Sex Differences in Clinical Profiles and Quality of Care Among Patients With ST-Segment Elevation Myocardial Infarction From 2001 to 2011: Insights From the China Patient-Centered Evaluative Assessment of Cardiac Events (PEACE)-Retrospective Study

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***Background*—**China is experiencing a marked increase in ST-segment elevation myocardial infarction hospitalizations, with 30% occurring among women and higher risk of in-hospital death in relatively younger age groups (<70). Yet, little is known about sex differences in ST-segment elevation myocardial infarction presentation and management.

***Methods and Results*—**In a nationally representative sample of patients with ST-segment elevation myocardial infarction admitted to 162 Chinese hospitals in 2001, 2006, and 2011, we examined sex differences in hospitalization rates, clinical profiles, and quality of care. Among 11 986 patients, the proportion of women was unchanged between 2001 and 2011. The estimated national rates of hospital admission per 100 000 people increased from 4.6 in 2001 to 18.0 in 2011 among men (3.9-fold increase) and from 1.9 to 8.0 among women (4.2-fold increase) (P_{trend}<0.0001). The median age of women increased from 68 years in 2001 to 72 years in 2011 (P_{trend}<0.001); however, there was no age change in men (63 years in 2011) (P_{trend}=0.48). After accounting for age, women had a higher frequency of comorbidities. Although there were significant sex differences in the time interval of >12 hours between symptom onset and admission time in 2001, since 2006 delays in presentation were comparable between women and men. Fewer women without contraindications received evidence-based therapies than men, including reperfusion (57.5% versus 44.2%), early aspirin (88.8% versus 85.9%), and clopidogrel (56.9% versus 52.5%, P<0.001 for all) and the differences were largely unchanged over time.

***Conclusions*—**Women experienced a higher increase in hospitalization rates for ST-segment elevation myocardial infarction in China between 2001 and 2011 and were less likely to receive evidence-based therapies, especially reperfusion. In addition to efforts to improve quality of care generally, understanding the reasons for this sex disparity and addressing these differences in care should be a priority.

***Clinical Trial Registration*—**URL: https://www.clinicaltrials.gov. Unique identifier: NCT01624883. **(*J Am Heart Assoc.* 2016;5:e002157 doi: 10.1161/JAHA.115.002157)**

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Abstract

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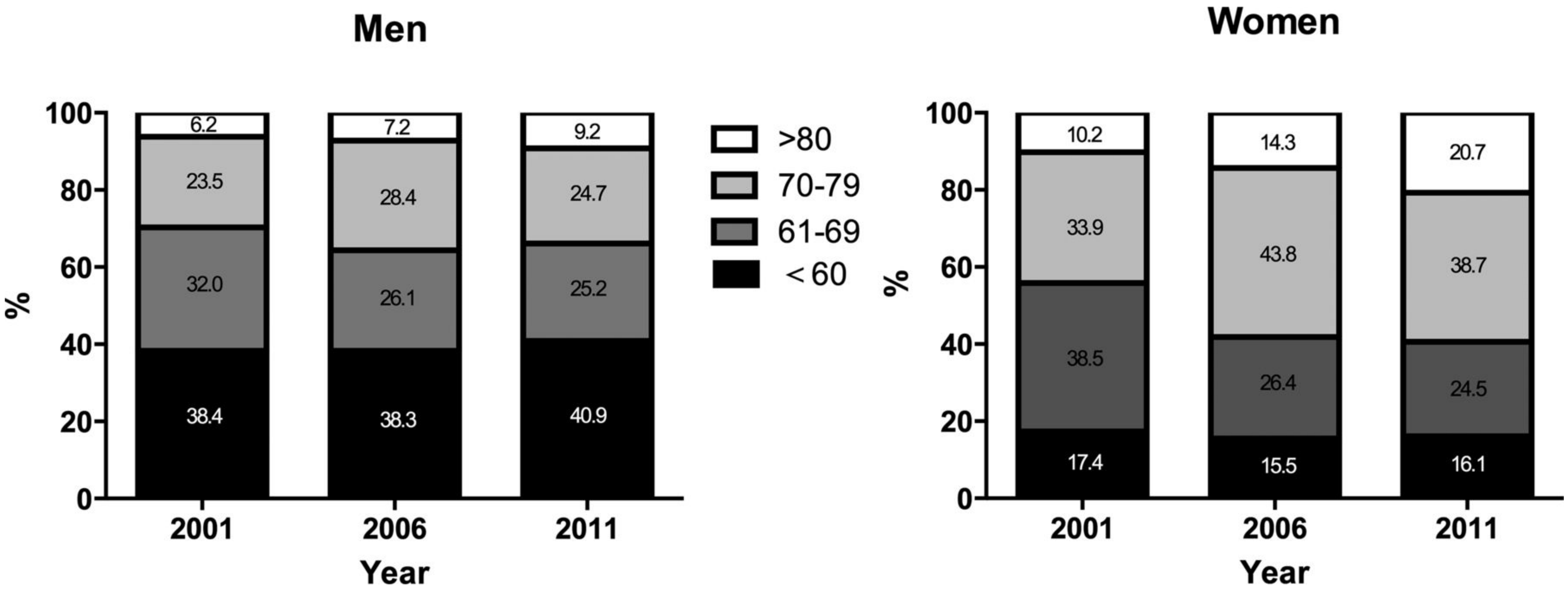

