

Final Report: Emergency Services Assessment of the Coast Provincial General Hospital, Kenya

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ABBREVIATIONS

AMREF	African Medical and Research Foundation
ACLS	Advanced Cardiac Life Support
ATLS	Advanced Trauma Life Support
BLS	Basic Life Support
BTLS	Basic Trauma Life Support
BVM	Bag, Valve Mask Device
CD	Casualty Department
CO	Clinical Officer
CPGH	Coast Province General Hospital
CSSD	Central Sterilising Supply Department
ECN	Enrolled Community Nurse
GCS	Glasgow Coma Scale
GE	Gastro-enteritis
ICU	Intensive Care Unit
IV	Intravenous infusion
KNH	Kenyatta National Hospital
KRN	Kenya Registered Nurse
MO	Medical Officer
MOH	Ministry of Health
MSH	Management Sciences for Health
MTC	Medical Training Centre
OPD	Out Patient Department
OT	Operating Theatre
PALS	Paediatric Advanced Life Support
RCK	Resuscitation Council of Kenya
RTA	Road Traffic Accident
START	Simple triage and rapid treatment
TPR	Temperature, pulse, respirations
TT	Tetanus Toxoid
USA	United States of America
USAID	United States Agency for International Development
USD	U.S. dollar
VE	Vaginal examination

I. INTRODUCTION

Georgianna Platt, R.N., M.A conducted an assessment of emergency services at Coast Province General Hospital (CPGH), Mombasa, Kenya, from May 27, 1999 – June 15, 1999. Management Sciences for Health (MSH) is under contract with United States Agency for International Development (USAID) to facilitate the Ministry of Health (MOH) decentralisation program whereby organisational reengineering of CPGH and the development and implementation of strategies to improve organisational performance and quality of medical services is achieved. MSH conducted a community survey in December, 1998, which identified the perception of poor quality of emergency services by both the public and hospital staff.

The purpose of the emergency services assessment at CPGH is to evaluate emergency care services, identify and develop a plan to revise patient assessment and processing, unit management, staffing, as well as identify staff training and department equipment needs.

II. EXECUTIVE SUMMARY

CPGH is the second largest acute care hospital and referral institution in Kenya. The institution is currently developing strategies for the improvement of organisational performance and the quality of services. The Casualty Department (CD) has been targeted for renovation of the physical plant. The hospital administrative team is committed to revising operational procedures, patient flow, supplementing equipment and supplies and possibly staffing in order to improve emergent services as well as expand the hospital's capacity to provide trauma services.

The CD registers on the average 170 patients per day. Patients are referred from rural hospitals and clinics as well as public and private health care facilities in Mombasa town. Patient acuity ranges from minor wounds and medical conditions to major multi-system trauma. Since the hospital is seeing greater numbers of trauma cases, the management staff of the CD have written a proposal to expand and upgrade the hospitals capacity to perform advanced resuscitation and surgical trauma care.

During the three week on site consultancy period, the quality of nursing and medical care in the CD was assessed, by evaluating patient flow through the department, the admission and discharge process, the utilisation of space, staffing and staff training requirements, nursing management and supervision, equipment and supply needs, sanitation and infection control and disaster preparedness.

The current utilisation of the space in the CD influences the flow of patient traffic. There are a number of treatment and examination rooms that are not being utilised due to lack of furniture and equipment. Consequently, most of the patient care activities are concentrated in the observation area, where patients are treated and monitored and either discharged or processed for admission. The renovations proposed by Dr. Calleb, the

director of the CD, are most appropriate and with the concomitant supply of furniture, equipment and an increase in staff, the processing of patients should be improved. The introduction of triage and primary assessment by a nurse either before or after patients are registered will enhance the flow of patients, since the acuity of the patient will be determined and the patient filtered to the most appropriate consultation or treatment room.

Training in basic and advanced resuscitation is imperative, as outdated and inadequate interventions are currently being provided for the patient in extremis. At the same time, supplementing the current armamentarium of resuscitation equipment and supplies is necessary to improve the quality of resuscitation. A training program plan and schedule is included in the appendices of this report.

The quality of nursing care is influenced by the lack of specialty equipment and some routine supplies. Also influencing the quality of nursing care is the lack of specialty training in emergency nursing. General and focused physical assessments are not done routinely by the nurse, nor is the patient re-evaluated during his/her stay in the CD to assess the impact of treatment. Day to day supervision of nursing staff and support staff performance on all three shifts by nurse managers needs to be strengthened, as observation of nursing performance has shown a drastic improvement in care when the unit Matron is present to monitor staff nurses in the unit.

While there is a definite need to increase the number of professional staff working in the CD, primarily medical officers (doctors) and nurses, the recruitment of support and auxiliary staff will allow the nursing staff to concentrate on traditional nursing duties rather than on clerical duties and errands. Ward secretaries, properly trained to perform clerical duties such as ordering supplies, supply inventory, transcription of orders, and recording of patient disposition, will allow nurses to spend more time in direct patient care and patient education. Nursing attendants can perform routine duties such as recording patient intake and output, feeding patients, minor dressing changes, and assist with the admission and transport of non-critical patients.

While the amount of routine supplies is just barely adequate, essential equipment for trauma care, resuscitation, diagnostic procedures and emergency medical interventions are lacking. Disposable, consumable supplies such as chest tubes, Foley catheters, suction tubes and drainage bags are not available, but are critical for routine care. While high-tech equipment is desirable to enhance the quality of trauma care, the purchase of lower cost items such as additional oxygen cylinders, sphygmomanometers; stethoscopes and fracture splints will improve the quantity and quality of patient assessment and care. Better organisation of supplies in storage rooms and the use of wheeled carts to store high volume items such as IV supplies will decrease time spent gathering equipment and supplies for routine and emergent situations.

