**Real-world Practice of Reperfusion in Patients with ST-Segment Elevation Myocardial Infarction in China: Findings from the Improving Care for Cardiovascular Disease in China–Acute Coronary Syndrome (CCC-ACS) Project**

**SUPPLEMENTAL APPENDIX**

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Supplemental Methods

Definitions of other variables

The medical insurance status of patients was categorized as “urban” (Urban Employee Basic Medical Insurance and Urban Resident Basic Medical Insurance), “rural” (New Rural Cooperative Medical Insurance), “self-paid”, or “others”. Hypertension was defined as having a history of hypertension, receiving antihypertensive therapy, or having a systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg on admission. Diabetes mellitus was defined as having a history of diabetes, receiving glucose-lowing drugs, HbA1c ≥ 6.5% at admission, or with diabetes mellitus in discharge diagnosis. Elevated low-density lipoprotein cholesterol level (LDL-C) was defined as having a serum LDL-C level ≥ 1.8 mmol/L (70 mg/dL). Smoking includes both current smoking, recent smoking (within 1 year of the current hospitalization) and stop smoking less than 1 year. Estimated glomerular filtration rate (eGFR) was calculated using the Modification of Diet in Renal Disease Study equation1. Chronic heart failure (CHF) was defined as having a history of heart failure, left ventricular ejection fraction (LVEF) < 50%, or having a new diagnosis of CHF in discharge record. High bleeding risk was were diagnosed by doctors during patients’ hospitalization and recorded in medical records at admission. A history of coronary heart disease (CHD) was specified if patients had a clinical history of myocardial infarction or underwent percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) prior to the current hospitalization. The transfer status indicated whether the patient was transferred in from another hospital. Acute heart failure, cardiogenic shock, and cardiac arrest at admission were defined based on the corresponding documentation of the clinical condition at hospital arrival. Multivessel coronary artery disease (CAD) was defined, according to in-patient records and coronary angiography reports, as a stenosis of 70% or greater in 2 or more epicardial coronary arteries other than the left main, where a stenosis of 50% or more was considered obstructive. The culprit vessel for AMI was defined as the coronary segment with the highest degree of stenosis and lesion complexity, and identified according to in-patient records and coronary angiography reports. The number of coronary arteries narrowed was identified according to coronary angiography reports. Multivessel PCI was defined as PCI in 2 or more territories (left main, left anterior descending, left circumflex, or right coronary artery) during the procedure for patients with multivessel CAD. Furthermore, a part of variables related to procedural characteristic, including the total number of stents and the use of multivessel PCI, intra-aortic balloon pump (IABP), percutaneous transluminal coronary angioplasty (PTCA), have been only recorded during Phases III and IV.

We also identified hospital-level factors, such as seven official geographical regions (North China, Northeast China, East China, Central China, South China, Southwest China, and Northwest China), and regional per capita gross domestic product (GDP). Each study site was categorized as regions of low, medium and high economic regions according to the quartiles of their gross domestic product per capita in 2012. Study sites with GDP per capita in 2012 <¥29,608 were categorized as low economic regions; those between the first and third quartiles, ¥29,608 and ¥54,095, were categorized as medium economic regions; and those >¥54,095 were categorized as high economic regions. China region was categorized according to geographical factors, comprehensive history, nationality and other dimensions into 7 group: (1) North: Beijing, Tianjin, Hebei, Shanxi and Inner Mongolia Autonomous Region; (2)Northeast: Heilongjiang Province, Jilin Province, Liaoning Province; (3) East: Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Shandong, Fujian, and Taiwan; (4)Central: Henan Province, Hubei Province, Hunan Province; (5) South: Guangdong Province, Guangxi Zhuang Autonomous Region, Hainan Province; (6) Southwest: Chongqing, Sichuan, Guizhou, Yunnan; (7) Northwest: Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous Region.

