with clinical data. Such access tokens can be issued automatically, without need for human intervention, and they are short-lived, with a *recommended expiration time of fifteen minutes*.

To obtain an access token, the service uses an OAuth 2.0 client credentials flow, with a JWT assertion as its client authenticaiton mechanism. The exchange, depicted below, allows the backend service to authenticate to the EHR and request a short-lived access token:





Eliminate the business and policy barriers associated with the implementation of the FHIR APIs

2017 Road Map includes support for scheduling, provider directory, and "CDS Hooks"; 2018 covers "Flat" FHIR/backend services, questionnaire, clinical notes

Multi-stakeholder collaborative to deliver a trust framework for consumer-directed exchange; voluntary but enforceable app "code of conduct"

Patient Data Sharing Trust, Model Form

Explanation for Use of AHIMA Patient Request for Health Information Model Form

The explanation below is intended for healthcare organizations and providers in support of patients' right of access.

Purpose

This form is intended to provide a plain language tool that provides patients a standardized mechanism to access their health information from a provider or organization. The form is written at an 8th grade reading level. The patient may or may not have knowledge of their ability to obtain copies of their information in the format of their choosing. The Office of Civil Rights (OCR) guidance indicates *"a covered entity may require individuals to use the entity's own supplied form, provided use of the form does not create a barrier to or unreasonably delay the individual from obtaining access to his PHI"*. This form, created by the American Health Information Management Association (AHIMA) is a suggested template but should not be required.

This model form IS:

- Exclusively for access to the pati
  to streamline the request to assist
  guidance.
- A suggested model form.

This model form IS NOT:

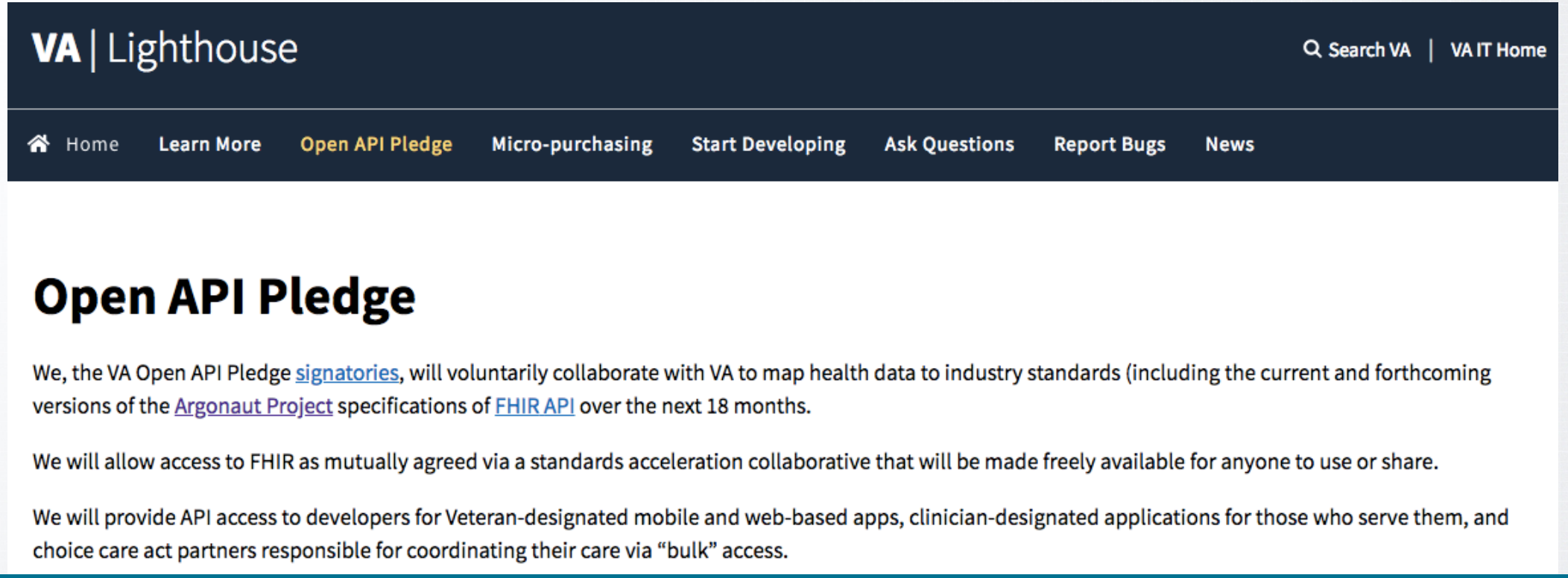
- Intended to replace, nor is it the s
- Intended to address state specific
  sensitive health information, such
  processing other requests.
- A required HIPAA form.

Table S11. Trust in Organizations and Individuals Involved in Using Health Information†

How much do you trust…	A Great Deal (%)	A Lot (%)	A Moderate Amount (%)	A Little (%)	Not at All (%)
Universities	23.9	40.2	29.4	4.9	1.6
Drug companies	3.7	14.7	37.5	31.5	12.6
Government agencies that fund medical research	9.7	25.9	40.9	18.9	4.7
Health insurance companies	3.6	12.0	34.0	33.3	17.1
Doctors	28.8	48.2	18.4	4.0	0.7

† Percentages may not sum to 100 due to rounding or blank responses. Numbers were rounded to the nearest tenth.

