



Conceptualization of the Guidelines Part 1

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Outline

- From guidelines to formal statements (10 min)
- Guideline overview
- Exercise (40 minutes)
- Discussion (15 minutes)
- Summary (hints and tricks) (10 minutes)



Goals for this session

- Activity: Learn how to dissect guideline text into a formal statements that can be coded within a knowledge base to generate patient specific recommendations.
- Product of session: A selection of formal statements to be encoded



Our context - from the last session

- **Who:** Primary care clinicians – includes doctors, physician assistants and nurses
- **Where:** VA environment – outpatient setting in primary care
- **When:** Shortly before seeing patient, during visit or after scheduled appointments
- **What (kind of DSS):** A pop-up advisory window



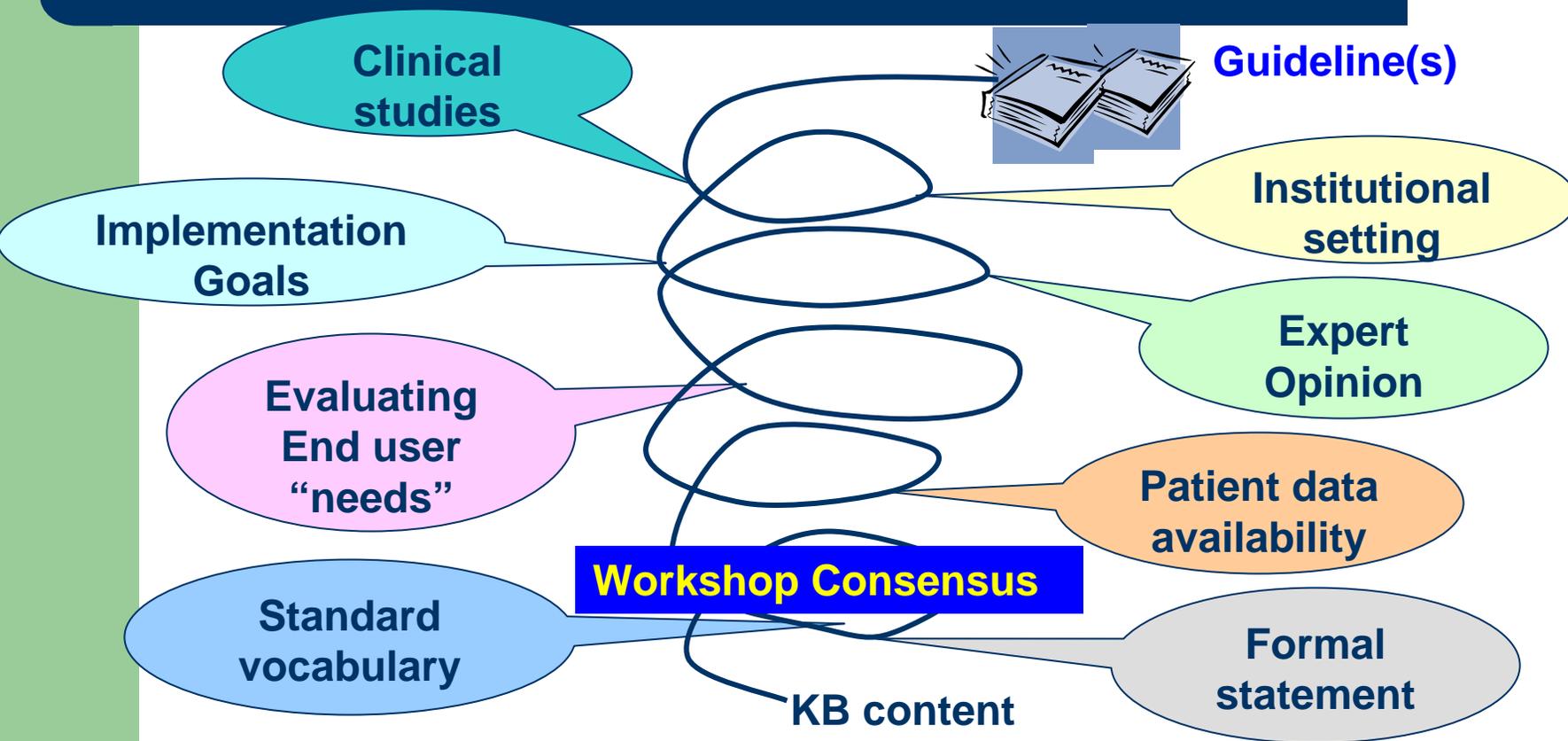


Big Picture- Basic Steps to Operationalizing our Guideline

- Achieve content consensus
- Translate the narrative guideline to encodable bits and bytes
- Identify requirements for concept and guideline model
- Create management algorithm
- Define method(s) to share encoded content
- Encode!



