

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

AHRQ

CDS Connect Pain Management Summary

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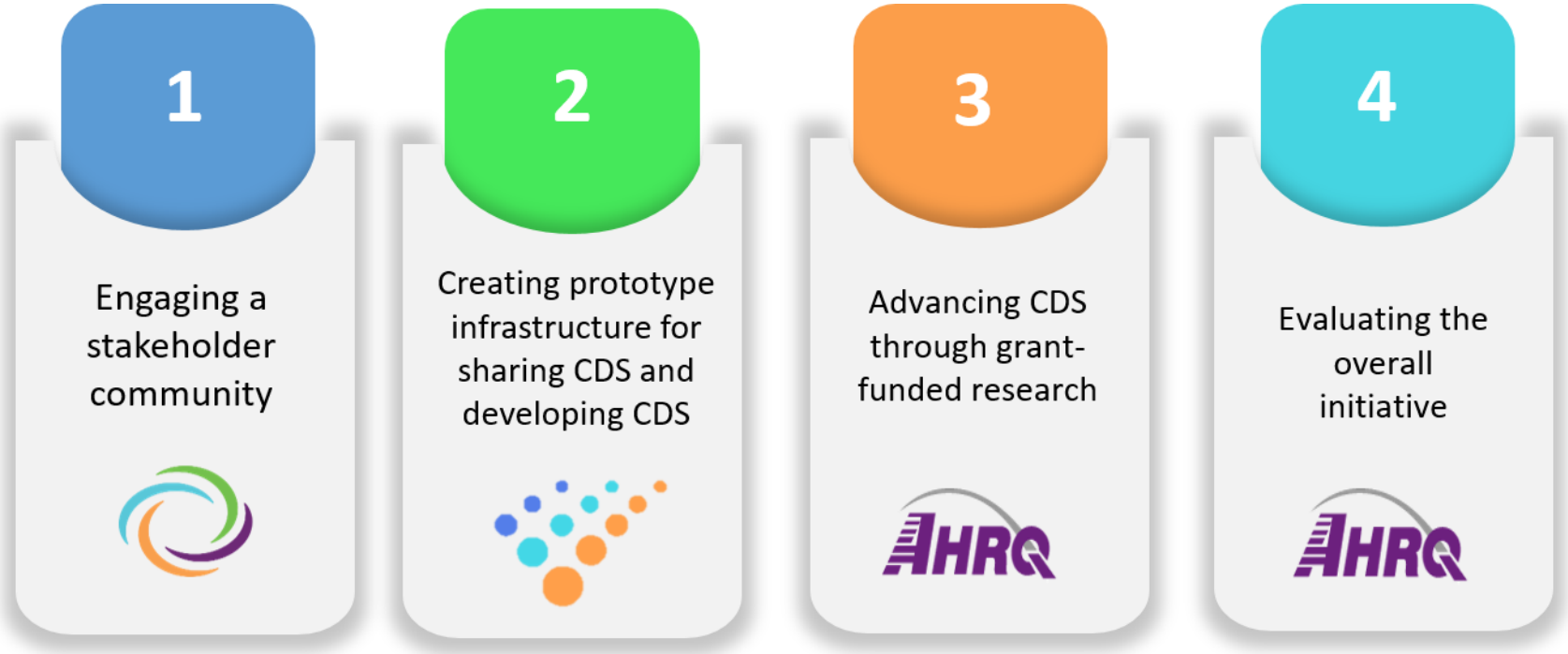
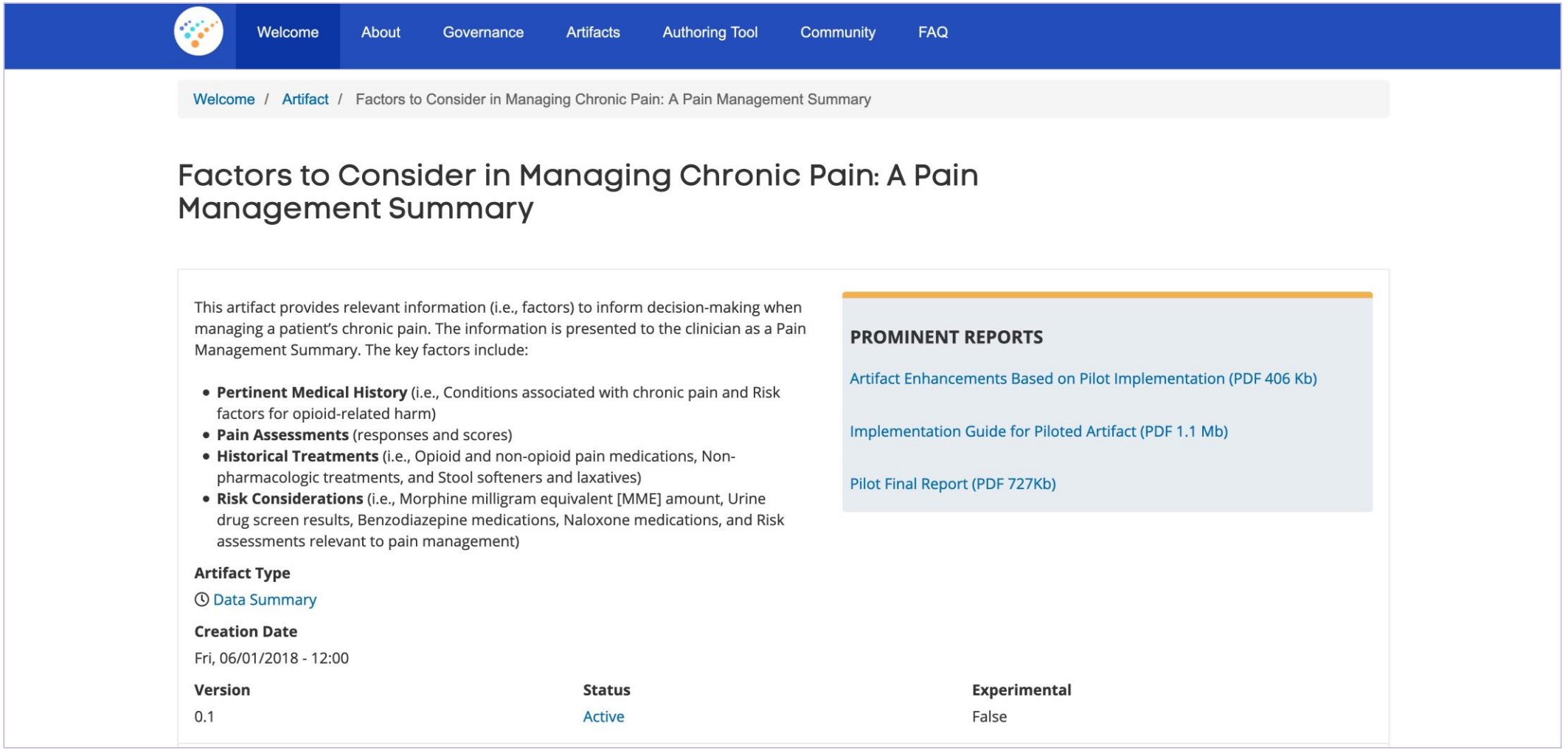
AHRQ Clinical Decision Support

