Improving Care for Cardiovascular Disease in China: A collaborative project of AHA and CSC

(The CCC Project)

Project Progress

Beijing Anzhen Hospital, Capital Medical University

Beijing Institute of Heart Lung and Blood Vessel Diseases

Landmark Events

	Meeting	Data	Education
03/2014	1st SMG meeting		
09/2014	Launching meeting		
10/2014	2nd SMG meeting		1st training course
11/2014		ACS Phase 1 began	
02/2015		AF Phase 1 began	
03/2015	3rd SMG meeting		2nd training course
05/2015		ACS Phase 2 began	1st webinar
06/2015		ACS: 10000	
08/2015		AF Phase 2 began	
09/2015		ACS: 20000	1st recognition meeting
12/2015		AF: 10000	1st regional workshop
01/2016		ACS: 30000	2nd webinar
02/2016	4th SMG meeting		3rd webinar
05/2016			2nd regional workshop
09/2016		ACS: 45000， AF: 20000	2nd recognition meeting
07/2017		ACS: 62694， AF: 30667	3nd training course

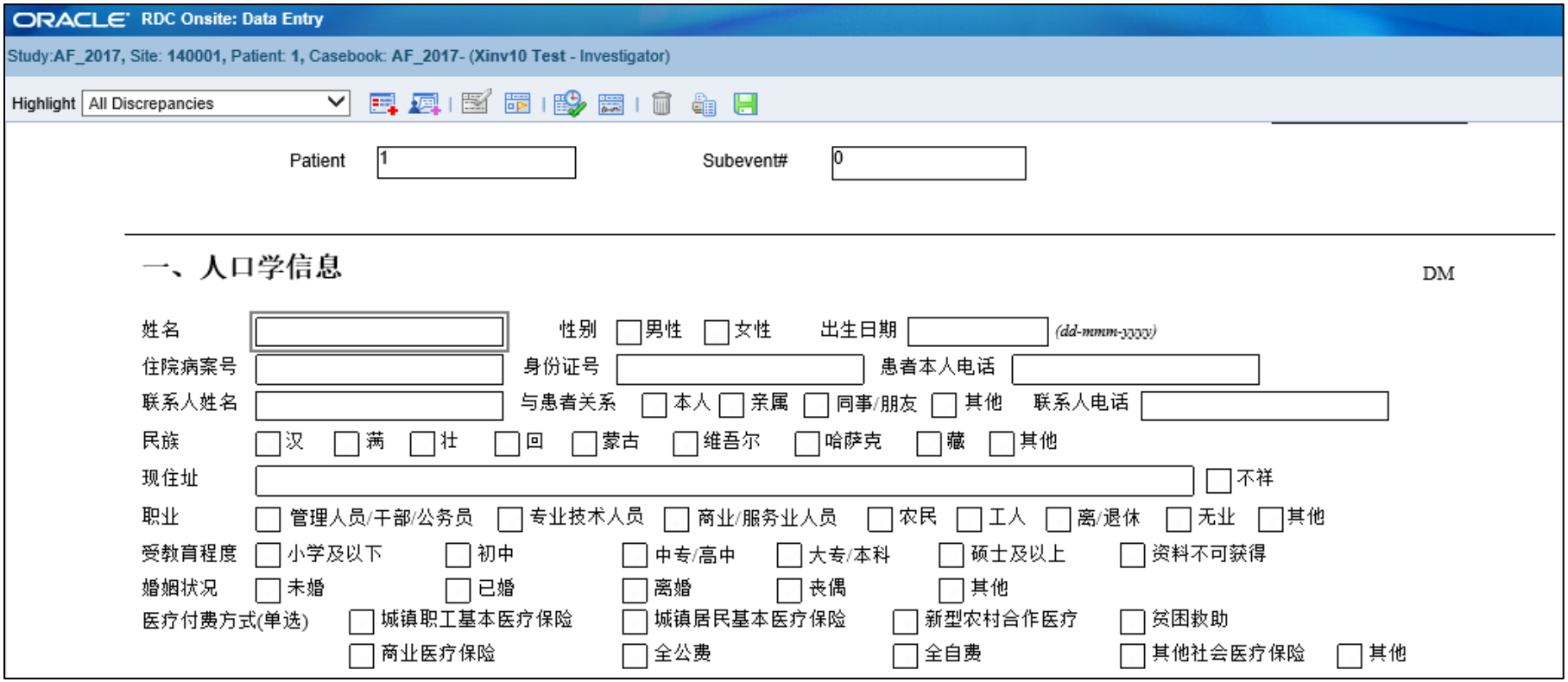
Infrastructure Set-up

- The CCC website
- Electronic data collection (EDC) system
- WeChat official accounts and groups
- Web-based education platform (webinar)
- Monthly feedback system for quality of care
- Regional workshop
- Annual recognition meeting

CCC Website: http://www.ccc-heart.com/

Electronic Data Collection System

Oracle OC/RDC database



Official WeChat Accounts and Groups

Web-based Education Platform (webinar)

- Know your reports
- Early administration of beta blockers in patients with ACS
- Risk assessment and anticoagulant therapy in patients with atrial fibrillation

Achievements of Scientific Research

List of SCI papers

Type	Title	Journal
Protocol	Rationale and design of the Improving Care for Cardiovascular Disease in China (CCC) project: A national effort to prompt quality enhancement for acute coronary syndrome	Am Heart J
Protocol (revised)	Rationale and design of the Improving Care for Cardiovascular Disease in China (CCC) Project: A national effort to improve management of atrial fibrillation	Circ Cardiovasc Qual Outcomes
Result	Invasive management strategies and antithrombotic treatments in patients with non-ST-segment-elevation acute coronary syndrome in China	Circ Cardiovasc Intervention

Trial Design

Rationale and design of the Improving Care for Cardiovascular Disease in China (CCC) project: A national effort to prompt quality enhancement for acute coronary syndrome

Yongchen Hao, PhD,[a] Jing Liu, MD, PhD,[a] Jun Liu, MD,[a] Sidney C. Smith, Jr., MD,[b] Yong Huo, MD,[c] Gregg C. Fonarow, MD,[d] Changsheng Ma, MD,[e] Junbo Ge, MD, PhD,[f] Kathryn A. Taubert, PhD,[g] Louise Morgan, MSN,[b] Yang Guo, MD,[a] Qian Zhang, MD,[a] Wei Wang, MD,[a] and Dong Zhao, MD, PhD[a], on behalf of the CCC-ACS Investigators *Beijing, Shanghai, China; Chapel Hill, NC; Los Angeles, CA; and Basel, Switzerland*

Background A sizeable gap exists between guideline recommendations for treatment of acute coronary syndrome (ACS) and application of these recommendations in clinical practice. The CCC-ACS project is a novel national quality enhancement registry designed to help medical care providers bridge this gap, thereby improving clinical outcomes for ACS patients in China.

Methods and Results The CCC-ACS project uses data collection, analysis, feedback, rapid-cycle improvement, and performance recognition to extend the use of evidence-based guidelines throughout the health care system and improve cardiovascular health. The project was launched in 2014, with 150 centers recruited representing the diversity of care for ACS patients in tertiary hospitals across China. Clinical information for patients with ACS is collected via a Web-based data collecting platform, including patients' demographics, medical history, symptoms on arrival, in-hospital treatment and procedures, in-hospital outcomes, and discharge medications for secondary prevention. Improvement in adherence to guideline recommendations is facilitated through monthly benchmarked hospital quality reports, recognition of hospital quality

Coronary Interventions

Invasive Management Strategies and Antithrombotic Treatments in Patients With Non–ST-Segment–Elevation Acute Coronary Syndrome in China

Findings From the Improving CCC Project (Care for Cardiovascular Disease in China)

Qing Yang, MD*; Ying Wang, PhD*; Jing Liu, MD, PhD; Jun Liu, MD; Yongchen Hao, PhD; Sidney C. Smith, Jr, MD; Yong Huo, MD; Gregg C. Fonarow, MD; Changsheng Ma, MD; Junbo Ge, MD, PhD; Kathryn A. Taubert, PhD; Louise Morgan, MSN; Yang Guo, MD; Wei Wang, MD; Yujie Zhou, MD; Dong Zhao, MD, PhD; on behalf of the CCC-ACS Investigators

Background—Early invasive strategies and antithrombotic treatments are key treatments of non–ST-segment–elevation acute coronary syndrome (NSTE-ACS). Few studies have examined the use of these strategies in patients with NSTE-ACS in China. This study aimed to assess the applications of invasive strategies and antithrombotic treatments in patients with NSTE-ACS and compare their outcomes.

Methods and Results—A nationwide registry study, Improving CCC (Care for Cardiovascular Disease in China) ACS project, was launched in 2014 as a collaborative study of the American Heart Association and Chinese Society of Cardiology (CSC), with 142 participating hospitals reporting details of clinical management and outcomes of patients with NSTE-ACS. The use of invasive strategies and antithrombotic treatments was examined based on updated guidelines. Major adverse cardiovascular events were analyzed. A total of 9953 patients with NSTE-ACS were enrolled. Angiography was performed in 63.1% of these patients, and 58.2% underwent percutaneous coronary intervention (PCI). However, 40.6% of patients did not undergo early risk assessment, and very-high-risk patients had the lowest proportion of PCI (41.7%). PCI was performed within recommended times in 11.1% of very-high-risk patients and 26.3% of high risk patients.

