

Detailed Clinical Models for Sharable, Executable Guidelines

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Roadmap

- *What is SAGE?*
- *Sharing guideline information*
 - *Challenges*
 - *Solutions*

What Is SAGE?

- *Standards-based, Active Guideline Environment*
- *NIST ATP Grant*
- *Apelon, IDX, IHC, Mayo Clinic, Stanford, UNMC*

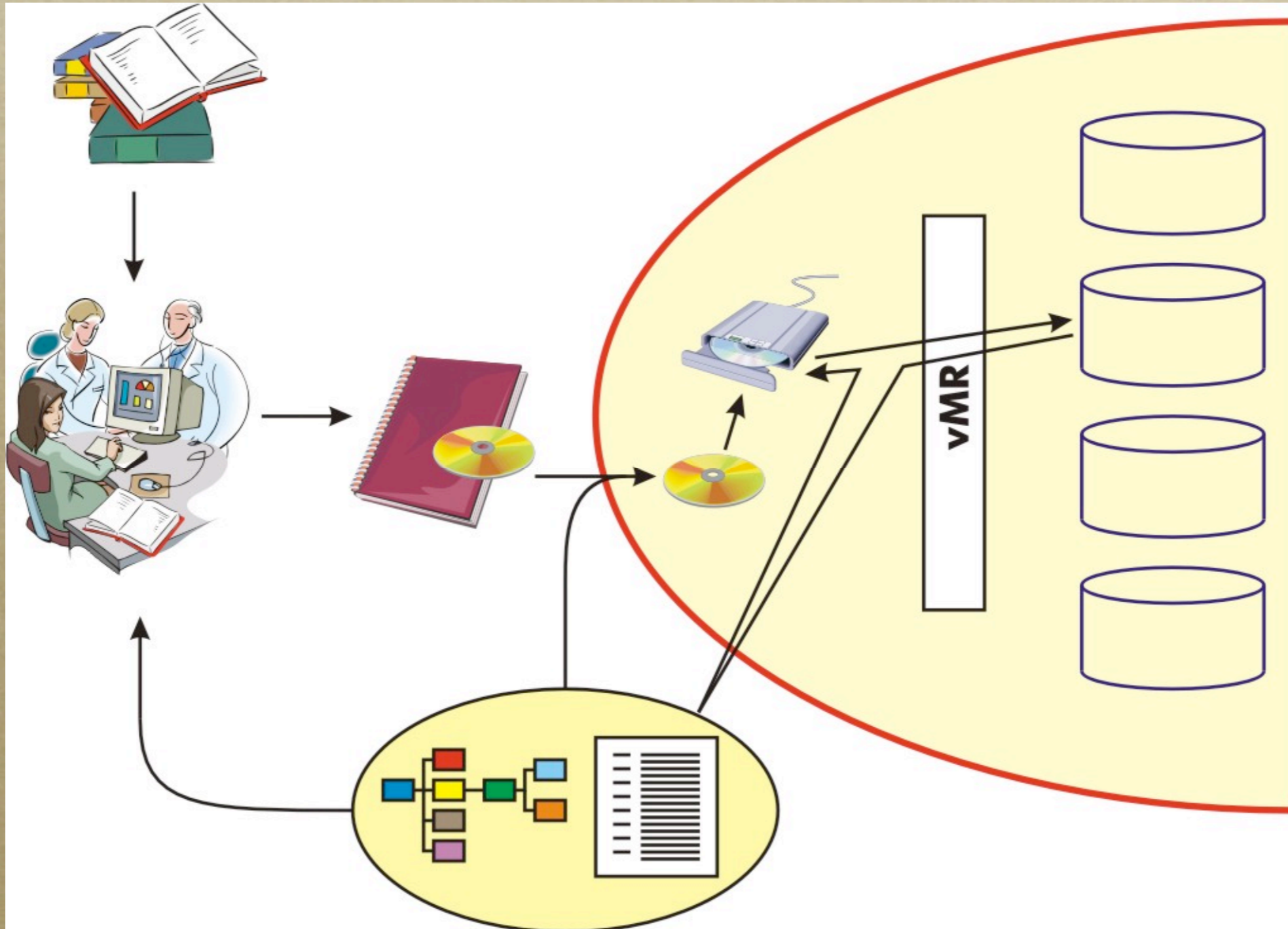
What Is SAGE?

