Lative Logic Accomodating the WHO Family of International Classifications

E

Patrik Eklund
Umeå University, Sweden

INTRODUCTION

Traditional logic is informal about the production of terms and sentences, and even worse, often avoids to clearly describe how terms latively appear in sentences, i.e., how sentences proceed from terms, and are in fact constructed using terms. Continuing that lativity towards entailment and provability, it is clear that sentences appear in provability, but provability as a statement should not be seen as a sentence. This creates self-referentiality which leads to peculiar situations, both theoretically as well as in WHO's classifications on health.

Logic, as a structure, contains signatures, terms, sentences, theoremata (as structured sets of sentences, or 'structured premises'), entailments, algebras, satisfactions, axioms, theories and proof calculi. This chapter also shows how the notion of signature often needs to be expanded to levels of signatures, in particular when dealing with type constructors. Lative logic produces a huge potential of applications using terminology, nomenclature and ontology in particular in social and health care. WHO classifications are logically lative. The reference classifications ICD and ICF then appear in structured relation with each other. Similar transformations can be made for the derived classifications as well as for the related classifications ICPC-2, ICECI, ISO9999, ATC/DDD and ICNP.

Formal mappings, e.g., between ICD and ICF are rare, and this is mostly due to a lack of understanding terminology and nomenclature as terms in a logic. ATC/DDD for drugs embraces 'dose' but not 'intervention', which means that drug-drug interactions are possible to describe whereas drug-condition is more complicated. IHTSDO's SNOMED CT subdivides 'concepts' within its hierarchy consisting e.g. of clinical findings disorders, body structure, pharmaceutical/biologic product, social context, staging and scales, and qualifier values, but has been developed only with intuitive connections with WHO classifications. Further, SNOMED's assumption that "health ontology" needs the same or a similar underlying logic as "web ontology", is a fatal mistake not promoting the "dialogue and interrelation of classifications and nomenclature" in useful application oriented directions.

The pillars and underlying observations of the chapter are the following:

- Modern type theory is not formal enough to recognize the need to arrange type constructors in a level of signatures.
- This provides tools to establish generalized relations as formal concepts, and also as substitution theory required to manage nomenclature and ontology in health care.
- Signatures and terms for nomenclatures and terms are in turn building blocks used in sentences that appear in guidelines and recommendations in social and health care.
- WHO and other international organizations as well as national authorities do not embrace a formal logic that is required in particular to develop relations and mapping between nomenclatures.

There are lots of "Yes, we can!" claims within authorities and industry about such nomenclatures and their intertwining, and this chapter very clearly shows "No, you cannot!, unless we first properly clean the logic mess appearing around nomenclatures in health.

The lack of regional strategies together with scattered and unstructured guidelines for prevention, detection and intervention related to older persons decline in cognitive and functional capabilities is the most serious threats against a sustainable development of supportive environments for the older persons. Further, the lack of well-structured guidelines and well-organized utility of assessment and, in particular, rigorous assessment based decision-making and care provisioning, leads to overlaps and inefficiency, and even worse, to subjective decision-making and care processes that cannot be measured nor evaluated. Socio-economic modelling of the social welfare effect due to demographic change is therefore of utmost importance, on the one hand, for municipality resource planning and objective decision making, and on the other hand, for enabling required accuracy of business models as used by public and private actors in the social sector.

This chapter is structured as follows. We first provide some examples and nomenclature detail related to fall risk and fall injuries. These descriptions are not intended to be complete from the viewpoint of the whole spectrum of fall risk factor, but rather serve to provide a few examples of terminology related to risk factures and fall related injuries. We then proceed to discuss the "osteoporosis fractures dogma", which is a debate to what extent fractures for older persons is more or less related to weak bone. This also includes an example of ICD encoding of a particular type of fracture. This reveals some logical problems involved when countries develop their own extensions to the core ICD nomenclature. Functioning is thereafter discussed in detail for the ICF nomenclature where the generic scale as related to kind of an uncertainty attachment is important. A brief survey of typing and lativity in logic concludes the chapter.

FALL AND FALL INJURIES

Fall prevention and fall risk is largely treated in the literature, but it is surprising that the traditional definition of fall is very shallow. This is very critical since cohorts and studies dealing with target groups and populations need to adapt to more specific definitions. This then often means that studies are not comparable. The literature does provide logically strict definitions of falls [Lach et al 1991], which prevents the use of those data in potentially comparable studies. Therefore, the operational definition of a fall is highly important. However, even if there are many different types of falls definitions, this does not necessarily mean we should aim at a simplified version of a definition. The definition of fall is very important to understand as the definition used in studies determines when observations for risk factors are registered and how falls and non-falls are discriminated.[1]

Although there is still no universally accepted definition or consensus as to what a fall should be, some definitions are more popular than others. In 1987 the Kellogg International Working Group on the prevention of falls in the elderly defined a fall as "an unintentionally coming to the ground or some lower level as a consequence of sustaining a violent blow, loss of consciousness, sudden onset of paralysis as in stroke or an epileptic seizure". Since then, many researchers have used this or very similar definitions of a fall. Depending on the focus of study, however, some researchers have used a broader definition of falls to include those that occur as a result of dizziness and syncope. The Kellogg definition is appropriate for studies aimed at identifying factors that impair sensorimotor function and balance control, whereas the broader definition is appropriate for studies that also address cardiovascular causes of falls such as postural hypotension and transient ischaemic attacks. WHO defines falls more broadly as "an

Related Content

Virtual Screening and Its Applications in Drug Discovery Process
Gurusamy Mariappanand Anju Kumari (2019). *Computer Applications in Drug Discovery and Development (pp. 101-126).*
www.irma-international.org/chapter/virtual-screening-and-its-applications-in-drug-discovery-process/217070

Predictive Modeling for Improving Healthcare Using IoT: Role of Predictive Models in Healthcare Using IoT
Jayanthi Jagannathanand Udaykumar U. (2020). *Incorporating the Internet of Things in Healthcare Applications and Wearable Devices (pp. 243-254).*
www.irma-international.org/chapter/predictive-modeling-for-improving-healthcare-using-iot/238982

Effect of a Motivational Song on the Autonomic Nervous System and the Heart of Indian Male Volunteers
Gitika Yadu, Suraj Kumar Nayak, Debasisha Panigrahi, Sirsendu Sekhar Rayand Kunal Pal (2018). *Design and Development of Affordable Healthcare Technologies (pp. 299-317).*
www.irma-international.org/chapter/effect-of-a-motivational-song-on-the-autonomic-nervous-system-and-the-heart-of-indian-male-volunteers/206302

Artificial Intelligence and Robotics in the Nail Care Industry: Are Cyberattackers Sitting Pretty for a Zero-Day Attack?
Laura Ann Jones (2024). *Innovations, Securities, and Case Studies Across Healthcare, Business, and Technology (pp. 274-295).*
www.irma-international.org/chapter/artificial-intelligence-and-robotics-in-the-nail-care-industry/336896

Redefining Health Education in the Post-Pandemic World: How to Integrate Digital Technologies into the Curricula?
Raquel Simões de Almeida (2023). *Handbook of Research on Instructional Technologies in Health Education and Allied Disciplines (pp. 1-25).*
www.irma-international.org/chapter/redefining-health-education-in-the-post-pandemic-world/320372