

CODE BLUE SYSTEM

HOSPITAL SULTANAH AMINAH JOHOR BAHRU



RAPID RESPONSE SYSTEM FOR THE MANAGEMENT OF INTRAINSTITUTIONAL MEDICAL EMERGENCIES

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CODE BLUE

Emergency Medical Management – A Rapid Response System

1. Introduction:

Code Blue is a rapid response system for emergency resuscitation and stabilization of medical emergency situations that happen within the hospital area. These medical emergencies require immediate attention. A Code Blue is to be initiated immediately whenever a person is found in cardiac or respiratory arrest (unresponsive, pulseless, or not breathing) i.e. the patient needs cardiopulmonary resuscitation (CPR).

Code Blue Rapid Response System is established to ensure that all critical medical emergencies are provided with resuscitation and stabilization **ALMOST** immediately. The Response System is in 2 phases.

- i) The initial response (*first responder*) should always be from the hospital personnel who are at the vicinity; where Basic Life Support (BLS) service should be provided.
- ii) The second response (*second responder*) will be from a specialized and well trained team from a department identified by hospital authorities.

The response system is being conducted with a specific response time based upon the service quality standards which have been determined by the hospital authorities. To enable the proper establishment of such system, the following is essential:

- i) All personnel in the hospital should be trained with BLS skills to enable the initiation of critical basic life support at the incident site.
- ii) Basic Life Support equipment should be placed in all strategic locations within the hospital grounds, for example hospital lobby, waiting areas in polyclinics and other high risk areas; where the equipment is portable or mobile to enable rapid response.

Once there is a Code Blue, a team of doctors and paramedics (medical assistants and staff nurses), often a designated "code-team", will rush to the patient taking life-saving measures. The team uses a 'crash cart', wheelchair/stretchers, which contains important aids such as a defibrillator, intubation equipment, suction, oxygen, ambubag, resuscitation drugs (adrenaline, atropine, lignocaine) and an I.V. setup to stabilize the patient. The team will utilize BLS and Advanced Cardiac Life Support (ACLS) skills to resuscitate patients.

In areas where patients are routinely admitted, there should be a 'crash cart' or trolley, containing specialized life support equipment, available. If a Code Blue is called in an area without a 'crash cart', the designated code blue team will bring the 'crash cart' or resuscitation kit. A code blue is called for patients who do not have an advance healthcare directive indicating otherwise.

2. Objectives of Code Blue:

1. To provide rapid (almost immediate) resuscitation and stabilization for victims of medical emergencies or cardio-respiratory arrest within the hospital grounds.
2. To establish well-trained and equipped medical emergency (code blue) teams that can be deployed rapidly from pre-determined departments to the medical emergency site.
3. To initiate training in BLS skills and use of Automated External Defibrillators (AEDs) for all hospital staff whether clinical or non clinical based.
4. To initiate placement of BLS equipment in various strategic locations within the hospital grounds to facilitate a rapid response for medical emergencies.
5. To make the hospital safe for emergency.

3. Code Blue for Hospital Sultanah Aminah:

A Code Blue response for the entire Hospital Sultanah Aminah area cannot be handled by any particular department by itself, for example the Emergency and Trauma Department (ETD), due to the logistic difficulties for example difficult terrain and unreasonable distance. If the Code Blue team is handled by the ETD alone, their team members may not be able to attend immediately to emergencies occurring far away from the ETD, for example the Bakawali and Teratai building, *Balai Pelawat*, and Specialist Clinic/Polyclinic or even hospital administration office.

A Code Blue response time ideally should be within a pre-determined service standard in order to improve chances of successful resuscitation; for example, 5 minutes from activation of Code Blue to arrival of Code Blue team at the incident site. Therefore, each department has the responsibility of initiating resuscitation and basic life support for victims of medical emergencies in their workplace and surrounding area. This initial phase of the Code Blue response is the responsibility of each department as all these departments have doctors, paramedics or allied health personnel.

For example, the polyclinic team should cover Hospital Director Office; Imaging and Diagnostic department should cover their own department, Chest team clinic should

cover the Teratai building and the Orthopaedic department should cover the main hospital block.

The ETD will cover the non-clinical areas or departments in the hospitals such as main hospital lobby, Record department and overall coverage of the entire hospital grounds. The table in **Section 4** shows the proposal distribution of response teams by department and the area of coverage

Each department has to have their own medical emergency response team to deal with any such emergency. The formation of these teams (Code Blue teams), training of its members and provision of basic resuscitation equipment kits will be coordinated by the Emergency and Trauma Department. The level of training (BLS), expertise and resuscitation equipment for all the teams will be standardized.

