Trends in Early Aspirin Use Among Patients With Acute Myocardial Infarction in China, 2001–2011: The China PEACE-Retrospective AMI Study

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Background—Aspirin is an effective, safe, and inexpensive early treatment of acute myocardial infarction (AMI) with few barriers to administration, even in countries with limited healthcare resources. However, the rates and recent trends of aspirin use for the early treatment of AMI in China are unknown.

Methods and Results—Using data from the China Patient-centered Evaluative Assessment of Cardiac Events Retrospective Study of Acute Myocardial Infarction (China PEACE-Retrospective AMI Study), we identified a cohort of 14 041 patients with AMI eligible for early aspirin therapy. Early use of aspirin for AMI increased over time (78.4% in 2001, 86.5% in 2006, and 90.0% in 2011). However, about 15% of hospitals had a rate of use of <80% in 2011. Treatment was less likely in patients who were older, presented with cardiogenic shock at admission, presented without chest discomfort, had a final diagnosis of non-ST-segment elevation acute myocardial infarction, or did not receive reperfusion therapy. Hospitalization in rural regions was also associated with aspirin underuse.

Conclusions—Despite improvements in early use of aspirin for AMI in China, there remains marked variation in practice and opportunities for improvement that are concentrated in some hospitals and patient groups.

Clinical Trial Registration—URL: ClinicalTrials.gov Unique identifier: NCT01624883. (***J Am Heart Assoc***. 2014;3:e001250 doi: 10.1161/JAHA.114.001250)

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Abstract

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Methods and Results- Using data from the China Patient-centered Evaluative Assessment of Cardiac Events Retrospective Study of Acute Myocardial Infarction (China PEACE-Retrospective AMI Study), we identified a cohort of 14 041 patients with AMI eligible for early aspirin therapy. Early use of aspirin for AMI increased over time (78.4% in 2001, 86.5% in 2006, and 90.0% in 2011). However, about 15% of hospitals had a rate of use of <80% in 2011. Treatment was less likely in patients who were older, presented with cardiogenic shock at admission, presented without chest discomfort, had a final diagnosis of non-ST-segment elevation acute myocardial infarction, or did not receive reperfusion therapy. Hospitalization in rural regions was also associated with aspirin underuse.