“Buyers Club”, VA Pledge to Accelerate API Development

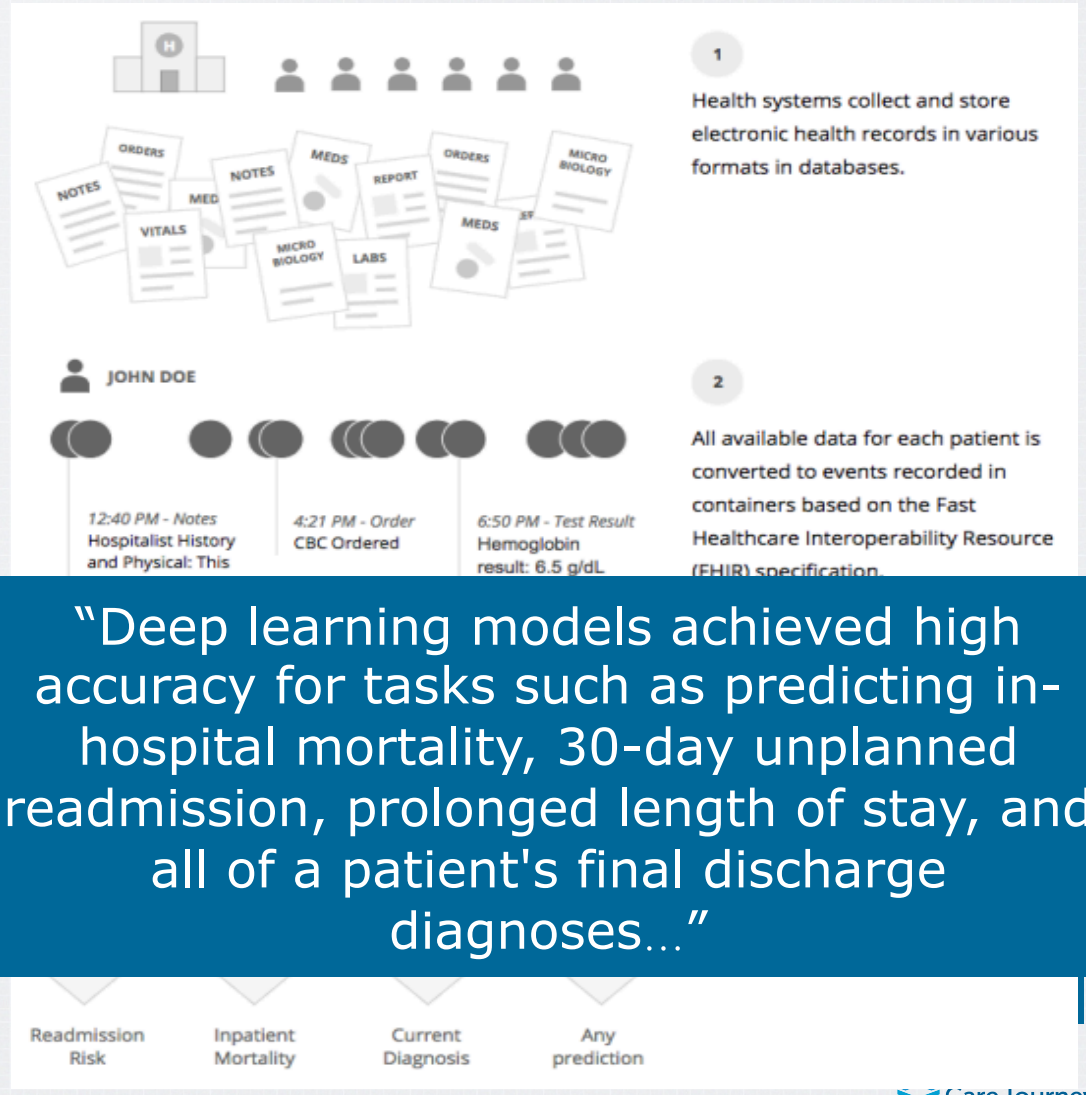


CMS 2019 Draft IPPS Rule (Promoting Interoperability)

"Finally…HHS could develop…a pilot…[for] use of an API based on the emerging update to the FHIR standard which would allow population level data access through an API in lieu of reporting on measures under the Public Health and Clinical Data Exchange objective.”

https://www.cms.gov/Newsroom/MediaReleaseDatabase/Press-releases/2018-Press-releases-items/2018-04-24.html

De-Coupling Digital Health Platforms from EHRs



"Deep learning models achieved high accuracy for tasks such as predicting in-hospital mortality, 30-day unplanned readmission, prolonged length of stay, and all of a patient's final discharge diagnoses…"

