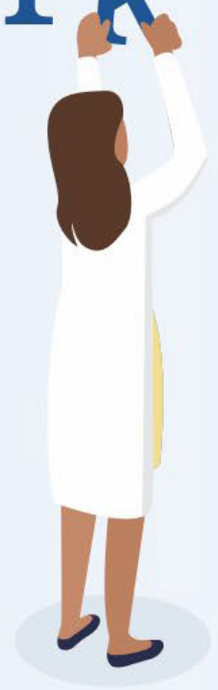
HHS ONC/CDC | **Health Information Technology**

Integration Framework



The Integration Framework provides guidance to health care systems, states, and health information technology (IT) vendors to support successful project execution, management and communications for Health IT integrations. This Framework is based on the project's learnings from Prescription Drug Monitoring Program-Electronic Health Record (PDMP-EHR) Integration and electronic Clinical Decision Support (CDS) Implementation. The intended audience for this Framework includes health care systems preparing to integrate their EHR with the state PDMP, as well as PDMP administrators interested in providing PDMP-EHR integrations to health care systems in their state. The learnings from this project may also be useful to organizations undertaking other Health IT integrations. This Framework is supplemented by the PDMP-EHR Integration Toolkit that provides detailed guidance and templates for specific phases of integration.

This document is an interactive tool. Use the clickable tabs on the top left of each page to easily navigate between pages. **When in PowerPoint, use presentation mode to enable links.**

Office of the National Coordinator for Health Information Technology

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Resources Meet the Actors

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Acknowledgements

This document was developed in June 2021 by Accenture Federal Services as the contractor leading the Advancing PDMP-EHR Integration project under contract #GS-35F-540GA order # HHSP233201800327G. The project team from Accenture Federal Services served as a contractor to the Office of the National Coordinator for Health Information Technology (ONC). ONC served as the implementer partner to the Centers for Disease Control and Prevention (CDC). Funding was provided by the CDC.

The Integration Framework was developed based on lessons learned by the Accenture team through collaborations with PDMP-EHR integration technical demonstration sites and Clinical Decision Support Proofs-of-Concept that participated in the Advancing PDMP-EHR Integration Project from 2018 - 2021. The collected learnings were discussed and refined in a series of working sessions conducted in May 2021 with the project sponsors and collaborators.

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Disclaimer

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HHS ONC/CDC | **Integration Framework**

Health Information Technology Context

The Integration Framework draws on experience with PDMP-EHR integration and electronic CDS. The phases, process steps, and practices presented in this Framework may be applicable to other health IT projects.

The Framework includes two separate sections that provide specific guidance for PDMP-EHR Integration and electronic Clinical Decision Support implementation. To navigate directly to a specific section, click on the applicable description to the right.

Quick Navigation Links

PDMP-EHR Integration Framework

Guidance on PDMP-EHR Integration for PDMPs, health care systems and clinicians, and health IT vendors

CDS Framework

Guidance on electronic Clinical Decision Support implementation for project staff, clinicians, and technical professionals

Phases Defined in this Framework are Common to Many Health IT projects

1. Planning

Successful Health IT integration planning includes communicating requirements, preferences, and constraints between the integration partners.

2. Development

Technical development is a collaborative and iterative process. The integration partners need to ensure that the integration both complies with regulatory requirements and operates within the partners' technical capabilities. This phase requires orchestration of the development activities, ensuring that patient needs are supported, and clinician workflows are addressed.

3. Testing

Thorough testing of all elements of the integration ensures that issues are discovered and resolved prior to Go-Live. Testing also allows implementers to better understand the integration and refine its appearance or capabilities.

4. Training

Training ensures that users are aware of how and when to use the integration.

5. Go-Live

The Go-Live is the culmination of the integration process. While it is a singular event, a successful Go-Live requires foresight and planning.

6. Ongoing Activities

Integration requires ongoing maintenance, which often includes resolving technical issues, implementing upgrades and enhancements, developing routine testing protocols and auditing.

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HHS ONC/CDC | **Integration Framework**

PDMP-EHR Integration

The goal of integration is to provide a more complete medical record through a single source to support clinical decision-making at the point of care (Pew Charitable Trusts, 2016). PDMP-EHR integration enables prescribers and dispensers to access EHR and PDMP data in a view that supports their clinical workflows.

PDMP-EHR integration is heavily dependent on what is allowed under state policy, state PDMP technical capabilities, as well as a health care facility's needs and usage of PDMP data.

Meet the Actors

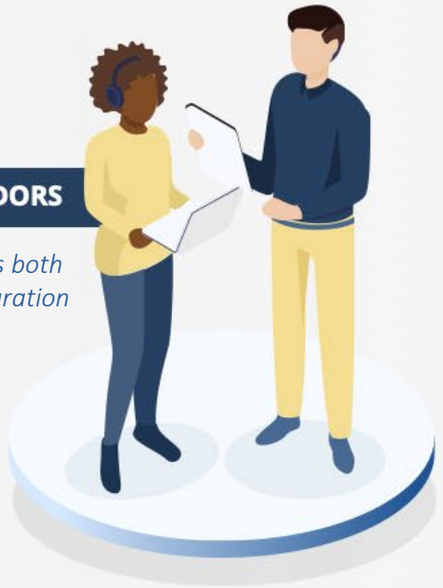
These avatars represent the general actors involved in each step of the PDMP-EHR Integration Framework. The approach taken by each health care system may vary.

**Represents PDMP administrators and staff*

P H V

**Represents both administrative staff & clinicians*

P **H** V



**Represents both EHR & Integration*

P H **V**

Instructions & Key

The letters above (P, H, V) are used to indicate who is participating in the activity.

Toolkit Item

Reference to resources containing content relevant to the step

Suggested Practices

Valuable lessons learned applied by demonstration participants

Clinician Involvement

Engagement of appropriate clinical staff in discussions and decision making is encouraged within a step

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PDMP-EHR Integration Framework Phases

Click any of the steps below to learn more.

PLANNING >

1. Planning

Successful pre-integration planning includes communicating requirements, preferences, and constraints between the state PDMP, the health care system, and any vendors (such as EHR or integration vendors).
Click any of the images below for more detailed steps.

01
Begin Preliminary Conversations & Vendor Landscape Analysis

02
Identify & Establish Buy-in Among Participants

03
Evaluate & Select Integration Approach

04
Plan & Sign Relevant Legal Agreements

05
Coordinate Ongoing Conversations & Plan Timeline

01. PLANNING:

Step 1: **Begin Preliminary Conversations & Vendor Landscape Analysis**

See the Advancing PDMP-EHR Integration project's Integration Taxonomy, External Appendix, and MOU Guidance and Template may be used as resources to inform your integration approach.

❑ 1.1 Reach out to the state PDMP liaison and discuss the state's requirements, if any, on integration

P H V

- ❑ Discuss if the state has a preferred integration vendor

Health care facilities may consider investigating suggested practices from prior implementations.

❑ 1.2 Develop a business case for integration within the health care system

P H V

- ❑ Explore the value of integration to improving clinical workflows
- ❑ Document, at a high level, the health care system's PDMP-related clinical workflows

Developing clinical partnerships early in this process is an important strong practice for building clinician buy-in.

Similarly, clinical partnerships help document clinical workflows, which is a major part of the business case.

❑ 1.3 Assess pre-existing vendor solutions

P H V

- ❑ The EHR Vendor may already have a preferred integration vendor or integration solution

If the vendor does not have an existing integration solution, the vendor, PDMP, and health care system will need to work together to propose a solution.

❑ 1.4 Sign relevant preliminary legal agreements (MOU, data use agreements, etc.)

P H V

Some states may require preliminary legal agreements to begin discussing integration. Others may require it later in the process.

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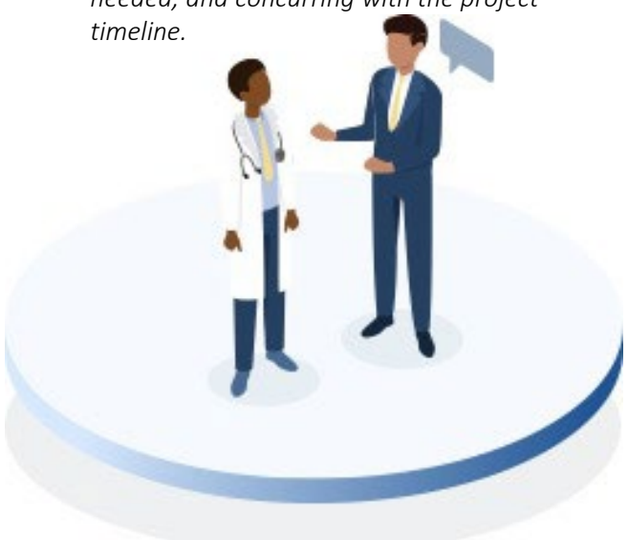
01. PLANNING:

Step 2: Identify & Establish Buy-In Among Participants

Steps 2.1, 2.2, and 2.3 may occur concurrently.

Buy-in is demonstrated by: agreeing on the project's value and priority, committing staff to participate, contributing financial resources as needed, and concurring with the project timeline.



❑ 2.1 Secure health care system buy-in

P H V

- ❑ Secure administrative buy-in (that includes project funding and integration policy development)
- ❑ Secure clinician buy-in (that includes identifying integration champion(s) to build support among peers)
- ❑ Secure technical team buy-in (that includes confirming feasibility within the health care systems' technical environment and resource allocation)

Explore and modify expectations across these groups so the health care system shares one common vision of PDMP-EHR Integration.

❑ 2.2 Secure PDMP buy-in

P H V

- ❑ Secure PDMP leadership buy-in including a commitment to address relevant policy requirements (If the PDMP has a pre-existing integration with EHR vendor, skip this step)
- ❑ Secure PDMP technical team/integration resources buy-in including confirming feasibility within the PDMP's technical environment

Often, the PDMP's strategic initiatives dictate the integration approach they support. PDMP leadership buy-in is required for new EHR integrations (new EHRs to the PDMP).

❑ 2.3 Secure vendor buy-in

P H V

- ❑ Secure EHR vendor buy-in including confirming technical feasibility
- ❑ Secure integration vendor buy-in (if applicable) including confirming technical feasibility

❑ 2.4 Identify and appoint health care system integration project team

P H V

- ❑ Appoint a project team with administrative, clinical, and technical representation
- ❑ Identify and agree on expectations across and within all parties
- ❑ Establish a charter for the project team specifying roles, responsibilities, and authority

The project team should include CMO, CMIO, or medical director for clinical oversight.

Identify clinician(s) to serve as integration champion(s) to promote buy-in, provide valuable clinician input to the project team, and support clinician adoption. Champions should be respected clinician leaders that understand the benefits and impacts of integration and can communicate project updates with peers.

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01. PLANNING:

Step 3: **Evaluate & Select Integration Approach**

Engage clinicians throughout this step so that the clinical team understands and supports the integration approach decision. Also, consider the integration's long-term sustainability and scalability throughout this step.

