



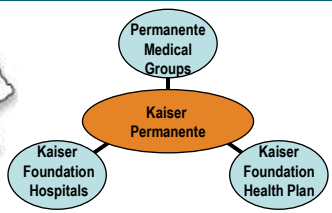
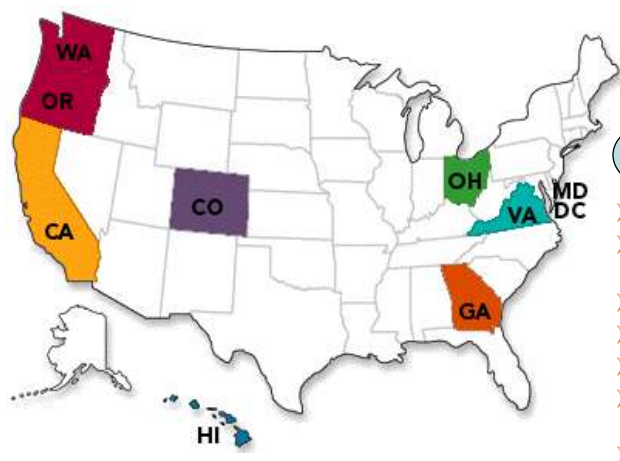
Interactive Web Page for Embedding Guidance In the Kaiser Permanente Electronic Health Record

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care management | institute



Kaiser Permanente: Largest Non-Profit Health Care Program in the United States



- Founded in 1945
- 8 regions in 9 states and District of Columbia
- 8.6 million members (as of 12/09)
- 15,129 physicians (as of 12/09)
- 164,098 employees (as of 12/09)
- KP Care Management Institute (CMI)
- KP National Guideline Program (NGP)



Overview

➤ Background:

- Guidelines must be implemented to impact health outcomes
- Guidance can be embedded in interactive web pages
- Linking interactive web pages to electronic health records (EHRs) has significant potential for impact
 - Automated individual-level data transfer
 - Meta-tagged links
 - Place Orders from a web page into an EHR

Learning Objectives

➤ After this session, attendees will be able to:

- Describe elements of a guideline web page that can address the needs of clinical users at the point of care
- List three levels of potential interactivity for guideline web pages
- Explore the pros and cons of interactive web pages for embedding guidance in their own systems

Lipid Treatment Goals for Secondary Prevention

As LDL-C treatment goal of < 100 mg/dL is recommended for reducing rates of coronary events in patients with established atherosclerotic disease.
 Reducing LDL-C is the primary focus of treatment. Only after the LDL-C is at goal should attention be turned to managing triglycerides (TG) and HDL-C, except when TG are ≥ 200 mg/dL. (See [Thyridin Level](#) section, LDL-C)

A more aggressive LDL-C goal of < 70 mg/dL is an option. With the increasing use of more potent statins, there are now many randomized controlled trials where the treatment group has achieved LDL-C levels substantially below 100 mg/dL. Several have obtained levels below 70 mg/dL. In all cases, the lower LDL-C group had significantly lower atherosclerotic events. Most of these trials, however, were not designed to evaluate the LDL-C level obtained and it is therefore unknown whether the benefit was derived from the LDL-C reduction, the intensity of the statin, other factors, or a combination of these. The Guideline Development team therefore recommends the goal of LDL-C < 70 as an option. Many authorities, however, now recommend the < 70 mg/dL goal especially in patients at very high risk.

When to intensify treatment in people with an LDL-C < 100 mg/dL should be a shared decision with the patient, taking into consideration factors such as overall CVD risk, TG status, HDL-C, non-HDL cholesterol, medication tolerance, cost and patient preference.

Choice of Drug - Primary and Secondary Prevention

Before initiating drug treatment, rule out and, if present, correct any secondary causes of dyslipidemia such as poor glycemic control, hypothyroidism, renal or liver disease, or medications.

Because of its proven effectiveness in event reduction, safety and cost, atorvastatin is the preferred first line statin for both primary and secondary prevention patients. Comparisons of individual lipid lowering strategies (statins, niacin, fibrate and niacin or, placebo, have shown that statins are the most effective for reducing CVD events. Given that all statins appear to be efficacious at lowering LDL-C, the choice of statin should be based on both cost and evidence of direct benefit on important health outcomes (e.g., CVD morbidity and mortality). The initiation doses in [Table 2](#) were chosen to achieve target LDL-C, up to the maximum dose of 80 mg daily. See [Medication Information](#) section for dosing and safety recommendations for the use of lipid modifying drugs.

Lipid Management in Acute Coronary Syndromes

In patients with acute coronary syndromes:

- Statins are recommended regardless of baseline LDL-C.
- If baseline lipid values are desired, a 12-hour fasting lipid panel is recommended as soon as possible, but definitely within 48 hours after hospital admission.
- If a fasting lipid panel is not possible a non-fasting lipid panel is recommended as soon as possible after hospital admission.
- Repeat the lipid panel two months after hospital discharge.