Advancing evidence into practice through CDS and making CDS more shareable, standards-based and publicly- available



https://cds.ahrq.gov

CDS Connect: Pain Management Summary



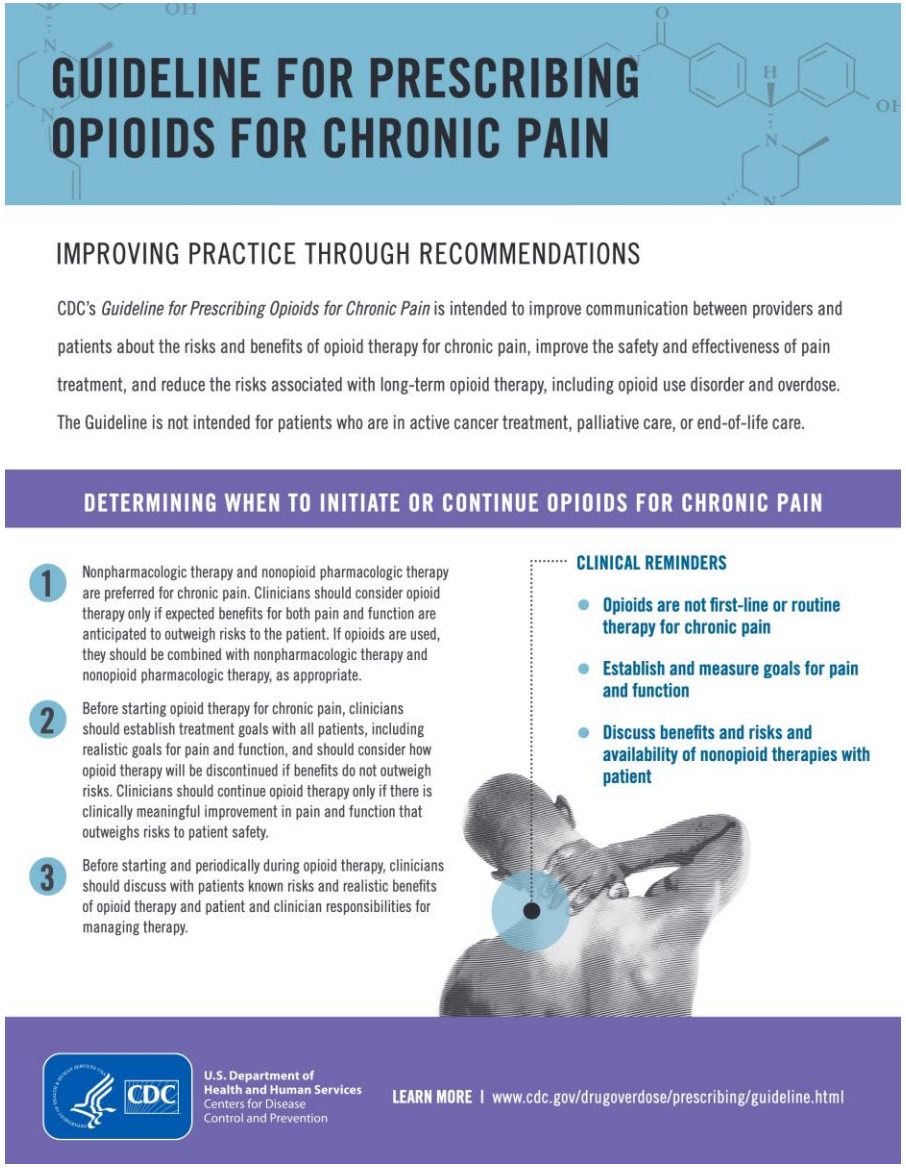
Screenshot from https://cds.ahrq.gov/cdsconnect/artifact/factors-consider-managing-chronic-pain-pain-management-summary

CDC Guideline for Prescribing Opioids for Chronic Pain

- Non-pharmacologic & non-opioid therapies preferred
- Establish treatment goals with patients
- Assess and discuss risks and benefits
  - Prescribe naloxone if at high risk
- Prescribe immediate-release opioids
- Prescribe the lowest effective dose
- Monitor Physician Drug Monitoring Program (PDMP)
  - ≤50 MME/day preferred
  - ≥90 MME/day is high risk
- Urine drug screening (prior to and annually)
- Avoid concurrent benzodiazepines
- Offer med-assisted treatment for opioid use disorder

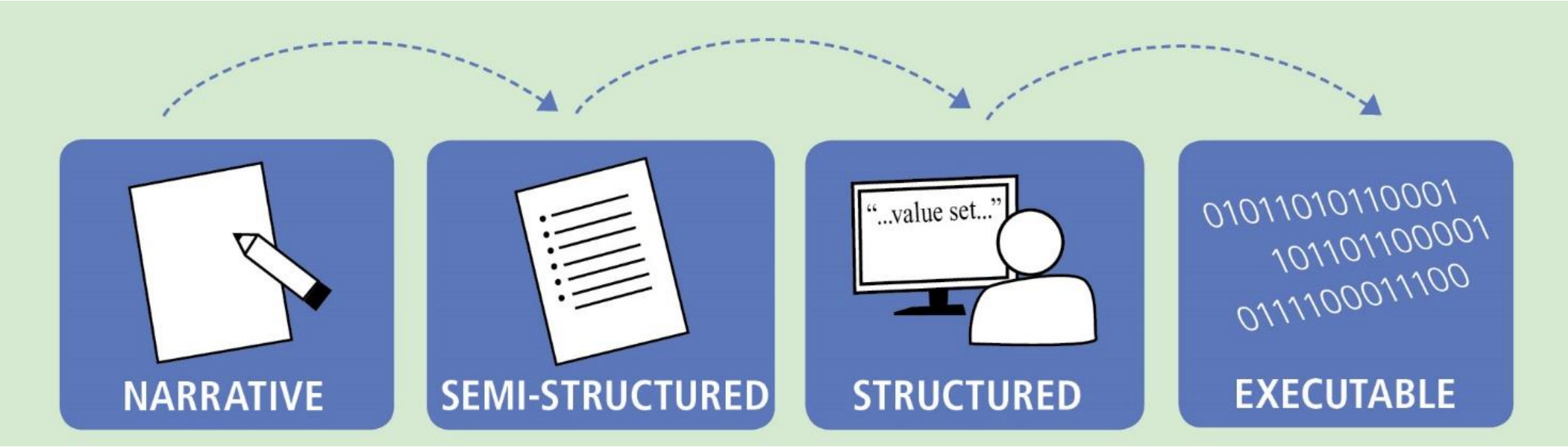
https://www.cdc.gov/drugoverdose/prescribing/guideline.html

MME = morphine milligram equivalent



Translating Evidence-Based Research to Executable CDS

The Road from the *CDC Guideline for Prescribing Opioids for Chronic Pain* to the *AHRQ CDS Connect Pain Management Summary*



Level 1 (or “L1”) Level 2 (or “L2”) Level 3 (or “L3”) Level 4 (or “L4”)

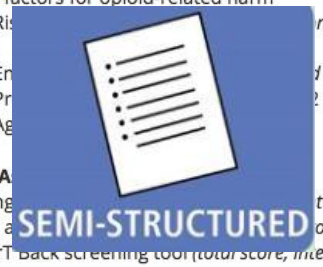
Adapted from: Boxwala, A. A., et al. (2011). "A multi-layered framework for disseminating knowledge for computer-based decision support." Journal of the American Medical Informatics Association : JAMIA 18 Suppl 1: i132-139.