- *Standards-based*
 - *Leverage existing standards*
 - *Help create new standards*
 - *Goal: shareable guidelines*
- *Active*
- *Guideline*
- *Environment*

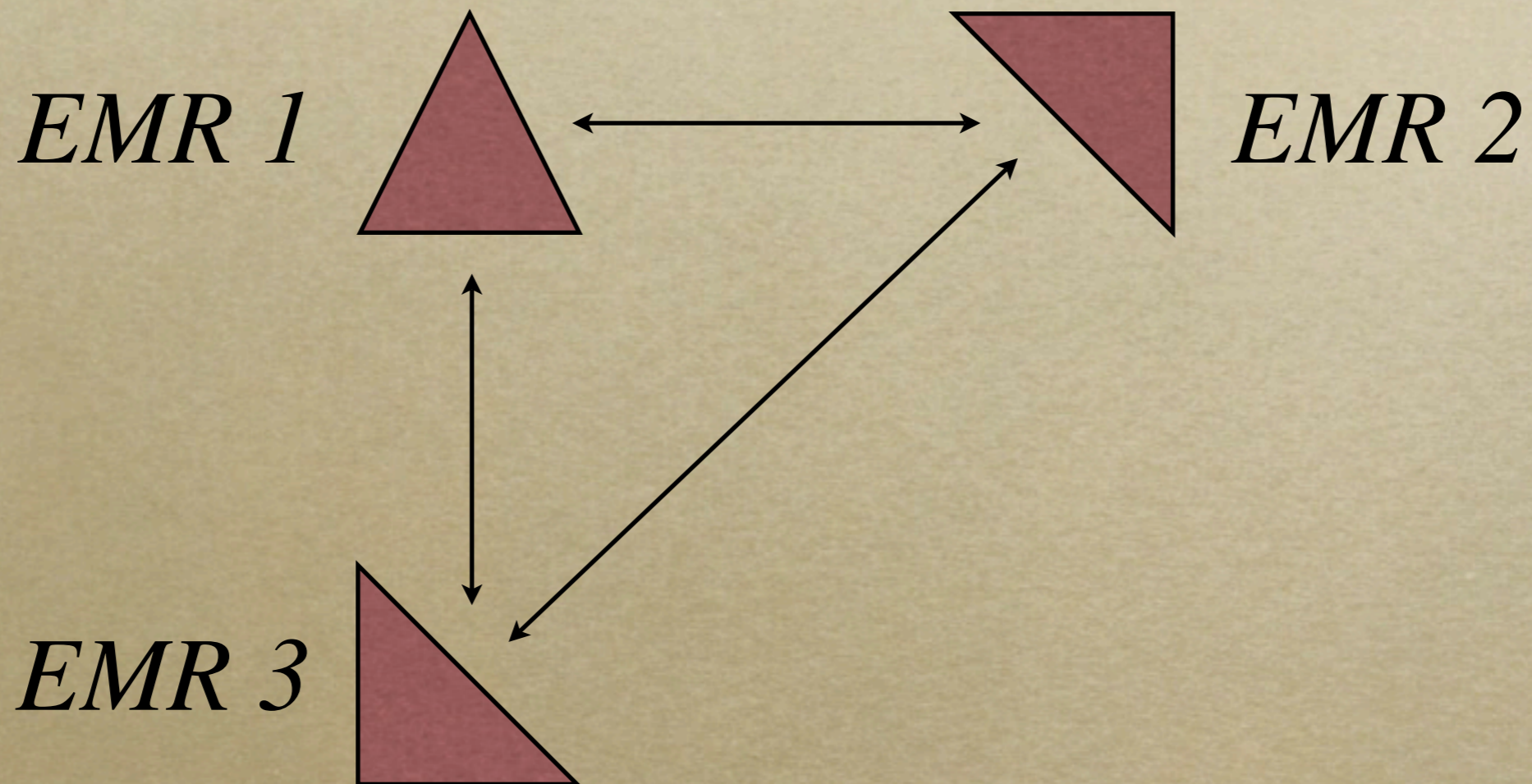
What Is SAGE?