Each team will compose of 3 to 5 members. Basic emergency resuscitation kits, which are easy to transport, should be placed in strategic locations all over the hospital especially in areas where there is high probability of medical emergencies or where hospital staff have been trained in BLS skills. At least one basic resuscitation kit should be placed in each department workplace so that the primary response teams can quickly mobilize and utilize the resuscitation equipment. If more kits or advanced resuscitation kits are available, especially if the area of coverage is big, then the effectiveness and response time of the Code Blue teams will be better. Further details on these aspects are described in Sections 5v, 6, 7 and 8. Whenever a Code Blue is activated, the team in charge of the incident site will attend to the emergency immediately, bringing along their basic resuscitation equipment kits.

The Emergency Department will still send a Code Blue team to the site of a Code Blue incident once a Code Blue is activated. However, due the previously mentioned logistic difficulties, the response time may be more than 5 minutes. Hence, individual departments or units play a vital role in performing early BLS while waiting for advanced life support care to arrive from ETD. This will improve the victim's chances of survival.

It is equally important that all hospital personnel, especially non-doctors and non-medical, are trained in BLS so that they can also provide early basic life support/Cardiopulmonary Resuscitation (CPR) at the incident site while waiting for the primary response or Code Blue team to arrive, thus also improving chances of good outcome for the medical emergency victims. Training of hospital staff in BLS skills and the use of AEDs can also be conducted by the ETD.

4. Code Blue teams of Hospital Sultanah Aminah, Johor Bahru.

Code Blue teams/Department of Origin and Area of Coverage

No	Code Blue team of primary responding team (Coordinator)	Propose Area of coverage
1	EMERGENCY AND TRAUMA TEAM (Dr. Mohd Amin Mohidin)	Emergency Department area, Record Department, Main and L&D building ground floor and Front Parking area, main entrance lobby, Blood Bank, PGMC, Pusat Bersalin and Rose building, Pharmacy, BDM and Unit Hasil. Second responder coverage of hospital area
2	ORTHOPAEDIC TEAM (Mr. Abdul Kahir bin Misnan)	Hospital main block (Level 1 to 6)
3	POLYCLINIC TEAM (Dr Chan Bee Keow)	Polyclinic Building (LPPKN, Pantai Medivest, Transportation unit, Integration Store, Hospital Administration Office), Polyclinic Parking and HO mass
4	O&G RESPONSE TEAM (Dr. Saripah Samsiah S. Haron)	L &D building except ground floor
5	MEDICAL(D1) (Dr. Kan Foong Kee)	Blok A, B, C, D, public canteen Balai Pelawat .
6	MEDICAL (PP1) (Dr. Kan Foong Kee)	Public Parking, PP1,PP2,PP3, Occupational therapy, surau
7	CHEST TEAM (Dr. Teoh Ker Ang)	Teratai and Bakawali building, chest clinic, canteen staff, hemodialysis
8	IMAGING AND DIAGNOSTIC TEAM (Dr. Maheswari)	Radiology, dietetic department, department of nuclear medicine, lab (behind the radiology department)
9	FORENSIC TEAM (Dr. Nor' Amirah Ahmad)	Forensic department
10	HAEMATOLOGY TEAM (Dr. Kan Foong Kee)	Hematology ward

5. Phases of Code Blue Rapid Response System:

i) Alert system

There should be a smooth and coordinated system in place in order to activate the occurrence of a medical emergency within the hospital grounds to the Code Blue team members.

The current telephone system will be used.

If a medical emergency occurs, any hospital personnel anywhere within HSAJB can trigger the Code Blue response by call for help and activates:

- a) Local Alert: depend on the mechanism that made by Zone Coordinator, examples:
 - Announcement through the PA system
 - Display the names of Primary Code Blue team at the strategic location in their zone
 - Once the Code Blue case occurs, the Primary Team should leave her/his job and take the code blue bag and rushing to the location and start the CPR/BLS.
- b) Hospital Alert: Code Blue number 5555→ Medical Emergency Call Centre (MECC):
 - 1st Priority: To activate the Secondary Code Blue Team from the ETD (lead by Clinical Coordinator)
 - 2nd Priority: To check (as a second safety net) the activation of the Primary Code Blue Team.

Pre-determined members of the primary Code Blue response team in charge of the vicinity where the medical emergency has occurred will respond to the Code Blue situation as soon as possible. The team members will mobilize their resuscitation equipment kit and rush to the site of the medical emergency. The ETD Code Blue team will also respond to the Code Blue situation.