Supplemental Table 1 Investigators of CCC-ACS project

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ID | **Hospitals** | **Territories** | **Provinces** | **City** | **Investigator** |
| 1 | Peking University First Hospital | Northern China | Beijing | Beijing | Jie Jiang |
| 2 | Beijing Anzhen Hospital, Capital Medical University | Northern China | Beijing | Beijing | Shaoping Nie, Xiaohui Liu |
| 3 | The First Affiliated Hospital of Bengbu Medical College | Eastern China | Anhui | Bengbu | Honhju Wang |
| 4 | Beijing Friendship Hospital, Capital Medical University | Northern China | Beijing | Beijing | Hongwei Li |
| 5 | The First Affiliated Hospital of Chongqing Medical University | Southwest China | Chongqing | Chongqing | Suxin Luo |
| 6 | Changhai Hospital of Shanghai | Eastern China | Shanghai | Shanghai | Xianxian Zhao |
| 7 | Xinqiao Hospital, Third Military Medical University | Southwest China | Chongqing | Chongqing | Cui Bin, Lan Huang |
| 8 | Dongguan People's Hospital | Southern China | Guangdong | Dongguan | Jianfeng Ye |
| 9 | Zhongda Hospital, Southeast University | Eastern China | Jiangsu | Nanjing | Genshan Ma |
| 10 | Gansu Provincial Hospital | Northwest China | Gansu | Lanzhou | Ping Xie |
| 11 | Guangdong General Hospital | Southern China | Guangdong | Guangzhou | Jiyan Chen |
| 12 | The First Affiliated Hospital of Guangxi Medical University | Southern China | Guangxi | Nanning | Lang Li |
| 13 | The People's Hospital of Guangxi Zhuang Autonomous Region | Southern China | Guangxi | Nanning | Yingzhong Lin |
| 14 | Panyu Hospital of Chinese Medicine | Southern China | Guangdong | Guangzhou | Jianhao Li |
| 15 | The Affiliated Hospital of Guizhou Medical University | Southwest China | Guizhou | Guiyang | Lirong Wu |
| 16 | The 2nd Affiliated Hosiptal of Harbin Medical University | Northeast China | Heilongjiang | Harbin | Bo Yu |
| 17 | Navy General Hospital | Northern China | Beijing | Beijing | Tianchang Li |
| 18 | Haikou People's Hospital | Southern China | Hainan | Haikou | Moshui Chen |
| 19 | Hainan General Hospital | Southern China | Hainan | Haikou | Bin Li |
| 20 | The First Hospital of Handan | Northern China | Hebei | Handan | Shuanli Xin |
| 21 | Hebei General Hospital | Northern China | Hebei | Shijiazhuang | Xiaoyong Qi |
| 22 | The Second Hospital of Hebei Medical University | Northern China | Hebei | Shijiazhuang | Xianghua Fu |
| 23 | The First Affiliated Hospital of Henan University of Science and Technology | Central China | Henan | Luoyang | Pingshuan Dong |
| 24 | Henan Provincial People's Hospital | Central China | Henan | Zhengzhou | Chuanyu Gao |
| 25 | Chenzhou First People's Hospital | Central China | Hunan | Chenzhou | Qiaoqing Zhong |
| 26 | Hunan Provincial People's Hospital | Central China | Hunan | Changsha | Ying Guo |
| 27 | West China Hospital of Sichuan University | Northwest China | Sichuan | Chengdu | Xiaoping Chen |
| 28 | Huai'an First People's Hospital | Eastern China | Jiangsu | Huai'an | Shuren Ma |
| 29 | The First Hospital of Jilin University | Northeast China | Jilin | Changchun | Yang Zheng |
| 30 | The Second Hospital of Jilin University | Northeast China | Jilin | Changchun | Bin Liu |
| 31 | Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School | Eastern China | Jiangsu | Nanjing | Biao Xu, Guangshu Han |
| 32 | Jiangsu Province Hospital | Eastern China | Jiangsu | Nanjing | Zhijian Yang |
| 33 | The 309th Hospital of Chinese People's Liberation Army | Northern China | Beijing | Beijing | Fakuan Tang, Jun Xiao |
| 34 | First Affiliated Hospital of the People's Liberation Army General Hospital | Northern China | Beijing | Beijing | Miao Tian |
| 35 | The First Affiliated Hospital of Lanzhou University | Northwest China | Gansu | Lanzhou | Zheng Zhang |
| 36 | The First Affiliated Hospital of Liaoning Medical University | Northeast China | Liaoning | Jinzhou | Guizhou Tao |
| 37 | China Meitan General Hospital | Northern China | Beijing | Beijing | Di Wu |
| 38 | The First Affiliated Hospital to Nanchang University | Eastern China | Jiangxi | Nanchang | Zeqi Zheng |
| 39 | The Second Affiliated Hospital to Nanchang University | Eastern China | Jiangxi | Nanchang | Xiaoshu Cheng |
| 40 | Nanfang Hospital of Southern Medical University | Southern China | Guangdong | Guangzhou | Yuqing Hou |
| 41 | Inner Mongolia People's Hospital | Northern China | Inner Mongolia | Hohhot | Xingsheng Zhao |
| 42 | Affiliated Hospital of Ningxia Medical University | Northwest China | Ningxia | Yinchuan | Shaobin Jia |
| 43 | People’s Hospital of Qinghai Province | Northwest China | Qinghai | Xining | Rong Chang |
| 44 | Binzou City Center Hospital | Eastern China | Shandong | Binzhou | Lijun Meng |
| 45 | Shanxi Provincial People's Hospital | Northern China | Shanxi | Taiyuan | Chunlin Lai |
| 46 | Shanxi Cardiovascular Hospital | Northern China | Shanxi | Taiyuan | Bao Li |
| 47 | The Second Hospital of Shanxi Medical University | Northern China | Shanxi | Taiyuan | Zhiming Yang |
| 48 | The Ninth Hospital Affiliated to Shanghai Jiaotong University School of Medicine | Eastern China | Shanghai | Shanghai | Changqian Wang |
| 49 | Shanghai Sixth People's Hospital | Eastern China | Shanghai | Shanghai | Shixin Ma |
| 50 | Tongren Hospital Affiliated to Shanghai Jiaotong University School of Medicine | Eastern China | Shanghai | Shanghai | Li Jiang |
