**Problem Statement**

- Complex patient management processes are usually managed by the interdisciplinary healthcare teams (IHTs).
- Formalization of these processes as workflow models often ignores team delivery aspect or simplifies it.
- Applicability of business workflow models in healthcare domain is limited.

**Preliminaries**

- Team and Workflow Management Framework (TWMF)
  - Extends business workflow model with IHT dynamics (formation, management, task-practitioner allocation).
  - Uses first-order logic (FOL) to manage IHT dynamics.
- Underlying assumptions
  - Leadership by the Most Responsible Physician (MRP).
  - Practitioners and workflow tasks characterized by capabilities and competency levels.
- Task collections formed by tasks to be executed by the same practitioner (IHT member).

**TWMF Architecture**

- Contains the concepts and relations describing IHT, workflow, practitioners, patients.
- Represents complex dynamics of an IHT.
- Contains instances of the ontology concepts.
- Enables workflow execution.
- Derives instructions for WEE through logical reasoning.

**IHT Ontology**

- Describes workflows, practitioners, patients, and their interactions.
- Supports the principle of continuity of care.
- Inclusion of patient preferences to further control workflow execution for personalized and participatory care.

**Selected Behavioral Rules**

- **Rule 3**: ∀ t,tm,pr, (Task(t) ∧ Team(tm) ∧ Practitioner(pr) ∧ hasTaskStatus(t, MemberSelection, tm) ∧ hasMember(tm, pr, t, Preferred) ∧ hasPractitionerStatus(pr, Available) → hasMember(tm, pr, t, Assigned).
- **Rule 4**: ∀ t, tm, pr, w, c, cl, (Task(t) ∧ Team(tm) ∧ Practitioner(pr) ∧ Workflow(w) ∧ Capability(c) ∧ hasTaskStatus(t, MemberSelection, tm) ∧ requiresCapability(c, cl) ∧ hasCapability(pr, c, cl) ∧ hasPractitionerStatus(pr, Available) ∧ (c, cl) ≥ hasMRP(tm, pr, w) ∧ (pr, Practitioner(pr),) ∧ hasMember(tm, pr, t, Preferred) ∧ hasMember(tm, pr, w, GCS_assessment, Assigned) ∧ hasMember(tm, pr, w, GCS_assessment, Assigned).

**Proof-of-Concept Implementation**

**Employed tools and technologies**

- IBM Business Process Manager
  - A sophisticated business workflow execution engine.
  - Accessed by TWC using REST services.
- Z3 Solver
  - A powerful FOL reasoner (theorem prover and model finder).
  - Accessed by TWC using C++ API.
- Protégé
  - An advanced ontology editor.
  - Manages the IHT ontology.

**Management of Acute Stroke**

**Assignment of the GCS assessment task**

- Task(GCS_assessment, requiredCapability(GCS_assessment, assess_GCS, 1), Practitioner(RN1), hasCapability(RN1, assess_GCS, 2), hasPractitionerStatus(RN1, Available), Practitioner(RN2), hasCapability(RN2, assess_GCS, 1), hasPractitionerStatus(RN2, Available), Team). hasTaskStatus(GCS_assessment, MemberSelection, tm).

**Conclusions and Future Work**

- Business workflow model extended with TWMF.
  1. Supports workflow execution by an IHT – allows for variability in team composition.
  2. Supports fine-grained assignment of practitioner to a task – departs from specialty-based assignment.
- Inclusion of patient preferences to further control workflow execution for personalized and participatory care.