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How to Improve Sudden Cardiac Arrest Survivors in the Community

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NO CONFLICT OF INTEREST TO DECLARE

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Contents

- Current Status of SCD in Communities Worldwide
- Standard Chain of Survival After OHCA
- Current Status in China
- What We Can Do in Future

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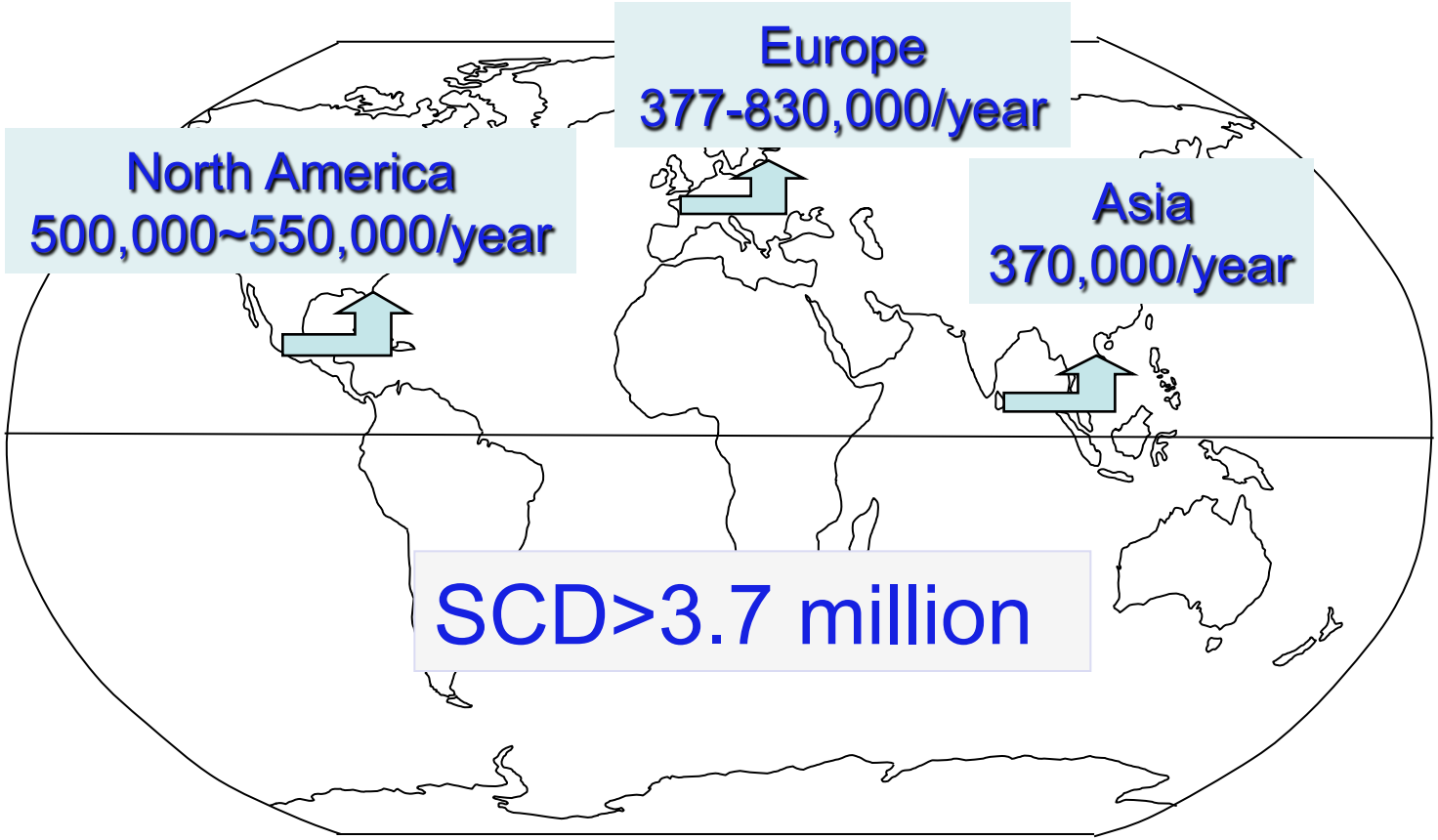
Global Challenge:Sudden Cardiac Death

- **Out-of-hospital sudden cardiac arrest（OHCA）remains a leading cause of death throughout the world.**
- **Despite community-based interventions, overall survival is still low.**

Global Challenge:Sudden Cardiac Death



Murakoshi N. Circulation Journal. 2013

Incidence of SCD in American Communities

Journal of the American College of Cardiology
© 2004 by the American College of Cardiology Foundation
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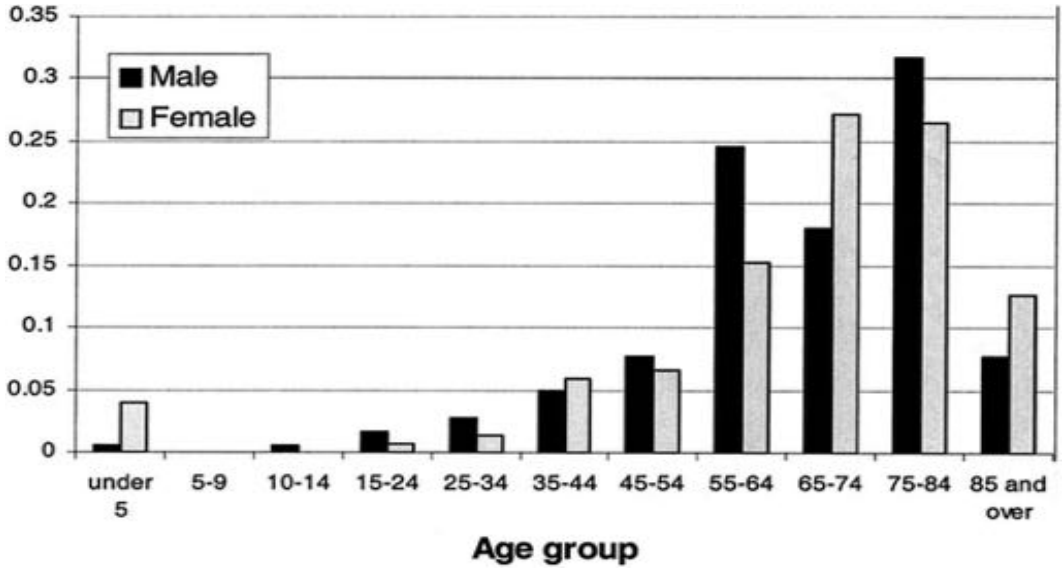
Vol. 44, No. 6, 2004
ISSN 0735-1097/04/$30.00
doi:10.1016/j.jacc.2004.06.029

Current Burden of Sudden Cardiac Death: Multiple Source Surveillance Versus Retrospective Death Certificate-Based Review in a Large U.S. Community

Sumeet S. Chugh, MD, FACC,* Jonathan Jui, MD,* Karen Gunson, MD,* Eric C. Stecker, MD,* Benjamin T. John, MD,* Barbara Thompson, BSN, JD,* Nasreen Ilias, BS,* Catherine Vickers, RN,* Vivek Dogra, MD,* Mohamud Daya, MD,* Jack Kron, MD, FACC,* Zhi-Jie Zheng, MD, PHD,† George Mensah, MD, FACC,† John McAnulty, MD, FACC*

Portland, Oregon; and Atlanta, Georgia



In this prospective evaluation of a large U.S. community, the annual incidence of SCD was 53 per 100,000 residents and accounted for 5.6% of overall deaths.