If any team is unsure whether the site of the medical emergency is covered in their area of coverage, they should still respond to that 'Code Blue' alarm.

The service standard for the duration of time taken between receiving the 'Code Blue' message (Code Blue activation) and arrival of the Code Blue team at the incident site is 5 to 10 minutes.

This service standard will be timed & subject to performance reviews and quality assurance checks in order to determine pitfalls in the alert system and maintain an efficient and rapid deployment of the 'Code Blue' team.

- Responsibility of MECC toward Code Blue line.
 - Assume every call through the Code Blue line is a real Code Blue cases (until proven otherwise)
 - Code blue call should be answer as soon as possible (< 3 ringing)
 - Minimal conversation/question and focus towards activation of code blue team as soon as possible.
 - Vital information are
 - Name and particular either public/hospital staff/ paramedic/ Doctor
 - Exact Location
 - Trauma or medical case
 - Adult or pediatric
 - Announcement to ETD Code Blue Team- CODE BLUE 3x in the respective area.
 - The Code Blue Staff should leave his or her job and run with carry the crash cart to code blue scene if within the ETD zone coverage by foot (except in PGMC and Rose Building by ambulance)
 - Record and document in the Code Blue Census

ii) Immediate Intervention at the Incident Site

Staff at the site where a medical emergency (patient is unconscious or in cardio respiratory arrest) has occurred have a responsibility to call for further help, initiate resuscitation using Basic Life Support (BLS) guidelines and use advanced life support skills and equipment if adequately trained and equipped.

- a) The Hospital Code Blue team number/MECC number will be placed in wards, departments, divisions, units, offices, lift lobbies, corridors, canteens, gardens, parking lots, walkways etc and other locations within the hospital grounds.
- b) The hospital personnel who found the victim should activate the Local Alert for Primary Code Blue team or instruct someone to do it for them; they should also call for further help from nearby staff if available.
- c) At the same time, activation of the Hospital Alert should be carried out by dialing the Hospital Code Blue number 5555.
- d) Parties responsible or in charge of a particular area (for example, Medical Officer on call or in charge of a ward) must also be informed to come to the site immediately.
- e) While awaiting the arrival of the primary responding Code Blue team, if BLS-trained staff are available, they should start BLS (airway positioning, rescue breathing, chest compression etc).

- f) If there are no BLS-trained staffs who can attend to the victim, the attending staff should wait for experienced help and keep the site clear from crowding (crowd and traffic control) if possible.
- g) If cardiac monitors, manual defibrillators or Automated External Defibrillators (AEDs) are available, these equipment should be attached to the patient to determine the need for defibrillation; this phase is done by experienced staff or staff trained in Advance Cardiac Life Support (ACLS).
- h) Each department, division, ward or unit should strive to ensure that their staffs are trained in at least BLS skills and their resuscitation kits or trolleys are well equipped with at least basic resuscitation equipment and placed in strategic locations.
- i) Staff at each department will be responsible for the maintenance of their resuscitation kits.
- j) If the victim is successfully resuscitated while awaiting the arrival of the Code Blue response team, the attending staff should place the patient in the recovery position and monitor the vital signs.
- k) All code blue case should be sending to the ETD for further evaluation and management regardless the outcome.

iii) Code Blue team arrival

- a) Once the Code Blue team members receive the Code Blue activation, they have to stop their current tasks, collect their resuscitation kits (equipment bag) and rush to the site of the medical emergency on foot.
- b) They have to deploy themselves rapidly and smoothly and use the shortest route available.
- c) The response time (service standard) from time of Code Blue call/activation to arrival of Code Blue team at the scene will be recorded.
- d) There will be times when the ETD/Secondary Code Blue team arrival is delay due to various reasons; therefore, the need for Code Blue teams to not just consist of ETD staff but also staff from more strategic or nearer departments. Furthermore, it is imperative that any medical personnel at the scene start BLS steps.
- e) If the victim is still in cardio respiratory arrest when the Code Blue response team arrives at the scene, the team will take over the resuscitation task; the staff at the scene should stay around to provide additional assistance if required.

