

Report on the process of selection&modelling of protocols

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Plan

- Purpose:
 - reflections on the selection&modelling of protocols
- Motivation:
 - useful for Protocure results (and after-Protocure activities)



Plan (cont.)

- Selection process
 - characteristics of protocols (with some numbers)
- Modelling process
 - an integrated framework
 - ...for what has been (and can be) done
 - ...and a case study: modelling a guideline for intravascular catheter infections
- Conclusions

Selection: characteristics of protocols

- Based on (some) protocol characteristics in:
 - [Bernstam et al., 2000]: *Guideline Classification to Assist Modeling, Authoring, Implementation and Retrieval*. AMIA Annual Fall Symposium 2000
 - NGC site (see <http://www.guideline.gov/>, Site Map > Help > Guideline Comparison)
 - [Shiffman et al., 2000]: *GEM: A Proposal for a More Comprehensive Guideline Document Model Using XML*. J Am Med Inform Assoc. 2000

Selection: characteristics of protocols (cont.)

– Different types of characteristics:

- general information, e.g.
 - developers, endorser, etc
 - release date
 - review methods, methods to collect evidence, rating scheme, etc
- purpose&audience, e.g.
 - category (e.g. counselling, diagnosis)
 - disease/condition (according to UMLS)
 - intended users (e.g. nurses, physicians)
 - speciality (e.g. cardiology)
 - target population (by sex/age)

Selection: characteristics of protocols (cont.)

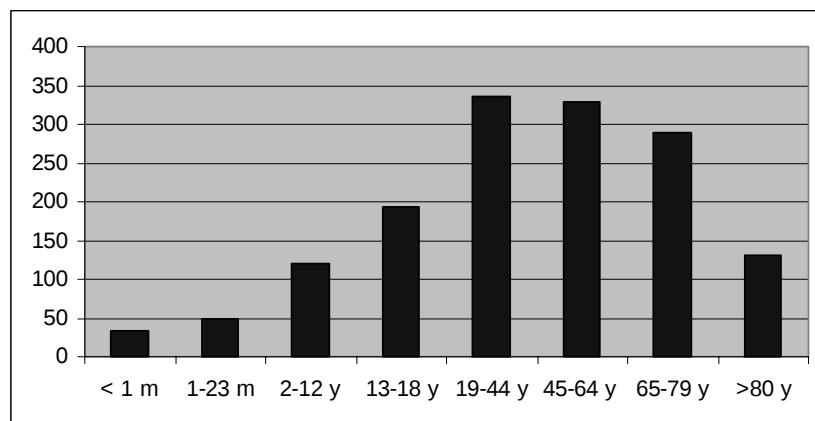
– Different types of characteristics (cont.):

- application, e.g.
 - care setting (e.g. ICU)
 - number of encounters
 - time frame (e.g. emergency, chronical)
- general information, for modellers, e.g.
 - availability of full text
 - computability (e.g. guiding, intermediate)
- detailed information, for modellers, e.g.
 - actions
 - algorithm (procedural)
 - conditional recommendations (declarative)
 - cost

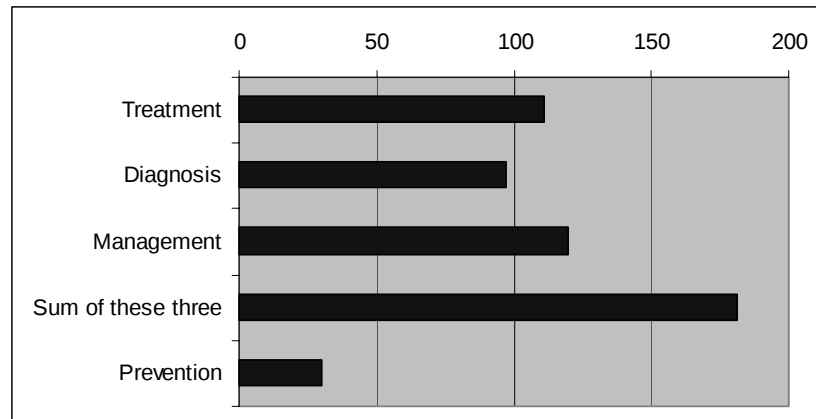
Selection: characteristics of protocols (cont.)

