

# Integrating the Doctor Evidence Technology Platform into Kaiser Permanente Guideline Development Processes

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Methodologist, National Guideline Program  
Kaiser Permanente

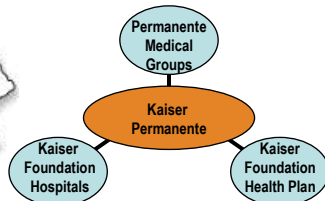
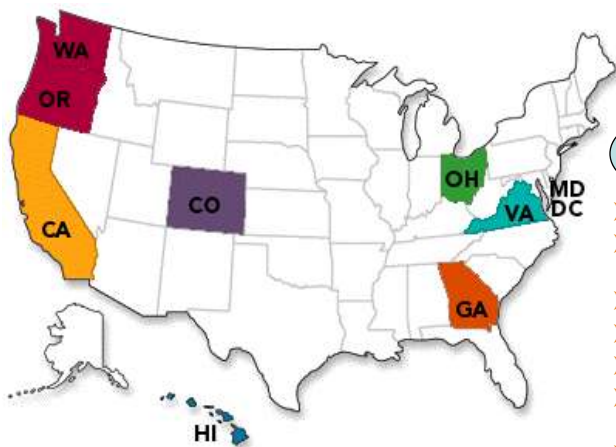
**Paul J. Song, JD, MPH**  
Director, Client Solutions  
Doctor Evidence



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## 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)

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## Doctor Evidence: Overview

- **Founded in 2002**
- **The Doctor Evidence mission is to improve clinical outcomes by finding, delivering, and making relevant and readable medical evidence that enables clinicians to support informed decisions**
- **Doctor Evidence clients include leading healthcare providers, payers, academic institutions & manufacturers**
- **Distinctive competencies are integrating leading EBM methodologies into one unified technology platform**

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## Challenges in Systematic Review (SR) & Clinical Practice Guideline (CPG) Development

- **CPGs not transparent to clinicians**
  - **Evidence basis not always explicitly linked**
  - **Difficult to assess rigor of development**
- **Very resource-intensive**
  - **Infinite needs - Finite resources**
  - **Balance between efficiency versus rigor**
  - **Investment in developing expertise & infrastructure**
  - **Updating SRs & CPGs**
    - Every 2 years?
    - Dynamic updating, based on evidence & impact?
- **A robust technology platform can help address these needs**