Defining Knowledge Content





Reality

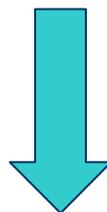
This is a fluid, dynamic
process

And your targets will
change



Steps to Developing Formal Statements for Knowledge Base

Define statements and concepts
Clarifying statements
Refining knowledge within statements
Qualifying statements



Formal statements (where we are going)



Example in our context

- ATP III guideline states:
 - “ For most patients with coronary heart disease and a baseline LDL cholesterol \geq 130 mg/dL, an LDL lowering drug will be required to achieve an LDL cholesterol of $<$ 100 mg/dL.”



What are the clinical concepts?

“ For **most patients** with **coronary heart disease** and a **baseline LDL cholesterol ≥ 130 mg/dL**, an **LDL lowering drug** will be required to achieve an **LDL cholesterol of < 100 mg/dL.**”



Define the concepts and the statements

- “ For most patients with coronary heart disease and a baseline LDL cholesterol...”
 - Coronary heart disease
 - What does it mean for your knowledge base?
 - Most likely – standard vocabularies like ICD9 or Snomed
 - ICD9 = (411.1, 411.8, 411.89, 412, 414.0, 414.00, 414.01, 414.02, 414.03, 414.04, 414.05, 414.11, 414.8, 414.9)
 - LDL Cholesterol
 - Standard Vocabulary: LOINC (lab codes)



Clarify your concepts and statements

- What does the guideline mean with the statement “**For most patients**”...?
- What do you want it to mean?
 - All?
 - Specific sub-group depending on severity?
 - Clinician discretion?



Refine your statements and concepts

- “..a baseline of LDL cholesterol \geq 130mg/dL, an **LDL lowering drug** will be”
 - Which drugs? (statins, nicotinic acid?)
 - Create preferences (based on formulary)
 - Add dose suggestions or ranges
- The granularity (or specific amount of detail) depends on what your purpose is



Specify missing information in the statements

- Important missing concept in statement (assumed knowledge)
- “..a baseline of LDL cholesterol \geq 130mg/dL, an **LDL lowering drug** will be required to achieve an LDL cholesterol <100 mg/dL”
- What is it?

No adverse drug reactions



Finally: the formal statement

- What we started with:

“ For most patients with coronary heart disease and a baseline LDL cholesterol ≥ 130 mg/dL, an LDL lowering drug will be required to achieve an LDL cholesterol of < 100 mg/dL.”

- What we are aiming in the Knowledge base:

IF ((LDL cholesterol (LOINC code) ≥ 130 AND (Presence of CHD(ICD9 codes)) and (absence of allergy to statin) THEN recommend (Statin).



Workbook exercises

- Please get into groups of 3 or 4
- Choose a recorder (keep in mind that everyone might want to take notes)
- Choose a speaker
- We'll look at 2 sections at a time.
- Hint: Think in terms of If..then statements and suspect all words that aren't prepositions



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ATP III “Workshop Consensus”

- **Goals of CDSS**

- Increase % patients screened
- Increase % patients that meet LDL goal (recommend appropriate drug therapy)