Overall, 43% of SCD cases were female.

Sumeet S. Chugh. J Am Coll Cardiol.2004

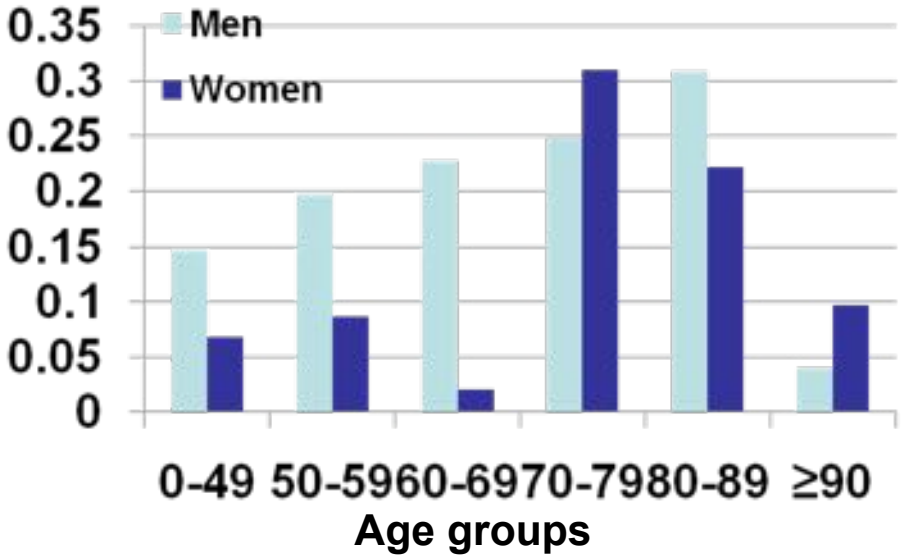
Incidence of OHSCD in Communities of U.K.

CARDIOVASCULAR MEDICINE

Demographic and temporal trends in out of hospital sudden cardiac death in Belfast

M J Moore, B M Glover, C J McCann, N A Cromie, P Ferguson, D C Catney, F Kee, A A J Adgey

Heart 2006;92:311–315. doi: 10.1136/hrt.2004.059857



The European age standardized incidence for OHSCD in this study was 122/100 000 for men and 41/100 000 for women.

M J Moore. Heart. 2006

Incidence of SCD in Japanese Communities

Open Access Research

BMJ open

Trends in sudden cardiac death and its risk factors in Japan from 1981 to 2005: the Circulatory Risk in Communities Study (CIRCS)

Minako Maruyama,[1,2] Tetsuya Ohira,[1,2] Hironori Imano,[1,2] Akihiko Kitamura,[2] Masahiko Kiyama,[2] Takeo Okada,[2] Kenji Maeda,[2] Kazumasa Yamagishi,[2,3] Hiroyuki Noda,[2,4] Yoshinori Ishikawa,[2] Takashi Shimamoto,[2] Hiroyasu Iso[1]

From 2001 to 2005, the annual incidence was

36.8 per 100 000 person-years .

M Maruyama, T Ohira, H Imano et al. BMJ open. 2012

Incidence of Communities SCD in China

from around the world

focus on China

Incidence of Sudden Cardiac Death in China

Analysis of 4 Regional Populations

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‡The Peking University School of Public Health, Beijing, China;

§Guangdong Provincial Cardiovascular Institute, Guangzhou, China;

‖Yuxian People's Hospital, Shanxi Province, China;

¶Center for Disease Control and Prevention in the Xicheng District, Beijing, China; and the

#Kelamayi Central Hospital, Xinjiang Uygur Autonomous Region, China

Sudden cardiac death (SCD) is most commonly defined as unexpected death from a cardiac cause within a limited time period, generally <1 h from symptom onset, in a person without any prior condition to explain the fatality (1–3). Often SCD is the first and only manifestation of heart disease (4). In the U.S., SCD accounts for about one-half of all coronary heart disease (CHD) deaths (5), for a total of 300,000 to 400,000 deaths annually, depending on the definition used (2,3).

China is the largest developing country in the world, with a land mass of 9.6 million km^2 and a population of 1.33 billion people. The profile of cardiovascular disease (CVD) of China is very different from Western populations: for example, compared with Western countries, the incidence of CHD is much lower in China but the incidence of stroke is higher (6,7). Consequently, the incidence of SCD in China may be lower than that of Western populations, but to our knowledge there are no currently available data on the incidence rate of SCD in China. Conversely, because of the geographic, economical, and cultural differences in different parts of China, there are significant regional variations in CHD incidence (8). Therefore, several Chinese populations would have to be assessed to obtain accurate information regarding SCD. Thus, in the present study, we explore the incidence rate of SCD in 4 regional populations.

Methods

Study population and data collection. To provide an adequate representation of socioeconomic status, geographical location, and rural versus urban environments, populations in 4 regions of mainland China were evaluated (Fig. 1). Each study region included residents of a defined geographical area, and each population studied ranged from 150,000 to 200,000 residents. In Yuxian, an undeveloped inland rural area in the Shanxi province of central China, the study population consisted of a clustered sampling of all men and women living in 158 of the 453 villages in the region. Additional study populations came from the large cities of Beijing in northern China (cluster sampled from the Xicheng district; there were 660,000 residents in the Xicheng district in Beijing in 2005) and Guangzhou in southern China (cluster sampled from the traditional Yuexiu district; there were 410,000 residents in the traditional Yuexiu district in Guangzhou in 2005). Both the Beijing and Guangzhou

The overall incidence of SCD was 41.8 of 100,000 per year in China.

Incidence rates in men were higher than those for women.