Source:
https://blog.google/topics/machine-learning/partnering-machine-learning-healthcare/;
https://arxiv.org/pdf/1801.07860.pdf

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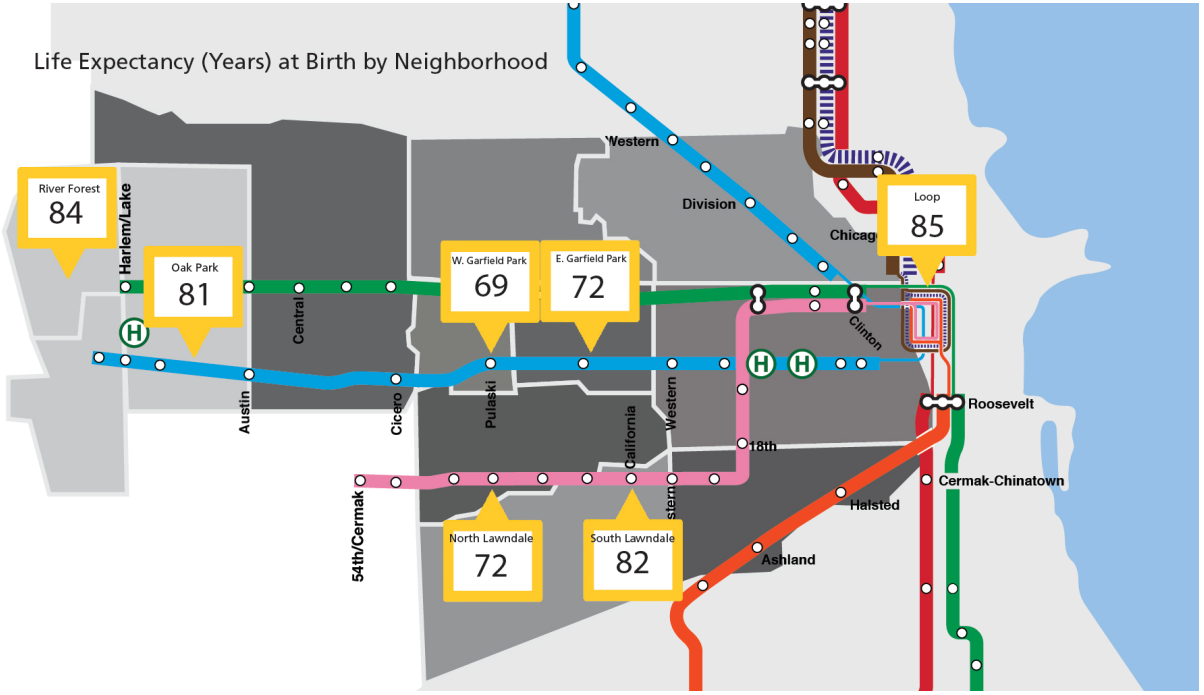
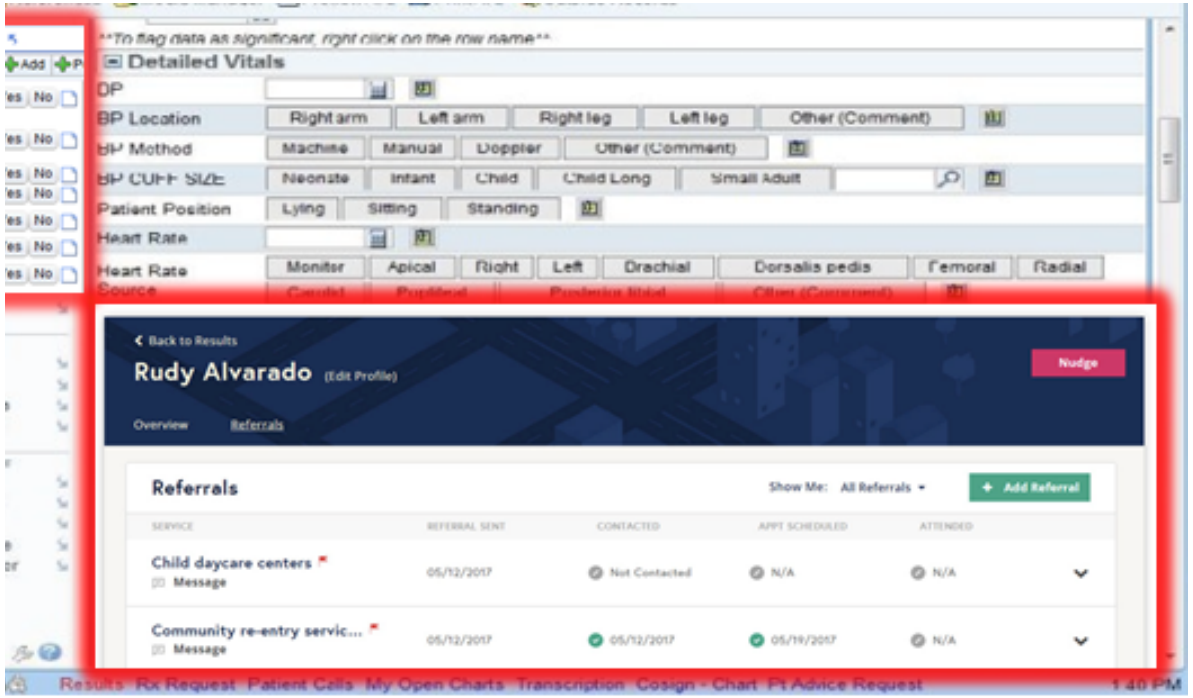
Entering the “Plug & Play” Era for Applications Integration