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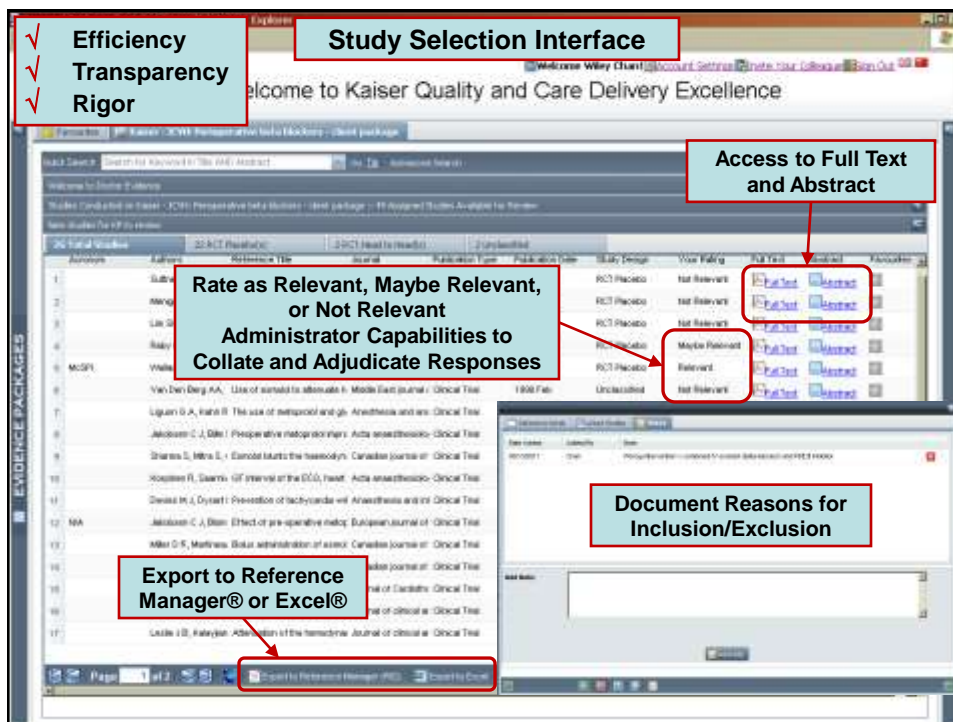
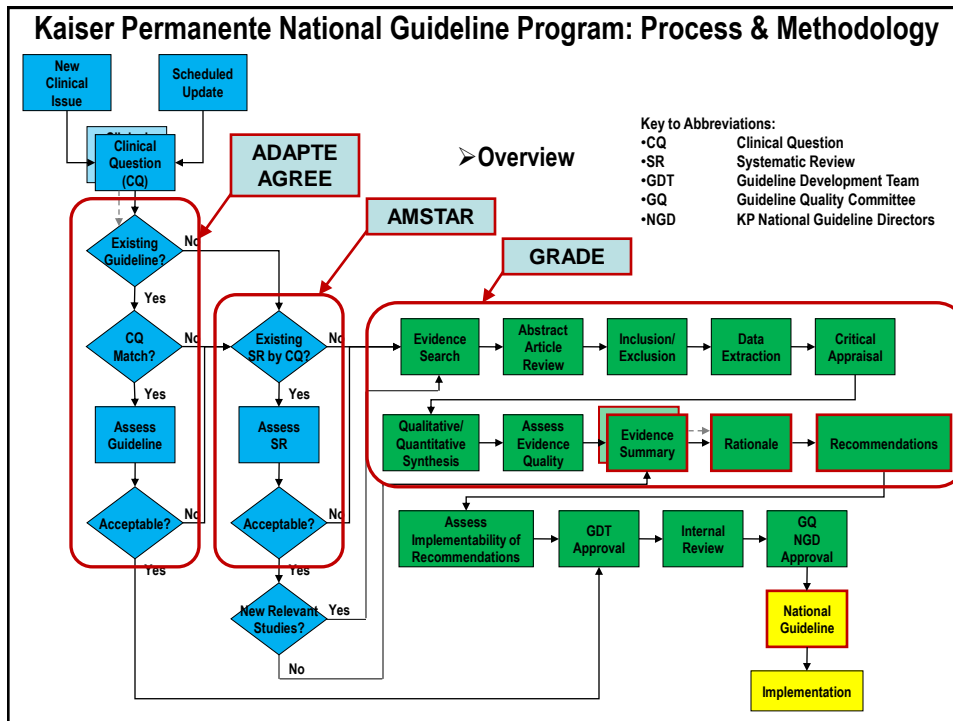
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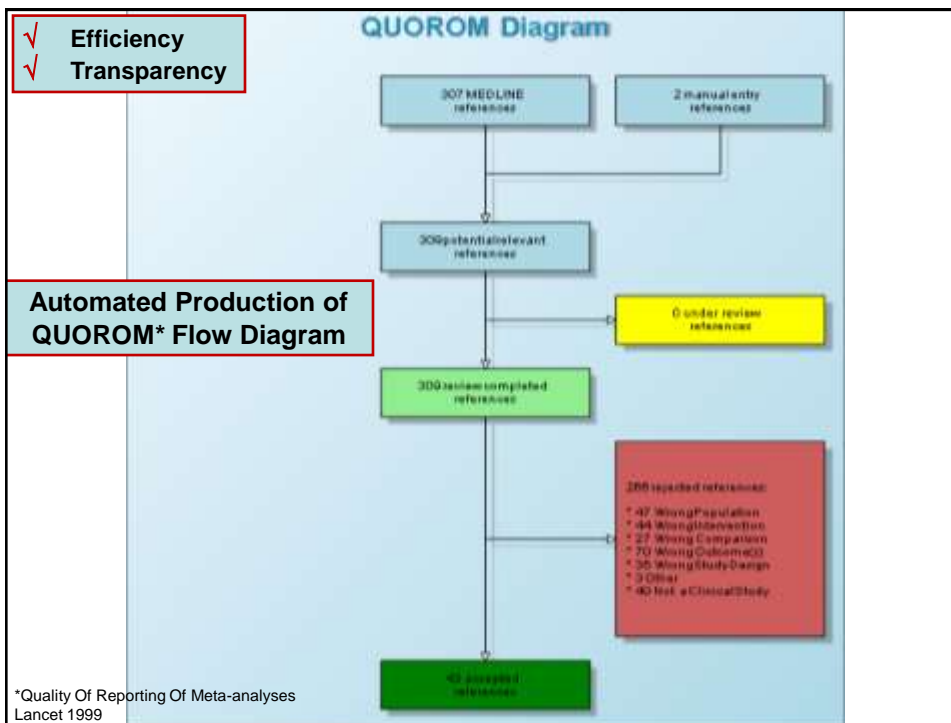
## Learning Objectives

