P1752.2 Metabolic Subgroup Meeting

Working Group Sponsored by IEEE Engineering in Medicine & Biology (EMB) Standards Committee

21 June 2022
Teleconference
Agenda

1. Attendance
2. Review of action items
3. Review of tasks
4. Other business
Review of Tasks
Next steps

- Update Open mHealth blood glucose schema as needed
- Draft additional schemas
- Model data elements for possible addition to 1752.1 header schema

- Resources for volunteers
  - Existing IEEE 1752.1 schemas
  - Existing Open mHealth schemas
Data elements to model (I)

• Glucose (mg/dL)
• Time in range (%) [TIR] [http://www.agpreport.org/agp/agpreports](http://www.agpreport.org/agp/agpreports)
• Time above range [TAR]
• Time below range [TBR]
• Mean glucose (average)±standard deviation
Data elements to model (II)

- Percentage coefficient of variation for glucose ($%CV = \frac{(SD \ of \ glucose)}{\text{mean glucose}}$)

- Glucose Management Indicator (GMI) tells you the approximate A1C level based on the average glucose level from CGM readings for 14 or more days (eA1C $\rightarrow$ GMI)
  
  [Link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6196826/)

- Number of hypo/hyper events / Timestamps of alarms [to be defined more precisely]

- Reference ranges (for hypo/hyperglycemia)
Additional measures

• Average daily carbs (g)
• Mean amplitude of glycemic excursions (MAGE): the arithmetic mean of differences between consecutive peaks and nadirs of differences greater than one SD of mean glycemia
• Mean of daily differences (MODD): the mean of absolute differences between glucose values at corresponding time points of consecutive days
• Rate of Increase
• Rate of Decrease
Additional measures (metadata)

- sensor usage (%)
- calibration status
- mean absolute relative difference (MARD) for accuracy (device-specific)
- number of scans (during a time period)
- sensor location, specimen source, sample location
- battery

**Suggestion**: amend header schema property *modality* value set to have the following items:
  - device generated
  - user reported
Temporal relationships

• Temporal relationship to meal*
• Temporal relationship to sleep*
• Temporal relationship to physical activity
  • e.g., before exercise, after exercise (see related OMH schema)
• Temporal relationship to doses of antihyperglycemic medications
  *These elements are present in the Open mHealth blood glucose schema

Proposal to have a generic temporal relationship to event property requires additional discussion
Temporal relationship to medication

- DrugSituation: medicine information
  - Name: the name of medicine
  - Number: the number of medicine (mg)
- Name: the name of insulin
  - Number: the number of insulin (unit)
- "DinnerSituation": "Before_breakfast",
- "DrugSituation": "After_taking_pills",
- [...]
- "Carbs": 100, <-- does this refer to the breakfast about to be eaten?
- "MedicineList": [
  
  "Name": "Actoplus Met",
  "Number": 1 <-- 1 what?
]
- ...

- "InsulinList": [
Temporal relationship to medication

Example schema
• Name: the name of medicine
• Number: the number of medicine(mg)
• Name: the name of insulin
• Number: the number of insulin(unit)

Example instance:
"DrugSituation": "After_taking_pills",
[...]

"MedicineList": [
  {
    "Name": "Actoplus Met",
    "Number": 1
  }]
[...]

"InsulinList": [
  {
    "Name": "Afrezza",
    "Number": 1
  }]
[...]
Summary of Action Items
Open action items from previous call

• Add a ReadMe file in the iMeet schema folder DONE
• Develop a step-by-step how-to for schema development
• Analyze FHIR observation resource wrt concentration (to follow up on proposal to have a concentration unit-value schema)
  • https://build.fhir.org/observation.html
  • https://build.fhir.org/datatypes.html
  • OMH medication schemas (strength, dose)
Next Meeting
Upcoming Meeting

• Metabolic subgroup:
  • Tuesday, July 26 19 at 8 am Pacific