4 Abstracts were accepted in the International Conference: 2 in AHA annual meeting , 1 in ACC annual meeting, and 1 in Global health systems Symposium

Up-to-date results

Nov. 1st, 2014 – May 31st, 2017

- Hospital enrollment
- Case recruitment and performance measures for ACS
- Case recruitment and performance measures for AF

Hospital Enrollment

150 tertiary hospitals were recruited

Northern China	25
Northeast China	20
Eastern China	45
Central China	19
Southern China	15
Southwest China	13
Eastern China	13

Second Level hospital: 42

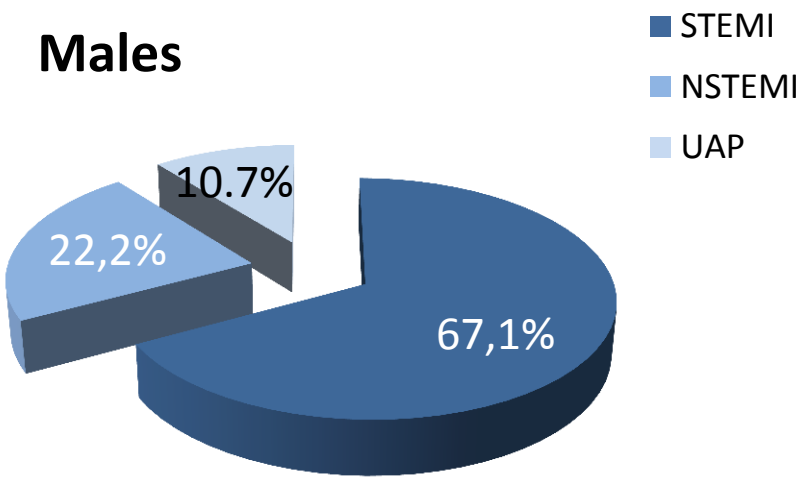
Hospital sampling frame
stratified by **geographic-economic** level

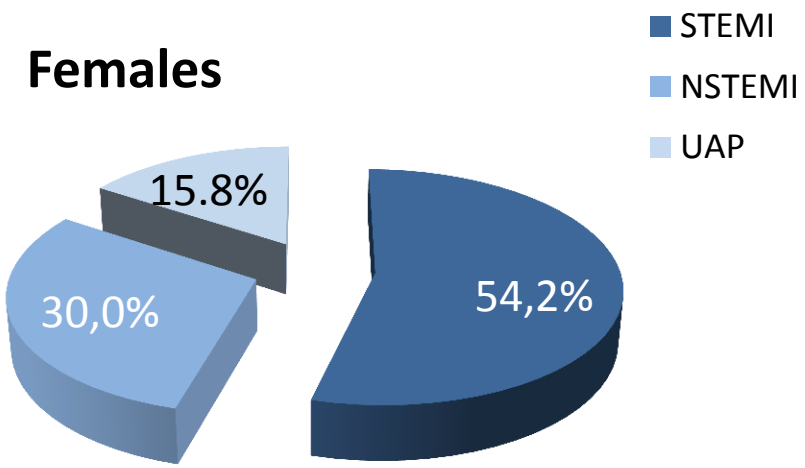
Region	Economic level	Provinces	No. of hospitals in the area#	No. of hospitals needed (10%)	Enrolled hospitals in phase 1	Enrolled hospitals in phase 2	Total
Northern China	Low	NA	--	--	--	--	--
	Medium-low	Shanxi	49	5	4	1	5
	Medium-high	Hebei	55	5	4	2	6
	High	Beijing, Tianjin, Inner Mongolia	123	12	13	1	14
Northeast China	Low	NA	--	--	--	--	--
	Medium-low	Heilongjiang	77	7	1	5	6
	Medium-high	Jilin	39	4	2	1	3
	High	Liaoning	101	10	2	9	11
Eastern China	Low	Anhui, Jiangxi	84	8	3	5	8
	Medium-low	NA	--	--	--	--	--
	Medium-high	Fujian, Shandong	129	12	1	12	13
	High	Shanghai, Jiangsu, Zhejiang	240	23	13	11	24
Central China	Low	NA	--	--	--	--	--
	Medium-low	Henan, Hunan	134	13	7	7	14
	Medium-high	Hubei	60	6	0	5	5
	High	NA	--	--	--	--	--
Southern China	Low	Guangxi	50	5	2	2	4
	Medium-low	Hainan	11	1	2	0	2
	Medium-high	NA	--	--	--	--	--
	High	Guangdong	105	10	5	4	9
Southwest China	Low	Guizhou, Yunnan, Tibet	82	8	3	2	5
	Medium-low	Sichuan	83	8	0	5	5
	Medium-high	Chongqing	22	2	3	0	3
	High	NA	--	--	--	--	--
Northwest China	Low	Gansu	34	3	2	0	2
	Medium-low	Qinghai, Xinjiang	29	3	5	0	5
	Medium-high	Shaanxi, Ningxia	51	5	3	3	6
	High	NA	--	--	--	--	--
Total			**1558**	**150**	**75**	**75**	**150**

ACS Case Recruitment

62694 ACS cases have been reported (Nov, 2014-May, 2017)

Male: 46882 cases, 75% Female: 15812 cases, 25%

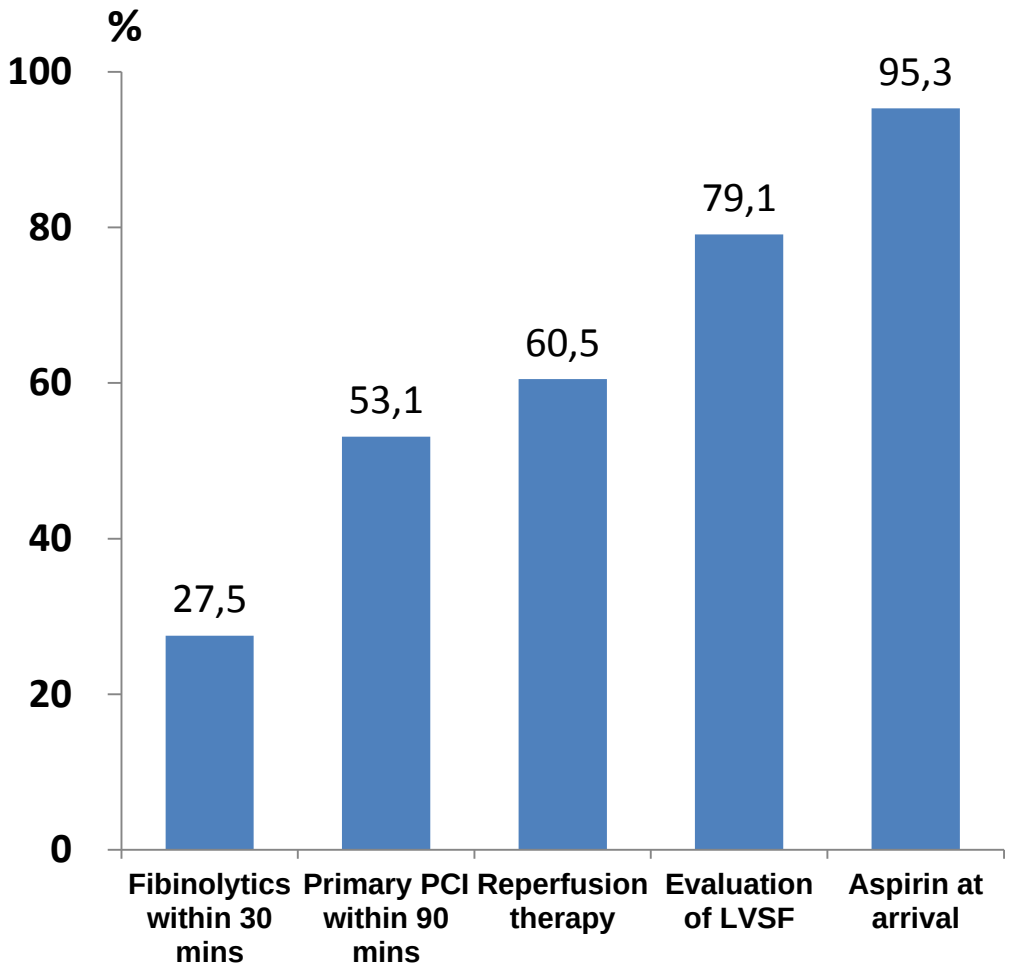




ACS Primary Performance Measures

Early performances

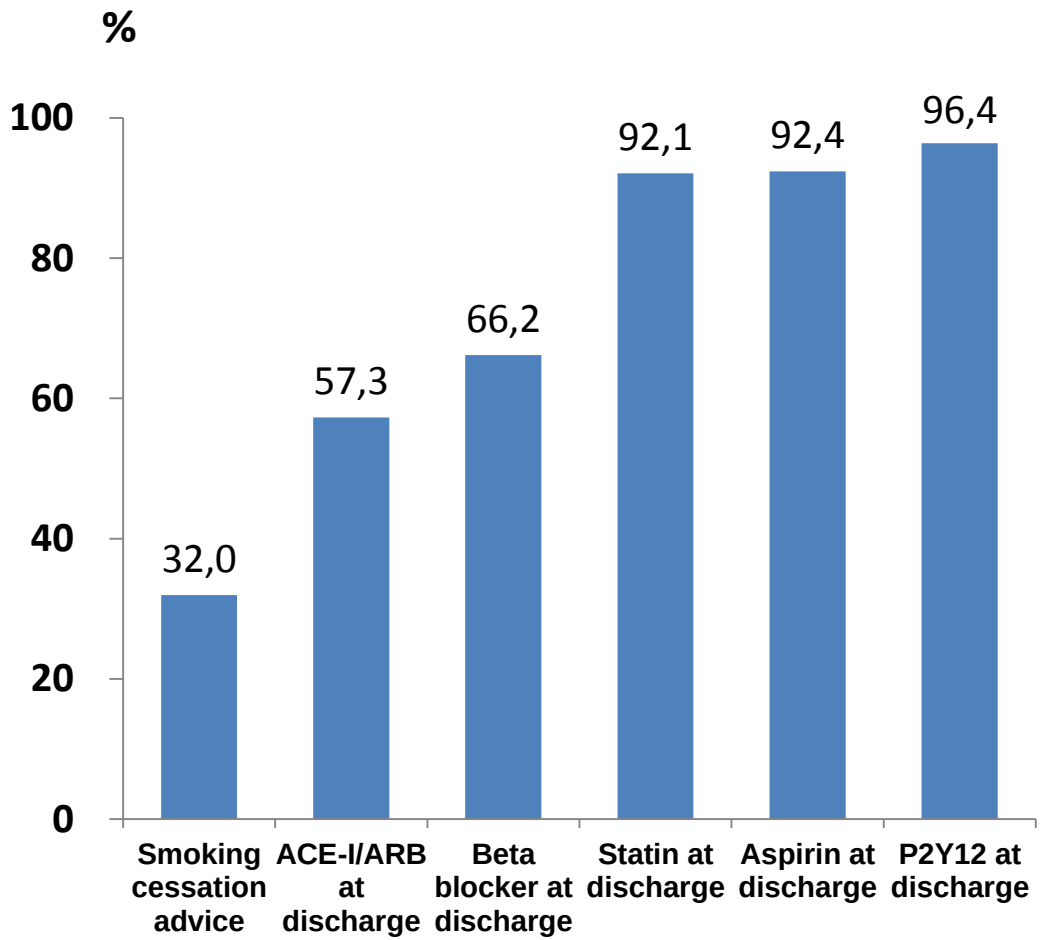
1. Proportion of patients receiving aspirin at arrival (within 24 hours)
2. Proportion of STEMI patients receiving fibrinolytic therapy within 30 minutes after arrival among those receiving this treatment
3. Proportion of STEMI patients receiving primary PCI within 90 minutes after arrival among those receiving this treatment
4. Proportion of STEMI patients receiving reperfusion therapy
5. Proportion of patients with evaluation for LV systolic function by echocardiography