Conclusions- Despite improvements in early use of aspirin for AMI in China, there remains marked variation in practice and opportunities for improvement that are concentrated in some hospitals and patient groups.
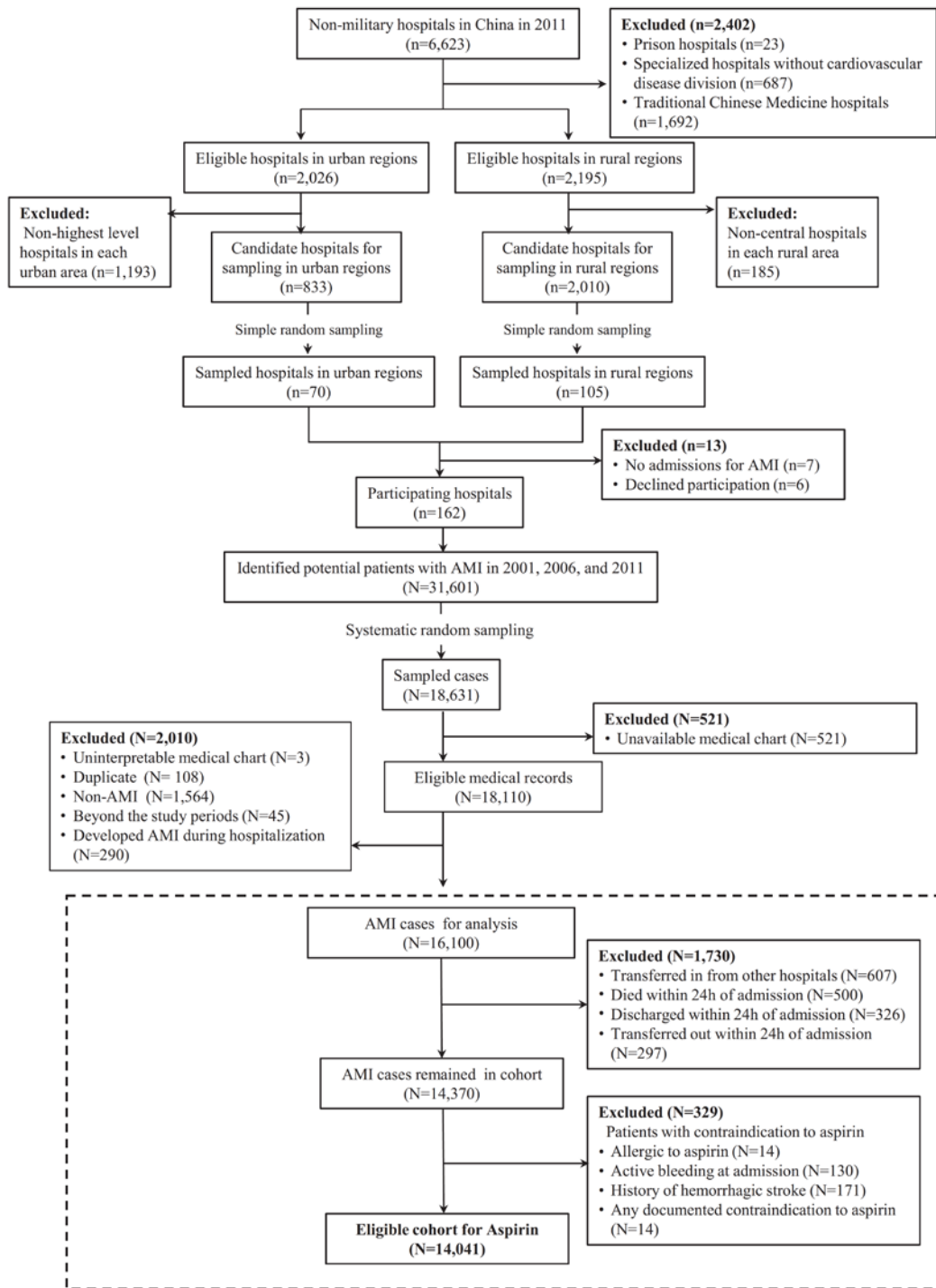
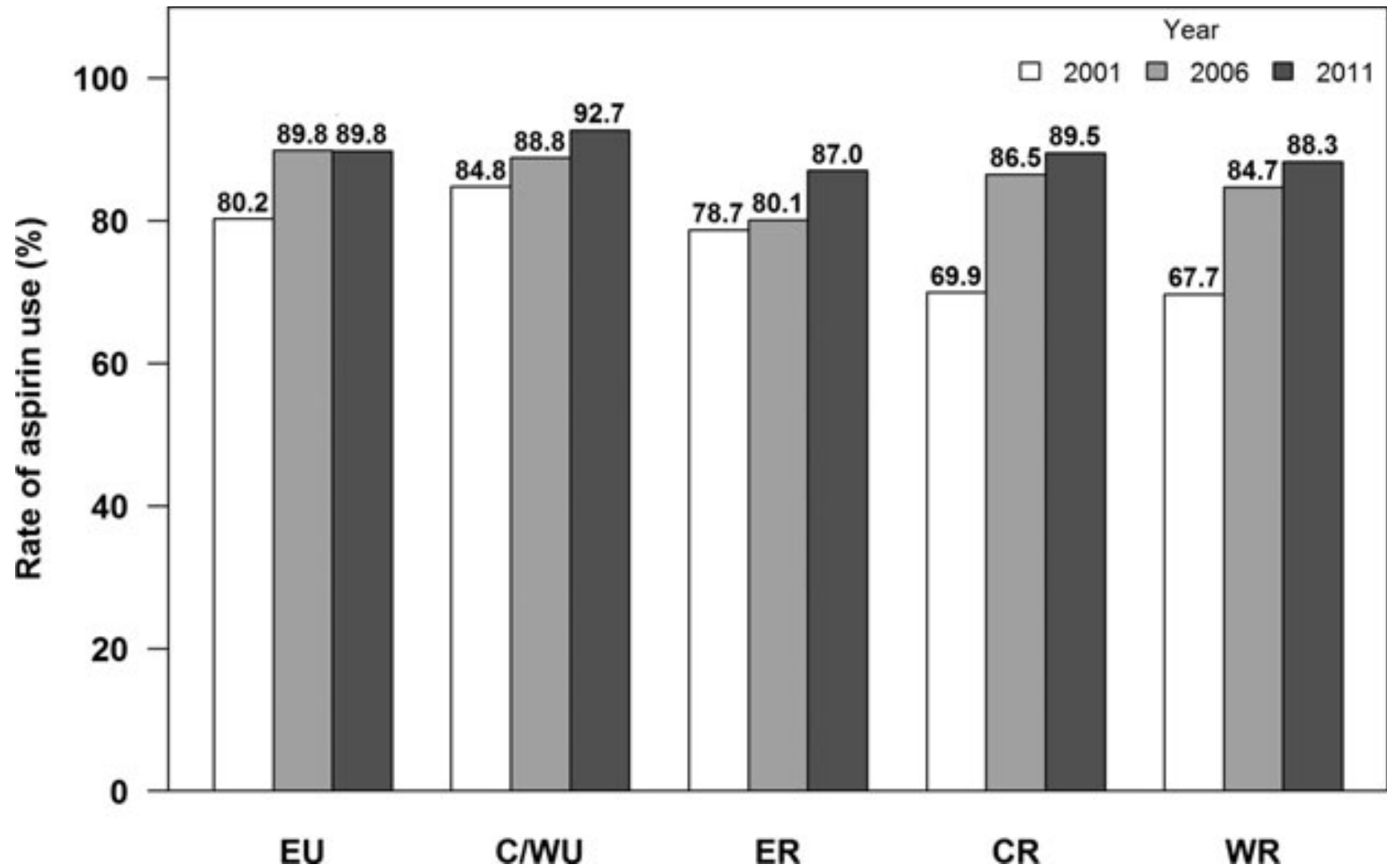**Figure 1.** Flow diagram of the study sample. AMI indicates acute myocardial infarction.