Pain Management Summary CDS

- **Pertinent Medical History**
  - Conditions associated with chronic pain
  - Risk factors for opioid-related harms
- **Pain Assessments**
  - Wong-Baker FACES Rating Scale
  - Pain, Enjoyment, General Activity (PEG) Assessment
  - STarT Back Screening Tools
  - ~~Patient's goal for pain management~~
- **Historical treatments**
  - Opioid medications
  - Non-opioid medications
  - Non-pharmacologic treatments
  - Stool softeners and laxatives
- **Risk Considerations**
  - MME amount
  - Urine drug screen results
  - Benzodiazepine medications
  - Naloxone medications
  - Risk screenings relevant to pain management
  - ~~PDMP access~~

Level 1 (Narrative) to Level 2 (Semi-Structured)

Before starting, and periodically during continuation of opioid therapy, clinicians should evaluate risk factors for opioid-related harms. Clinicians should incorporate into the management plan strategies to mitigate risk, including considering offering naloxone when factors that increase risk for opioid overdose, such as history of overdose, histor of substance use disorder, higher opioid dosages (greater than or equal to [≥] 50 morphine milligram s [MME]/day), or concu benzodiazepine use, a



ARTIFACT REPRESENTATION

Triggers

Trigger Type Named event

Trigger Event Provider clicks on link to the Pain Management Summary

Inclusions

Age >=18 years
AND
- OR Conditions associated with chronic pain (confirmed, active or recurring status, onset date, asserted date, abatement date)
- OR Opioid pain medication
  - o Orders (date, active, completed, or stopped within past 180 days)
  - o Statements (date, active, or completed within past 180 days)
- OR Adjuvant analgesic medication
  - o Orders (date, active, completed, or stopped within past 180 days)
  - o Statements (date, active, or completed within past 180 days)

Exclusions

None

ions and Actions

DISPLAY an **ULATE** a Pain Management Summary of the following items:

Pertinent Medi tory (unrestricted lookback)
- Conditions associa d with chronic pain *(confirmed, active or recurring status, onset date, asserted date, abatement date)*
- Risk factors for opioid-related harm
  - o Ri *n of value sets) - (confirmed, active or recurring status, onset date, asserted date, abatement date)*
  - o En *d by a union of value sets) - (name, visit date, onset date, abatement date, and recorded date)*
  - o Pr 2 weeks
  - o Ag

Pain A
- Wong *terpretation, date)*
- PEG a *otal score, interpretation, date)*
- STarT Back screening tool *(total score, interpretation, date)*

Source:
https://www.cdc.gov/drugoverdose/pdf/prescribing/Guidelines_Factsheet-a.pdf

Source:
https://cds.ahrq.gov/cdsconnect/artifact/factors-consider-managing-chronic-pain-pain-management-summary

Level 2 (Semi-Structured) Example

Inclusions

- Age >=18 years
- *AND*
  - *OR* **Conditions associated with chronic pain**
    (confirmed, active or recurring status, onset date, asserted date, abatement date)
  - *OR* **Opioid pain medication**
    - **Orders** (date, active, completed, or stopped within past 180 days)
    - **Statements** (date, active, or completed within past 180 days)
  - *OR* **Adjuvant analgesic medication**
    - **Orders** (date, active, completed, or stopped within past 180 days)
    - **Statements** (date, active, or completed within past 180 days)

Level 2 (Semi-Structured) to Level 3 (Structured)

ARTIFACT REPRESENTATION

Triggers

Trigger Type Named event

Trigger Event Provider clicks on link to the Pain Management Summary

Inclusions

Age >=18 years
AND
- OR Conditions associated with chronic pain (confirmed, active or recurring status, onset date, asserted date, abatement date)
- OR Opioid pain medication
  - o Orders (date, active, completed, or stopped within past 180 days)
  - o Statements (date, active, or completed within past 180 days)
- OR Adjuvant analgesic medication
  - o Orders (date, active, completed, or stopped within past 180 days)
  - o Statements (date, active, or completed within past 180 days)

Exclusions

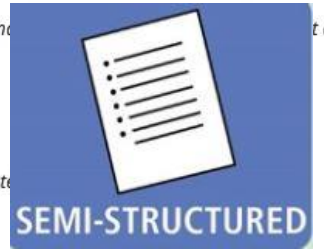
None

Interventions and Actions

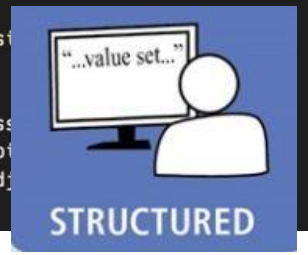
DISPLAY and **POPULATE** a Pain Management Summary of the following items:

Pertinent Medical History (unrestricted lookback)
- Conditions associated with chronic pain *(confirmed, active or recurring status, onset date, asserted date, ement date)*
- Risk factors for opioid-related harm
  - o Risk Conditions *(represented by a union of value sets) - (confirmed, active or recurring status, onset date, asserted date, abatement date)*
  - o Encounter Risk Diagnosis *(represented by a union of value sets) - (n t date, and recorded date)*
  - o Pregnancy Observation in the past 42 weeks
  - o Age >=65 years

Pain Assessments (lookback of 2 years)
- Wong-Baker FACES assessment *(score, interpretation, date)*
- PEG assessment *(question response and total score, interpretation, dat*
- STarT Back screening tool *(total score, interpretation, date)*




```
define Is18orOlder:
  AgeInYears() >= 18

define ConditionsAssociatedWithChronicPain:
  C3F.Confirmed(C3F.ActiveOrRecurring([Condition: "Conditions associated with chronic pain"]))

define HasConditionAssociatedWithChronicPain:
  exists(ConditionsAssociatedWithChronicPain)

define HasRecentOpioidPainMedication:
  exists(C3F.ActiveCompletedOrStoppedMedicationOrder(C3F.MedicationOrderLookBack(
    [MedicationOrder: "Opioid Pain Medications"],
    InclusionMedicationsLookbackPeriod)
  ))
  or exists(C3F.ActiveOrCompletedMedicationStatement(C3F.MedicationStatementLookBack(
    [MedicationStatement: "Opioid Pain Medications"],
    InclusionMedicationsLookbackPeriod)
  ))

define HasRecentAdjuvantAnalgesicMedication:
  exists(C3F.ActiveCompletedOrStoppedMedicationOrder(C3F.MedicationOrderLookBack(
    [MedicationOrder: "Adjuvant Analgesic Medications"],
    ionMedicationsLookbackPeriod)
  ))
  or exists(C  ctiveOrCompletedMedicationStatement(C3F.MedicationStatementLookBack(
    [Medicatio  ent: "Adjuvant Analgesic Medications"],
    InclusionMed  ionsLookbackPeriod)
  ))

define MeetsInclusi
  Is18orOlder
  and (
    HasConditionAss
    or HasRecentOpi
    or HasRecentAd
  )
```