❑ 3.1 Define the integration's requirements (If there is only one integration option. Skip to Step 3.4)

P H V

- ❑ Define state requirements
- ❑ Define health care system requirements
- ❑ Define EHR vendor requirements
- ❑ Define integration vendor requirements

There will likely be dependencies between the different requirements above.

❑ 3.2 Define the integration options that are available

P H V

Refer to the landscape analysis from Step 1.

Under some circumstances, states may have specific requirements on how the integration may be displayed to clinical end users. If vendors or the integration development team are unable to meet this requirement, the data-sharing hub is able to format PDMP responses as HTML web pages rather than XML-based data packages.

❑ 3.3 Evaluate and select option

P H V

- ❑ Be sure to discuss the integration's costs (both direct costs of development and costs of maintenance)

❑ 3.4 Establish protocols for technical support

P H V

- ❑ Establish issue tracking mechanism
- ❑ Discuss division of labor between state PDMP, health care system, and/or vendors

Step 2.4 can guide how these protocols are established.

These protocols answer questions such as "who do end users report bugs to?" and "how is responsibility assigned to the right entity?".

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01. PLANNING:

Step 4: **Plan & Sign Relevant Legal Agreements**

See the Advancing PDMP-EHR Integration project's MOU Guidance and Template for additional information.

❑ 4.1 Sign relevant legal agreements between the health care system and the PDMP (MOU, data use agreements, etc.) **P** **H** **V**

- *PDMPs may wish to create state-specific templates for legal agreements as a part of PDMP's strategic initiatives. These templates may differ based on the different approved integration approaches or health care system size.*
- *Legal negotiations may vary/delay anticipated timeline.*

❑ 4.2 Sign relevant legal agreements between vendors, PDMP, and/or health care system **P** **H** **V**

- *If applicable, the PDMP and the vendors may need to sign a viewing agreement so that PDMP representatives are able to inspect the integration user interface and approve it. In some states, this approval is required under state regulations.*

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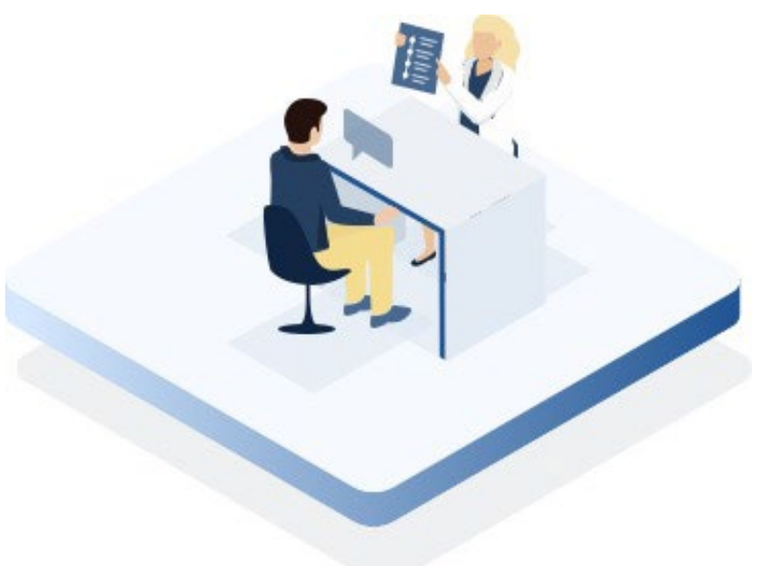
01. PLANNING:

Step 5: **Coordinate Ongoing Conversations & Plan Timeline**

Steps 5.2 and 5.3 may occur concurrently.



❑ 5.1 Schedule regular meetings between PDMP, health care system, and/or vendors

P H V

The frequency and time of these meetings should be driven by the PDMP, since it has limited resources for possible multiple integrations.

❑ 5.2 Establish a timeline of integration

P H V

- ❑ Determine Go-Live date, with flexibility for unexpected disruptions

Consider aligning Go-Live date with other IT updates.

PDMPs may benefit from sharing typical timeline expectations early in this process, such as through Gantt Charts or On-Boarding Webinars.

Consider an incremental Go-Live for large facilities or health care systems.

❑ 5.3 Discuss/anticipate the other phases of integration

P H V

Watch out for unexpected challenges in future phases; looking ahead is recommended.

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2. Development

Technical development, particularly when it is the first time an EHR or other vendor is integrating, is a collaborative and iterative process. The state PDMP and vendor(s) need to ensure that the integration both complies with state requirements and operates within the vendor system's technical capabilities. The health care system orchestrates the development activities, ensures that clinician workflows are addressed, and makes necessary updates to their documentation.

01
Gather Resources & Ensure Development Support

02
Elaborate & Validate Requirements/Capabilities

03
Establish Connectivity to PDMP &/or Your Chosen Data-Sharing Hub

04
Develop & Configure User Interface

05
Conduct Role Mapping Between Systems

06
Iterate/Troubleshoot as needed based on Testing Phase

< PLANNING

TESTING >

02. DEVELOPMENT:

Step 1: **Gather Resources & Ensure Development Support**

❑ 1.1 Establish contracts as required

P H V

- ❑ Determine what contracts are required
- ❑ Validate roles and responsibilities across organizations and vendors
- ❑ Draft, negotiate, and sign contracts

Review lessons learned from previous collaborations across organizations/vendors.

Clarify health care system and vendor roles/engagement.

Ensure auditing requirements are incorporated into contracts.

PDMP should confirm with health care system that contract paperwork has been completed with their vendor.

Structure contracts to allow for flexibility to modify the contract throughout the integration (e.g., using task orders as addendums).

❑ 1.2 Hold kickoff meeting and determine meeting cadence

P H V

- ❑ Revalidate and modify meeting participation
- ❑ Establish a schedule for coordinating meetings with project participants

During kickoff, review project plan and other key artifacts from planning phase.

❑ 1.3 Acquire Human Resources (analysts, etc.)

P H V

- ❑ Determine if additional staff or contracted resources are needed for development purposes

❑ 1.4 Acquire Technical Resources (server needs, etc.)

P H V

- ❑ Determine if additional hardware, software, or network capacity is needed

❑ 1.5 Revisit project plan and revise as necessary

P H V

Confirm that all project participants concur with and are committed to the timeline.

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02. DEVELOPMENT:

Step 2: **Elaborate & Validate Requirements/Capabilities**

See the Advancing PDMP-EHR Integration project's Integration Taxonomy and the Auditing Guidance for additional information.

❑ 2.1 Convene technical team members to determine options

P H V

- ❑ Identify PDMP options
- ❑ Identify EHR options
- ❑ Identify data-sharing hub options

Include clinicians in discussion of EHR options.

Convene clinical and technical team members to discuss security requirements and options.

❑ 2.2 Compile and document clinical and data workflows

P H V

- ❑ Convene clinicians to expand on workflows from planning phase
- ❑ Convene technical team members to review information workflows

Conduct walk-throughs of current clinical workflows.

Conduct demos of anticipated workflows, if available.

Ensure that information workflows are formally documented.

❑ 2.3 Assess alignment of technical capabilities with workflows

P H V

- ❑ Convene working sessions of technical and clinical team members
- ❑ Update workflows and requirements based on technical capabilities

If necessary, develop requirements to connect with the data-sharing hub and/or integration vendor.

Ensure all team members are informed of changes to requirements and implications for clinical workflows.

❑ 2.4 Determine audit* requirements

P H V

- ❑ Review PDMP requirements
- ❑ Determine health care system requirements
- ❑ Assess auditing capabilities against requirements
- ❑ Finalize auditing requirements

**Identify data elements and functionality to effectively gather and analyze system usage. See Usage Auditing section.*

❑ 2.5 Finalize requirements

P H V

- ❑ Obtain technical approach approval from clinicians
- ❑ Obtain technical approach approval from technical team members

Consider using a formal concurrence/sign-off process.

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02. DEVELOPMENT:

Step 3: **Establish Connectivity to PDMP &/or Your Chosen Data-Sharing Hub**

❑ 3.1 Review documentation

P H V

- ❑ Review PDMP related documentation
- ❑ Review data-sharing hub-related documentation

🔔 *If documentation does not exist, consider developing guides for future implementations.*

🔔 *If a guide is developed, determine if the vendor or health care system has primary responsibility for development. The state PDMP and health care system should provide oversight.*

❑ 3.2 If necessary, develop/refine the interface to connect with the data-sharing hub and/or integration vendor

P H V

🔔 *If a new interface is developed for the data-sharing hub, the interface should be included in the Testing phase activities.*

❑ 3.3 Validate connectivity

P H V

- ❑ Validate connectivity to data-sharing hub, if applicable
- ❑ Validate connectivity to PDMP

🔔 *Consider whether a sign-off process among the key parties is needed to confirm connectivity.*

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02. DEVELOPMENT:

Step 4: **Develop & Configure User Interface**

Steps 4.2 and 4.3 may occur concurrently.

❑ 4.1 Determine responsibilities (health care system, EHR vendor, integration vendor, or data-sharing hub)

P H V

- ❑ Convene technical team members to determine roles and plan
- ❑ Update project plan

❑ 4.2 Configure interface to align with workflow and requirements (based on decisions made in Step 2)

P H V

Some elements of Testing may occur under this step.

Some health care systems may rely on vendors to assist with configuration.

❑ 4.3 Convene team members to review configured interface

P H V

- ❑ Determine if any modifications are required to the user interface
- ❑ Update requirements and workflow to reflect the implemented interface

Training materials should also be updated as needed to reflect these changes.

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02. DEVELOPMENT:

Step 5: **Conduct Role Mapping Between Systems**

❑ 5.1 Analysis – compile and harmonize roles

P H V

- ❑ Collect and review documentation of roles in EHR, PDMP, and data-sharing hub
- ❑ Compare roles and identify issues
- ❑ Determine and validate mapping approach across health care system, PDMP, and vendors

- *Ensure that state requirements are addressed.*
- *Become familiar with Prescription Monitoring Information Exchange (PMIX) roles.*
- *Assign vendors to lead the technical mapping of the PMIX standard. The ways in which vendor system roles are mapped to PMIX roles should be documented for future reference.*

❑ 5.2 Compile list of PDMP users and their clinical roles in the EHR

P H V

- ❑ Mapping of users to the role categories across EHR, data-sharing hub, and PDMP (PMIX roles)
- ❑ Validate role mapping

- *Consider developing a role-mapping guide, if one does not already exist.*
- *Address integration vendor approach to roles.*
- *PDMP may ask the health care system to validate the mapping.*
- *PDMP may audit mapping of roles.*

❑ 5.3 Apply roles as mapped

P H V

- ❑ Implement mapping in EHR
- ❑ Implement mapping in data-sharing hub

- *There will be elements of Testing that will occur in this step.*
- *Vendor may provide guidance to health care system.*

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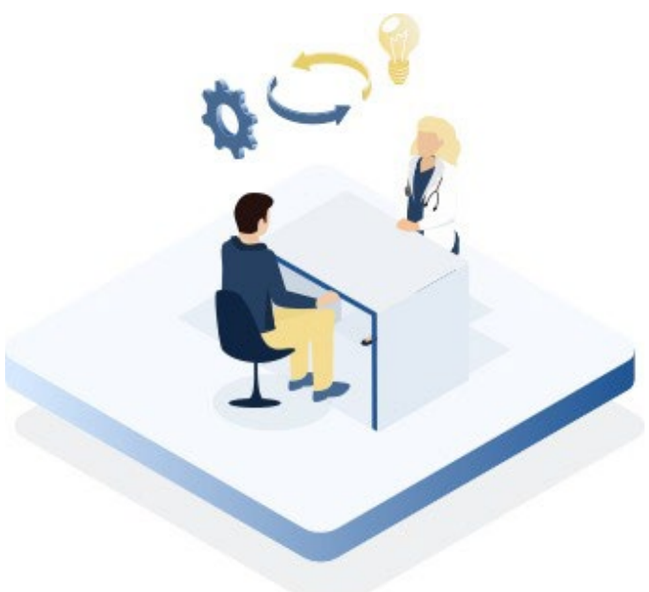
02. DEVELOPMENT:

Step 6: **Iterate/Troubleshoot as needed, based on Testing Phase**

This step occurs as issues emerge in technical testing as described in Testing Step 3.