Figure 2. Trends in early aspirin use for acute myocardial infarction in 2001, 2006, and 2011 by Chinese Geographic Regions. P<0.001 for trend for all 5 regions. CR indicates Central rural; C/WU, Central/Western-urban; ER, Eastern-rural; EU, Eastern-urban; WR, Western-rural.

Table. Bivariate Analysis of Characteristics Associated With Patients Receiving Early Aspirin

Characteristics	Total (%) (N=14 041)	Early Aspirin User (%) (N=12 260)	Early Aspirin Non-User (%) (N=1781)	P Value
Demographic				
Age, y				<0.001
<55	22.1	23.0	16.3	
55 to 64	23.6	24.0	20.9	
65 to 74	30.1	29.9	31.0	
≥75	24.2	23.1	31.8	
Gender				<0.001
Male	69.9	70.7	64.4	
Female	30.1	29.3	35.7	
Cardiac risk factors				
Prior hypertension	49.5	49.9	46.8	0.015
Prior diabetes	17.4	17.3	18.1	0.388
Current smoker	34.7	35.8	27.3	<0.001
Medical histories				
Ischemic stroke	10.0	9.7	12.0	0.003
Myocardial infarction	10.8	10.9	10.3	0.460
Primary PCI	1.9	2.0	1.3	0.059
Clinical characteristics at admission				
Chest discomfort	91.9	93.5	81.5	<0.001
Cardiac arrest	1.0	0.8	2.0	<0.001
Cardiogenic shock	4.2	4.0	5.9	<0.001
Blood pressure mmHg				0.080
SBP<180 and DBP<110	91.6	91.8	90.6	
SBP≥180 or DBP≥110	8.4	8.2	9.4	
AMI type				<0.001
STEMI	85.4	86.1	80.6	
NSTEMI	14.6	13.9	19.4	
Reperfusion therapy				0.027
No reperfusion	69.3	67.4	82.5	
Fibrinolytic therapy	20.3	21.4	12.4	
Primary PCI	10.4	11.2	5.2	
Hospital characteristics				
Teaching hospital	80.8	80.7	75.5	<0.001
PCI-capable hospital	60.7	62.2	50.3	<0.001
Economic geographic region				0.915
Eastern	59.2	58.6	62.7	
Center	21.3	21.5	19.4	
Western	19.6	19.8	17.9	
Urban/Rural				<0.001
Urban	61.1	62.3	52.8	
Rural	38.9	37.7	47.2	
Year				<0.001
2001	15.0	13.6	24.9	
2006	28.3	28.1	29.6	
2011	56.7	58.3	45.5	