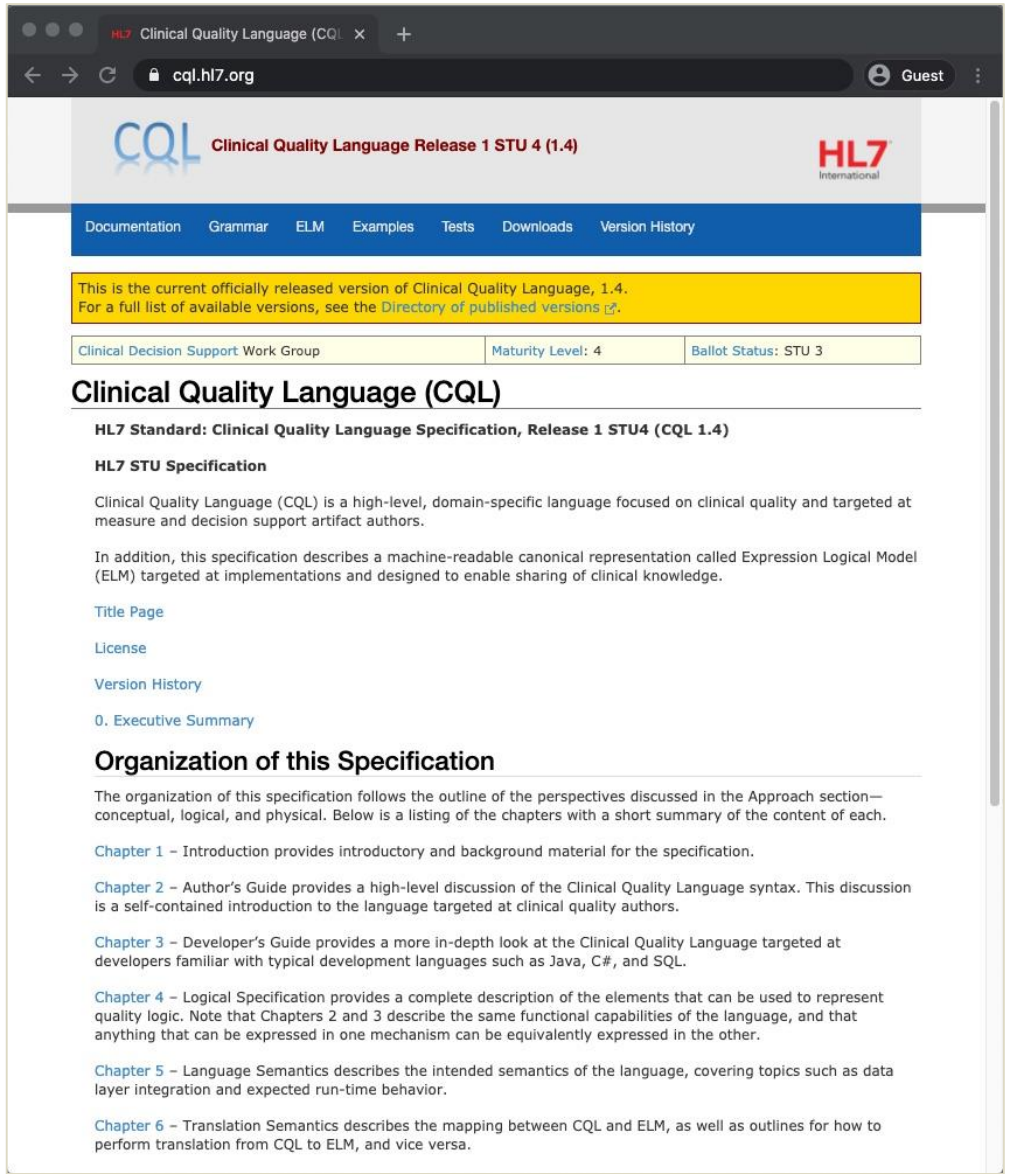


Source: https://cds.ahrq.gov/cdsconnect/artifact/factors-consider-managing-chronic-pain-pain-management-summary

HL7 Clinical Quality Language

"Clinical Quality Language (CQL) is a high-level, domain-specific language focused on clinical quality and targeted at measure and decision support artifact authors."

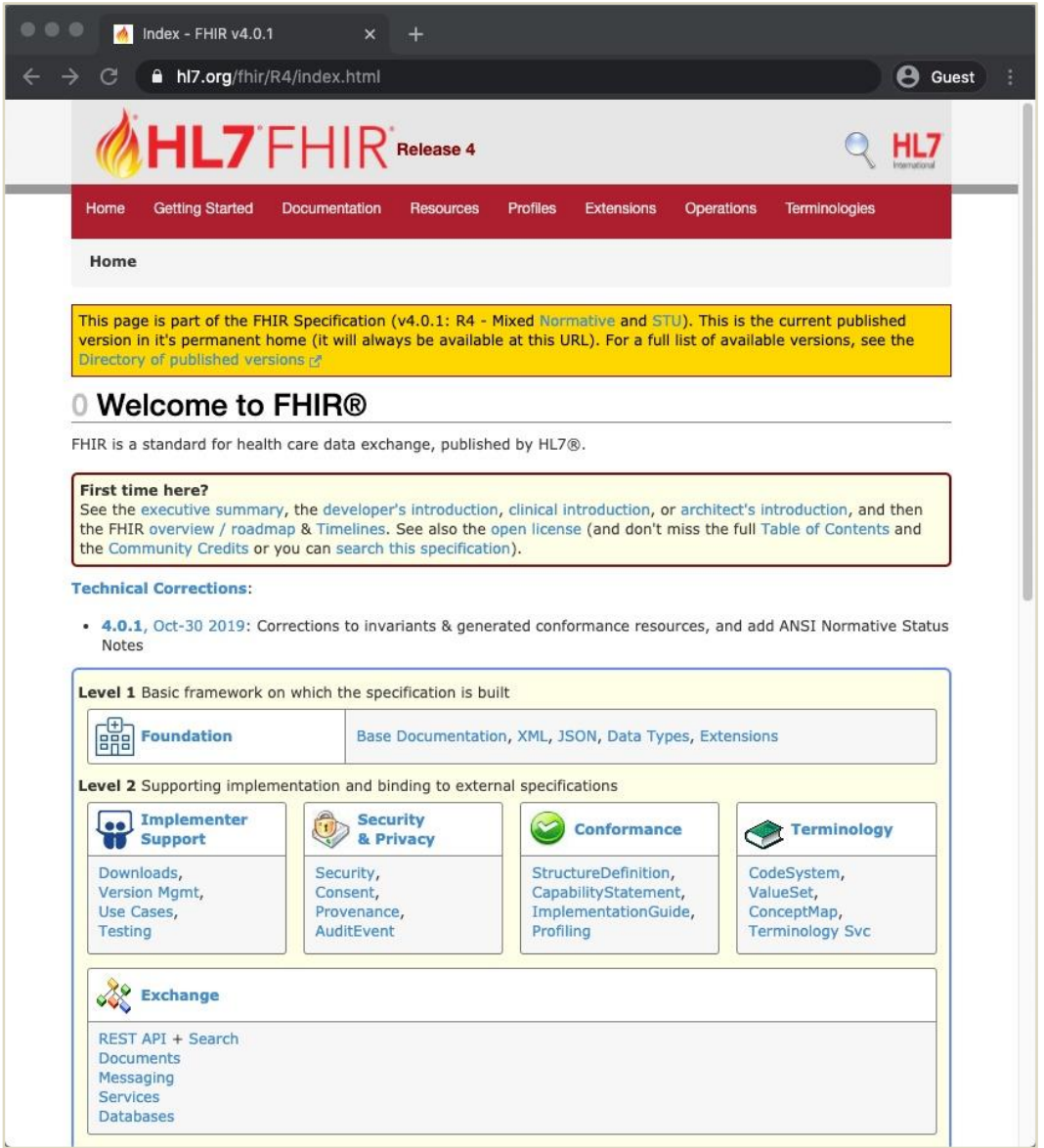
HL7 Standard: Clinical Quality Language Specification, Release 1 STU4
http://cql.hl7.org/



HL7® Fast Healthcare Interoperability Resources (FHIR)

"FHIR is a standard for health care data exchange, published by HL7®."

