Solution Report Case 3: Venous thromboembolism (VT) + Urinary Tract Infection (UTI)

Team:
Mar Marcos and Begoña Martínez-Salvador

Part 1: Architecture and use

Architecture

Common to all cases

The UJI approach to the management of comorbidities in CIGs uses solely the editing and enacting facilities of the CIG language, in our case PROforma (and its Composer tool). Consequently, no architecture is proposed. Instead, the management of comorbidities is handled by developing specific PROforma fragments that should be considered when jointly using the CIGs of the comorbid conditions. We refer to these fragments as comorbidity management models (CMMs). Note that, for the combined use of the CIGs of the comorbid conditions, a series of adaptations might be required.

CIG representation

Common to all cases

We have represented the CIG in PROforma, using the Composer tool to edit the models. We have designed a CMM to solve the specific scenarios/patient cases proposed (e.g. 76-year old female with TIA and DU in case 1). Note that we have only considered the interactions of the provided scenarios. Moreover, the CMM assumes that all the comorbidities indicated are present. In case additional scenarios are required, the new situations should be modelled as a new CMM to be considered together with the existing one(s).

For a complete solution, it would be necessary to model the CIGs involved and build a final model with such CIGs and the CMMs. This approach is labor intensive since it is necessary to model each possible interaction as a CMM. On the positive side, the interactions will be fully described in the CMM, resulting in self-contained and self-explanatory models.

The descriptions below refer to the elements of the PROforma CIG language. **TODO add paragraph or reference**.

We have followed the following naming conventions. Each time a drug/treatment is prescribed we use a task (usually a plan or an action) with a name beginning with the word “start” followed by the name of the drug/treatment. Each time a drug/treatment needs to be stopped, we have explicitly represented it with a task whose name begins with the word “stop” followed by the name of the drug/treatment. Moreover, if the drug/treatment must be resumed after a period of time, or when the problem is solved, we have also modelled it with a task whose name starts with the word “resume” followed by the name of the drug/treatment. This naming convention helps to realize that there is an action for interaction management and also how it has been solved. In addition, we have associated tasks and data to appropriate SNOMED CT ontology terms.

Apart from that, decisions by the clinician or the patient have been modelled as enquiry tasks. For example, the decision to prescribe or not aspirin will be modelled with a task enquiry_add_aspirin, requesting an answer yes or no from the clinician.

Task preconditions and wait conditions have been fundamental to solve the interactions of the proposed scenarios.

CIG representation

Specific to CASE 3

Here we describe the PROforma CMM to solve the interactions of the Case 3 scenario, which corresponds to a patient diagnosed of VT and being treated for that, and then a new problem appears, UTI. The treatment for the new problem interacts with the treatment of the initial disease.

The top level plan in PROforma is shown in Figure 1:

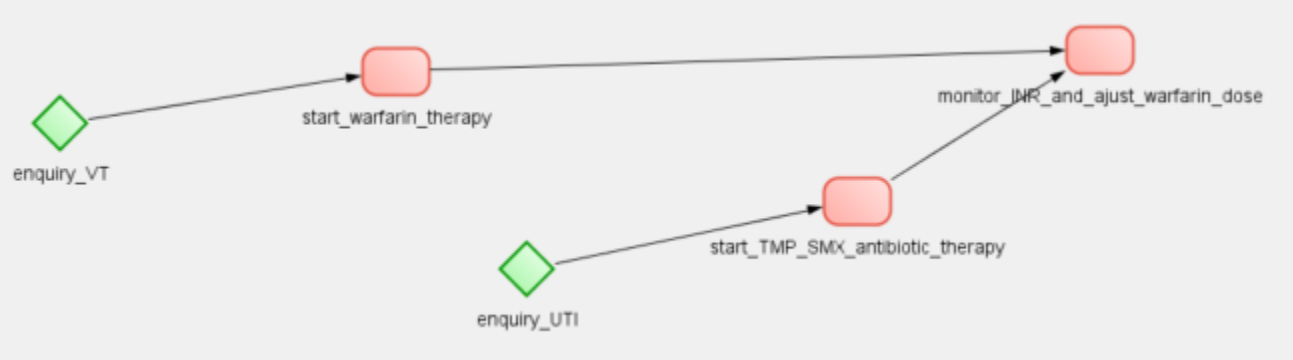

Figure 1: Top-level plan for the management of VT+UTI

If the patient is diagnosed with VT, she starts therapy with warfarin. If the patient is diagnosed with UTI, she starts treatment with TMP-SMX antibiotics. If both treatments happen simultaneously, there is a cyclical plan monitor_INR_and_adjust_warfarin_dose that is repeated daily until the antibiotic treatment finishes or the INR value is greater than 2.

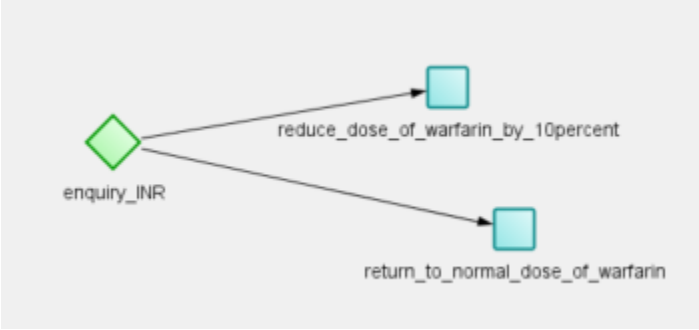

Figure 2: Content of the cyclical plan monitor_INR_and_adjust_warfarin_dose

The content of the plan monitor_INR_and_adjust_warfarin_dose is shown in Figure 2. It reads the INR value and adjusts warfarin dose correspondly. Notice that the SNOMED-CT Terminology has the

term 439202006 | Monitoring of international normalized ratio (regime/therapy) | and the term 439814009 International normalised ratio (INR) derived warfarin dose.

Domain knowledge representation

Common to all cases

As mentioned above, we have associated tasks and data to appropriate SNOMED CT ontology terms when possible.

Mode of use

Common to all cases

The system could be used to develop a PROforma-based DSS system. It could be used for simulation but also at the moment of the patient encounter.

Strengths of the approach

Common to all cases

Does the approach have very good support for particular features? Which? Please justify. What is the singular point of strength of your approach?

- Explainability: Interactions are fully described in the CMM, resulting in self-contained and self-explanatory models
- Ontology binding
- Support for both automated decisions and for decisions by the clinician or the patient

Part 3: Implementation of the Case Studies

N/A.