The intent of acute events (see lower LDL-C goals for up to 2 to 3 months). Evidence suggests that people with ACS should receive immediate aggressive statin lipid lowering treatment. Emphasize the importance of lifestyle modifications and adherence to lipid lowering medications.

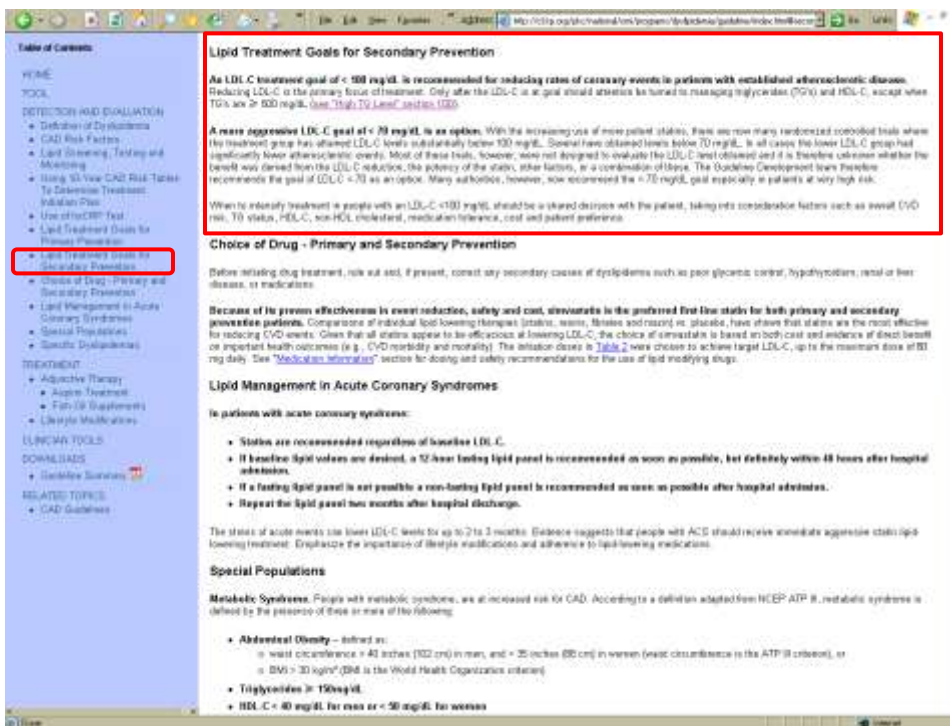
Special Populations

Metabolic Syndrome. People with metabolic syndrome are at increased risk for CAD. According to a definition adapted from NCEP ATP III, metabolic syndrome is defined by the presence of three or more of the following:

- **Abdominal Obesity** – defined as:
 - waist circumference ≥ 40 inches (102 cm) in men, and ≥ 35 inches (89 cm) in women (waist circumference is the ATP III criterion), or
 - BMI ≥ 30 kg/m² (BMI is the World Health Organization's criterion)
- **Triglycerides** ≥ 150 mg/dL
- **HDL-C** < 40 mg/dL for men or < 50 mg/dL for women

Dyslipidemia Guideline Web Portal Structured to Support Clinical Decision-Making

People with:	Baseline LDL-C (mg/dL)	Lifestyle Modifications are Recommended in ALL Patients Initiate Treatment with a Daily Evening Dose of:	Target LDL-C (mg/dL)	See Corresponding Sections
Acute Coronary Syndrome	Any	Simvastatin 40 mg	< 100 OPTIONAL < 70	<ul style="list-style-type: none"> • Lipid Treatment Goals for Secondary Prevention
Clinical Risk Categories <ul style="list-style-type: none"> • CAD or ischemic Stroke/TIA • Diabetes Mellitus (DM) age ≥ 40 • AAA or PAD • Carotid artery stenosis ($> 50\%$) 	≥ 160	Simvastatin 80 mg	Treatment Targets = 100 OPTIONAL = 70	Hyperlinks to Details <ul style="list-style-type: none"> • Lipid Treatment Goals for Secondary Prevention • Lipid Treatment Goals for Primary Prevention • Choice of Drug - Primary and Secondary Prevention • Quickly Assess Age 40 or Older
	< 160	Simvastatin 40 mg		
	<ul style="list-style-type: none"> • Framingham 10-year risk/ $\geq 20\%$ • DM age < 40 WITH ≥ 1 risk factor* 	≥ 160 Simvastatin 80 mg 100 – 159 Simvastatin 40 mg < 100 Simvastatin 40 mg OPTIONAL (for Framingham 10-year risk $> 20\%$ NCCP APP 2007/2008a)		
DM age < 40 WITHOUT risk factors*	≥ 160	Simvastatin 80 mg	Pop-up Definitions <p>*It is OPTIONAL to initiate statin therapy in DM and women ≥ 40 years old with noCAD. ≥ 2mg on 2 days, treat with simvastatin 40 mg. The decision is based on cost effectiveness of using statin to select patients for non-lipid lowering treatment is not known.</p>	<ul style="list-style-type: none"> • Lipid Treatment Goals for Primary Prevention • Choice of Drug - Primary and Secondary Prevention • Diabetes Mellitus Age 20 or Under
	120 – 159	Simvastatin 40 mg		
	< 100	Simvastatin 40 mg OPTIONAL		
CKD Stage 4 or 5 (GFR < 30 mL/min/1.73 m² or)	≥ 160	Simvastatin 20 mg	= 100	<ul style="list-style-type: none"> • Chronic Kidney Disease
	≥ 100	Simvastatin 20 mg OPTIONAL		
	120 – 219	Simvastatin 40 mg		
Framingham 10-year risk/ 10–22%	≥ 220	Simvastatin 80 mg	< 120	<ul style="list-style-type: none"> • Using 10-Year CAD Risk Tables To Determine Treatment/Prevention Plan • Use of hsCRP Test • Lipid Treatment Goals for Primary Prevention • Choice of Drug - Primary and Secondary Prevention
	120 – 219	Simvastatin 40 mg		
	< 120	statin OPTIONAL*		
Framingham 10-year risk/ < 10%	≥ 220	Simvastatin 80 mg	= 100	<ul style="list-style-type: none"> • Using 10-Year CAD Risk Tables To Determine Treatment/Prevention Plan • Use of hsCRP Test • Lipid Treatment Goals for Primary Prevention
	120–219	Simvastatin 40 mg		
	100–199 WITH Five of previous CAD* and	Simvastatin 40 mg		