Maintenance of equipment and improving the sanitation of the physical environment are essential to minimise the risk of cross contamination. Improved supervision of the

cleaning staff and follow-up by nurse supervisors coupled with additional cleaning and hygiene supplies are needed.

Many factors have been identified that influence the quality of emergency services at CPGH. Insufficient staff, lack of formal training of MOs, COs and nurses in emergency care and resuscitation, shortages of supplies and lack of essential diagnostic and treatment equipment, inadequate day to day supervision of nurses and support staff, and lack of triage and filtering which impede smooth patient flow in the CD all contribute to poor staff motivation, staff frustration and hence, provide a negative impact on the quality of care. However, one area of significance that was identified was poor staff-client interaction. An overall lack of courtesy to the patients, lack of respect for patient privacy, and an attitude of staff being inconvenienced by the presence of the patient and/or family contribute to the public's perception of poor quality of emergency services.

III. OBJECTIVES OF CONSULTANCY

(See Scope of Work – Appendix A)

IV. ACTIVITIES

The consultant assessed and evaluated CPGH emergency services for a period of seventeen days, meeting and interviewing Casualty Department (CD) supervisory staff, staff nurses, medical officers (MOs), and clinical officers (COs). Focused group discussions were held with nursing staff to ascertain awareness of department and administrative policies and procedures, technical and clinical knowledge specific to the CD, and identify staff perceptions of the deficiencies of the CD. Department records, which included patient charts, handing over report books, equipment inventory books, medication utilisation books, cost-sharing books, as well as staff work schedules, were reviewed. Direct observation of patient flow, from registration to discharge or admission was conducted, while observing the quality of medical and nursing services. Support services for the CD were reviewed, mainly, laboratory, pharmacy and central sterilising. Routine activities were also observed, such as the admission process, transfer of patients, referrals, and patient resuscitation. The consultant observed Casualty Department routines on all three shifts (7:30 AM – 1:30 PM, 1:30 PM – 8:00 PM, 8:00 PM – 8:00 AM) as well as on weekends and during one public holiday.

Listed below are the specific areas assessed during the consultancy period.

- A. Patient flow through the CD - “filtering”, triage, admission, discharge
- B. Layout and utilisation of CD space
- C. Quality of assessment and patient care
- D. Training requirements
- E. Staffing
- F. Equipment – Supplies
- G. Routine maintenance, sanitation, infection control

- H. Management and supervision
- I. Disaster preparedness and response

See Appendix B for Activity Schedule.

V. FINDINGS AND RECOMMENDATIONS

A. Patient flow through the CD - “filtering”, triage, admission, discharge

The CD is divided into five areas: reception and outer waiting area, inner waiting and examination rooms (which includes plaster room), minor operating theatre, observation ward (sub-divided into three sections - stitching, admission/observation, and gastro-enteritis), and trauma treatment - ambulance entry.

Patients are registered by a non-professional clerk who records patient demographic data, assigns the patient a casualty number, and directs the patient to the appropriate section of the CD, i.e. MO consultation room for P3 evaluation or CO consultation rooms. Depending on the assertiveness of the patient or family member, sicker patients will either queue to see the CO, or go directly into the treatment/observation area of the department. No medical person assesses incoming casualty patients for the acuity of their condition or directs patients to the most appropriate treatment area. In the daily staff assignment roster a nurse is assigned to "filter" incoming patients, however, this is rarely done. The COs will often perform a cursory review of patients sitting outside their consultation rooms to determine who requires immediate attention.

After the patient is assessed by the CO, the patient is referred either to the casualty observation room for admission processing, wound care, short-term treatment, or referral. Patients who require injectable medications are sent to the injection room where a nurse administers the injection. If oral medication is prescribed, the patient is directed to the pharmacy on discharge. At the time of this assessment, the x-ray department lacked film, thus all patients requiring x-rays were referred to private facilities in town, or a Mombasa Council Clinic that provided x-rays at a nominal charge. Those patients who urgently require a x-ray for definitive treatment (usually trauma cases) are transported to Aga Khan Hospital and back. This entails a lengthy process whereby the head of x-ray department and the casualty MO or CO complete a fee waiver form.

Patients for admission are directed to the casualty observation area where a nurse directs the family member back to the reception clerk to obtain an admission chart. The nurse will draw a blood sample for malaria (to be done for all patients admitted), take observations (blood pressure, temperature, pulse, and respirations (TPR), and if ordered by the CO, start an intravenous infusion. Once the result of the malaria smear is obtained, a nurse escorts the patient to the appropriate ward. Due to the volume of admissions (anywhere from 10% to 80% of all patients seen in casualty each shift), nurses will process five or six admissions, then escort the group of patients to the ward.

Patients who require wound care are treated by a CO or nurse depending on the severity of the wound (COs do most suturing), and discharged after the administration of tetanus toxoid and antibiotics. Patients may have to wait up to several hours for suturing if the CO is performing other procedures or is screening patients in the consultation rooms. Patients requiring short-term treatment and observation are attended to in the casualty observation room or in the section for gastro-enteritis patients. They are re-evaluated for admission or discharge by the CO after medications and other treatments are administered by the nurse. During the course of treatment, ongoing assessment by the nurse is not performed, nor are vital signs usually taken.

Summary of Findings

- No triage is performed by a medical professional.
- Patients are not directed to the appropriate treatment, consultation room or "filtered" for acuity of illness.
- Nurses are congregated in the main observation ward and do not participate in filtering or directing patients to appropriate treatment room.
- Crowds of people who accompany patients congest inner waiting area - corridor between observation ward and consultation rooms. Little if any crowd control by security staff.
- Nurse-patient interaction minimal. Little hands-on care. No discharge instructions or other patient education instructions given.
- Patients become hostile or angry when sicker patients are treated first rather than first-come first-served.

