

STATUS UPDATE | **TG-CARDIO EXPANDED SCOPE** | JAN 2020

DIFFERENTIATION OF MULTIPLE SUBTOPICS BEYOND  
**CARDIOVASCULAR DISEASE (CVD) RISK PREDICTION USING  
MACHINE LEARNING**

UPDATE SUBMITTED BY

**DR. BENJAMIN MUTHAMBI**

[WWW.LINKEDIN.COM/IN/BMUTHAMBI](http://WWW.LINKEDIN.COM/IN/BMUTHAMBI)

SNR SCHOLAR-IN-RESIDENCE/MANAGING DIRECTOR

IEPH/INSTITUTES OF EPIDEMIOLOGY & PUBLIC HEALTH

IN PARTNERSHIP WITH WATIF HEALTH



# ASSIGNMENT OF 2<sup>ND</sup> SUBTOPIC TO TG-CARDIO – SEPT 2019

## Evaluating Accuracy of AI in CVD Risk Prediction

- Risk Scoring Calculators (Standard of Practice) vs.
- AI Risk Estimation

Subtopic #1a

risk of death, <1% at 10 years.

**Low risk**, <10%

**Intermediate risk**, 10-20%

**Moderately high risk**, 15-20%

**High risk**, >20%

## Evaluating Accuracy of AI in Coronary CT Scan Image Interpretation

- Radiologist's Image Interpretation (Standard of Practice) vs.
- AI Image Interpretation

Subtopic #2a

## Interpretation of CAC

CAC = 0.

CAC = 1-100.

CAC = 101-400.

CAC = 101-400 & >75th centile.

CAC > 400.

Subtopic #1b/#2b

# TG-CARDIO | POTENTIAL MULTIPLE SUBTOPICS IN EXPANDED SCOPE

- SUBTOPIC #1 – CLINICAL PREDICTIONS | **CVD Risk Prediction using AI**
- SUBTOPIC #2 – CARDIAC IMAGE ANALYSIS | **AI-assisted Coronary CT Image Processing/Recognition for Coronary Artery Disease (CAD) Diagnosis in Coronary Computed Tomography Angiography (CCTA)**
- SUBTOPIC #3 – INTELLIGENT ROBOTS | e.g. Surgical Robot Technologies incl. AI-assisted Minimally Invasive Cardiac Surgery
- SUBTOPIC #4 – PRECISION MEDICINE | e.g. AI-assisted Individualized Medicine and healthcare customized for each patient

With the advent of the addition of a 2<sup>nd</sup> subtopic not primarily addressing the originally envisaged limited scope of TG-Cardio which focused on “**CVD risk prediction**”, the scope of topic group/TG-Cardio has thus been effectively expanded into a broader cardiac organ system-based cluster of potential subtopics/categories listed below.

# TENTATIVE PROJECT MILESTONES—UPDATE OF 1/22/2020

| Activities Towards TDD, TDD Implementation Demonstration Project, Replication & Real World Devices Standardization | Subtopic #1:<br>Clinical Prediction   CVD Risk Prediction | Subtopic #2:<br>Cardiac Image Analysis   Coronary Computed Tomography Angiography (CCTA) in CAD diagnosis | Subtopic #3:<br>Intelligent Robots | Subtopic #4:<br>Precision Medicine |
|--|---|---|------------------------------------|------------------------------------|
| <b>Inaugural Use Case Proposal for Subtopic</b>  | <b>Jan 2019</b>   | Sept 2019   | TBD                                | TBD                                |
| <b>Call for Participants</b>   |   |   |                                    |                                    |
| General Call for Participants  | March 2019  | TBD   |                                    |                                    |
| Call for Technical Participants  | Jan 2020  | TBD   |                                    |                                    |
| Call for Data-Contributing Participants  | TBD   | TBD   |                                    |                                    |
| <b>TDD (Topic Description Document)</b>  |   |   |                                    |                                    |
| Initial/Preliminary TDD Draft  | Nov 2019  | Oct 2019-Subtopic Summary   |                                    |                                    |
| Review & Refinement Draft TDD  | <b>Jan 2020</b> =>  | TBD   |                                    |                                    |
| <b>TDD Implementation Demonstration Project</b>  | TBD   | TBD   |                                    |                                    |
| Replication Studies  | TBD   | TBD   |                                    |                                    |
| <b>Real World Application-Device Standards</b>   | TBD   | TBD   |                                    |                                    |