Logic-Encoded Web Pages, Data Transfer, & Meta-Tagged Links

- **Logic-encoded web pages**
 - Require manual data entry
 - Return individualized recommendations
- **Automated individual-level data transfer**
 - Pass detailed information from EHR to web servers
- **Meta-tagged links**
 - Pass Orders from web servers to EHR
 - “Actionable” recommendations & graphic/text algorithms
- **Combination allows individualized, actionable guidance, seamlessly embedded in an EHR**

10-Year CAD **User Enters Data**

Age: years **Arteriosclerotic CVD** Yes No

Gender: Female Male **Diabetes** Yes No

Total Cholesterol: mg/dL **Microalbuminuria** Yes No

HDL Cholesterol: mg/dL **Duration of DM ≥ 10 yrs** Yes No

Systolic Blood Pressure: mmHg **LDL Cholesterol** mg/dL

Diastolic Blood Pressure: mmHg **On Statins** Yes No

On BP Medications: Yes No **GFR < 30** Yes No

Smoker: Yes No **His of Premature CAD** Yes No

10-Year CAD **Data Passed from EHR to Web Server**

Age: years Yes No

Gender: Female Male Yes No

Total Cholesterol: mg/dL Yes No

HDL Cholesterol: mg/dL Yes No

Systolic Blood Pressure: mmHg Yes No

Diastolic Blood Pressure: mmHg Yes No

On BP Medications: Yes No Yes No

Smoker: Yes No Yes No

10-Year CAD Risk is 16%.

Aspirin 81 mg daily Optional (10-Year CAD Risk: 10-20%)

LDL-C Goal < 130

Simvastatin 40mg daily Recommended

Individualized Recommendations Returned

Corresponding Sections in Guidelines

- Classical Risk, Primary and Secondary Prevention
- Low Intensity Goals for Primary Prevention
- Use of statin drug
- Guidelines for CAD: Risk Stratification, Determination Treatment Intensity, Plan

Hyperlinks to Details

Main 55 - 59 Years Old

Data provided is recommended for all people with CAD, Diabetes Mellitus (age 40 or older), Ischemic Stroke/TIA, AAA, PAD, or Elevated Aortic Stenosis (> 60%), regardless of baseline LDL-C, and for all people with baseline LDL-C ≥ 190 mg/dL, regardless of risk factors.



Data Passed from EHR to Web Server

10-Year CAD Risk is 16%.
Aspirin 81 mg daily Optional (10-Year CAD Risk: 10-20%)
LDL-C Goal < 130
Simvastatin 40mg daily Recommended

Individualized Recommendations Returned

Meta-Tagged Links Return Orders in EHR

Combination of:
• Logic-Encoded Web Pages
• Automated Individual-Level Data Transfer
• Meta-Tagged Links
Allows individualized, actionable guidance, seamlessly embedded in an EHR

Interactive Web Page Conclusions

- Interactive web pages can support the needs of clinical users at the point of care
 - Present actionable guidance
 - Provide entry point into larger guideline document
- Data transfer from an EHR to a web page can automate the presentation of guidance
- Functionality exists to turn interactive web pages into individualized, actionable guidance in an EHR
- Decision support logic can be encoded in the web pages, rather than built into EHR tools

Embedding Guidance in the Kaiser Permanente EHR



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