W Hua, LF Zhang, YF Wu et al. J Am Coll Cardiol. 2009

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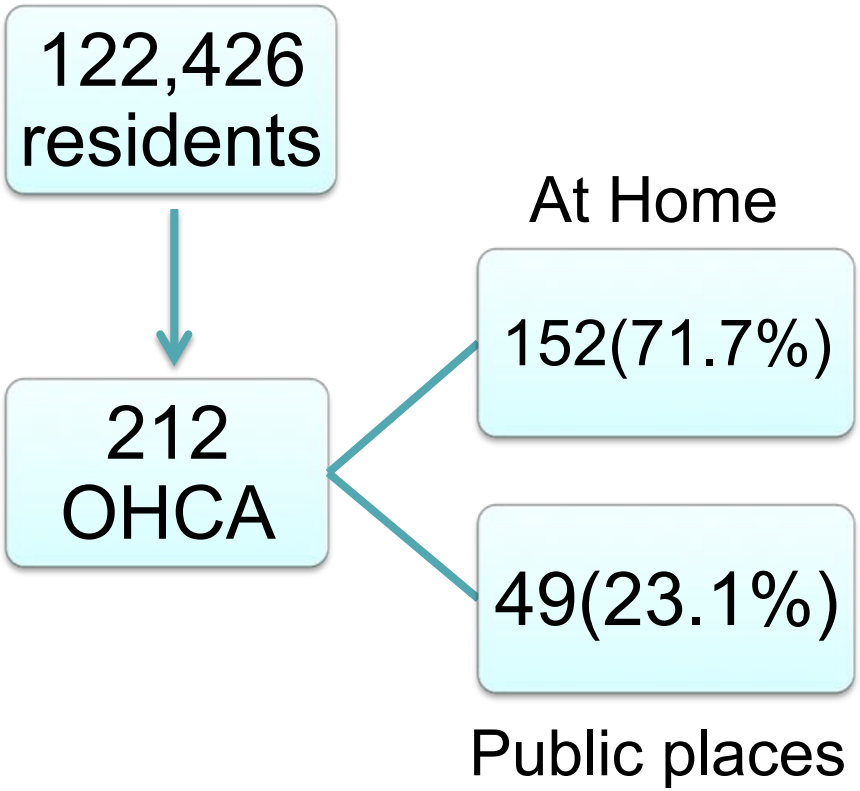
Incidence of Patients with OHCA Considered for Resuscitation

Country	OHCA consider for resuscitation （100000/year）
Asia	55
Europe	86
North America	94
Australia	113

Best Pract Res Clin Anaesthesiol. 2013

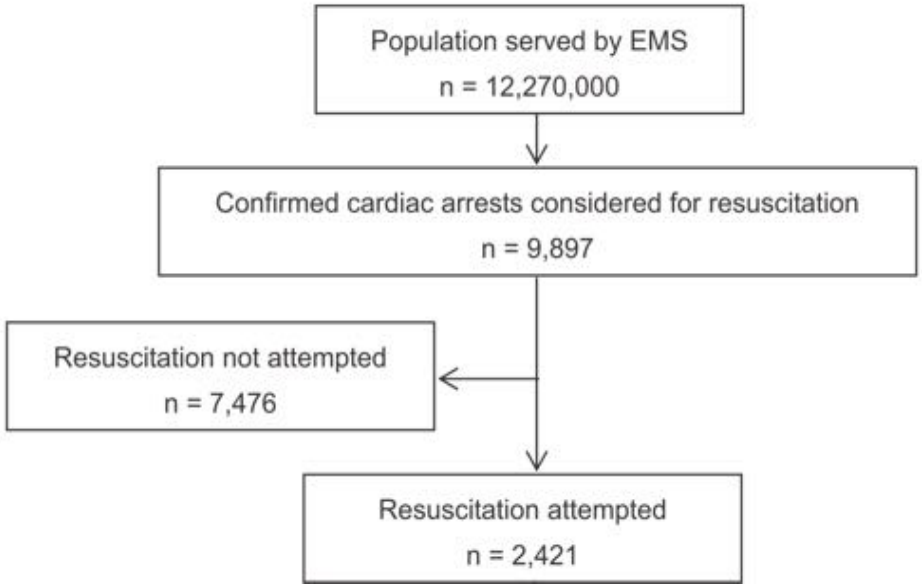
Incidence and Survival of OHCA in the West of Ireland



- The overall incidence of OHCA was 51.2/100 000.
- 42 patients (19.8%) had ongoing resuscitation efforts on arrival in the emergency department.
- 13 patients (6.1%) survived to admission of whom eight (3.8%) were alive at discharge.

R Byrne, O Constant, Y Smyth, et al. European heart journal. 2008

Current Situation of OHCA Survival Rate in China



Location, *n* (%)	
Home	1804 (74.5)
Public place	375 (15.5)
Other	242 (10.0)

- Among 9897 confirmed OHCA patients during the 1-year study period, CPR was initiated in 2421 patients (24.5%) by EMS personnel.
- Among the CPR-receivers, 1804 patients (74.5%) had collapsed at home, while 375 patients (15.5%) at a public place.

F Shao, CS Li, LR Liang, et al. Resuscitation. 2014

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Standard Chain of Survival After OHCA

- ✓ Early arrest recognition and activation of EMS
- ✓ Initiation of CPR
- ✓ Defibrillation
- ✓ Early access to emergency medical care
- ✓ Resuscitation system of care

RW Neumar, B Eigel, CW Callaway et al. Circulation. 2015

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Influence of Bystander Response During SCD

The role of the general public and first responders is critical, they must be ready, willing, and able to take quick action within a comprehensive patient-centered system of care.

