

# MET3-AE System to Support Management of Pediatric Asthma Exacerbation in the Emergency Department

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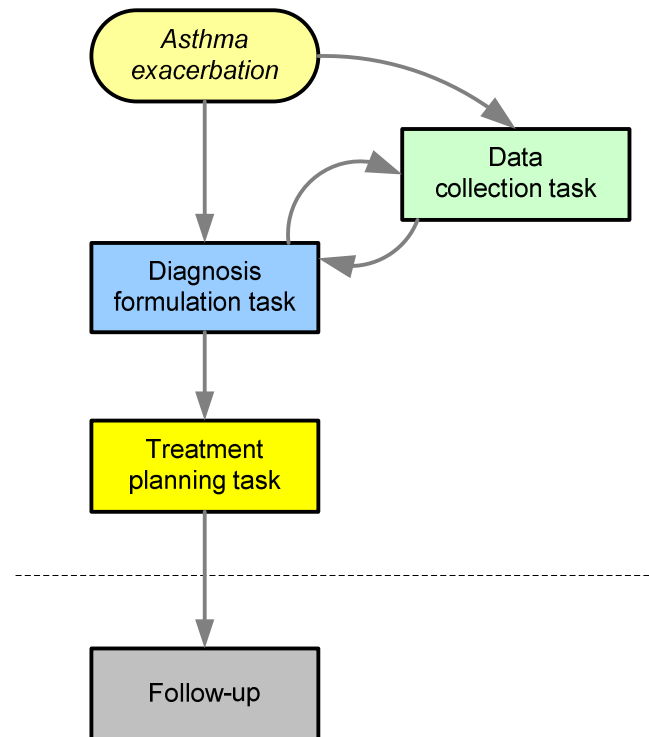


# Outline

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- Asthma ED management process
- MET3 functional model
- MET3 architecture and implementation
- MET3-AE
- Conclusions

