

Applying Clinical Alert System To Reduce In-Hospital Cardiac Arrests: Multidisciplinary Team Integrated Care

Wei-Lun Liu^{1,2,*} Si-Chon Vong³ Heng-Ching Huang⁴ Chia-Jung Chen¹

Center for Quality Management¹, Intensive Care Medicine², Emergency Medicine³, Internal Medicine⁴, Chi Mei Medical Center, Liouying, Tainan, Taiwan

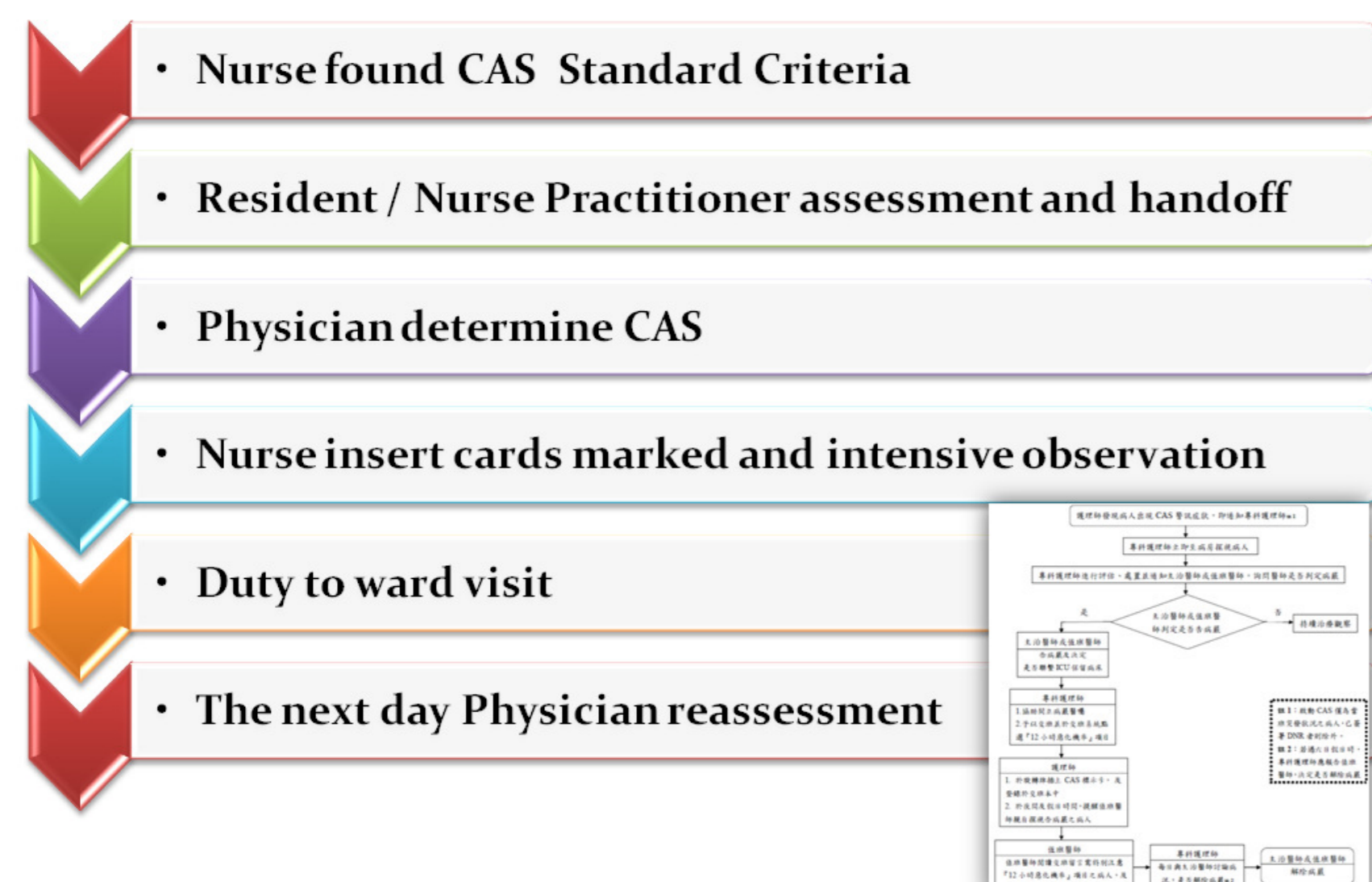
Objectives

Cases of in-hospital cardiac arrest (IHCA) are common and are associated with lower rates of survival. We introduced a clinical alert system (CAS) through multidisciplinary team integrated care to reduce hospital cardiopulmonary arrests.