- After this session, attendees will be able to:
  - Describe the challenges in developing SRs and CPGs and how a technology platform can help address them
  - List five factors that are required for success in integrating a technology platform
  - Explore the pros and cons of integrating a technology platform supporting SR and CPG development in their own systems

## Desired Outcomes For Technology Platform

- Improved SR & CPG development processes
  - Efficiency
  - Transparency
  - Rigor
- Devote more energy to CPG implementation
  - Embedding practices into standard workflows
  - Clinical Decision Support in Electronic Health Record
  - Collaborate with performance metric developers
- Collaborate with other SR & CPG developers
  - Share data extractions?





### Data Extraction Template

**Efficiency**  
**Transparency**  
**Rigor**

**Robust quality control**  
Discrepancies with other extractor's entries are flagged in red

Outcome	Value	Quality Control
Bleeding, Stroke, Non-Fatal, 11 years	0.1 %	Flagged in red
Mortality, All-Cause, 11 years	10.8 %	Flagged in red
Mortality, Bleeding, Stroke, 11 years	0.2 %	Flagged in red
Mortality, Cardiovascular, Ischemic, 11 years	0.1 %	Flagged in red
Stroke, Fatal, 11 years	0.4 %	Flagged in red
Mortality, Bleeding, Stroke, 11 years	0.2 %	Flagged in red
Mortality, Bleeding, Myocardial Infarction, 11 years	0.4 %	Flagged in red
Bleeding, Non-Fatal, Any (P) OR Bleeding, Fatal, Any (P) OR Stroke, Fatal, 11 years	0.5 %	Flagged in red

Outcome	Author	Final	Value
✓ Efficiency ✓ Transparency ✓ Rigor Fatal Stroke, 11 years Is Primary Outcome	E. Kim		N <--Use Value
	(1)		Y <--Use Value
GROUP: Placebo OUTCOME: Stroke, Fatal, 11 years Is Primary Outcome	M. Fam		N <--Use Value
	Final		Y <--Use Value
GROUP: Placebo OUTCOME: Stroke, Fatal, 11 years SS	E. Kim		N <--Use Value
	(1)		? <--Use Value
GROUP: Placebo OUTCOME: Stroke, Non- Fatal, 11 years SS	E. Kim		N <--Use Value
	(1)		? <--Use Value
GROUP: Placebo OUTCOME: Stroke, Non- Fatal, 11 years Is Primary Outcome	E. Kim		N <--Use Value
	(1)		Y <--Use Value
GROUP: Placebo OUTCOME: Bleeding, Non- Fatal, Any, 11 years OUTCOME: Bleeding, Fatal, Any, 11 years AM_CustomDefinition	E. Kim		N <--Use Value
	(1)		N <--Use Value

**Data Extraction Adjudication**

Adjudication between discrepant extractions is included in the final template

The risk of an initial event of major hemorrhage was 71% higher in the aspirin group as compared to placebo. Hazard ratio = (# with outcome)/(person time at risk).

The rate of a major hemorrhage requiring admission to hospital was 71% higher in the Aspirin group as compared to the Placebo group.

The risk of an initial event of major hemorrhage was 71% higher in the aspirin group as compared to placebo. Hazard ratio = (# with outcome)/(person time at risk).

Characteristic	Atorvastatin	Placebo																														
Design of Study	RCT																															
Year of Study	1997																															
Follow Up	16 weeks																															
Number of Participants	3080																															
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**Data Extraction Into Reusable Database: User View**

Detailed study-specific descriptions of characteristics and outcomes are exposed by hovering

✓ Efficiency  
✓ Transparency  
✓ Rigor

**Meta-Analysis Page**

Choose Outcome Category, Outcome with Sub-type, and Follow-up period

Preliminary evidence summary statement

Filter studies by Baseline Characteristics for Subgroup & Sensitivity Analyses

Select Category: Clinical Outcomes  
 Select Outcome: Myocardial Infarction  
 \*Select Type: No Preference  
 \*\*Select Follow-up: 4 weeks to 47 months

**Statins Effectiveness:**

Although the result was not considered statistically significant ( $p > 0.05$ ), the evidence (10 studies, 9218 participants) shows that Myocardial Infarction, 4 weeks to 47 months was 6% less likely in those that used Statins compared with those who were using Usual Care.