16-year life expectancy gap; “Total Health Collaborative” goal to cut 50% in ten years

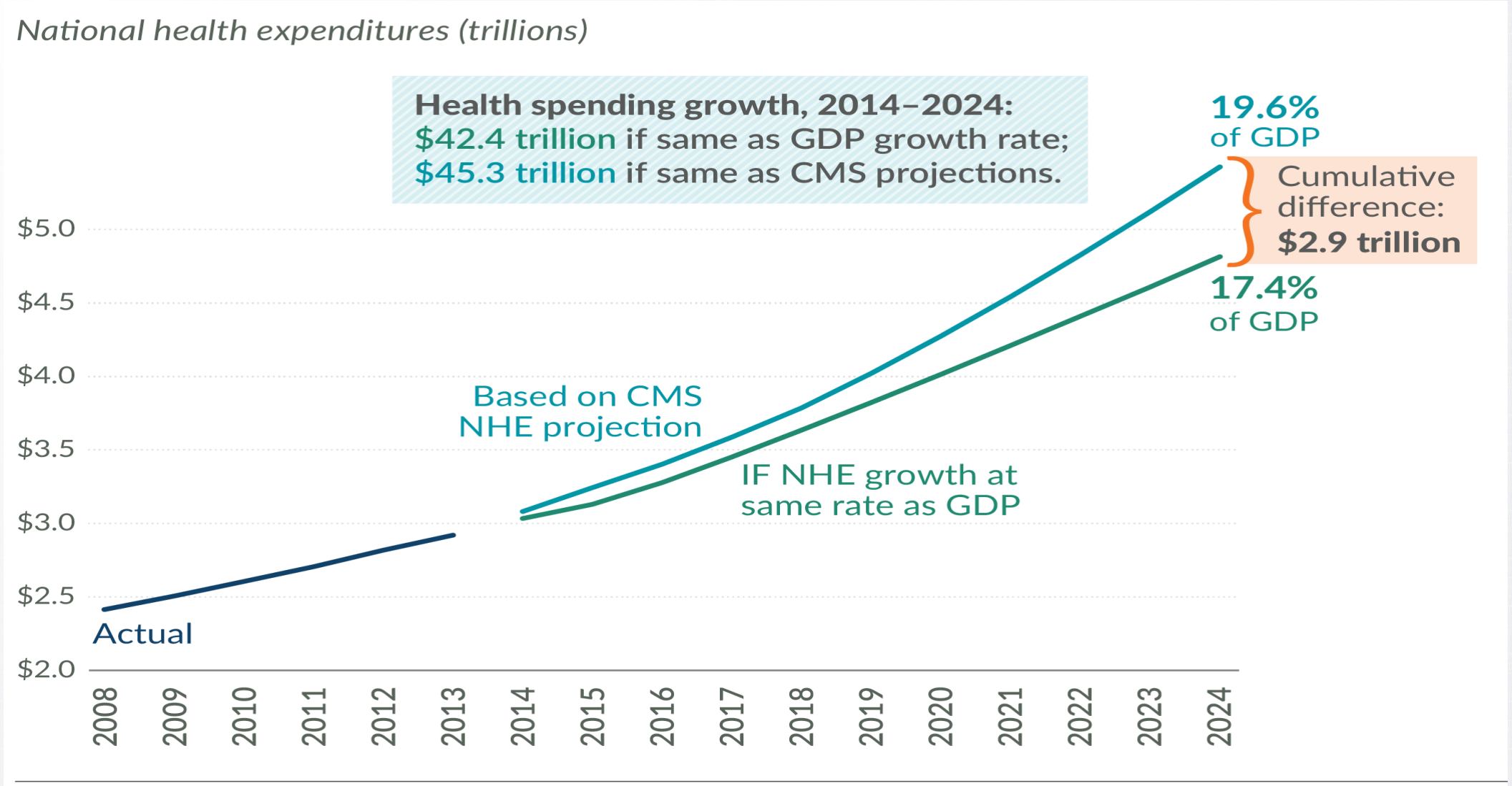
Leadership selected 3rd party app, NowPow, for “plug-play” seamless experience via reusable FHIR standards

CIO takes 6 weeks to production by extending Epic MU3 FHIR APIs for “bulk access” via API mgmt & +$16K in labor costs

1st 30 days - 70 screened, 48 needs (shelters, meals, utilities, transportation); no return ER visits

