Improving Opioid Prescribing through Electronic Clinical Decision Support Tools: Implementation of CDC's Guideline for Prescribing Opioids for Chronic Pain

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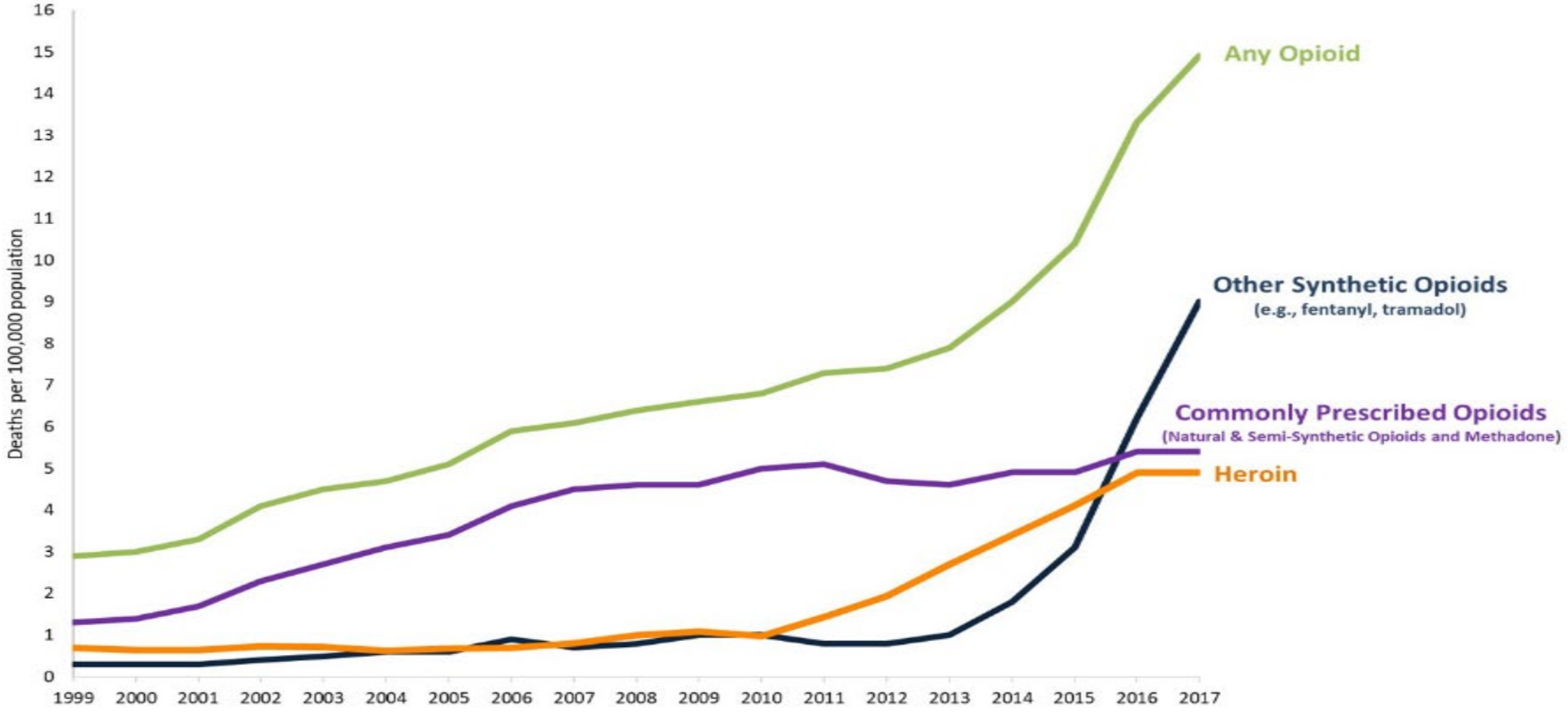
National Center for Injury Prevention and Control

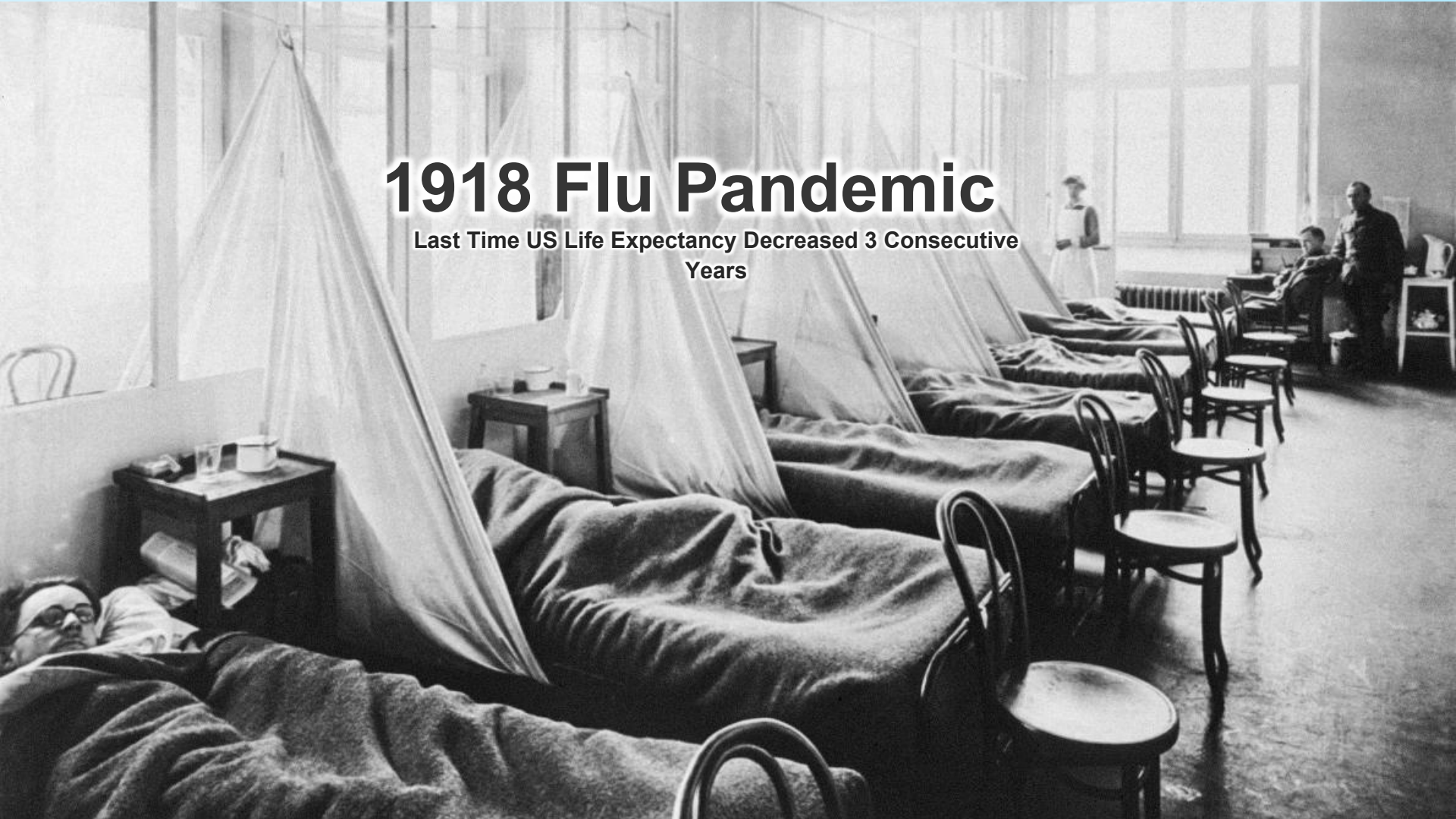
December 19, 2019

Overdose Death Rates Involving Opioids, by Type, United States, 2000-2017



SOURCE: CDC/NCHS, National Vital Statistics System, Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC; 2018. https://wonder.cdc.gov/.

www.cdc.gov
Your Source for Credible Health Information



1918 Flu Pandemic

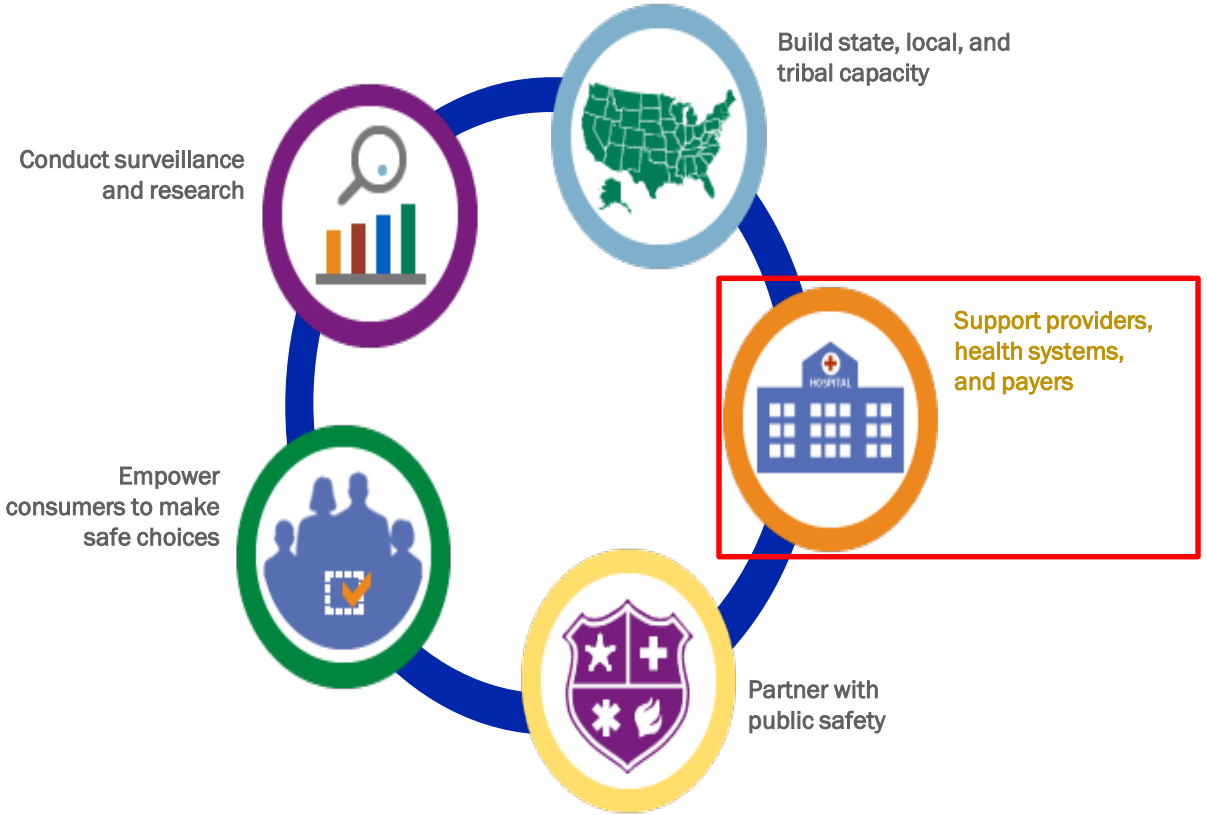
Last Time US Life Expectancy Decreased 3 Consecutive Years