- *Standards-based*
- *Active*
 - *Executable*
- *Guideline*
- *Environment*

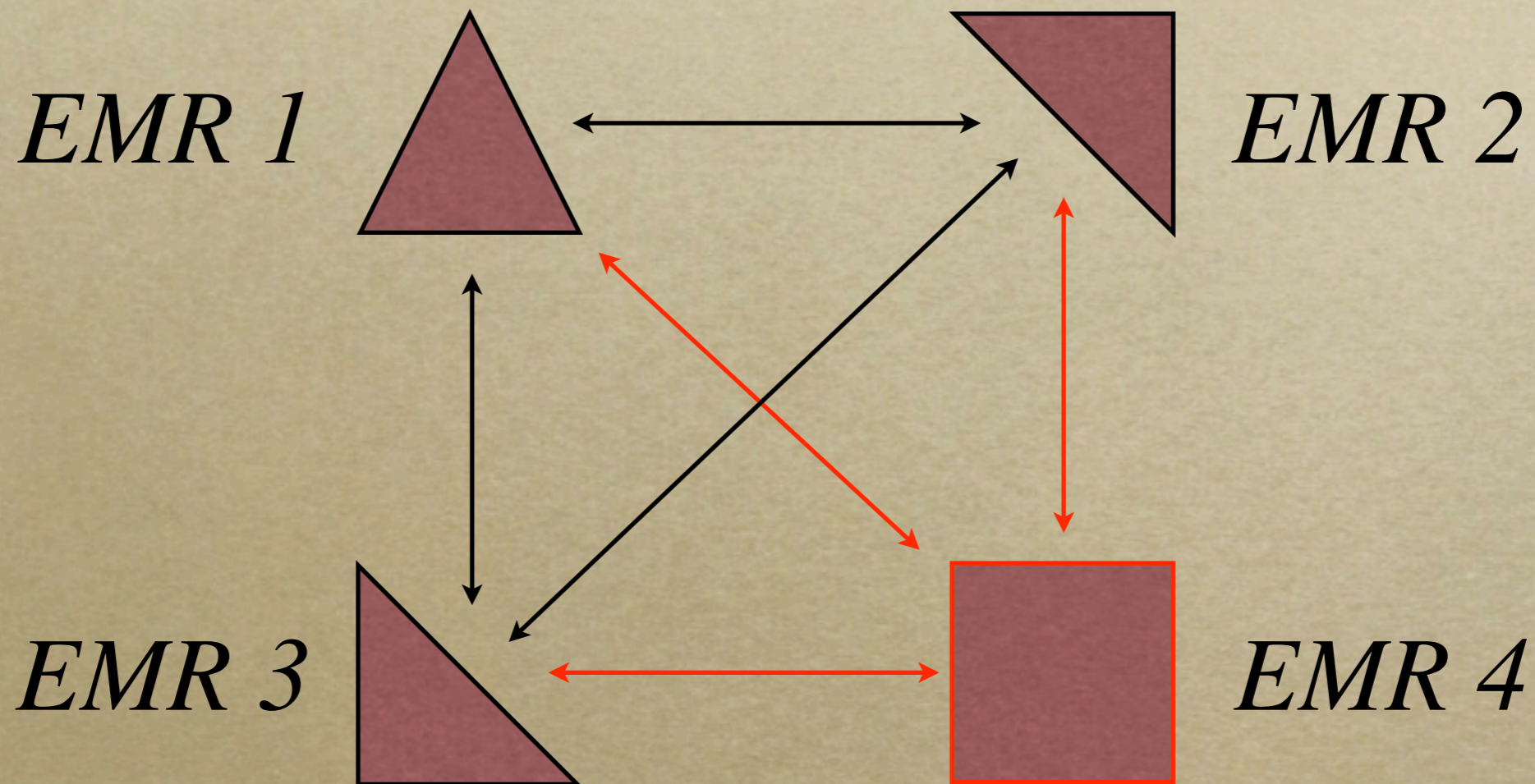
SAGE Overview



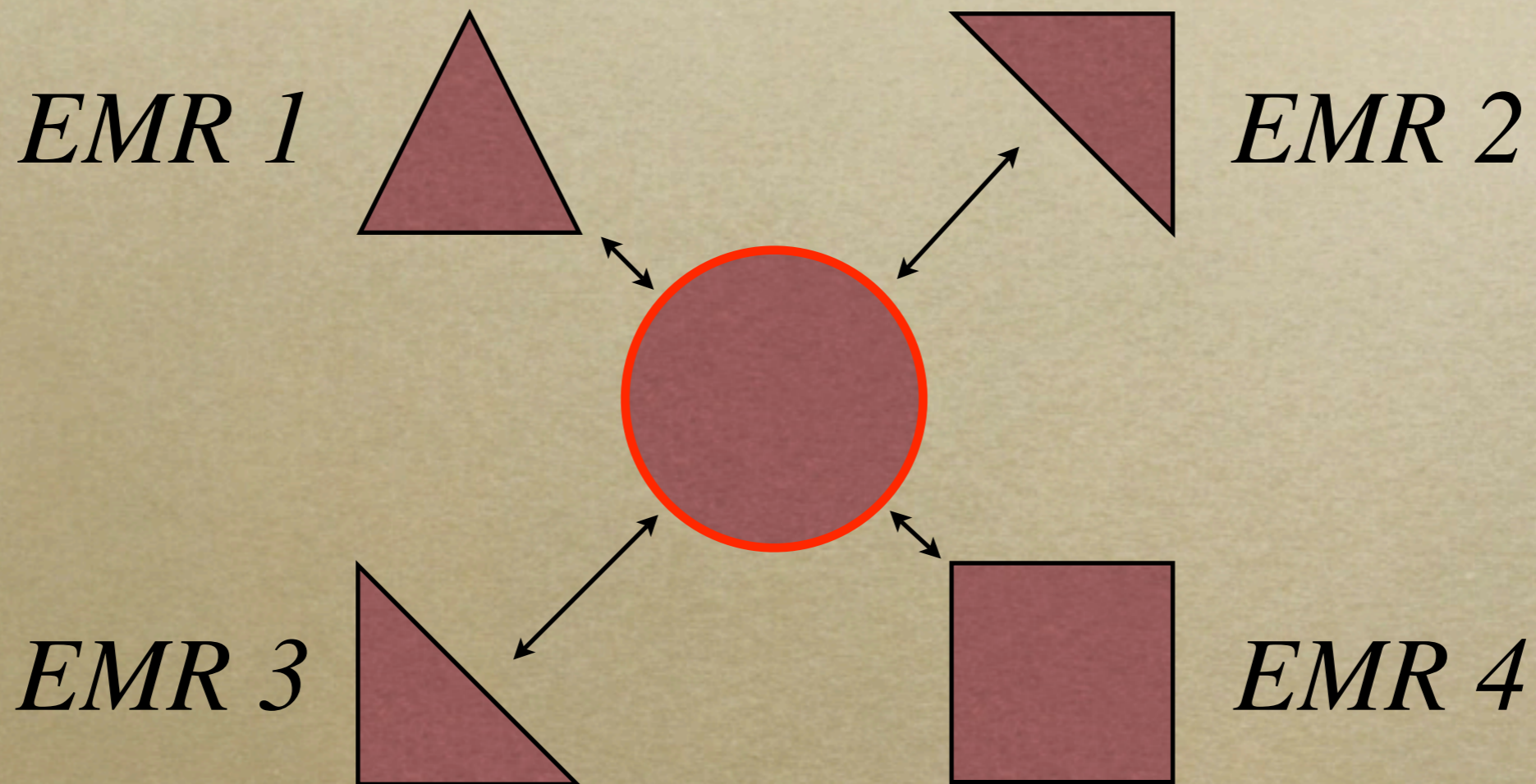
Multiple EMRs, Multiple Mappings