RW Neumar, B Eigel, CW Callaway et al. Circulation. 2015

Bystander CPR before EMS in China

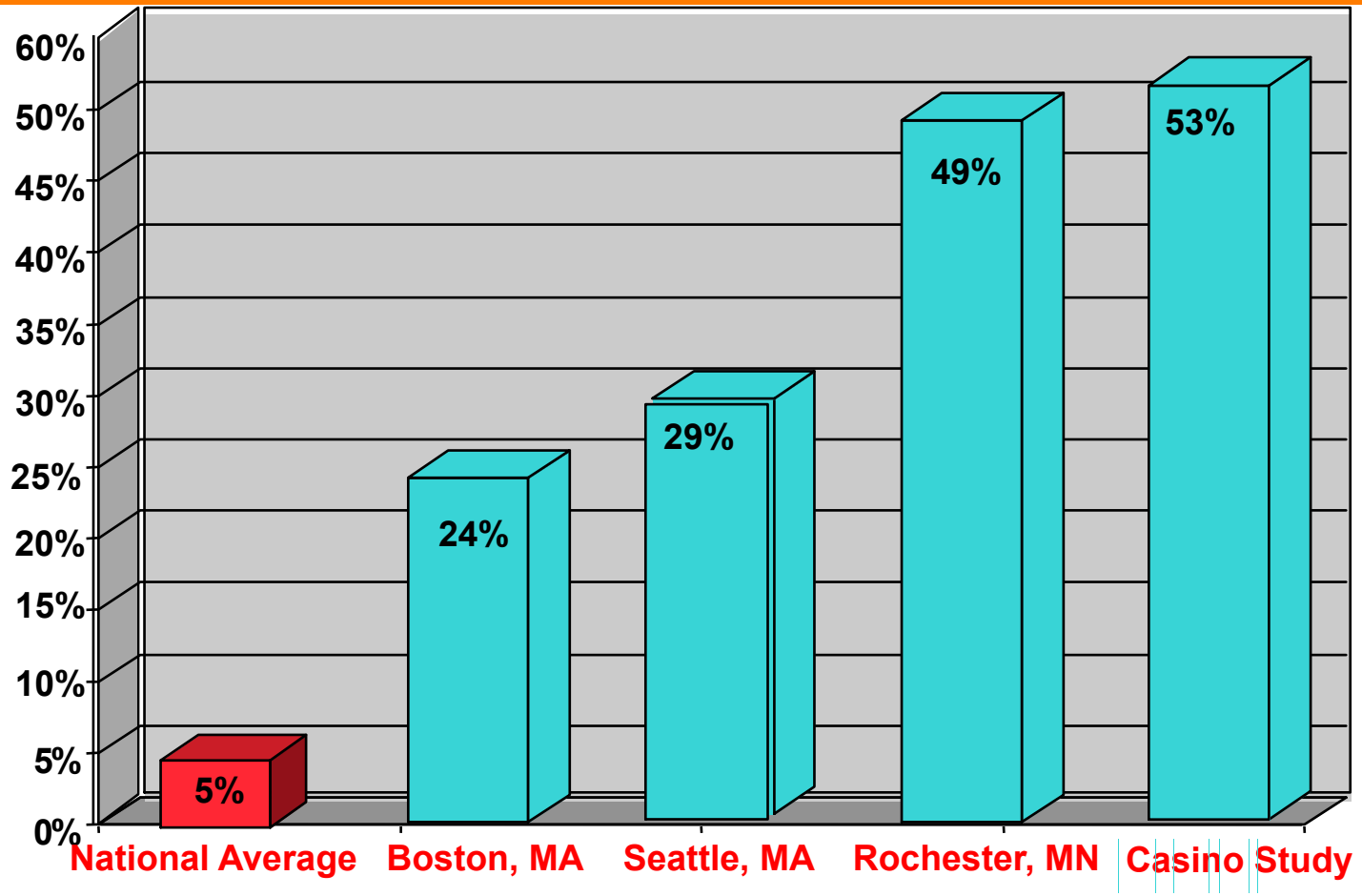
- An exploration of attitudes toward bystander CPR in university students in China reveal only 29.9% non-medical specialties students were more willing to perform bystander CPR .

Reasons for being unwilling to perform CPR

Lack of confidence	Fear of legal dispute	Fear of disease transmission	Feeling embarrassed to perform CPR	Reluctant to rescue breathing	None of my business	Physical inability
32.9%	17.2%	16.0%	14.0%	10.7%	5.3%	2.2%

C Lu, Y Jin, F Meng, Y Wang, et al. Int Emerg Nurs. 2015

AED increase survival after SCA in US



RD White, BR Asplin, TF Bugliosi, et al. Annals of emergency medicine. 1996
LA Cobb, WD Weaver, CE Fahrenbruch, et al. Circulation. 1992
SC Smith, RS Hamburg. Circulation. 1998
TD Valenzuela, DJ Roe, G Nichol et al. NEJM. 2000

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AED density in various countries

TABLE 2. Automated external defibrillator per population and automated external defibrillator density in various countries

	Year	No. of AEDs	Population (x 10^6)	AED/10 000 population	Area (km^2)	Density AED/km^2
New Territories West region of Hong Kong	2013	207	1.066	1.942	223	0.928
Japan[18]	2007	8 826 520	12 720	6.978	37 800 020	0.234
Singapore[20-22]	2013	106421	5.39922	1.971	682.323	1.559
Copenhagen[23]	2011	55 224	0.60024	9.200	9724	5.691
Austria[24,25]	2004	186 525	8.4126	2.218	8 400 026	0.022
Metropolitan area in the US[26]	2006	173 927	2.527	6.956	517 827	0.336

Abbreviation: AED = automated external defibrillator

The number of AEDs per 10 000 population in Hong Kong (1.942) was comparable to that in Singapore (1.971) and Austria (2.218), but far behind that in Copenhagen (9.200), Japan (6.978), and the US (6.956).

CL Ho, CT Lui, KL Tsui, et al.Hong Kong Med J. 2014

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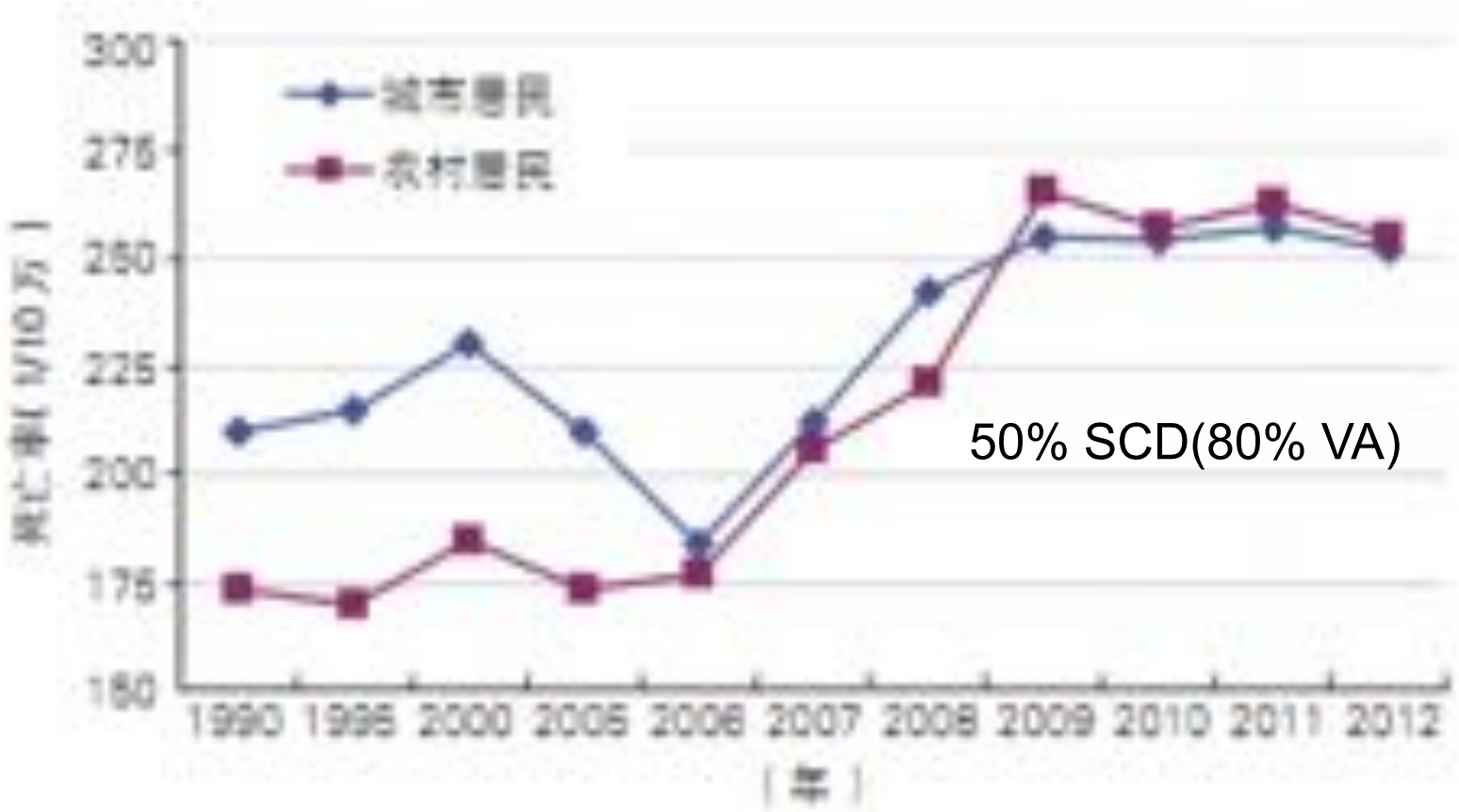
Incidence of Cardiovascular Diseases in China