| 51 | The General Hospital of Shenyang Military Region | Northeast China | Liaoning | Shenyang | Yaling Han |
| 52 | The Third Hospital of Shijiazhuang | Northern China | Hebei | Shijiazhuang | Zhenguo Ji |
| 53 | North Jiangsu People's Hospital | Eastern China | Jiangsu | Yangzhou | Shenghu He |
| 54 | General Hospital of TISCO | Northern China | Shanxi | Taiyuan | Huifeng Wang |
| 55 | Tianjin Chest Hospital | Northern China | Tianjin | Tianjin | Yin Liu |
| 56 | Teda International Cardiovascular Hospital | Northern China | Tianjin | Tianjin | Wenhua Lin |
| 57 | Tianjin Medical University General Hospital | Northern China | Tianjin | Tianjin | Yuemin Sun |
| 58 | Wuxi People's Hospital | Eastern China | Jiangsu | Wuxi | Zhenyu Yang |
| 59 | The First Affiliated Hospital of Xi’an Jiaotong University | Northwest China | Shaanxi | Xi'an | Zuyi Yuan |
| 60 | Xijing Hospital | Northwest China | Shaanxi | Xi'an | Ling Tao |
| 61 | Southwest Hospital, Third Military Medical University | Southwest China | Chongqing | Chongqing | Zhiyuan Song |
| 62 | Hospital of Xinjiang Production & Construction Corps | Northwest China | Xinjiang | Urumchi | Junming Liu |
| 63 | The First Teaching Hospital of Xinjiang Medical University | Northwest China | Xinjiang | Urumchi | Yitong Ma |
| 64 | Xinjiang Uygur Autonomous Region People’s Hospital | Northwest China | Xinjiang | Urumchi | Guoqing Li |
| 65 | The Affiliated Hospital of Xuzhou Medical College | Eastern China | Jiangsu | Xuzhou | Zhirong Wang |
| 66 | People's Hospital of Yuxi City | Southwest China | Yunnan | Yuxi | Yinglu Hao |
| 67 | The Second People's Hospital of Yunnan Province | Southwest China | Yunnan | Kunming | Minghua Han |
| 68 | Sir Run Run Shaw Hospital, College of Medicine, Zhejiang University | Eastern China | Zhejiang | Hangzhou | Guosheng Fu |
| 69 | The Second Affiliated Hospital of Zhengzhou University | Central China | Henan | Zhengzhou | Yulan Zhao |
| 70 | The First Affiliated Hospital of Zhengzhou University | Central China | Henan | Zhengzhou | Ling Li |
| 71 | The Third Xiangya Hospital of Central South University | Central China | Hunan | Changsha | Weihong Jiang |
| 72 | Sun Yat-sen Memorial Hospital, Sun Yat-sen University | Southern China | Guangdong | Guangzhou | Jingfeng Wang |
| 73 | The Military General Hospital of Beijing PLA  | Northern China | Beijing | Beijing | Junxia Li |
| 74 | Baogang Hospital | Northern China | Inner Mongolia | Baotou | Yongdong Li |
| 75 | Zhejiang Provincial Hospital of TCM | Eastern China | Zhejiang | Hangzhou | Wei Mao |
| 76 | Affiliated Hospital of Qinghai University | Northwest China | Qinghai | Xining | Weijun Liu |
| 77 | Anhui Provincial Hospital | Eastern China | Anhui | Hefei | Likun Ma |
| 78 | Anyang District Hospital | Central China | Henan | Anyang | Hui Liu |
| 79 | The Third the People‘s Hospital of Bengbu | Eastern China | Anhui | Bengbu | Gengsheng Sang |
| 80 | Cangzhou Central Hospital | Northern China | Hebei | Cangzhou | Zesheng Xu |
| 81 | The First People's Hospital of Changde | Central China | Hunan | Changde | Yi Huang |
| 82 | Dalian Municipal Central Hospital | Northeast China | Liaoning | Dalian | Hailong Lin |
| 83 | The Second hospital of Dalian Medical University | Northeast China | Liaoning | Dalian | Peng Qu |
| 84 | The First Affiliated hospital of Dalian Medical University | Northeast China | Liaoning | Dalian | Yanzong Yang |
| 85 | Fujian Provincial Hospital | Eastern China | Fujian | Fuzhou | Yansong Guo |
| 86 | Longyan First Hospital | Eastern China | Fujian | Longyan | Kaihong Chen |
| 87 | The First Affiliated Hospital of Fujian Medical University | Eastern China | Fujian | Fuzhou | Jinzi Su |
| 88 | Affiliated Hospital of Guangdong Medical College | Southern China | Guangdong | Guangzhou | Keng Wu |
| 89 | Guangzhou Red Cross Hospital | Southern China | Guangdong | Guangzhou | Tongguo Wu |
| 90 | The First Affiliated Hospital of Guangzhou Medical College | Southern China | Guangdong | Guangzhou | Wei Wang |
| 91 | The Third Affiliated Hospital of Guangzhou Medical College | Southern China | Guangdong | Guangzhou | Ximing Chen |
| 92 | Guizhou Provincial People's Hospital | Northwest China | Guizhou | Guiyang | Qiang Wu |
| 93 | The Central Hospital of Zhoukou | Central China | Henan | Zhoukou | Hualing Liu |
| 94 | The Central Hospital of Jilin | Northeast China | Jilin | Changchun | Shuangbin Li |
| 95 | The First People's Hospital of Jining | Eastern China | Shandong | Jining | Xiaofei Sun |
| 96 | Affiliated Hospital of Jiangsu University | Eastern China | Jiangsu | Zhenjiang | Jinchuan Yan |
| 97 | Jiangxi Provincial People's Hospital | Eastern China | Jiangxi | Nanchang | Lang Ji |
| 98 | The People's Hospital of Liaoning Province | Northeast China | Liaoning | Shenyang | Zhanquan Li |
| 99 | The First Affiliated Hospital of Liaoning University of Traditional Chinese Medicine | Northeast China | Liaoning | Shenyang | Ping Hou |
| 100 | Liaocheng People's Hospital | Eastern China | Shandong | Liaocheng | Chunyan Zhang |
| 101 | Linyi People's Hospital | Eastern China | Shandong | Linyi | Zhihong Ou |
| 102 | Mudanjiang Cardiovascular Disease Hospital | Northeast China | Heilongjiang | Mudanjiang | Jianwen Liu |
| 103 | The First People's Hospital of Nanning City | Southern China | Guangxi | Nanning | Jinru Wei |
| 104 | Ningxia People's Hospital | Northwest China | Ningxia | Yinchuan | Hong Luan |