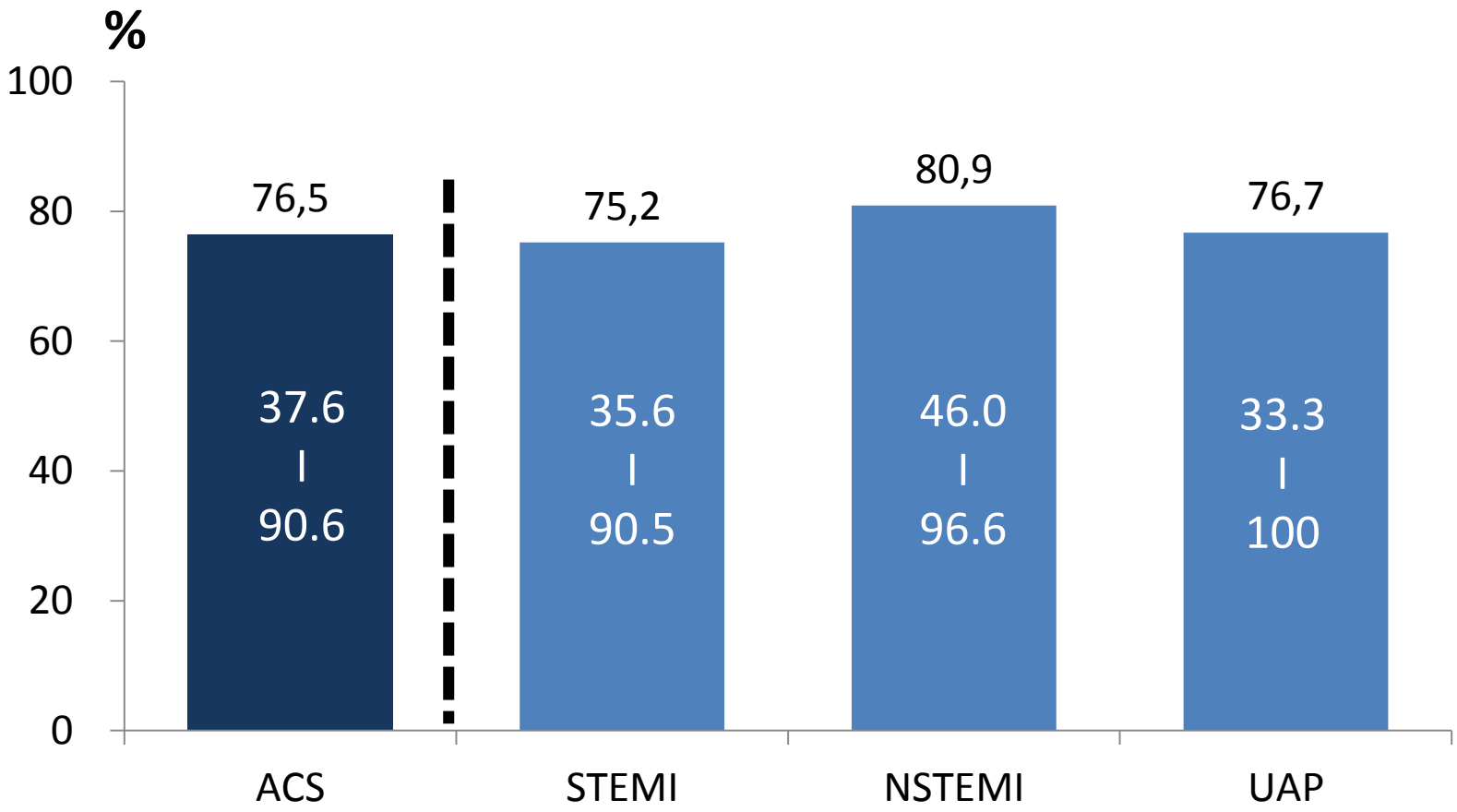
ACS primary performance measures

At discharge

6. Proportion of ACS patients receiving aspirin at discharge
7. Proportion of patients with indications receiving $P2Y_{12}$ receptor inhibitor at discharge
8. Proportion of patients with indications receiving a beta-blocker at discharge
9. Proportion of patients receiving a statin at discharge
10. Proportion of ACS patients with indications receiving an ACE-I or ARB at discharge
11. Proportion of smoking patients that receiving smoking cessation advice/ counseling

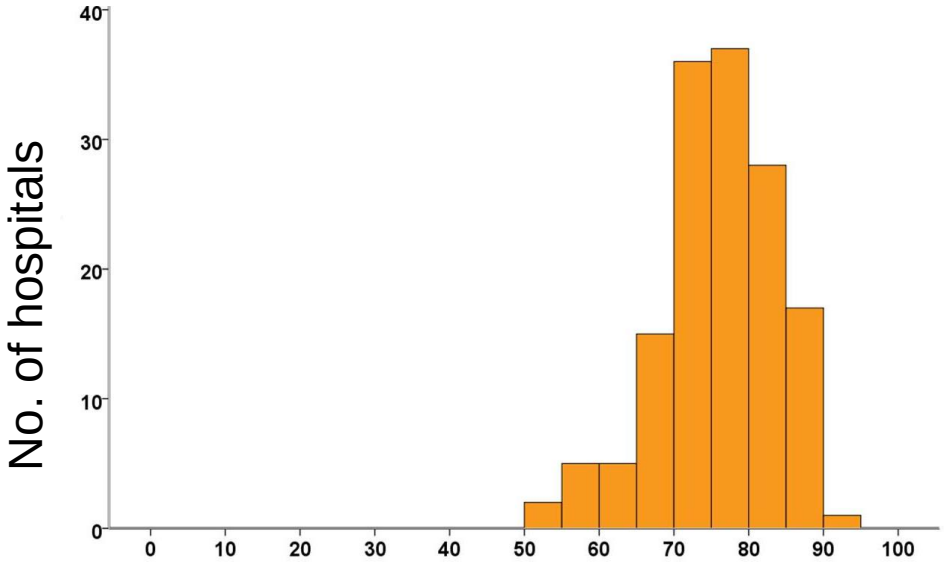


Composite Scores of ACS Primary Performance Measures

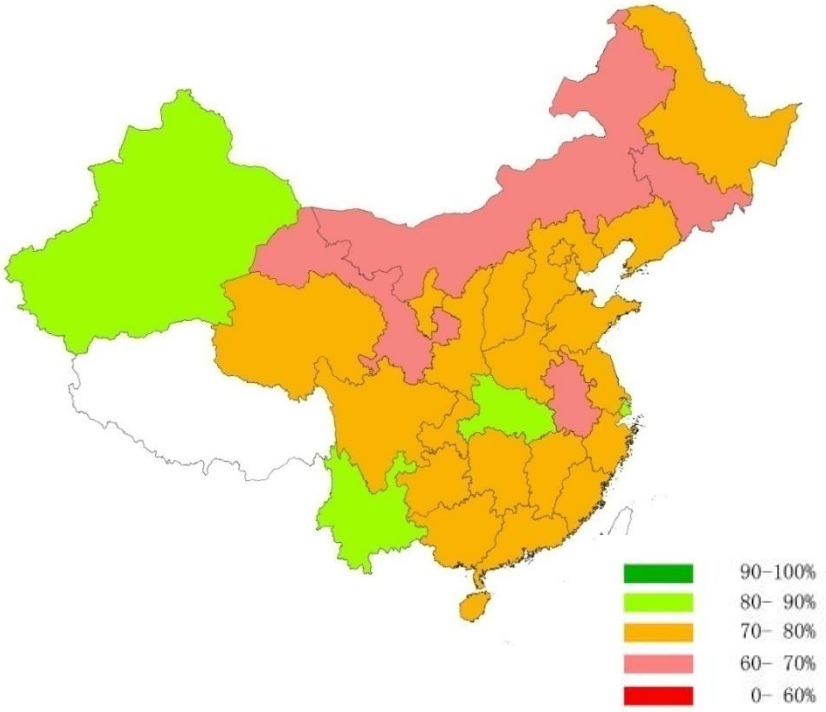


Notes: numbers above the bars refer to composite scores of performance measures for all hospitals; numbers in the bars refer to the maximum and minimum values.