# ED Asthma Management



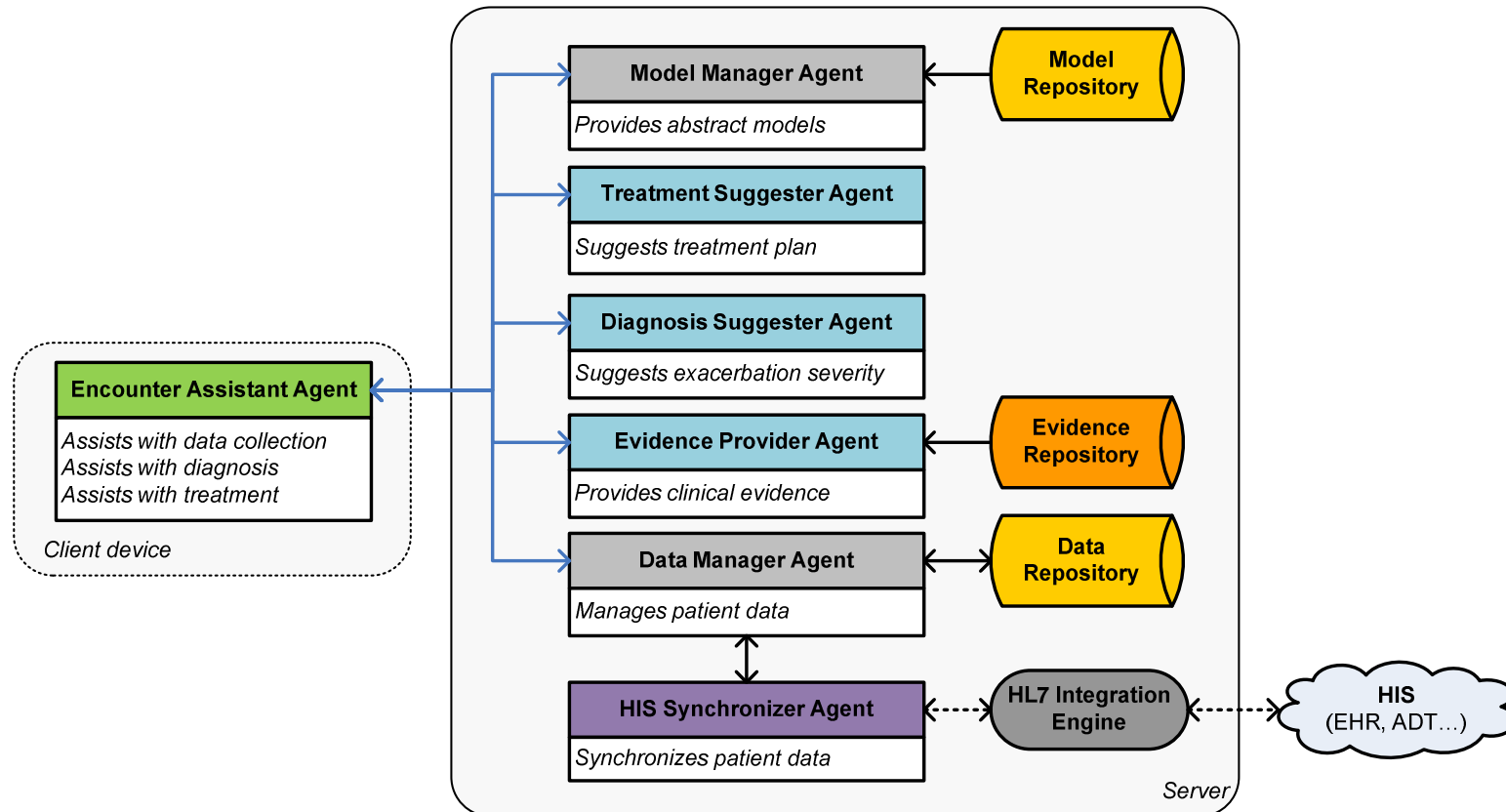
## Implications for Decision Support

- Provide support for all tasks of ED asthma management
- Access and integrate all patient data
- Be available at the point of care

## MET3-AE Functional Layout

<b>Task</b>	<b>Function</b>	<b>Abstract model</b>
Data collection	Support for structured data collection	Data model; User interface model
Diagnosis formulation	Support for predicting severity of the exacerbation	Diagnostic model
Treatment planning	Support for asthma pathways; Provision of evidence	Treatment model; Evidence model