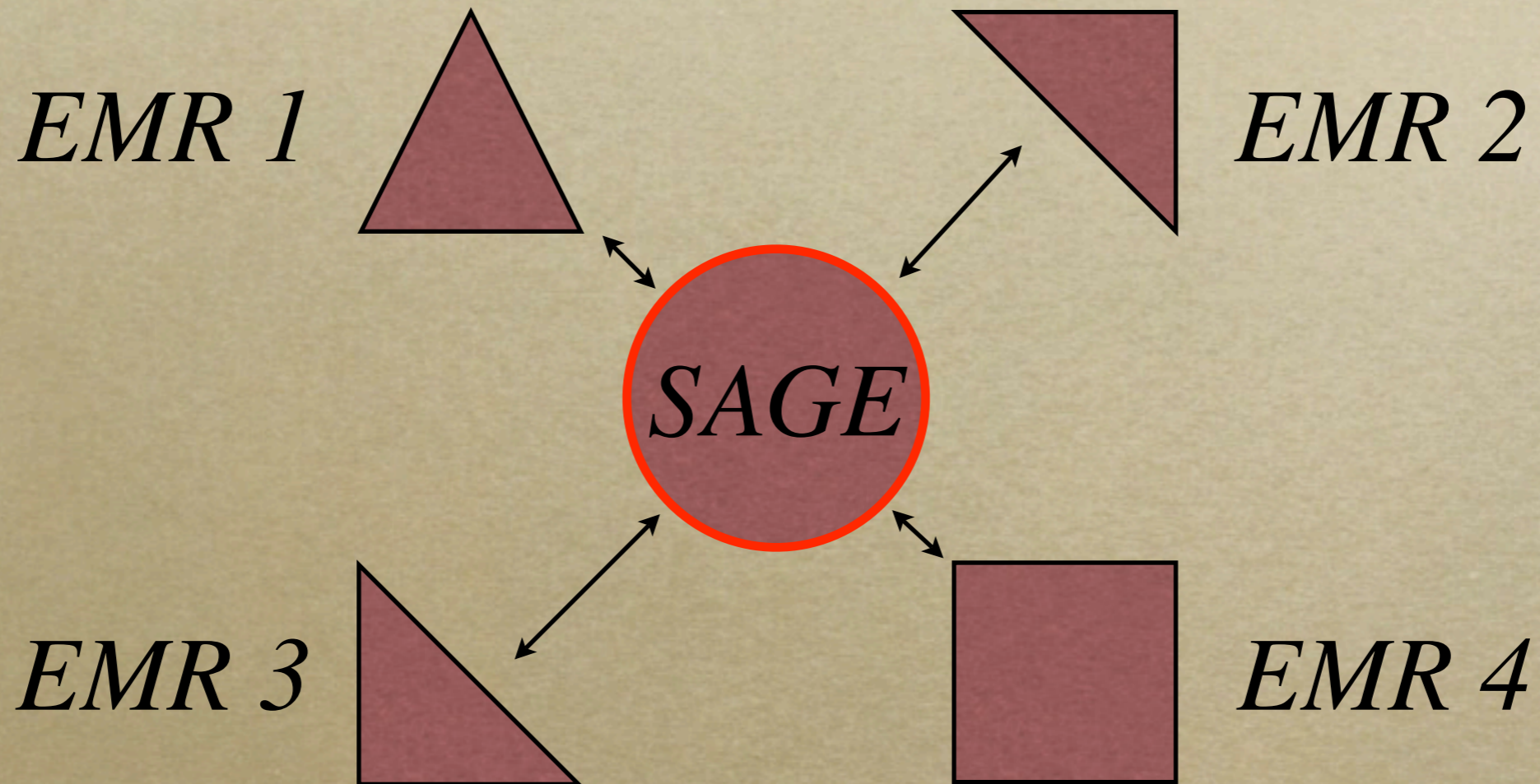
Mappings Grow Exponentially



Standard, Shared Representation



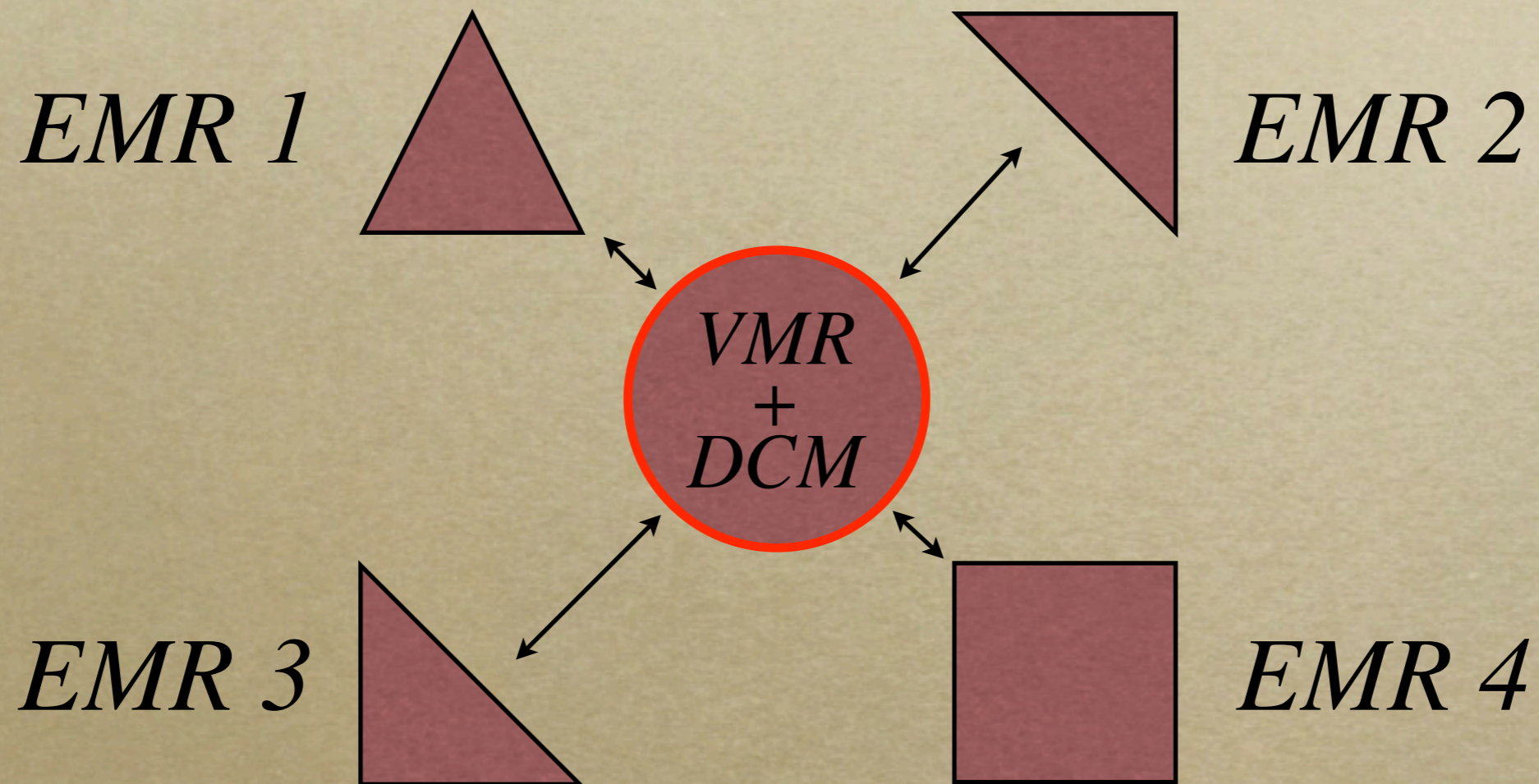
For Guidelines



What Needs to Be Sharable?

- *Logic*
 - *E.g. Arden Syntax (procedural)*
 - *SAGE guideline format (declarative)*
- *Data (focus of this presentation)*
 - *Curly braces in Arden Syntax*
 - *VMR + Detailed Clinical Models in SAGE*

