ORIGINAL RESEARCH

National Quality Assessment of Early Clopidogrel Therapy in Chinese Patients With Acute Myocardial Infarction (AMI) in 2006 and 2011: Insights From the China Patient-Centered Evaluative Assessment of Cardiac Events (PEACE)–Retrospective AMI Study

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Background—Early clopidogrel administration to patients with acute myocardial infarction (AMI) has been demonstrated to improve outcomes in a large Chinese trial. However, patterns of use of clopidogrel for patients with AMI in China are unknown.

Methods and Results—From a nationally representative sample of AMI patients from 2006 and 2011, we identified 11 944 eligible patients for clopidogrel therapy and measured early clopidogrel use, defined as initiation within 24 hours of hospital admission. Among the patients eligible for clopidogrel, the weighted rate of early clopidogrel therapy increased from 45.7% in 2006 to 79.8% in 2011 ($P<0.001$). In 2006 and 2011, there was significant variation in early clopidogrel use by region, ranging from 1.5% to 58.0% in 2006 ($P<0.001$) and 48.7% to 87.7% in 2011 ($P<0.001$). While early use of clopidogrel was uniformly high in urban hospitals in 2011 (median 89.3%; interquartile range: 80.1% to 94.5%), there was marked heterogeneity among rural hospitals (median 50.0%; interquartile range: 11.5% to 84.4%). Patients without reperfusion therapy and those admitted to rural hospitals were less likely to be treated with clopidogrel.

Conclusions—Although the use of early clopidogrel therapy in patients with AMI has increased substantially in China, there is notable wide variation across hospitals, with much less adoption in rural hospitals. Quality improvement initiatives are needed to increase consistency of early clopidogrel use for patients with AMI.

Clinical Trial Registration—URL: https://www.clinicaltrials.gov/. Unique identifier: NCT01624883. **(*J Am Heart Assoc*.2015;4: e001906 doi: 10.1161/JAHA.115.001906)**

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Abstract

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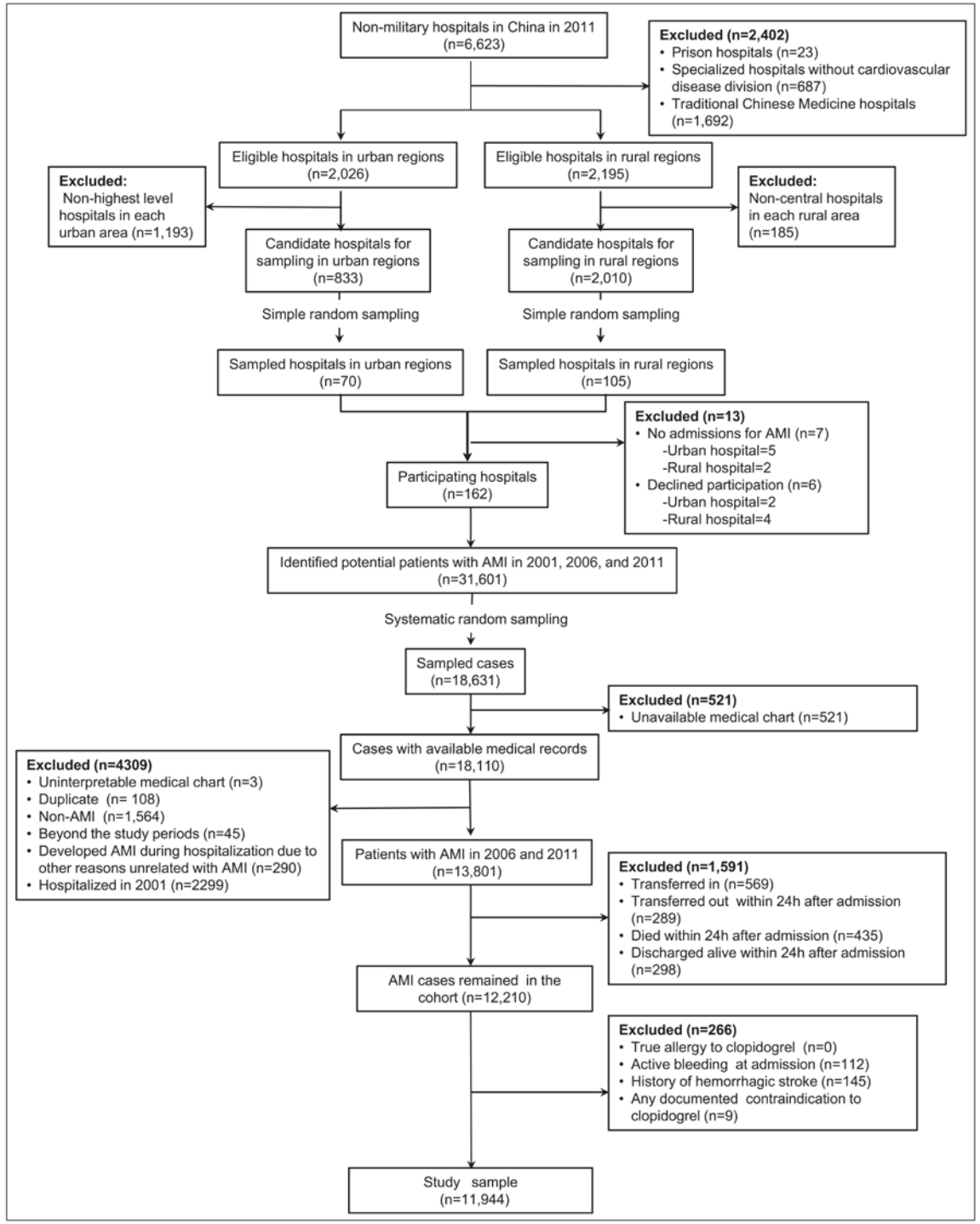