Recommendations

- All CD staff nurses to be trained in triage - patient assessment (see training section of report).
- All patients are "triaged" by a nurse preferably prior to registration (non-acute patients who have been referred to routine clinics and for wound care should be directed to OPD for follow-up prior to registration at the CD).
- Move registration office to unused CD pharmacy; establish triage room in present registration area of CD.
- Initial observations on all patients by triage nurse - blood pressure, temperature, pulse, respirations (TPR), and primary assessment documented to provide CO or MO with essential clinical data. Triage nurse should also documents patient complaints, past medical history, and other pertinent information. The triage nurse covers exposed and open wounds, and splints suspected fractures.
- Triage nurse directs patients to appropriate section of the CD, i.e. CO examination room, GE observation, plaster room for follow-up interventions, resuscitation room, VE room or paediatric examination room (after proposed renovations of CD completed).
- Stretchers and wheel chairs to be located in the triage area for non-ambulatory patients.
- Investigate option of moving patients for P-3 review to OPD or self contained section of the CD to relieve congestion during peak daytime hours.

- Once physical revision of the CD is completed and equipment supplied, assign two nurses to the examination-initial treatment section of the department to assist with patient flow, and to relieve the congestion of patients in the observation section of the CD. Nurses assigned to this area could assist with vaginal examinations (VE), perform minor wound care, inject medications, while continuing to filter patients.
- Satellite laboratory should be established in CD to decrease waiting time for lab results. The volume of patients seen in CD justifies a satellite lab that will only perform examination for malaria parasites, haemoglobin, and possibly blood sugar by hemostix.
- Hospital administration should investigate the option of using support staff, such as ward secretary or nursing attendant. Nursing attendants can assist with minor wound care, transport patients for admission, thus ensuring the availability of nursing staff for direct patient care, triage, and filtering. A ward secretary could facilitate ordering of weekly supplies, run errands to lab and pharmacy, again, minimising the non-nursing demands of the nursing staff. See section of staffing for additional comments.

B. Utilisation of casualty department space and layout

A proposal to improve the efficiency of the CD was recently submitted to the CPGH administrator by Dr. G. Calleb, the Director of Emergency Services. (See Appendix C). This plan identifies areas in the CD for renovation. Dr. Getambu and Dr. Calleb conducted a tour with this author on June 5th 1999 and highlighted the proposed changes in the physical layout. The proposed renovations will enhance patient flow, provided concomitant changes are made in nurse assignments, the triage of all patients is introduced and continuous patient filtering is done. Additional furniture and equipment must accompany the proposed renovations.

There are ten consulting examination rooms adjacent to the main waiting area. Room one will be utilised for triage and screening. Room 2 and 3 will be converted into resuscitation or treatment rooms for high-risk patients. Currently these rooms have access from the main waiting room and it is planned that the doors from the waiting area be blocked off, to allow access from either the trauma area or from the triage area of the CD. Each room will be retrofitted with an examination table or high quality stretcher (with plastic covered mattress), lockable storage cupboard for equipment, desk/table for nurse or CO documentation, and table top area for preparation of treatment supplies, and drugs.

The next room (4) in this row has been reserved for the MO, and should be outfitted with an x-ray view box, examination table and desk as well as appropriate diagnostic equipment.

Room 5 will be reserved for injections and should be equipped with an examination type table (for infant and children injections), desk/chair, and storage cupboard for supplies and equipment.

Plans are for Room 6 to be used as gynaecology examination room, however, I do not think the space is adequate to allow a stretcher to enter the room to transfer non-ambulatory patients from stretcher to examination table. While Room 6 is small, it may be adequate for use as a consultation room by the CO.

Either room 7 or 8 should be reserved for paediatrics, equipped with a scale, paediatric resuscitation equipment, and paediatric size supplies.

Two rooms will be allocated to the CO's for examination and consultation, and lastly, one room will be reserved for the orthopaedic/plaster technicians and consulting orthopaedic surgeons.

Each room should be fitted with a curtain or sliding door to ensure patient privacy. As of now, none of the rooms are curtained to ensure patient privacy; only the present injection room has a door to the common corridor connecting all the exam rooms.

Adjacent to the last consulting room is a Sister's office. This can be utilised by the nursing staff for either hand-over reports or storage of routine supplies that are used in each of the examination - treatment rooms.

As identified in the renovation proposal of Dr. Caleb, solid doors should be installed at the ambulance entrance. During a mass casualty incident, crowds gathered at the ambulance entrance, looking on the assessment and treatment activities through the vented metal gate.

Ideally, each examination-treatment room and consultation room should have a sink for handwashing. Along the inner entrance to all the consultation rooms is a partition with sinks and potential counter space. The sinks should be repaired, supplied with soap and towels, and the wall lowered to chest level to allow visibility into the corridor.

Minor Operating Theatre - Trauma Centre at Casualty Department

Renovations will soon be underway in the minor - casualty operating theatre. The long-term goal of the administrative team at CPGH is to develop this theatre into a full-time trauma theatre, operational 24 hours, seven days a week, with a complement of 20 nurses to run this department. Prior to this, the minor theatre was used on occasion to suture large lacerations, perform minor orthopaedic procedures, and perform surgical toilet (debridement) on casualty patients. One nurse was assigned to this ward, who assisted with opening sterile supplies and equipment, provided essential nursing care, and once the patient was admitted, ensured that the unit was cleaned. If there were no cases pending, the nurse assigned to the minor theatre performed other duties in the main CD.