CDC North Star

VISION

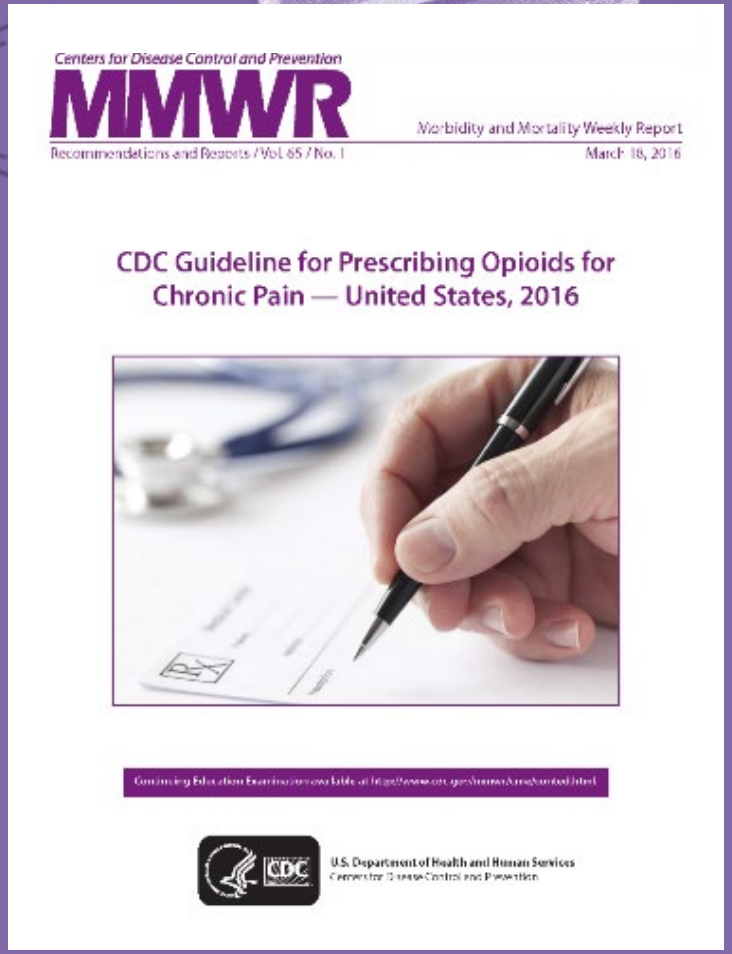
Prevent opioid-related harms & overdose deaths

Preventing Opioid Overdoses and Opioid-Related Harms



Support Providers, Health Systems, and Payers

- Promote use of the *CDC Guideline for Prescribing Opioids for Chronic Pain*
- Train healthcare providers on implementation of Guideline
- Provide tools to help integrate into clinical practice



- Primary care providers
- Patients 18 years or older with chronic pain
- Outpatient settings
- Outside of active cancer, palliative, and end of life care

GUIDELINE FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN

www.cdc.gov

Organization of Guideline Recommendations

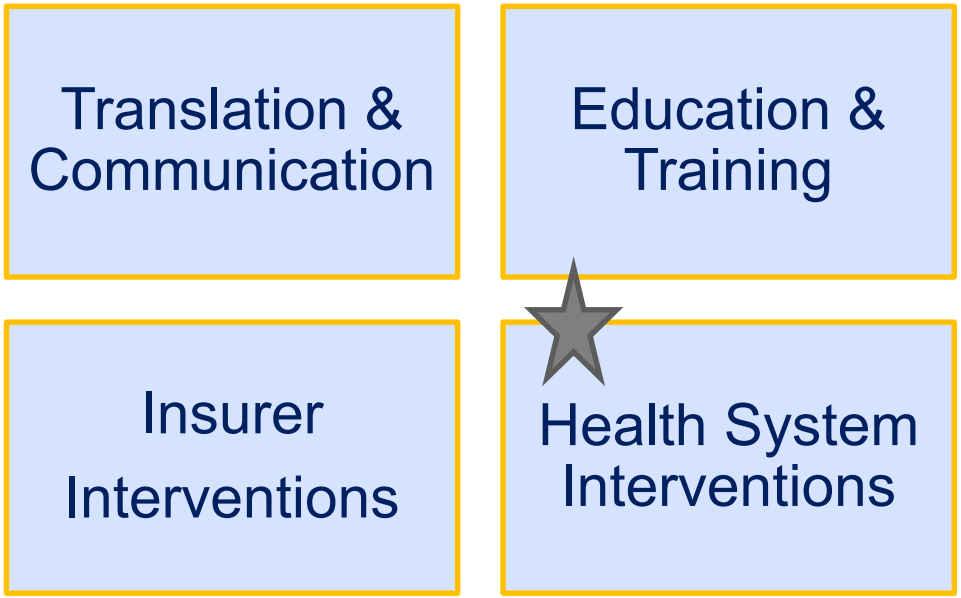
12 recommendations grouped into 3 conceptual areas:

- Determining when to initiate or continue opioids for chronic pain
- Opioid selection, dosage, duration, follow-up, and discontinuation
- Assessing risk and addressing harms of opioid use

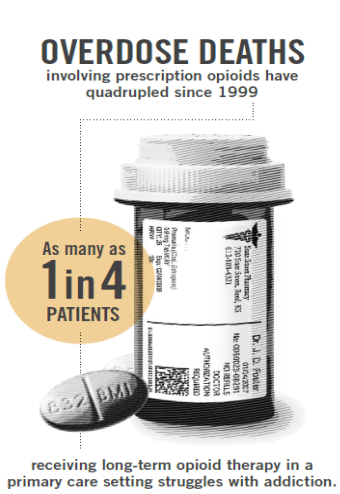
EMPOWERING PROVIDERS.

www.cdc.gov GUIDELINE FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN

Comprehensive Implementation Approach for the CDC Prescribing Guideline



Translation & Communication



Tips for Communicating with Patients

- Ask open-ended questions
- Be empathetic
- Use active listening
- Use clear explanations—avoid jargon
- Include verbal and written materials

SIMPLE WAYS TO START CONVERSATION

- ☑ What medications are you taking?
- ☑ What medications have you taken to manage pain and how did you respond?
- ☑ Describe how you normally take your medications.
- ☑ How well is your medication controlling your pain?
- ☑ Are you experiencing any side effects from your pain medications?
- ☑ In addition to medications, what other ways are you managing your pain?
- ☑ Do you know which medications you should avoid while taking opioids?
- ☑ What questions do you have about your medications?

Pharmacists are an essential part of the health care team. On the front lines of dispensing opioid pain medications and providing medication-related services, pharmacists can serve as a first line of defense by engaging in prevention and treatment efforts of opioid use disorder and overdose.

RESOURCES AND EDUCATION

American Pharmacists Association: www.pharmacist.com/

CDC Injury Prevention and Control Opioid Overdose: www.cdc.gov/drugoverdose/

CDC What Patients Need to Know factsheet: www.cdc.gov/drugoverdose/pdf/aha-patient-opioid-factsheet-a.pdf

Substance Abuse and Mental Health Services Administration: www.samhsa.gov

PDMP Resource: www.namsdl.org/prescription-monitoring-programs.cfm

Drug Enforcement Administration: www.dea.gov/index.shtml

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
www.cdc.gov/drugoverdose

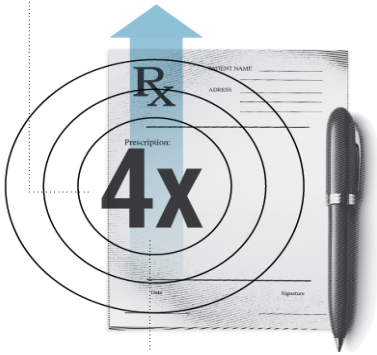
PHARMACISTS: ON THE FRONT LINES

Addressing Prescription Opioid Abuse and Overdose

Sales of prescription opioids in the U.S. nearly

QUADRUPLED

from 1999 to 2014,



but the amount of pain Americans reported remained

UNCHANGED

GUIDELINE FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN

*Recommendations focus on pain lasting longer than 3 months or past the time of normal tissue healing, outside of active cancer treatment, palliative care, and end-of-life care.

APP includes:

- MME Calculator
- Prescribing Guidance
- Motivational Interviewing

EMPOWERING PROVIDERS.

www.cdc.gov GUIDELINE FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN

Clinician Education & Training

Online training modules & webinars for clinicians

Free Interactive Trainings:

1. Addressing the Opioid Epidemic: Recommendations from CDC
2. Treating Chronic Pain Without Opioids
3. Communicating with Patients
4. Reducing the Risk of Opioids
5. Assessing and Addressing Opioid Use Disorder
6. Dosing and Titration of Opioids: How Much, How Long, and How and When to Stop
7. Determining Whether to Initiate Opioids for Chronic Pain
8. Implementing CDC's Prescribing Guideline into Clinical Practice
9. Opioid Use and Pregnancy
10. Motivational Interviewing
11. Collaborative Patient-Provider Relationship in Opioid Clinical Decision Making

To learn more:
www.cdc.gov/drugoverdose/training/index.html

Clinical Outreach and Communication Activity (COCA) Free Webinars

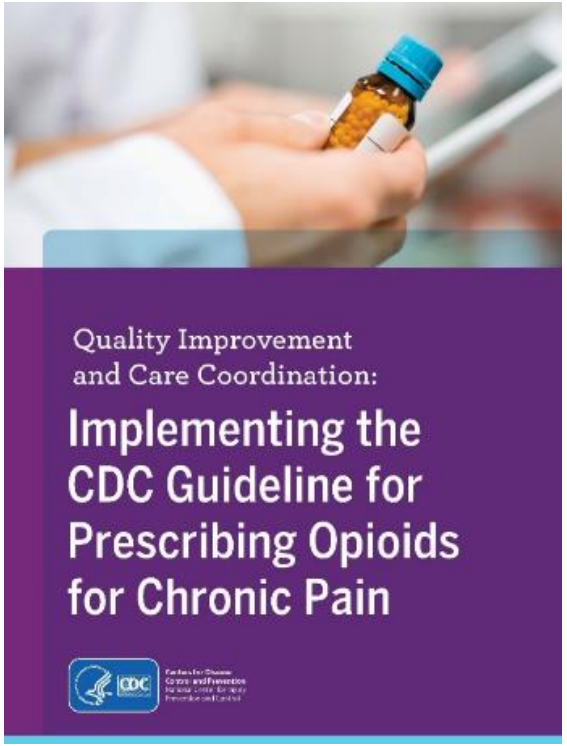
1. Overview of Guideline
2. Nonopioid Treatments for Chronic Pain
3. Assessing Benefits and Harms of Opioid Therapy
4. Dosing and Titration of Opioids
5. Opioid Use Disorder—Assessment and Referral
6. Risk Mitigation Strategies
7. Effective Communication with Patients

To learn more:
https://www.cdc.gov/drugoverdose/training/webinars.html

Health Systems Interventions

- Clinical Quality Improvement and Care Coordination
- EHR and PDMP (prescription drug monitoring program) Data Integration
- Clinical decision support (CDS) tools embedded into electronic health records (EHRs)

