

# INPLASY PROTOCOL

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**Corresponding author:**  
Hengameh Ferdosian

ferdosian.h@gmail.com

**Author Affiliation:**  
Tehran University of Medical Sciences, Tehran, Iran.

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**Conflicts of interest:**  
None declared.

## Application of artificial intelligence in prediction of cardiovascular complications in patients with diabetes mellitus type 2: A protocol of systematic review

Ferdosian, H<sup>1</sup>; Zamanian, H<sup>2</sup>; Emami, SA<sup>3</sup>; Sedighi, E<sup>4</sup>; Moridi, M<sup>5</sup>; Doustmehraban, M<sup>6</sup>.

**Review question / Objective:** The aim of this systematic review is to evaluate AI-based models in identifying predictors of cardiovascular events and risk prediction in patients with diabetes mellitus type 2.

**Condition being studied:** T2DM patients have an increased risk of macrovascular and microvascular complications, lead to decreased quality of life and mortality. Considering the significance of cardiovascular complications in these patients, prediction of such events would be important. Different traditional statistical methods (such as regression) and new AI-based algorithms are used to predict these complications in diabetic patients.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 October 2021 and was last updated on 20 October 2021 (registration number INPLASY2021100076).

### INTRODUCTION

**Review question / Objective:** The aim of this systematic review is to evaluate AI-based models in identifying predictors of cardiovascular events and risk prediction in patients with diabetes mellitus type 2.

**Condition being studied:** T2DM patients have an increased risk of macrovascular and microvascular complications, lead to decreased quality of life and mortality. Considering the significance of cardiovascular complications in these patients, prediction of such events would be important. Different traditional statistical

methods (such as regression) and new AI-based algorithms are used to predict these complications in diabetic patients.

## METHODS

**Search strategy:** We used the following keyword combinations to find relevant articles: (AI-based OR "artificial intellig\*" OR "artificial-intellig\*" OR "neural network\*" OR "deep learning" OR "deep-learning" OR "machine learning" OR "machine-learning" OR "big data tech\*" OR python OR scala OR "artificial neur\*" OR "deep neur\*" OR "hybrid neur\*" OR ensemble OR "data mining" OR datamining OR "data-mining" OR "reinforcement learning" OR "reinforcement-learning" OR SVM OR "vector\* machine\*" OR "support vector\*" OR "vector\* network\*" OR "vector\* support\*" OR "deep unified network\*" OR "computational intelligen\*" OR "machine\* intellig\*" OR "machine-intellig\*" OR "learning machine\*" OR "learning algorithm\*" OR "learning vector\*" OR "support-vector\*" OR "inductive machine\*" OR "inductive learning" OR "supervised learning" OR "deep belief network\*" OR "supervised network\*" OR "supervised algorithm\*" OR "unsupervised learning" OR "unsupervised network\*" OR "unsupervised algorithm\*" OR "semi-supervised learning" OR "limited supervision" OR "training data" OR "generative adversarial network\*") AND TITLE-ABS-KEY (diabet\*) AND TITLE-ABS-KEY (cardio\* OR cardia\* OR arrhythm\* OR dysrhythm\* OR "peripheral arterial disease\*" OR vascular OR heart\* OR coronary OR IHD OR CAD OR PAD OR CVD OR CHD OR "myocardial\*").

**Participant or population:** Patients with diabetes mellitus type 2 are considered in this review.

**Intervention:** We have no intervention due to our review question, but our main group is AI-based predictor model.

**Comparator:** We have no intervention due to our review question.

**Study designs to be included:** Only cohort studies are included.

**Eligibility criteria:** INCLUSION CRITERIA 1. Articles in all languages 2. Cohort study types 3. Patients with diabetes mellitus type II 4. All Macrovascular complications associated with particularly cardiac disease 5. clearly described AI algorithms and process used EXCLUSION CRITERIA 1. Case reports, conference proceedings, letters 2. DM type I or impaired glucose tolerance patients or pre-diabetic patients 3. Diabetic Patients comorbid with major systemic diseases 4. Peripheral arterial disease, cardiovascular autonomic neuropathy and other microvascular complications.

**Information sources:** The following databases searched: Pubmed, Web of science core collection, Scopus, Embase.

**Main outcome(s):** Macrovascular complications.

**Data management:** All results were screened by at least two authors and finally the disagreement was resolved by the third author. All retrieved results were exported into Endnote and then Rayyan platform for screening and teamwork management.

**Quality assessment / Risk of bias analysis:** Modified observational scale was used for quality assessment.

**Strategy of data synthesis:** Since we have no meta-analysis in this review, we will do just qualitative synthesis considering different levels of extracted data such as country, study type, sample size, etc.

**Subgroup analysis:** None.

**Sensitivity analysis:** None.

**Country(ies) involved:** Iran, Australia.

**Keywords:** Diabetes mellitus type 2, cardiovascular disease, artificial intelligence, prediction.

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**Contributions of each author:**

**Author 1 - Hengameh Ferdosian.**

**Email: hengameh.ferdosian@gmail.com**

**Author 2 - Hadi Zamanian.**

**Email: hadi\_zamanian@yahoo.com**

**Author 3 - Sayed Ali Emami.**

**Email: ali.emami91@yahoo.com**

**Author 4 - Elahe Sedighi.**

**Email: ela.sedighi@gmail.com**

**Author 5 - Mina Moridi.**

**Email: mina\_m292002@yahoo.com**

**Author 6 - Maryam Doustmehraban.**

**Email: mehrimaryam31@gmail.com**