While the goal to renovate the minor theatre is warranted - painting, repair sinks, sterilisers, increase equipment such as suction devices, instrument sets and other specialty items - the volume of surgical cases originating from the CD at this time does not justify a full time contingent of surgical nurses as proposed in the CD renovation document.

Recommendations

Effective trauma care is geared to providing immediate interventions during the "golden hour" after injury. During this window, effective stabilisation of the trauma victim is essential, with resources available to perform diagnostic procedures. At the same time, gathering a team of trained specialists is imperative. In light of these prerequisites for success, CPGH CD should address the current deficiencies in staffing, training, equipment and supply resources and operational systems for everyday routine emergency care, then modify their proposed plan for a trauma centre, implementing their current plan once the deficiencies in routine emergent care have been addressed.

- Train all CD staff in basic resuscitation (also ICU and OT staff as identified by Dr. Calleb).
- Train all CD staff in Basic Trauma Life Support.
- Proceed with CD renovation plans as outlined in existing renovation plan.
- Increase the number of MOs staff assigned to CD. Recommend one MO each shift.
- Equip CD with essential trauma support equipment (See Appendix D)
- Equip minor theatre with minimal but essential surgical instruments and supplies for orthopaedic and chest trauma interventions.
- Develop a mechanism of utilising main OT staff for trauma surgery performed in minor CD theatre to minimise the need to expand cadre of nurses dedicated to minor theatre.
- Investigate feasibility of developing an "ambulatory surgical program" as an amenity program to maximise the utilisation of the minor theatre, justifying a dedicated cadre of OT nurses for the minor OT. Such a program could be marketed to area surgical consultants. Minor elective procedures would be done on an outpatient basis. Minor elective cases could be easily cancelled to accommodate emergency trauma surgery.

C. Nursing Process and Quality of Patient Care

Standards of Emergency Nursing Practice (see Appendix E) outlines the nursing process—all aspects of ongoing patient care in the CD. Other than performing observations - blood pressure and TPR for those patients to be admitted, there are very little if any hands on nursing assessment, either on admission to the CD or to evaluate the progress of treatment. Nurses do not independently re-assess patients physical status, but rely on the CO to review patient treatment progress (an example is the asthma patient - no baseline assessment of breath sounds is done or periodic re-evaluation of the patient after injection of epinephrine or aminophylline).

While most nurses are familiar with routine standards of care for the trauma patient (i.e. injection of tetanus toxoid (TT), initiation of IV fluids), there are no written standards of care for trauma patients or patients with common medical or surgical conditions.

Patient and/or family communication and education were significantly lacking, both for the patient to be admitted and those for transfer or discharge. This was also evident in the injection room, where there is a high volume of patient contact, with little or no patient education. One area where more detailed and thorough patient education was facilitated

was in the plaster room, where the orthopaedic technicians instructed patients and/or family on cast care and impairment of circulation warning signs.

Documentation on the patient's record was scant at best. Nurses do not document patient condition, response to treatment or condition of patient at time of discharge or admission in the patient record. While a summary of patient progress is made in the admission book, this was rote and lacked specific patient related detail. For example, to write patient admitted in a "sick-looking condition" is vague and non-specific.

Overall the quality of nursing care for routine urgent and emergent clients is substandard. Nurses often only perform the absolute bare minimum for the average patient, with very little verbal interaction and relatively little hands-on physical care. This is partly due to the philosophy of getting the patients admitted as quickly as possible and not initiating definitive care in the CD, as well as the shortage of routine supplies such as catheters and oxygen.

One of the most disturbing observations made during the assessment was the callous and often times rude behaviour of the nurses toward patients and families. The nurses would sit at the nurses' station and not make any effort to assist sick patients onto stretchers or beds. On several occasions, a family member would come into the CD observation area seeking nursing assistance to bring in a very ill patient, only to have the nurse remain sitting at the desk, point to a stretcher and tell the individual to bring the patient in without nursing assistance.

Many of the nurses were short tempered and openly irritable with family members who asked questions about the admission procedure. When patients or families who were queuing up for injections or minor treatments asked when they would be attended to, it was not uncommon for the nurses to either ignore the inquiry or rudely tell the person to sit and wait their turn, without little or any explanation as to why a delay was necessary.

Often the prevailing attitude of the nursing staff was one of annoyance with the patient or family member. If there is any one area of staff performance that influence community perception of the quality of care, it is the attitude and behaviour of the CD staff. However, it was noted that during the presence of the supervisors in the CD, nurses tended to be more obliging and less rude with patients and family members.

Recommendations

- Formal Casualty-Emergency Nurse training for all nursing staff deployed to CD. While this is a major endeavour, at minimum, a triage - nursing assessment and documentation program should be implemented, on a part-time basis, for all CD nursing staff. See Appendix F for training program topics.
- Standing nursing committee formed to develop Standards of Care for the CD. Standards of Care are guidelines for basic nursing care for patients with various diseases or conditions. For example, establishing guidelines for nursing care of a patient with shortness of breath (i.e. asthma, congestive heart failure), that includes nursing assessment, interventions, and documentation. A nurse consultant will be

evaluating the nursing department, and this is one area that will be addressed. Standards of Care (also referred to as Department Policies and Procedures) are used as a guide for patient care, as well as a tool for orienting and training new staff to the department.