Quality Improvement (QI) and Care Coordination Resource

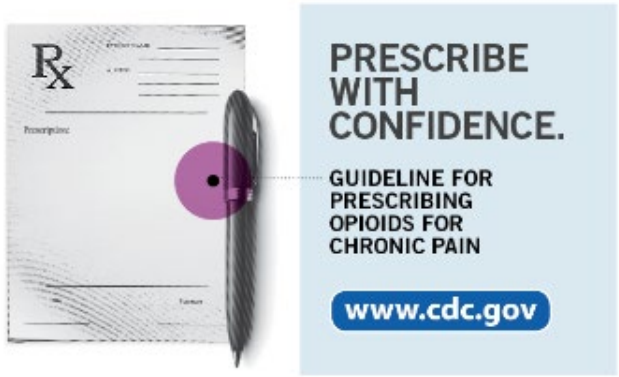


- Companion resource to facilitate implementation of the Guideline recommendations into practice
- Intended to help healthcare systems and providers integrate QI measures and care coordination into their clinical practice

https://www.cdc.gov/drugoverdose/pdf/prescribing/CDC-DUIP-QualityImprovementAndCareCoordination-508.pdf

Quality Improvement (QI) Measures

- 16 clinical QI opioid measures align with the 12 Guideline recommendation statements
- Support safe and effective opioid prescribing and pain management and treatment—rather than performance management
- Should be tailored to individual practice policies on opioid prescribing and pain management, or reflect state laws or regulations
- Organized into two categories:
  1) New opioid prescriptions
  2) Long-term opioid therapy



CDC Resources

CDC Opioid Overdose Prevention Website
www.cdc.gov/drugoverdose

State Efforts
https://www.cdc.gov/drugoverdose/states/index.html

CDC Guideline for Prescribing Opioids for Chronic Pain
https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm

Resources for Patients
https://www.cdc.gov/drugoverdose/patients/index.html

Resources for Providers
https://www.cdc.gov/drugoverdose/providers/index.html

Clinical Decision Support Resources

- **Implementation Guide Output:** http://build.fhir.org/ig/cqframework/opioid-cds/
- **Source for the implementation guide:** https://github.com/cqframework/opioid-cds
- **Supporting Java packages for the CQL-to-ELM translator and CQL Engine:** https://github.com/cqframework/opioid-cds-logic
- **Agency for Healthcare Research Quality's CDS Connect:** https://cds.ahrq.gov/cdsconnect/artifact/factors-consider-managing-chronic-pain-pain-management-summary

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Please note that the findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

The Office of the National Coordinator for Health Information Technology

Overview of ONC and Clinical Decision Support (CDS) Interventions for the CDC Guideline for Prescribing Opioids for Chronic Pain

December 19, 2019

Lolita Kachay, ONC

Health IT is Critical for Combating the Opioid Epidemic

How can health IT help…
Enhance Prescription Drug Monitoring Programs (PDMPs) and improve prescribing practices
Integrating PDMPs and electronic health records (EHRs) enables providers to routinely query a patient's controlled substance history prior to prescribing. Standards based electronic data exchange between EHRs, pharmacies, and PDMPs allows more seamless and timely access to medication history data to those who need it most.
Improve provider/prescriber education
Advancing clinical decision support standards and functionality in certified EHRs can provide evidence based pain management recommendations to providers/prescribers directly in their workflow.
Connect and refer individuals to drug addiction treatment services
Standards based electronic data exchange between EHRs, HIEs, and PDMPs would improve transitions of care and care coordination between primary care, SUD treatment centers, behavioral health, and social services.
Improve access to more complete, accurate, and timely data and reporting
Standard data capture and exchange within and across complex health systems can support more robust state and federal public health reporting.

ONC's Opioid-Related Efforts

- ONC's current opioid work focuses on utilizing health IT to help reduce the inappropriate use of opioids and opioid-related harms:
  - ONC Health IT Certification Program to support Care Continuum
  - Prescription Drug Monitoring Programs (PDMPs) & Health IT Data Integration
  - Clinical Decision Support (CDS)
  - Electronic Prescribing of Controlled Substances (EPCS)
  - Policy Vehicles, Coordination, and Stakeholder Engagement

Background - Clinical Decision Support (CDS)

- In March 2016, the CDC released its Guideline for Prescribing Opioids for Chronic Pain based on the most recent scientific evidence (see http://www.cdc.gov/drugoverdose/prescribing/guideline.html)
- However, not all physicians may be aware of the CDC prescribing guideline and adoption of the guideline can vary by state and setting
- Integrating the Guideline recommendations electronically into a provider's workflow can help them make more informed clinical decisions when prescribing opioids
- In 2016, the CDC and ONC began working collaboratively to convert the opioid clinical practice guideline into standardized and shareable electronic CDS interventions to be used in EHRs to support appropriate prescribing. The collaboration continues to update and modify CDS content
  - » This collaboration successfully modified CDS content and developed an electronic CDS guide for six of the twelve recommendation statements (http://build.fhir.org/ig/cqframework/opioid-cds/)

The Office of the National Coordinator for Health Information Technology

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CDC OPIOID CLINICAL DECISION SUPPORT PROJECT: OVERVIEW

GREG WHITE
PROJECT MANAGER
SECURITY RISK SOLUTIONS

CDC PRESCRIBING GUIDELINE

- For opioid use for chronic pain outside of active cancer treatment, palliative care, or end-of-life care

https://www.cdc.gov/drugoverdose/prescribing/guideline.html

Determining when to initiate or continue opioids for chronic pain

1. Opioids are not first-line therapy
2. Establish goals for pain and function
3. Discuss risks and benefits

Opioid selection, dosage, duration, follow-up, and discontinuation

4. Use immediate-release opioids when starting
5. Use the lowest effective dose
6. Prescribe short durations for acute pain
7. Evaluate benefits and harms frequently

Assessing risk and addressing harms

8. Use strategies to mitigate risk
9. Review PDMP data
10. Use urine drug testing
11. Avoid concurrent opioid and benzodiazepine prescribing
12. Offer treatment for opioid use disorder

Source: https://www.cdc.gov/drugoverdose/pdf/guidelines_at-a-glance-a.pdf

CDC OPIOID DECISION SUPPORT PROJECT

- Goal: provide point-of-care support for CDC Guideline for Prescribing Opioids for Chronic Pain
- CDC-sponsored effort. Contributors: ONC, AHRQ, Yale, Indiana University, Duke, Security Risk Solutions, Epic, Cerner, and many others.
- Approach:
  - Leverage health IT standards for representing clinical knowledge & integrating into EHR
  - Pilot with multiple healthcare organizations and EHR products

STANDARDS-BASED DISSEMINATION

- **EHR data retrieval: HL7 FHIR**
  - FHIR = Fast Healthcare Interoperability Resources
- **Guideline knowledge representation: HL7 CQL**
  - CQL = Clinical Quality Language
- **EHR workflow integration: HL7 CDS Hooks**
- **EHR app integration: HL7 SMART**
  - SMART = Substitutable Medical Apps, Reusable Technologies
- **Key enabler: EHR vendor support for these standards**

TRANSLATING EVIDENCE TO EXECUTABLE CDS

Knowledge Level	Description	Example
L1	Narrative	Guideline for a specific disease that is written in the format of a peer-reviewed journal article
L2	Semi-structured	Flow diagram, decision tree, or other similar format that describes recommendations for implementation **(HUMAN READABLE)**
L3	Structured	Standards-compliant specification encoding logic with data model(s), terminology/code sets, value sets that is ready to be implemented **(COMPUTER/MACHINE READABLE)**
L4	Executable	CDS implemented and used in a local execution environment (e.g., CDS that is live in an electronic health record (EHR) production system) or available via web services

Adapted from: Boxwala, AA, et al.. A multi-layered framework for disseminating knowledge for computer-based decision support. *J Am Med Inform Assoc* 2011(18) i132-i139.

KNOWLEDGE RESOURCES & PILOT IMPLEMENTATIONS

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CO-CHAIR, HL7 CLINICAL DECISION SUPPORT WORK GROUP
MEMBER, US HEALTH IT ADVISORY COMMITTEE

DISCLOSURES

- In the past year, I have served as a consultant, sponsored researcher, or invited speaker with honorarium for the U.S. Office of the National Coordinator for Health IT (via Security Risk Solutions), Hitachi, McKesson InterQual, Klesis Healthcare, RTI International, Mayo Clinic, and UC San Francisco

1.0.0 Opioid Prescribing Support Implementation Guide

Contents

1.1.0 Introduction

This implementation guide provides resources and discussion in support of applying the Centers for Disease Control and Prevention (CDC) Opioid Prescribing Guidelines:

CDC guideline for prescribing opioids for chronic pain

This implementation guide was developed as part of the Clinical Quality Framework Initiative, a public-private partnership sponsored by the Centers for Medicare & Medicaid Services (CMS) and the U.S. Office of the National Coordinator for Health Information Technology (ONC) to identify, develop, and harmonize standards for clinical decision support and electronic clinical quality measurement.

This project is a joint effort by the Centers for Disease Control and Prevention (CDC) and the Office of the National Coordinator for Health IT (ONC) focused on improving processes for the development of standardized, shareable, computable decision support artifacts using the CDC Opioid Prescribing Guideline as a model case.

1.2.0 Scope

This implementation guide includes support for the following guideline recommendations:

- Recommendation #1 - Nonpharmacologic and Nonopioid Pharmacologic Therapy Consideration
- Recommendation #2 - Opioid Therapy Goals Discussion
- Recommendation #3 - Opioid Therapy Risk/Benefit Discussion
- Recommendation #4 - Opioid Release Rate When Starting Opioid Therapy
- Recommendation #5 - Lowest Effective Dose
- Recommendation #6 - Prescribe Lowest Effective Dose and Duration
- Recommendation #7 - Opioid Therapy Risk Assessment
- Recommendation #8 - Naloxone Consideration
- Recommendation #9 - Consider Patient's History of Controlled Substance Prescriptions
- Recommendation #10 - Urine Drug Testing
- Recommendation #11 - Concurrent Use of Opioids and Benzodiazepines
- Recommendation #12 - Evidence-based Treatment for Patients with Opioid Use Disorder

1.3.0 Getting Started

For a quick start to get up and running and see how the artifacts work, refer to the Quick Start

http://build.fhir.org/ig/cqframework/opioid-cds-r4/

- Functional Description
- Process Flow
- Computable Content
- Test Cases

8.16.0 Recommendation #11 - Concurrent Use of Opioids and Benzodiazepines

Recommendation #11:

Clinicians should avoid prescribing opioid pain medication and benzodiazepines concurrently whenever possible *(recommendation category: A, evidence type: 3)*.

8.16.1 Functional Description

Patient is being prescribed opioids for chronic pain.

Patient does not appear to be at end of life.

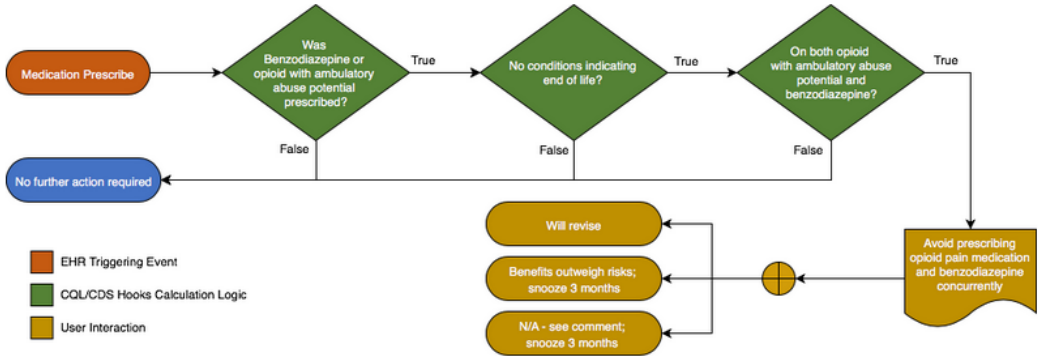
If patient is prescribed opioid medication concurrently with Benzodiazepine medication, provide a recommendation to revise order:

Avoid prescribing opioid pain mediation and benzodiazepine concurrently whenever possible.