Diseases	Number of Patients
Cardiovascular Diseases	0.29 billion
Hypertension	0.27 billion
Stroke	7 million
Myocardial Infarction	2.50 million
Heart Failure	4.50 million
Pulmonary Heart Diseases	5.00 million
Rheumatic Heart Diseases	2.50 million
Congenital Heart Diseases	2.00 million
Hypertrophic Heart Diseases	10 million

China Cardiovascular Diseases Report 2013

Cardiovascular disease mortality in China



China Cardiovascular Diseases Report 2013

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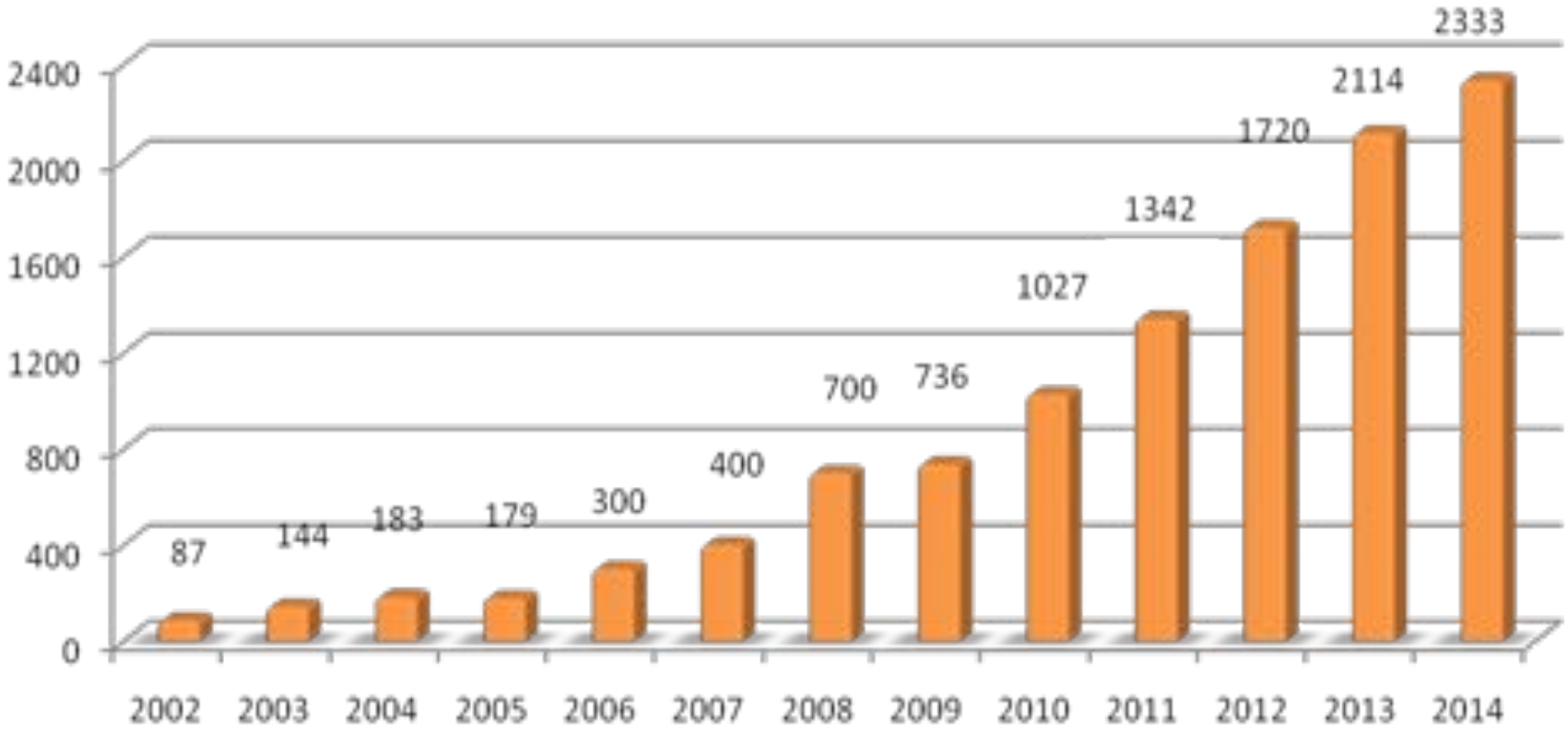
The number of ICD Implantation Increasing Annually