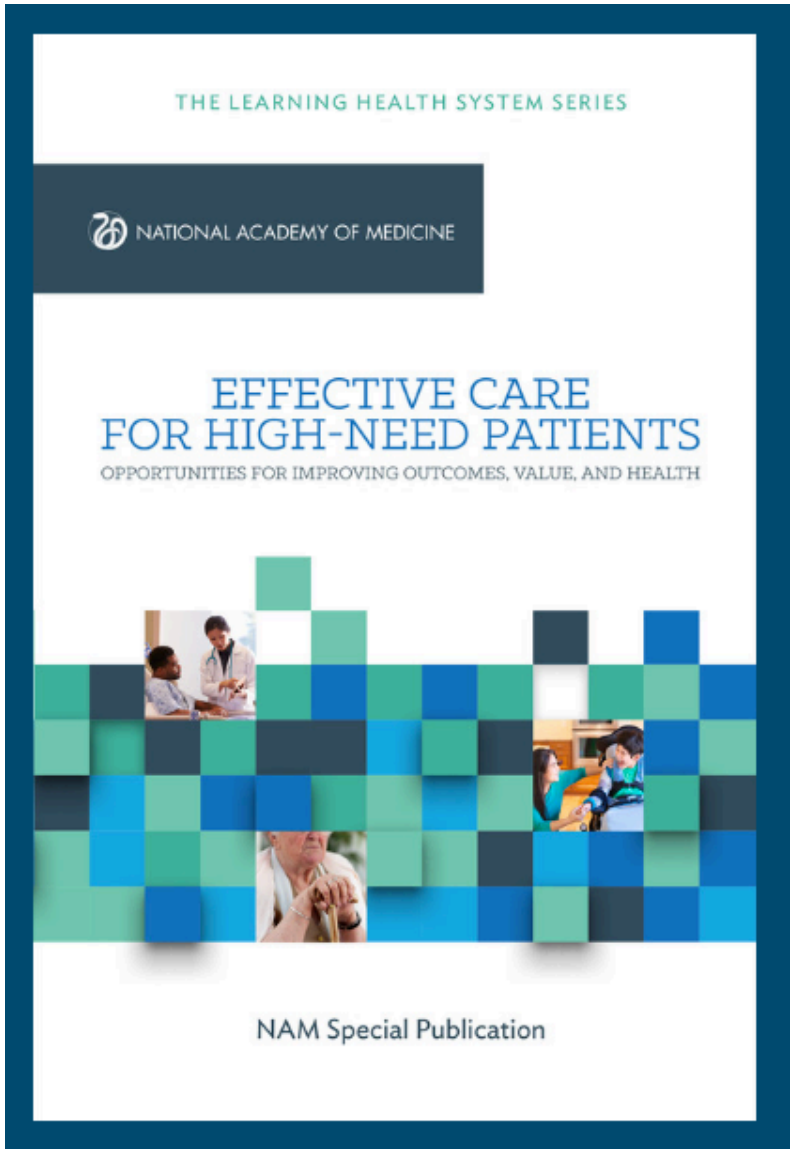
Source: https://www.rush.edu/health-wellness/video-library/total-health-collaborative; Shafiq Rab, RUMC CIO

