

An Ontology based Scheme for Formal Care Plan Meta-Description

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Overview

- Propose a conceptual model and an ontology for a meta-description of formal care plans
 - ↪ *Focusing on care plans as a whole and not addressing internal algorithmic steps*
- The proposed care plans model allows
 - ↪ *Semantic tagging*
 - ↪ *Semantic enrichment*
- Advantages
 - ↪ *Use and re-use care plans across platforms [[searching](#)]*
 - ↪ *Link to other scientific information (e.g. papers in PubMed, PHR, etc) [[management](#)]*
 - ↪ *Modeling of the provenance [[organization](#)]*
 - ↪ *Justifications for modifications [[organization](#)]*
 - ↪ *Alterations to care plans [[organization](#)]*

e-ClinPro: Clinical protocol management system

- A heterogeneous semantic social network to describe and organize clinical protocols
- The protocols' organization is based on their provenance, evolution and modifications

Guest

Protocols

Manage your protocols here!

Add New Protocol

←

Acute coronary syndrome

Acute coronary syndrome

Management pathway

Related Conditions

- Acute coronary syndrome
- Stable angina
- Myocardial infarction
- Chest pain
- Hyperglycaemia, unspecified

Downloads & links

- <http://pathways.nice.org.uk/pathways/acute-coronary-syndromes/acute-coronary-syndromes-overview>

Entry points

Chest pain ☒ yes AND (Assessment of chest pain ☒ stable OR Assessment of chest pain ☒ unstable)

Description

This pathway covers the assessment and diagnosis of recent onset chest pain

Evidence list

- NICE guidance. Chest pain of recent onset: assessment and diagnosis of suspected cardiac origin.
PMID : 20538674
Authors : Skinner JS, Smeeth L, Kendall JM, Adams PC, Timmermans P, et al.
©2010
- Unstable Angina and NSTEMI: The Early Management of Unstable Angina
Myocardial Infarction
PMID : 21977549

AND

Add Condition

Add Group

not

Chest pain

value

>

yes

and

OR

Add Condition

Add Group

Remove Group

not

Assessment of chest pain

value

>

stable

or

not

Assessment of chest pain

value

>

unstable

Formal care plans

- **Clinical guidelines**
 - ↳ Systematically developed recommendations to address various clinical problems
- **Clinical protocols**
 - ↳ Detailed algorithms on how to address a particular clinical problem (based on guidelines)
- **Care pathways**
 - ↳ Care algorithms integrating multidisciplinary tasks for patient care in and outside the hospital (based on guidelines)
- ...

Examples of formal care plans

Diabetes Diagnosis

Criteria for Diabetes Diagnosis: 4 options

A1C $\geq 6.5\%$* Performed in lab using NGSP-certified method and standardized to DCCT assay
FPG ≥ 126 mg/dL (7.0 mmol/L)* Fasting defined as no caloric intake for ≥ 8 hrs
2-hr PG ≥ 200 mg/dL (11.1 mmol/L) during OGTT (75-g)* Performed as described by the WHO, using glucose load containing the equivalent of 75g anhydrous glucose dissolved in water
Random PG ≥ 200 mg/dL (11.1 mmol/L) In persons with symptoms of hyperglycemia or hyperglycemic crisis

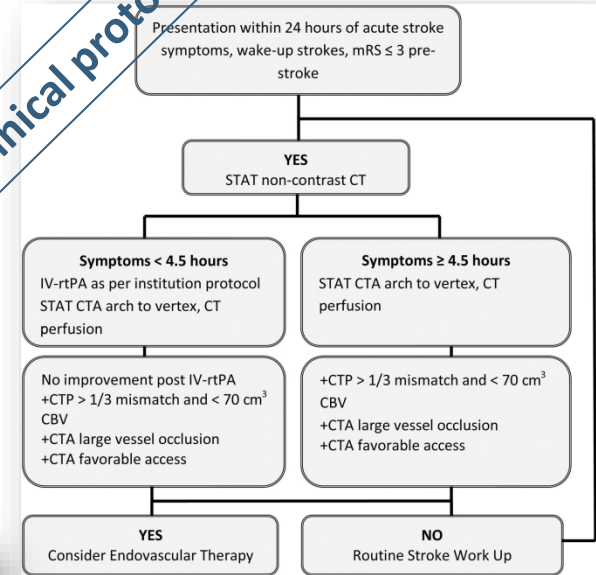
*In the absence of unequivocal hyperglycemia results should be confirmed using repeat testing

