**Major Adverse Cardiac Events while on statins– Phenotype Definition**

**Phenotype Description**: Patients with Major Adverse Cardiac Events (MACE) while on statins. The type of MACE will be divided into revascularization events (bypass surgery or angioplasty/intracardiac stenting) and acute myocardial infarction (AMI). Additionally, patients will be distinguished as being their first event (e.g., the first MI) or not.

For either type of MACE (revascularization or AMI), the algorithm identifies two cohorts based on the data from electronic medical records (EMRs). One is the group of subjects of the MACE (revascularization or AMI) while on statin, and the other is the group of subjects of 1st MACE while on statin. The latter is a subset of the former.

If you have questions regarding any of the information presented on this page, you may contact either:

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**Algorithms for the Phenotype**

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| **AMI on statin** | * At least 2 current AMI Codes (410.\* or 411.\*) within a 5-Days Window
* Confirmed Lab within the same time window defined by
	+ Troponin-I≥0.10 ng/ml
	+ or Troponin-T≥0.10 ng/ml,
	+ or CK-MB/CK ratio≥3.0 and CK-MB ≥10.0 ng/mL
* Statin prescribed prior to the AMI event ≥180 days
 |
| **1st AMI on statin** | * AMI on statin
* No any AMI codes (410.\*, 411.\*, or 412.\*) assigned before the AMI event
* No AMI mentioned in previous problem list by NLP
 |
| **Revascularization while on statin**  | * Any CPT code for angioplasty or stent (see below)
* statin prescribed prior to the procedure ≥180 days
 |
| **1st Revascularization****while on statin** | * Revascularization while on statin
* No exclusion codes before starting statin (see below)
* No revascularization mentioned in previous problem list by NLP
 |
| **Statin exposure** | * The number of days that the earliest statin prescription prior to the event (AMI/Revascularization)
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| **All-cause mortality** | * EMR or social security death index (SSDI) defined mortality (date)
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**The timeline of AMI on statin**

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AMI on statins: Case definition (all three conditions required):

* At least two ICD9 code for AMI or other acute and subacute forms of ischemic heart disease within a five-day window (see AMI Case ICD9 codes below)
* Confirmed lab within the same time window (see AMI Case lab names/values below)
* Statin prescribed prior to the AMI event in medical records at least 180 days

**The timeline of 1st AMI on statin**



1s**t** AMI on statins: Case definition (all four conditions required):

* Meet the above criteria for AMI on statins
* No diagnosis code for AMI, other acute and subacute forms of ischemic heart , or historical AMI assigned previously (see Case exclusion ICD 9 codes below)
* No revascularization CPT codes assigned previously (see Revascularization CPT codes below)
* No MACE found in previous problem list by NLP (see MACE Exclusion keywords listed below)

Revascularization while on statin: Case definition (both conditions required):

* At least one revascularization CPT code (see Revascularization CPT codesbelow)
* Statin prescribed prior to the revascularization event in medical records at least 180 days

1st Revascularization while on statin: Case definition (all four conditions required):

* Meet the above criteria for revascularization while on statin
* No diagnosis code for AMI, other acute and subacute forms of ischemic heart , or historical AMI assigned previously (see Case exclusion ICD 9 codes below)
* No revascularization CPT codes assigned previously (see Revascularization CPT codes below)
* No MACE found in previous problem list by NLP (see MACE Exclusion keywords listed below)

Control definition

* Statin prescribed
* No diagnosis code for AMI, other acute and subacute forms of ischemic heart , or historical AMI assigned previously (see Case exclusion ICD 9 codes below)
* No revascularization CPT codes assigned previously (see Revascularization CPT codes below)
* No MACE found in previous problem list by NLP (see MACE Exclusion keywords listed below)

**Variables of Interest**

**Medication keyword list**

Simvastatin, Zocor

Fluvastatin, Lescol, Canef,  Vastin

Atorvastatin, Lipitor

Pravastatin, Pravachol, Selektine

Lovastatin, Mevacor

Cerivastatin, Baycol, Lipobay

Rosuvastatin, Crestor

**AMI Case ICD9**

410.\*: AMI

411.\*: Other acute and subacute forms of ischemic heart disease

**AMI Case lab names/values**

TnI: >=0.10 ng/ml

TnT: >=0.10 ng/ml

CKMB ratio: >=3.0 and CK-MB >=10.0 ng/mL

**Case exclusion ICD 9 codes**

410.\*: AMI

411.\*: Other acute and subacute forms of ischemic heart disease

412: Old myocardial infarction

**Revascularization CPT codes**

**CABG**

33533 – coronary artery bypass, using arterial grafts; single arterial graft

33534 - coronary artery bypass, using arterial grafts; two coronary artery grafts

33535 - coronary artery bypass, using arterial grafts; three coronary artery grafts

33536 - coronary artery bypass, using arterial grafts; four or more coronary artery grafts

33510 - coronary artery bypass, vein only, single coronary venous graft

33511- coronary artery bypass, vein only, two coronary venous grafts

33512- coronary artery bypass, vein only, three coronary venous grafts

33513- coronary artery bypass, vein only, four coronary venous grafts

33514- coronary artery bypass, vein only, five coronary venous grafts

33515- coronary artery bypass (old code)

33516- coronary artery bypass, vein only, six coronary venous grafts

33517 - coronary artery bypass, using venous grafts and arterial grafts, single vein graft

33518 - coronary artery bypass, using venous grafts and arterial grafts, two venous grafts

33519- coronary artery bypass, using venous grafts and arterial grafts, three venous grafts

33520 - coronary artery bypass (old code)

33521 - coronary artery bypass, using venous grafts and arterial grafts, four venous grafts

33522 - coronary artery bypass, using venous grafts and arterial grafts, five venous grafts

33523 - coronary artery bypass, using venous grafts and arterial grafts, six venous grafts

**PTCA**

92980 – transcatheter placement of an intracoronary stent, percutaneous, with or without other therapeutic intervention, any method, single vessel

92981 - transcatheter placement of an intracoronary stent, percutaneous, with or without other therapeutic intervention, any method, each additional vessel

92982 – percutaneous transluminal coronary balloon angioplasty, single vessel

92984  – percutaneous transluminal coronary balloon angioplasty, each additional vessel

92995 - percutaneous transluminal coronary atherectomy, by mechanical or other method, with or without balloon angioplasty, single vessel

92996 - percutaneous transluminal coronary atherectomy, by mechanical or other method, with or without balloon angioplasty, each additional vessel

C1874 - Stent, Coated/Covered, With Delivery System

C1875 - Stent, Coated/Covered, Without Delivery System

C1876 - Stent, Non-coated/Non-covered With Delivery System

C1877 - Stent, Non-coated/Non-covered Without Delivery System

**Case Keywords**

AMI: “ AMI ”,“ MI ”,“acute myocardial infarction”, “myocardial infarction”

Revascularizaion: “CABG”, “coronary artery bypass”, “cypher”, “taxus”, “BMS”, “DES”, “stent”

**MACE** **Exclusion keywords (if present, cannot be a control)**

“ AMI ”,“ MI ”,“acute myocardial infarction”, “myocardial infarction”, “CABG”, “coronary artery bypass”,

“cypher”, “taxus”, “BMS”, “DES”, “stent”