Figure 1. Age distribution of the study sample according to sex and year.

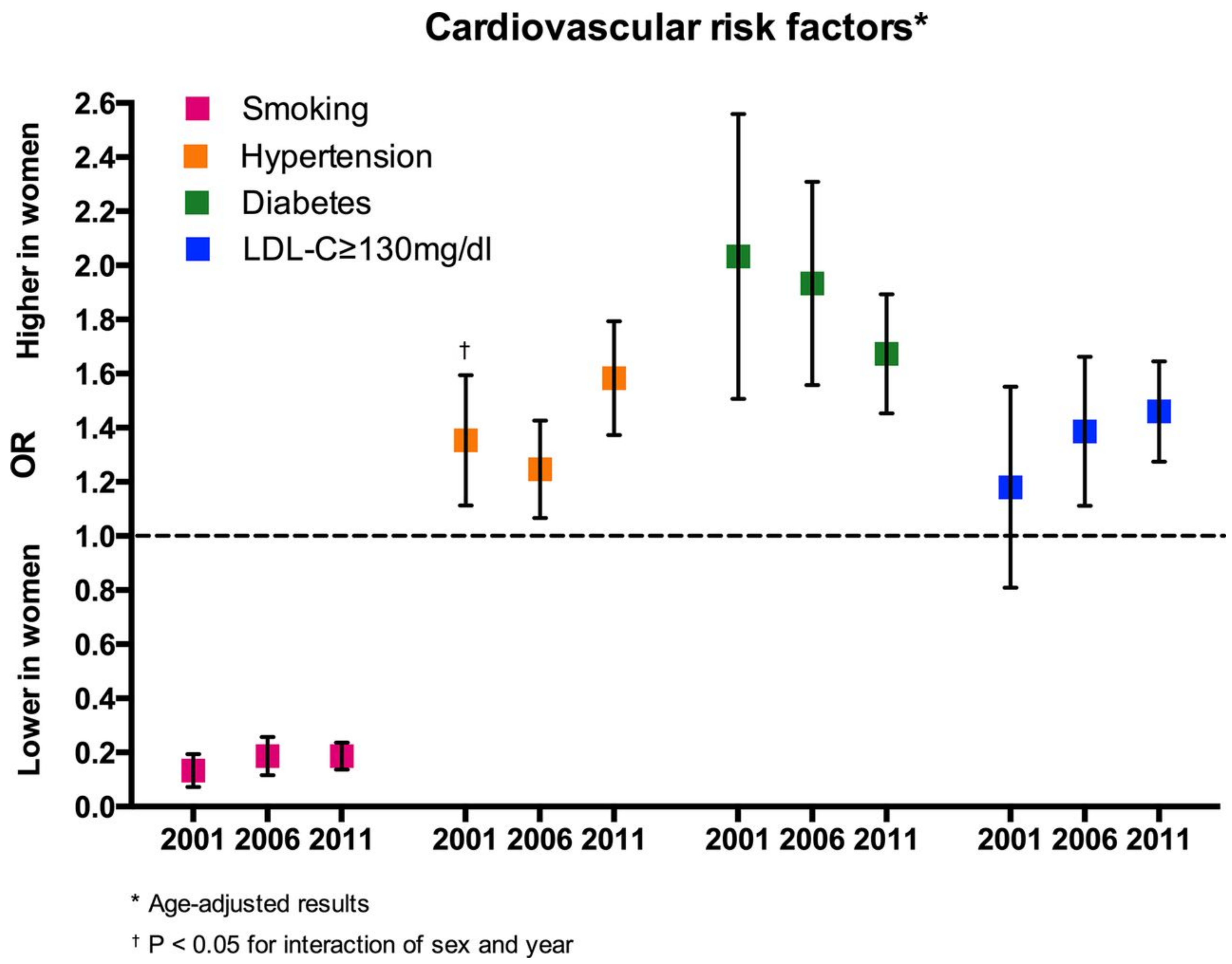

Figure 2. Temporal trends of age-adjusted results in sex differences in cardiovascular risk factors. LDL-C indicates low-density lipoprotein cholesterol; OR, odds ratio.