* Unless clinical diagnosis is clear, same test to be repeated using a new blood sample for confirmation

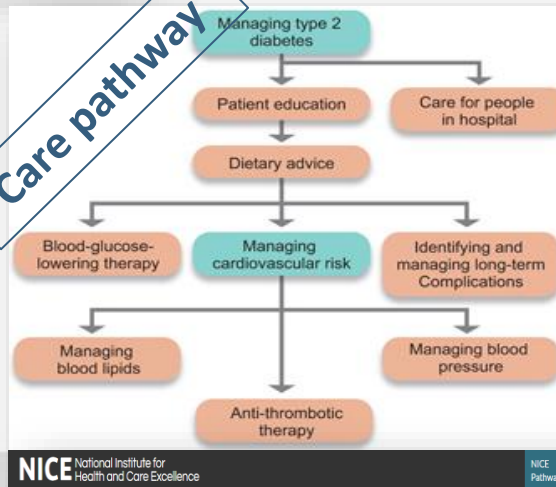
* 2 discordant results? Result above cutpoint should be repeated

American Diabetes Association

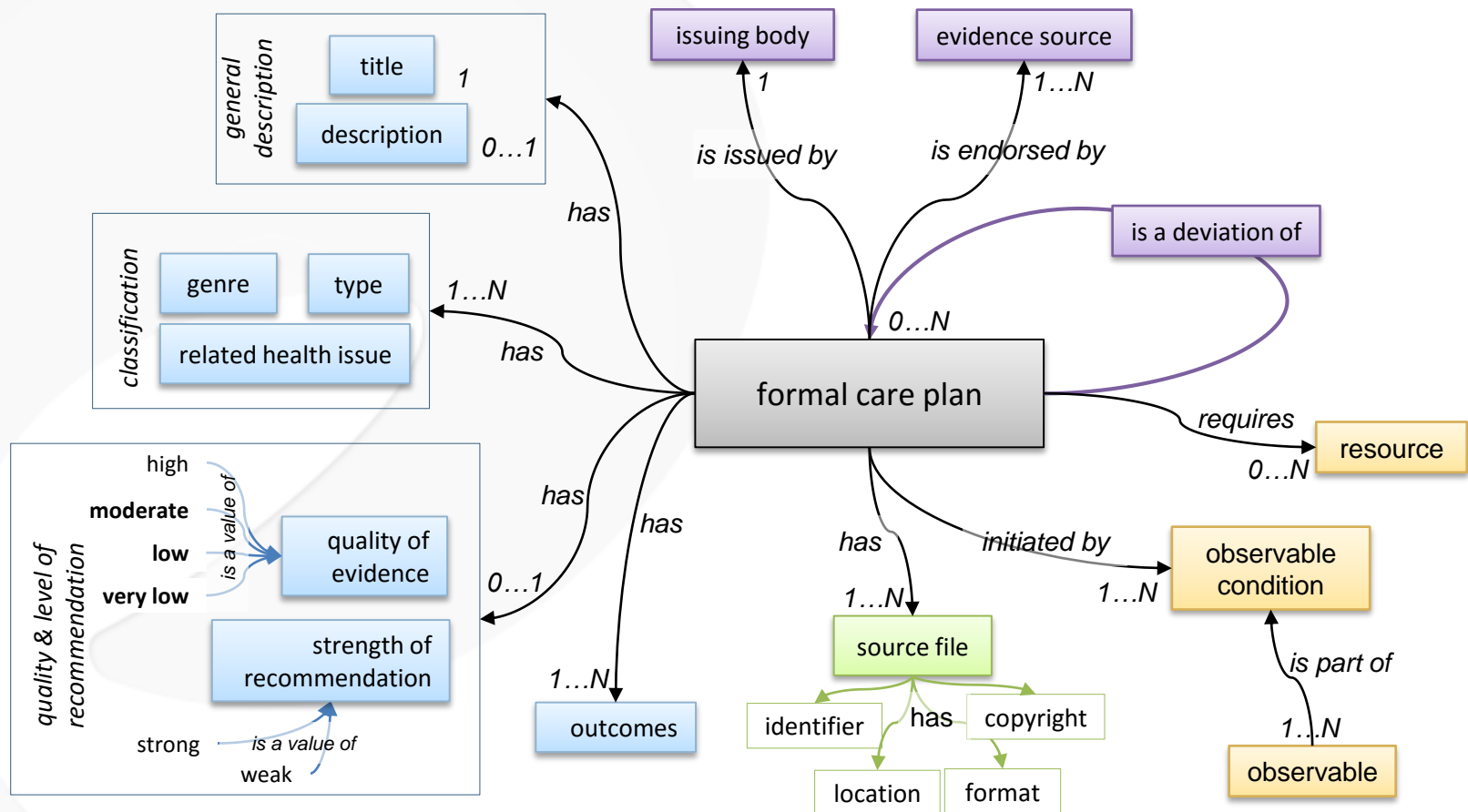
Clinical protocol



Care pathway

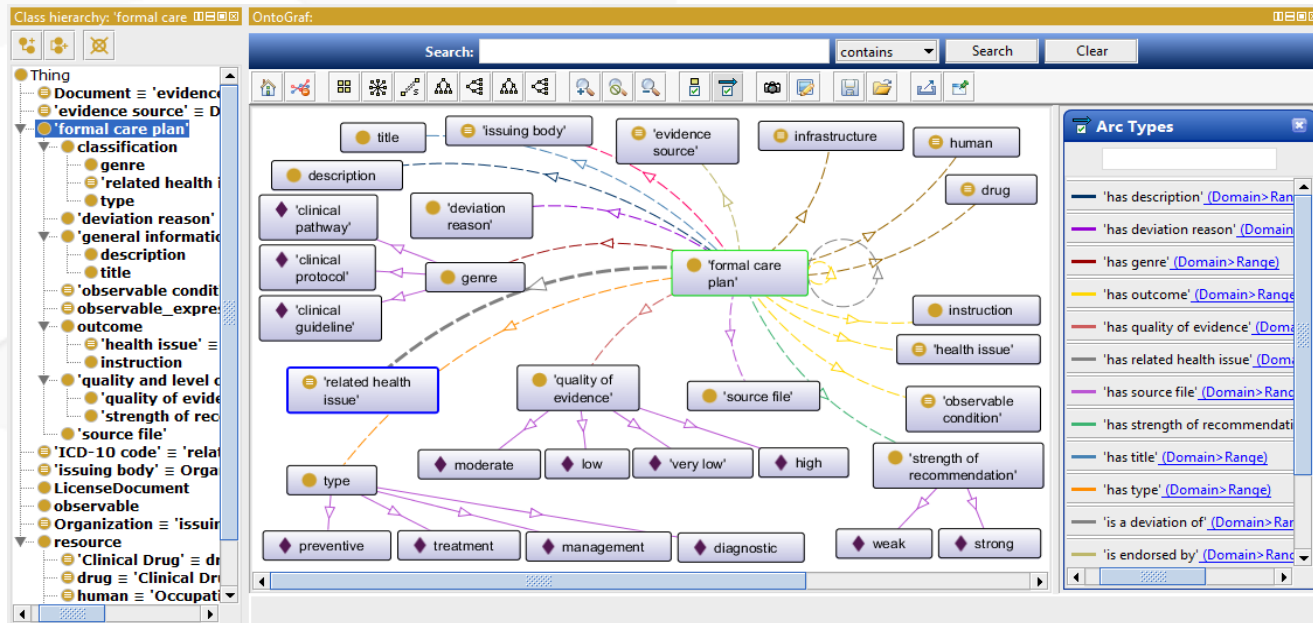


Conceptual model of care plan meta-description



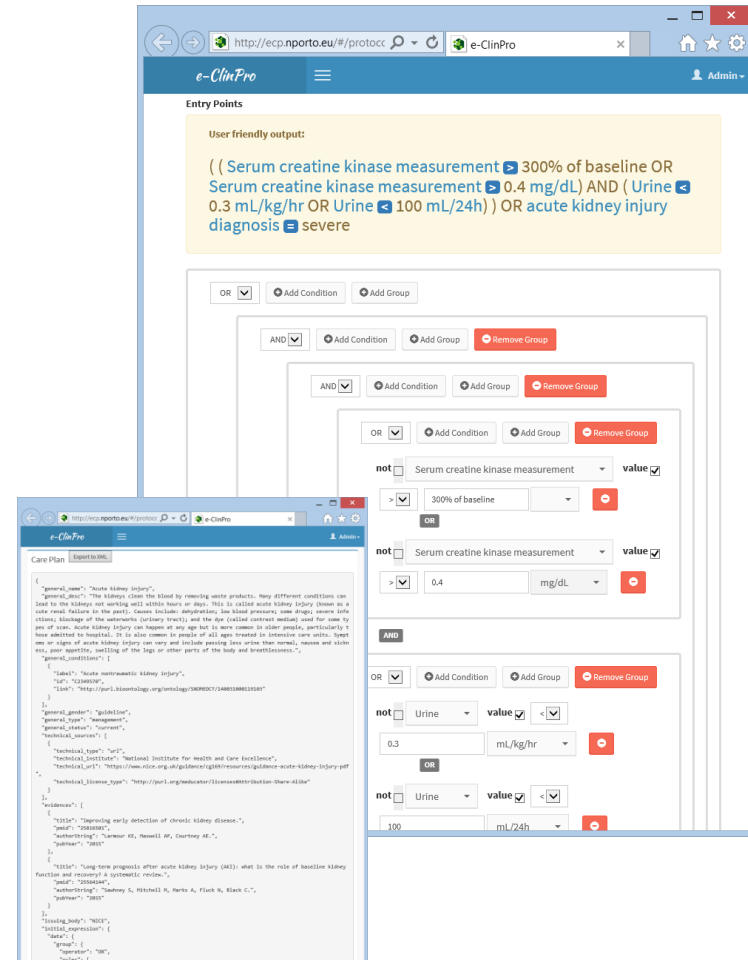
Ontology implementation

- Implemented with OWL2 using Protégé
- Available online in: <http://purl.bioontology.org/ontology/ECP>
- Integrated with commonly used standards and controlled vocabularies:
 - ↳ ICD-10, SNOMED-CT, QUDT, UO, GRADE and UMLS



Development process and evaluation

- Development by health care professionals (4 medical & 4 technology experts)
