Emergency Triage for Asthma Exacerbation

- Asthma is the most common chronic disease in children (10% of Canadian population) and asthma exacerbations are the most common reasons for children to visit the emergency department (ED). 
- Asthma is expensive - asthmatic children use 3 times more prescriptions and require twice as many ambulatory care / ED visits as other pediatric patients.

Emergency Triage for Asthma Exacerbation

- Moderate Attack: Rare aggressive treatment over an extended observation. 
  - Up to 12 hours
- Severe Attack: Hospitalized therapy before ultimately being transferred to an inpatient hospital bed for ongoing treatment. 
  - After about 16 hours
- Mild Attack: Discharge home following a short course of treatment. 
  - Less than 4 hours

Categories of Asthma Exacerbation Severities

Importance of Early Prediction of Severity

- Three categories of exacerbation severities: mild, moderate, and severe.
- Important that severity is determined as soon as possible, so that appropriate therapies are prescribed and provided in a timely fashion.
- Underestimation of the severity results in premature discharge and a possible return visit.
- Overestimation of the severity results in patients unnecessarily occupying beds and clinical resources.

The Ubiquitous MET-Asthma Application

- The MET-Asthma application provides point of care clinical decision support (CDSS) for managing asthma exacerbations.
- It predicts severity of asthma exacerbation using a decision model and patient clinical information from a number of electronic hospital information systems (HIS) including:
  - Electronic health record (EHR)
  - Laboratory information system (LIS)
  - Computer physician order entry (CPOE)
  - Admission-discharge-transfer (ADT)

Services Oriented Architecture

- Paradigm that has been applied in the business community for interconnecting on demand loosely coupled legacy systems.
- SOA services have self-describing platform independent interfaces which communicate via formally defined messages.
- Model MET where each HIS acts as a service provider according to defined information provider roles.
- MET CDSS is a service requestor that invokes provided services by sending appropriate messages (HL7).
- Service registry maps services to providers to ensure location transparency.

Aligning with Asthma Management Workflow

- Each user group has corresponding interface agent.
- Each management task has corresponding task agent.
- Each HIS has corresponding information agent.

Ongoing Research

- Agent Communication using ACL
- Agent Collaboration using Mediator Agents e.g. Blackboard Architecture
- Ontology Driven Design using shared clinical ontologies for standard nomenclature
- Integration of MET CDSS with existing hospital systems and data exchange methods
- Implement security and privacy solutions by incorporating legal framework provided by PHIPA – Personal Health Information Protection Act
- Prospective Data Collection for training and testing prediction algorithms
- Provision of meaningful evidence for decision support at the point of care
- Prospective evaluation of clinical performance.