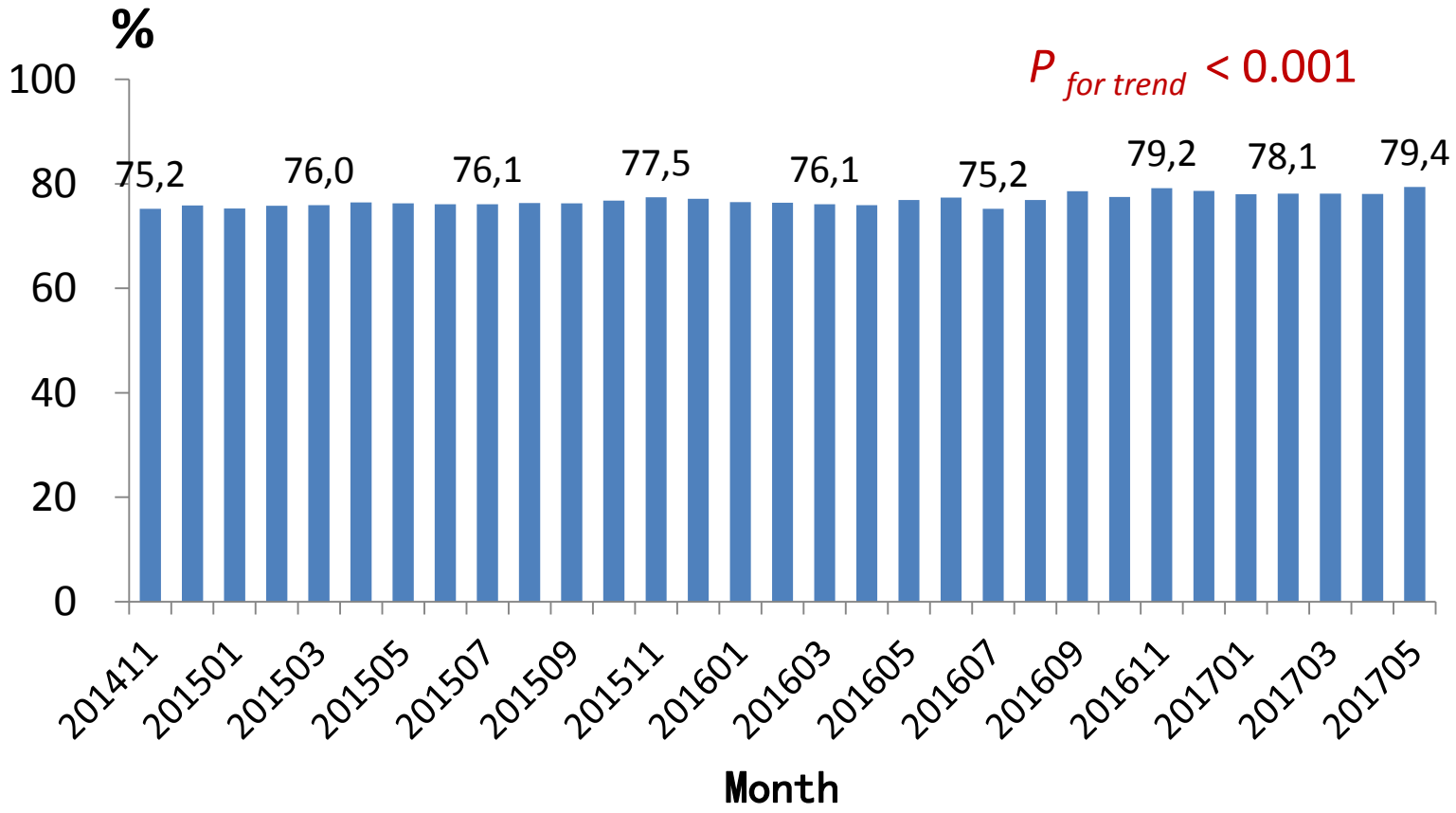
National Distribution of Composite Scores of ACS Primary Performance Measures



Composite scores of ACS primary performance measures

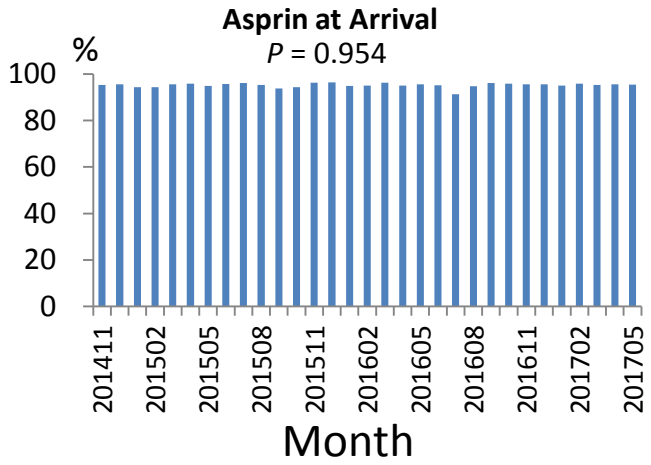


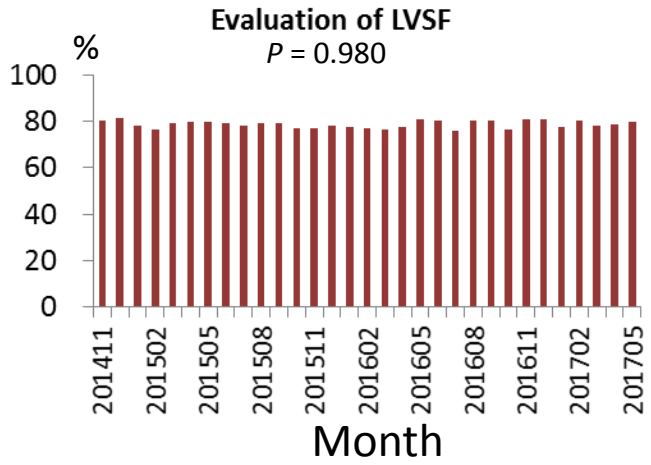
Trend of Composite Primary Performance Measures for ACS

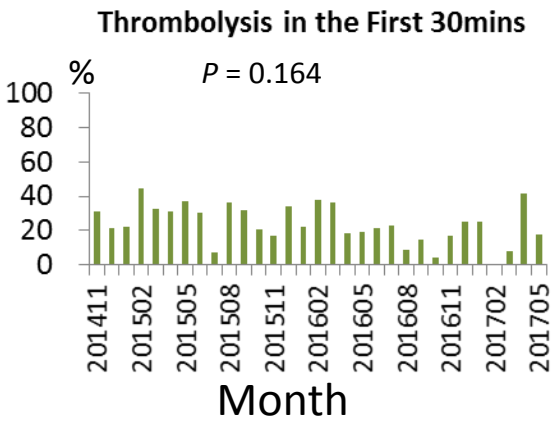


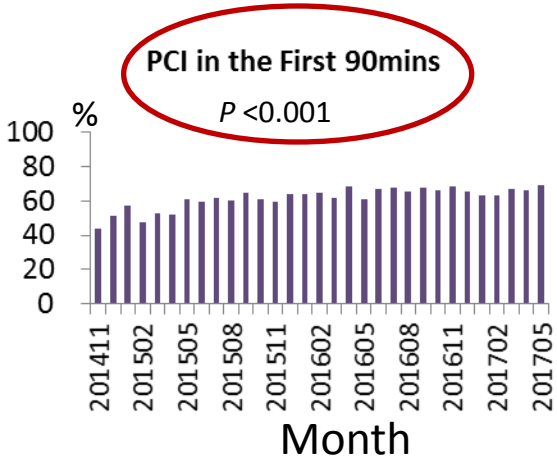
Notes: numbers above the bars refer to composite scores of performance measures for all hospitals

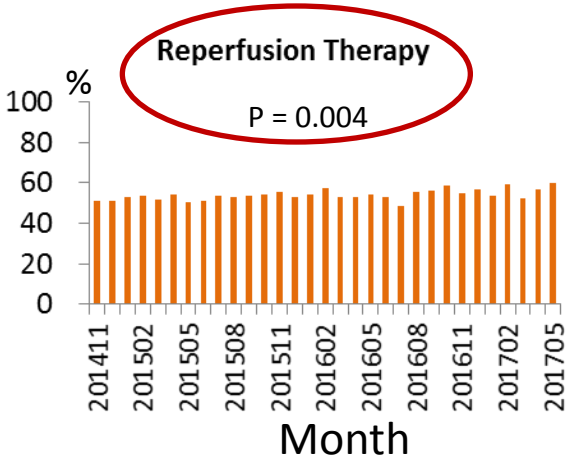
Trend of Individual Primary Performance Measure for ACS -- Early Strategies





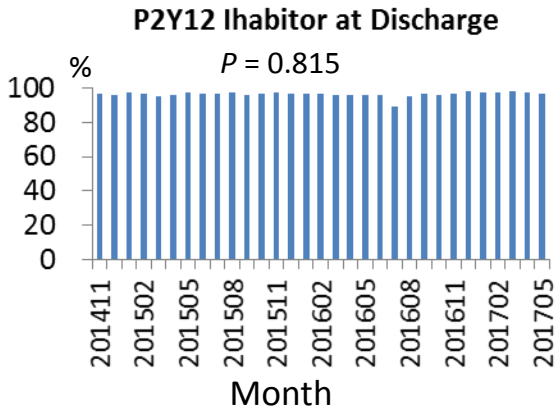


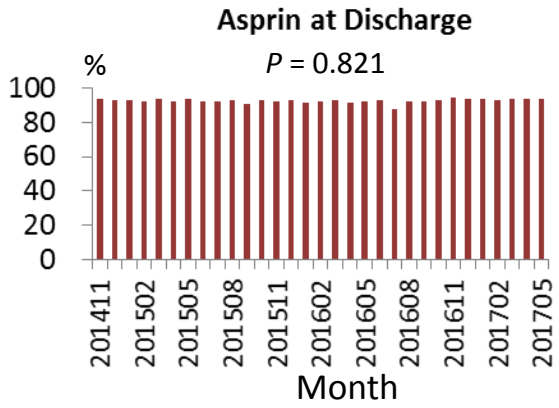


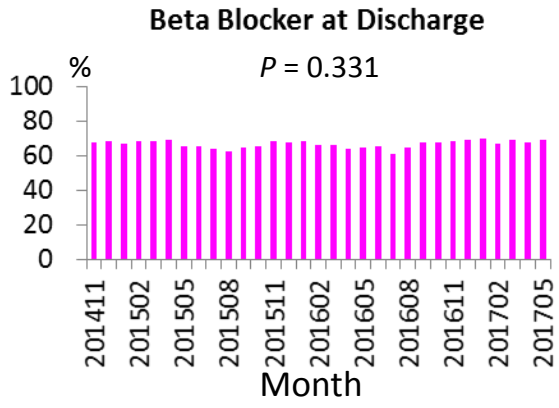


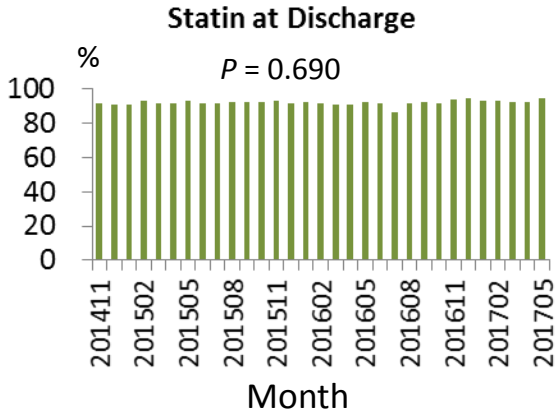
* Trend Chi-square test

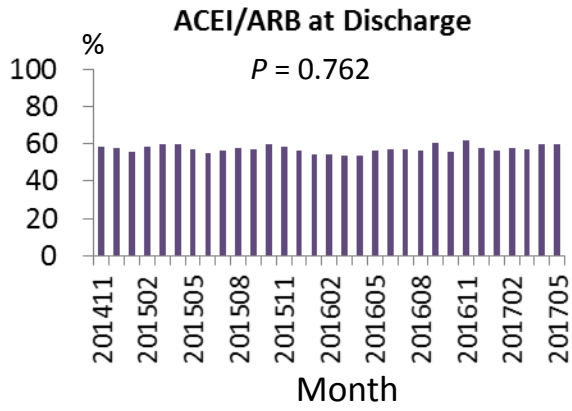
Trend of Individual Primary Performance Measure for ACS -- At Discharge