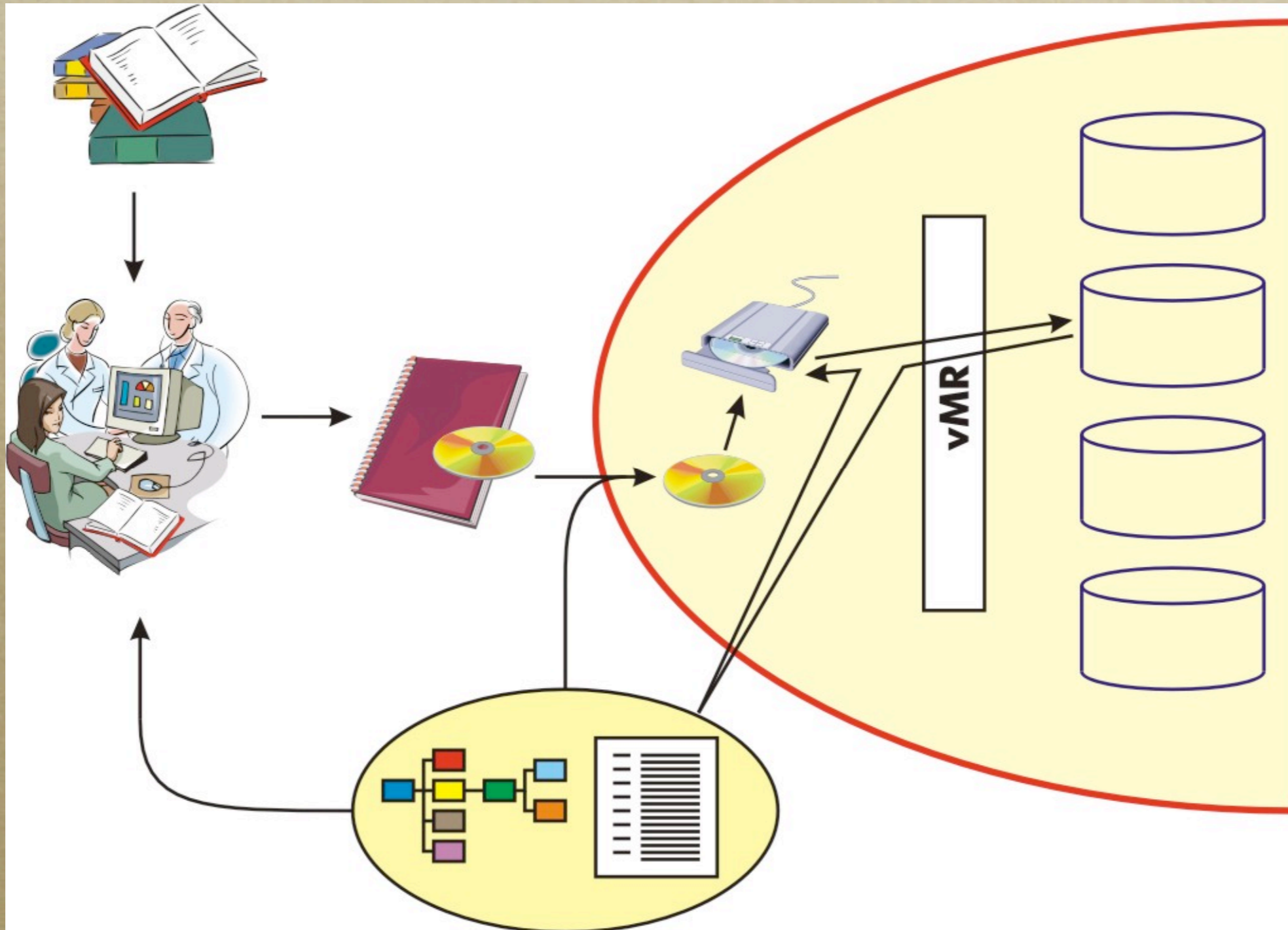
For Data in Guidelines



What Is the VMR?

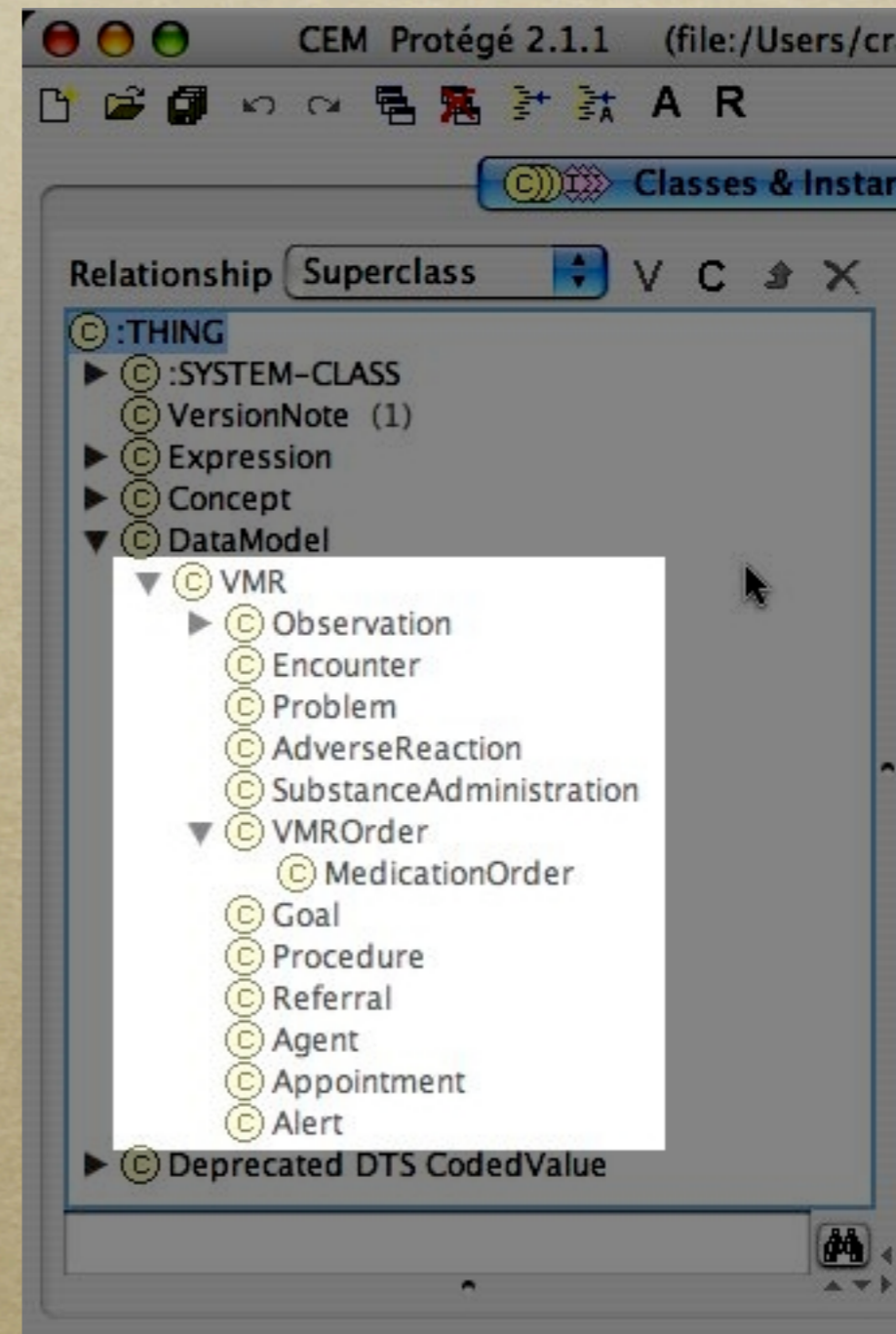
- *Virtual Medical Record*
- *A small set of classes corresponding to the broad types of clinical data needed for guideline execution*
- *Classes defined on an as-needed basis*
- *Based on other existing standards (HL7 RIM) where possible*