- f) Every case of code blue will be send to ETD regardless the patient condition either sustain return of spontaneous circulation (ROSC) or not. In the ETD, patient disposition will be decided after integration post cardiac arrest care.

iv) Definitive Care

- a) Medical emergencies that occur in any area either clinical or non-clinical and either involve in-patient or out-patient (public) will be attended to by the Code Blue response teams; these patients will be transported to the ETD for further resuscitation and definitive care as these places usually do not have adequate infrastructure and equipment for advanced care.
- b) If resuscitation is unsuccessful (the victim dies at the scene), the victim still need to be transferred to the ETD for further documentation or confirmation of death.
- c) Every code blue case will received definitive care after integration post cardiac arrest care and discussion in ETD.

v) Equipment and training

- a) All levels of hospital staff should be adequately trained in at least BLS and the use of the AED.
- b) AEDs and basic resuscitation equipment kits should be placed in various areas within the hospital grounds and be easily accessible for medical personnel and the primary Code Blue response team to use.
- c) Local/Primary Code blue (low risk zone) team equipments:
 - 1. Gloves
 - 2. Pocket mask
 - 3. Guerdel/oropharyngeal airway
 - 4. Bag/ first aid box
- d) Basic resuscitation equipment kits needed by Primary Code Blue Team in high risk zone and ETD/secondary response teams:
 - 1. Oxygen tank and tubing
 - 2. High flow mask
 - 3. Pocket mask
 - 4. Bag-valve mask
 - 5. Manual defibrillator or AED (in ETD and KIV to other discipline)
 - 6. Disposable and sterile gloves
 - 7. Oro-pharyngeal and naso-pharyngeal airways

8. Extraglottic devices (LMA/LT)
9. Wheelchair or stretcher
10. Stethoscope
11. Syringes and needles
12. Intravenous drip set (including spirit swab, branula and plaster)
13. Glucometer
14. Drugs- Dextrose 50%, Dextrose 10%, Normal saline/Hartmann's, Adrenalin, Atropine, Amiodarone, Diazepam, Tab GTN and Aspirin
15. Sphygmomanometer
16. Torch light

e) Advanced life support training can be acquired through the CPR committee.

f) The maintenance of these resuscitation kits is the responsibility of staff working in places where those kits are placed.

g) Crash/resuscitation equipment and drugs – to be checked and restocked after each code blue response.

6. Code Blue team composition:

The Code Blue team is available all the time.

1. Primary Code Blue response team members trained in at least Basic Life Support (BLS).
The Code Blue team consists of 3 to 4 members:
1 Assistant Medical Officer and 1 staff nurse **OR** 2 Staff nurses
1 Medical Attendant
1 Medical Officer (if necessary)
 - The Coordinator is responsible to submit the roster of local/primary Code Blue team to the MECC monthly.
2. ETD Code Blue response team is equivalence to Pra-Hospital team. It is compulsory for each member trained in BLS.
The Code Blue team consists of 3 to 4 members:
1 Assistant Medical Officer (Clinical Coordinator)
1 Medical Attendant
1 Medical Officer (if necessary)
1 Driver

Each code blue team member will have a designated responsibility such as the team leader, airway manager, chest compression, intravenous line, drug preparation and defibrillation.

Each designated team member will carry a hand phone

7. Education, Training and Quality Assurance:

BLS (compulsory) or ACLS certification for team members is required every three (3) years.

Review of all policies and procedures.

Review of regulatory standards.

Response time (service standards) measurement.

An Audit

BLS, ACLS and MTLs/ATLS courses will also be provided to staff from various hospital departments and units to improve the standard of care and outcome for the code blue response as these staff will play a vital role as first responders for code blue situations.

Parties interested in attending these courses should contact the Emergency and Trauma Department or CPR committee (Anesthesiology department).

8. Communication:

MECC

Specific dial/ext or hand phone number to activate the primary Code Blue team

9. Coordination with other departments/units:

Input will be acquired from other departments and units regarding the absence or presence of their current medical emergency response. If there is no emergency response plan in place, ETD of HSAJB will get input regarding their requirements for emergency medical care and coordinate with them on how to establish an emergency medical response using the code blue system. For departments already having a code blue response team, we would like to get input on how to improve the Code Blue response.

10. Budget requirements:

Basic and advanced resuscitation kits (bag/trolley/wheelchair)