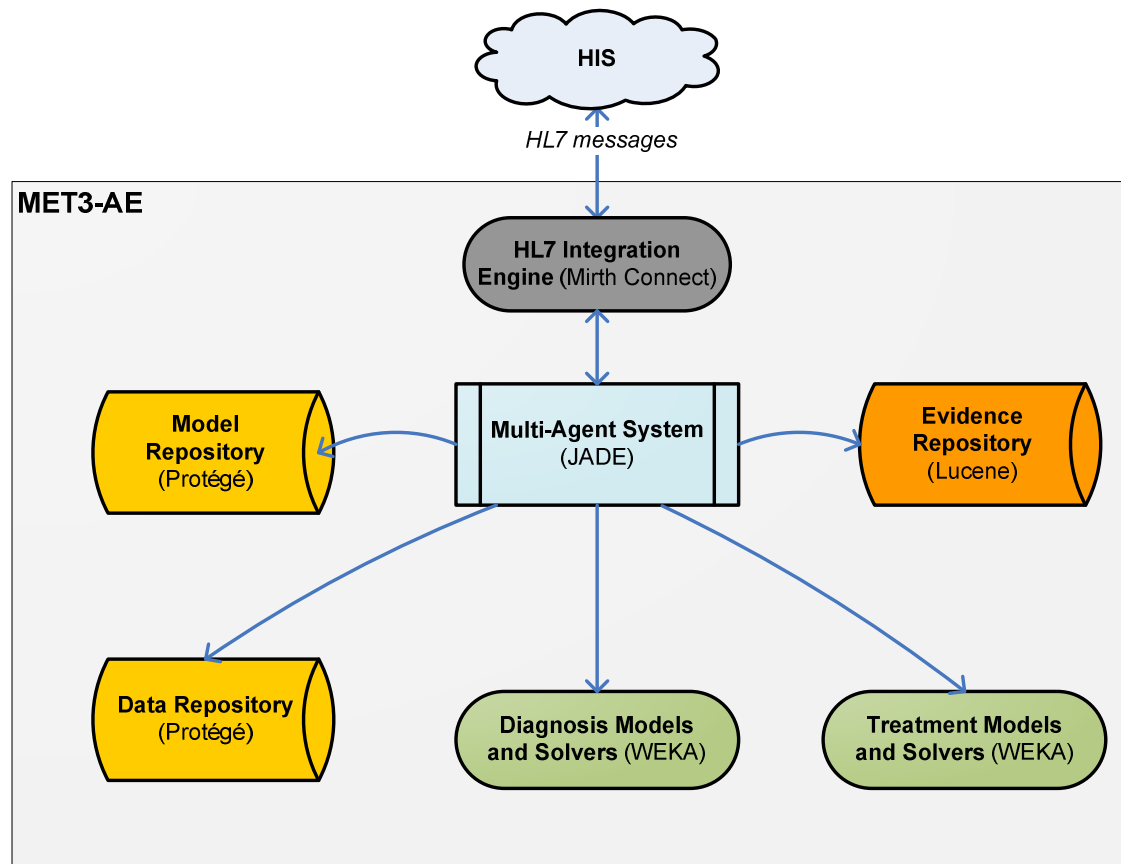
# MET3-AE Architecture



## MET3-AE Abstract Models

- **Data model**: specifies asthma clinical attributes
- **User interface model**: specifies components of user interface
- **Diagnostic model**: specifies prediction algorithm for a severity of asthma exacerbation
- **Treatment model**: specifies relationships between severity of exacerbation and a treatment plan
- **Evidence model**: specifies mappings between the attributes and indexing terms for the reviews in The Cochrane Library

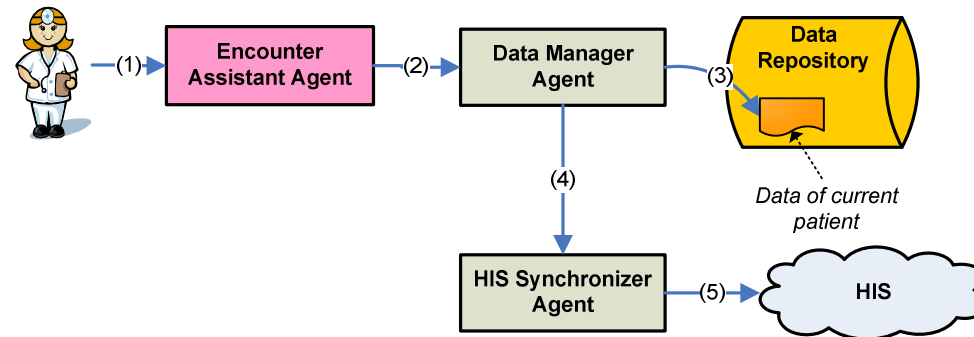
# MET3-AE Technological Infrastructure





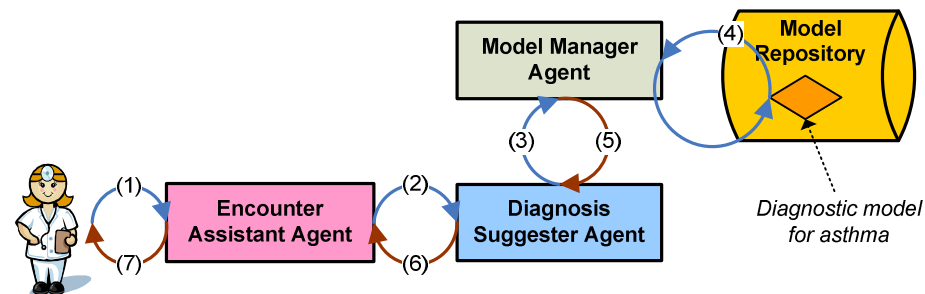
# MET3-AE in Action – Data Collection

- ➔ Physician collects and records patient data
- *Encounter assistant agent* sends new data item to *data manager agent*
  - *Data manager agent* updates patient data in data repository and notifies *HIS synchronizer agent*
  - *HIS synchronizer agent* passes the update notification to HIS via a proper HL7 message