| 105 | Qingdao Municipal Hospital | Eastern China | Shandong | Qingdao | Jun Guan |
| 106 | Quanzhou First Hospital | Eastern China | Fujian | Quanzhou | Rong Lin |
| 107 | The First Affiliated Hospital of Xiamen University | Eastern China | Fujian | Xiamen | Qiang Xie |
| 108 | Xiamen Cardiovascular Disease Hospital | Eastern China | Fujian | Xiamen | Yan Wang |
| 109 | Qilu Hospital of Shandong University | Eastern China | Shandong | Jinan | Jifu Li |
| 110 | Yantaishan hospital | Eastern China | Shandong | Yantai | Juexin Fan |
| 111 | Zhongshan Hospital Affiliated to Fudan University | Eastern China | Shanghai | Shanghai | Junbo Ge |
| 112 | Shanghai East Hospital Affiliated to Tongji University | Eastern China | Shanghai | Shanghai | Xuebo Liu |
| 113 | The Central Hospital of Shaoyang | Central China | Hunan | Shaoyang | Zewei Ouyang |
| 114 | Central Hospital Affiliated to Shenyang Medical College | Northeast China | Liaoning | Shenyang | Man Zhang, Kaiming Chen |
| 115 | The First Affiliated Hospital of Soochow University | Eastern China | Jiangsu | Suzhou | Xiangjun Yang |
| 116 | The Second Affiliated Hospital of Soochow University | Eastern China | Jiangsu | Suzhou | Weiting Xu |
| 117 | The Central Hospital of Taiyuan | Northern China | Shanxi | Taiyuan | Xiaoping Chen |
| 118 | Tangshan Gongren Hospital | Northern China | Hebei | Tangshan | Zheng Ji |
| 119 | The First Affiliated Hospital of Wannan Medical College | Eastern China | Anhui | Wuhu | Xingsheng Tang |
| 120 | The First Affiliated Hospital of Wenzhou Medical University | Eastern China | Zhejiang | Wenzhou | Weijian Huang |
| 121 | Wuzhou People's Hospital | Southern China | Guangxi | Wuzhou | Shaowu Ye |
| 122 | Renmin Hospital of Wuhan University | Central China | Hubei | Wuhan | Hong Jiang |
| 123 | Xiangtan City Central Hospital | Central China | Hunan | Xiangtan | Lilong Tang |
| 124 | The Central Hospital of Xuzhou | Eastern China | Jiangsu | Xuzhou | Peiying Zhang |
| 125 | Affiliated Hospital of Yan'an University | Northwest China | Shaanxi | Yan'an | Xiaochuan Ma |
| 126 | Yancheng Third People's Hospital | Eastern China | Jiangsu | Yancheng | Chunyang Wu |
| 127 | Yangzhou First People's Hospital | Eastern China | Jiangsu | Yangzhou | Aihua Li |
| 128 | Yichang Central Hospital | Central China | Hubei | Yichang | Jiawang Ding |
| 129 | The First People's Hospital of Yunnan Province (Kunhua Hospital) | Northwest China | Yunnan | Kunming | Hong Zhang |
| 130 | Hospital 463 of Chinese People's Liberation Army | Northeast China | Liaoning | Shenyang | Bosong Yang |
| 131 | The First Affiliated Hospital of China Medical University | Northeast China | Liaoning | Shenyang | Yingxian Sun |
| 132 | The Fourth Affiliated Hospital of China Medical University | Northeast China | Liaoning | Shenyang | Yuanzhe Jin |
| 133 | The Second Xiangya Hospital of Central South University | Central China | Hunan | Changsha | Daoquan Peng |
| 134 | Xiangya Hospital Central South University | Central China | Hunan | Changsha | Tianlun Yang |
| 135 | Zhoushan People's Hospital | Eastern China | Zhejiang | Zhoushan | Guoxiong Chen |
| 136 | Chengdu Third People’s Hospital | Northwest China | Sichuan | Chengdu | Jiong Tang |
| 137 | Tangdu Hospital of The Fourth Military Medical University | Northwest China | Shaanxi | Xi'an | Xue Li |
| 138 | The First Hospital of Haerbin City | Northeast China | Heilongjiang | Harbin | Lin Wei |
| 139 | The First Affiliated Hospital of Jiamusi University | Northeast China | Heilongjiang | Jiamusi | Zhaofa He |
| 140 | The Central Hospital of Panzhihua | Northwest China | Sichuan | Panzhihua | Dawen Xu |
| 141 | The First Hospital of Qiqihaer City | Northeast China | Heilongjiang | Qiqihaer | Gang Xu |
| 142 | Wuhan Asia Heart Hospital | Central China | Hubei | Wuhan | Xi Su |
| 143 | Sichuan Provincial People’s Hospital | Northwest China | Sichuan | Chengdu | Jianhong Tao |
| 144 | The Central Hospital of Mianyang | Northwest China | Sichuan | Mianyang | Caidong Luo |
| 145 | The First Hospital of Jiamusi | Northeast China | Heilongjiang | Jiamusi | Guixia Zhang |
| 146 | Huaibei Miners General Hospital | Eastern China | Anhui | Huaibei | Zhenqi Su |
| 147 | Beijing Tsinghua Changgung Hospital | Northern China | Beijing | Beijing | Ping Zhang |
| 148 | The Second Affiliated Hospital of Qiqihar Medical Hospital | Northeast China | Heilongjiang | Qiqihar | Yanli Wang |
| 149 | Ningbo First Hospital | Eastern China | Zhejiang | Ningbo | Huimin Chu |
| 150 | Guang’an People’s Hospital | Southwest China | Sichuan | Guang’an | Tian Tuo |
| 151 | Linfen People’s Hospital | Northern China | Shanxi | Linfen | Junping Deng |
| 152 | Dianjiang People’s Hospital | Southwest China | Chongqing | Chongqing | Yang Yu |
| 153 | First Affiliated Hospital of Harbin Medical University. | Northeast China | Heilongjiang | Harbin | Yue Li |
| 154 | The Fourth Affiliated Hospital Zhejiang University School of Medicine | Eastern China | Zhejiang | Yiwu | Shudong Xia |
| 155 | Suizhou Central Hospital | Central China | Hubei | Suizhou | Fengwei Li |
| 156 | Affilioted Hospital of North Sichuan Medical College | Northwest China | Sichuan | Nanchong | Zhan Lv |
| 157 | Guangyuan Central Hospital | Northwest China | Sichuan | Guangyuan | Bing Fu |
| 158 | Dazhou Central Hospital | Northwest China | Sichuan | Dazhou | Yong Guo |
| 159 | Nanchong Central Hospital | Northwest China | Sichuan | Nanchong | Tao Liu |