6.1 Update requirements, workflows, and training based on testing results

P H V

Issue tracking for test results should include steps for updating requirements and workflows.

Update training documentation as needed.

6.2 Iterate on previous steps as needed

P H V

- ❑ Successfully pass all test scenarios to move into the Training phase

NEXT PAGE >

3. Testing

Thorough testing of all elements of the integration ensures that issues are discovered and resolved prior to Go-Live. Testing also allows implementers to better understand the integration and refine its appearance or capabilities.

See the Advancing PDMP-EHR Integration project's Testing Guidance for additional details and specific testing scenarios.

01
Develop Testing Plan

02
Plan Testing Meeting Cadence & Attendance

03
Conduct Technical Testing Based on Testing Plan

< DEVELOPMENT

TRAINING >

03. TESTING:

Step 1: **Develop Testing Plan**

❑ 1.1 Determine required high-level testing scenarios

P H V

Check with state PDMP if there are any required testing scenarios.

❑ 1.2 Determine required testing procedures (i.e., PDMP attendance and validation, screen-sharing, etc.)

P H V

- ❑ Designate a note-taker to closely document the testing process (this improves the team's availability in the future to troubleshoot, resolve errors, avoid re-work, and check that all aspects of the integration are ready to Go-Live)

❑ 1.3 Confirm expectations across all entities

P H V

Refer to Planning steps 2.4 and 3.1 where these expectations were set.

❑ 1.4 Develop detailed test scenarios and protocols, if necessary

P H V

- ❑ Engage clinicians to ensure testing team fully understands how clinicians interact with the integration and can test the integration accordingly
- ❑ Determine which data elements are applicable, map steps for user interactions, and identify expected results

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03. TESTING:

Step 2: **Plan Testing Meeting Cadence & Attendance**

❑ 2.1 Establish testing schedule and timeline

P H V

- ❑ Identify participants (health care system, state PDMP, and/or vendors)
- ❑ Send out calendar invitations to all expected attendees to ensure attendance
- ❑ Confirm availability of all participants
- ❑ Prior to testing sessions, send out a meeting agenda to ensure efficient use of time

Refer to the timeline from Planning Step 5 and future phases to see if adjustments are needed.

❑ 2.2 Determine and designate testing roles and responsibilities

P H V

- ❑ Ensure relevant test data are available in advance of testing
- ❑ Involve integration champion(s) in testing and obtain their feedback
- ❑ Engage clinicians to validate testing data and scenarios
- ❑ Ensure IT team does not modify test data before testing session

NEXT PAGE >

03. TESTING:

Step 3: **Conduct Technical Testing based on Testing Plan**

❑ 3.1 Conduct connectivity testing

P H V

- ❑ Ensure proper data element transmission

❑ 3.2 Conduct user interface testing

P H V

- ❑ Validate integration appearance with state PDMP and health care system
- ❑ Verify that the integration does not affect other functionalities within the EHR

❑ 3.3 Conduct case-based testing

P H V

- ❑ Create testing scenarios based on PDMP and health care system preferences and requirements
- ❑ Test the integration based on agreed-on scenarios

❑ 3.4 Conduct user acceptance testing

P H V

- *Integration champion and other clinicians may conduct this testing to ensure authentic user acceptance.*
- *User acceptance outcomes should be addressed in training.*
- *User acceptance testing may be followed by a Go-Live with a pilot group to ensure proper integration roll-out.*

❑ 3.5 Conduct reporting and auditing capability testing

P H V

❑ 3.6 Conduct testing to ensure successful migration into production without affecting other EHR functionalities

P H V

❑ 3.7 Document technical issues and/or enhancement requests

P H V

- ❑ Resolve documented technical issues and/or enhancement requests
- ❑ Re-test after implementing technical solutions and enhancements

Revisit Development Step 6 if resolutions require significant functional and user interface changes.

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4. Training

Training not only ensures that users are aware of how to use the integration, but also when to use it.
Training is held at the discretion of each health care system. Some state PDMPs require training and strategy will differ between smaller and larger health care systems.

See the Advancing PDMP-EHR Integration project's Training Guidance for additional details and example training documentation.

01
Launch Adoption Initiatives

02
Develop Training Plan

03
Create Training Content

04
Train Users

04. TRAINING:

Step 1: **Launch Adoption Initiatives**

❑ 1.1 Collaborate with the state PDMP and/or vendors

P H V

- ❑ Identify appropriate training points of contact within the state PDMP and vendors
- ❑ Reach out to state PDMP for pre-existing training resources

Ask your state PDMP about facilitating clinician continuing education credits to incentivize clinician adoption.

❑ 1.2 Confirm integration champion(s) participation and support for training

P H V

- ❑ Integration champion(s) should help communicate the reasons behind and benefits of integration to their peers

Including integration champion(s) in training communications and delivery may increase clinicians' responsiveness to training.

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04. TRAINING:

Step 2: **Develop Training Plan**

- *Consider state regulations while developing communications plan and training content.*
- *Review the Communication Plan with state PDMP and/or vendors and if needed, delegate responsibilities accordingly.*
- *Training plans, platforms, and content should be tailored for different components of the health care system and user roles.*

❑ 2.1 Identify the training audience(s)

P H V

- ❑ Compile a list of end-user groups that will be impacted by the integration (e.g., clinicians, delegates, IT staff, etc.)
- ❑ Discuss and document the changes, benefits, and costs of integration to the end-user groups

This exercise will inform the training's content and may help clarify the best training delivery method for your health care system.

❑ 2.2 Identify appropriate training delivery method

P H V

- ❑ Select a training platform most efficient for your health care system's size and range (e.g., webpage, in-person sessions, etc.)

These methods can be combined depending on your clinicians' needs.

❑ 2.3 Establish training timing and frequency

P H V

- ❑ Plan a Go-Live Communications Campaign for training information and Go-Live reminders
- ❑ Establish a schedule for communications
- ❑ Develop a detailed training schedule for each end-user group

Consider your audience's workload and communication preferences when determining the timing and frequency of the Go-Live communications.

Assess whether existing meetings can be used for training sessions.

Review the draft training schedule with team members including integration champion(s) to confirm that training will not conflict with other activities.

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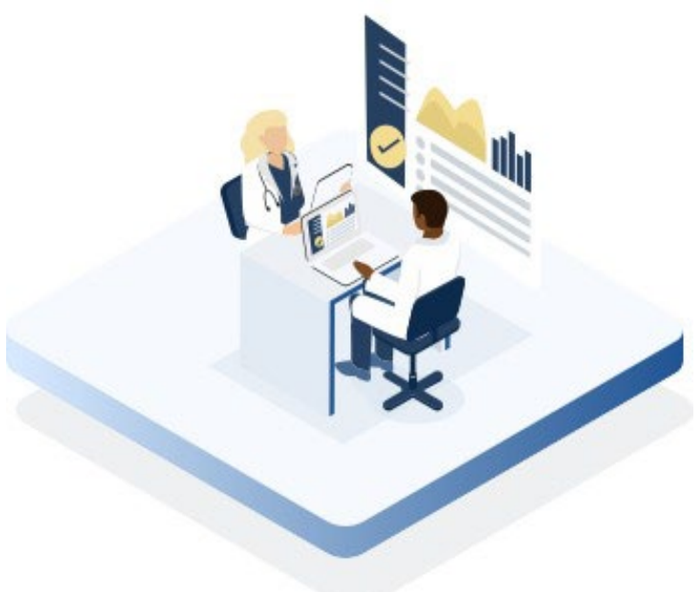
04. TRAINING:

Step 3: **Create Training Content**



❑ 3.1 Document the integration's purpose, workflow changes and new functionalities

P H V

- ❑ Create job aids and written documentation for end users

❑ 3.2 Think proactively about clinician concerns and address them in the content

P H V

- ❑ Reference non-integration issues or requirements (i.e., regular PDMP portal access to maintain an active account)
- ❑ Mention how training compliance will be tracked and mention applicable incentives
- ❑ Provide information on how to access and use the integration's feedback mechanism

The integration champion(s) should identify potential clinician concerns and help validate how they are addressed.

NEXT PAGE >

04. TRAINING:

Step 4: **Train Users**

Ensure integration champion is involved in this step to maximize end-user buy-in.

State PDMPs may provide training materials and participate in training sessions to explain PDMP policies.

❑ 4.1 Launch health care system's Go-Live Communications Campaign

P | H | V

- ❑ Emphasize training dates and relevant methods within all correspondence

❑ 4.2 Train users

P | H | V

- ❑ Conduct training sessions
- ❑ Track attendance to identify follow-up training needs
- ❑ Capture end-user feedback at training
- ❑ Relay user feedback to relevant project team members
- ❑ Update training content based on feedback

When conducting in-person training, have members of the training team attend initial sessions to identify opportunities for improvement.

NEXT PAGE >

5. Go-Live

The Go-Live is the culmination of the integration process. While it is a singular event, a successful Go-Live requires foresight and planning.

01
Determine Roles & Time of Go-Live

02
Migrate into Production & Turn on Integration

03
Communicate to End Users that Integration is Live

< TRAINING

ONGOING ACTIVITIES >

05. GO-LIVE:

Step 1: **Determine Roles & Time of Go-Live**

See the Advancing PDMP-EHR Integration project's Training Guidance and Template toolkit item for further information on establishing a Go-Live Communications Campaign.

❑ 1.1 Determine Go-Live approach

P H V

- ❑ Coordinate Go-Live timing with all involved project participants to ensure support

Consider scheduling Go-Live on a low-volume time/day (e.g., late at night or early in the morning) to test and validate the live integration.

Consider a phased Go-Live and using a pilot group, particularly for large facilities.

❑ 1.2 Assign roles for day of Go-Live

P H V

- ❑ Develop communication plan between implementers
- ❑ Develop communication plan for end users (see Training phase)

Select style of communication depending on your health care system (can include virtual meeting, phone call, email, etc.).