\*When no preference is selected, the meta results will use the selected outcome listed above to the first outcome in the sorted dropdown list as reported in the study.  
 \*\*The latest follow-up reported in the study within the range is selected when multiple outcomes exist within a single study.

Current User Filters: None

✓ Efficiency  
✓ Transparency  
✓ Rigor

**Meta-Analysis Results**

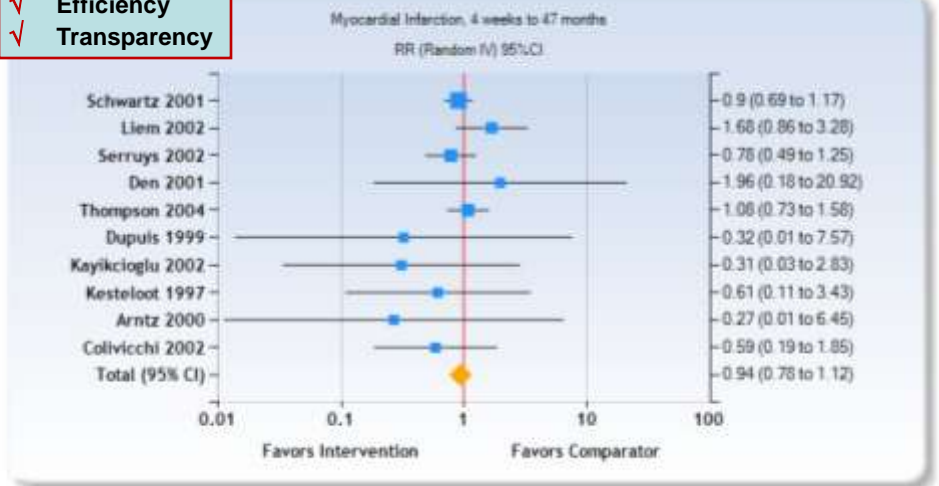
Detailed study- and outcome-specific descriptions of Cochrane Risk of Bias are exposed by hovering

Select and de-select studies and recalculate for sensitivity analyses

Study	Outcome	I n/N	C n/N	RR (95% CI)	Randomly
Overall	Myocardial Infarction, 4 weeks to 47 months	9218	9218	RR 0.94 (0.78 to 1.12)	100%
Schwartz 2001	Myocardial Infarction, Any, 16 weeks	18/1536 (0.4%)	18/1536		
Lien 2003	Myocardial Infarction, Recurrent, 1 year	2/285 (7.4%)	2/285		
Schwartz 2002	Myocardial Infarction, Non-Fatal, 47 months	30/944 (3.8%)	35/833 (4.6%)	RR 0.78 (0.49 to 1.25)	15.13
Den 2001	Myocardial Infarction, Any, 12 weeks	2/69 (4%)	5/48 (2%)	RR 1.06 (0.18 to 20.82)	0.04
Thompson 2004	Myocardial Infarction, Non-Fatal, 4 weeks	32/1712 (3.8%)	49/1698 (4.6%)	RR 1.06	
Devere 1999	Myocardial Infarction, Non-Fatal, 6 weeks				
Devere 2002	Myocardial Infarction, Recurrent, 26 weeks				
Kishimoto 1997	Myocardial Infarction, Any, 12 weeks	3/38 (5.8%)	3/33 (3.1%)	RR 0.61 (0.11 to 3.42)	1.12
Assa 2000	Myocardial Infarction, Non-Fatal, 2 years	0/571 (0.7%)	1/567 (2.8%)	RR 0.27 (0.01 to 6.45)	0.33
Colucci 2002	Myocardial Infarction, Non-Fatal, 1 year	4/8 (10%)	7/41 (17.1%)	RR 0.59 (0.19 to 1.85)	2.52
Reckman	Myocardial Infarction, 4 weeks to 47 months	213/4623 (4.8%)	228/4699 (8%)	RR 0.94 (0.78 to 1.12)	100%