Supplemental Table 2 The denominators and numerators of measures for acute treatments and medical therapies for secondary prevention

1. DAPT at first 24 hours of arrival

|  |
| --- |
| Measure description: Proportion of ACS patients receiving DAPT (Aspirin plus P2Y12 receptor inhibitor) within 24 hours after hospital arrival |
| Numerator | STEMI patients who have received DAPT within 24 hours after hospital arrival |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

2. ACEIs/ARBs at first 24 hours of arrival

|  |
| --- |
| Measure description: Proportion of STEMI patients receiving ACEI/ARB within 24 hours after hospital arrival. |
| Numerator | Patients with STEMI are prescribed an ACEI/ARB within 24 hours after hospital arrival |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

3.β-blockers at first 24 hours of arrival

|  |
| --- |
| Measure description: Proportion of ACS patients receiving a β-blocker within 24 hours after hospital arrival. |
| Numerator | ACS patients receiving a β-blocker within 24 hours after hospital arrival |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

4. Statins at first 24 hours of arrival

|  |
| --- |
| Measure description: Proportion of ACS patients receiving statins within 24 hours after hospital arrival |
| Numerator | Patients with ACS who are prescribed statins within 24 hours after hospital arrival |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None s |

5. Reperfusion practice

(1) no reperfusion

|  |
| --- |
| Measure description: The proportion of STEMI patients who did not receive reperfusion |
| Numerator | STEMI patients who did not receive timely reperfusion (including patients only receiving staged PCI during hospitalization) |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

(2) Primary PCI

|  |
| --- |
| Measure description: The proportion of STEMI patients receiving primary PCI within 24h of symptom onset |
| Numerator | STEMI patients receiving primary PCI  |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

(3) Fibrinolysis

|  |
| --- |
| Measure description: The proportion of STEMI patients only receiving fibrinolysis |
| Numerator | STEMI patients receiving fibrinolysis alone (including patients only receiving fibrinolysis, and patients receiving fibrinolysis and staged PCI during hospitalization), or pharmaco-invasive strategy |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