- Problem
 - too many guidelines
 - too little time to read them
- Solution
 - selection using NGC's query features

Different Ages



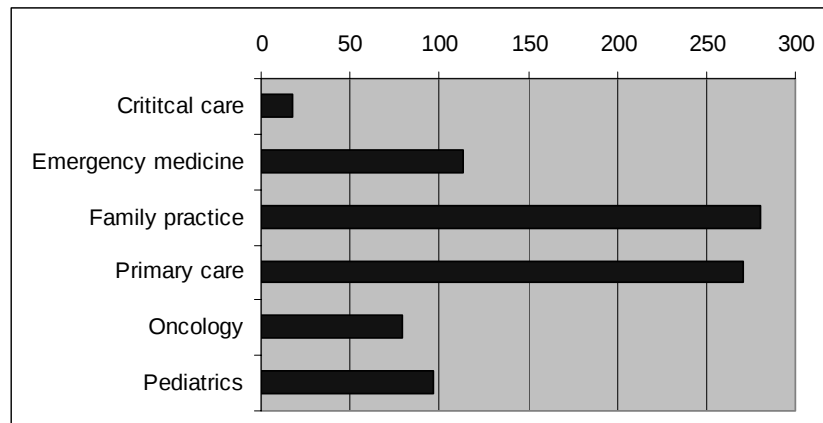
“Contains Clinical Algorithm”



Narrowing the Field

- Guidelines for diagnosis, evaluation, management, or treatment 856
- ... from 1996 or later 737
- ... for nurses or physicians 684
- ... for physicians (nurses only optional) 664

Different Specialties



The Final Decision

- Take the first one in critical care
 - with above restrictions
 - after sorting by date (reverse order)
- The winner is

*Guidelines for the Management of
Intravascular Catheter-Related
Infections*

Modelling: an integrated framework

- Observation:
 - one-step modelling is not possible, at least:
protocol $\longrightarrow$ intermediate $\longrightarrow$ XML-Asbru
 model model
- Question:
 - are there other possibilities?

Candidates for intermediate representation

- Some abstraction of Asbru
 - the workbench DTD
 - Yuval’s approach
 - the current Vienna approach
- Something independent
 - “aspects of guidelines (and statements)”
 - the Mar Marcos Markup

Aspects of guidelines (1/2)

- Control
 - Conditions to do something
 - Conditions not to do something/stop it
 - Invocation structure (call graph)
- Data
 - Definition
 - Flow of information
 - manipulation/usage

Aspects of guidelines (2/2)

- Timing
 - Temporal relation of parts (e.g. do before)
 - Numeric information on start, end, duration
- Reason & Background Information
 - Intention
 - Justification
 - recent reports on ... indicate the need to ...
 - Background information
 - 1/3 of all babies are jaundiced

Aspects: so what?

- Draw diagrams
 - interactively switching between aspects
 - various foci provide different subsets of all the complex information
- Annotate the (original) guideline text
 - assigning roles to text pieces
 - ... yet another markup
 - compare: Mar Marcos Markup

Mar Marcos' Markup (1/2)

- Recommendations
 - Negative
 - Alternatives
- Condition
 - Results
- Order
- Time

Mar Marcos' Markup (2/2)