Provide links to the CDC Guidance.

One of the following responses should be required:

- Will revise order.
- Risk of overdose carefully considered and outweighed by benefit; snooze 3 months.
- N/A-see comment (will be reviewed by medical director); snooze 3 months.



EXAMPLE CQL

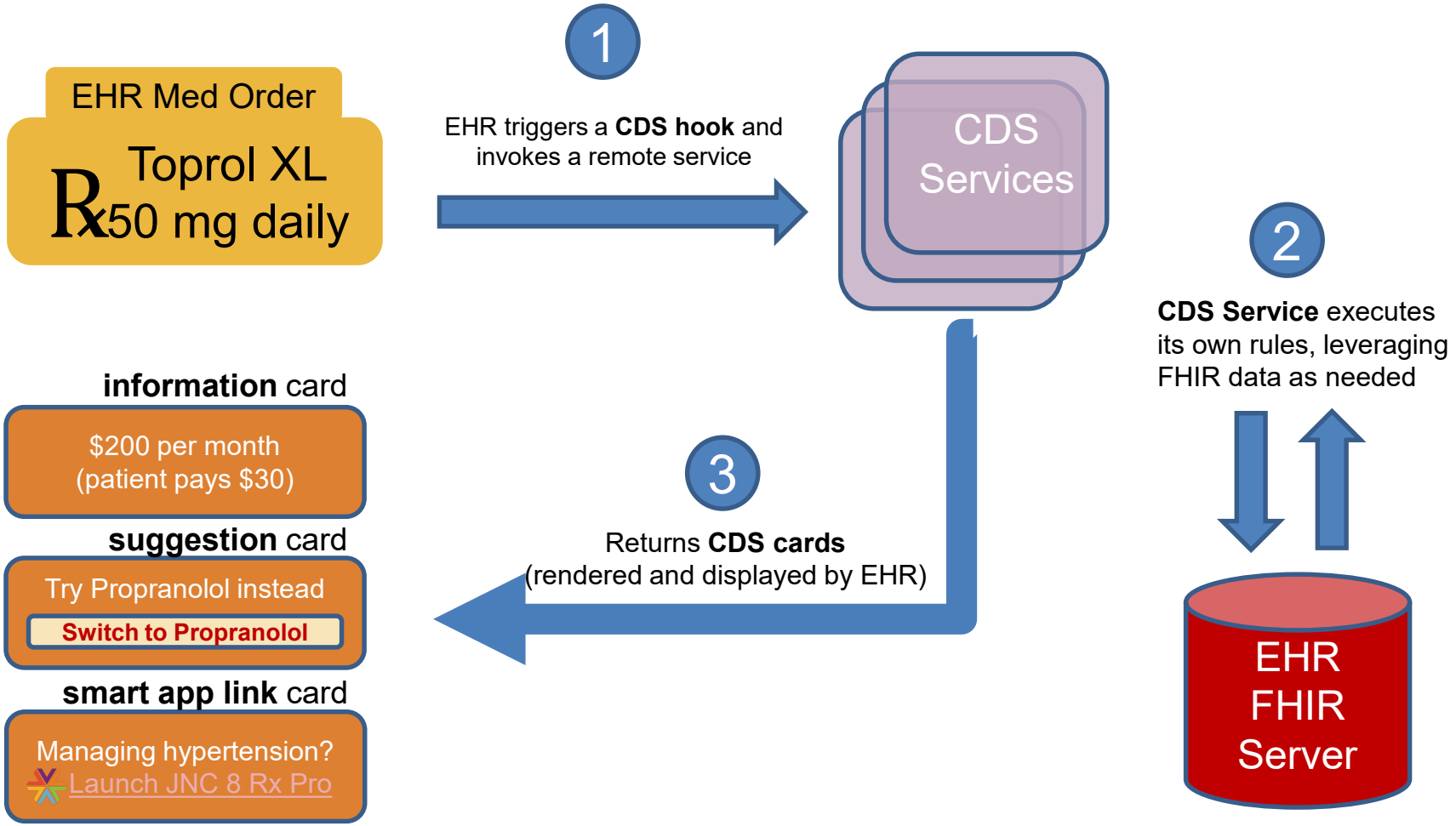
```
50  context Patient
51
52  define "Lookback Year":
53    Interval[Today() - 12 months - 1 days, Today() - 1 day]
54
55  define "Inclusion Criteria":
56    AgeInYears() >= 18
57      and exists (Common."Active Ambulatory Opioid Rx")
58      and AnyTrue(Common.ProbableDaysInRange(Common."Active Ambulatory Opioid Rx", 90, 80))
59      and
60        ("No Urine Screening In Last 12 Months"
61          or "Has Evidence of Opioids"
62          or "Has Evidence of Illicit Drugs")
63
64  define "Illicit Drug Urine Screenings in Last 12 Months":
65    (
66      [Observation: "code" in Common."Illicit Drug Screening"] IllicitDrugScreen
67        where date from IllicitDrugScreen.effective in day of "Lookback Year"
68    ) IllicitDrugScreenDuringLookback
69      sort by effective.value
```

PILOTED EHR INTEGRATION APPROACHES

- **Direct CQL execution**
  - Enables fast execution, even across large populations of patients
  - Requires native EHR vendor system to understand CQL

- **SMART on FHIR**
  - Accessible as a tab in the EHR
  - Requires proactive usage

- **CDS Hooks**
  - Alert or reminder
  - Could contribute to alert fatigue
  - Can also suggest use of a SMART on FHIR app



Slide courtesy of Bryn Rhodes

OVERVIEW OF PILOTS

- **Pilot with Custom Infrastructure: University of Utah**
  - With SMART on FHIR and custom CDS Hooks infrastructure layered on top of Epic Best Practice Advisory Web service infrastructure
  - Recommendation #5 (lowest effective dosing)
- **Pilot with Native EHR Infrastructure, #1: Epic / Yale**
  - With CDS Hooks, recommendations #10 (drug testing) & 11 (benzo)
- **Pilot with Native EHR Infrastructure, #2: Cerner / Indiana U.**
  - With CQL in population health management platform
  - Recommendations #10 and 11
- **Pilot with Native EHR Infrastructure, #3: Epic / Duke**
  - With CDS Hooks, recommendations #10 and 11

PILOT 1:

UNIVERSITY OF UTAH HEALTH
EPIC EHR
CDS HOOKS W/CUSTOM INFRASTRUCTURE
SMART ON FHIR W/NATIVE EHR INFRASTRUCTURE

BestPractice Advisory - Testpatient,Opioid1

Patient's average oral morphine equivalence (OME) is **192.33** mg/day.

Daily Average OME (mg/day)

For adults, CDC recommends reassessing evidence of individual benefits and risks when increasing dosage to >= 50 OME/day, and avoid increasing dosage to >= 90 OME/day or carefully justifying such a decision.

Active Opioid Rx	Avg OME/day*
New **Oxycodone Hydrochloride 15 MG Oral Tablet**	**135 mg**
FENTANYL CITRATE 200 MCG BU LPOP	**17.33 mg**

⚠ Verify taking; Rx may have expired

Sig: Place 1 each (200 mcg) inside cheek every 2 hours as needed. Use prior to bowel movements, maximum 4 per day

Morphine equivalence: 130x. For 1 lozange, OME = 26 mg.

Rx by Smith, John on 02/07/18. Disp 20 each, Refills 0.

Start date: 02/07/18. End date (estimated): 02/12/18. Based on dispense quantity and max daily dose in sig.

Daily dose (avg): Fentanyl Oral Lozenge 20 dispense * 0.2 mg / 30d supply (assumed) = 0.13 mg.

Daily dose (max): Fentanyl Oral Lozenge 4 (daily max per sig) * 0.2 mg = 0.8 mg.

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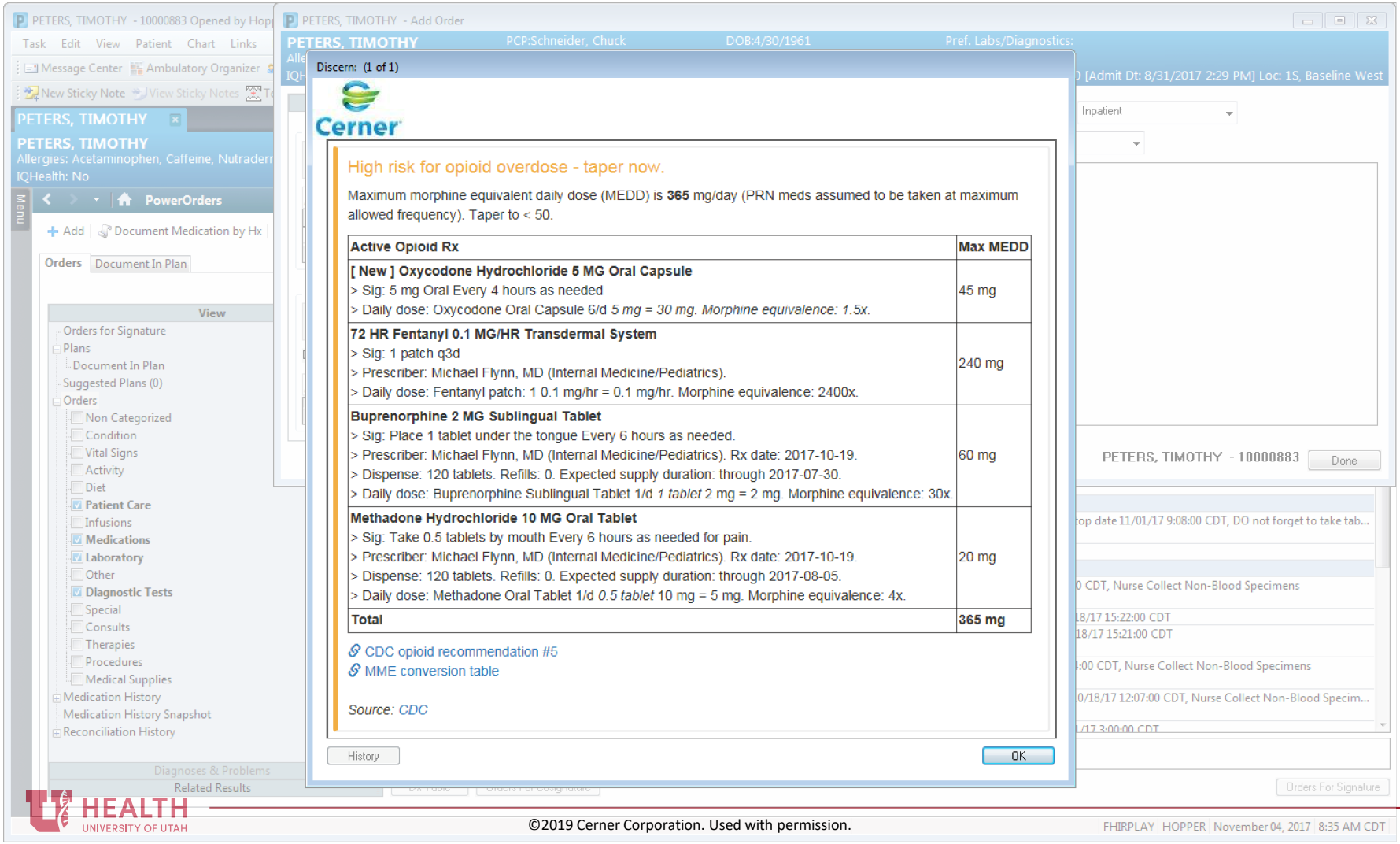
Accept | Cancel



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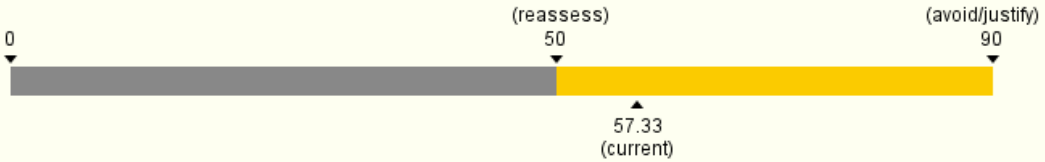
Outpatient Opioid Oral Morphine Equivalence (OME) Calculator

Patient's average oral morphine equivalence (OME) is **57.33** mg/day.