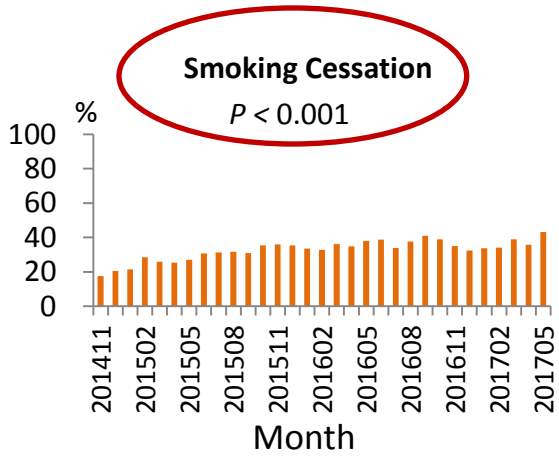








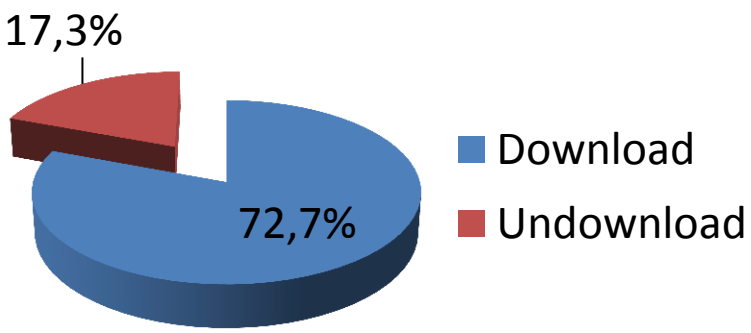




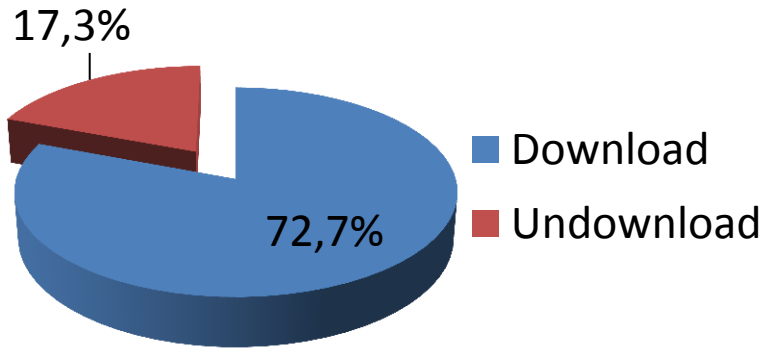
* Trend Chi-square test

Downloading of The Monthly Quality Reports

Phase 1 hospitals

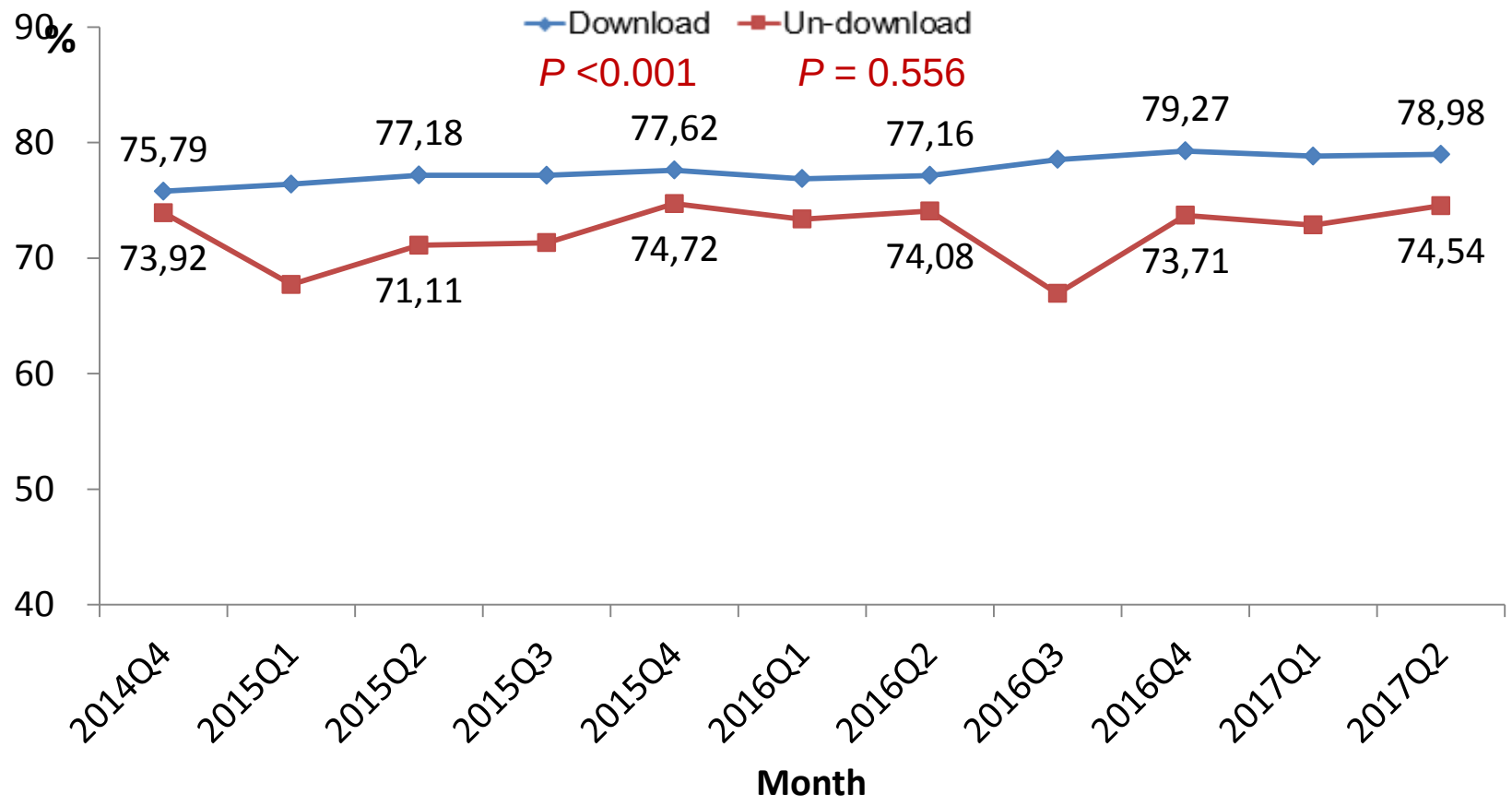


Phase 2 hospitals



Phases	No. of hospitals	No. of reports	Download rate (%)
Phase 1	73	1259	86.3
Phase 2	67	825	77.6
Total	**140**	**2084**	**82.1**

Composite Scores of ACS Primary Performance Measures Improved Significantly in Hospitals which Downloaded Reports



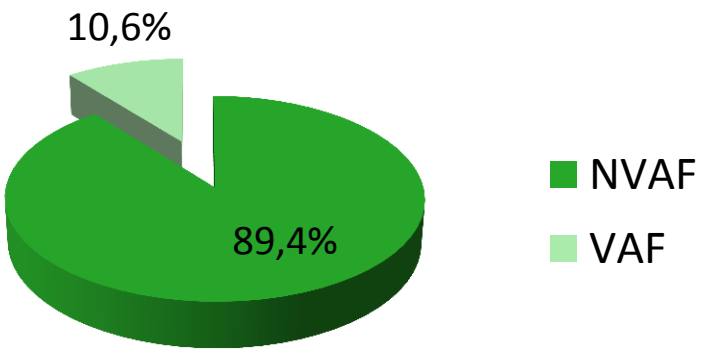
* Trend Chi-square test

AF Cases Recruitment

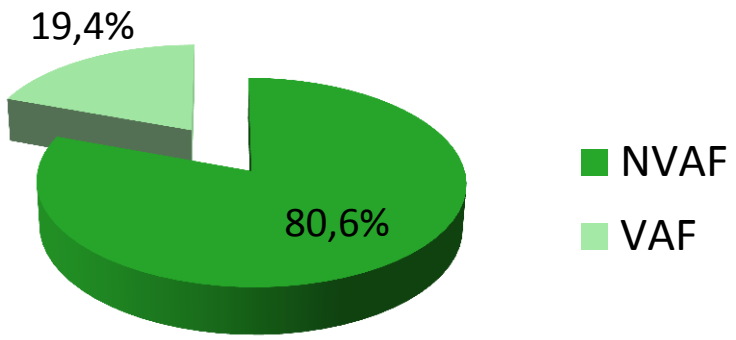
30667 AF cases have been reported (Feb, 2015-May, 2017)