- Nurses in the CD should conduct an initial nursing assessment and perform focused physical assessments on the patient throughout their stay in CD and should document on the patient record the assessment findings as well as patient responses to treatment and patient disposition. There is a head trauma sheet that is available in the CD for all head injury patients and patients with altered levels of consciousness that could also be used for general trauma, and suspected cerebral malaria patients. While nurses may lack training in physical assessment, the triage - nursing assessment course will introduce physical assessment techniques.
- Make available additional equipment and other patient care modalities that will improve the quality of patient care. For 1 1/2 weeks during the assessment, the oxygen tank was being used in another ward. For one week while the tank was in the CD, it was empty. Each nurse should be required to have her own stethoscope, cutting shears/scissors, as well as penlight. Additional equipment needs will be discussed in section on Equipment.
- Hospital administration address the issue of nursing attitude toward CD patient - clients. With the introduction of cost-sharing, a paying public has a right not only to the best quality care available, but care performed by practitioners who are motivated, interested and expressing basic courtesy to patient and family.
- Post signs for the public throughout the department stating that the sickest patients will be seen first.

D. Staffing

Approximately 35 Registered and Enrolled nurses work in the CD. One MO is assigned to the department and on the average, 2 COs are present each shift. The CD registers approximately 170 patients per day. The peak hours are from 10:00 AM to 8:00 PM. By midnight, the CD is relatively quiet compared to daytime activity.

An analysis of staff - patient ratios was done with statistical data collected from CD records of a seven-week period. See Appendix G. The number of patients seen each day of the week was averaged to determine which days of the week that see the highest number of patients.

Nursing Staff

Nurses in the CD cite the shortage of staff as the most significant factor influencing the quality of patient care (second was the shortage of equipment). While this is a universal concern within the health care system, the lack of support services and support staff contributes to the high volume of work for the nursing staff as well as the amount of non-nursing duties each must perform.

Each nurse is off duty every other weekend. As a result, there are fewer nurses working the weekend shifts, however, review of the statistics showed that Saturdays and Sundays had the highest patient census.

Evaluating the patient-nurse ratios, there are approximately 11.5 patients registered for each nurse on the day shift, 10.6 patients per nurse on the evening shift, and 11.5 patients per nurse on the night shift¹. However, several variables influence these ratios and the volume of work for the nurse. While CPGH does not score patient seen on an acuity scale, the number of patients admitted per shift is a reflection of the number of acutely ill patients seen in the CD who require more intensive nurse/patient contact. When reviewing the admission figures, the patient admissions to staff nurse ratios are as follows: the day shift had 1.6 patient admissions per nurse, the evening shift had 3.7 patient admissions per nurse, and the night shift had 6.1 patient admissions per nurse. The statistics for the night shift are slightly skewed. The night shift runs from 8:00 PM to 8:00 AM. The peak hours during this shift are from 8:00 PM to midnight, after which the volume of patients seen and admitted usually decreases significantly. So while there are more admissions per nurse on the night shift, note that the shift is of 12-hour duration with relatively less patient activity after the first four hours of the shift.

Another factor that influences the volume of work is the amount of "non-nursing" duties that are performed by the nurses. For example, ordering supplies from CSSD, the storeroom, and lab and drugs from the pharmacy is a time consuming process that often ties up one nurse for a full shift twice a week. Nurses routinely run errands throughout the day, either to CSSD, pharmacy or laboratory.

The admission process is time consuming, not in the preparation of the patient for admission, but in the actual transport of the patient to the wards. It is not uncommon for a nurse to escort up to three to five patients at one time to various wards throughout hospital, and be away from the department for an hour or more.

Medical Officers

During this assessment period, there was one medical officer (doctor) on duty in the CD. The MO has very little contact with acutely ill patients, rather spends 90 % of his time evaluating patients for the P3 forms. P3s are police forms that request a physician (not a CO) to evaluate the injuries of accident victims and persons involved in assaults and other police cases. Most of the observed P3 patients are not in acutely injured. Up to 15 to 20 (or more) of these patient queue to see the MO each day. The MO must also testify in court as to the severity of injuries, thus the MO is often not available until mid-afternoon to evaluate the waiting P3 patients and provide assistance with routine emergency patients.

¹ Note: The Matron and Asst. Matron were not included in the statistical analysis of nurses per shift, since they are usually not involved in direct patient care. They mostly concentrate on administrative duties which take them away from the unit.

Clinical Officers

There are on the average 2 COs on duty per shift. On a number of occasions during the assessment period (about 20% of the time), there was only one CO on duty. The CO sees all patients (except the P3 patients) visiting the department. Since there is no triage system or filtering done by a nurse, the CO will quickly review the acuity of the patients sitting in the waiting area to determine which patients should be seen first. The CO will do a cursory physical assessment (equipment is not available to take vital signs or do an eye, ear, nose, throat assessment), then direct the patient to either the injection room, observation area for admission or therapy, or discharge the patient home. During this time, the CO must also perform procedures in the main observation area, such as suturing of wounds, insertion of urinary catheters, insertion of IV cannulas and butterfly needles, as well as assess patient's responses to treatment.

Security Staff

One security officer was assigned at the north (?) entrance door (adjacent to the minor theatre) to control access to the CD. On occasion, a security officer was seen outside the main registration area. During the course of this assessment, multiple incidents were observed whereby visitors, family members, and people who accompanied the patients were unruly and argumentative. On a number of occasions, patients were escorted to the CD by large crowds of family who often refused to remain in the waiting areas. The security staffs were observed to be effective in crowd control, and unable to defuse tense situations.

Cleaning Staff (see section on Sanitation, Infection Control)

Recommendations

- If at all possible, increase the number of nursing staff on the evening shift, by at least one nurse.
- Revise staff schedule to increase the number of staff working on Saturdays and Sundays. While overtime may not be an alternative, perhaps using a "compensation time" (comp time) arrangement whereby staff work a weekend shift and are given time extra time off during the week.
- Evaluate the feasibility of employing ward secretaries (also referred to as Unit Clerks, Unit Secretaries, Ward Clerks etc.) who can assist with non-nursing duties. If "par levels" were established for all supplies, it would be easy for a ward secretary to do routine ordering. This person can also perform other clerical duties such as record admissions, fill out lab slips/requisitions, compile statistical data (for cost sharing), as well as run numerous errands, thus keeping the nurse on the unit where she/he is needed. Ward secretaries require training and orientation.
- If resources are not available to increase the nursing staff (particularly on evening shift), consider hiring nursing attendants to perform tasks such as dressing changes, feeding patients, transporting patients to the wards after the nurse has telephoned a report to the receiving ward nurse. The CD nurse would still transfer critically ill patients to theatre or ICU. Again, the use of auxiliary staff will ease the burden of non-nursing duties from the professional nursing staff.