Daily Average OME (mg/day)



For adults, CDC recommends reassessing evidence of individual benefits and risks when increasing dosage to >= 50 OME/day.

Active Opioid Rx	**Avg OME/day***
FENTANYL CITRATE 200 MCG BU LPOP ⌄⌄	**17.33 mg**
⚠ Verify taking; Rx may have expired	
HYDROCODONE-ACETAMINOPHEN 10-325 MG PO TABLET ⌄⌄	**40 mg**
⚠ Verify taking; Rx may have expired	
⚠ Not adding OME for presumed redundant Rxs with start dates of 02/07/18 and 03/07/18.	
Total Average OME/Day	**57.33 mg**

*Avg OME = (qty dispensed)/(days supply). 30d supply assumed unless otherwised noted in Sig or note to pharmacy.
*Max OME (see details) = max amount patient may take on a given day according to Sig, even if patient runs out of med early.

OME conversion table
CPG opioid Rx guideline
Source: CDC opioid Rx guideline -- recommendation #5

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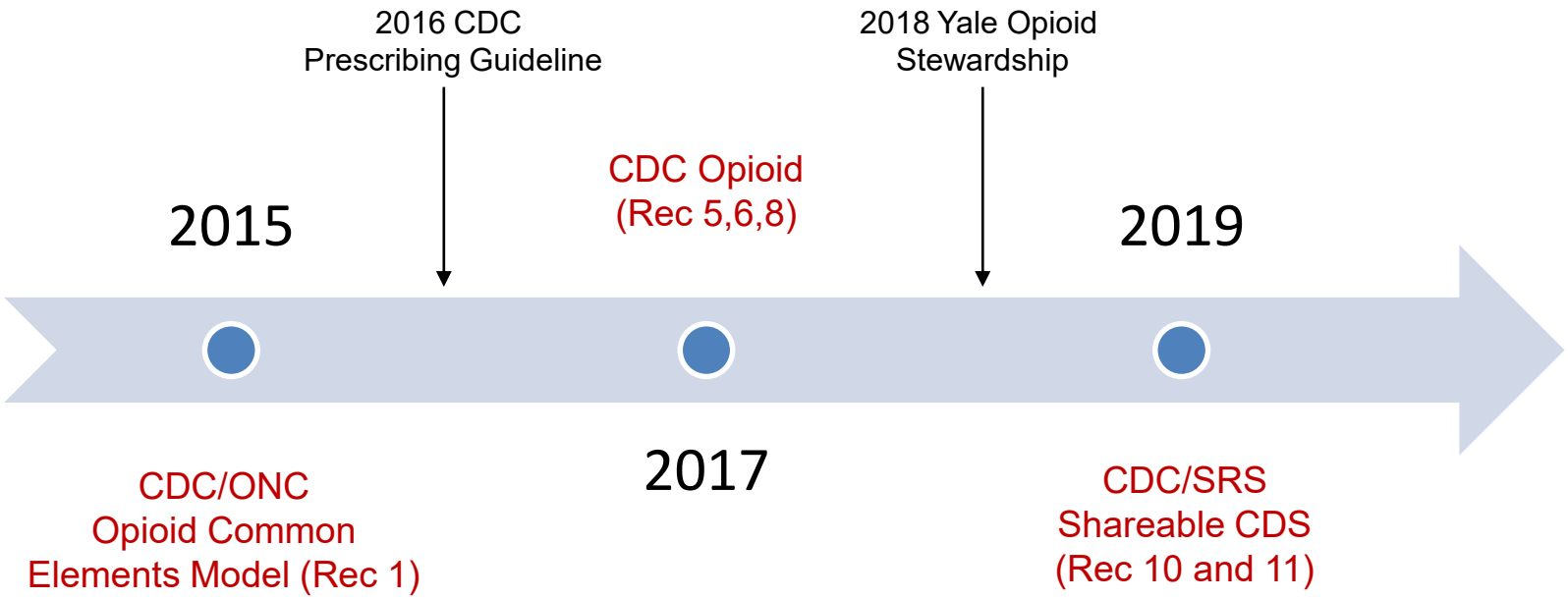
PILOT 2:

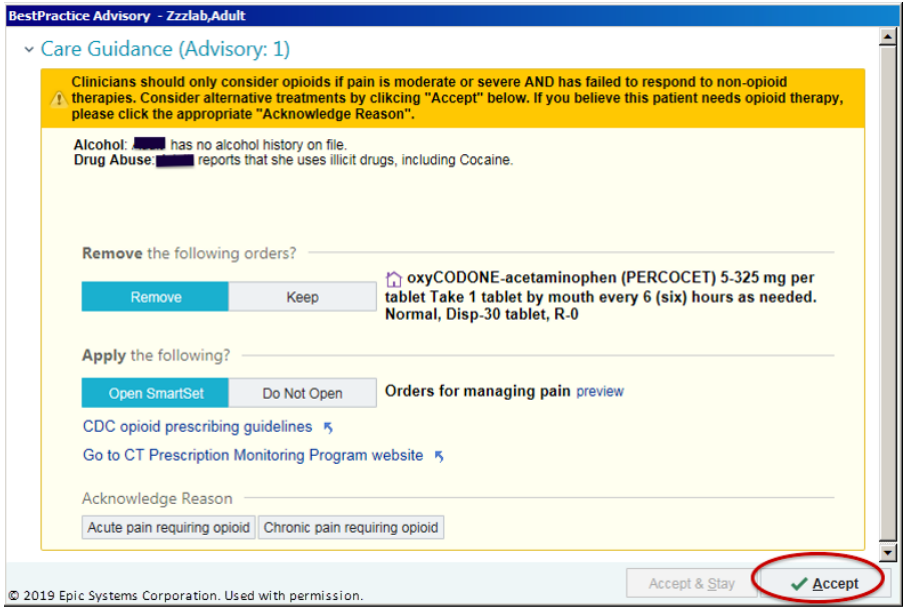
YALE NEW HAVEN HEALTH
EPIC EHR
NATIVE EHR INFRASTRUCTURE
EHR CDS TOOLS + CDS HOOKS

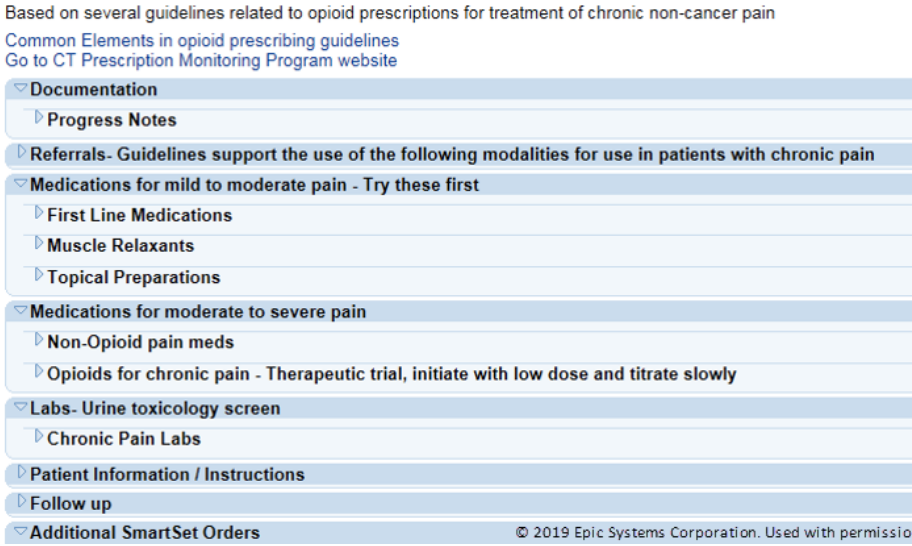
YALE OPIOID DECISION SUPPORT JOURNEY



Slide courtesy of Nitu Kashyap

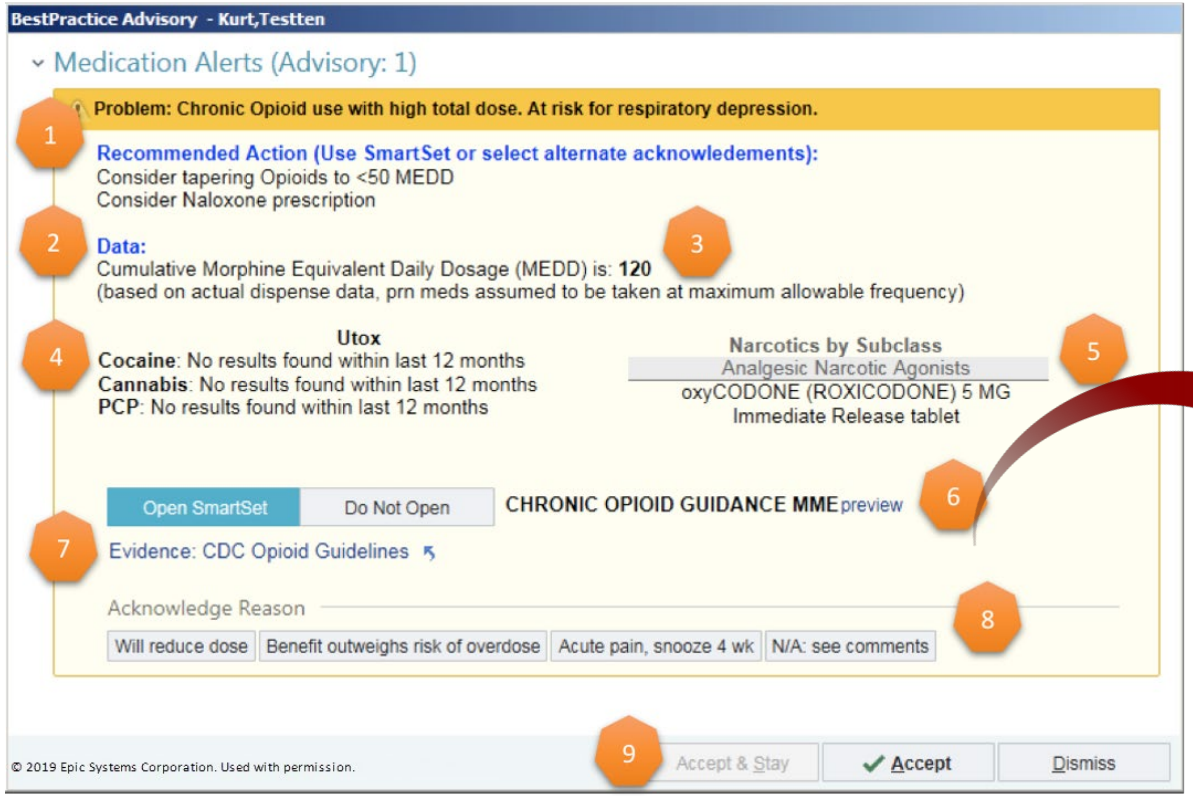
2015: WHEN TO CONSIDER OPIOIDS, ALTERNATIVES