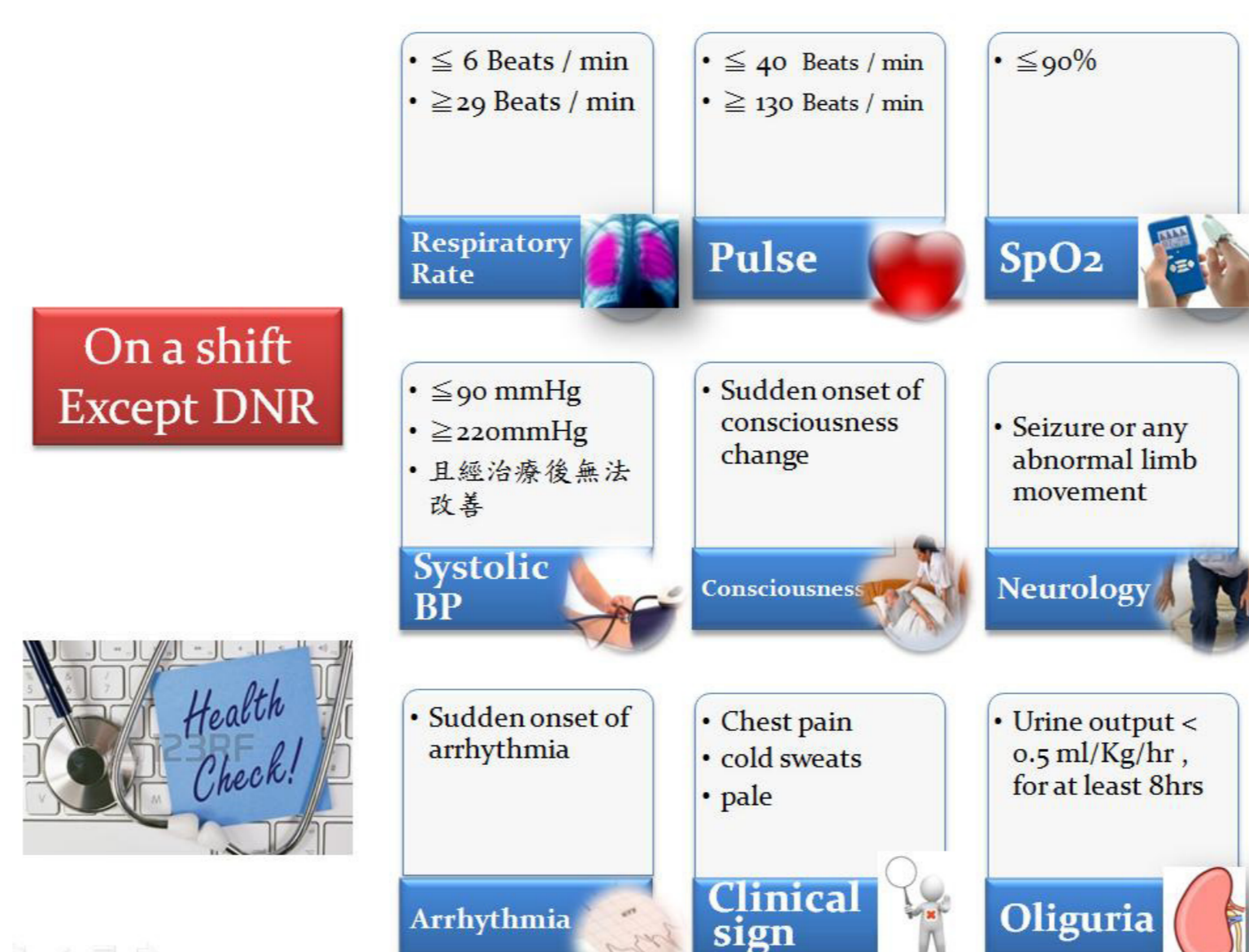
Methods

This study was conducted in the Chi Mei Medical Center, Liouying branch, an 870 bed hospital providing primary care in southern Taiwan since 2005. The preintervention period was between January 1, 2012 and August 31, 2013, and the postintervention period was between October 1, 2013 and December 31, 2013. The interventions for reducing IHCA were performed through multidisciplinary team integrated care, including emergency medicine physicians, intensive care unit physicians, ward attending physicians, nurses, nurse practitioners, and quality control staffs. We identified a 48-bed general ward that accounted for the largest number of IHCA, and admitted patients mostly came from divisions of pulmonary medicine, infectious disease, and oncology. The multidisciplinary team integrated care consisted of four main parts: (1) Set up the standard criteria for CAS, including acute changes in the patient's mental status, seizure attack, respiratory rate, heart rate, oxygenation, or blood pressure and newly onset arrhythmia, chest pain, or oliguria; (2) established the protocol for CAS activation; (3) defined the responsibility and role of patient's attending physicians, on-duty doctors, nurses, and nurse practitioners when CAS activated; (4) designed reminding code for those CAS activated patients in the electrical handoff system. Multidisciplinary team integration, staff education and CAS rollout occurred from September 1, 2013 to September 30, 2013, and patient data from this period was excluded.