Schedule debrief between project participants (that includes vendors, PDMP, and health care system) to address Go-Live issues.

❑ 1.3 Establish feedback mechanism

P H V

- ❑ Provide a telephone number or email address that routes to a help desk, IT Director, integration project manager, your health care system's CTO, or a liaison at the state PDMP
- ❑ Validate that the feedback mechanism is mentioned in the Go-Live Communications Campaign and training content

Keep communication bidirectional and establish a clear channel for feedback.

❑ 1.4 Create Go-Live checklists

P H V

- ❑ Establish a Go-Live readiness checklist
- ❑ Establish a post-Go-Live assessment

A Go-Live readiness checklist should encompass completion of testing scripts, training, communication plans, production connection testing, auditing testing, and a go/no-go checkpoint.

A post-Go-Live assessment should encompass success of initial queries, validating query volume, collecting end-user usability feedback, access denials, and patient matching issues.

❑ 1.5 Decide Go vs. No-Go

P H V

- ❑ If decision is No-Go, create and disseminate communication to end users

NEXT PAGE >

05. GO-LIVE:

Step 2: **Migrate into Production & Turn On Integration**

❑ 2.1 Turn on integration

P H V

- ❑ Verify that the integration does not affect other functionalities within the EHR

❑ 2.2 Validate integration functionality and auditing capabilities

P H V

- ❑ Validate integration immediately following Go-Live

Implementers can use either test queries or monitor live queries.

- ❑ Validate auditing capabilities immediately following Go-Live

Confirm that as queries are conducted, the audit logs record transactions as expected and can be accessed by appropriate administrative users.

❑ 2.3 Monitor activity on day of Go-Live

P H V

- ❑ Document technical issues and/or enhancement requests from end users
- ❑ Meet with project team members to address issues as needed

NEXT PAGE >

05. GO-LIVE:

Step 3: **Communicate to End Users that Integration is Live**

❑ 3.1 Determine/develop communication (see Step 1.2)

P H V

- *Use communication methods best suited for your health care system's setting and size.*
- *If needed, facilities may reiterate key information in communication (i.e., state requirements, workflow changes, etc.).*

❑ 3.2 Disseminate communication

P H V

- ❑ Send communication to end users when integration is live
- ❑ Send communication to end users if issues arise

NEXT PAGE >

6. Ongoing Activities

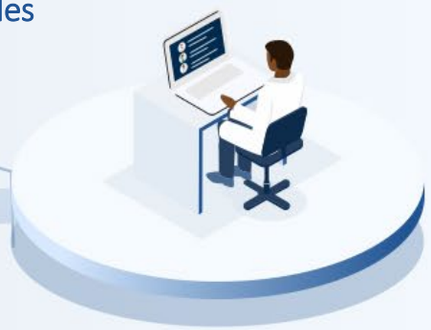
Like any technical implementation, integration requires ongoing maintenance, which often includes resolving technical issues, implementing upgrades and enhancements, developing routine testing protocols and auditing.
Ongoing Activities is divided into two subsections: Technical Maintenance and Usage Auditing.
These do not necessarily happen sequentially.

Technical Maintenance

Technical maintenance is necessary to ensure the integration remains functional and matures to address end-user needs.

01
Establish Responsibilities & Communication Protocols Between Project Participants

02
Maintain User Profiles



03
Implement Updates & Enhancements, & Resolve Technical Issues

06. TECHNICAL MAINTENANCE:

Step 1: **Establish Responsibilities & Communication Protocols Between Project Participants**

❑ 1.1 Establish general expectations, requirements, and roles

P H V

- ❑ Develop protocols for resource transitions (i.e., project manager changes roles)
- ❑ Establish process for monitoring legal and regulatory changes

❑ 1.2 Determine meeting/reconvening expectations

P H V

- ❑ As needed, implement meeting schedule

Meetings may include reviewing errors (such as access denied, appropriateness, etc.).

❑ 1.3 Re-visit support protocols, including error tracking and assignment of responsibilities

P H V

NEXT PAGE >

06. TECHNICAL MAINTENANCE:
Step 2: **Maintain User Profiles**

Technical Maintenance Step 2 and Step 3 may occur concurrently.

❑ 2.1 Determine protocol for adding and removing users

P H V

- ❑ Establish workflows
- ❑ Define roles and responsibilities

If possible, collaborate with human resources and automate user on-boarding and old user removal.

❑ 2.2 Add and train new users as needed

P H V

Be vigilant for legal/policy changes that affect integration access permissions.

Ensure new users align with state PDMP requirements/restrictions.

❑ 2.3 Remove old users as needed

P H V

- ❑ Remove users who have left the health care system
- ❑ Remove non-compliant users (see Auditing Step 3)

NEXT PAGE >

06. TECHNICAL MAINTENANCE:

Step 3: **Implement Updates & Enhancements, & Resolve Technical Issues**

Technical Maintenance Step 2 and Step 3 may occur concurrently.

❑ 3.1 Determine roles/responsibilities

P H V

- ❑ Establish contingency protocols for maintenance and downtime of different systems

❑ 3.2 Identify, track, and address technical issues

P H V

- ❑ Develop solution to technical issues (see Development)
- ❑ Test the solution (see Testing)
- ❑ Deploy the solution (see Go-Live)
- ❑ Update documentation

Validate technical issue fixes with end users, as needed.

❑ 3.3 Identify and address enhancement requests

P H V

- ❑ Develop enhancements (see Development)
- ❑ Test the enhancements (see Testing)
- ❑ Deploy the enhancements (see Go-Live)
- ❑ Update documentation

Engage end users throughout this step.

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6. Ongoing Activities

Like any technical implementation, integration requires ongoing maintenance, which often includes resolving technical issues, implementing upgrades and enhancements, developing routine testing protocols and auditing. *Ongoing Activities is divided into two sections: Technical Maintenance and Usage Auditing. These do not necessarily happen sequentially.*

Usage Auditing

Auditing is the action of gathering and analyzing data on the integration query requests and PDMP responses. Usage auditing supports monitoring compliance, determining the impact of the integration, and points to new directions for improvement.

See the Advancing PDMP-EHR Integration project's Auditing Guidance for additional details and specific auditing data elements.

06. USAGE AUDITING:

Step 1: **Establish Auditing Frequency & Protocols**

❑ 1.1 Determine purpose and scope of audits

P H V

- ❑ Determine what data to use for audit (such as transaction logs showing when queries and responses were sent and received)
- ❑ Consider using audit log/report to evaluate performance

Health care facilities should consider conducting internal audits in addition to the state PDMP's audits.

By conducting internal audits, health care facilities can assess and address their integration's performance.

❑ 1.2 Determine audit process and frequency

P H V

- ❑ Determine roles and responsibilities for audits
- ❑ Determine frequency of audits

Health care system and/or state PDMP may wish to regularly conduct audits, particularly following Go-Live.

Consider documenting audits to track long-term performance.

NEXT PAGE >

06. USAGE AUDITING:

Step 2: **Obtain & Analyze Audit Log/Report**

❑ 2.1 Compile and validate audit log/report data

P H V

- ❑ Extract data from source systems
- ❑ Conduct data validation checks, e.g., codes, ranges, format
- ❑ Merge data if more than one source file will be used
- ❑ Validate contents and format of the merged file

❑ 2.2 Analyze data

P H V

- ❑ Prepare findings and recommendations

If the health care system does not have access to their own audit log and if state PDMP can share, the state PDMP may consider sharing audit findings with facilities.

Clinician input may be needed to contextualize the findings and validate the recommendations.

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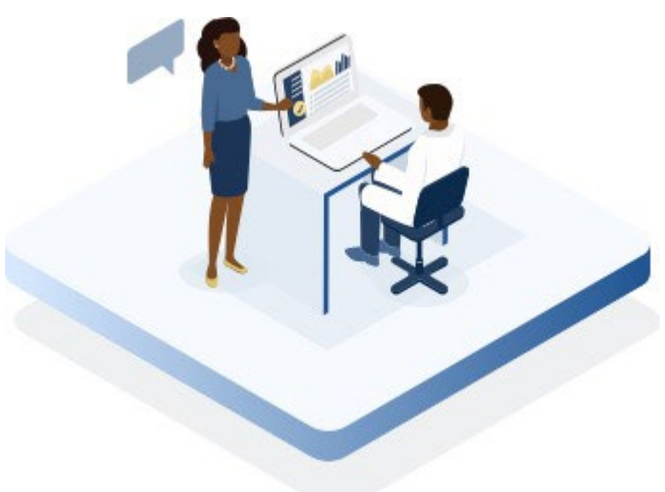
06. USAGE AUDITING:
Step 3: **Address Audit Findings**



❑ 3.1 Increase end-user adoption as needed

P H V

- ❑ Evaluate barriers preventing use
- ❑ Communicate benefits of adoption to end users

Increasing adoption will likely be driven by the health care system.

❑ 3.2 Address impacts of non-compliance as needed

P H V

- ❑ Discuss and clarify impacts of non-compliance with state or health care system PDMP use mandates
- ❑ Analyze and address potential causes of non-compliance
- ❑ Educate clinicians on expectations
- ❑ Share resources regarding state or health care system compliance requirements with integration end users

State law and PDMP policy define compliance requirements and should be the starting points for assessing PDMP compliance.

Relevant health care system policies should also be addressed in compliance reviews.

State PDMPs and health care systems should discuss the impacts of non-compliance and if applicable, collaborate on how to inform clinicians of the requirements and impacts of non-compliance with state mandates or health care system policies.

NEXT PAGE >

HHS ONC/CDC | **CDS Framework**

Electronic Clinical Decision Support

Clinical Decision Support (CDS) provides clinicians, staff, patients, and other individuals with knowledge and person-specific information, intelligently filtered or presented at appropriate times, to enhance health and health care. CDS encompasses a variety of tools to enhance decision-making in the clinical workflow. (Office of the National Coordinator for Health Information Technology, 2018)

This CDS Framework addresses the electronic implementation of the recommendations within the 2016 CDC Guideline for Prescribing Opioids for Chronic Pain (CDC Prescribing Guideline). CDS implementation will vary based on the size and technical capability of the health care system and the data sharing capacity of the state PDMP.

CDS Resource Network

This graphic provides an overview of potential interactions among internal and external entities involved in CDS. Note, the pictured internal collaborators are subject to change and based on the health care systems' organizational structure and goals.

CDS Tool

A CDS tool may be provided by an EHR vendor, a CDS software developer, or a health care system internal build team. These entities provide tools that enable a health care system to implement CDS in alignment with the CDC Opioid Prescribing Guideline. There are both open source and proprietary CDS tools that implement prescribing and chronic pain management guidelines.

Clinicians

Clinicians should provide input to project staff throughout CDS development and implementation to ensure the CDS tool effectively and efficiently meets their needs.

Project Staff

The project manager and other project staff will be in close coordination with all entities involved in CDS implementation to ensure effective and successful outcomes.

Technical Professionals

The technical staff from the health care system or any involved vendors will closely coordinate with other project staff to ensure that clinician and state prescribing requirements are incorporated within the CDS tool.