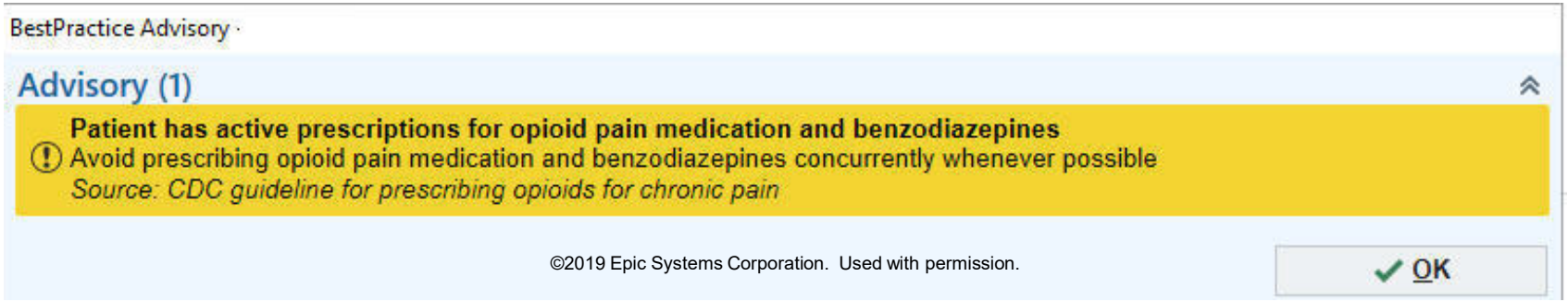
Slide courtesy of Nitu Kashyap

2017: CDS FOR RISK MITIGATION



Slide courtesy of Nitu Kashyap

2019: CDS HOOKS (NATIVE EHR FUNCTIONALITY)



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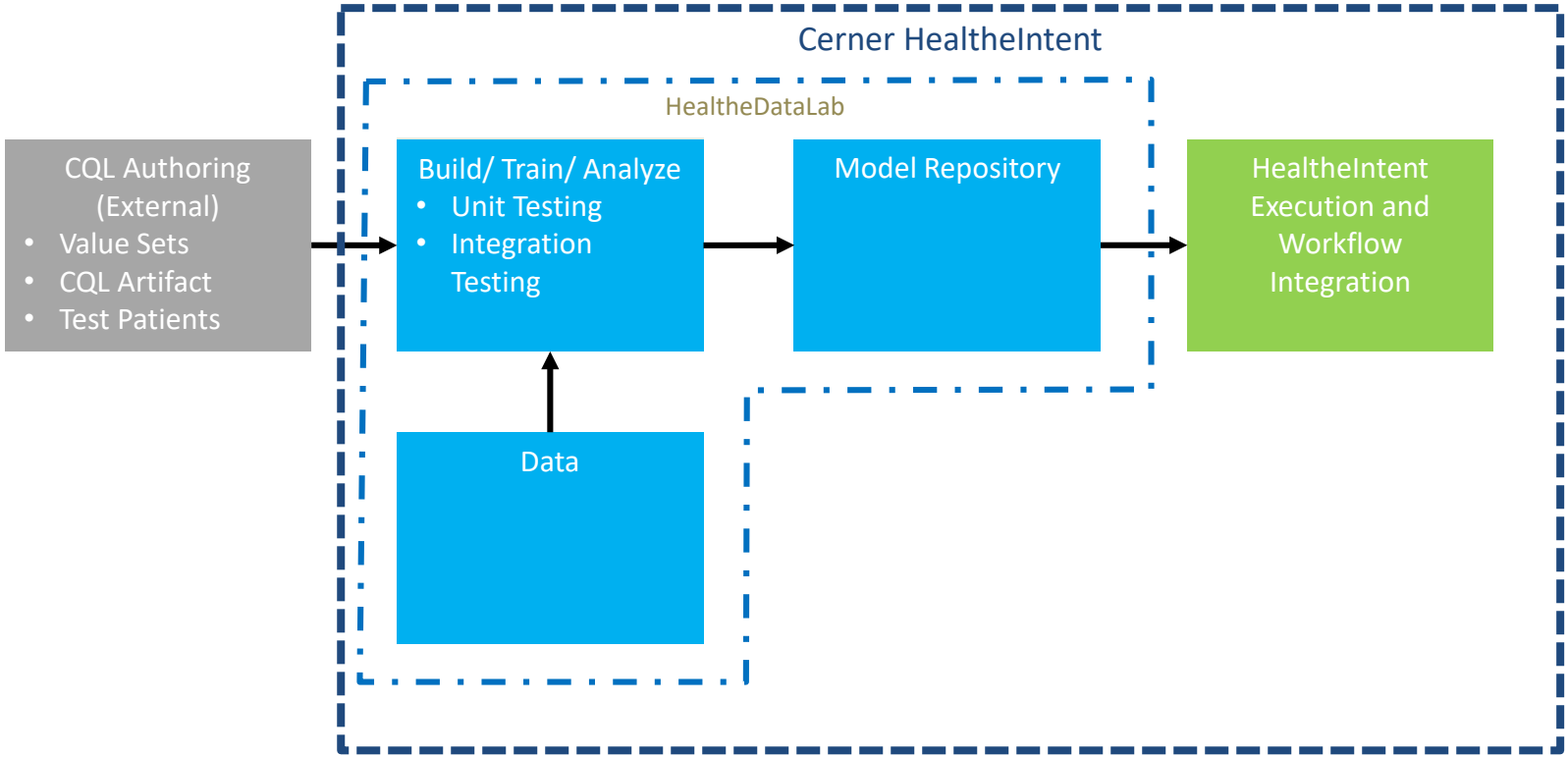
PILOT 3:

INDIANA UNIVERSITY HEALTH PILOT
CERNER EHR
NATIVE CQL EXECUTION

EXECUTION TESTING AND DATA FLOW



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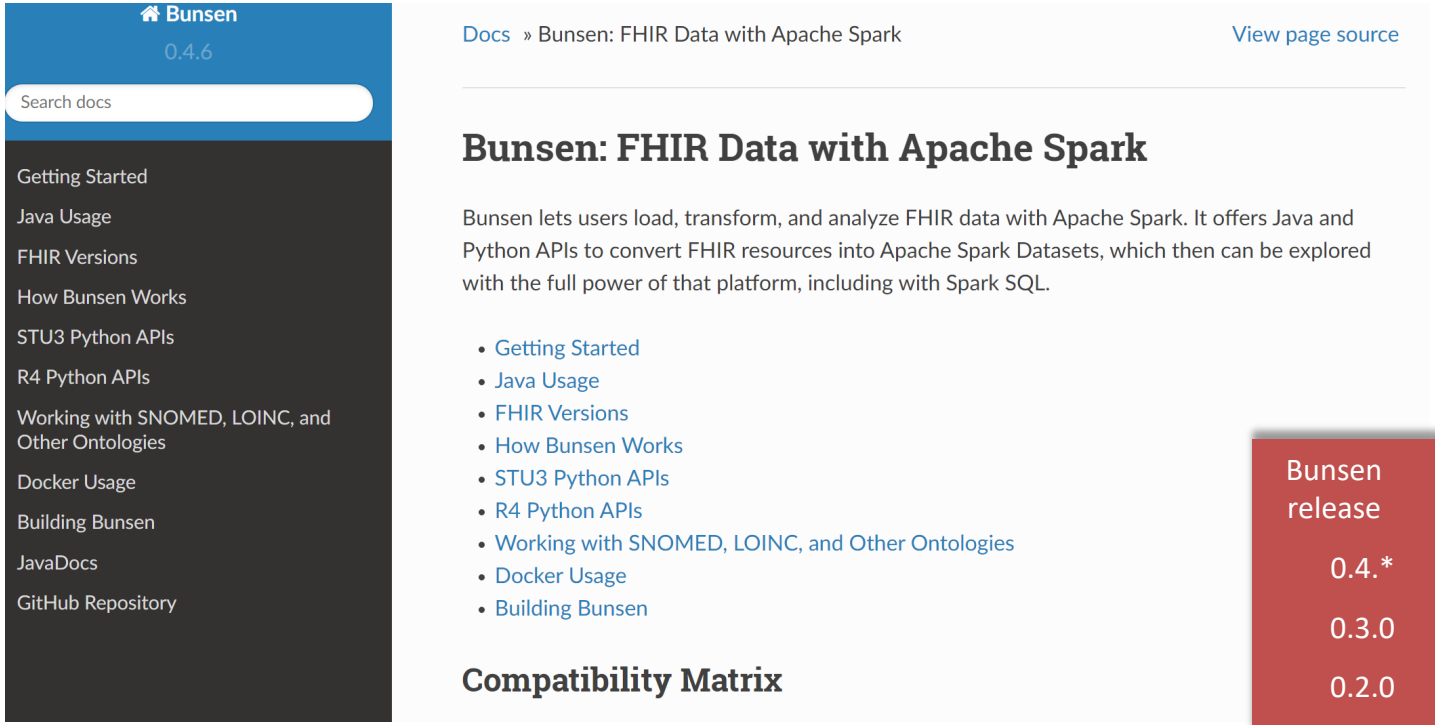
BUNSEN – ENABLE FHIR EXECUTION



Bunsen release	Spark version	FHIR
0.4.*	2.3	STU3, R4
0.3.0	2.2	STU3, R4
0.2.0	2.2	STU3
0.1.0	2.1	STU3

- https://engineering.cerner.com/bunsen/0.4.6/

Slide courtesy of Cole Erdmann

Project work was divided into two Sprints.