- **References:**

- NCEP ATP III
- VA Dyslipidemia Guideline

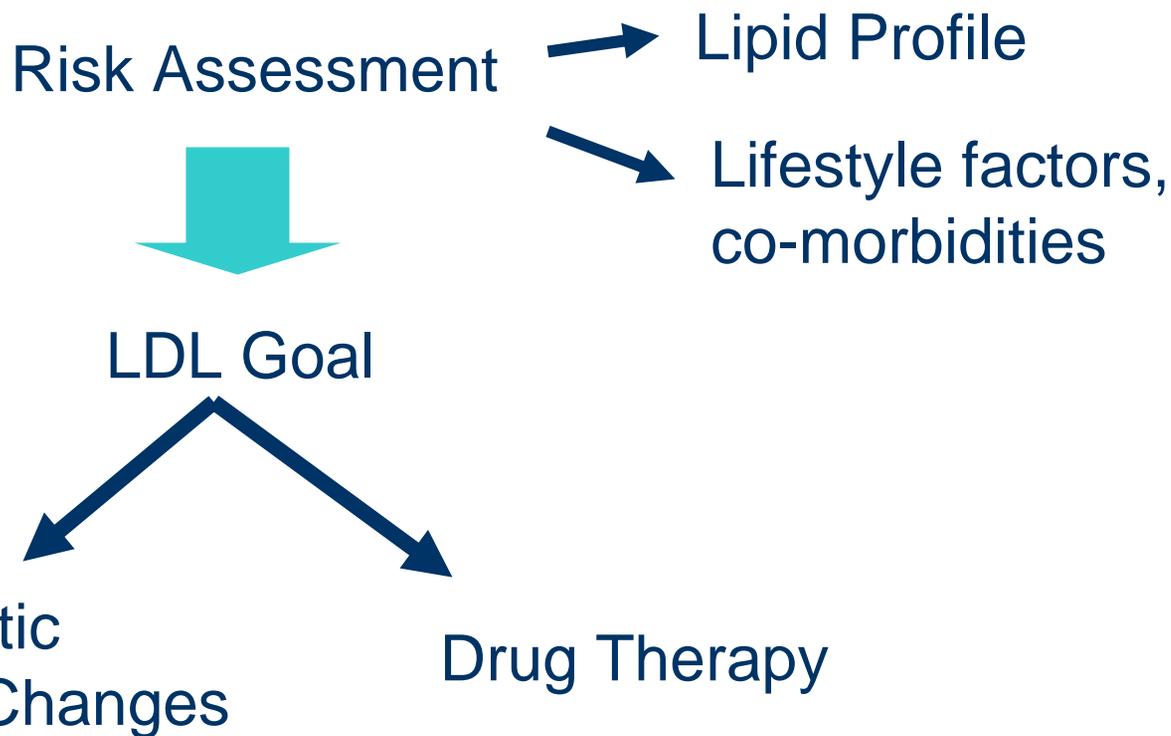


Workshop Consensus

- Who should be screened
- Risk category definition
- Guideline goals (LDL)
- Threshold for drug therapy (LDL)
- Recommended drugs