FHIR Specification
(v4.0.1: R4 - Mixed Normative and STU)
https://hl7.org/fhir/R4/index.html



From L2 to L3: Extracting FHIR Resources & CQL Logic

Inclusions

- Age >=18 years
- *AND*
  - *OR* **Conditions associated with chronic pain**
    (confirmed, active or recurring status, onset date, asserted date, abatement date)
  - *OR* **Opioid pain medication**
    - **Orders** (date, active, completed, or stopped within past 180 days)
    - **Statements** (date, active, or completed within past 180 days)
  - *OR* **Adjuvant analgesic medication**
    - **Orders** (date, active, completed, or stopped within past 180 days)
    - **Statements** (date, active, or completed within past 180 days)

FHIR: Age

Patient: birthDate

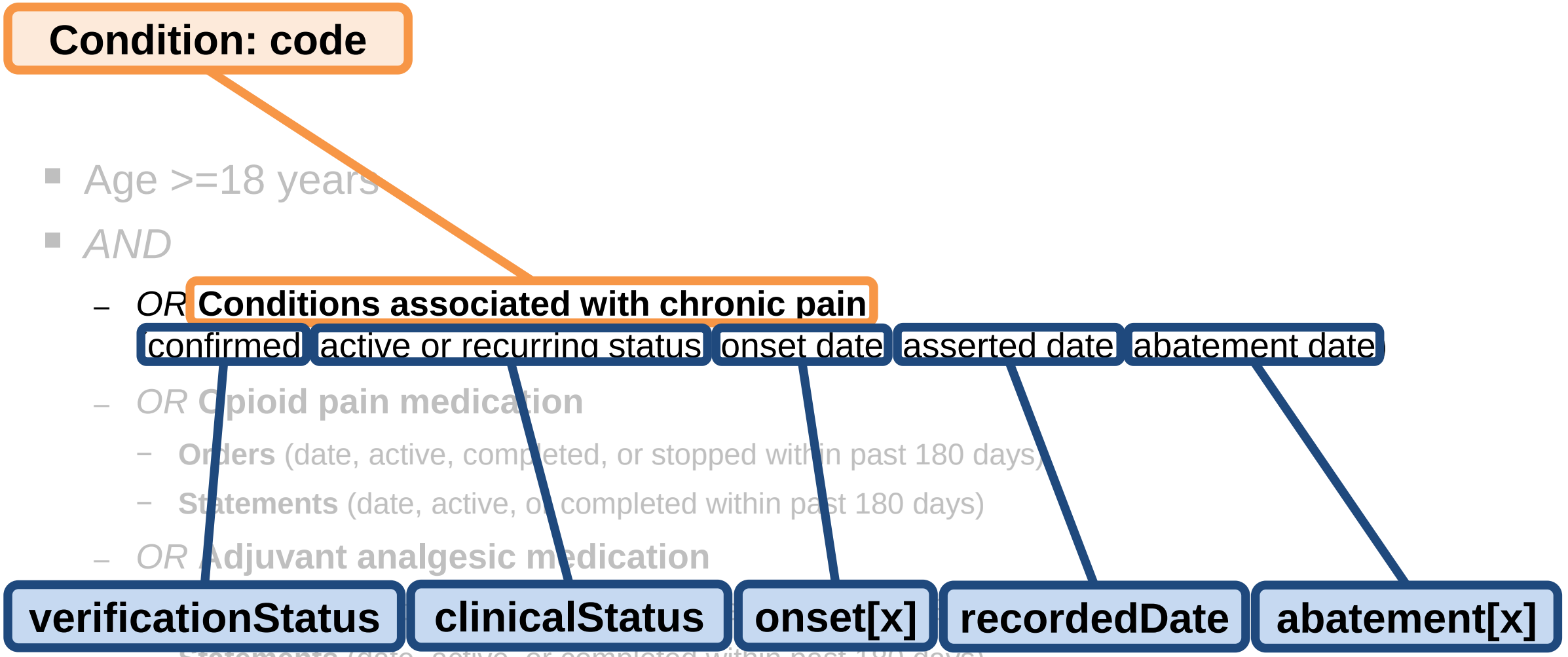
- Age >=18 years
- *AND*
  - *OR* **Conditions associated with chronic pain**
    (confirmed, active or recurring status, onset date, asserted date, abatement date)
  - *OR* **Opioid pain medication**
    - **Orders** (date, active, completed, or stopped within past 180 days)
    - **Statements** (date, active, or completed within past 180 days)
  - *OR* **Adjuvant analgesic medication**
    - **Orders** (date, active, completed, or stopped within past 180 days)
    - **Statements** (date, active, or completed within past 180 days)

CQL Logic: Age

- Age >=18 years

```
define Is18orOlder:
  AgeInYears() >= 18
```

FHIR: Conditions Associated w/ Chronic Pain



CQL Logic: Conditions Associated w/ Chronic Pain

- Conditions associated with chronic pain (confirmed, active or recurring status, onset date, asserted date, abatement date)