- **Technical implementation**

1. Integrate CQL Logic into IU Health's data in Cerner HealtheDataLab
2. Test integration with IU Health population data

- **Clinical User Testing**

1. Design mock environment and user testing script
2. Conduct interviews and analyze responses

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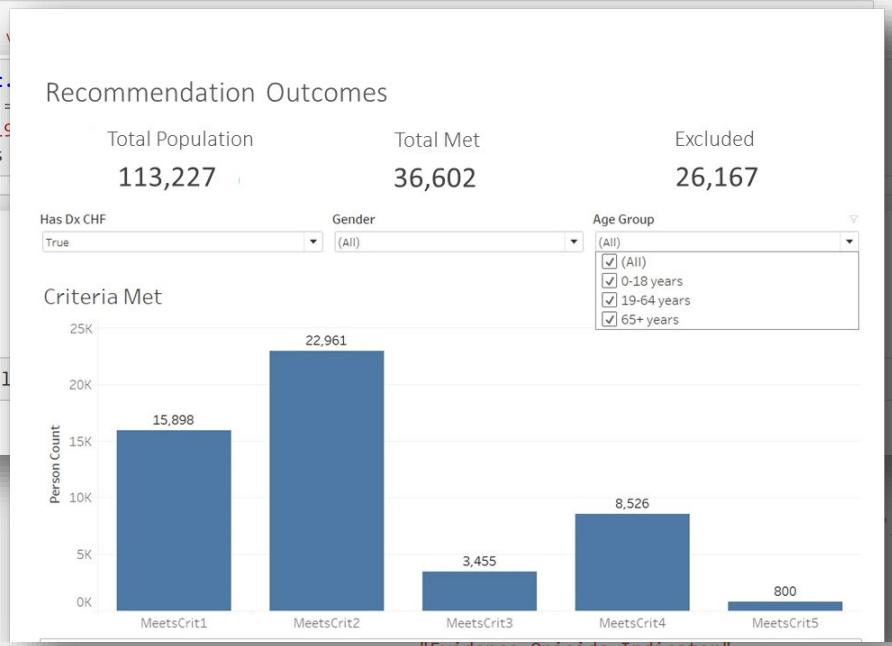
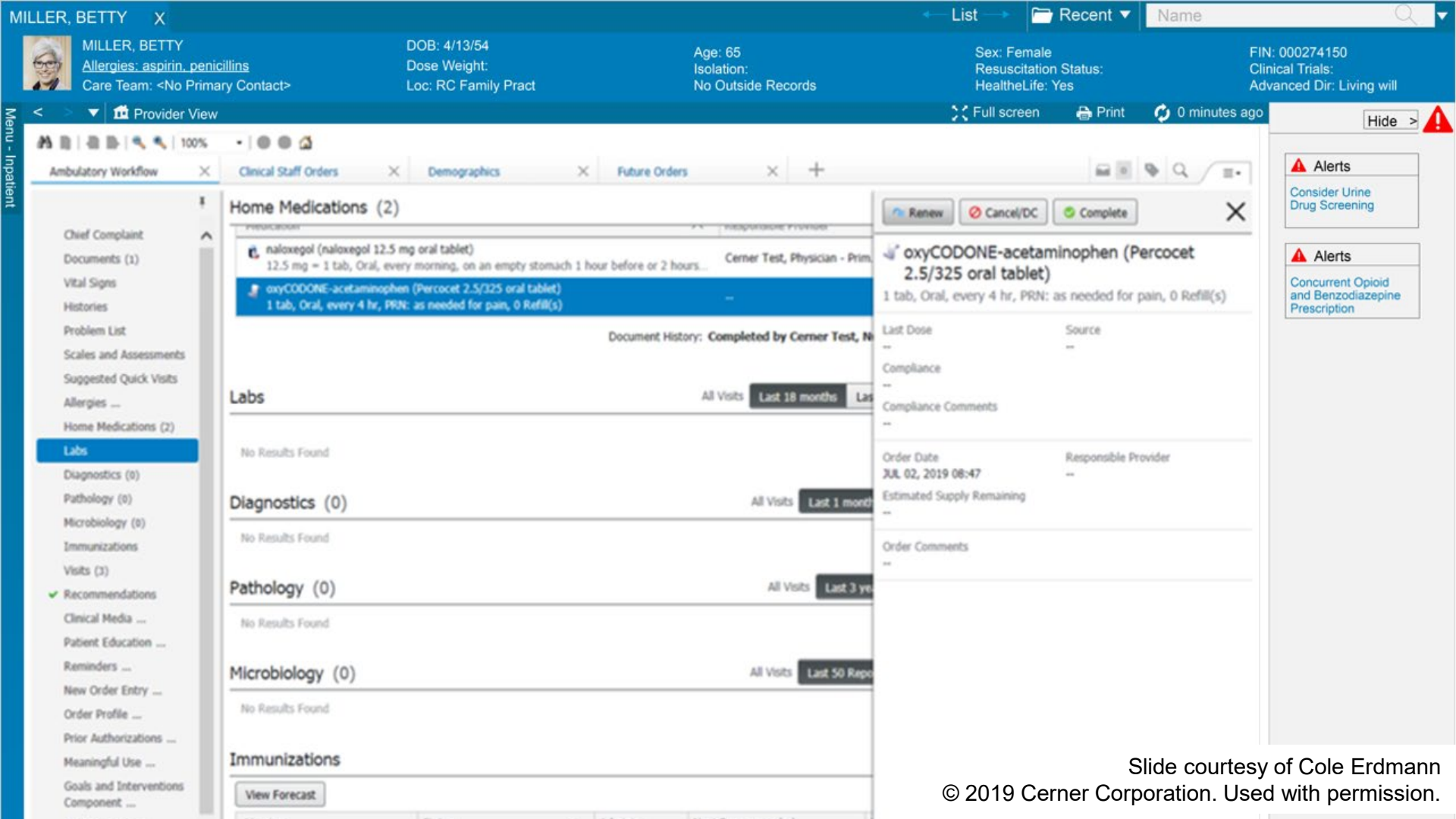
DEMO OF THE DATA




```
In [1]: spark.sql("SHOW DATABASES").toPandas()

In [2]: query= """
        library OpioidCDS_STU3_REC_10 v

In [3]: from foresight.
        fhir_database =
        version = "2019
        fhir_databases

In [28]: read_resul
Out[28]: 113227

                                "Evidence Opioids Indicator",
                                "Evidence of Opioids Summary",
                                "Evidence of Opioids Detail",
                                "Evidence of Illicit Drugs Indicator",
                                "Evidence of Illicit Drugs Summary",
                                "Evidence of Illicit Drugs Detail"],
                    session_today="2018-12-31T14:40:00-00:00")
```

Slide courtesy of Cole Erdmann



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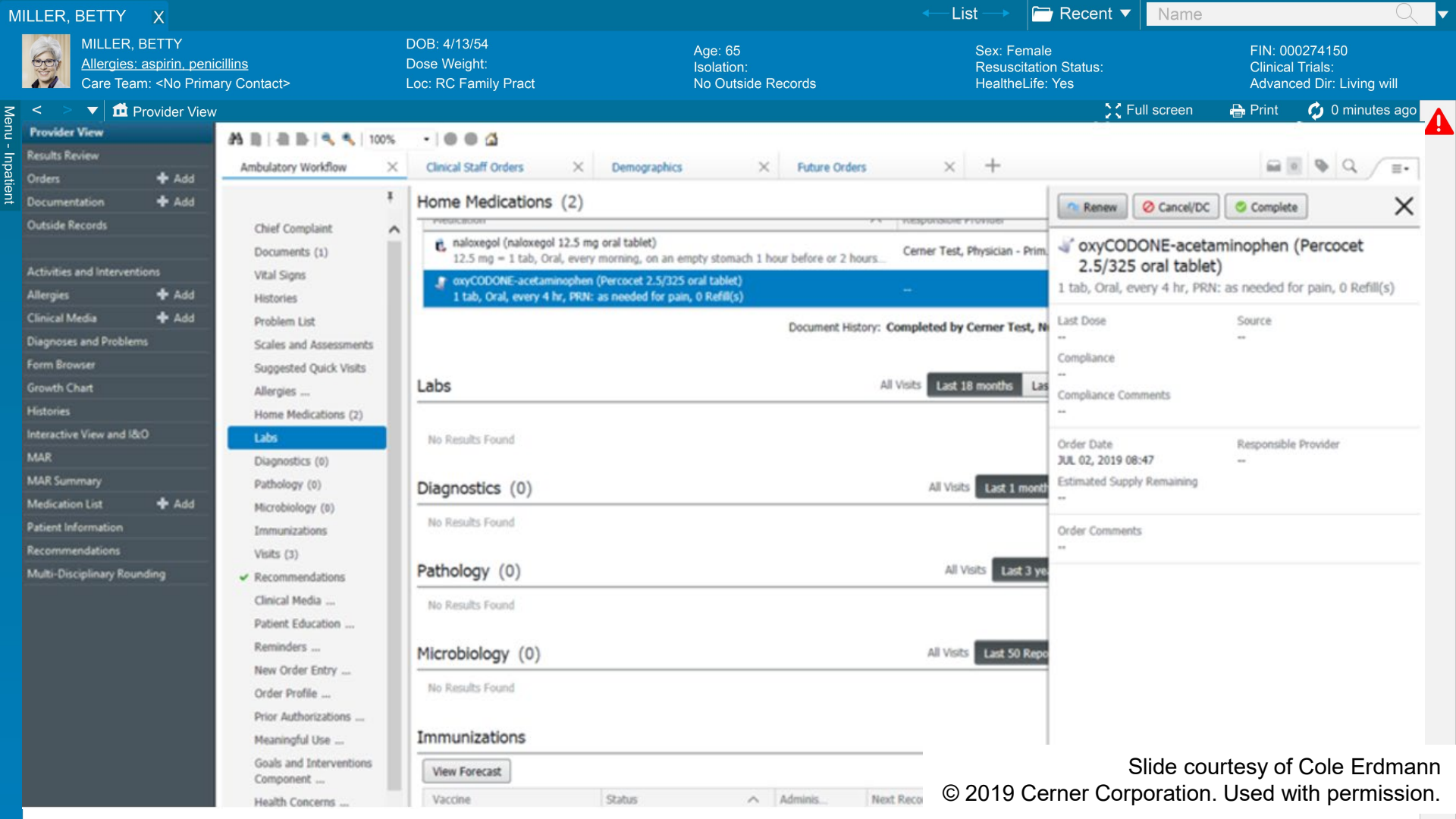