Figure 1. Flow diagram of study sample. AMI indicates acute myocardial infarction.

Table. Baseline Characteristics for Patients Hospitalized With and Without Early Clopidogrel Therapy

Characteristics	Total N (%)	Early Clopidogrel Use N (%)	Not Early Clopidogrel Use N (%)	*P* Value
All eligible patients	11 944	7795 (65.3)	4149 (34.7)	
Demographics				
Age, y				0.086
<55	2616 (21.9)	1849 (23.7)	767 (18.5)	
55 to 64	2791 (23.4)	1873 (24.0)	918 (22.1)	
65 to 74	3487 (29.2)	2177 (27.9)	1310 (31.6)	
≥75	3050 (25.5)	1896 (24.3)	1154 (27.8)	
Gender				<0.001
Female	3626 (30.4)	2242 (28.8)	1384 (33.4)	
CVD risk factors				
Prior hypertension	6086 (51.0)	4179 (53.6)	1907 (46.0)	<0.001
Prior diabetes	2195 (18.4)	1539 (19.7)	656 (15.8)	<0.001
Currently smoking	4253 (35.6)	3092 (39.7)	1161 (28.0)	<0.001
Medical histories				
Ischemic stroke	1244 (10.4)	787 (10.1)	457 (11.0)	0.118
Myocardial infarction	1311 (11.0)	859 (11.0)	452 (10.9)	0.834
PCI	258 (2.2)	216 (2.8)	42 (1.0)	<0.001
Clinical characteristics at admission				
Chest discomfort	10 968 (91.8)	7333 (94.1)	3635 (87.6)	<0.001
Cardiogenic shock	517 (4.3)	314 (4.0)	203 (4.9)	0.027
BP, mm Hg				0.049
SBP ≥180 or DBP ≥110	998 (8.4)	623 (8.0)	375 (9.0)	

Table. Continued

Characteristics	Total N (%)	Early Clopidogrel Use N (%)	Not Early Clopidogrel Use N (%)	*P* Value
AMI type				0.969
STEMI	10 049 (84.1)	6559 (84.1)	3490 (84.1)	
Reperfusion therapies				<0.001
No reperfusion	8334 (69.8)	5065 (65.0)	3269 (78.8)	
Fibrinolytic therapy	2251 (18.8)	1446 (18.6)	805 (19.4)	
Primary PCI	1359 (11.4)	1284 (16.5)	75 (1.8)	
Hospital characteristics				
Teaching hospital	9552 (80.0)	6836 (87.7)	2716 (65.5)	<0.001
PCI-capable hospital	7863 (65.8)	6333 (81.2)	1530 (36.9)	<0.001
Economic–geographic region				<0.001
Eastern	6883 (57.6)	4789 (61.4)	2094 (50.5)	
Central	Central	1435 (18.4)	1161 (28.0)	
Western	2465 (20.6)	1571 (20.2)	894 (21.5)	
Urban/rural				<0.001
Urban	7271 (60.9)	5613 (72.0)	1658 (40.0)	
Rural	4673 (39.1)	2182 (28.0)	2491 (60.0)	
Year				<0.001
2006	3977 (33.3)	1651 (21.2)	2326 (56.1)	
2011	7967 (66.7)	6144 (78.8)	1823 (43.9)	

BP indicates blood pressure; CVD, cardiovascular disease; DBP, diastolic blood pressure; PCI, percutaneous coronary intervention; SBP, systolic blood pressure; STEMI, ST-segment elevation myocardial infarction.