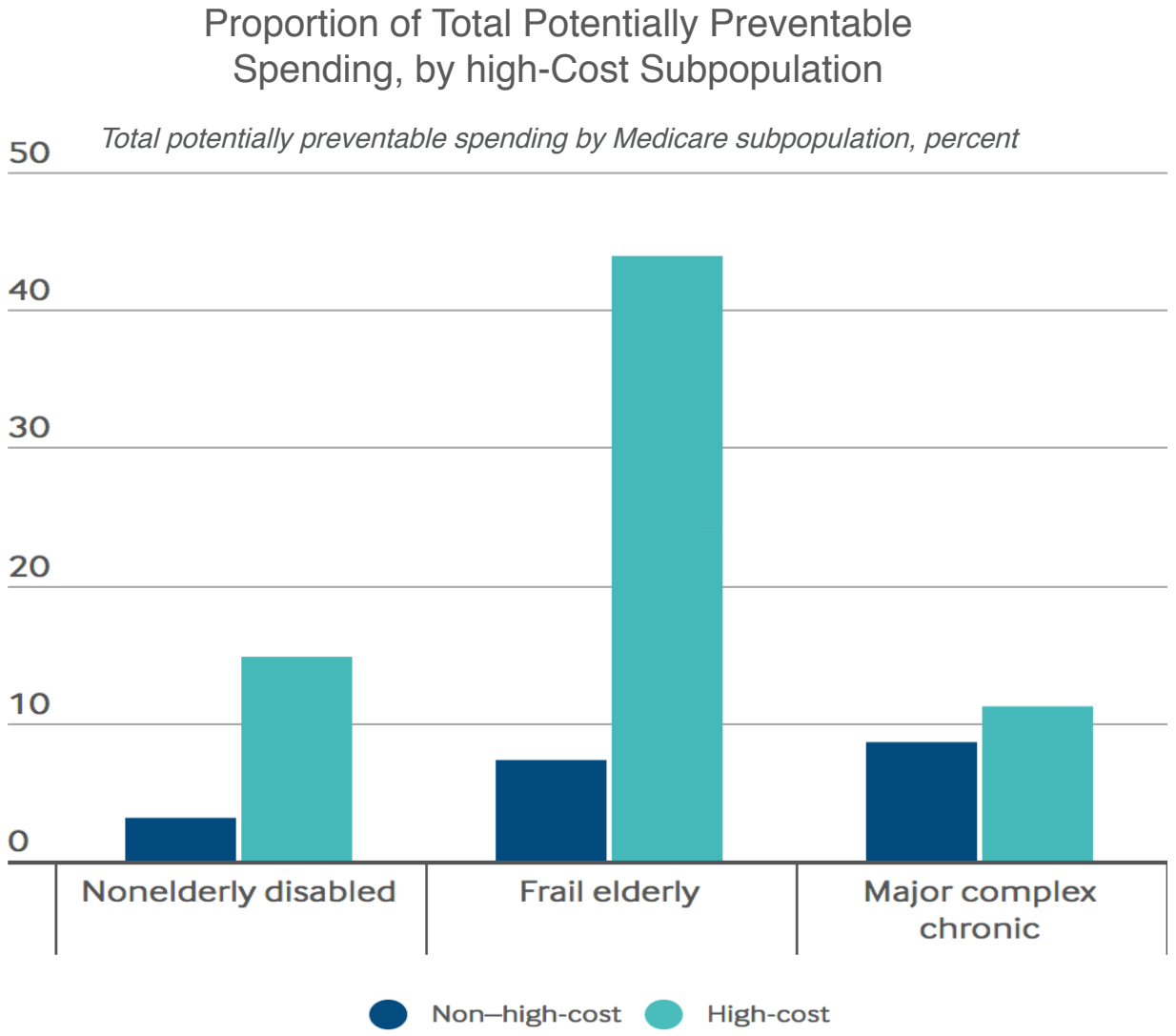
Eye on Prize: Cost Growth @ GDP Growth Rate



Source: Author's analysis based on data from Centers for Medicare and Medicaid Services (CMS), Office of the Actuary, 2014-2024 National Health Expenditures (NHE), projected July 2015; http://cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html.

Focus on High Need, High Cost Patients





Adapted from J. F. Figueroa, K. E. Joynt Maddox, N. Beaulieu et al., "Concentration of Potentially Preventable Spending Among High-Cost Medicare Subpopulations," *Annals of Internal Medicine,* published online Oct. 17. 2017.

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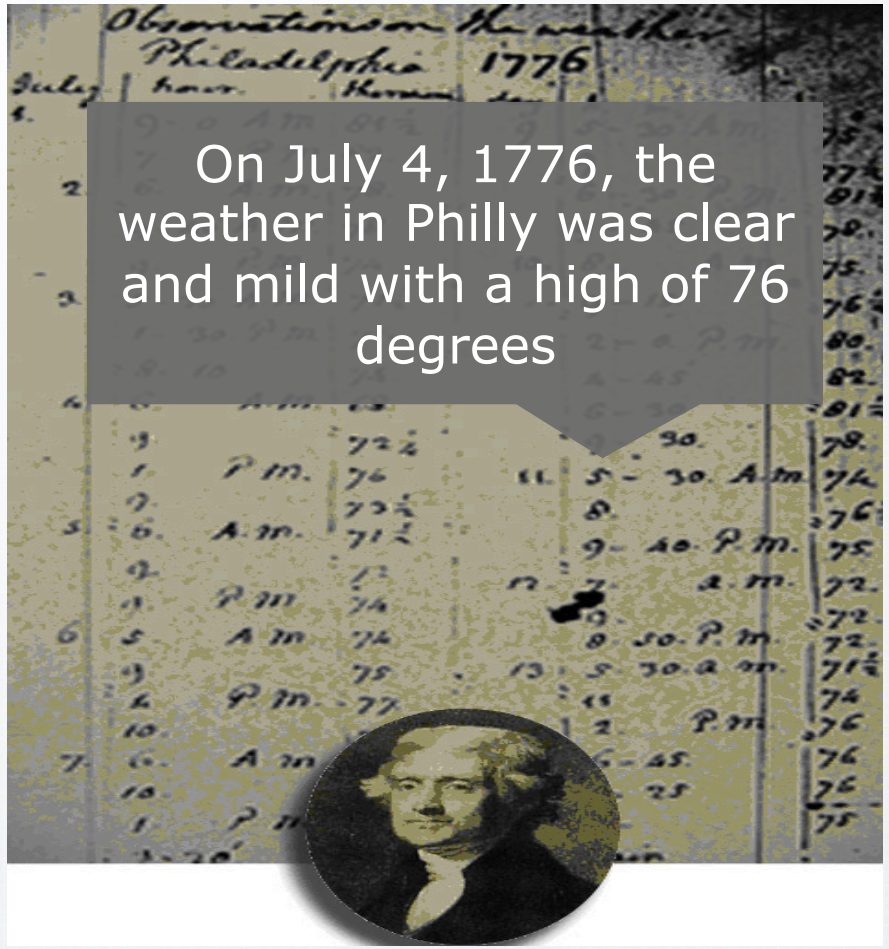
Longitudinal Medicare Claims Now Available for Commercial Use



Expanded Access to Encounter Data

CMS is expanding data available to researchers starting with 2015 Medicare Advantage (MA) encounter data, which provides detailed information about services to beneficiaries enrolled in a Medicare Advantage managed care plan in calendar year 2015. Researchers already have access to Medicare claims data for the fee-for-service program, and this release of MA data will provide a fuller picture of care provided to Medicare beneficiaries.