Established the protocol for CAS activation



CAS Standard Criteria

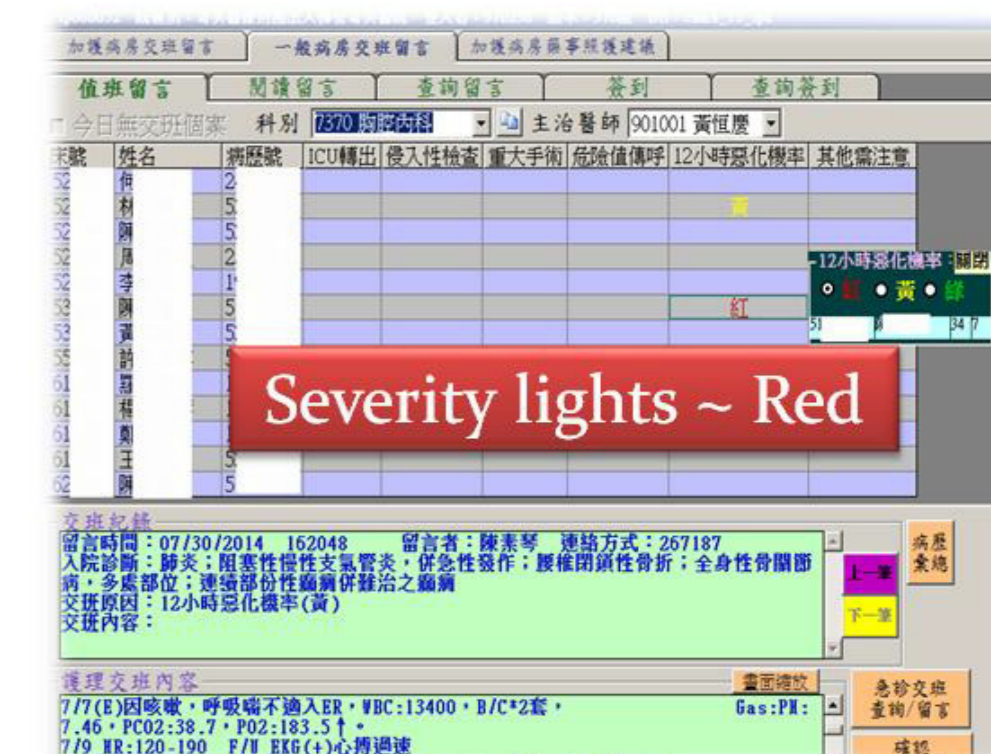


CAS Warning Mechanism

Insert cards marked



Electrical Handoff



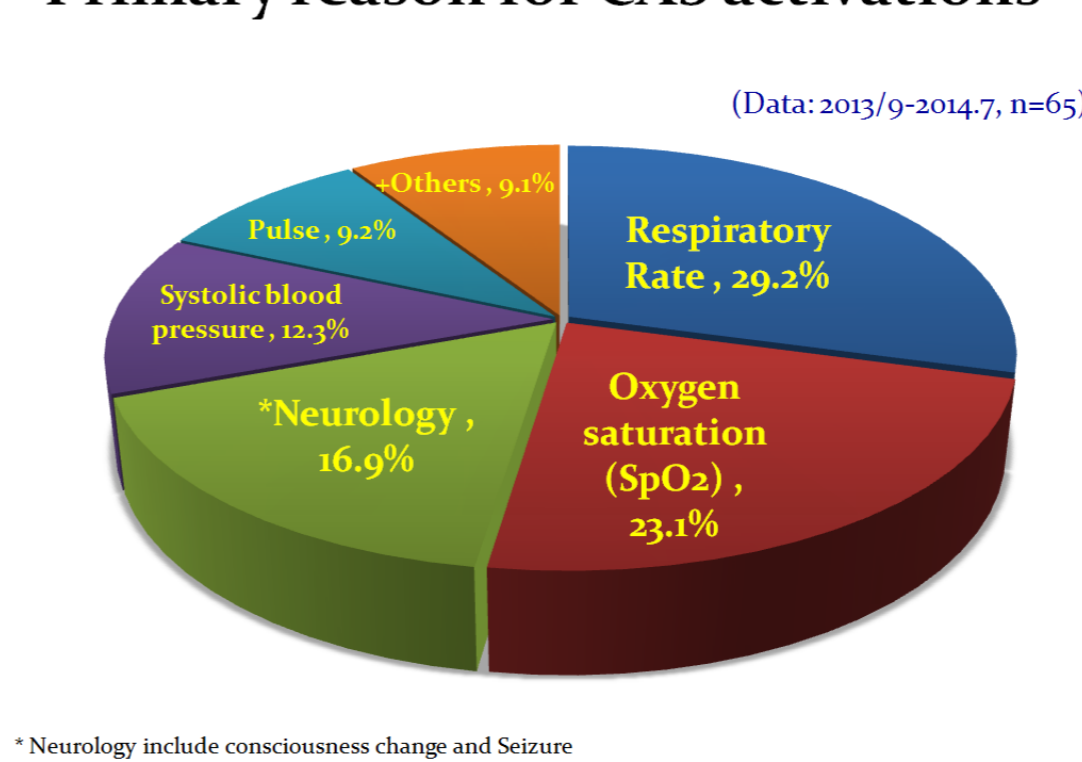
Results

A total of 2,959 admissions in the preintervention period, and 453 admissions in the postintervention period. There were 24 cases of IHCA during the preintervention period and no case of IHCA occurred during the postintervention period, and the rate of IHCA decreased from 8.11% to 0 % (p<0.0001). Twenty one patients activated CAS in the postintervention period, and the reasons and criteria for CAS activation were list in table 1. The most common reasons for CAS activation were respiratory rate exceeding 29 /min (57.1%), oxygen saturation lower than 90%(28.6%), and sudden onset of consciousness change(9.5%). Ten patients stabilized and discharged after treatment, eight patients established do not resuscitate status, and three patients died after ICU transferal.