Male: 16781 cases, 55% Female: 13886 cases, 45%

Male



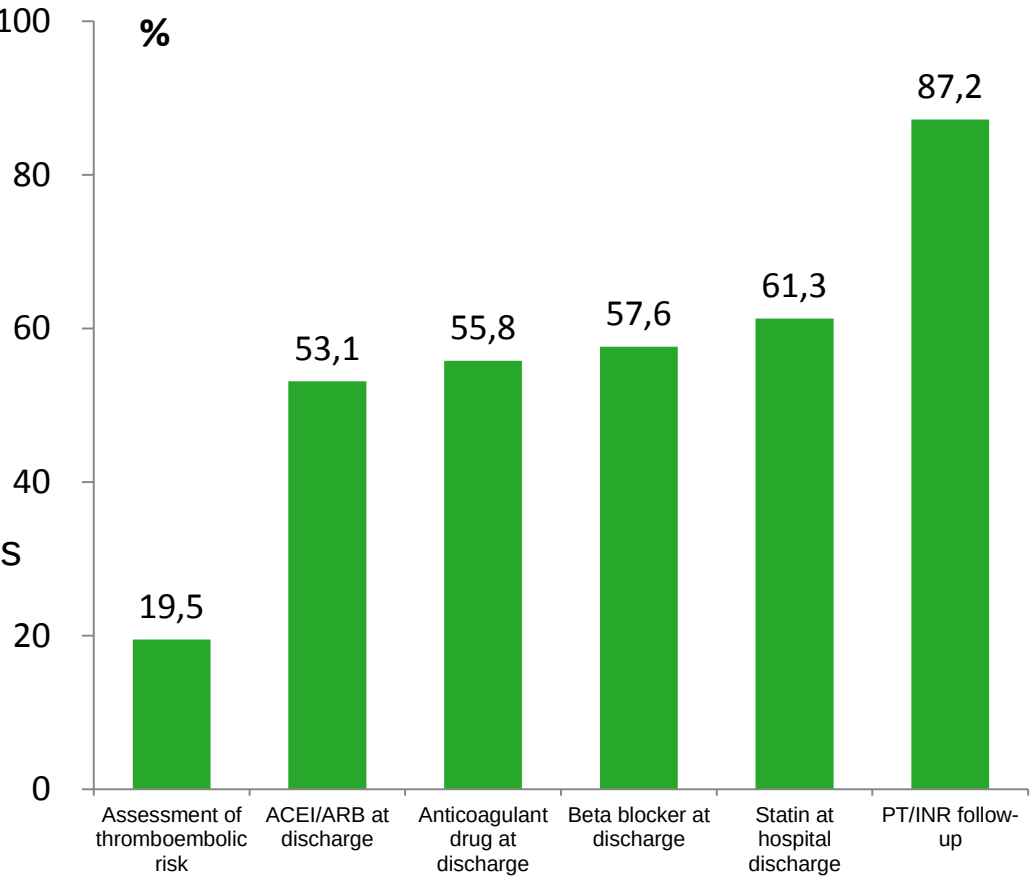
Female



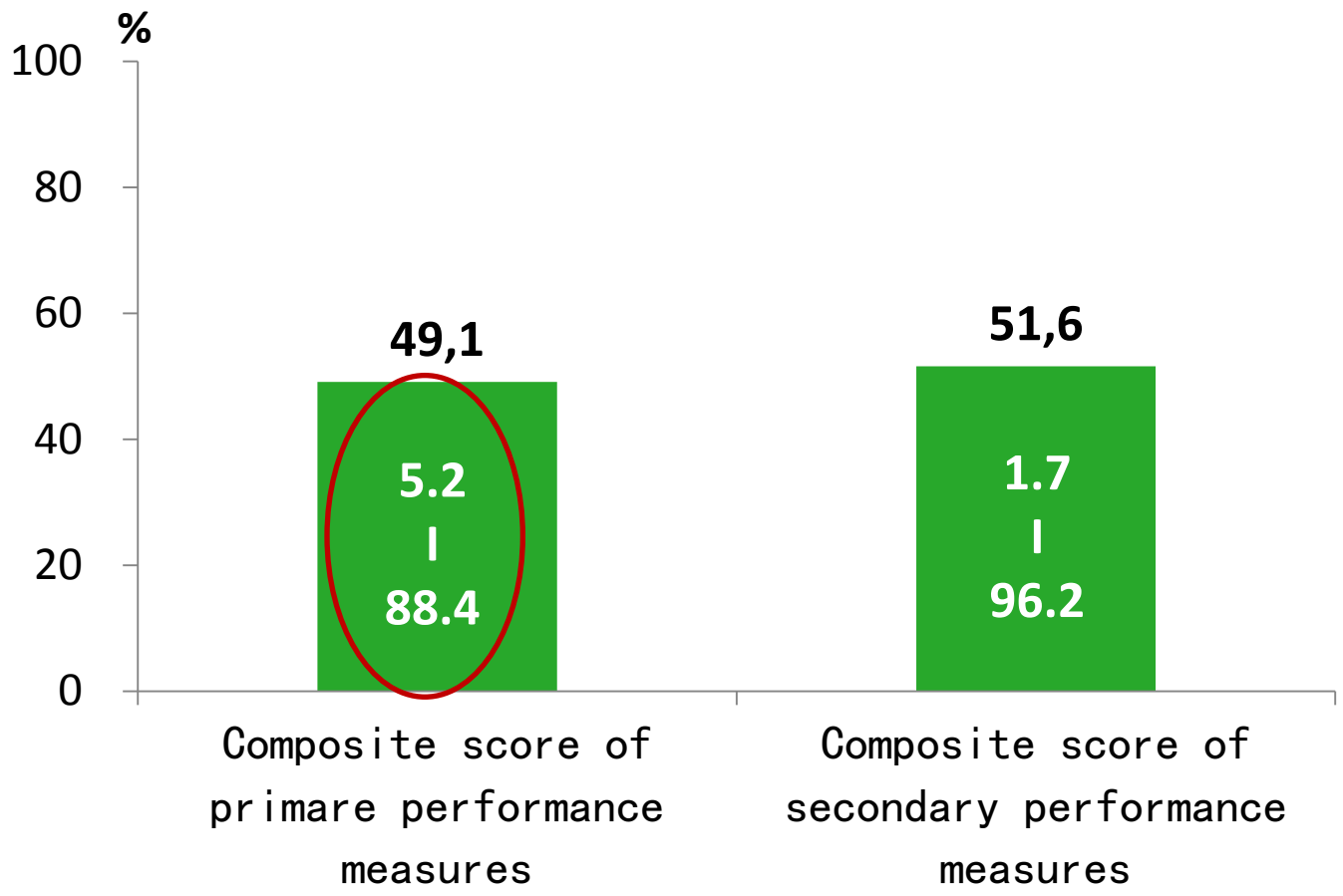
Notes: The cases included if the discharge diagnosis and date of discharge were filled in completely and correctly.

AF Primary Performance Measures

1. Proportion of patients with nonvalvular atrial fibrillation in whom assessment of thromboembolic risk
2. Proportion of AF patients with indication prescribed an anticoagulant drug at discharge
3. Proportion of patients discharged on warfarin who have PT/INR follow-up planned prior to hospital discharge
4. Proportion of AF patients with indications receiving ACEI/ARB at discharge
5. Proportion of AF patients with indication prescribed a beta blocker at discharge
6. Proportion of AF patients with indication prescribed a statin at hospital discharge

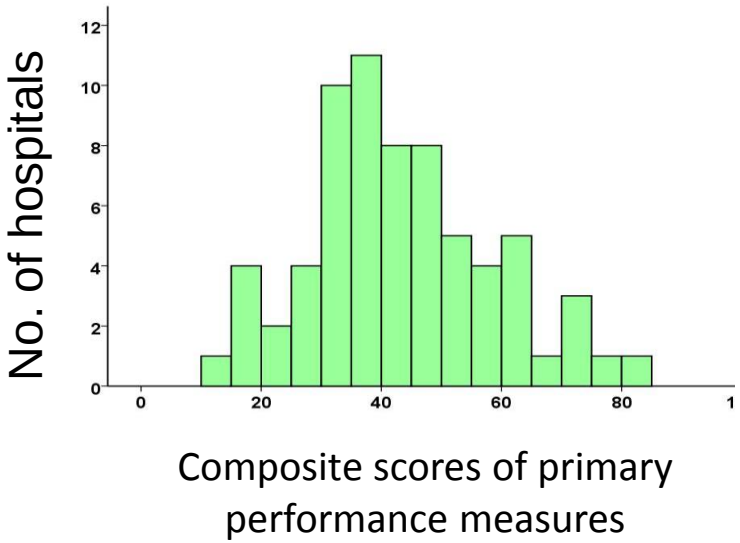


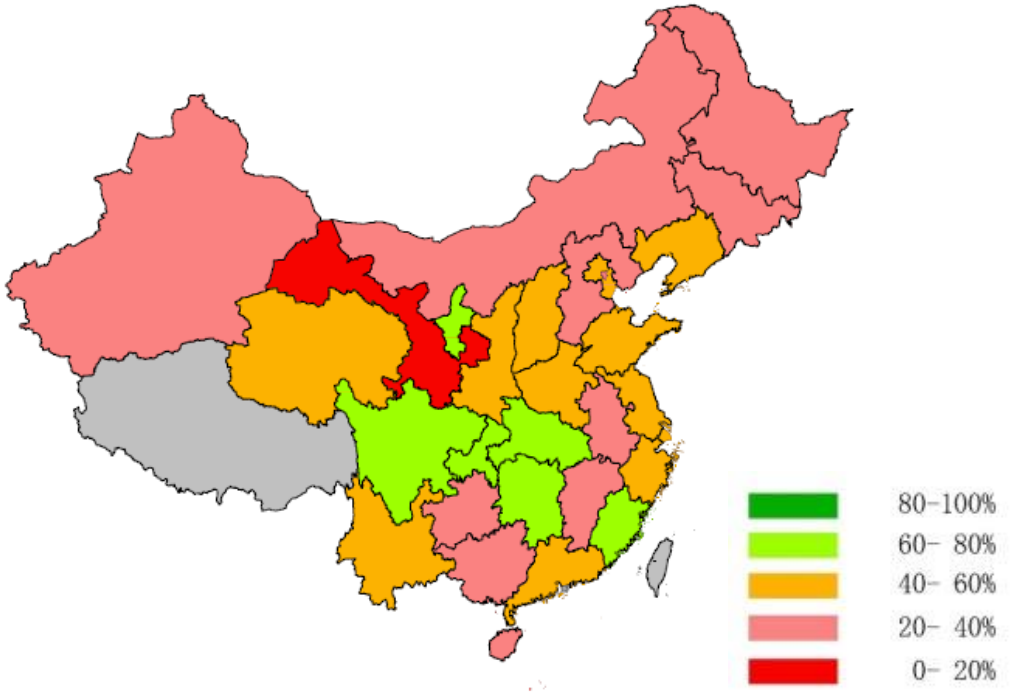
Composite Score of AF Performance Measures