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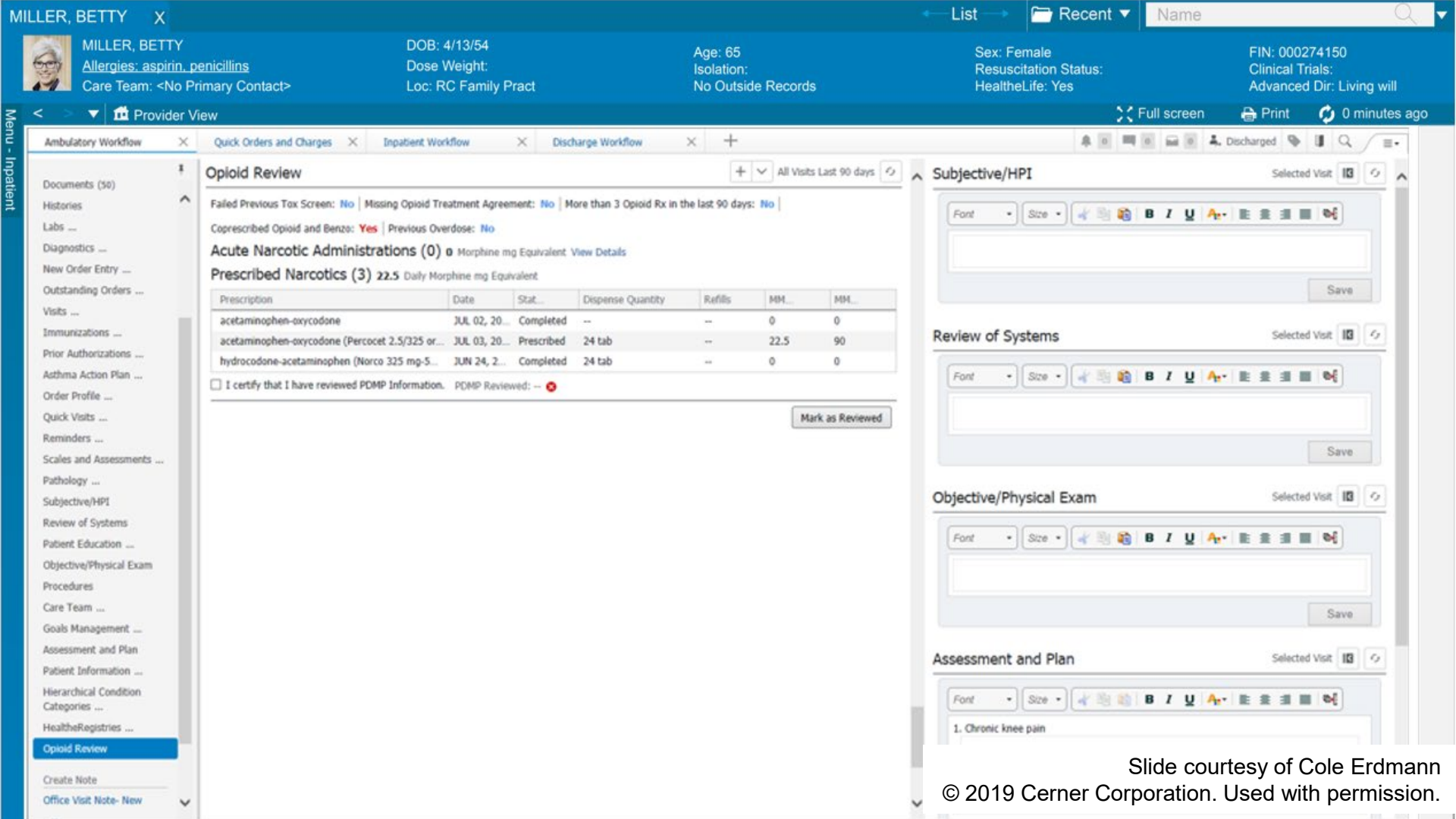

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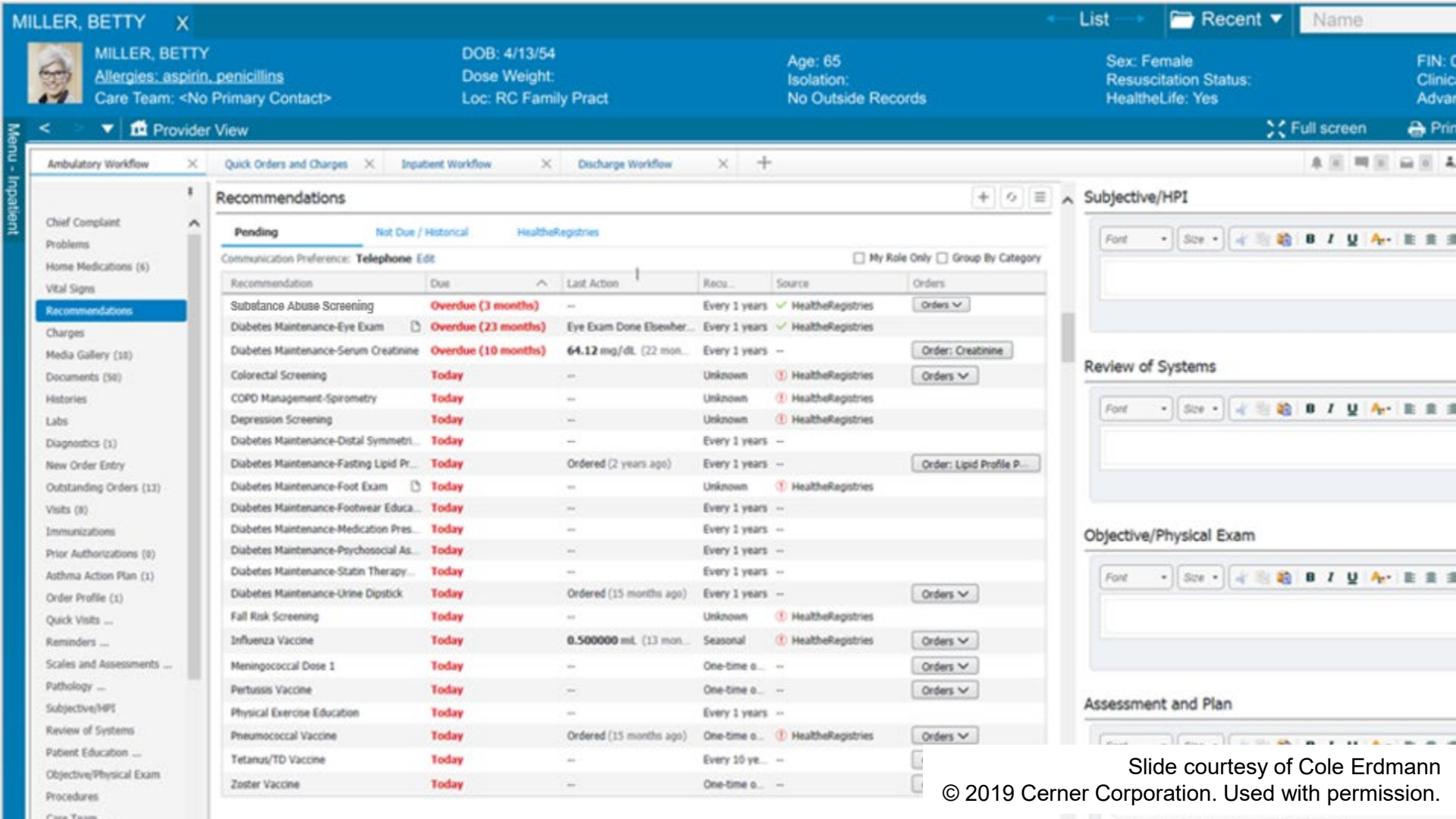

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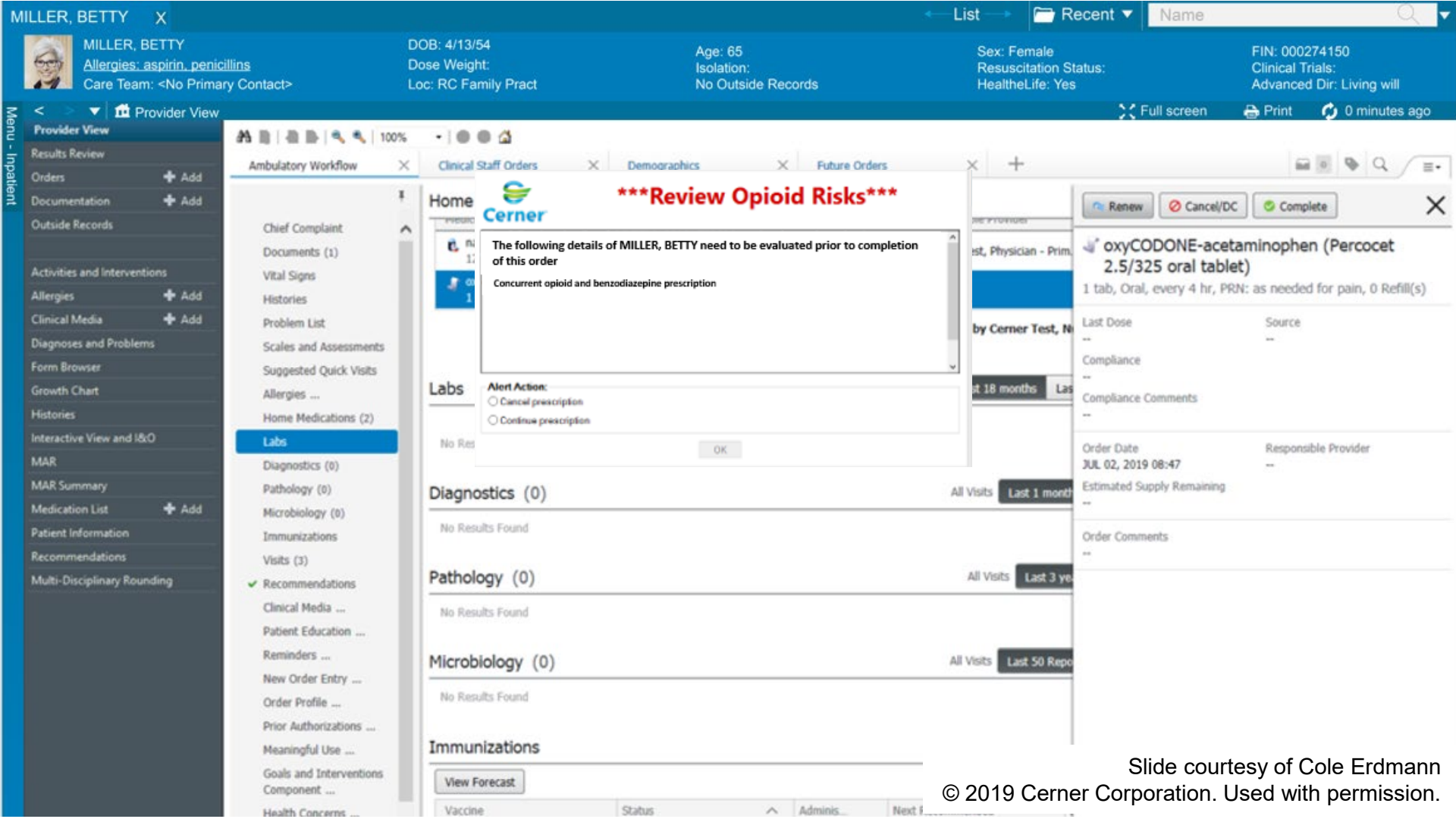

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SUMMARY & LESSONS LEARNED

- Standards-based CDS knowledge artifacts are now available for all 12 recommendations in CDC guideline
- Pilot implementations have been successful to date
- Shareable CDS could reduce the time taken to develop, test and deploy CDS, expediting guideline adoption
- Local skills are still required for deployment, testing, and maintenance; should be reduced as approach matures
- Additional EHR capabilities are desired for optimal user experience (e.g., triggering based off of ordering workflow, 1-click execution of recommended actions)

FUTURE DIRECTIONS

- Pilot additional recommendations
- Pilot at additional clinical sites
- Support more production clinical deployments
- Evaluate impact
- Iteratively enhance resources based on feedback
  - Knowledge artifacts
  - Supporting resources (e.g., implementation manual, testing scripts)
- Contribute to maturation of underlying standards

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THANK YOU!

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DISCUSSION QUESTIONS

- Can you share anything your organization is engaged in that is similar?
- Do you see opportunities for this approach to be applied to your work and priorities?
- Where are the gaps in the standards, and how can we work to address these?