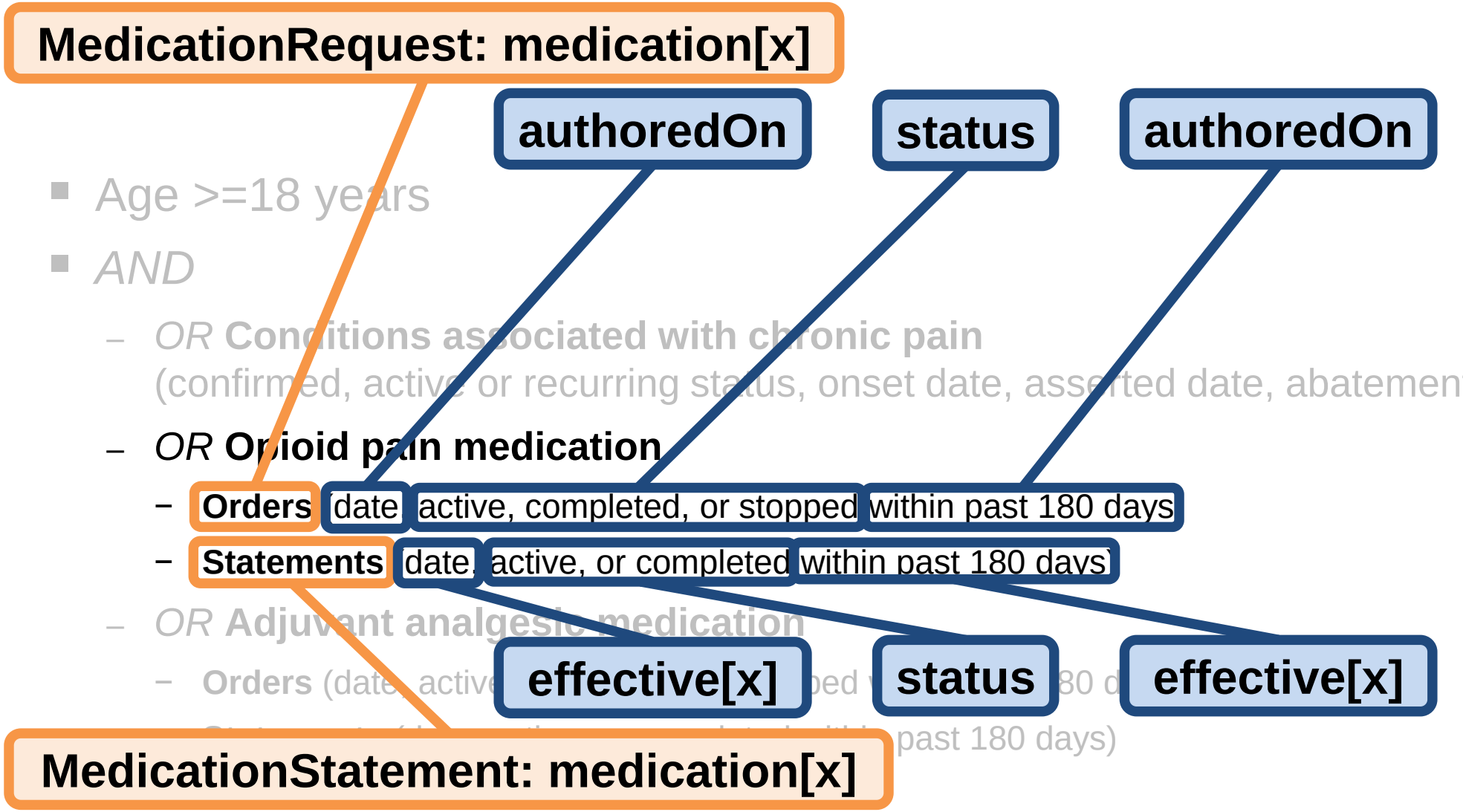
```
include CDS_Connect_Commons_for_FHIRv400 version '1.0.1' called C3F

valueset "Conditions associated with chronic pain":
  '2.16.840.1.113762.1.4.1032.37'

define ConditionsAssociatedWithChronicPain:
  C3F.Confirmed( C3F.ActiveOrRecurring(
      [Condition: "Conditions associated with chronic pain"]
  ) )

define HasConditionAssociatedWithChronicPain:
  exists(ConditionsAssociatedWithChronicPain)
```

CQL Logic: Common Functions

- Conditions associated with chronic pain (confirmed, active or recurring status, onset date, asserted date, abatement date)

```
library CDS_Connect_Commons_for_FHIRv400 version '1.0.1'

// additional declarations removed for brevity

define function Confirmed(CondList List<Condition>):
  CondList C where C.verificationStatus ~ "Condition Confirmed"

define function ActiveOrRecurring(CondList List<Condition>):
  CondList C
    where C.clinicalStatus ~ "Condition Active"
      or C.clinicalStatus ~ "Condition Recurrence"
      or C.clinicalStatus ~ "Condition Relapse"
```

FHIR: Opioid Pain Medication



CQL Logic: Opioid Pain Medication

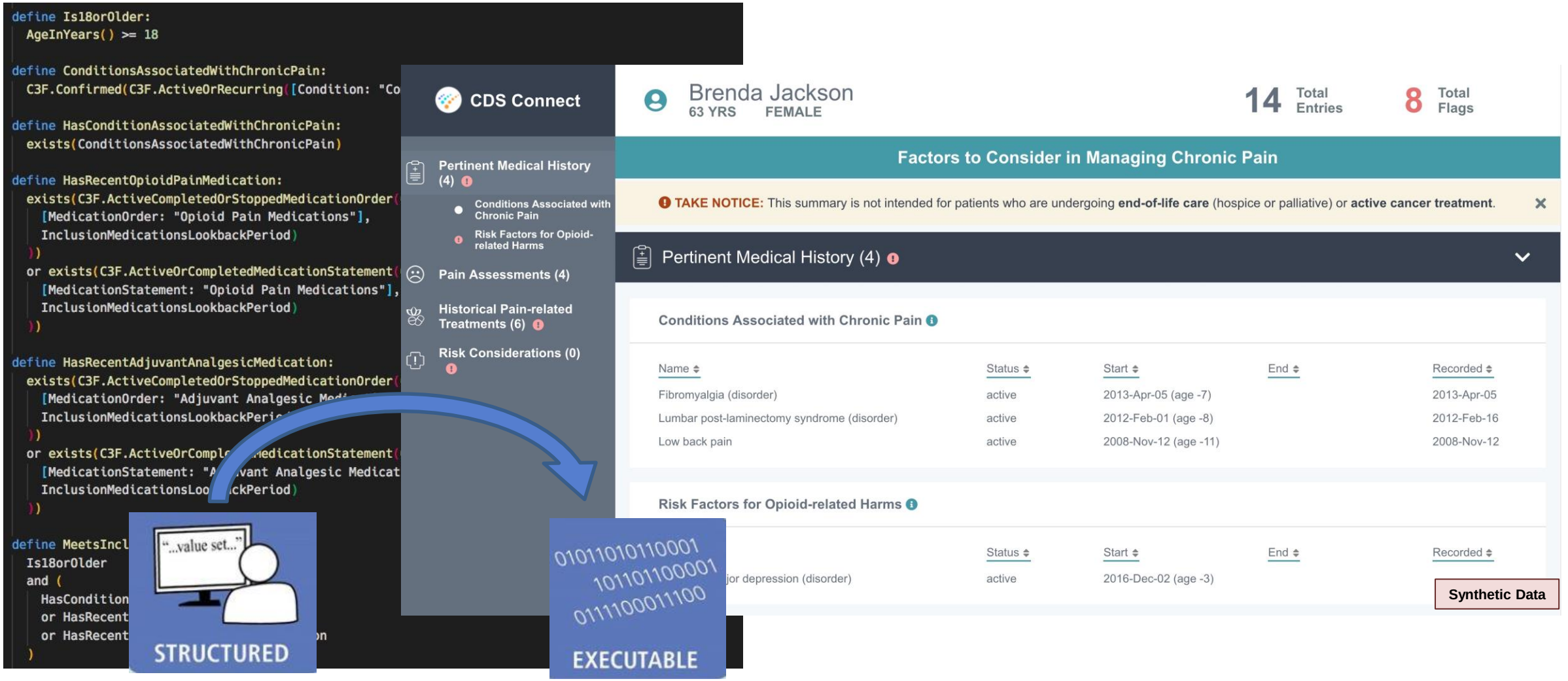
- Opioid pain medication
  - **Orders** (date, active, completed, or stopped within past 180 days)
  - **Statements** (date, active, or completed within past 180 days)

```
define HasRecentOpioidPainMedication:
  exists(
    C3F.ActiveCompletedOrStoppedMedicationRequest( C3F.MedicationRequestLookBack(
      [MedicationRequest: "Opioid Pain Medications"],
      InclusionMedicationsLookbackPeriod
    ))
  )
  or exists(
    C3F.ActiveOrCompletedMedicationStatement( C3F.MedicationStatementLookBack(
      [MedicationStatement: "Opioid Pain Medications"],
      InclusionMedicationsLookbackPeriod
    ))
  )
```