- Goal
- Preference
 - prefer
 - to (optional!)
- Explanation

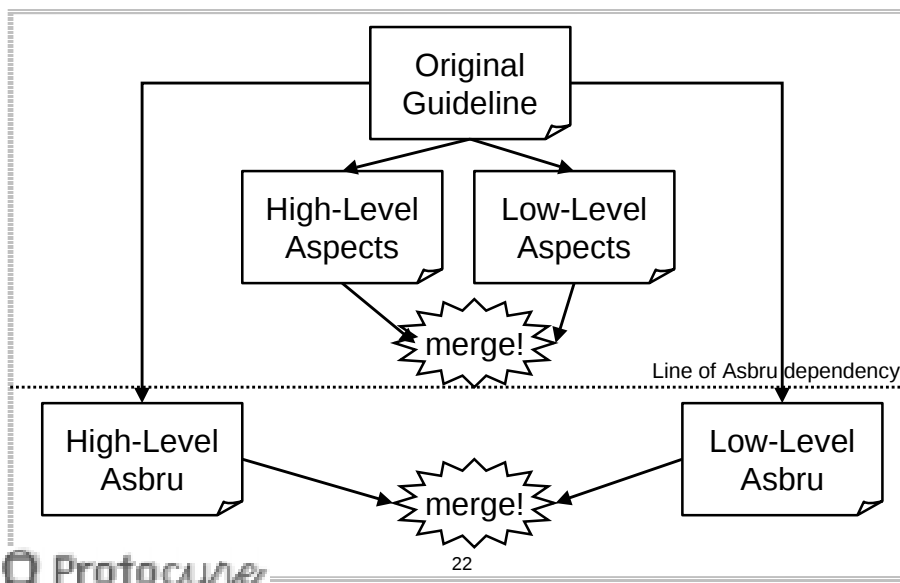
Modelling: what has been done

- Different ideas/tools:
 - an intermediate Asbru notation (**intermediate models**)
 - tools for XML Asbru (**XML-Asbru models**):
 - Vienna's PIXEE
 - Vienna “boxes” and A'dam visualiser
 - A'dam interpreter
 - a template for “noteworthy examples”
 - includes: title, protocol context, overview of the solution, detailed solution, implications/interactions, further usage

Modelling: what can be done

- Explore the “aspects”
 - compare other approaches
 - test on guidelines
- Design diagram representation
 - “Ph.D. for a person with psychology background”
- Explore markup
 - Vienna tool coming “soon”

The Big Picture of Modeling



Language Independent Aspects

- High Level
 - Control: call graph
 - Data: definitions
 - Time: relations between parts
 - Reason: background knowledge
- Low Level
 - Control: conditions
 - Data: usage, manipulation
 - Time & Reason: various details

Merge of Independent Aspects

- Would yield language independent, semi-formal representation of guideline
- Be (yet) another representation by itself!
- Maybe a Ph.D. for ...
- Still can shed a lot of light !
 - but should not get a cult of its own

Asbru Oriented Intermediate Reps

- High Level
 - Amsterdam boxes
 - Table of content in Jaundice guideline (i.e. call graph)
- Low Level
 - Asbru workbench
 - Vienna guideline markup tool
 - Mar Marcos Markup (semi-Asbru-dependent)

Merge of Asbru-Oriented Parts

- Would yield a potentially incomplete, incorrect picture of the original
 - if done without domain expert
 - input for guideline critiquing (compare Mar's anomalies)
- Needs several steps of refinement
- Promises labor efficiency
 - Direct path from original guideline to final Asbru code

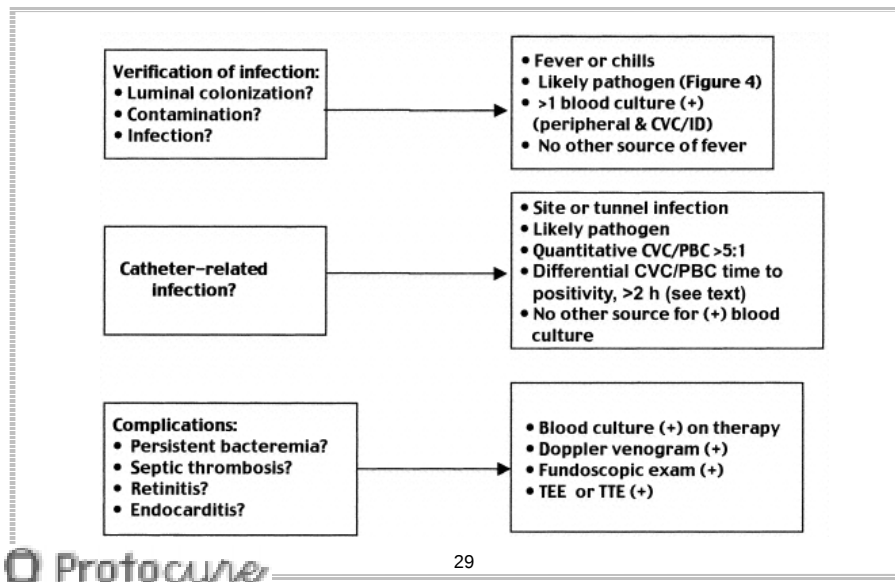
Modelling: a case study

- Guidelines for the Management of Intravascular Catheter-Related Infections
 - make sure the catheter is the cause of the infection
 - administer antibiotics (or not)
 - remove the catheter (or not)

Positive Features

- Clear cut lists of recommendations
- Background information
- Nicely structured (??)

Negative Features



Current State

- Asbru-oriented markup (in part)
- Aspect-annotated (in part)
- MMM (in part)
- there are ideas about the overall structure ...

Conclusions

- Modelling guidelines in a formal representation is hard
- Intermediate representation is desirable
- Many different dimensions / aspects

- 2 weeks are nothing ...