6. Timely PCI

|  |
| --- |
| Measure description: The proportion of STEMI patients receiving primary PCI and post-fibrinolysis PCI, including pharmaco-invasive PCI and rescue PCI |
| Numerator | STEMI patients receiving primary PCI or post-fibrinolysis PCI |
| Denominator | All STEMI patients |
| Denominator exclusions | None |
| Denominator exceptions | None |

7. PCI strategies

(1) primary PCI<12h

|  |
| --- |
| Measure description: The proportion of STEMI patients who received primary PCI within 12 hours of symptom onset |
| Numerator | STEMI patients who received primary PCI within 12 hours of symptom onset |
| Denominator | STEMI patients who received primary PCI  |
| Denominator exclusions | None |
| Denominator exceptions | None |

(2) primary PCI 12-24h

|  |
| --- |
| Measure description: The proportion of STEMI patients who received primary PCI |
| Numerator | STEMI patients who received primary PCI during 24 hours to 12 hours of symptom onset |
| Denominator | STEMI patients  |
| Denominator exclusions | None |
| Denominator exceptions | None |

8. DTB within 90 minutes for STEMI

|  |
| --- |
| Measure description: The proportion of STEMI patients who received PCI during the hospital stay with a time from hospital arrival to PCI of 90 min or less |
| Numerator | STEMI patients who received primary PCI within 90 minutes |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | STEMI patients received fibrinolytic therapy or did not receive timely reperfusion |
| Denominator exceptions | None |

9. IABP during hospitalization

|  |
| --- |
| Measure description: The proportion of STEMI patients who received IABP during hospitalization |
| Numerator | STEMI patients who received IABP during primary PCI index |
| Denominator | STEMI patients who received primary PCI and were enrolled since 2017 |
| Denominator exclusions | None |
| Denominator exceptions | None |

10. PTCA during hospitalization

|  |
| --- |
| Measure description: The proportion of STEMI patients who received PTCA during hospitalization |
| Numerator | STEMI patients who received PTCA during primary PCI index |
| Denominator | STEMI patients who received primary PCI and were enrolled since 2017 |
| Denominator exclusions | None |
| Denominator exceptions | None |

11. Vascular access

(1) Transradial access

|  |
| --- |
| Measure description: The proportion of STEMI patients allocated to the transradial access site |
| Numerator | STEMI patients allocated to the transradial access site during primary PCI index |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(2) Transfemoral access

|  |
| --- |
| Measure description: The proportion of STEMI patients allocated to the transfemoral access site |
| Numerator | STEMI patients allocated to the transfemoral access site during PCI index |
| Denominator | STEMI patients who received PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(3) Others

|  |
| --- |
| Measure description: The proportion of STEMI patients allocated to brachial access or other sites |
| Numerator | STEMI patients allocated to brachial access or other sites during PCI index |
| Denominator | STEMI patients who received PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

12. Thrombus aspiration

|  |
| --- |
| Measure description: The proportion of STEMI patients were treated by thrombus aspiration during PCI index |
| Numerator | STEMI patients were treated by thrombus aspiration during primary PCI index |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

13. Multivessel CAD

|  |
| --- |
| Measure description: The proportion of patients with STEMI and multivessel CAD defined as a stenosis of 70% or greater in 2 or more epicardial coronary arteries other than the left main, where a stenosis of 50% or more was considered obstructive, and were identified according to the in-patient records and coronary angiography reports  |
| Numerator | patients with STEMI and multivessel CAD  |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

14. Multivessel intervention

|  |
| --- |
| Measure description: The proportion of STEMI patients defined as PCI in 2 or more territories (left main, left anterior descending, left circumflex, or right coronary artery) during the index procedure |
| Numerator | STEMI patients treated with multivessel revascularization |
| Denominator | patients with STEMI and multivessel CAD and who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

15. Culprit vessel location for STEMI patients who received PCI

(1) LM

|  |
| --- |
| Measure description: The proportion of STEMI patients with a stenosis of 50% or more in left main artery according to all angiograms were identified according to the in-patient records and coronary angiography reports |
| Numerator | STEMI patients with a stenosis of 50% or more in left main artery |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(2) LAD

|  |
| --- |
| Measure description: The proportion of STEMI patients with a stenosis of 70% or more in left anterior descending artery according to all angiograms, identified according to the in-patient records and coronary angiography reports |
| Numerator | STEMI patients with a stenosis of 70% or more in left anterior descending artery |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(3) LCX

|  |
| --- |
| Measure description: The proportion of STEMI patients with a stenosis of 70% or more in left circumflex artery according to all angiograms, identified according to the in-patient records and coronary angiography reports |
| Numerator | STEMI patients with a stenosis of 70% or more in left circumflex artery |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(4) RCA

|  |
| --- |
| Measure description: The proportion of STEMI patients with a stenosis of 70% or more in right coronary artery according to all angiograms, identified according to the in-patient records and coronary angiography reports |
| Numerator | STEMI patients with a stenosis of 70% or more in right coronary artery |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(5) Others

|  |
| --- |
| Measure description: The proportion of STEMI patients with a stenosis of 70% or more in proximal left anterior descending, mid left anterior descending, circumflex proximal left circumflex and obtuse marginal/ramus, distal left circumflex and posterior lateral ventricular according to all angiograms, identified according to the in-patient records and coronary angiography reports |
| Numerator | STEMI patients with a stenosis of 70% or more in proximal left anterior descending, mid left anterior descending, circumflex proximal left circumflex and obtuse marginal/ramus, distal left circumflex and posterior lateral ventricular |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

