Guidelines & Careflows

- **Clinical guidelines** are documents that describe the state-of-the-art on clinical therapies [2].
- They provide the basis for planning patient care in hospitals/clinics.
- They are iteratively refined by experts:
  - evidence-based guidelines
  - clinical practice guidelines
  - careflows

**Problem(s)**

Building a careflow from a clinical guideline is **time consuming** and **error prone**, due to complexity and ambiguity [5].

1.5.1.2. consider metformin as an option for first-line glucose-lowering therapy for a person who is not overweight.
1.5.1.3. continue with metformin if blood glucose control remains inadequate and another oral glucose-lowering medication is added.

**Que (1):** Can NLP be used to automatically extract careflows?

**Que (2):** Can formal methods be used to ensure careflow quality?

### Biomedical NLP Resources

Typically, **biomedical thesauri** have been exploited to **semantically annotate** guidelines [3], in particular the **UMLS metathesaurus** [1].

```
continue with metformin if blood glucose control remains inadequate
```

Such resources don’t handle well guidelines, they:

1. don’t segment well guidelines
2. ignore function words denoting structure

### Careflow Extraction and Verification

**But:** we can use NLP **parsing**, such as the Stanford dependency parser to:

1. extract **syntactic structure** from guidelines
2. combine with UMLS or WordNet [4] annotations
3. use the parse trees to extract **workflow structure**

*E.g.* this dependency tree can be decorated with UMLS/WordNet tags:

```
from parse tree and tags, careflows can be extracted
```

The workflow/careflow provides an explicit, but **ambiguous**, (semi)formal representation of the control flow [2].

It can be embedded in **logics** (FO, temporal) with **reasoning services** to:

- ensure correctness of clinical properties
- detect errors and flaws [2]

### Project Goals

- Semantically annotate clinical guidelines and build careflows
  - evaluate annotation resources
  - propose techniques for extraction
- Check for their properties using formal methods/computational logic
- Evaluate the results by comparing to manually extracted guidelines

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### Collaborations

Collaborations are currently in course with the eHealth group from FBK-Irste (Trento, Italy), and the Merano hospital (Merano, Italy)

### References