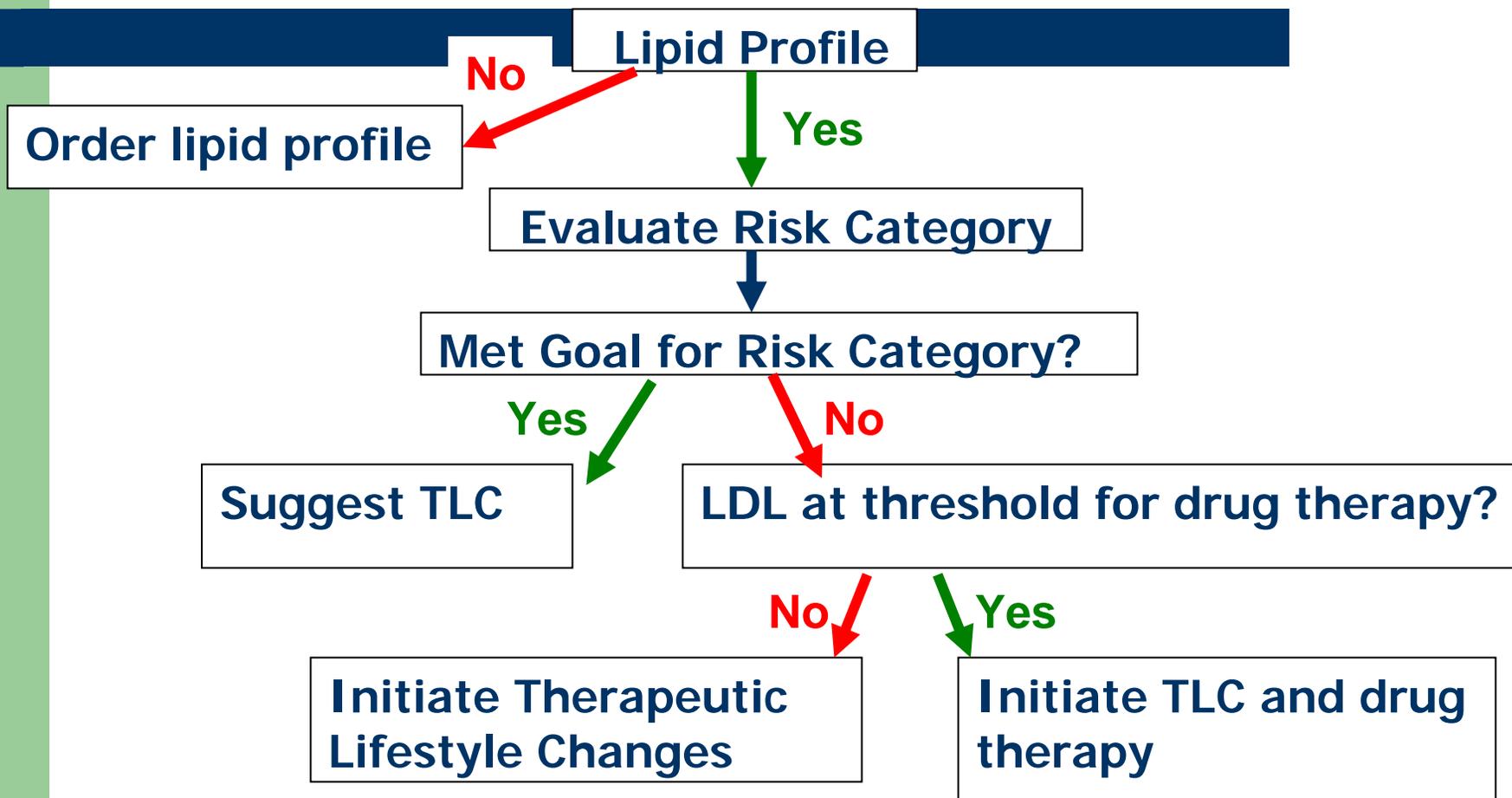


ATP III: Broad Concepts



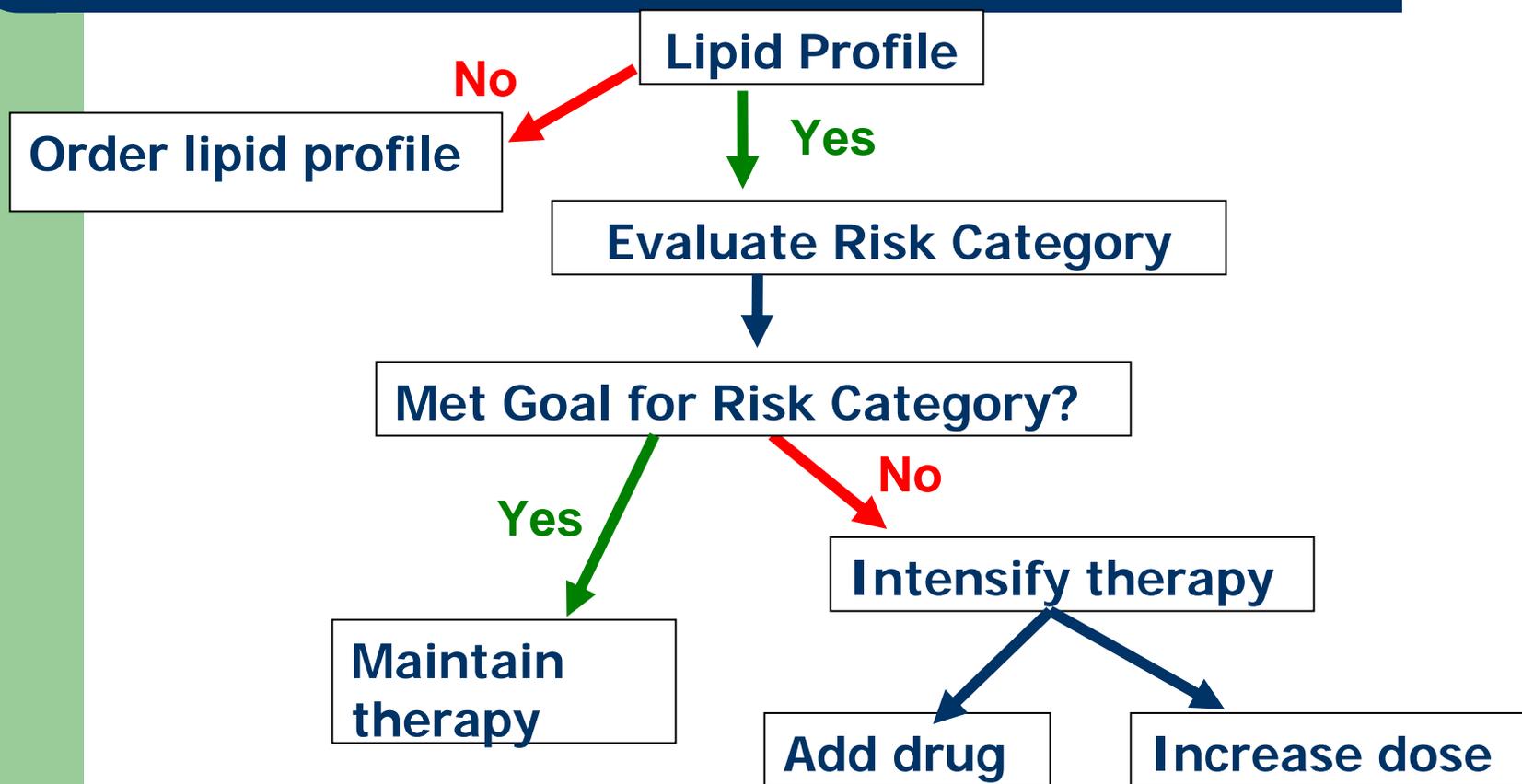


Screening and Initiation on Drug therapy





Maintenance





I. Exercises: Target population

- Define target population: The guidelines are written for adults over 20. Pregnancy is excluded because 1) it isn't mentioned in the guideline and 2) there may be different guidelines for hyperlipidemia in pregnancy
- Formal Statement: (Age ≥ 20 years and if sex = F, then not pregnant)



II. Exercises: Screening

- Define screening test: screen for HDL, LDL, total cholesterol, and triglycerides
- Actions
 - If no lipid profile, then order profile
 - If most recent profile is old (> 5 years) then order profile— define for different conditions (i.e., heart disease or diabetes?)



Screening – formal statement

If absence of (HDL or LDL or TG or TC) then order lipid profile

If ((HDL value \geq 5 years) or (LDL \geq 5 years), or (TG \geq 5 years) or (Total Cholesterol \geq 5 years)) then order lipid profile



III. Exercises: Risk Factors

- A. What ways exist to define risk? How are they distinguished?
 - Framingham (looks at age, total cholesterol, smoking status, HDL levels, and Systolic BP)
 - Major Risk Factors (Smoking, HBP, Low HDL, Family history, Age)
 - CHD/CHD equivalent – (clinical CHD, peripheral arterial disease, abdominal aortic aneurysm, carotid artery disease, diabetes)



Exercises: Risk factor – Smoking

- **Definition:** Have to think about what qualifies as current smoking or if you care about smoking history. The guidelines don't specify. Could ask patient if they've smoked >5 cigs per day for more than 6 months
- **Formal definition:** IF (ICD9 code = 305.1 or 305.10 or 305.11 or 305.12 or 305.13) then tobacco use is present.