(5) Uncertain

|  |
| --- |
| Measure description: The proportion of STEMI patients without in-patient records and coronary angiography reports to certain the culprit vessel location |
| Numerator | STEMI without in-patient records and coronary angiography reports to certain the culprit vessel location |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

16. No. coronary arteries narrowed for STEMI patients who received PCI

|  |
| --- |
| Measure description: The proportion of STEMI patients with the number of coronary arteries narrowed identified according to the in-patient records and coronary angiography reports |
| Numerator | STEMI patients with the number of coronary arteries narrowed |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

17. Stent placed for STEMI patients who received PCI

|  |
| --- |
| Measure description: The proportion STEMI using stent during PCI index |
| Numerator | STEMI patients using stent during primary PCI index |
| Denominator | STEMI patients who received primary PCI |
| Denominator exclusions | None |
| Denominator exceptions | None |

18. Stent types for STEMI patients who received PCI

(1) DES

|  |
| --- |
| Measure description: The proportion of STEMI patients using DES during PCI index |
| Numerator | STEMI patients using DES during primary PCI index |
| Denominator | STEMI patients using stent during primary PCI index |
| Denominator exclusions | None |
| Denominator exceptions | None |

(2) BMS

|  |
| --- |
| Measure description: The proportion of STEMI using BMS during PCI index |
| Numerator | STEMI patients using BMS during primary PCI index |
| Denominator | STEMI patients using stent during primary PCI index |
| Denominator exclusions | None |
| Denominator exceptions | None |

(3) others

|  |
| --- |
| Measure description: The proportion of STEMI patients using biolimus-eluting stents or other stents during PCI index |
| Numerator | STEMI patients using biolimus-eluting stents or other stents during primary PCI index |
| Denominator | STEMI patients using stent during primary PCI index |
| Denominator exclusions | None |
| Denominator exceptions | None |

**Supplemental Table 3.** Missing rates of Each Variable and Management of Missing Data

(variables without any missing were not list in the following table)

|  |  |  |
| --- | --- | --- |
| Variables | Missing rate (%) | Management of missing data |
| Age | 149 (0.25) | Patients with missing values were imputed using sequential regression multiple imputation method implemented by IVEware software. |
| Medical insurance | 10618 (17.52) |
| Systolic blood pressure | 143 (0.24) |
| Heart rate | 180 (0.30) |
| Serum creatinine | 16105 (26.57) |
| Cardiac arrest at admission | 569 (0.94) |
| Type of PCI strategies | 1270 (2.70) |
| Hospital stays | 93 (0.15) |
| Time from symptom onset to admission for STEMI | 14306 (23.94) | Patients with missing values were not included for median estimation.Patients with missing values were not included for proportion estimation. For patients with STEMI, this variable was included in the multivariate logistic regression models using complete case analysis. |
| Time from symptom onset to admission for primary PCI\* | 4153 (12.61) |
| Time from door to balloon\* | 7065 (21.46) |
| Heart failure at admission | 531 (0.88) | Patients with unclear status for heart failure and cardiogenic shock were imputed by Killip class. Patients with Killip class 2-3 were classified as acute heart failure and patients with Killip class 4 were classified as cardiogenic shock. If patients with unclear status of Killip class, we imputed the missing values using sequential regression multiple imputation method implemented by IVEware software. |
| Cardiogenic shock at admission | 509 (0.84) |
| Killip class | 4285 (7.07) | Patients with unclear status for Killip class were imputed based on the status of heart failure or cardiogenic shock at admission. Patients with acute heart failure were identified as Killip class 2-3 and patients with cardiogenic shock were identified as Killip class 4. If patients with unclear status of heart failure or cardiogenic shock, we imputed the missing values using sequential regression multiple imputation method implemented by IVEware software. |
| Type of reperfusion | 1171 (1.93) | Patients with missing values were not included for median estimation |
| Vascular access\* | 544 (1.65) |
| Multivessel intervention\* | 1 (0.00) |
| No. coronary arteries narrowed\* | 3663 (11.12) |
| Stent placed\* | 3 (0.00) |
| Stent types† | 236 (0.80) |
| Total number of implanted stents‡ | 78 (0.70) |

LDL-C, indicates low-density lipoprotein cholesterol; PTCA, ; PCI, percutaneous coronary intervention; and STEMI, ST-elevation myocardial infarction

\* Among STEMI patients who received primary PCI (n=32929).

† Among STEMI patients who received primary PCI and implantation of stents (n=29619).

‡ Among STEMI patients who received primary PCI, insertion of stents, and enrolled since July 2017 (n=11222).