Federal Government

Federal entities have aided in the development and implementation of clinical guidelines and recommendations. These guidelines and recommendations will likely influence the CDS logic written by the technical and project management team.

State PDMP

The state PDMP provides mechanisms to access state PDMP data to be used by CDS tools. The state PDMP may provide support to health care systems implementing CDS for the CDC Prescribing Guideline. They may also provide additional guidelines or recommendations to the project management staff.

NEXT PAGE >

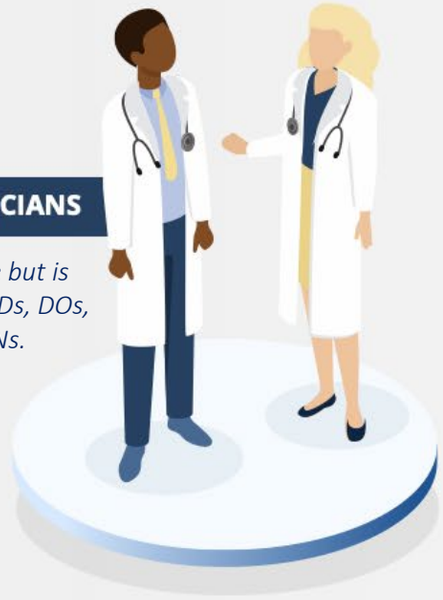
Meet the Actors

These avatars represent the general actors involved in each step of the CDS Framework. The approach taken by each health care system may vary.

PROJECT STAFF

This may include but is not limited to project managers, researchers, and business analysts.

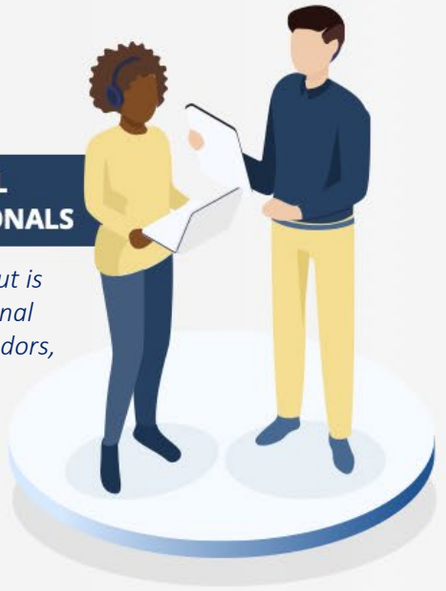
S C T



CLINICIANS

This may include but is not limited to MDs, DOs, PAs, NPs, and RNs.

S **C** T



TECHNICAL PROFESSIONALS

This may include but is not limited to internal technical staff, vendors, and contractors.

S C **T**

Instructions & Key

The letters above (S, C, T) are used to indicate who is participating in the activity.

Suggested Practices

Valuable lessons learned applied by demonstration participants

Clinician Involvement

Engagement of appropriate clinical staff in discussions and decision making is encouraged within a step

NEXT PAGE >

CDS Framework Phases

Click any of the steps below to learn more.

PLANNING >

1. Planning

CDS planning includes assessing clinician needs, establishing roles, determining the approach, and developing the project timeline. Click any of the images below for more detailed steps.

01

Begin Preliminary Conversations & Assess Clinician Needs

02

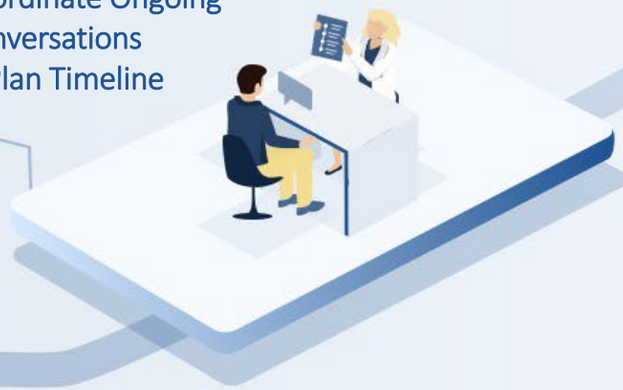
Identify & Establish Buy-In Among Participants

03

Evaluate & Select CDS Approach

04

Coordinate Ongoing Conversations & Plan Timeline



DEVELOPMENT >

01. PLANNING:

Step 1: **Begin Preliminary Conversations & Assess Clinician Needs**

❑ 1.1 Assess challenges in ensuring appropriate patient care, related to prescribing controlled substances

S C T

- ❑ Determine the drivers for implementing CDS
- ❑ Review health care system data on patterns of prescribing controlled substances
- ❑ Assess performance on quality measures
- ❑ Obtain feedback from a broad range of clinical staff

- *Review CDC's Prescribing Guideline to identify quality measures.*
- *Review local statutes and government policies for prescribing-related requirements and recommendations.*
- *Opportunities to improve patient outcomes should be the priority focus of the analysis, when feasible.*
- *Speak with clinicians to understand perceived challenges both individually and in groups.*

❑ 1.2 Identify priority areas for CDS implementation

S C T

- ❑ Review analyses with key clinical and leadership decision makers
- ❑ Develop recommendations for the initial focus of CDS development
- ❑ Establish evaluation parameters

- *Ask clinicians to prioritize their list of concerns.*
- *Focus on areas where clinician decisions and actions have been demonstrated in other settings to impact patient outcomes.*
- *Identify barriers to implementing and achieving acceptance of CDS in selecting the priority area of focus.*

NEXT PAGE >

01. PLANNING:

Step 2: Identify & Establish Buy-In Among Participants

Buy-in is demonstrated by: agreeing on the project's value and priority, committing staff to participate, contributing financial resources as needed, and concurring with the project timeline.

❑ 2.1 Secure buy-in

S C T

- ❑ Secure executive leadership buy-in (that includes determining project funding and CDS policy development)
- ❑ Secure clinician buy-in (that includes identifying champion(s) to build support among peers)
- ❑ Secure technical team buy-in (that includes confirming feasibility within the health care system's technical environment and resource allocation)

Select respected leaders who understand the motivation for and impacts of CDS and are comfortable communicating about the project with peers.

A champion's primary role is to support and advocate for the project with their peers.

In large health care systems, multiple champions may be needed to work with peers in different locations or in different services (e.g., emergency department, inpatient, outpatient).

Explore and modify expectations across these groups so the health care system shares one common vision of CDS Implementation.

❑ 2.2 Identify and appoint CDS implementation project team

S C T

- ❑ Appoint a project team with appropriate representation including administrative, clinical, and technical representatives
- ❑ Identify and agree on expectations across and within all parties
- ❑ Establish a charter for the project team specifying roles, responsibilities, and authority

Consider including staff responsible for quality improvement.

Include any overarching CDS governance representation on the team or as an advisor to the team, if applicable.

NEXT PAGE >

01. PLANNING:

Step 3: **Evaluate & Select CDS Approach**

Engage clinicians throughout this step so that the clinical team understands and supports the CDS approach decision. Consider the long-term sustainability and scalability of CDS throughout this step.

❑ 3.1 Identify CDS implementation options and assess their feasibility and cost

S C T

- ❑ Determine technical and operational requirements for implementation of priority CDS areas using the analysis of quality improvement opportunities, as identified in Planning Step 1.1

Address barriers to clinical acceptance of CDS as part of the feasibility analysis, (e.g., lack of a CDS champion, impacts on workflow).

Assess the ability to leverage existing EHR capabilities to support CDS.

❑ 3.2 Evaluate and select focus areas and technical approach

S C T

- ❑ Review the feasibility assessment with project participants for input on the selection of focus areas
- ❑ Conduct a project team review of the options and feasibility to make final recommendations on focus areas
- ❑ Inform key clinical and leadership decision makers of the recommendation

Engage groups with overall CDS governance responsibilities.

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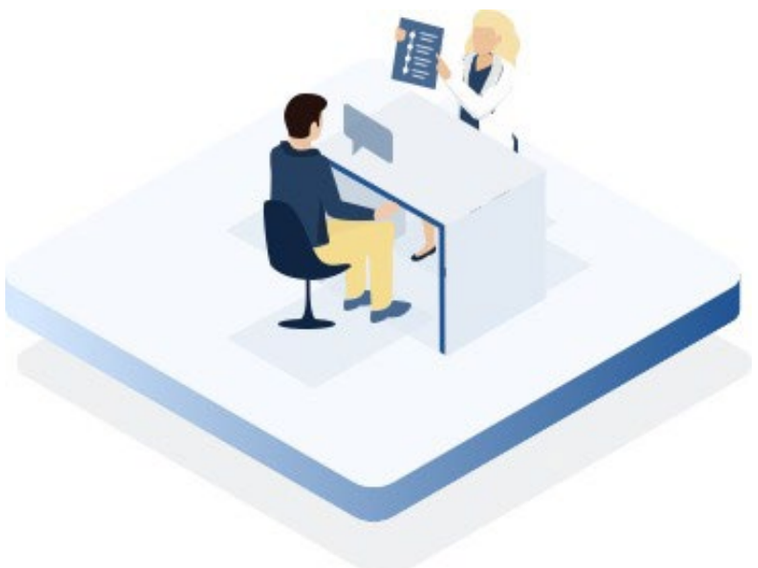
01. PLANNING:

Step 4: **Coordinate Ongoing Conversations and Plan Timeline**



❑ 4.1 Schedule regular meetings for CDS development and implementation team members

S C T

- ❑ Establish a routine meeting schedule for the CDS implementation project team
- ❑ Identify participants and establish a meeting schedule to coordinate technical development activities
- ❑ Determine timing for touchpoints with other groups, (e.g., CDS governance, executive leadership, quality improvement)

Technical team meetings may be driven using an iterative development methodology.

When scheduling meetings, consider selecting times when CDS champion(s) and leadership are available.

❑ 4.2 Establish a timeline of CDS development and implementation

S C T

- ❑ Develop a preliminary timeline that includes deliverables and milestones
- ❑ Review timeline with clinical, technical, and executive leadership to identify additional tasks, validate resource availability, and confirm timeframes
- ❑ Update and disseminate timeline

Build in time for clinical engagement throughout the process.

Consider an incremental Go-Live for large facilities or health care systems.

Consider factors that may impact resource availability, e.g., system upgrades, holidays, resident rotations in teaching facilities.

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2. Development

Technical development is a collaborative and iterative process. Clinical workflows are assessed to determine how to optimize CDS implementation. Developers and other project team members work together to determine requirements, ensure usability, implement CDS logic, and test all CDS components.

01
Gather Resources & Ensure Development Support

02
Elaborate & Validate Requirements/Capabilities

03
Establish & Validate CDS Logic

04
Develop & Configure User Interface

05
Develop User Interface & Implement CDS Logic

06
Iterate/Troubleshoot as needed, based on Testing Phase

02. DEVELOPMENT:

Step 1: **Gather Resources & Ensure Development Support**

❑ 1.1 Hold kickoff meeting and determine meeting cadence — S C T

- ❑ Revalidate and modify meeting participation, if needed
- ❑ Establish a schedule for coordinating meetings (as needed) with project participants

During kickoff, review project plan and other key artifacts from planning phase.