- Testing with 20 clinical protocols and guidelines (by **NICE, NKF KDOQI, ADA, Hellenic Society of Nephrology** and **2 Greek National University Hospitals**)
- Medical experts found:
 - The model was straightforward to use
 - The terminology was familiar and easy to understand and apply
 - The only difficulty identified in the expression of initial logical condition



Conclusion

- Introduced a metadata scheme and ontology for the description of formal care plans
- Goal of the proposed scheme is to support:
 - a) care plan management in electronic repositories
 - b) organization and classification
 - c) universal tracking queries of care plans used by search engines or medical portals
 - d) literature of evidence provenance
 - e) institutional provenance
- Our aim was to define in a formal, ontology-based, platform-independent metadata set to describe formal care plans and their relationships

Acknowledgement



This work was supported by eCP: Electronic Clinical Protocols project (**MIS 375876**), funded under the Greek National Programme Thales and the FP7-ICT project CARRE (No. **611140**), both co-funded by the **European Commission**.



eCP: Development of electronic clinical protocols



CARRE Project: Personalized patient empowerment and shared decision support for cardiorenal disease and comorbidities

Cite as

E. Kaldoudi, George Drosatos, Nick
Portokallidis and Allan Third

An Ontology based Scheme for Formal
Care Plan Meta-Description

MEDICON 2016, Paphos, Cyprus, 2 April
2016

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