CMS also plans to release data from Medicaid and the Children's Health Insurance Program (CHIP) next year, realizing such data has the potential to facilitate research that will help drive innovation and competition in the healthcare system and, ultimately, help doctors and patients make the best decisions about care.

"Data has the potential to help produce better, more targeted treatments for patients, improving their quality of life while at the same time reducing costs," Administrator Verma said.

CMS opens "linked A/B/D" data access via QE program, VRDC, PUF files and "Blue Button"; adds MA, Medicaid 2018-19

Source: http://celebrating200years.noaa.gov/foundations/climate_data/image1.html; hhttps://www.ccwdata.org/web/guest/interactive-data/ams-dashboard

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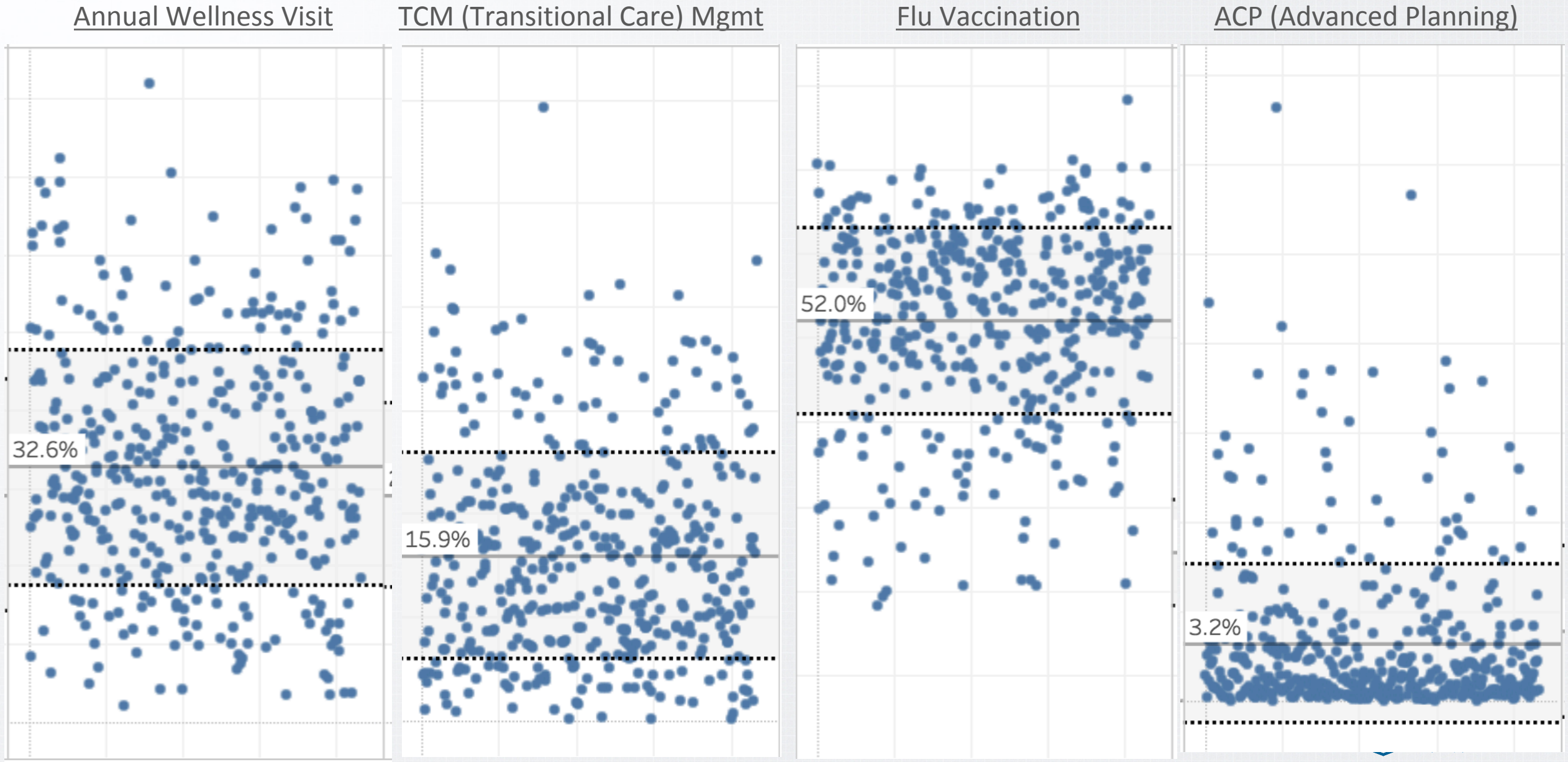
Widespread Variation on Key Preventive Service Performance Metrics