❑ 1.2 Allocate human resources (analysts, developers, etc.) — S C T

- ❑ Delegate responsibilities and tasks to the acquired human resources
- ❑ Determine if additional staff, contracted resources, or technical expertise are needed for development purposes

❑ 1.3 Allocate technical resources (server needs, etc.) — S C T

- ❑ Determine if additional hardware, software, or network capacity is needed

❑ 1.4 Establish mechanisms for coordination with the development team — S C T

- ❑ Determine roles and processes to coordinate development
- ❑ Establish an issue tracking mechanism

❑ 1.5 Revisit project plan and revise as necessary — S C T

Confirm that all project participants concur with and are committed to the timeline.

NEXT PAGE >

02. DEVELOPMENT:

Step 2: **Elaborate & Validate Requirements/Capabilities**

❑ 2.1 Convene CDS team members to elaborate requirements

S C T

- ❑ Review and elaborate high level requirements
- ❑ Identify options for implementing CDS, e.g., use of tools within the EHR, new software development, use of external tools that integrate with the EHR

- *Include clinicians in requirements discussions.*
- *Validate that the software tools can implement the clinical decision logic.*

❑ 2.2 Compile and document clinical and data workflows

S C T

- ❑ Convene clinicians to expand on workflows from the Planning phase
- ❑ Convene technical team members to review data workflows

- *Conduct walk-throughs of current clinical workflows.*
- *Conduct demos of anticipated workflows, if available.*
- *Ensure that data workflows are formally documented.*

❑ 2.3 Determine requirements for importing data (if applicable)

S C T

- ❑ Convene working sessions with technical and clinical team members including CDS champions
- ❑ Update data workflows and requirements based on technical capabilities

- *Anticipate that data transfers will need to be incorporated into testing.*

❑ 2.4 Determine reporting and auditing requirements

S C T

- ❑ Identify organizations with reporting and auditing needs
- ❑ Convene representatives to specify reports and audit logs
- ❑ Finalize reporting and auditing requirements

- *Obtain input from quality management staff on reporting requirements.*
- *Ensure that reporting addresses clinical, technical, and auditing reports.*

❑ 2.5 Finalize requirements

S C T

- ❑ Obtain agreement from clinicians on functional and workflow specifications
- ❑ Obtain technical agreement from technical team members

- *Consider using a formal concurrence/sign-off process.*
- *Ensure all team members are informed of changes to requirements and implications for clinical workflows.*

NEXT PAGE >

02. DEVELOPMENT:

Step 3: **Establish & Validate CDS Logic**

❑ 3.1 Develop the CDS logic specifications

S C T

- ❑ Review clinical guidelines and other references applicable to the CDS logic
- ❑ Develop logic specification for clinical review
- ❑ Develop technical logic specifications for developer review

Reference CDC's Prescribing Guideline and related Quality Improvement (QI) and Care Coordination measures to identify QI opportunities.

Reference and reinforce Agency for Healthcare Research and Quality (AHRQ)'s CDS Five Rights for the logic specifications.

Validate alignment with state laws and regulations.

❑ 3.2 Conduct review of the CDS logic specifications

S C T

- ❑ Review CDS logic with clinicians
- ❑ Review CDS logic with developers

Consider simulating the logic on a sample of patient records.

❑ 3.3 Update and finalize the CDS logic specifications

S C T

- ❑ Revise clinical logic specification
- ❑ Revise technical logic specification

Consider whether a sign-off process among the key parties is needed to confirm the CDS specifications.

NEXT PAGE >

02. DEVELOPMENT:

Step 4: **Determine CDS Workflow Integration**

❑ 4.1 Document pre- and post-implementation workflows

S C T

- ❑ Review and update workflows developed in Development Step 2.2 based on detailed functional and logic specifications

❑ 4.2 Obtain end-user feedback on post-implementation workflow

S C T

- ❑ Convene clinicians to review workflows

Ensure that the review process includes clinical representatives from all settings where the CDS will be implemented, e.g., emergency department, inpatient, outpatient.

❑ 4.3 Finalize workflows

S C T

- ❑ Update workflows based on end-user input

Obtain any formal sign-offs that are needed.

Review with CDS governance body, if necessary.

NEXT PAGE >

02. DEVELOPMENT:

Step 5: **Develop User Interface & Implement CDS Logic**

❑ 5.1 Design and review user interface

S C T

- ❑ Develop mock-ups of the user interface
- ❑ Convene representative groups of end users to obtain feedback on the mock-ups

Developers should participate in review sessions.

Consider using an interactive screen mock-up tool during review sessions so suggested changes can be visualized with the reviewers.

❑ 5.2 Develop application and implement CDS logic

S C T

- ❑ Development steps will vary based on the approach and requirements

Plan to have clinicians available to provide feedback to developers as they develop the application.

Maintain a log of all changes to specifications made during development and the rationale for the change.

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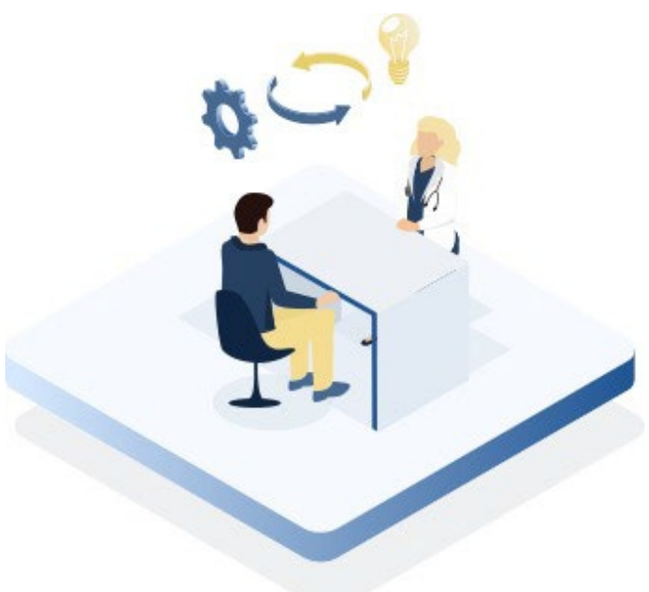
02. DEVELOPMENT:

Step 6: **Iterate/Troubleshoot as needed, based on Testing Phase**

This step occurs as issues emerge in technical testing as described in Testing Step 3.



❑ 6.1 Update requirements, workflows, and training based on testing results

S C T

Issue tracking log for test results should include steps for updating requirements and workflows.

Update training documentation as needed.

❑ 6.2 Iterate on previous steps as needed

S C T

- ❑ Successfully pass all test scenarios to move into the Training phase

NEXT PAGE >

3. Testing

Thorough testing of all elements of CDS ensures that issues are discovered and resolved prior to Go-Live. Testing also allows implementers to better understand the CDS functionalities and refine its appearance or capabilities.

01
Develop Testing Plan

02
Plan Testing Activities & Timeline

03
Conduct Technical Testing Based on Testing Plan

03. TESTING:

Step 1: **Develop Testing Plan**

For CDS, a significant amount of testing will be required. CDS will change clinician workflows, practices, and introduce potential new steps in the decision-making process.

Engage CDS champion(s) from the start of the testing process.

❑ 1.1 Develop required testing scenarios/scripts

S C T

- ❑ Establish criteria for test success
- ❑ Define cases applicable to each CDS alert
- ❑ Specify the source of data to be reviewed and expected data results

If implementing interruptive CDS, consider running non-visible silent alerts to simulate the frequency and conditions under which the alerts will fire.

Ensure that test scripts include multiple cases for each CDS alert, report, or item.

❑ 1.2 Determine required testing procedures

S C T

- ❑ Identify user roles in testing
- ❑ Determine method(s) to document testing results
- ❑ Identify or create data sets that can be used to support testing
- ❑ Determine the instance of the software where testing will be conducted e.g., pre-production
- ❑ Decide who will sign off to determine tested components for implementation

❑ 1.3 Confirm expectations across all entities

S C T

Consider and communicate the time needed from each team member to participate in testing.

NEXT PAGE >

03. TESTING:

Step 2: **Plan Testing Activities & Timeline**

❑ 2.1 Establish technical testing schedule and timeline

S C T

- ❑ Identify technical testing team
- ❑ Establish technical testing session(s) schedule
- ❑ Confirm availability of all participants
- ❑ Send out testing instructions and scripts prior to testing activities to ensure efficient use of time

❑ 2.2 Establish end-user testing schedule and timeline

S C T

- ❑ Identify testing participants
- ❑ Send out calendar invitations to all expected participants
- ❑ Confirm availability of all participants
- ❑ Send out testing instructions and scripts prior to testing activities to ensure efficient use of time

❑ 2.3 Determine and designate testing roles and responsibilities

S C T

- ❑ Ensure relevant test data are available in advance of testing
- ❑ Engage technical testing team to validate technical testing data and scenarios
- ❑ Engage CDS champion(s) and other clinicians to validate clinical testing data and scenarios

Ensure the test data are not unintentionally modified before the testing session.

NEXT PAGE >

03. TESTING:

Step 3: Conduct Technical Testing based on Testing Plan

Consider implementing pilot(s) of the CDS as part of testing.

❑ 3.1 Conduct data import testing

S C T

- ❑ Ensure proper data element transmission

Confirm data elements from the PDMP.

Confirm data elements from the EHR for standalone CDS applications.

❑ 3.2 Conduct user interface testing

S C T

- ❑ Conduct data validation within the user interface
- ❑ Confirm that the user interface meets requirements

❑ 3.3 Conduct case-based testing

S C T

- ❑ Create testing scenarios based on CDS and workflow requirements
- ❑ Validate that the CDS logic executes as specified
- ❑ Confirm that application workflow matches anticipated workflow

Actively engage CDS champion(s) in this testing activity.

❑ 3.4 Conduct reporting and auditing capability testing

S C T

- ❑ Confirm that report layouts, data content, calculations, and graphics conform to specifications
- ❑ Review and validate reports with anticipated users
- ❑ Review and validate audit logs with anticipated users

❑ 3.5 Conduct testing to ensure successful implementation in production

S C T

- ❑ Install and test in a pre-production environment or equivalent

❑ 3.6 Document technical issues and/or enhancement requests

S C T

- ❑ Determine technical issues and/or enhancements to be implemented
- ❑ Implement technical updates and enhancement
- ❑ Re-test after implementing technical updates and enhancements

See Development phase if resolutions require significant functional and user interface changes.

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4. Training

Training ensures that users are aware of how to use CDS. The training design is tailored to the specific needs of the health care setting in which CDS is implemented.