Supplemental Table 4 Characteristics of Hospitalized Patients with STEMI and Receiving Primary PCI by PCI strategies.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Total****(n=32929)** | **Primary PCI** |  |
| **Primary PCI< 12H (n=28280)** | **Primary PCI 12- 24h (n=4649)** | **P Value** |
| Age, yrs | 61.1±12.5 | 61.0±12.5 | 61.9±12.5 | <0.001 |
| Female | 6593 (20.0) | 5565 (19.7) | 1028 (22.1) | <0.001 |
| Medical insurance |  |  |  | <0.001 |
| Urban insurance | 18958 (57.6) | 16609 (58.7) | 2349 (50.5) |  |
| Rural insurance | 5693 (17.3) | 4794 (17.0) | 899 (19.3) |  |
| Self-paid  | 4676 (14.2) | 3882 (13.7) | 794 (17.1) |  |
| Other insurance | 3602 (10.9) | 2995 (10.6) | 607 (13.1) |  |
| Risk factor |  |  |  |  |
| Hypertension | 20480 (62.2) | 17565 (62.1) | 2915 (62.7) | 0.442  |
|  Diabetes mellitus | 9262 (28.1) | 7847 (27.7) | 1415 (30.4) | <0.001 |
| CHF | 8030 (24.4) | 6744 (23.8) | 1286 (27.7) | <0.001 |
| Elevated LDL-C (≥ 70 mg/dL) | 29221 (88.7) | 25240 (89.3) | 3981 (85.6) | <0.001 |
| Smoking | 16124 (49.0) | 13976 (49.4) | 2148 (46.2) | <0.001 |
| History of disease |  |  |  |  |
| CHD | 2058 (6.2) | 1788 (6.3) | 270 (5.8) | 0.179  |
| Cerebrovascular disease | 2255 (6.8) | 1938 (6.9) | 317 (6.8) | 0.932  |
| Atrial fibrillation | 424 (1.3) | 378 (1.3) | 46 (1.0) | 0.052  |
| Renal failure | 279 (0.8) | 227 (0.8) | 52 (1.1) | 0.029  |
| Bleeding\* | 38 (0.3) | 36 (0.3) | 2 (0.1) | 0.311 |
| Transferred-in  | 14069 (42.7) | 11489 (40.6) | 2580 (55.5) | <0.001 |
| Symptom-to-admission time, hours  | 4.1 (2.1,8.0) | 3.9 (2.0,6.7) | 14.9 (7.0,24.3) | <0.001 |
| Killip ­class |  |  |  | <0.001 |
| Ⅰ | 24615 (74.8) | 21509 (76.1) | 3106 (66.8) |  |
| Ⅱ-Ⅲ | 6899 (21.0) | 5576 (19.7) | 1323 (28.5) |  |
| Ⅳ | 1415 (4.3) | 1195 (4.2) | 220 (4.7) |  |
| Vital signs |  |  |  |  |
| eGFR, mL/ (min\*1.73 m2) | 92.4 ± 37.3 | 92.9 ± 36.9 | 89.7 ± 39.2 | <0.001 |
| Heart rate, bpm | 78.3 ± 16.1 | 78.3 ± 16.1 | 78.5 ± 16.3 | 0.282  |
| Systolic blood pressure, mm Hg | 127.2 ± 23.6 | 127.2 ± 23.7 | 127.3 ± 23.1 | 0.785  |
| Medications in first 24 h |  |  |  |  |
| DAPT | 31830 (96.7) | 27369 (96.8) | 4461 (96.0) | 0.004  |
| ACEI or ARB | 15056 (45.7) | 12788 (45.2) | 2268 (48.8) | <0.001 |
| β-blockers | 17574 (53.4) | 14932 (52.8) | 2642 (56.8) | <0.001 |
| Statins | 31054 (94.3) | 26687 (94.4) | 4367 (93.9) | 0.238  |
| Hospital stays, days | 9.0 (7.0,12.0) | 9.0 (7.0,12.0) | 9.0 (7.0,12.0) | 0.026  |

Values are n (%) or median (interquartile range). P values are for comparisons among the 2 groups using the Student’s t-test, Wilcoxon’s rank-sum test, or χ2 test. STEMI: ST-segment elevation myocardial infarction; IQR: Interquartile range; CHF: Chronic heart failure; CHD: Coronary heart disease; eGFR: estimated Glomerular filtration rate; ACEI: Angiotensin-converting enzyme inhibitors; ARB: Angiotensin-receptor blocker; PCI: Percutaneous coronary intervention; DAPT: Dual antiplatelet therapy; LDL-C: Low-Density Lipoprotein Cholesterol.

\* Among patients enrolled since July 2017.



Supplemental Figure 1. Flowchart of participant recruitment. STEMI: ST-segment elevation myocardial infarction; PCI: percutaneous coronary intervention.



Supplemental Figure 2 Sensitivity Analyses for Association between Patients’ Characteristics and Reperfusion.

OR: Odds Ratio; CI: confidence interval; CHD: coronary heart disease; GDP: gross domestic product

**Supplemental References**

1. Levey AS, Stevens LA, Schmid CH, Zhang YL, Castro AF, 3rd, Feldman HI, et al. A new equation to estimate glomerular filtration rate. *Ann Intern Med*. 2009;150:604-612