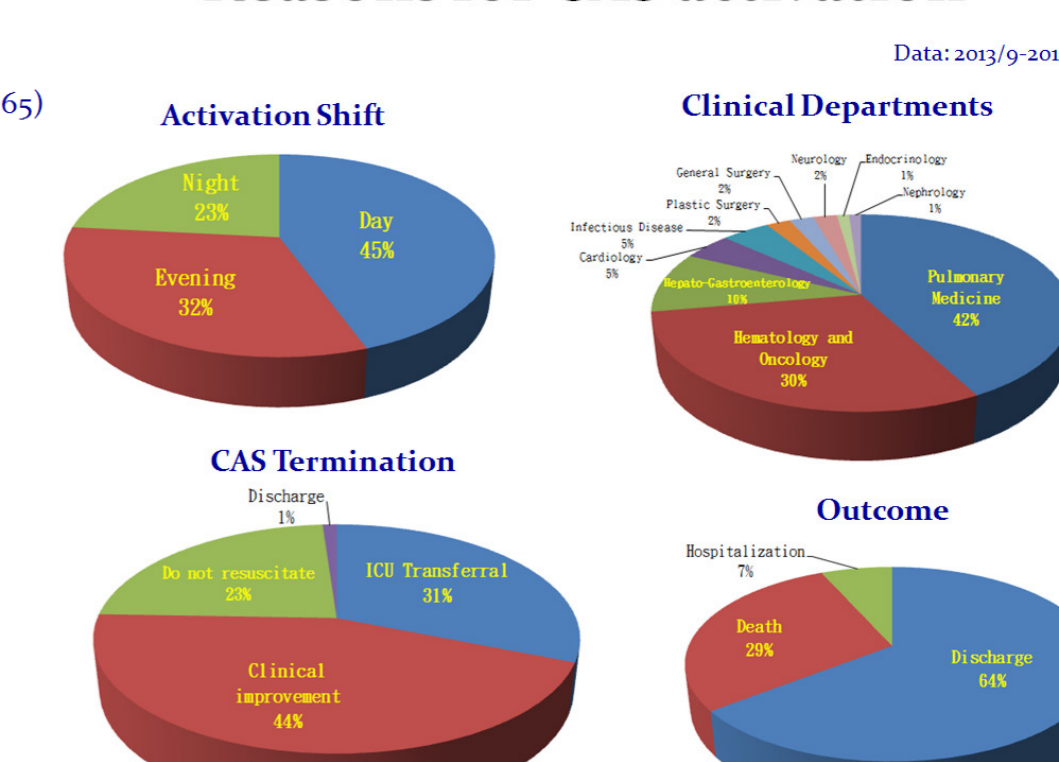
Table 1. Primary reason for CAS activation

Reason	Criteria	No. (%) of activations (n=21)
Respiratory Rate	6 or 29	12 (57.1%)
Pulse (bpm)	40 or 130	0 (0%)
Oxygen saturation (SpO ₂)	90%	6 (28.6%)
Systolic blood pressure	90 mmHg or 220mmHg	1 (4.8%)
Neurology	Sudden onset of consciousness change Seizure or any abnormal limb movement	2 (9.5%) 0 (0%)
Others	Sudden onset of arrhythmia Chest pain and cold sweats Urine output < 0.5 ml/Kg/hr, for at least 8hrs	0 (0%) 0 (0%) 0 (0%)

Primary reason for CAS activations



Reasons for CAS activation



* Neurology include consciousness change and Seizure
* Others include Sudden arrhythmia, Chest pain, Oliguria and others Clinical sign

Conclusion

Introducing the CAS through multidisciplinary team integrated care effectively reduced the in-hospital cardiopulmonary arrests.