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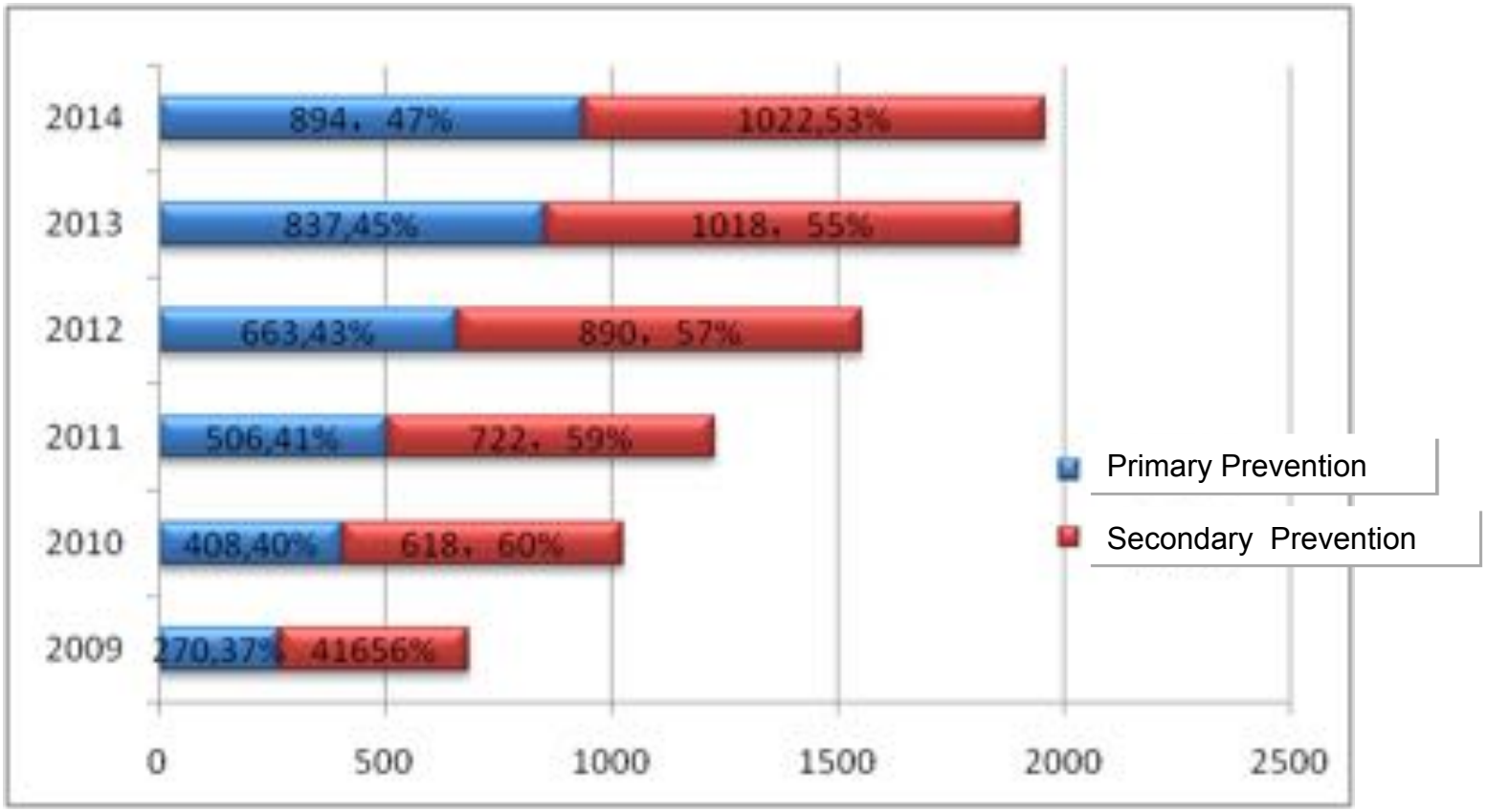
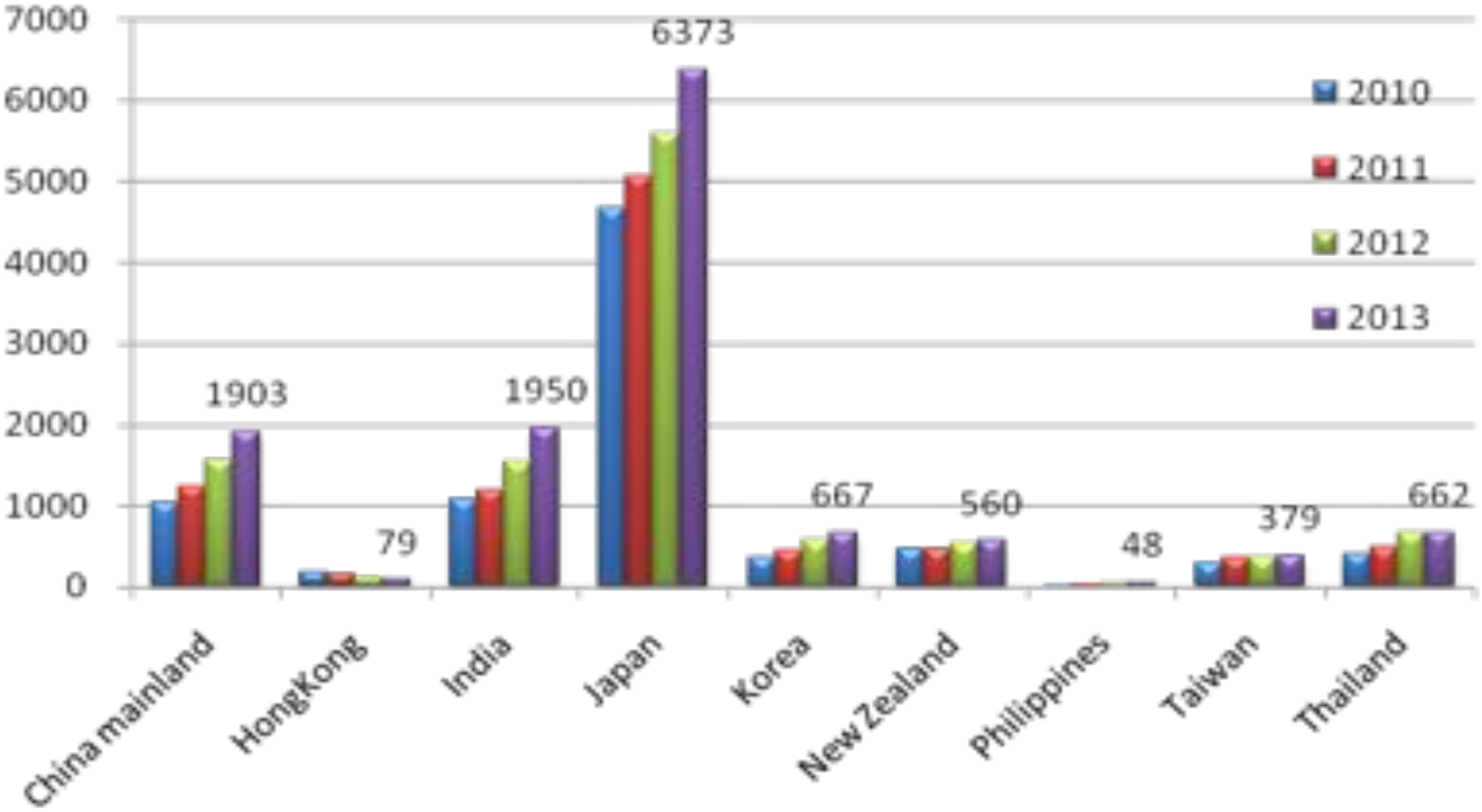
Indications for ICD Implantation