01
Launch Adoption Initiatives

02
Develop Training Plan

03
Create Training Content

04
Train Users

04. TRAINING:

Step 1: **Launch Adoption Initiatives**

❑ 1.1 Secure CDS champion(s) support for training

S C T

- ❑ Convene CDS champion(s) to discuss preliminary training approach
- ❑ Confirm commitment to support training initiatives

❑ 1.2 Identify internal points of contact for training activities

S C T

- ❑ Identify appropriate training points of contact within the health care system
- ❑ Engage staff responsible for training and incorporate them into training activities

Points of contact may include CDS champion(s), training expert(s), site manager(s), user support, technical support, and administrative staff responsible for scheduling.

NEXT PAGE >

04. TRAINING:

Step 2: **Develop Training Plan**

❑ 2.1 Identify the training audience(s)

S C T

- ❑ Compile a list of end users and other groups that will be impacted by the CDS (e.g., clinicians, quality improvement staff, information technology staff, user support staff etc.)
- ❑ Establish a profile for each audience to identify the scope of training, delivery methods, and scheduling requirements

This exercise will inform the training's content and may help clarify the best training delivery method for your health care system.

❑ 2.2 Identify appropriate training delivery method

S C T

- ❑ For each training audience determine the delivery method aligned to their preferences and schedules

Clinicians may prefer training that can be taken online anytime while other staff may want to incorporate in-person training into group sessions.

Training delivery methods may include training peer trainer(s), use of a training instance of the CDS application, presentations, and hands-on practice.

❑ 2.3 Establish training timing and frequency

S C T

- ❑ Plan a Go-Live Communications Campaign for training information and Go-Live reminders
- ❑ Establish a schedule for communications
- ❑ Develop a detailed training schedule for each end-user group

Consider your audience's workload and communication preferences when determining the timing and frequency of the Go-Live communications.

Assess whether existing meetings can be used for training sessions.

Review the draft training schedule with team members to confirm that training will not conflict with other activities.

Determine if a formal scheduling system should be used for training.

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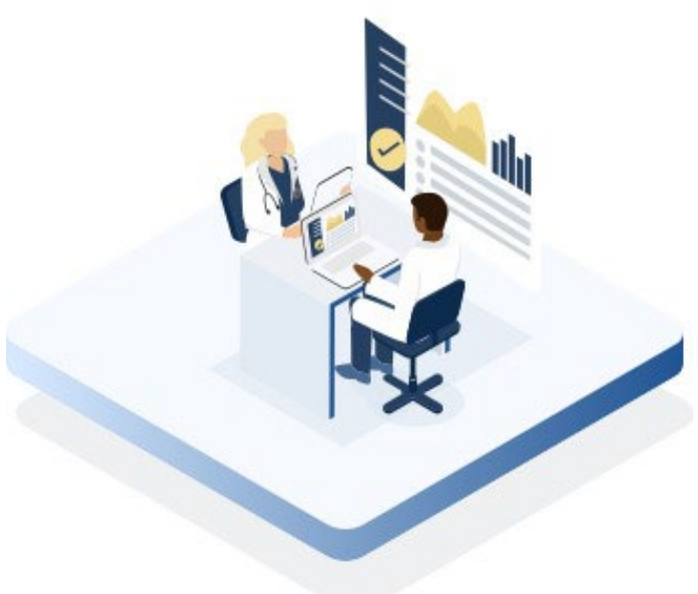
04. TRAINING:

Step 3: **Create Training Content**



❑ 3.1 Develop training materials and job aids

S C T

- ❑ Review delivery methods for each audience to determine what training materials are needed
- ❑ Develop training materials and job aids, such as end-user guides and troubleshooting manuals, tailored to each end-user group

Engage training and communications staff (if available) in the development of training and communications materials.

Ensure training infrastructure requirements are addressed such as having a version of the application available for training.

❑ 3.2 Review materials and job aids with CDS champion(s) and other end-user representatives

S C T

- ❑ Identify reviewers who are representative of the training audiences listed in Training Step 2.1
- ❑ Provide reviewers with tools to capture their feedback, e.g., spreadsheets, specific questions
- ❑ Revise training based on reviewer feedback

Include technical staff in the review of training materials to confirm the accuracy of the training content.

Continue to engage training and communications staff in review activities.

NEXT PAGE >

04. TRAINING:

Step 4: **Train Users**

❑ 4.1 Launch the health care system's Go-Live Communications Campaign

S C T

- ❑ Disseminate planned communications
- ❑ Monitor receipt and review of electronic communications
- ❑ Confirm that other forms of communication have occurred, e.g., placing posters, banners in the EHR

Use CDS champion(s) to reinforce communication messaging.

❑ 4.2 Train users

S C T

- ❑ Conduct training sessions
- ❑ Track attendance to identify follow-up training needs
- ❑ Capture end-user feedback at training
- ❑ Relay user feedback to relevant project team members

For in-person training have members of the training team attend initial sessions to identify opportunities for improvement.

❑ 4.3 Update training content

S C T

- ❑ Incorporate user feedback or new enhancements into training materials

NEXT PAGE >

5. Go-Live

The Go-Live is the culmination of the CDS process. While it is a singular event, a successful Go-Live requires foresight and planning.

01
Determine & Implement the Go-Live Approach

02
Migrate into Production & Turn on CDS

03
Provide Go-Live Support to End Users

05. GO-LIVE:

Step 1: **Determine & Implement the Go-Live Approach**

❑ 1.1 Determine Go-Live approach

S C T

- ❑ Coordinate Go-Live timing with all involved project participants to ensure support

🔔 *Consider scheduling Go-Live on a low-volume time/day (e.g., late at night or early in the morning) to test and validate the CDS.*

🔔 *Consider a phased Go-Live and use of a pilot group, particularly for large facilities.*

❑ 1.2 Assign roles for day of Go-Live

S C T

- ❑ Develop communication plan between implementers
- ❑ Develop communication plan for end users (see Training phase)

🔔 *Select communication style based on the health care system's needs (that includes virtual meeting, phone call, email, etc.).*

🔔 *Consider scheduling a debrief between project participants (that includes champions, managers, developers) to address Go-Live issues.*

❑ 1.3 Establish feedback mechanism

S C T

- ❑ Provide a telephone number, link, or email address that routes to a help desk or support Point of Contact
- ❑ Validate that the feedback mechanism is mentioned in the Go-Live communications and training content

🔔 *Keep communication bidirectional and establish clear point(s) of contact for feedback.*

🔔 *Consider protocols for identifying, routing, and resolving issues that impact clinical care.*

❑ 1.4 Create Go-Live checklists

S C T

- ❑ Establish a Go-Live readiness checklist
- ❑ Establish a post-Go-Live assessment checklist

🔔 *A Go-Live readiness checklist should encompass completion of testing scripts, training, communication plans, production connection testing, auditing testing, and a go/no-go checkpoint.*

🔔 *A post-Go-Live assessment checklist should encompass workflow and system performance impacts, data accuracies, and end-user usability feedback.*

❑ 1.5 Decide Go vs. No-Go

S C T

- ❑ If decision is No-Go, create and disseminate communication to end users and develop an action plan to address barriers to Go-Live

NEXT PAGE >

05. GO-LIVE:

Step 2: **Migrate into Production & Turn on CDS**

❑ 2.1 Test production instance

S C T

- ❑ Turn on CDS
- ❑ Verify that the CDS does not affect other functionalities within the EHR
- ❑ Validate that CDS is functioning as anticipated

Implementers can use either test queries or monitor live queries.

❑ 2.2 Monitor activity on day of Go-Live

S C T

- ❑ Document technical issues and/or enhancement requests from end users
- ❑ Meet with project team members to address issues as needed
- ❑ Conduct post-Go-Live assessment, using the checklist created in Go-Live Step 1.4

NEXT PAGE >

05. GO-LIVE:

Step 3: **Provide Go-Live Support to End Users**

❑ 3.1 Disseminate communication

S C T

- ❑ Send communication to end users when integration is live
- ❑ Send communication to end users if issues arise

❑ 3.2 Provide in-person support

S C T

- ❑ Designate champions or other staff to be available to assist users at care sites
- ❑ Maintain communication between implementation team and on-site support designees

❑ 3.3 Implement & monitor end-user feedback mechanism

S C T

- ❑ Prioritize and develop a plan to address issues
- ❑ Communicate with end users submitting feedback, indicating the disposition of the issue

Use a rapid response process for issues with a significant impact on CDS.

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6. Ongoing Activities

Like any technical implementation, CDS requires ongoing maintenance, which often includes resolving technical issues, implementing upgrades and enhancements, developing routine testing protocols and auditing. *Ongoing Activities is divided into three subsections: Technical Maintenance, Usage Auditing, and Reporting. These do not necessarily happen sequentially.*

Technical Maintenance

Technical maintenance is necessary to ensure CDS remains functional and matures to address end-user needs.

01

Establish Responsibilities & Protocols for Ongoing Project Team Support

02

Resolve Technical Issues & Implement Enhancements

06. TECHNICAL MAINTENANCE:

Step 1: **Establish Responsibilities & Protocols for Ongoing Project Team Support**

❑ 1.1 Establish expectations, requirements, and roles

S C T

- ❑ Document the roles, processes, and service level expectations for technical maintenance
- ❑ Review issue logs to identify recurring issues that may require a non-technical solution, e.g., training

❑ 1.2 Determine meeting/reconvening expectations

S C T

- ❑ Establish and implement a meeting schedule

Determine if CDS related issues can be addressed as part of existing meeting agendas.

❑ 1.3 Re-visit support protocols, including error tracking and assignment of responsibilities

S C T

- ❑ Conduct periodic assessments to determine if technical support meets user requirements

❑ 1.4 Manage user access

S **C** T

- ❑ Determine if CDS requires specific user access management, e.g., may be incorporated into EHR access
- ❑ Define roles and responsibilities for user access management
- ❑ Develop and communicate protocols for requesting or changing user access

If possible, collaborate with human resources and automate user on-boarding and old user removal.

❑ 1.5 Train new users as needed

S C **T**

- ❑ Determine roles and responsibilities for ongoing training
- ❑ Develop mechanisms to monitor completion of training
- ❑ Periodically assess and update training methods and content

NEXT PAGE >

06. TECHNICAL MAINTENANCE:

Step 2: **Resolve Technical Issues & Implement Enhancements**

❑ 2.1 Determine roles/responsibilities

S C T

- ❑ Establish contingency protocols for maintenance and downtime of different systems

❑ 2.2 Identify, track, and address technical issues

S C T

- ❑ Develop solution(s) to technical issues (see Development)
- ❑ Test the solution(s) (see Testing)
- ❑ Deploy the solution(s) (see Go-Live)
- ❑ Update documentation

Validate technical issue fixes with end users, as needed.

❑ 2.3 Identify and address enhancement requests

S C T

- ❑ Implement a process for tracking enhancement requests
- ❑ Define and implement a process for prioritization of enhancements
- ❑ Develop enhancements (see Development)
- ❑ Test the enhancements (see Testing)
- ❑ Deploy the enhancements (see Go-Live)
- ❑ Update documentation

Engage end users throughout this step.

Periodically validate that the CDS logic is consistent with current clinical guidance.