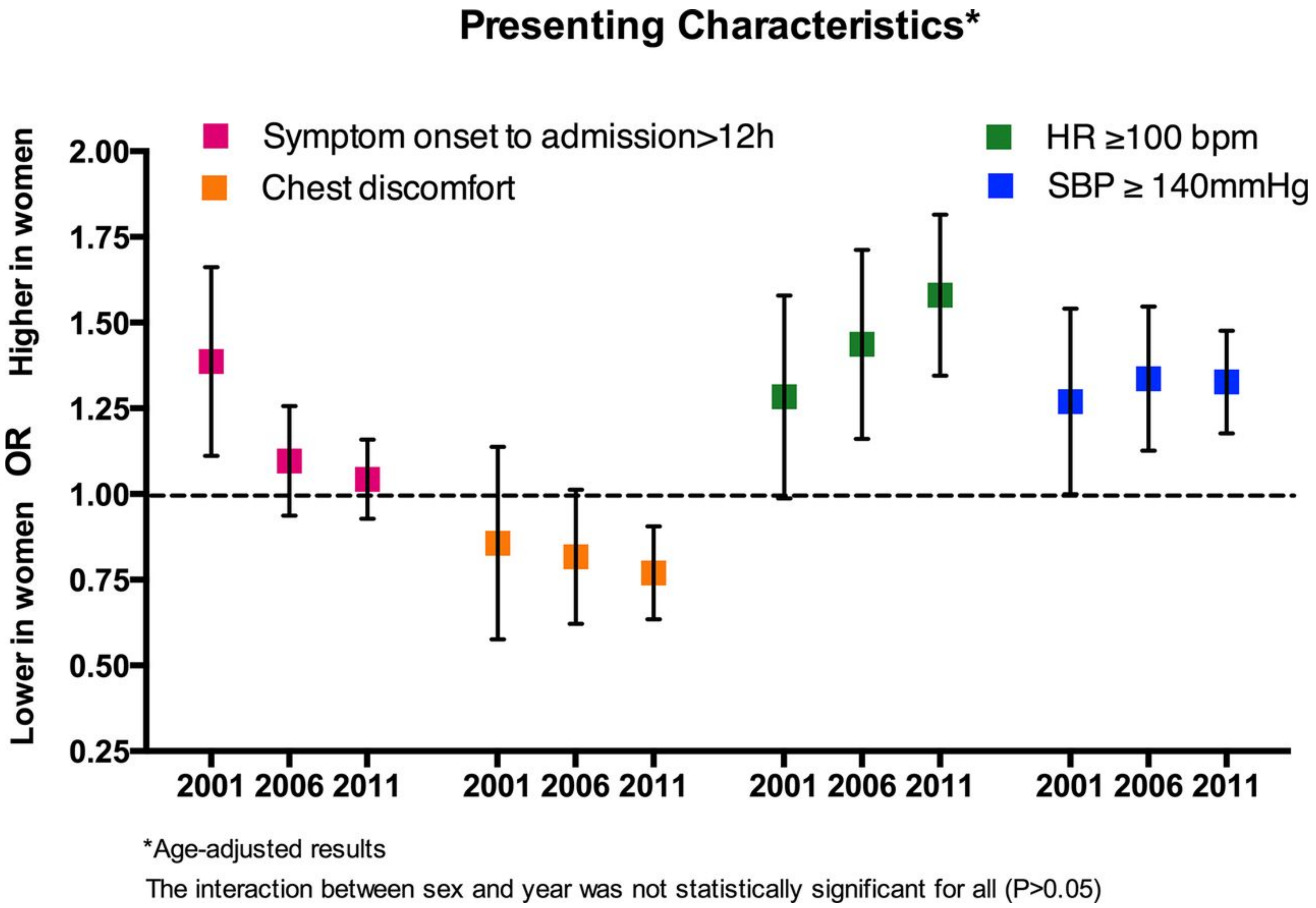

Figure 3. Temporal trends of age-adjusted results in sex differences in presenting characteristics. HR indicates heart rate; OR, odds ratio; SBP, systolic blood pressure.