Resuscitation equipment and drugs

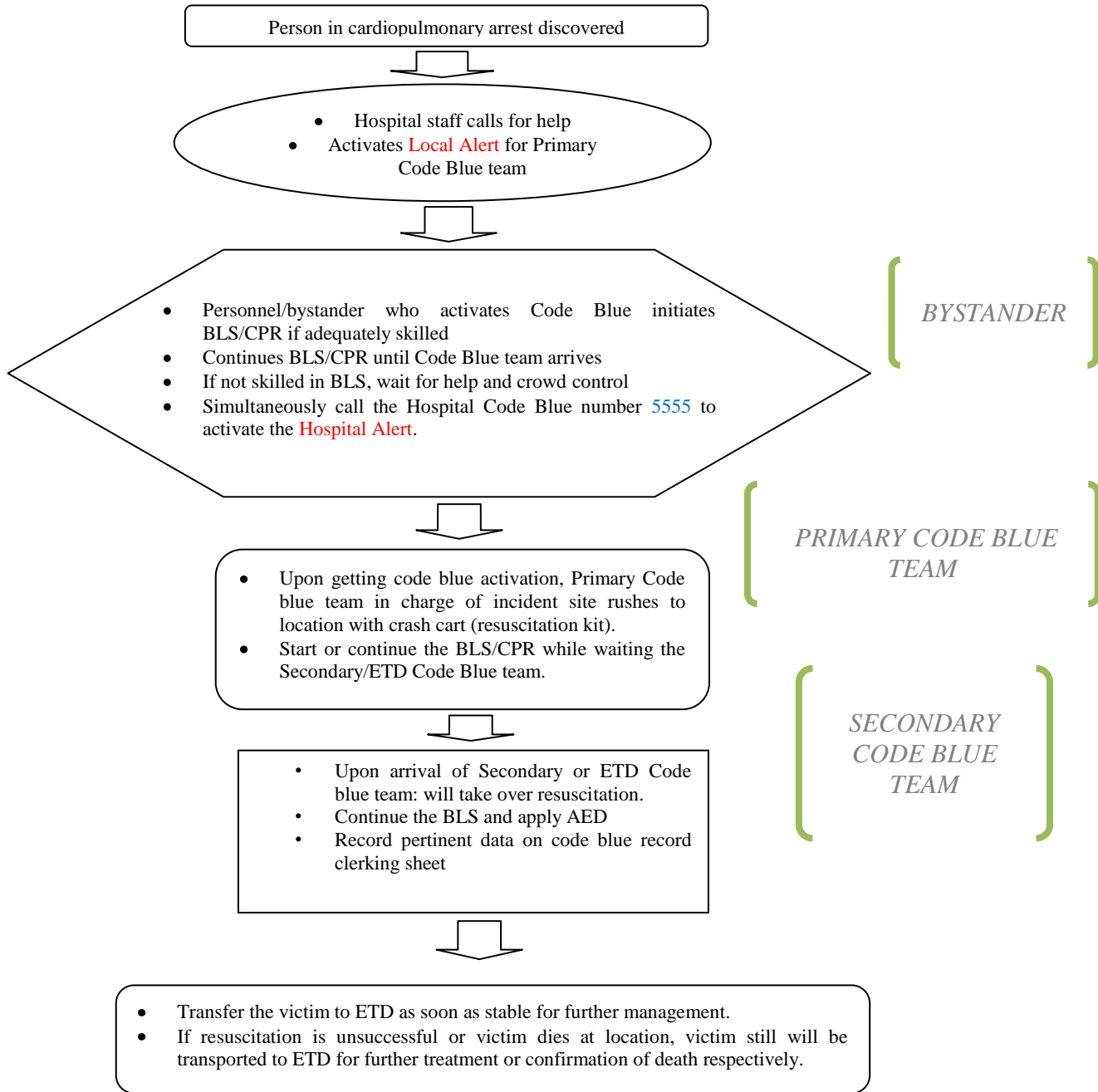
11. Dry run

Trial runs and simulations will have to be conducted to iron out unanticipated and anticipated problems that will be faced when activating and conducting Code Blue responses.

12. Target clientele and areas :

Any person (patients, relatives, visitors or general public) within the hospital area.

13. CODE BLUE ALGORITHM



14. Emergency and Trauma Department Phone Directory

1. Medical Emergency Call Center 1 : Ext 3248
2. Dr Md Saed Bin Mian : 019-9114632 SD: 6629
4. Dr. Mohd Amin Bin Mohidin : 019-7112399 SD: 5501
5. Dr. Redzuan Bin Abd. Hamid : 012-7198788
6. Dr Raja Zubaidah Bt Raja Mohd Rasi : 016-7171901
7. En,Twin Anak Johnson Entalai : 012-8586284
8. En. Haji Ismail bin Ahmad : 013-7372172
9. En. Haji Raschidi Bin Abdul Karim : 012-7539137
9. En. Mohd Ali Bin P. Kassim : 013-7053941
10. En. Nazrul Izzad Bin Mansor : 012-7644066
11. En. Mohd Aswadi Bin Abdul Rahman : 012-9497634
12. En. Zayuri Bin Mohd Noor : 19-9857970
13. Puan Aida Royani Bt Husain : 012-7710554
14. Puan Noorizah Bt Puteh : 017-7148189