Comparison of ICD Implantation in Asia-Pacific region



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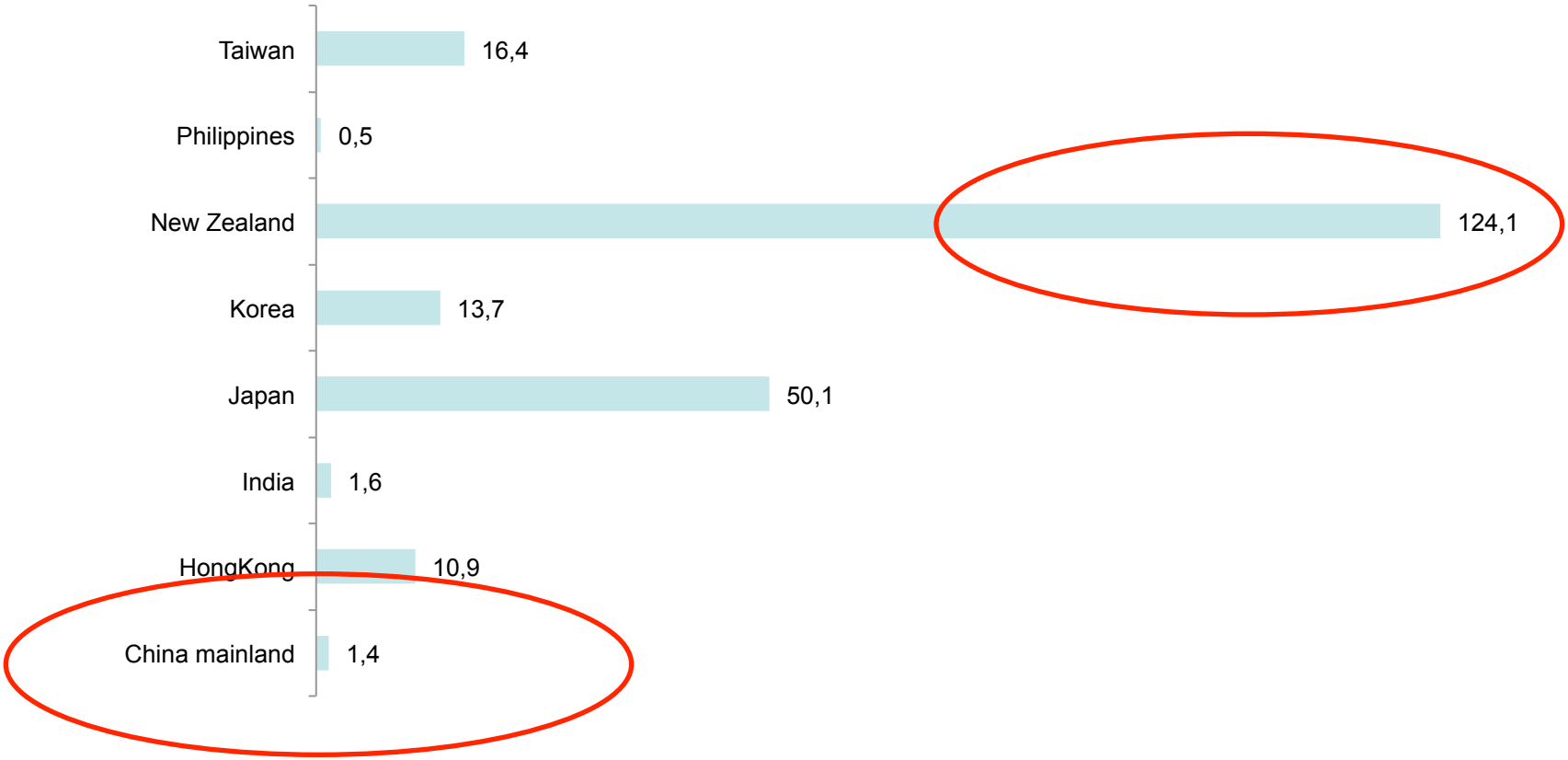
Comparison of the number of ICD per million in Asia-Pacific region in 2013



AEDs in China
for Special Users Only

Limited Use of AED in China

- USA CPR + AED + 911
- China 120 + CPR + Few AED

Utilization of AED was close to 0 percent in China.