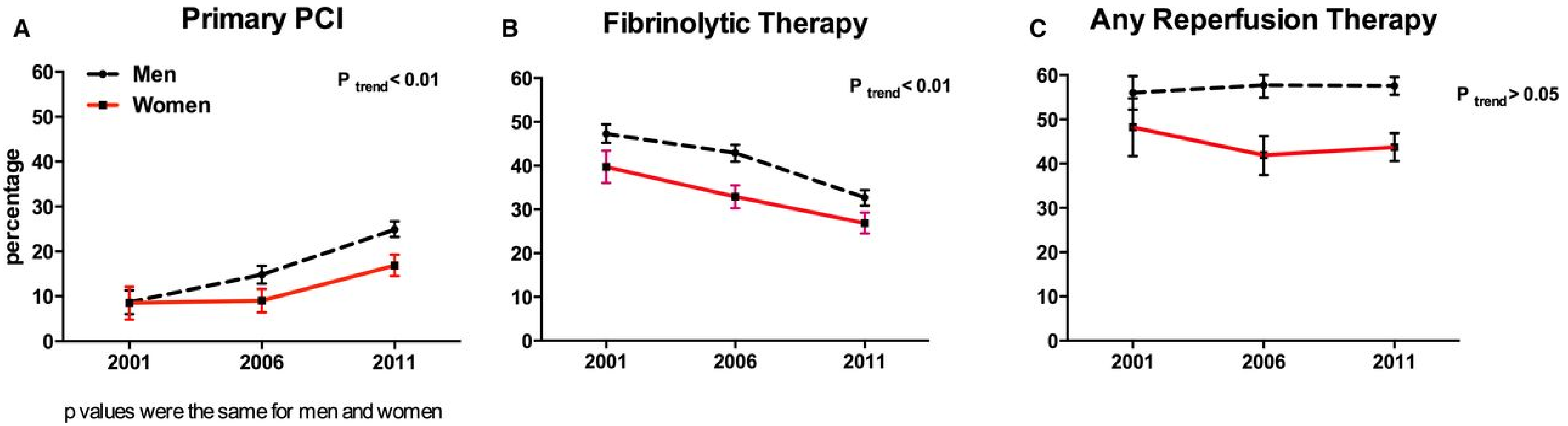

Figure 4. Temporal trends of sex differences in reperfusion therapy among ideal candidates. A, Primary PCI. B, Fibrinolytic therapy. C, Any reperfusion. PCI indicates percutaneous coronary intervention.

Table 1. Patient Characteristics According to Sex and Study Year

Characteristic	Men, %a			*P* for Trends	Women, %a			*P* for Trends
	2001 (n=1364)	2006 (n=2541)	2011 (n=4507)		2001 (n=569)	2006 (n=1040)	2011 (n=1965)	
Demographic								
Age, yb	63 (53, 70)	64 (54, 73)	63 (53, 73)	0.476	68 (62, 74)	71 (65, 76)	72 (64, 78)	<0.0001
Cardiovascular risk factors								
Hypertension	38.8	45.9	47.3	<0.0001	47.8	53.4	60.6	<0.0001
Diabetes	11	15.4	18.3	<0.0001	21.1	25.8	26.9	0.010
Current smoker	38.7	41.3	48	<0.0001	6	9	11.9	<0.0001
Medical history								
Coronary heart disease	22.6	19.1	20.5	0.355	26.2	22.2	21.8	0.054
Myocardial infarction	10.3	9.7	11.6	0.058	9.5	8.8	9.3	0.970
PCI	0.4	0.9	2.7	<0.0001	0.9	0.9	1.5	0.138
Stroke	9.2	10.3	11.5	0.010	10	11.7	13.9	0.070
Symptom onset to admission, hour								
<6	42.2	40.9	41.3	0.467	30.9	34.1	36.9	0.003
6 to 12 hours	8.9	9.6	10.5	0.027	10.7	12.5	11.3	0.921
>12 hours	48.9	49.5	48.1	0.430	58.3	53.4	51.7	0.008
Clinical characteristics								
Chest discomfort	93.1	93.2	93.4	0.652	91.2	89.7	89.3	0.219
Cardiogenic shock	3.4	5.5	6	0.0005	6.2	7.6	7.9	0.205
Cardiac arrest	0.9	1.3	1.5	0.078	0.7	0.8	1.1	0.335
Acute stroke	0.7	1.5	1	0.930	1.1	2.6	1.1	0.318
Heart rate ≥100 bpmb	15.7	14.8	11.6	<0.0001	20.2	22.0	18.4	0.098
SBP ≥140 mm Hgb	31.3	31.4	32.6	0.256	37.3	39.3	39.7	0.326

