

Progress report on Asbru modelling of diabetes protocol

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Plan

- The diabetes protocol (revisited)
- The diabetes protocol in Asbru
- Progress report
- Next steps



The diabetes protocol

- The diabetes protocol of NHG:
 - management of diabetes mellitus type 2
 - aspects of clinical practice: diagnosis & treatment
 - features: long time-span application, general practitioner/consultation use, low-frequency data
 - presentation: text + tables, in two versions (cards/booklet), and now in English!

NEW

The diabetes protocol in Asbru

Hierarchical number	Plan title
1	Diabetes-Mellitus-Type-2
DIAGNOSTIC PLANS	
1.1	Diagnostics
1.1.1	Anamnesis
1.1.1.1	Anamnesis-typical-signs
1.1.1.2	Anamnesis-olderthan-45
1.1.2	Glucose-determination
1.1.3	Risk-inventory
TREATMENT PLANS	
1.2	Policy
1.2.1	Education-DMT2
1.2.2	Treatments-and-Controls
1.2.2.1	Non-insulin-DMT2-treatments
1.2.2.2	Insulin-DMT2-treatments
1.2.2.3	Treatment-of-CV-disease-risk-factors
1.2.2.4	Quarterly-control
1.2.2.5	Annual-control
1.2.3	Policy-for-simultaneous-diseases
1.2.4	Policy-for-hypoglycemic-coma
1.2.5	Consultation-and-referring
...	...

The diabetes protocol in Asbru (cont.)

- The top-level plan:

PLAN Diabetes-Mellitus-Type-2

PLAN BODY

do sequentially, wait-for-optional-subplans=yes, wait-for one

Diagnostics

Policy

The diabetes protocol in Asbru the diagnosis part

- Diagnosis plans:
 - Diagnostics plan

PLAN Diagnostics

CONDITIONS

complete-conditions: glucose-determination-needed=no

or glucose-evaluation≠DMT2

PLAN BODY

do sequentially, wait-for-optional-subplans=yes, wait-for Anamnesis

Anamnesis

Glucose-determination

Risk-inventory

The diabetes protocol in Asbru the treatment part

- Treatment plans:

- Policy plan

PLAN Policy

CONDITIONS

filter-preconditions: glucose-evaluation=DMT2

PLAN BODY

do sequentially, wait-for all

Education-DMT2

do unordered, retry-aborted-subplans=yes,

wait-for Treatments-and-Controls

Treatments-and-Controls

Policy-for-simultaneous-diseases

Policy-for-hypoglycemic-comma

Consultation-and-referring

 Protocolure

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The diabetes protocol in Asbru the treatment part (cont.)

- Treatments-and-Controls plan:

PLAN Treatments-and-Controls

CONDITIONS

complete-conditions: alive=false

PLAN BODY

do parallel, wait-for none

DMT2-treatments

Treatment-of-CV-disease-risk-factors

cyclical-plan Quarterly-control

retry-delay min=3mon max=3mon

cyclical-plan Annual-control

retry-delay min=1y max=1y

 Protocolure

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The diabetes protocol in Asbru the treatment part (cont.)

- DMT2-treatments plan:

PLAN DMT2-treatments

PLAN BODY

do sequentially, wait-for-optional-subplans=yes,
wait-for Non-insulin-DMT2-treatments
Non-insulin-DMT2-treatments
Insulin-DMT2-treatments

The diabetes protocol in Asbru the treatment part (cont.)

- Non-insulin-DMT2-treatments plan:

PLAN Non-insulin-DMT2-treatments

PLAN BODY

do sequentially, wait-for-optional-subplans=yes,
wait-for Diet-specialist-referring
Diet-specialist-referring
Fasting-glucose-test [3mon, 3mon] [_] [_]
SU-derivative-treatment
SU-derivative-plus-metformin-treatment

The diabetes protocol in Asbru the treatment part (cont.)

- SU-derivative-treatment plan:

PLAN SU-derivative-treatment

CONDITIONS

filter-preconditions: glucose-monitoring=bad
and quetelet-index $\leq$ 27

PLAN BODY

do sequentially, wait-for all

ask drug-name

put-last drug-name **in** antidiabetics

antidiabetic-doses:=Initialise-drug-doses(antidiabetics,
antidiabetic-doses)

antidiabetic-doses:=Find-drug-doses(antidiabetics,
antidiabetic-doses)



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The diabetes protocol in Asbru the treatment part (cont.)

- Find-drug-doses plan:

PLAN SU-derivative-treatment

CONDITIONS

complete-conditions: glucose-monitoring $\neq$ bad

abort-conditions: antidiabetic-maximal-doses=true

and glucose-monitoring=bad

PLAN BODY

cyclical-plan Increase-drug-doses

retry-delay min=2w max=4w



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Progress report

- Modelling “front line”:
 - first example for the collection of “noteworthy examples”
 - sequence of trials of different non-insulin treatments (describes: context, solution overview, detailed solution, implications/interactions, further usage)
 - study of the open questions in the protocol

Progress report open questions in the protocol

- Questions:
 - **Q:** Is a non-fasting test equivalent to a postprandial one? **A:** No! (*common medical knowledge*)
 - **Q:** How is the glucose level determined when working with the (3) postprandial values?
 - **Q:** Which are the target values for glucose? **A:** “good” for fasting tests, and “good” or “acceptable” for postprandial tests. (*in the booklet*)
 - **Q:** Should “after 3 months” be understood flexibly? **A:** Yes, e.g. from 2 week before to 2 week later. (*specialised medical knowledge*)

Progress report

open questions in the protocol (cont.)

- Questions (cont.):

- **Q:** How should “perform an additional fasting text in the next days” be understood? **A:** E.g. in the next 2-3 days. (*medical knowledge*)
- **Q:** How does step 3 in the policy work? the same as step 2? (there is no step 3 in the booklet!)
- **Q:** What does “change to another insulin regime” mean? specialist referral?
- **Q:** What does “add to an oral drug” mean?
- **Q:** When changing from 1 to 2 dd of insulin, how should the overall dose be distributed? 8-12 E in the morning, but what about the evening?

 Protocol

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open questions in the protocol (cont.)

- Questions (cont.):

- **Q:** After that, how should the morning dose be adapted?
- **Q:** In the cholesterol treatment the eligibility criteria is clarified with examples, should these be used? **A:** No, stick to the general description. (*medical knowledge*)
- **Q:** In the treatment with ACE inhibitors, what does “increase dose gradually” mean?
- **Q:** In the treatment of simultaneous diseases, what should be done besides extra liquid intake? **A:** “...temporary increase of glucose lowering therapy based on blood glucose levels. Never stop insulin intake”. (*translation*)

 Protocol

Next steps

- Solve the remaining open questions (with the help of CBO diabetes specialist)
- ...update the XML-Asbru version of the protocol
- ...and validate it with the help of the visualisators and the interpreter.