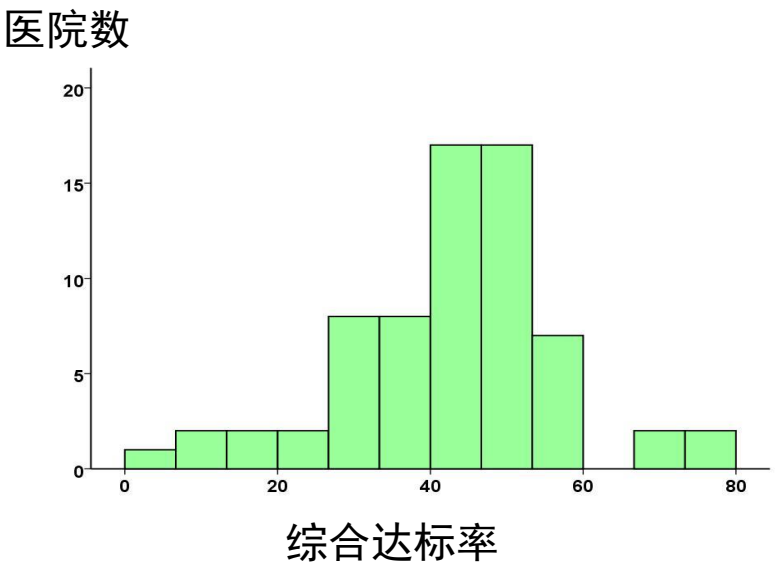
Notes: numbers above the bars refer to composite scores of performance measures for all hospitals; numbers in the bars refer to the maximum and minimum values.

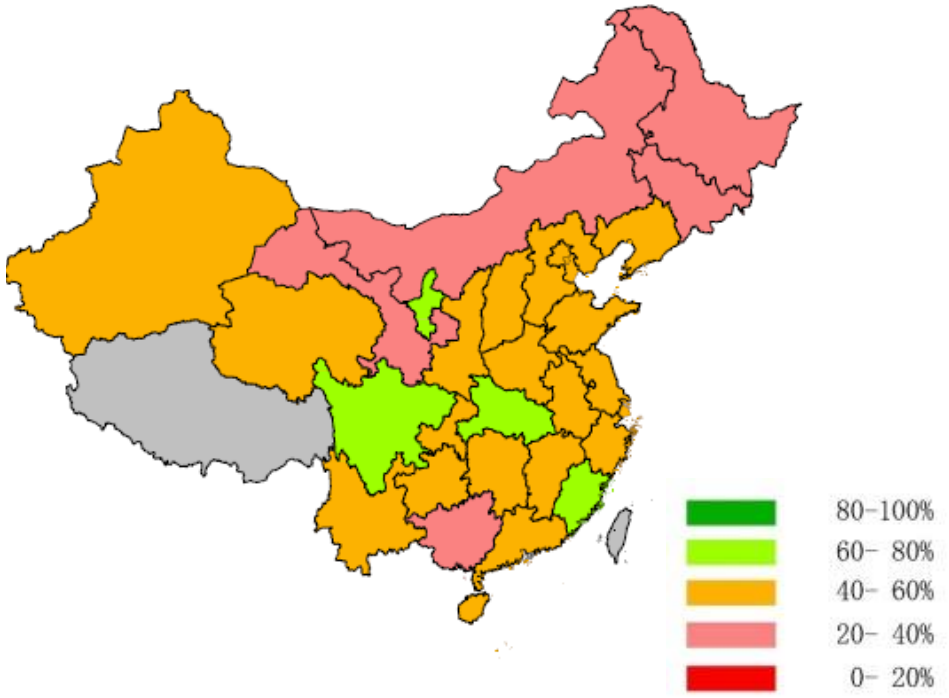
National Distribution of Composite Scores of AF Primary Performance Measures





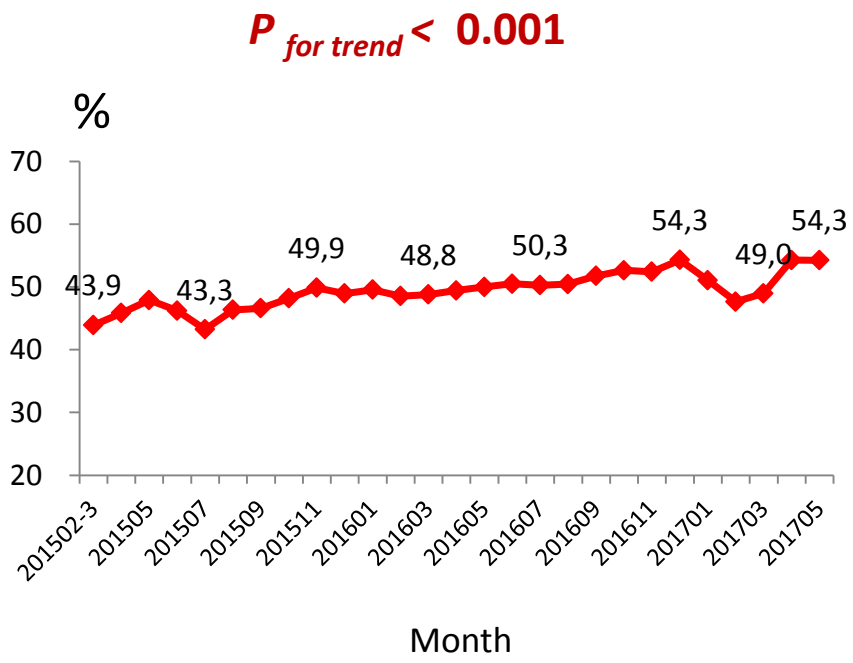
National Distribution of Composite Scores of AF Secondary Performance Measures