CQL Logic: Putting It All Together

```
define MeetsInclusionCriteria:
  Is18orOlder
  and (
    HasConditionAssociatedWithChronicPain
    or HasRecentOpioidPainMedication
    or HasRecentAdjuvantAnalgesicMedication
  )
```

Level 3 (Structured) to Level 4 (Executable)

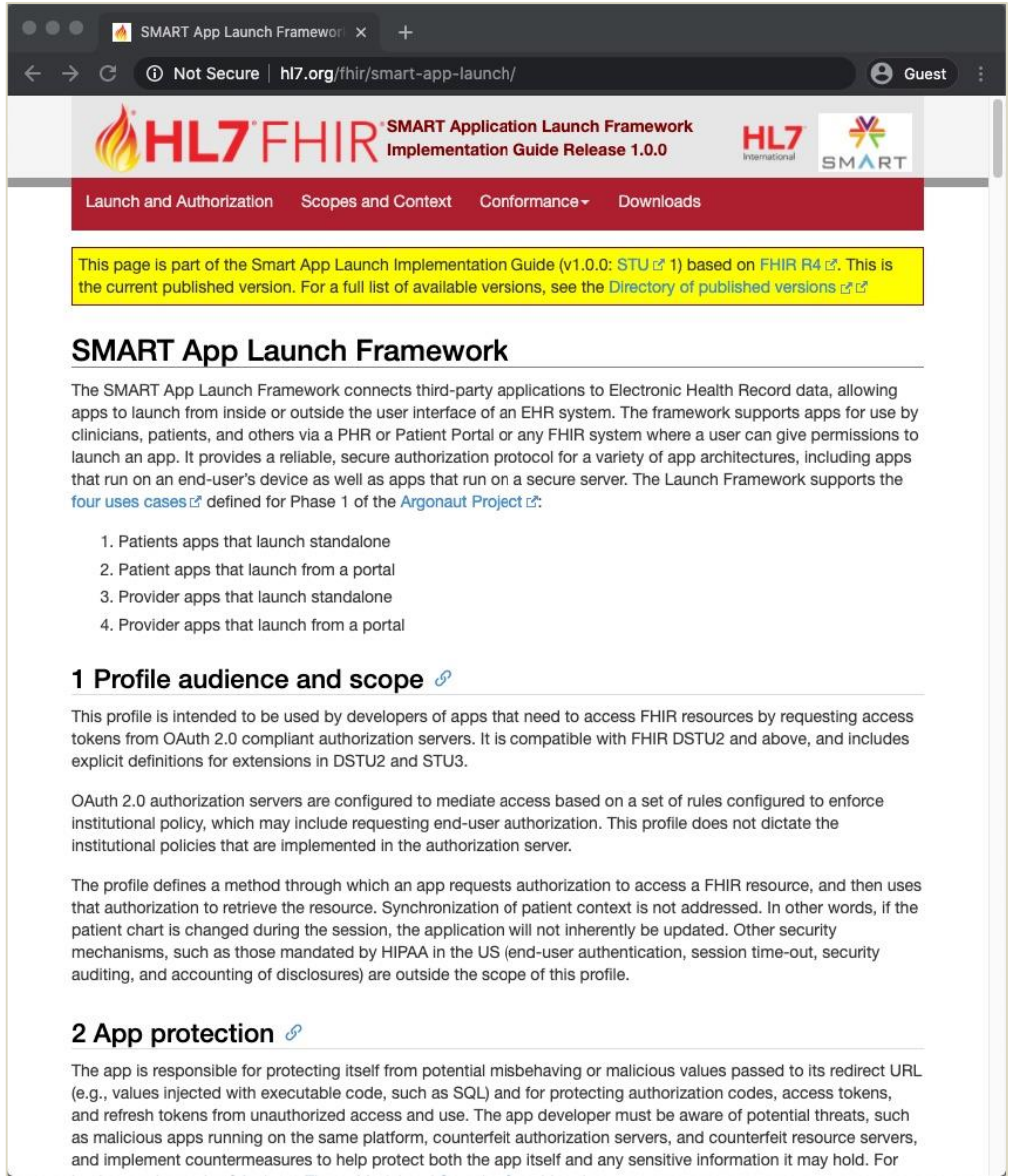


Source: https://cds.ahrq.gov/cdsconnect/artifact/factors-consider-managing-chronic-pain-pain-management-summary