- The night shift have fewer patients after midnight, assign the night staff to re-stock IV trays, prepare trauma dressings for sterilisation, fill out supply requisitions for the day shift, and other support tasks that may ease the burdens of the day and evening staff.
- Evaluate the feasibility of moving P3 patients to OPD.
- Assigning at least one additional MO to the unit during the peak hours.
- Assign one additional CO to perform procedures in the main CD observation area and proposed treatment rooms.
- Ongoing review of statistical data should be conducted to evaluate staffing options, such as split shifts, 12 hour day and night shifts, and use of "locum" nurses for peak hours.

E. Equipment – Supplies

In all meetings and discussions with CD staff, a major cause of frustration was the lack of adequate supplies and equipment. Of all the factors that influence the quality of care (staff knowledge, patient -staff relations, quality of management, compliance with standards), the lack of equipment and supplies is the most tangible. Essential equipment for routine patient care services is lacking, in addition to the absence of basic furniture and other fixed assets. Consumable supplies such as IV cannulas, IV fluids, and such were adequate, however, it appears that poor planning and lack of accountability for restocking contributes to supply shortages.

MSH sponsored a materials management consultant to assess the method of supply and equipment order as well as the distribution mechanism at CPGH. Unfortunately the report was not available.

The CD has several storage rooms; one adjacent to the CD observation ward that contains routine consumable supplies such as IV fluids, IV tubing and other items for everyday use. There is one "buffer" store adjacent to the trauma area that contains trauma supplies and additional routine patient care stock. There is also a third store for additional items that is adjacent to the examination rooms.

A list of equipment that is on order for the CD is included in Appendix H. This equipment will certainly supplement the meagre supply of furniture but is far from sufficient.

1. Routine Supplies

During the course of the assessment period, the x-ray department was out of x-ray film. Patients were referred to private clinics if they were ambulatory, and the more critical non-ambulatory patients were transported to Aga Khan hospital for x-rays. Stock outages of essential items such as x-ray film is inexcusable. Situations such as this certainly add to consumer and staff frustration.

There appears to be sufficient amounts of routine IV supplies, however, the unit lacks such disposable items as Foley catheters, chest tubes, drainage bags, and suction catheters. Often family members were asked to purchase these supplies from local

chemists. On two occasions during the assessment, the keys to the buffer store and back-up store were accidentally taken home by one of the shift nurses, resulting in inadequate consumable supplies available for use for the next two shifts.

The availability of laboratory supplies was inconsistent. On numerous occasions the CD ran short of glass slides, rectal swabs, and specimen bottles for blood. Part of the reason appeared to be poor planning and anticipation of unit needs by the charge nurse. Rather than periodically collect sufficient amounts of lab supplies, the staff will wait until all supplies have been exhausted before attempting to restock. By this time the lab may also be out of stock as well.

A similar situation was found for drug supply. On occasion the nursing staff did not plan well or liaise with the pharmacy for restocking of critical drugs. For example, the CD ran out of epinephrine, a drug used for asthmatics. This item was found to be also out of stock in the pharmacy. Rather than inform the pharmacy of limited remaining stock on a Friday afternoon, so that the pharmacy can purchase sufficient amounts from a local chemist, the nursing staff exhausted their supply, resulting in no drug being available until Monday.

2. Furniture

The amount of furniture is inadequate for the number of patients seen per day in the CD. Examining tables are broken, chairs inadequate in number for staff and patient use, and dressing trolleys in short supply. There is a shortage of benches for waiting patients and family. During peak hours it is not uncommon to find people sitting on the floors in the waiting areas.

It is also not uncommon to find two or three patients sharing one bed. This is due to a combination of poor patient flow control, poor utilisation of other CD space, as well as an inadequate supply of beds and/or stretchers (with mattresses).

2. Specialty Equipment

Listed below is the available diagnostic and resuscitation equipment in the CD:

- 1 thermometer
- 1 stethoscope (broken)
- 1 sphygmomanometer
- 3 clean forceps (in one container)
- 7 IV stands
- 1 suction machine
- 4 stretchers
- 1 oxygen cylinder with stand and O2 key
- 1 speculum
- 1 laryngoscope set (adult size blades)
- 1 diagnostic set
- 1 BVM (ambu bag) with mask

For the volume of patients seen in the CD, the routine diagnostic and patient care equipment is far from adequate. Resuscitation equipment and supplies are virtually non-existent.

While the CD administrative staff have identified a need for high-tech equipment for advanced trauma resuscitation, equipment that can be used for a greater number of patients and thus impact the quality of routine emergent care is of greater value. Such items as additional oxygen flowmeters for the piped oxygen system or additional oxygen tanks, disposable suction catheters and oxygen face masks, as well as modest cost resuscitation equipment as endotracheal tubes, airways, ambu bags with disposable masks and laryngoscope sets, both adult and paediatric, sphygmomanometers and basic orthopaedic splints will have a more significant impact on the quality of care.

Suture sets, while adequate in number, are incomplete. All lack a complete set of instruments, requiring the nurse to open two to four sets to assemble a set of instruments to suture lacerations and wounds.