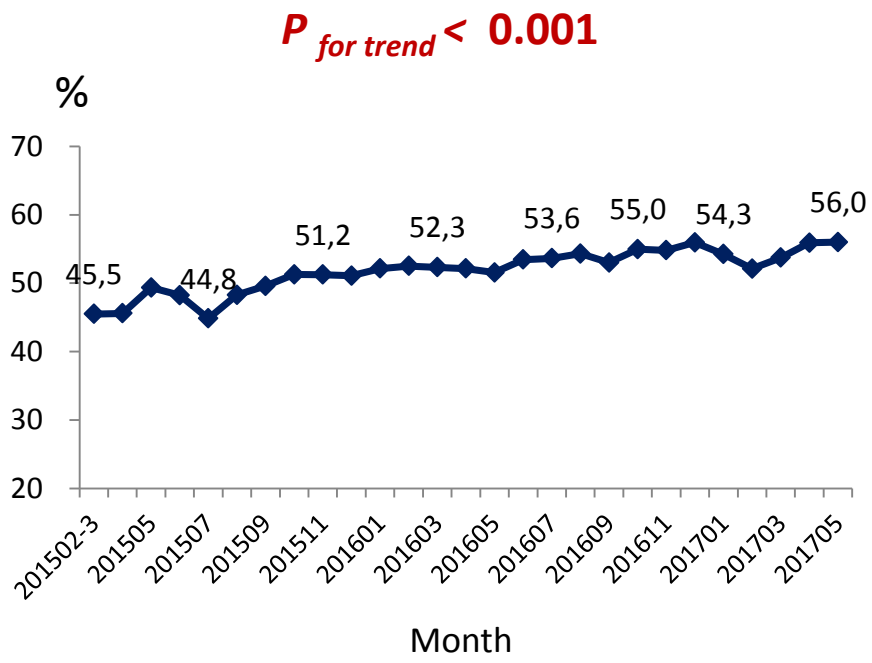


Trend of Composite Scores of Performance Measures for AF

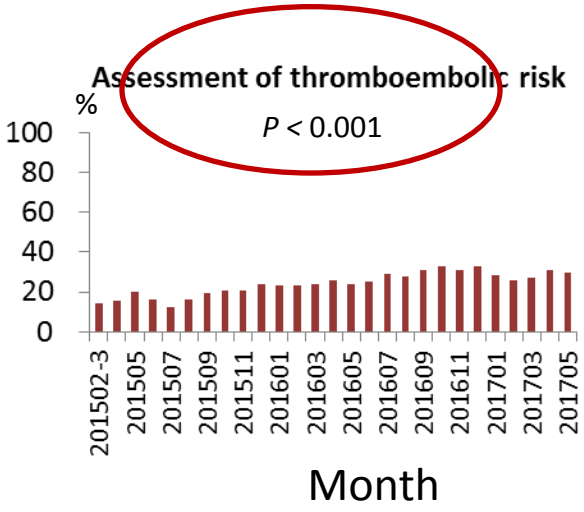
Primary performance measures

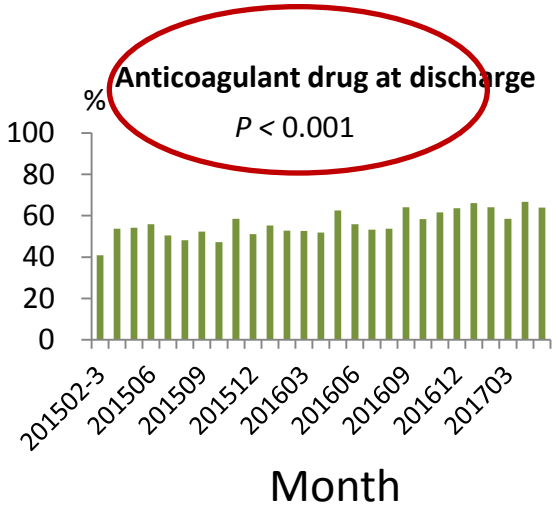


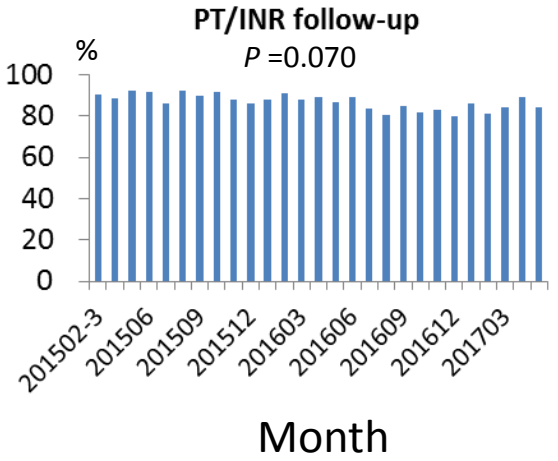
Secondary performance measures

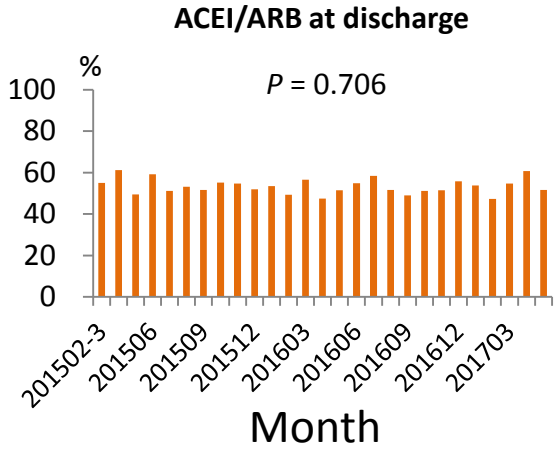


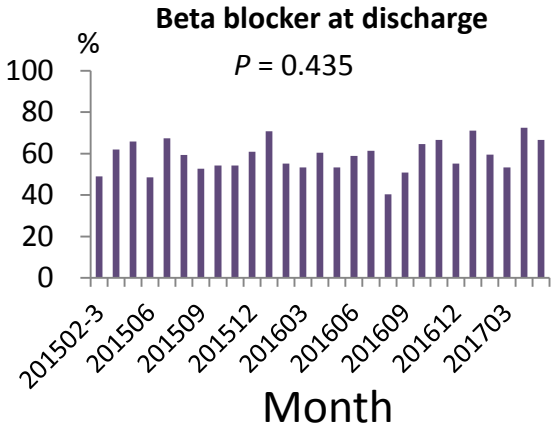
Trend of Individual Primary Performance Measures for AF

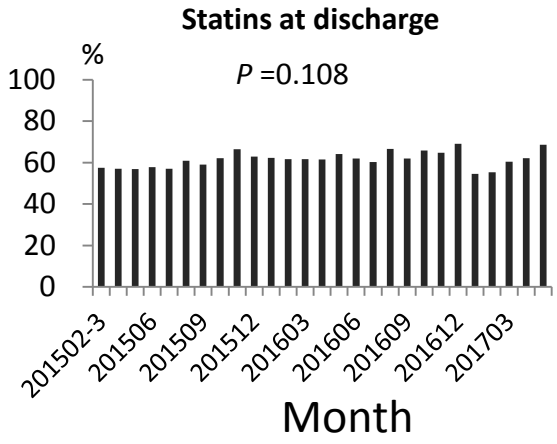








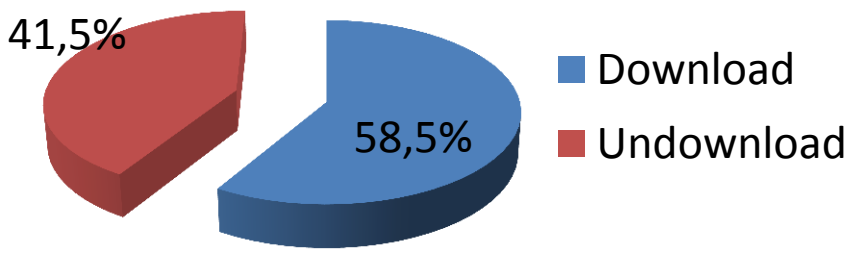




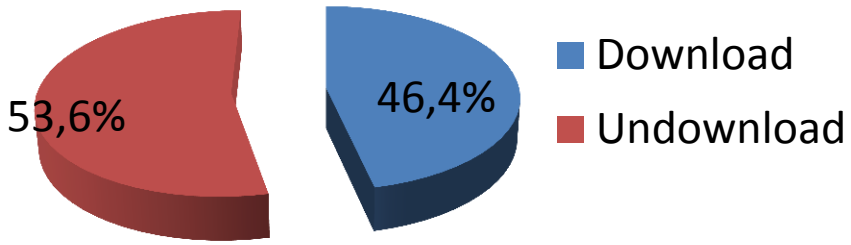
* Trend Chi-square test

Downloading of The Monthly Quality Reports

Phase 1 hospitals

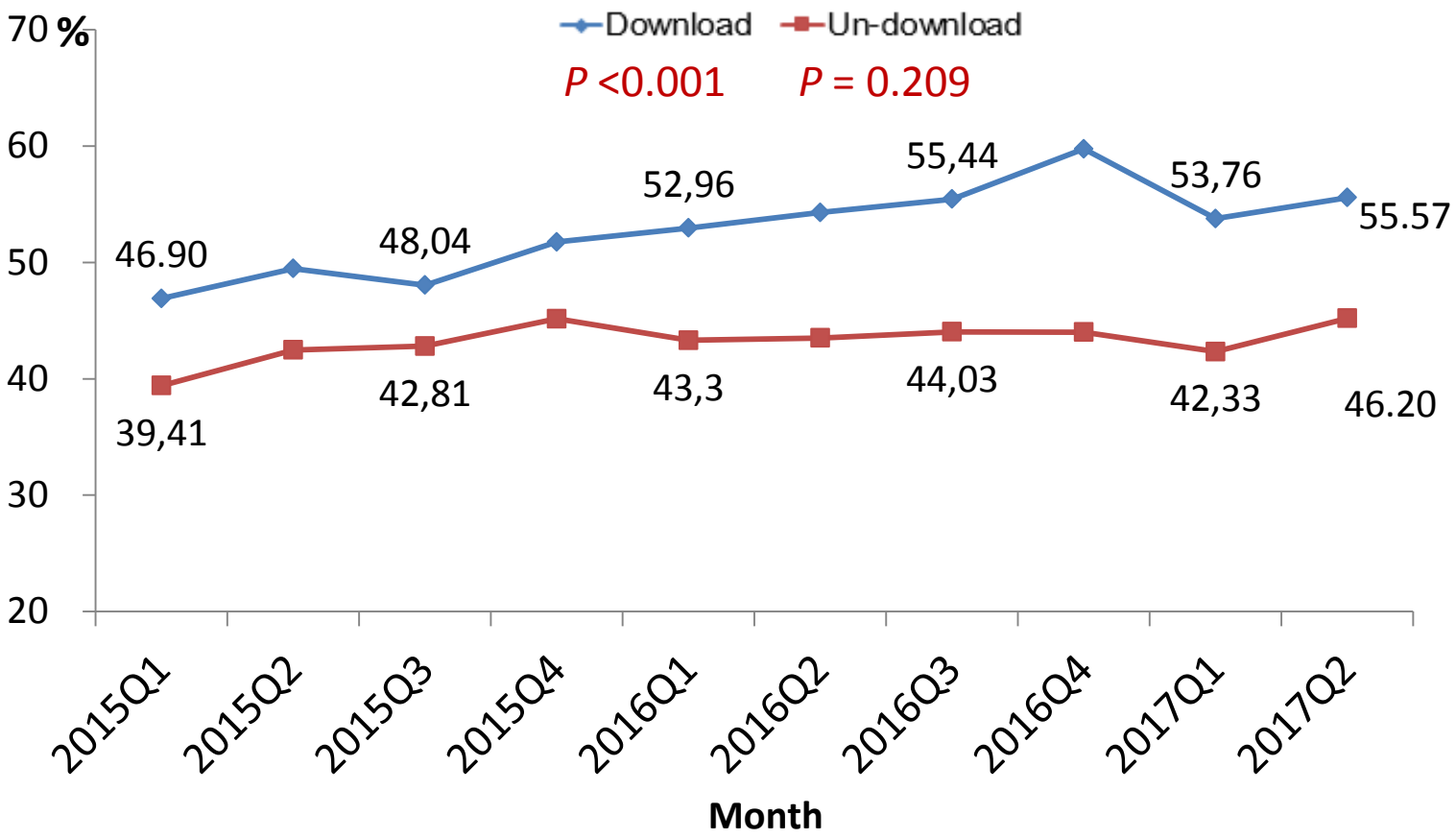


Phase 2 hospitals



Phases	No. of hospitals	No. of reports	Download rate (%)
Phase 1	65	735	58.5
Phase 2	56	529	46.4
Total	**121**	**1281**	**52.9**

Composite Scores of AF Primary Performance Measures Improved Significantly in Hospitals which Downloaded Reports



* Trend Chi-square test

Hospital Awards of CCC Project

Awards	ACS-2016		AF-2016	
	No.	%	No.	%
Medical Quality				
Gold	14	12.0	7	6.1
Silver	23	19.7	2	1.7
Bronze	23	19.7	1	0.9
Progress	3	2.6	3	2.6
Data Quality	3	2.6	3	2.6
Active Participation	3	2.6	3	2.6
Total	69	59.0	19	16.5
No. of Hospitals	117	100	115	100

Annual Awards Conference

Summary

- The infrastructure for the CCC project has been successfully set up, and lays a foundation for long-term quality improvement activities across China;
- Preliminary analysis identified major problems in quality of care for ACS and AF inpatients and key points for quality improvement in tertiary hospitals of China;
- Timely feedback of the quality of care by monthly quality reports is helpful for hospitals to identify problems in performance and to improve the quality of care;
- During the 2 years of CCC project, many hospitals have made achievements. With the secondary hospitals joined, it will make CCC project get a promotion in a greater scope. With everyone's efforts, this project will contribute to the improvement in quality of care for cardiovascular disease in China.

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- All collaborating hospitals of CCC Project

American Heart Association. Chinese Society of Cardiology

Thank you ！