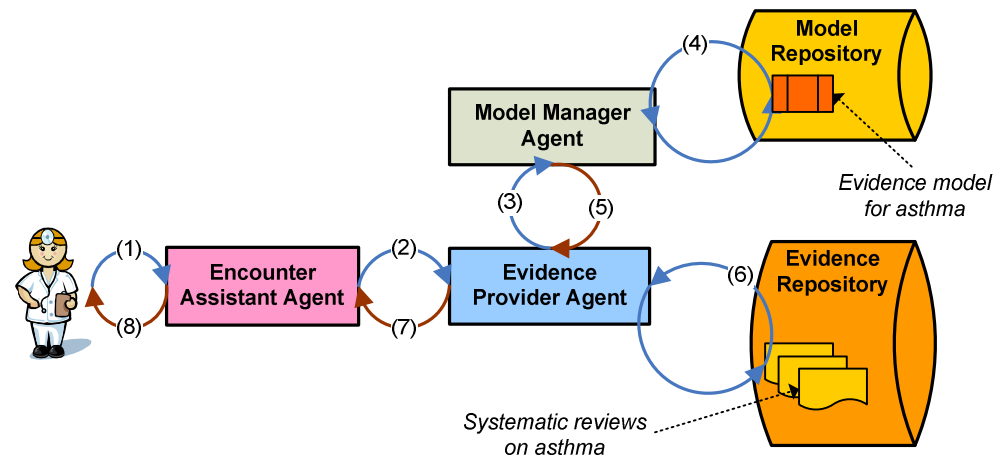
# MET3-AE in Action – Diagnosis Formulation

- ➔ Physician asks for a diagnostic advice
- *Encounter assistant agent* passes request to *diagnosis suggester agent*
  - *Diagnosis suggester agent* gets a diagnostic model from *model manager agent* and applies it to patient's data
  - *Encounter assistant agent* reports the advice to physician



# MET3-AE in Action – Treatment Planning

- ➔ Physician asks for supporting evidence
- *Encounter assistant agent* passes request to *evidence provider agent*
  - *Evidence provider agent* gets an evidence model from *model manager agent* and applies it to retrieve systematic reviews from evidence repository
  - *Encounter assistant agent* presents ranked reviews to physician



# MET3-AE Interface - Examples

Jane Smith

History Assessment (00:00:00) Assessment (00:34:00)

Temperature 37 C  axillary  oral  rectal

SaO2 95 %  room air  supplemental oxygen

Heart rate 120 bpm

Resp rate 40 bpm

Color  pink  pale  dusky

Distress  mild  moderate  severe  none

Air Entry  normal  reduced

Retractions  absent  present

Insp wheeze  absent  present

Exp wheeze  absent  present

Back Add new Assessment Remove Assessment

Jane Smith

History Assessment (00:00:00) Assessment (00:34:00)

Temperature 37 C  axillary  oral  rectal

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Exp wheeze  absent  present

Back Add new Assessment Remove Assessment

Jane Smith

Assessment (00:00:00)

Temperature

37.0

C

axillary

oral

rectal

SaO2

95.0

%

room air

Back Add new Assessment Remove Assessment

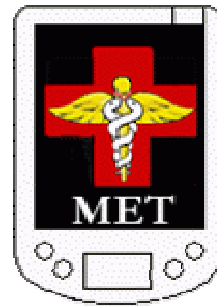
## Conclusions

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- Integrative decision support at the point of care
- Available on any Java-enabled computing platform
- Software engineering and development with open source software
- Successful pilot implementation in the Emergency Department

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