Virtual Medical Record



VMR in Protege

- *13 Classes (currently)*
- *Relatively flat inheritance hierarchy (currently)*
- *Designed to meet specific needs of specific guidelines*



VMR Observation Class

The screenshot shows the CEM Protégé 2.1.1 interface. The main window title is "CEM Protégé 2.1.1 (file:/Users/craig/Desktop/Current_SAGE_Stuff/CEM20040107%20Folder/CEM.pprj, Standard Text Files)". The toolbar includes icons for file operations and a menu with "A" and "R". The "Classes & Instances" tab is active, showing a tree view on the left and a configuration panel on the right.

Relationship: Sup... V C X

Classes & Instances: Classes Slots Forms Instances Queries

Observation (type=:STANDARD-CLASS) C X

Name: Observation

Documentation:

Constraints:

Role: Concrete

Template Slots: V V C X + -

Name	Type	Cardinality	Other Facets
S value	Instance	required single	classes={Expression}
S code	Instance	required single	classes={CodedValue,ConceptExpression}
S text	Instance	single	classes={EncapsulatedData}
S interpretationCode	Instance	single	classes={SetOfCS,ConceptExpression}
S effectiveTime	Instance	single	classes={TimeInterval}
S subject	Instance	single	classes={CodedValue,ConceptExpression}
S encounter	Instance	single	classes={Encounter}
S methodCode	Instance	single	classes={SetOfCE,ConceptExpression}

Superclasses: + -

- VMR

Do We Need More Than a VMR?

- *It describes broad areas of guideline related information*
- *It enables representations of clinical information*
- *It does not constrain or validate except at the coarsest level*

Too Many Ways to Say the Same Thing

A single name/code and value

Left patellar deep tendon reflex intensity is 2+

Combination of two names/codes and values

Patellar deep tendon reflex intensity is 2+

Laterality is left

Combination of three names/codes and values

Deep tendon reflex intensity is 2+

Body part is patella

Laterality is left

Too Many Ways to Say the Same Thing

A single name/code and value

Left

is 2+

Comb

ues

Pate

+

L

*All of these examples
can be represented by
a single VMR*

Comb

ues

Dee

Body part is patera

Laterality is left

Detailed Clinical Models

- *Specializations of VMR classes*
- *Define boundary between terminology and information models*
- *Similar to (if not the same as):*
 - *Archetypes*
 - *Templates*
 - *Clinical Statements*

Pseudocode DCM Example

```
Reflex constrains vmr.Observation {
  code.equals("reflex finding")
  value.isa(reflex_finding_value_set)
  hasQualifier {
    code.equals("body part")
    value.isa(body_part_value_set)
  }
  hasQualifier {
    code.equals("laterality")
    value.isa(laterality_value_set)
  }
}
```

What Do We Gain?

- *Preserve modeling decisions across guidelines*
- *Can be used as a catalog of the data used in a guideline*
- *A shareable definition of a clinical entity*

Priorities

- *Internally consistent*
- *Pragmatic - The ideal separation of information and terminology models was not always supported by:*
 - *Our chosen terminologies*
 - *Our information model*
 - *The real underlying EMRs*
 - *If every EMR stores the concept “no family history of breast cancer” what do we gain practically from using a post-coordination?*
- *Elegant*

Status of DCMs in SAGE

- *Currently:*
 - *Defines boundary between terminology & information models*
 - *Specify appropriate value sets*
- *In the future:*
 - *Aggregation*
 - *Qualification*

Conclusion

- *We have implemented a method for sharing data needed for representing clinical guidelines by:*
 - *Designing an abstraction of specific EMRs (the VMR)*
 - *Defining specializations of this abstraction (Detailed Clinical Models)*

Thank You

- *<http://www.SageProject.net>*