IEEE STANDARDS ASSOCIATION

IEEE

P1752 Sleep Schema Subgroup Meeting

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

- 11 Sept 2018
- Teleconference

Attendance

- **Put your name and affiliation in the chat window for attendance today.**
- If you are joining only via phone, please email charlotte.chen@philips.com with "P1752 Sleep Schema Subgroup call" as subject
- The document shows attendance is under https://ieee-sa.imeetcentral.com/omh/folder/WzIwLDEwMjY4MDg1XQ/ .
  --If you attended the call, please verify that your name is listed
  --If you name is not listed, either edit the document above or email charlotte.chen@philips.com

Agenda

1. Attendance
2. Update and discuss the use cases (include 25 mins open discussion)
3. Schema Development Preparation (include 15 mins open discussion)
4. Action Items
5. Q&A

Sleep Schema Subgroup Deliverables

- **Clinically important sleep attributes**
- **Common sleep attributes of the existing relevant devices and apps**
- **Standard Comparison Report (Review and mapping)**
- Proposed sleep schemas (modified and new) and **use cases**

  (1) Macrostructure

  (2) Microstructure

  (3) Subjective sleep experience

  (4) Other sleep related phenomena

Timeline for Stage2

July 23, 2018
Kick Off

Oct 22, 2018 **Review** on Sleep Schemas and use cases

Nov 9, 2018
-Propose Sleep Schemas and use cases
-All the deliverables are ready

Update and Discuss the Use Cases

Update on Use Cases Development (1)

- Discussion on the draft use cases with Dr. David White on Aug 21:

  ---Participants: David, Josh, Paul, Koichiro, Simona, Charlotte

  ---Outcomes:

  (1) Better understanding of the sleep attributes and use cases;

  (2) Notes captured on the use case final draft worksheet;

  (3) Many discussions (via calls, emails, etc.);

  (4) Use case worksheet final draft in iMeet for review;

Update on Use Cases Development (2)

- Information included on the worksheet:

  -Sleep Attribute ID;

  -Sleep Attributes;

  -Sleep Attributes Abbreviations;

  -**Definition of the sleep attributes;**

  -Relevant Schema Categories (Macro/Micro/Subj./Others);

  -Appeared in which stage1 document(s)(Common in devices/apps, Standards, Clinical important);

  -Use case ID;

  -Use cases Description;

  -**Revised Use Case Description;**

  -Status

  -Four Columns of Notes from discussion with Dr. White

  -References for use cases;

Discuss on the Use Cases (1)

- Examples 1:

1	ID	Sleep Attribute(s)	Attribute Abbrev.	Use Case Description	Use Case ID	Revised Use Case Description	Status
2	1	Sleep Onset Latency	SOL	When a person has difficulty falling asleep, the objective measure is SOL. The specialist may ask: "How long does it usually take for you to fall asleep when you go to bed?"	2018-U1	When a person has difficulty falling asleep or history of insomnia, an objective measure is SOL. While sleep studies provide the gold standard measure, consumer-grade devices may also be useful. A sleep specialist may also elicit a self-reported subjective measure by asking: "How long does it usually take for you to fall asleep when you go to bed?"	Proposed
3	2	Total Sleep Time	TST	When a person feels sleepy, tired, or dozes off during the day, one measure is the TST.	2018-U2	When a person feels sleepy, tired, or dozes off during the day, an objective measure is TST. While sleep studies are the gold standard, consumer-grade devices like sleep trackers may also be used. A sleep specialist may elicit a subjective, self-report measure by asking: "How long do you usually sleep for?"	Proposed

Discuss on the Use Cases (2)

- Examples 2:

1	ID	Sleep Attribute(s)	Attribute Abbrev.	Use Case Description	Use Case ID	Revised Use Case Description	Status
5	4	Wake After Sleep Onset	WASO	When a person reports feeling sleepy, tired, or dozes off during the day, the specialist might ask: "How long are you usually awake after initially falling asleep?"	2018-U4	time somnolence, WASO is an objective measure that may be captured during a sleep study or with a consumer-grade sleep tracker. A sleep specialist may also elicit a subjective self-report measure by asking: "How long are you usually awake after initially falling asleep?"	Proposed
6	5	Arousal Index	AI	When a person reports feeling sleepy, tired or dozing during the day, the specialist might ask: "How many times did you usually wake up after falling asleep?"	2018-U5	When a person reports constantly feeling sleepy, tired or dozing during the day, the specialist might ask: "How many times do you usually wake up after falling asleep?" However, the subject might not realize awakening everytime. Question: Should this be an arousal state that can be reported with the time stamp and duration as an effective measure, that can be further assessed as a index? Or should we propose an index, and is there a gold standard for this index?	Follow-up question for Dr. White

Discuss on the Use Cases (3)

- Examples 3:

1	ID	Sleep Attribute(s)	Attribute Abbrev.	Use Case Description	Use Case ID	Revised Use Case Description	Status
10	9	Number of Sleep Spindles	NSS	cognitive function, one of the objective measures is the number of sleep spindles			Exclude
11	10	Number of K-complexes	NKC	When a person reports feeling tired in the morning, one of the objective measures is number of K-complexes.			Exclude