Risk Factor: Age

- **Definition:** Men ≥ 45 or women ≥ 55
- **Formal definition:** (male and age ≥ 45) or (female and ≥ 55) then
AGE risk factor = TRUE



Risk Factor: Hypertension

- **Definition:** BP \geq 140/90 mmHG or on antihypertensive meds. Things to think about 1.) Should we take BP measures to define HBP? 2) Should we take the most recent HBP? 3) Fall back on ICD codes?
- **Formal definition:** Hypertension exists if (presence of (ICD codes) or (hypertension meds) then hypertension = TRUE



Risk Factor: Low HDL cholesterol

- **Definition:** Low HDL is defined as < 40 mg/dL
- **Formal definition:** HDL < 40 mg/dL then low HDL = TRUE



Risk Factor: Family history

- **Definition:** Defined as CHD (doesn't mention CHD risk equivalent) in male first degree relative <55 years; or female first degree relative <65 years). Note: we can obtain this by asking patient.
- **Formal definition:** if (presence of CHD and male relative and less than <55) or (presence of CHD and female relative and < 65) then FAMILY HISTORY = TRUE



IV. Exercises: Risk categories (putting the risk factors together)

- Formal definition for 0-1 risk category
“low risk”:

IF patient has:

- (COUNT OF: risk factors is ≤ 1)
AND (NOT CHD /CHD equivalent)

THEN

0-1 risk category evaluates to TRUE



IV. Exercises: Risk categories (putting the risk factors together)

- Formal definition for CHD/CHD risk equivalent “high risk”:

IF patient has:

- Clinical CHD **OR**
- Symptomatic carotid artery disease **OR**
- Peripheral arterial disease **OR**
- Abdominal aortic aneurysm **OR**
- Diabetes

– (all defined by ICD9 codes)

THEN CHD/CHD risk equivalent evaluates to TRUE



V. Exercises: Overall Patient LDL goals

Example 1: IF patient has CHD or CHD risk equivalent then the patient's LDL goal is $< 100\text{mg/dL}$.

*Example 2: IF patient has (COUNT OF: risk factors is ≥ 2) **AND** (NOT CHD /CHD equivalent) **THEN** patient's LDL goal $< 130\text{ mg/dL}$.*

*Example 3: If patient has (COUNT OF: risk factors is ≤ 1) **AND** (NOT CHD /CHD equivalent) **THEN** patient's LDL goal is $< 160\text{mg/dL}$.*



VI. Exercises: Threshold when to consider drug therapy

Example 1: IF patient has CHD or CHD risk equivalent and LDL is $\geq 130\text{mg/dL}$, then consider medication.

*Example 2: If patient has (COUNT OF: risk factors is ≤ 1) **AND** (NOT CHD /CHD equivalent) **AND** LDL is $\geq 190\text{mg/dL}$, then consider medication.*



VII. Exercises: Example of algorithm for patient without lipid profile

**IF Adult \geq 20
and not
pregnant with
absence of
lipid profile**

**Order lipid
profile**



Bonus: Tracking our knowledge content

- One suggestion – an Access database for:
 - tracking of concepts,
 - guideline recommendations
 - tasks
 - status
- We also track location of variables in VISTA, questions to ask experts, whether or not the concept has been approved by experts and various other items.

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Guideline Recommendation

Complete Assessment for every Patient

Related Files:



Guideline Step: B Quality: Poor Grade: C Status: Implement (low priority)

Related Guideline Concepts: (double click to edit) Implement now?

Guideline Concept	comprehensive pain assessment
Comments	Should be within past 12 months Need to identify exact fields;
Category	Procedures

Record: 1 of 1

New Guideline Concept to Add: comprehensive pain assessment

Comments
Very vague recommendation, need to make concrete
HA
"You are initiating opioid therapy with this patient. It is standard practice to document requirements that should be met before initiating opioid therapy. You can use the Pain and Medical Assessment Checklist to enter opioid medication requirement data in the patient record."

Logic:
If Comprehensive Pain Assessment not found within past 12 months, THEN issue recommendation to conduct assessment. Refer to checklist in application



Bonus: Hints, tricks and inspiration

- Documentation can be done in any form – Access, Word, or paper and we can think of advantages and disadvantages of these methods
- This is detail oriented work but gratifying to code such a complex narrative into computable form.



Summary

- Translating guidelines into formalized statements involves dissecting the guideline to make it as clear and computable as possible.
- In reality it involves consensus discussions with your experts.
- The process involves defining, clarifying, refining and specifying missing information about the concepts and formalized statements.