## Meta-Analysis Results: Forest Plot

- ✓ Efficiency
- ✓ Transparency

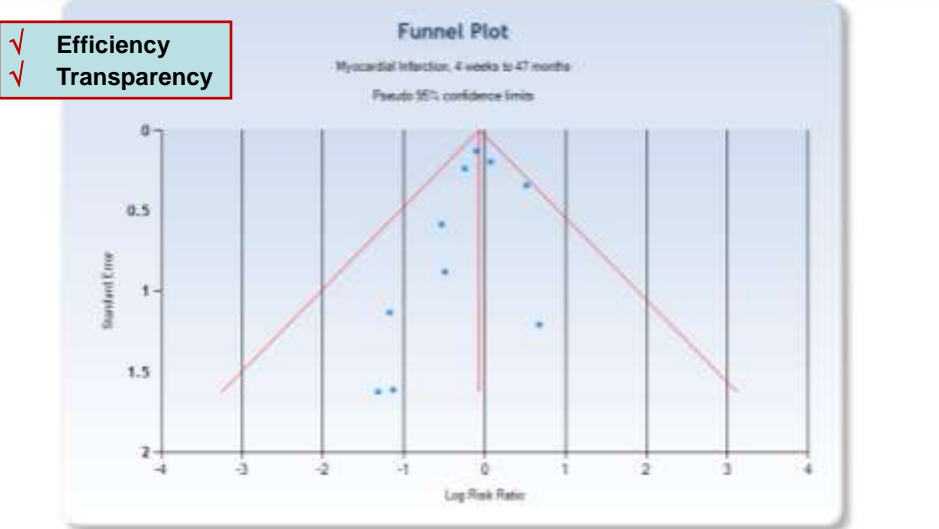


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## Meta-Analysis Results: Funnel Plot

- ✓ Efficiency
- ✓ Transparency



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# Meta-Analysis: Adding Custom Data

- ✓ Efficiency
- ✓ Transparency
- ✓ Rigor

Study	Participants	Events	RR	95% CI	Weight
...ction, Non-	4140 (10%)	741 (17.1%)	RR 0.59	(0.19 to 1.85)	3.02
...yocardial infarction, 4 weeks to 47 months	2134623 (4.6%)	2284599 (5%)	RR 0.93	(0.78 to 1.12)	100%

Ability to add custom data to current meta-analysis

Add Custom Data ?

**Add Custom Data**

Study Name (Author, Year)

Outcome

Intervention  Comparator

Events

Participants

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- ✓ Efficiency
- ✓ Transparency

**Customizable, Automated Evidence Table Generation**

Step 3: Preview / Generate Table

Number of Studies: 13 (Selected)

Generate Excel

Press Evidence Table

Study	Design	Length	Intervention	Time	Mean Age	% Female	Cholesterol Total	Cholesterol LDL	Cholesterol HDL	Diastolic Blood Pressure	ACE Inhibitors	Beta Blockers	Diuretics	Calcium Channel Blockers	Statins	Aspirin	Other
Amis 2008	RCT	108	2 yr	Prevention	55-65yr	70	18%	237mg/dL	116mg/dL	91mg/dL	6%	16%	37.7%	64%	31%		
				Usual Care	60	69%	21%	220mg/dL	112mg/dL	82mg/dL	6%	20%	33%	53%	70%	33%	

Primary Objective: The combined clinical and pathologic total mortality, cardiovascular death, nonfatal myocardial infarction, need for coronary intervention, stroke, and new onset of peripheral vascular disease. Nonfatal myocardial infarction, coronary balloon angioplasty or bypass grafting, stroke, new onset of ischemic peripheral vascular disease, hospital-acquired death, and all-cause mortality were prospectively defined as secondary end points.

Primary Outcomes: Mortality: All-Cause OR: Stroke, Any OR: Myocardial Infarction, Non-Fatal OR: Mortality, Cardiovascular OR: Coronary Intervention OR: Peripheral Vascular Disease

Inclusion/Exclusion: Patients with total cholesterol of <math>\ge 200</math> to <math>\le 400</math> mg/dL and low-density lipoprotein (LDL) cholesterol of <math>\ge 130</math> to <math>\le 300</math> mg/dL (after exclusion of secondary forms of hyperlipidemia) with an acute myocardial infarction (defined by the 2-point and troponin T criteria) or angina pectoris (defined by clinical symptoms and standardizing criteria) [R100] (stroke) during the entire period were included in this study. Patients with an acute infarction were included only if their troponin level was determined within 8 hours after onset of symptoms. Those in the balloon angioplasty group with a history of infarction were included only when the infarction was <math>\ge 3</math> months earlier. Patients > 75 years old, diabetic (fasting blood glucose > 125 mg/dL), patients with preexisting artery bypass graft, known malignant disease, serious kidney or liver dysfunction (creatinine > 1.5 mg/dL, serum aminotransferase and aspartate aminotransferase > 2 times normal value), or women of child-bearing age not using a reliable form of contraception were excluded.