AMI indicates acute myocardial infarction; DBP, diastolic blood pressure; NSTEMI, non ST-segment elevation myocardial infarction; PCI, percutaneous coronary intervention; SBP, systolic blood pressure; STEMI, ST-segment elevation myocardial infarction.
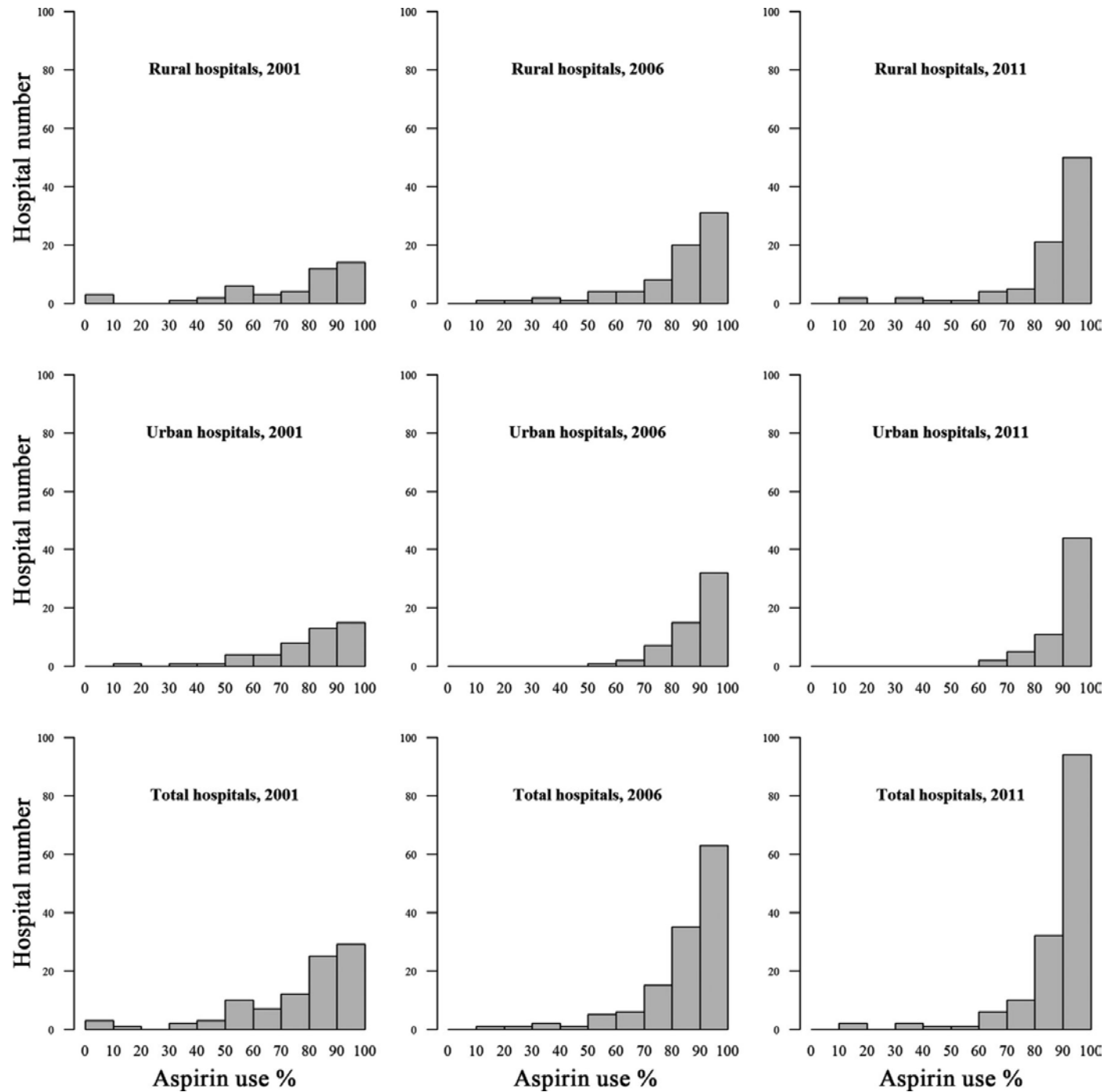
Figure 3. Trends of early aspirin therapy in rural and urban regions in 2001, 2006, and 2011 (hospitals with sample size <5 patients were excluded).