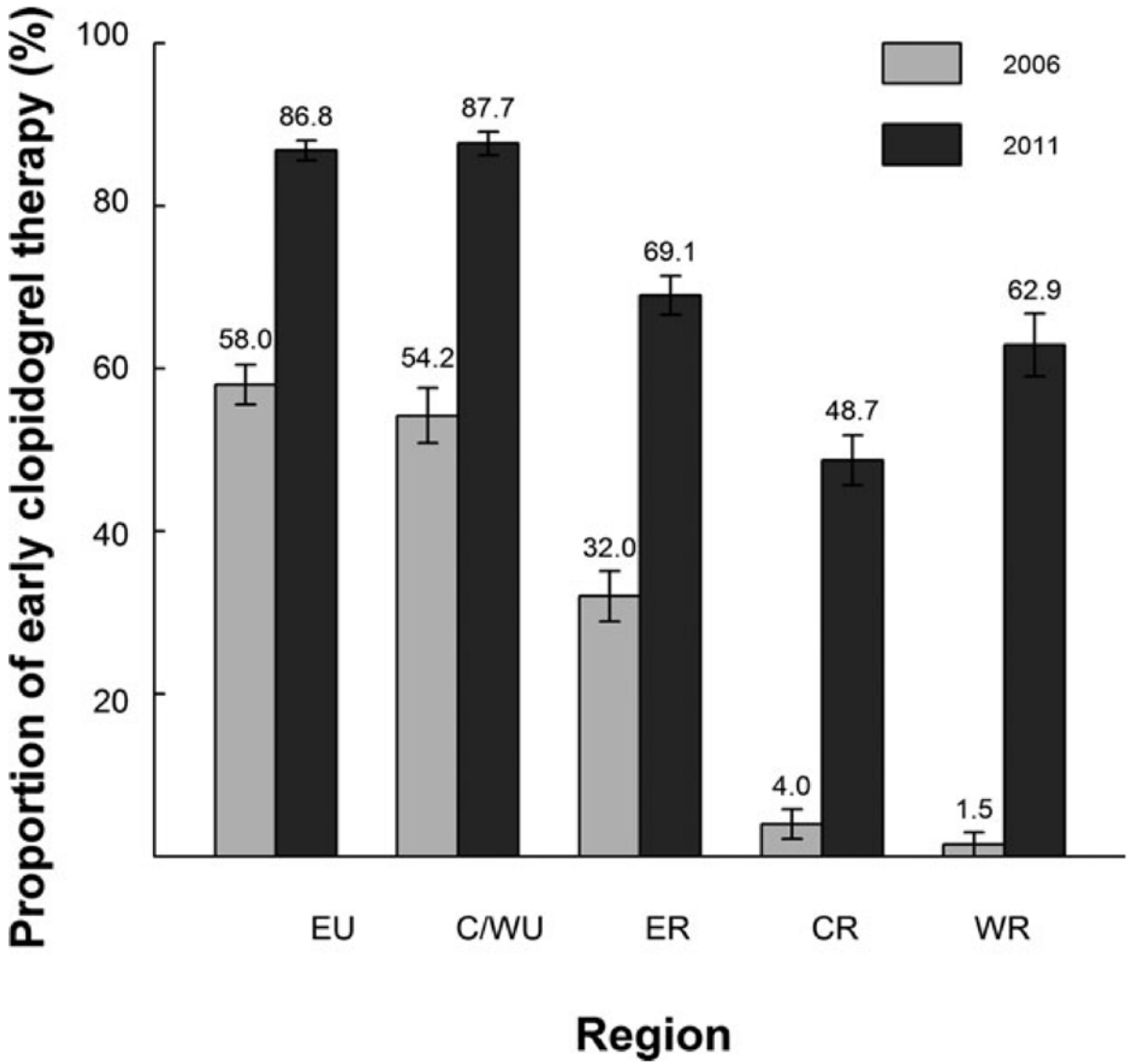

Figure 2. The proportion of early clopidogrel therapy stratified by region among patients with acute myocardial infarction. *P*<0.001 for changes between 2006 and 2011, P<0.001 for changes in all regions. Error bar indicates 95% CI. C/WU indicates Central/Western-urban; CR, Central-rural; ER, Eastern-rural; EU, Eastern-urban; WR, Western-rural.

Figure 3. The variation in early clopidogrel therapy between hospitals in rural areas and urban hospitals in 2006 and 2011. *P*<0.001 for the difference between rural and urban.