Recommendations

- In addition to the 8 stretchers on order, provide at least 6 additional stretchers. The beds in the middle section of the CD observation ward should be replaced with high quality stretchers with mattresses. Sicker patients who are admitted can be transported in these stretchers (or wheelchairs) without having to move from bed to stretcher for transport to the ward. The beds from this area can be used by the G/E patients who require longer term care. Two beds can be moved to the area currently used as a suture area for asthma patients who stay for several hours (once the minor theatre is operational again and equipped exam - treatment rooms are in use).
- Each nurse should be encouraged to provide his/her own stethoscope. Stethoscopes of reasonable quality can be purchased for as little as 500/= each. They should not be provided to each nurse by the hospital. Stethoscopes are necessary for detailed nursing assessment in addition to taking observations and performing triage duties.
- Each nurse should have a pair of heavy-duty shears for cutting adhesive tape, patient clothes (in trauma situations), gauze etc. Not one pair of scissors was evident in the CD. Nurses open sterile surgical blades to cut sutures, adhesive tape, and gauze. This is both dangerous and wasteful of blades.
- Organise IV supplies on one moveable cart. This self contained cart can be wheeled from patient to patient in any part of CD, with supplies to be replenished each shift from the storeroom. A minimal amount of IV cannulas, butterfly needles, tape, gloves, IV tubing to be stocked on the cart. While two carts would be ideal, one for the CD observation ward and one for the planned treatment rooms, one is adequate to start now.
- Organise one mobile resuscitation - emergency cart. This should be a lockable cart with drawers that contain essential supplies for respiratory and cardiac arrest. See Appendix D for list of supplies, drugs, and equipment for emergency resuscitation cart. The cart can be moved to any bedside to initiate resuscitation with all essential equipment and drugs available in one location, this minimising scrambling for multiple items. One drawer on the cart should be reserved for paediatric resuscitation

items for intubation and IV insertion. The emergency cart should then be checked every shift to ensure a full complement of supplies.

- Ideally, each proposed treatment-examination room should have its own sphygmomanometer, however, at a minimum, each area of the CD should have one. The sphygmomanometers should be on floor stands to minimise theft of the portable units.
- At least one additional mobile spot light, one for CD observation ward, one for the treatment-examination rooms. One is on order; hence one additional unit should be sufficient.
- Oxygen: one large tank is not sufficient. The piped oxygen system should be flushed, tested and flowmeters purchased. At least four flowmeters are necessary, which can be removed, cleaned, and mounted at the needed bedside or treatment area. As an alternative, at least 2 complete portable oxygen sets should be available, preferably three; one for the proposed treatment-examination areas, one for the CD observation area, and one for the trauma section. Disposable oxygen masks should be used, one per patient use. One significant diagnostic tool that is used to guide the use of oxygen is a pulse oximeter. A portable hand held unit can be purchased for about 800 USD and is an invaluable asset when evaluating patient oxygen saturation level and assisting the practitioner to determine the need for O₂ therapy and the volume of oxygen flow.
- CPGH CD sees a significant number of asthma patients. At present, the only treatment modalities are epinephrine and IV aminophylline. While there are other more effective treatment modalities available for asthma patients, the cost of inhalers (such as albuterol or metaproterenol) is prohibitive for the average patient. The CD Director may want to consider the cost of compressed air (in tank or small pump) to be used with aerosol bronchodilators for the more severe asthma patient. While aerosol equipment is usually designed for single patient use, with proper cleaning, it can be reused.
- Suction: ideally, suction should be available, like oxygen, at each bed station. The CD currently has one functioning unit (albeit contaminated with waste), however, two units are on order. One should be kept in the treatment-examination section, one for the trauma area, and one for the general CD observation unit. Suction machines must be cleaned after each patient use, with the connecting tubing replaced, the collecting bottle emptied and cleaned, and the used suction catheter discarded and replaced. Each machine should have an extra catheter (soft, flexible type) as well as a rigid Yankauer tip affixed to the machine for emergency use.
- Suture sets: Each suture set should be complete with the following items: 1 needle holder, 2 tissue forceps (1 with teeth, 1 without), 1 pair suture scissors, 2 small hemostats. This is in addition to 2 - 4 sterile towels and one slit drape two small gullipots, as well as assorted sterile cotton, gauze, and swabs.
- Establish "par levels" for all consumable supplies in concert with CSSD and central stores. All consumable supplies are listed on an inventory form with the established par level. Par levels are based on average weekly consumption of an item. When the nurse orders on a weekly basis, she/he will order only an amount to reach the established par level.

- Establish a "par level" system for routine drugs to prevent drug shortages. Maintain a supply of emergency drugs for resuscitation separate for the routine supply.

F. Training

Observation of nursing care, both routine and emergent, highlighted a lack of knowledge of essential principles of emergency care and a lack of compliance to hospital policies. Interviews with CD nurses, with questions posed on emergency medical and nursing care, revealed significant knowledge deficiencies on patient assessment, principles of triage, trauma nursing, resuscitation as well as appropriate nursing interventions for routine conditions. Observation of nursing and medical care highlighted antiquated practices for resuscitation (use of hydrocortisone is not a first line drug for respiratory and/or cardiac arrest).

The CD at CPGH is not completely devoid of routine standards of care, however, there is mixed compliance with established practices. For example, all are aware of the risk of contamination by blood and body fluids; however, about only half of the staff wear gloves when performing venopunctures or finger pricks for blood slides, yet non-sterile gloves were available at all times during the assessment period.