Additional Treatment Info: Treatment began an average of 5 (range 0-8) days after qualifying event. Patients in this group with a baseline LDL cholesterol level of <math>\le 100</math> mg/dL initially received pravastatin 20 mg/dL. Those with an LDL cholesterol of <math>\ge 100</math> mg/dL received 40 mg/dL. To achieve LDL cholesterol levels of <math>\le 100</math> mg/dL, the pravastatin dosage was increased to 40 mg/dL, and statins were added (1.5 to 8 g/day) and/or atorvastatin (1 to 20 g/day) was added if necessary. Antiplatelet therapy was determined by the family physician.

Notes on Bias: Sequence Generation: ENCLINER - No information about the sequence generation process. Allocation Concealment: R00H - Open-label design. Blinding: R00H - Open-label - patients not blinded; potential selection bias (B05 randomized to usual care; dropped out after knowledge of it); Incomplete Outcome Data: L00H - Described for primary outcome; those without available angiographies had similar reasons for missing outcome; Drop outs would not have changed interpretation of outcomes. Selective Outcome Reporting: L00H - The study protocol was not available, but extensive detail given in specification of primary and secondary outcomes. Other Sources of Bias: R00H - Not a placebo-controlled trial; potential bias in usual care; therefore control group may have been biased. Characteristics of Studies: Cholesterol, Total: The mean total cholesterol level for participants at baseline. Cholesterol, LDL: The mean LDL cholesterol level for participants at baseline. Cholesterol, HDL: The mean HDL cholesterol level for participants at baseline. Diastolic Blood Pressure: The number of participants who are diabetic. ACE Inhibitors, Concomitant: The number of participants taking ACE (Angiotensin-Converting Enzyme) inhibitors during the study period. Beta Blockers, Concomitant: The number of participants taking a beta blocker concomitantly.

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## Doctor Evidence Functionality in Development

- **GRADEpro Replication**
  - Summary of Findings tables
  - Evidence grading across outcomes
  - Strength of recommendation
- **Virtual Collaborative Work Space**
  - Integrate all SR & CPG activities into a single platform
  - Manage & track assignments & workflows
- **“Late Binding” to an Ontology**
- **Cost-Benefit Calculator**
- **Network Meta-Analysis**

## Elements for Successful Integration Client

- **Strong sponsorship from Senior Leaders**
  - Commitment to Evidence-Based Medicine (EBM)
  - Willingness to fund innovative projects
- **Technical skill**
  - Experience in SRs and EBM
  - Vision for platform requirements
- **Strong focus on implementation**
  - Full intention to use the platform in operations
  - Prioritization of development of new functionality

## Elements for Successful Integration Client

- **Potential for multiple users outside EBM**
  - Pharmacy
  - Purchasing
  - New Technology Assessment
  - Center for Effectiveness & Safety Research
- **Commitment to excellence**
  - Willingness to commit substantial energy & resources for potential future gains

## Elements for Successful Integration Vendor

- **Strong sponsorship from Senior Leaders**
  - Commitment to Evidence-Based Medicine (EBM)
- **Technical skill**
  - Existing, robust platform
  - Ability to quickly transform client's requirements into functionality in the platform
- **Flexibility & enthusiasm to enhance the platform**
- **Commitment to excellence**
  - Willingness to commit substantial energy & resources for potential future gains

## Conclusions: Integrating a Technology Platform for SR & CPG Development

- A well-constructed technology platform can address many of the critical challenges in SR & CPG development
- Successful implementation requires:
  - Operational needs to be addressed
  - Strong sponsorship from Senior Leaders
  - Good technical skills
  - Commitment to excellence
  - Flexible, cooperative client-vendor relationship

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## Integrating a Technology Platform for SR & CPG Development



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