CMS Blue Button Data ~ Oncology Care Model Insights

Stats on OCM Cancer Pop

+ Time period: CY2017

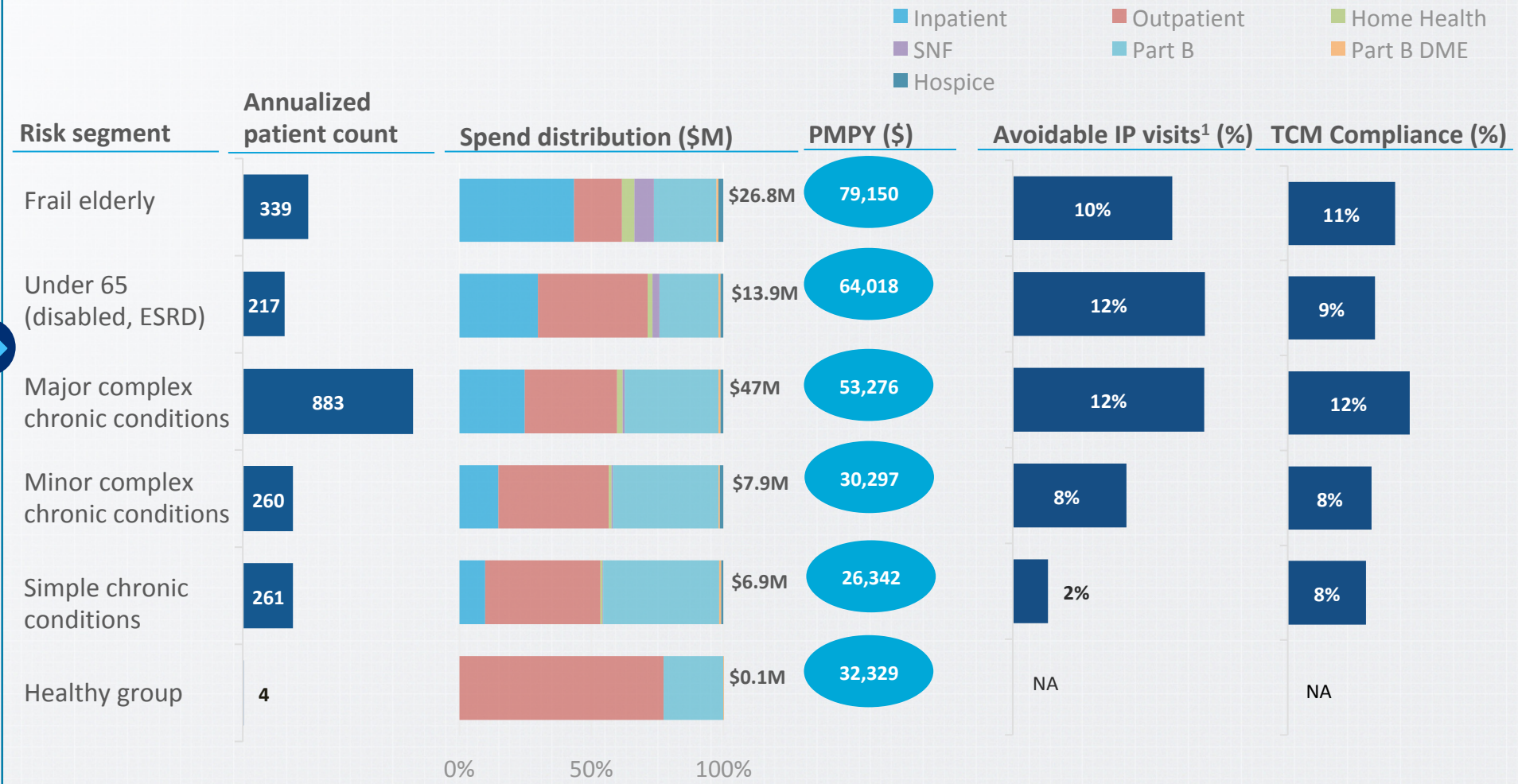
+ Patient count & total spend: **1,964 (3%)** out of ~81K annualized members in [Sample] are OCM active cancer patients and make up **~$103M (13%)** of **$810M** total spend at [Sample]

+ Average PMPY Spend: **$52,281** PMPY in the [Sample] OCM cancer pop vs **~$10K** PMPY in the general [Sample] population

+ Percent of avoidable IP visits: About **10%** of IP visits are avoidable in the cancer pop by AHRQ definition

+ Average % TCM compliance: About **10%** in cancer pop vs **~21%** in the [Sample] general pop

[Sample] OCM active cancer population by frailty segments: spend, utilization and quality metrics



1 Avoidable IP visit here is defined as presence of AHRQ PQI measure during an IP stay

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