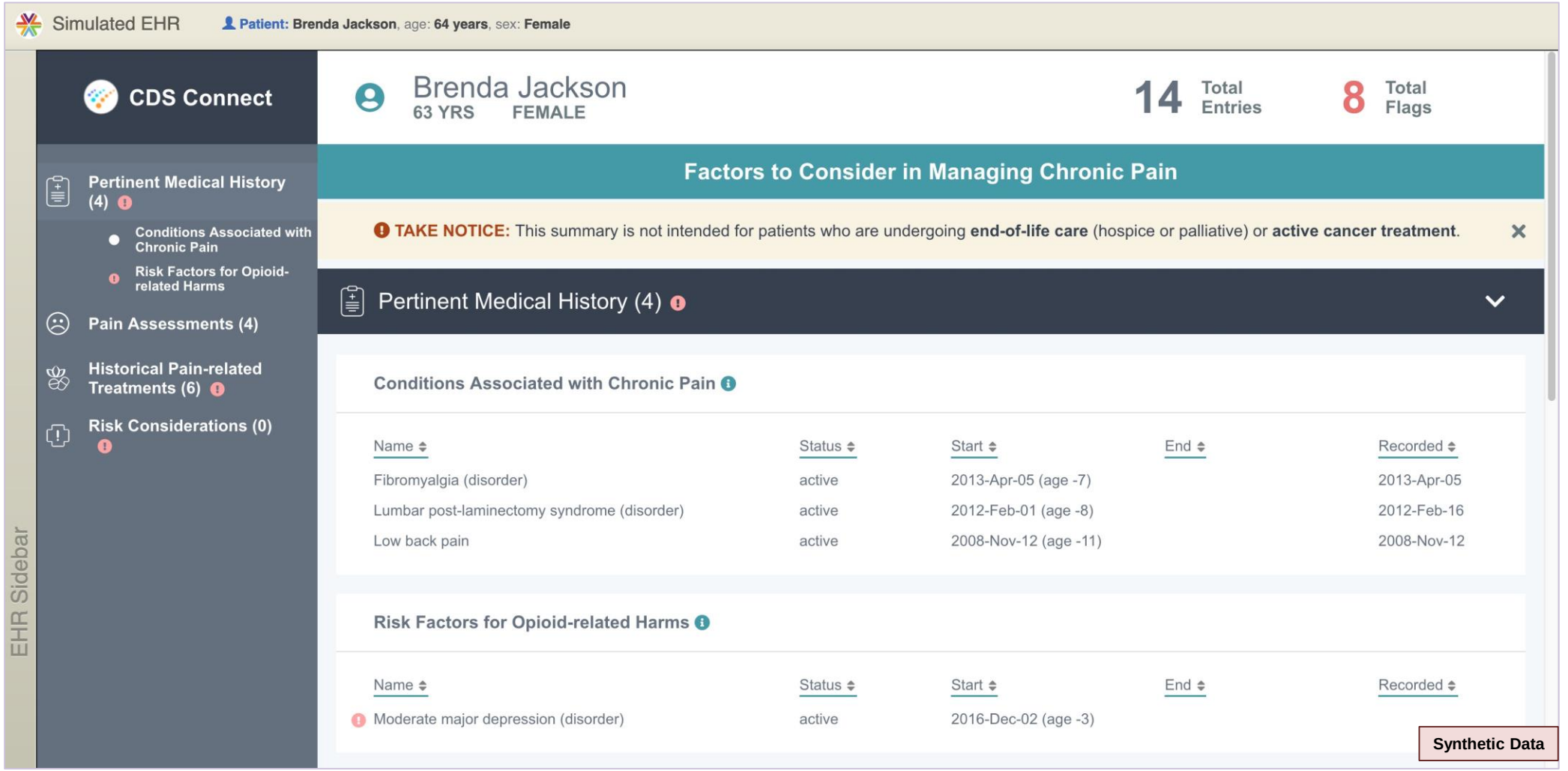
HL7® SMART App Launch Framework

"The SMART App Launch Framework connects third-party applications to Electronic Health Record data, allowing apps to launch from inside or outside the user interface of an EHR system."

Smart App Launch Implementation Guide (v1.0.0: STU 1)
http://www.hl7.org/fhir/smart-app-launch/



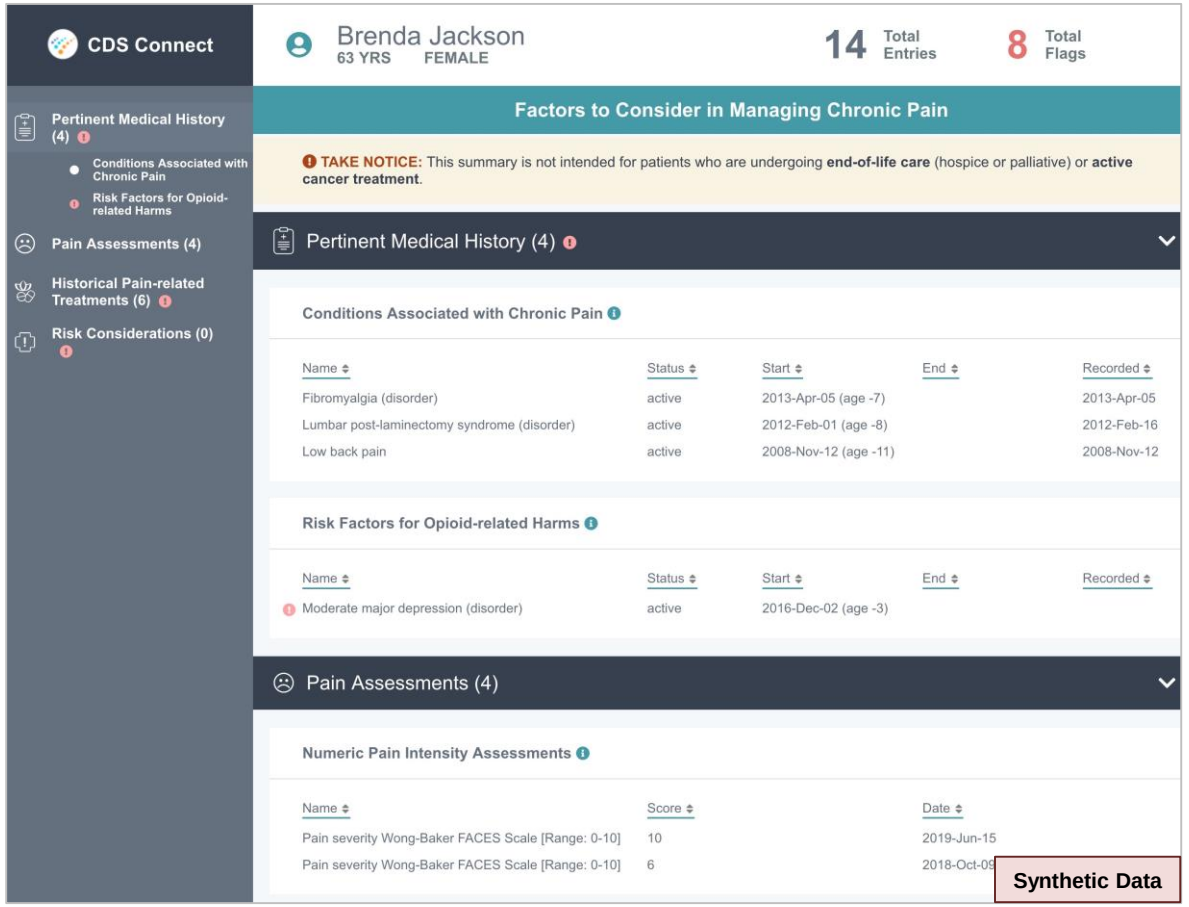
CDS Connect Pain Management Summary



Pain Management Summary: https://apps.smarthealthit.org/app/cds-connect

Pilot Implementation of the Pain Management Summary

- 1 health care center at OCHIN
- Pilot engagement: 5 months
- Pilot duration: 8 weeks
- Investigated various integration approaches
  - Best Practice Advisory
  - CDS Hooks
  - **SMART on FHIR app**
- Accessed via a Pain Management Information hyperlink in the Patient Summary page



Lessons Learned from the Pilot Implementation

What went well:

- Reliable, “simple and intuitive”
- Reduced burden
- Benefited care and informed decision making

Challenges:

- 10-second delay in display
- Troubleshooting required EHR access
- Inconsistent display of MME, urine drug screen results, non-pharmacologic treatments

Enhancement suggestions:

- Integration with PDMP
- Add pain agreement and due date
- Integration with medMATCH

Key takeaways:

- Evaluate FHIR Resources support via API
- Clinical Champion is vital
- Integration requires specific skills
  - Software Architect (64 hours), Quality Analyst (46 hours), Clinical Informaticist (41 hours), Business Analyst (120 hours), Project Manager (97 hours)

Resources

- AHRQ CDS: https://cds.ahrq.gov/

- Pain Management Summary:
  - Artifact on CDS Connect: https://cds.ahrq.gov/cdsconnect/artifact/factors-consider-managing-chronic-pain-pain-management-summary
  - App in SMART App Gallery: https://apps.smarthealthit.org/app/cds-connect
  - App source code on GitHub: https://github.com/ahrq-cds

- Relevant Standards:
  - HL7 FHIR: http://hl7.org/fhir/
  - HL7 CQL: https://cql.hl7.org/
  - HL7 SMART App Launch Framework: http://hl7.org/fhir/smart-app-launch/

Thank you!

Contact AHRQ CDS: ClinicalDecisionSupport@ahrq.hhs.gov