Table 1. Continued

Characteristic	Men, %a			P for Trends	Women, %a			P for Trends
	2001 (n=1364)	2006 (n=2541)	2011 (n=4507)		2001 (n=569)	2006 (n=1040)	2011 (n=1965)	
LDL-C level								
<130	35.2	55.8	67.6	<0.0001	25.8	50.1	59.3	<0.0001
≥130	11.7	15.4	18.2	<0.0001	12.8	18.5	22.4	<0.0001
Unrecorded	53.2	28.7	14.2	<0.0001	61.3	31.4	18.3	<0.0001
eGFR, mL/min per 1.73 m^2b	75.5 (60.0, 94.6)	77.9 (61.7, 97.9)	88.1 (68.9, 109.8)	<0.0001	63.7 (49.1, 81.9)	66.4 (48.2, 84.2)	76.1 (55.7, 100.1)	<0.0001
Hospital characteristics								
Teaching hospital	85	80.6	80.1	0.0001	83.5	79.7	77.8	0.003
PCI-capable hospital	32.8	55.1	72.9	<0.0001	34.3	52.6	69	<0.0001
Hospital with CCU	81.1	76.3	79.4	0.952	78.6	77.4	78.6	0.791
Economic–geographic region								
Central	19.5	21	23.2	<0.0001	16.9	17.9	22	<0.0001
Eastern	65.7	58.4	54.7	<0.0001	71.5	63.3	59.3	<0.0001
Western	14.8	20.6	22.1	<0.0001	11.6	18.8	18.7	<0.0001
Urban/rural								
Urban	63.9	60.6	63.4	0.586	64	60.9	57.9	0.006
Rural	36.1	39.4	36.6		36	39.1	42.1	

Table 2. In-Hospital Treatments Among Ideal Patients According to Sex and Year

Characteristic	Overall, N (%)		*P* Value	Men, %			*P* for Trends	Women, %			*P* for Trends
	Men	Women		2001	2006	2011		2001	2006	2011	
Acute medication											
Aspirin ≤24 hours[a]	7023 (88.8)	2765 (85.9)	<0.0001	81.1	87.7	91.8	<0.0001	78.0	85.0	88.8	<0.0001
Clopidogrel ≤24 hours[a]	4454 (56.9)	1679 (52.5)	<0.0001	1.4	44.3	80	<0.0001	0.8	36.5	75.5	<0.0001
β-Blockers ≤24 hours[a]	2371 (56.8)	770 (52.6)	0.005	47.8	62.7	56.1	0.095	46.4	54.8	53.1	0.202
ACE-inhibitor/ARB[a,b]	5073 (65.8)	1994 (63.8)	0.044	60.8	69.6	65.2	0.214	59.2	66.7	63.6	0.332
Statin[a,b]	6180 (76.5)	2476 (75.1)	0.117	30.3	75.0	91.5	<0.0001	27.8	72.6	90.4	<0.0001
Reperfusion therapy[b]											
With reperfusion	2289 (57.5)	646 (44.2)	<0.0001	56.3	58.0	57.6	0.702	47.3	42.2	44.4	0.758
Primary PCI	757 (19.0)	203 (13.9)	<0.0001	8.7	15.1	24.2	<0.0001	8.4	8.9	17.7	<0.0001
Fibrinolytic therapy	1535 (38.6)	443 (30.3)	<0.0001	47.7	43.0	33.5	<0.0001	38.9	33.3	26.8	0.0002
Procedure[c]											
Nonprimary PCI	1117 (21.8)	299 (14.3)	<0.0001	9.6	19.4	24.4	<0.0001	5.6	10.2	17.1	<0.0001
Cardiac catheterization	2414 (47.0)	669 (31.9)	<0.0001	34.2	41.7	51.1	<0.0001	26.2	25.0	35.5	<0.0001

- ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blocker; PCI, percutaneous coronary intervention.
- a Only among patients without contraindications for the treatment.
- b During hospitalization.
- c Only among patients admitted into a hospital capable of PCI.

Conclusions

- In a large, nationally representative observational study in China, women hospitalized with STEMI were older, had greater delays in care seeking, more comorbidities, and worse disease severity than men. Moreover, women were less likely to be candidates for, and less likely to receive, evidence-based therapies as compared with men.
- These disparities have changed little over the past decade despite large-scale efforts to increase access and quality.
- These findings underscore the need for improved systems to ensure the prompt diagnosis and use of evidence-based treatments for women with STEMI, particularly with respect to reperfusion therapies.