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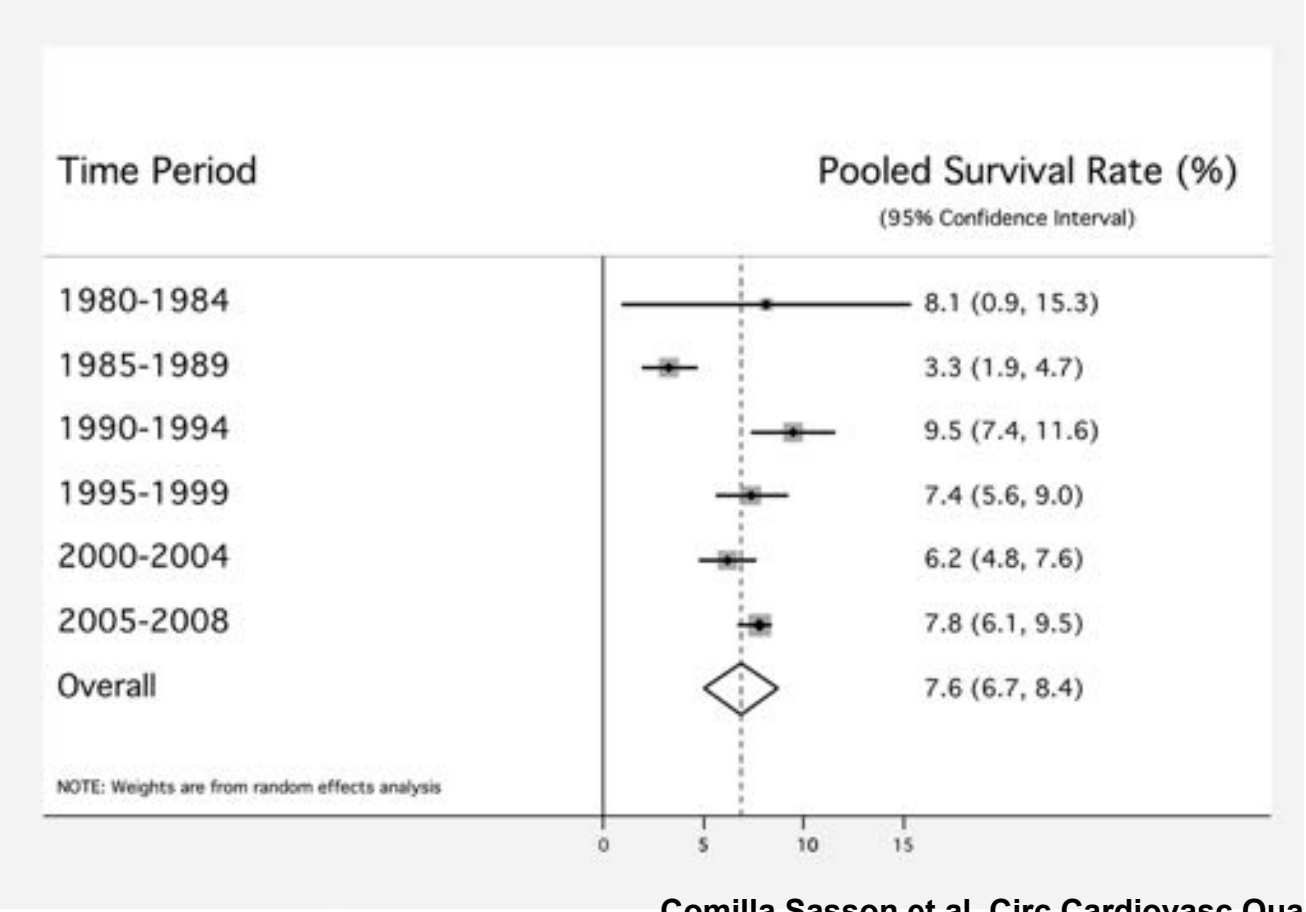
CPR Community Training Barriers in China

- Financial cost of CPR training
- Lack of information
- Fear of risking one's life
- Worry of taking unreasonable risk

Circ Cardiovasc Qual Outcomes. 2013;6:550-8

OHCA survival has been stable for almost 30 years in worldwide

OHCA survival to hospital discharge by 5-year time periods



Comilla Sasson et al. Circ Cardiovasc Qual Outcomes. 2010

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Current Situation of OHCA Survival Rate in China

Only 1.3% were discharged alive in Beijing, China.

Comparison of out-of-hospital cardiac arrests in Beijing and other large cities worldwide.

City	Year	Population (millions)	Incidence of EMS-assessed OHCA	Incidence of EMS-treated OHCA	Discharged alive (%)
Taipei	1993	2.7		28.4	1
Amsterdam	1997	1.3	60	46	13
Los Angeles	2000	3.7	45		6.9
Singapore	2002	4.1		19.7	0.9
Osaka	2003	7.3	67.1	64.6	3
Sydney	2005	4.0	52.6		13
Toronto	2007	5.6	91.6		6
Seoul	2007	9.7	36.8		4.7
Beijing	2012	12.3	71.2	19.7	1.3

All incidence rates are per 100,000 person-years. EMS: emergency medical services, NA: data not available, OHCA: out-of-hospital cardiac arrest.

F Shao, CS Li, LR Liang, et al. Resuscitation, 2014

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Governments

- Establish legislation such as Good Samaritan, Medical Aid or Defibrillation Acts to protect anyone using an AED in an emergency situation from liability
- Provide sustainable funding to support implementation and maintenance of public access to AED programs that include AED and CPR training
- Establish a national AED device registry to locate publicly accessible AEDs across China

Important role of registry

- **National and international registries of SCD and SCA are essential for epidemiology, benchmarking and quality management.**
  - **Longitudinal studies in North America**
    - AHA heart disease statistics
    - Cardiac Arrest Registry to Enhance Survival (CARES)
    - Resuscitation Outcomes Consortium (ROC)
  - **Resuscitation and Cardiac Arrest Registries in Europe**
    - The Swedish Cardiac Arrest Registry (SCAR)
    - The German Cardiac Arrest Registry
    - The ARREST project in the Netherlands – North Holland ARREST
    - European Registry of Cardiac Arrest (EuReCa)

JT Gräsner, L Bossaert. Best Practice & Research Clinical Anaesthesiology, 2013

Chinese Society of Pacing and Electrophysiology

- Raise awareness of the AED program
- Develop a training plan for CPR and AED
- ICD therapy to prevent SCD in high risk patients

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Public Access to AEDs

- Location---airports, casinos, places of recreation, sports facilities, public buildings and in other settings where large numbers of high-risk adults may be located
- Training---AEDs are most effective when used by trained individuals. An isolated addition of AEDs will not provide a measurable survival benefit

TA Sweeney, JW Runge, MA Gibbs, et al. Annals of emergency medicine 1998


AED
自动体外心脏除颤器
AED
温馨提示

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Education and Training

- Training objects

✓ Traditional First Responder---medical personnel police, and firefighter

✓ Nontraditional First Responder---lifeguards, security personnel, and airline flight attendants

✓ Family members of high risk patients

✓ Citizens---high school graduates, public officials

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Education and Training

- **Training content**

✓ **Chain of Survival--- early access, early CPR,**

early defibrillation, and early ACLS measures

✓ **Skills of CPR**

✓ **Correct use of AED**


American Heart Association
Learn and Live.
中国国家心血管病中心
美国心脏协会
心血管急救培训中心
American Heart Association Emergency Cardiovascular Care Training Center


CCTV 新闻
cctv.com
新闻直播间
LIVE NEWS
国家心脏急救培训中心开放


CCTV 新闻
cctv.com
10月27日
星期二
国家心脏急救培训中心开放
17:53
C40股指26日报收于3744.45点，较前一交易日

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Education and Training

- Training method
  - ✓ CPR pamphlet
  - ✓ Multi-media teaching websites or videos
  - ✓ Public media such as celebrities, movies

MAY 20, 2000
Presidential Radio Address
President Clinton announced the mandatory installation of automated external defibrillators in public places across the country.

Introducing 1.5 Prevention

Primary Prevention with Symptoms

- NSVT
- Frequent PVCs
- EF < 25%
- Pre-syncope or syncope

These symptoms are not only the risk of SCD but also promote the awareness of SCD

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Conclusions

- SCA is a major problem worldwide
- Prevention of SCD in less developed counties is big challenge
- Government invest and public education are very important to improve survivors from CSA
- Scientific research will be very helpful to the prevention of SCD

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Thanks for your attention