

From health professionals' discourse to KOS: representing the facets of allergy in the Integrative Levels Classification

MARCIN TRZMIELEWSKI & CLAUDIO GNOLI

NKOS-DC 2022 WORKSHOP

OCTOBER 6, ONLINE

Context

- Allergy is a major health issue in our society
- In France, allergy/allergology was only recognized as a specialty in its own right in 2017
- No KOS that might be used by professionals in this domain for their activities of organization, classification and search for information
- Cooperation with the Allergy Unit of the University Hospital of Montpellier to create an ontology to represent and organize allergy knowledge and support work activities of allergy professionals
- Starting with a study of information practices to investigate *the context of knowledge use* in the domain

From a study of information practices to allergy facets

- The study carried out in 2020-2021 in the Allergy Unit (by Trzmielewski)
- Data collecting:
 - 16 participants' observations of 8 journal club meetings and 8 clinical meetings
 - 20 interviews with professionals, investigating their practices
- Corpus of data: reports of the observations, transcripts of the interviews
- Gathering and thematic analysis of 497 terms from the corpus of data on practices
- Outcome: 17 facets, further validated by allergy professionals

Allergy facets

Phenomena

Allergen
Comorbidity
Diagnostic methods
Disease
Healthcare circuit
Mechanism
Person
Prevention
Quality of life
Risk factor
Symptom
Treatment

Perspectives

Data source
Discipline
Methodology

Documents

Author
Document

Contextual interpretation of facets

□ Mechanism

Indexing of article “Clinical relevance of cross-reactivity in food allergy”

- Mechanism as *perspective*: “cross-allergy, food allergy, mechanism”
- Mechanism as *phenomena*: “food allergy, cross reactivity (mechanism)”

is meant to express various kinds of allergic reactions such as “crossed”, “IgE-mediated”, “non-IgE-mediated”

□ Discipline

Facet created to express the different disciplinary perspectives adopted in e.g. the allergological approach versus the pneumological approach in the treatment of asthma

Application of allergy facets in the Integrative Levels Classification (ILC3)

*How may we transpose and apply the strongly contextual,
bottom-up data about representation of the allergy domain
(facets, concepts, terms) into a general classification
with classes mostly developed in a top-down way ?*

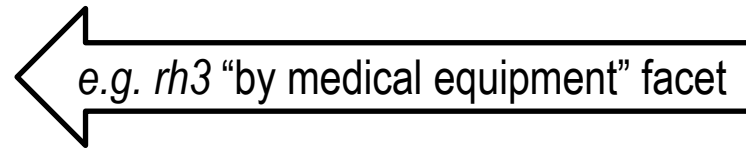
Basic ILC categories to organize facets

0 perspective

1 position; time

2 situation; place

3 agent



4 opposition

5 change

6 property

7 part

8 quantity

9 quality

Application of allergy facets as ILC facets

- ❑ Existing facets for ILC class *rh* “healthcare” have been considered as a starting point to organize allergy facets
- ❑ In ILC, facets for diseases (under *rh9-*) have to cover not only a list for types of disease – like “hypersensitivity” including allergy – but also one for treated parts, one for symptoms, one for severity, etc.
- ❑ In ILC, numerals also rule the syntactical properties of facets, including what in ontology terms are called their domain and range

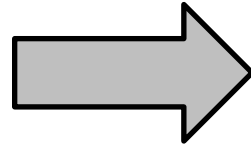
Allergy facets

ILC facets

Person (Children, ...)

Disease (Food Allergy, ...)

Treatment (Immunotherapy, ...)



rh96 “for *patient*”

rh94 “healing *condition*”

rh59 “treated by *therapy*”

The subject “immunotherapy in children food allergy” can be expressed as:

h96i94iplf59m “healthcare, for children, healing food allergy, treated by immunotherapy”

ILC facets of healthcare

rh “healthcare”

rh59 “treated by *therapy*”

rh94 “healing *condition*”

rh942 “with *concurrent condition*”

rh943 “caused by *organic pathogen*”

rh946 “showing *symptom*”

rh947 “complicated by *complication*”

rh96 “for *patient*”

rh97 “of *treated part*”

rh98 “*severity*”

ILC facets

- ❑ Facets of diseases belong to the lower level m “organisms”
- ❑ Some facets of rh “healthcare” have their range in $m4$ “diseases”
(parallel facets, extra-defined foci)
- ❑ Healthcare is one of the domains with the most complex facets system
(together with music)

Lesson learned and further investigations

- ❑ The special facets of a medical domain can be applied and represented in a general faceted classification. Contextual data about the actual knowledge use in a domain are useful for this task
- ❑ The bottom-up approach may be used to develop a general faceted classification
- ❑ Allergy concepts may show the need for additional special facets to be represented as specifications of existing healthcare facets by additional numerals
- ❑ The representation of allergy knowledge will soon be completed by further terms coming from different kinds of textual documents used by allergy professionals: titles and abstracts of scientific articles, messages from a general-public health forum, and clinical documents redacted in the Allergy Unit
- ❑ Comparison with the classes for allergies in the International Classification of Diseases or the ontologies available in the BioPortal may also be useful

References

- Binding, Ceri, Claudio Gnoli and Douglas Tudhope. 2021. "Migrating a complex classification scheme to the Semantic Web: expressing the Integrative Levels Classification using SKOS RDF". *Journal of Documentation* 77, n. 4: 926-945.
- Demoly, Pascal 2017. "L'allergologie ? Désormais une spécialité médicale universitaire". *Info Respiration*, n. 139: 15-16.
- Gnoli, Claudio. 2016. "Classifying phenomena, part 1: Dimensions", *Knowledge Organization* 43, n. 6: 403-415.
- Gnoli, Claudio. 2021. "Faceted classification as linked data: a logical analysis". *Knowledge Organization* 48, n. 3: 213-218.
- Morquin, David and Roxana Ologeanu-Taddei. 2018. "Le dossier patient informatisé: enjeux de la standardisation et personnalisation de l'information pour les professionnels de santé". In: Céline Paganelli (ed.). *Confiance et légitimité dans le champ de la santé*. London: ISTE.
- Trzmielewski, Marcin. 2022. Vers l'élaboration d'un système de représentation des connaissances en allergologie: analyse des documents et des pratiques informationnelles des acteurs. *Doctorales SFSIC*. Dijon, 23-24 June 2022.
- Trzmielewski, Marcin, Pascal Demoly, Luciana Kase Tanno, Davide Caimmi and Claudio Gnoli. 2019. "Information and Data in Allergology: Theoretical and Methodological Proposals to Build a Knowledge Organization Model dedicated to the Design of Info-Communication Devices". In: *ISKO Low Countries Conference. Morsels of Knowledge*, Bruxelles, 20-21 June 2019.
- Vickery, Brian C. 1960. *Faceted classification: a guide to construction and use of special schemes*. London: Aslib.