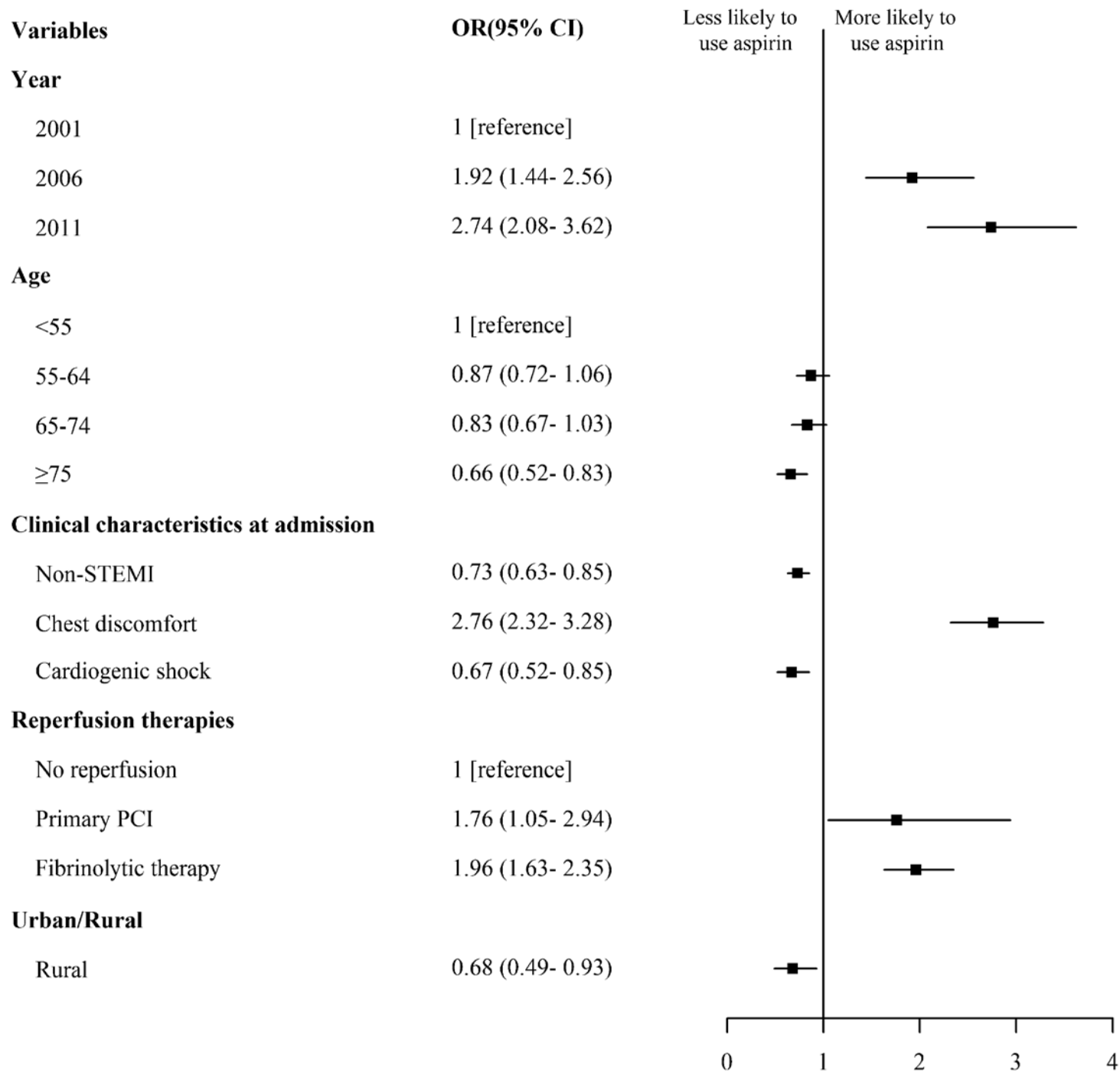| Variables	OR(95% CI)	Less likely to use aspirin / More likely to use aspirin
Year		
2001	1 [reference]	
2006	1.92 (1.44- 2.56)	
2011	2.74 (2.08- 3.62)	
Age		
<55	1 [reference]	
55-64	0.87 (0.72- 1.06)	
65-74	0.83 (0.67- 1.03)	
≥75	0.66 (0.52- 0.83)	
Clinical characteristics at admission		
Non-STEMI	0.73 (0.63- 0.85)	
Chest discomfort	2.76 (2.32- 3.28)	
Cardiogenic shock	0.67 (0.52- 0.85)	
Reperfusion therapies		
No reperfusion	1 [reference]	
Primary PCI	1.76 (1.05- 2.94)	
Fibrinolytic therapy	1.96 (1.63- 2.35)	
Urban/Rural		
Rural	0.68 (0.49- 0.93)	

Figure 4. Factors associated with early use of aspirin in multivariable model (c-statistic 0.683). Variables in the final multivariable model are shown along the vertical axis. The strength of effect is shown along the horizontal axis with the vertical line demarking an odds ratio (OR) of 1 (OR=1, no association); estimates to the left (OR<1) indicates that patients with the characteristic have a lower likelihood of receiving aspirin than those without the characteristic, while those to the right (OR>1) indicates that patients with the characteristic have a higher likelihood of receiving aspirin than those without the characteristic. Each square and line represents the point estimate of the effect of that variable in the model, while the line shows the 95% CI. CI indicates confidence interval; NSTEMI, non-ST-segment elevation myocardial infarction; OR, odds ratio; PCI, percutaneous coronary intervention.

Conclusion

- In China, we found a marked improvement in early aspirin therapy among patients with AMI over the past decade. However, use remained suboptimal in certain patient groups and care settings.

- Despite generally good performance, even this treatment could benefit from a quality improvement focus.