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6. Ongoing Activities

Like any technical implementation, CDS requires ongoing maintenance, which often includes resolving technical issues, implementing upgrades and enhancements, developing routine testing protocols and auditing. *Ongoing Activities is divided into three subsections: Technical Maintenance, Usage Auditing, and Reporting. These do not necessarily happen sequentially.*

Usage Auditing

Auditing is the action of gathering and analyzing data on the use of a system. Usage auditing determines if the CDS aligns with clinician practice and needs.

06. USAGE AUDITING:

Step 1: Establish Auditing Frequency & Methods

In the context of CDS, auditing analyzes data that indicates whether CDS is used as intended and is consistent with policy and/or regulatory requirements.

❑ 1.1 Determine purpose and scope of audits

S C T

- ❑ Identify the focus and audience for the audit findings
- ❑ Define the metrics to be applied in the audit
- ❑ Determine what data to use for audit
- ❑ Review audit log to ensure data are available

Keep the focus of the audit on opportunities for improvement rather than solely on compliance.

Include assessments of unintended consequences or other factors that indicate the need to modify the CDS; e.g., CDS may be too interruptive or trigger unnecessary alerts for unintended patient groups, such as patients in hospice care or with active cancer.

Reference evidence-based practices when defining metrics, if available.

❑ 1.2 Determine audit process and frequency

S C T

- ❑ Determine roles and responsibilities for audits
- ❑ Determine frequency of audits

Conducting routine audits can provide data to assess performance over time.

NEXT PAGE >

06. USAGE AUDITING:

Step 2: **Obtain & Analyze Audit Log/Report**

❑ 2.1 Compile and validate audit data

S C T

- ❑ Extract data from source systems
- ❑ Conduct data validation checks, e.g., codes, ranges, format
- ❑ Merge data if more than one source file will be used
- ❑ Validate contents and format of the merged file

❑ 2.2 Analyze data

S C T

- ❑ Apply calculations and generate reports
- ❑ Prepare findings and recommendations

Have staff familiar with clinical processes review the data for anomalies.

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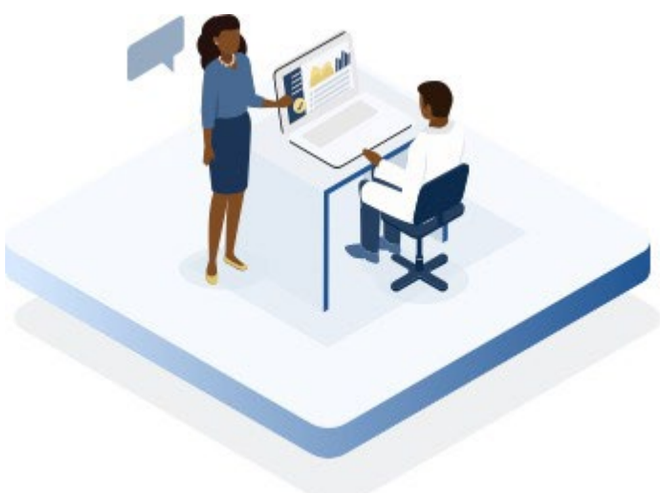
06. USAGE AUDITING:

Step 3: **Address Audit Findings**



❑ 3.1 Address variation in CDS usage as needed

S C T

- ❑ Clarify performance targets
- ❑ Analyze causes of below target performance
- ❑ Develop and implement actions to improve performance

Clinical staff should participate in determining performance targets.

Where available and applicable, external performance standards should be applied, e.g., standards from clinical societies.

❑ 3.2 Determine if and what CDS modifications are needed

S C T

- ❑ Evaluate whether CDS usage aligns with expectations
- ❑ Assess whether the CDS is providing value to patient care delivery
- ❑ Determine any CDS modifications needed to address identified issues

❑ 3.3 Iterate the usage auditing process as needed

S C T

- ❑ Assess the frequency and approach to auditing for future audits
- ❑ Conduct and iterate audit as needed

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6. Ongoing Activities

Like any technical implementation, CDS requires ongoing maintenance, which often includes resolving technical issues, implementing upgrades and enhancements, developing routine testing protocols and auditing.
Ongoing Activities is divided into three subsections: Technical Maintenance, Usage Auditing, and Reporting. These do not necessarily happen sequentially.

Reporting

Reporting determines the impact of CDS and points to new directions for improvement in areas such as quality and clinical relevance of the CDS.

**Reports may be defined for a broad range of users, including, but not limited to, administrators, end users, and quality improvement staff.*

06. REPORTING:

Step 1: Establish Reporting Frequency & Methods

Reporting, in the context of CDS, analyzes data that indicate whether CDS impacted patient care processes and outcomes.

❑ 1.1 Determine purpose and scope of reports

S C T

- ❑ Identify the focus and audience for the reports
- ❑ Define the data and calculations to be presented in the report
- ❑ Determine the source systems for the report data

Use report mock-ups to validate the contents and calculations to be used in the report.

Be clear on the rationale for data to be included in the report.

Consider using reports to support evaluation.

Dashboards may serve as a helpful tool for monitoring performance on quality improvement measures.

❑ 1.2 Determine reporting processes and frequency

S C T

- ❑ Determine roles and responsibilities for creating and using reports
- ❑ Determine frequency of reports

NEXT PAGE >

06. REPORTING:

Step 2: **Analyze Reporting Data & Address Issues**

❑ 2.1 Extract and validate data

S C T

- ❑ Extract data from source systems
- ❑ Conduct data validation checks, e.g., codes, ranges, format
- ❑ Merge data if more than one source file will be used
- ❑ Validate contents and format of the merged file

❑ 2.2 Analyze report data

S C T

- ❑ Determine appropriate analytical and statistical tools for analyzing data
- ❑ Apply calculations and generate reports
- ❑ Prepare findings and recommendations

Clinician input may be needed to contextualize the findings and validate the recommendations.

Explore all possible reasons for findings, including data-related issues, organizational changes, etc.

❑ 2.3 Address results of the analysis

S C T

- ❑ Determine if changes to clinical practice or processes should be implemented
- ❑ Determine roles and responsibilities for recommended actions identified in Step 2.2
- ❑ Plan and implement changes

References to peer reviewed literature and clinical standards may support decisions on any actions.

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Resources

Glossary of Acronyms

- **CDC**: Centers for Disease Control and Prevention
- **CDS**: Clinical Decision Support
- **CMO**: Chief Medical Officer
- **CMIO**: Chief Medical Information Officer
- **CTO**: Chief Technology Officer
- **DO**: Doctor of Osteopathic Medicine
- **EHR**: Electronic Health Record
- **IT**: Information Technology
- **MD**: Doctor of Medicine
- **MOU**: Memorandum of Understanding
- **NP**: Nurse Practitioner
- **ONC**: Office of the National Coordinator for Health Information Technology
- **PA**: Physician Assistant
- **PDMP**: Prescription Drug Monitoring Program
- **RN**: Registered Nurse

The following abbreviations are used to indicate actor involvement:

PDMP-EHR Integration:

- **P**: PDMP (PDMP administrators and staff)
- **H**: Health care system (administrative staff and clinicians)
- **V**: Vendors (EHR and integration vendors)

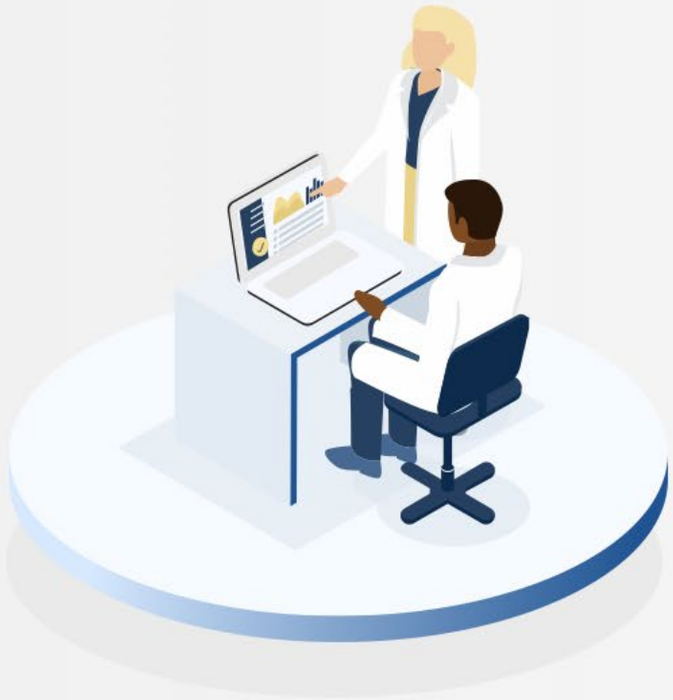
Clinical Decision Support:

- **S**: Project staff (project managers, researchers, and business analysts)
- **C**: Clinician (MDs, DOs, PA, NPs, and RNs)
- **T**: Technical professionals (internal technical staff, vendors, and contractors)

Resources

PDMP-EHR Integration Toolkit Items

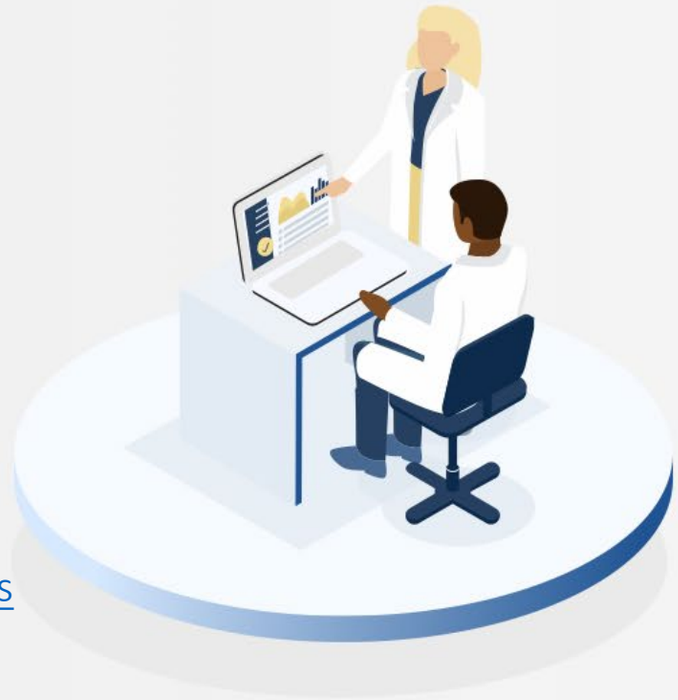
- Auditing Guidance
- External Appendix
- Integration Taxonomy
- Memorandum of Understanding (MOU) Guidance
- Testing Guidance
- Testing Template
- Training Guidance



Resources

Helpful Links

- 2016 CDC Guideline for Prescribing Opioids for Chronic Pain
- CDC Implementing Opioid Prescribing Guideline Video
- CDC Opioid Prescribing Handbook for Healthcare Executives
- CDC Quality Improvement (QI) and Care Coordination
- FHIR Opioid Prescribing Support Implementation Guide
- ONC Clinical Decision Support Overview
- Pew Charitable Trusts, Prescription Drug Monitoring Programs
- PDMP Training and Assistance Center (TTAC)



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