Discuss on the Use Cases (4)

- Examples 4:

1	ID	Sleep Attribute(s)	Attribute Abbrev.	Use Case Description	Use Case ID	Revised Use Case Description	Status
19	18	Resting Heart Rate	RHR			No value to create a use case for this attribute alone. Although this is a reported value from many sleep devices as heart rate. This needs to be collected through some means. Question: How do we point to or use as sleep attributes that other sub-groups or P1752 will be defining. i.e. Cardiac team or similar.	Follow-up question for P1752 main group.
20	19	Heart Rate Variability + RHR	HRV			When a preson gets up and feel sleepy, he might check his deep sleep duration or percentage on his HRV+RHR tracker with capability to estimate sleep stages from the HRV+RHR. This needs to be collected through some means. Question: How do we point to or use as sleep attributes that other sub-groups or P1752 will be defining. i.e. Cardiac team or similar.	Follow-up question for P1752 main group.

Discuss on Use Cases (5)

- Open discussion on the use cases developed (25 mins)

  -Q&A

  -Suggestions/Comments
- Next step for use cases:

  -Review/Comment by 9/14/2018

  -Final version in iMeet by 9/20/2018

Schema Development Preparation

- Overview of Schema development tasks
- Review/Discuss the list of mapping
- Discuss the proposed approach

Overview of Schema Development Tasks (1)

❖Review and Understand the Existing Work (Open mHealth)

- Design principles:

http://www.openmhealth.org/documentation/#/schema-docs/schema-design-principles

- Existing templates for various schemas:

http://www.openmhealth.org/documentation/#/schema-docs/write-a-schema

- Existing sleep schemas:

http://www.openmhealth.org/schema/omh/sleep-duration-2.0.json

http://www.openmhealth.org/documentation/#/schema-docs/schema-library/schemas/omh_sleep-episode

Overview of Schema Development Tasks (2)

❖Propose Modified and New Sleep Schemas

- Determine the sleep attributes for schema development

  -Determine the mappings between a schema and sleep attribute(s) based on the use case worksheet: (output: a list of schema names vs sleep attribute(s))

  ---one to one mapping (a schema contains a single sleep attribute)

  ---one to multiple mapping (a schema contains more than one sleep attributes)

  -Choose a name for each proposed schema

  -Categorize the schemas into 4 areas if necessary

- For each schema name above, create/modify it to include the necessary sections (TBD):

  -schema header (“reference” section: SNOMED, LOINC, RxNORM, or UCUM)

  -”definitions”

  -”properties”

  -”required”

Review/Discuss the List of Mapping (15 mins)

	Schema ID	Schema Name	Sleep Attribute1 (unit)	Sleep Attribute2 (unit)	Sleep Attribute3 (unit)	Sleep Attribute4 (unit)	Sleep Attribute5 (unit)	Associated Sleep Attribute(s)	Use Case ID
2	2018-S1	SleepOnsetLatency	SOL					WASO, Self-report	2018-U1
3	2018-S2	TotalSleepTime	TST					TIB, SOL, WASO, Self-report	2018-U2
4	2018-S3	TimeInBed	TIB					TST, SOL, WASO, Self-report	2018-U3
5	2018-S4	WakeAfterSleepOnset	WASO					SOL, AI, Self-report	2018-U4
6	2018-S5	ArousalState	AI	MA				WAK	2018-U5
7	2018-S6	SleepStages	DREM	DDS	DLS	TST			2018-U6, 2018-U7, 2018-U8
8	2018-S7	DeepSleep	DDS	TST				DLS, DREM	2018-U7
9	2018-S8	LightSleep	DLS	TST				DDS, DREM	2018-U8
10	2018-S9	Snore	SNS	SD	TST			AHI	2018-U9, 2018-U10, 2018-U11
11	2018-S10	OSA	AHI	SNS	SD	TST	BP	AI, SpO2, Resp	2018-U11, 2018-U13
12	2018-S11	BodyMovement	BM					DDS, DLS, AI	2018-U12
13	2018-S12	SleepEnviromentalFactors	L	Snd	Atmp			TST, SOL, WASO, AI, WAK, DDS, DLS	2018-U14, 2018-U15, 2018-U16

Proposed Approaches

➢**Determine if adopt the existing Open mHealth schema structure**

- Entire team

➢**Draft Schemas (Two Approaches)**

(1) Create a volunteer based ad hoc team to draft all the schemas

(2) Divide into possibly two groups to develop schemas:

---Macrostructure and microstructure

---Subjective sleep experience and other sleep related phenomena

➢**Review/Comment**

- Entire team

Action Items

- Review/Comment on the proposed use cases by Sept 14,2018
- Review/Discuss/Modify the list of mapping (schema vs. sleep attribute(s)) by Sept. 16, 2018
- Draft schemas done by Oct. 22, 2018
- Review schemas completed by Nov. 2, 2018
- Propose the schemas with use cases on Nov. 9, 2018

Future Meetings

- Continue with Tuesdays at 8:30 AM Pacific / 11:30 AM Eastern
- Upcoming meetings
  - Oct 9, 2018
  - Nov 6, 2018

Adjournment