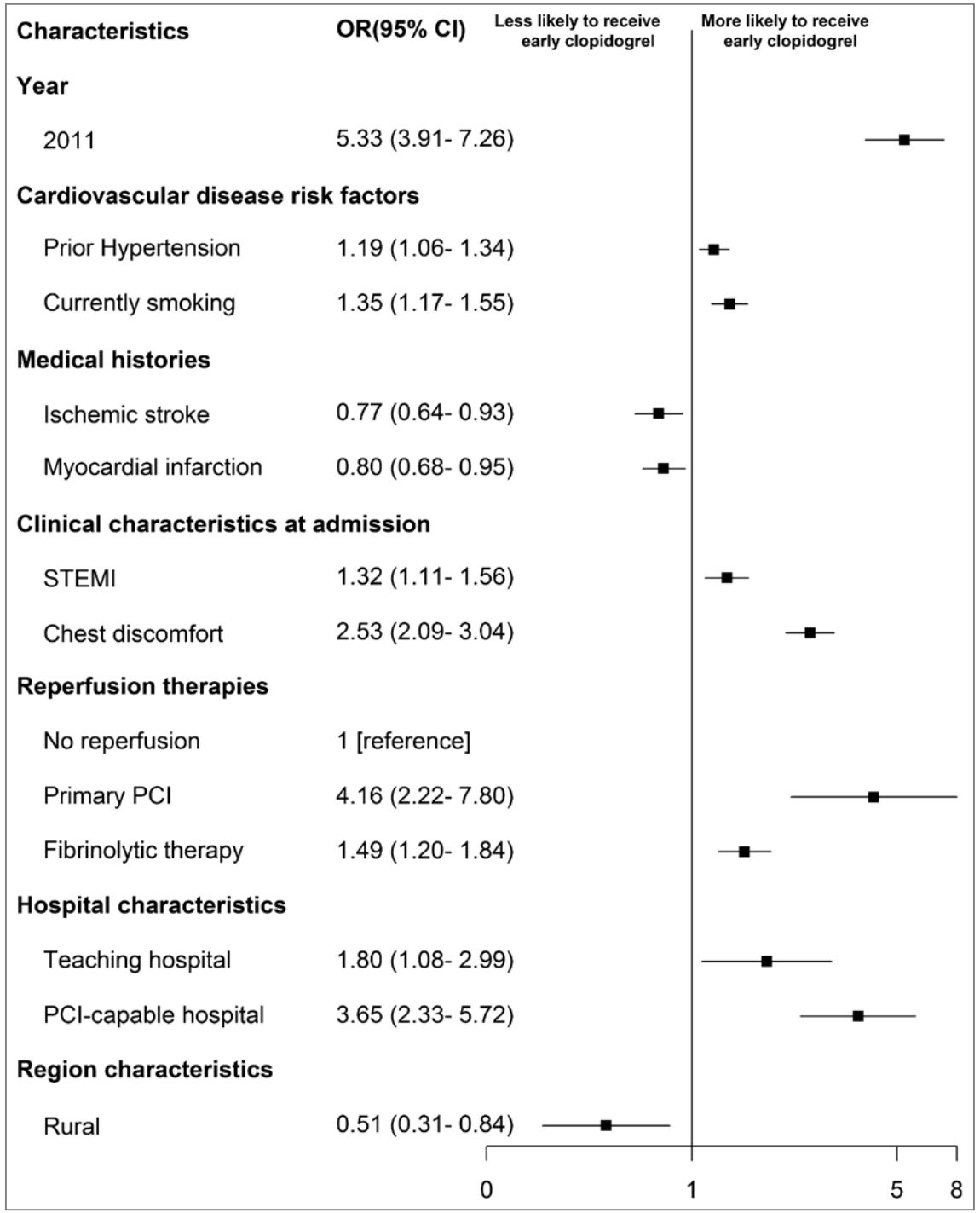

Figure 4. Factors associated with early use of clopidogrel in multivariable model. Variables with a significant association with early use of clopidogrel are shown along the vertical axis. The strength of effect is shown along the horizontal axis with the vertical solid line demarking an odds ratio (OR) of 1 (that is, no association); estimates to the right (that is, >1) are associated with greater likelihood of early clopidogrel use, while those to the left (that is, <1) indicate association with reduced likelihood of early clopidogrel use. Each square and line represents the point estimate of the effect of that variable in the model, while the line shows the 95% CI. PCI indicates percutaneous coronary intervention; STEMI, ST-segment elevation myocardial infarction.

Conclusion

- There has been marked improvement in the use of early clopidogrel therapy for patients with AMI in China. However, there are disparities in the use of this intervention between rural and urban regions, with lower rates of use and greater variation in use among hospitals in rural regions.
- National policies and initiatives, with a particular focus on rural hospitals, are needed to improve early clopidogrel therapy and patient outcomes.