# TG-CARDIO | MULTIPLE SUBTOPICS IN EXPANDED SCOPE



## TG-Cardio

Topic Group on Use of AI in Cardiovascular Disease Management

### Scope

This FG-AI4H topic group is dedicated to using artificial intelligence in cardiovascular disease management. *With the advent of the addition of a subtopic not primarily addressing the originally envisaged limited scope of TG-Cardio which focused on CVD risk prediction, the scope of topic group TG-Cardio has thus been effectively expanded into a broader cardiac organ system-based cluster of potential subtopics/categories listed below:*

- **Subtopic 1 - Clinical Predictions | CVD Risk Prediction using AI:**
  - Inaugural use case proposal
  - How to join subtopic group:
    - Go to subtopic page (ITU account required)
    - Public site access to onboarding info: [https://www.itu.int/en/ITU-T/focusgroups/ai4h/Documents/ITU\\_WHO\\_AI4H\\_Onboarding.pdf](https://www.itu.int/en/ITU-T/focusgroups/ai4h/Documents/ITU_WHO_AI4H_Onboarding.pdf)
- **Subtopic 2 - Cardiac Image Analysis | AI-assisted Coronary CT Image Processing/ Recognition for Coronary Artery Disease (CAD) Diagnostic System in Coronary Computed Tomography Angiography (CCTA)**
  - Inaugural use case proposal
  - How to join subtopic group: Call for subtopic group participation (TBD/Pending)
  - Subtopic description & status report (TBD/Pending)
- **Subtopic 3 - Intelligent Robots | Surgical Robot Technologies incl. AI-assisted Minimally Invasive Cardiac Surgery**
  - Call for new AI for health topic & use case proposal
    - Intranet page if logged-in
    - Public site address: <https://www.itu.int/en/ITU-T/focusgroups/ai4h/Pages/default.aspx> (Info under "Contribute")
- **Subtopic 4 - Precision Medicine | AI-assisted Individualized Medicine and healthcare customized for each patient**
  - Call for new AI for health topic & use case proposal
    - Intranet page if logged-in
    - Public site address: <https://www.itu.int/en/ITU-T/focusgroups/ai4h/Pages/default.aspx> (Info under "Contribute")

Renaming of Topic Group To Reflect:

- Broader Scope beyond CVD Risk Prediction

Update of TG-Cardio Main Page to Reflect:

- Multiple subtopics with distinct objectives
- Subgroups within topic group TG-Cardio working on distinct TDDs for each subtopic





[TG-Cardio Subgroup](#) page for subtopic on **CVD risk prediction** subtopic

- Supports subgroup working on distinct TDD for subtopic on CVD risk prediction

## [TG-Cardio | AI use in Cardiovascular Disease Management Subtopic Group on CVD Risk Prediction](#)

### Scope of Subtopic: CVD Risk Prediction

This FG-AI4H topic group is dedicated to using artificial intelligence methods to help predict cardiovascular disease risk.

- How to join:
  - Call for subtopic group participation (Updates for Mtng H - January 2020)
  - Call for subtopic group participation (Updates for Mtng-G)
- Updates of Topic Description Document (TDD) & Progress Reports
  - Topic description & status report (Update for Mtng H - January 2020)
  - Topic description & status report (Updates for Mtng G)

### TG-Cardio | Navigation

#### + new item

- ✓ TG-Cardio Site Pages
  - [Main Topic Page](#)
  - [CVD Risk Prediction](#)

### Discussions List

**Email list creation** for subtopic/subgroup: “TG-Cardio | CVD risk prediction”

- Work to continue thru asynchronous online editing of shared TDD document sections by teams of technical participants invited through Jan 2020 Call for Participants