Only one CD nurse is formally trained in Emergency Nursing (department Matron). None of the other 34 nurses on staff received training specific to the department. Orientation to the CD involves a tour of the department and on-the-job training in everyday routines; it apparently does not involve advanced nursing techniques for emergency nursing or trauma nursing. Good casualty department nurses require training inputs specific to the environment that exists in the CD. While nursing education is comprehensive, covering general medical-surgical nursing, maternity, paediatric and family planning, there is little in the core nursing curriculum specific to emergency nursing, resuscitation, trauma nursing, and elements of life support. A detailed outline of an emergency nurse training program is included in Appendix I. It is unrealistic to implement this comprehensive training program for all CPGH CD nurses at one go. Priority should be given to nurse and CO education in triage, assessment, nursing process, (which includes documentation), and resuscitation (basic and advanced). Emphasis should also be placed on training of trainers, utilising motivated and skilled nurses as mentors and trainers in the CD, who can provide orientation to new staff, student nurses, and provide ongoing continuing education for permanent CD staff.

All CD nurses interviewed identified the need for specialty training, however, many requested high cost orientation visits to USA or UK hospitals or enrolment in overseas training programs. Several hospitals in Kenya, mainly, Kenyatta National Hospital (KNH) and Nairobi Hospital, have provided specialty training in triage, assessment, resuscitation (basic and advanced) to supplement the Medical Training Centre (MTC) Intensive Care and Casualty Nursing training programs. There are also several organisations that provide training in basic and advanced resuscitation. African Medical and Research Foundation (AMREF), and Resuscitation Council of Kenya (RCK) provide a variety of resuscitation courses, as well as training of trainers courses.

Recommendations

- Triage - nursing assessment course for all nurses assigned to CD (See appendix J for curriculum).
- Basic Life Support course for all CD staff, (nurses, CO, MO, support staff).
- Basic Trauma Life Support course for all CD staff.
- Provide combination ICU and Emergency Nursing training program for select nurses who in turn will train other staff members. Initial training provided by a consultant or send to MTC program.
- Advanced Resuscitation course for select CD staff initially, then over a period of two years, all CD staff to be certified in advanced resuscitation techniques (includes Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support {ATLS}).
- Purchase of resuscitation manikins and training material to conduct in-house resuscitation training, thereby decreasing long term cost of resuscitation training.
- Assign key CD staff to attend training of trainers' course in basic resuscitation.
- Paediatric advanced life support (PALS) course for select CD staff (MO, CO, nurses), since most patients who require resuscitation in the CD are children under five.
- If resources are not available for comprehensive ICU/Emergency Nurse program, send two to three nurses KNH or NH CD for on-the-job training in resuscitation and triage for at least one-month duration.
- Establish a formal orientation program for newly assigned nurses to CD, utilising preceptor/mentor concept.
- Establish annual performance review - refresher schedule for all CD staff in resuscitation and key procedures. Resuscitation training is not a one shot program, but requires at least annual refresher/review. Other areas for annual review are infection control concepts and disaster response drill (internal and external disasters).
- In concert with general nursing department, investigate the feasibility of establishing a *nursing* staff development department (also called In-service Education Department) to co-ordinate all nurse training hospital wide, maintain orientation and staff development training records, and conduct general and specialty training programs (ICU and Emergency nursing courses, resuscitation courses) as well as co-ordinate routine staff development lectures (continuing education programs).

G. Routine Maintenance, Sanitation, and Infection Control

Routine Maintenance

There is a critical need for routine maintenance of fixed assets such as furniture, electrical fixtures, and plumbing. Light fixtures are broken, electrical ceiling fans not working and furniture - examination tables - broken and not used. None of the examination lights in the department are functional.

The patient toilets need to be overhauled. The toilets leak, and there is a constant odour emanating from the male and female toilets adjacent to the G/E observation area. The toilets did not have functioning ceiling lights at the time of the assessment. The public toilets outside the registration area were flooded, and again, had a constant odour of urine.

Curtains are absent in the main observation ward, there is no patient privacy in this area. Vaginal examinations are done in open view.

Most of the sinks in the department either do not work, are clogged, or have faucets with drips or leaks. None of the sinks save for the one in the main observation ward have soap dispensers or available hand soap or paper towels for hand drying.

The atrium adjacent to the main observation ward is littered with garbage, plastic buckets used to collect soiled bandages and other waste, as well as the remnants of a tree that fell and smashed the atrium glass window. During the duration of the assessor's visit, a foam mattress was left in the atrium, with the plastic cover removed and lying on the ground. The mattress was rained on and exposed to the elements for over three weeks.

There are adequate storage facilities in the CD; however, there is one storage room across from the Matron's office that is used as a temporary morgue for children. This room has no light, smells of decay, and is littered with paper and other waste.

Sanitation and Infection Control

The cleaners assigned to the CD also clean the x-ray department, Ramatullah Ward, and minor theatre. The cleaners wash the floors, sluice and utility rooms and toilets in the morning; however, there is little evidence of major cleaning, even on a weekly basis. The day-to-day supervision of the CD cleaning staff is under the auspices of the CD Matron. The Matron is often not on the unit as she is involved in house coverage or other administrative duties. The shift in-charge staffs in the CD do not closely monitor the performance of the cleaning staff.

Examples of the need for thorough cleaning are; dried blood on the walls of the trauma section; the beds in the observation section have dried body fluids and excreta on the metal springs and bedframes; the main sluice room is littered with metal basins, broken fixtures and countertop, and an inoperable bedpan washer. A metal basin contained soiled linen that was left unrinsed for two days, all the IV stands are encrusted with dirt and old adhesive tape.

The risk of cross contamination is great. The suction machine in the observation area was not cleaned at all during the time of the assessment, and the collection bottle of the machine is half filled with sputum and other irrigating fluids. The suction connection tubing and suction catheter is not changed between patient use.

The oxygen cylinder (when it was available) had an oxygen mask that was used multiple times. These devices are intended for single patient use only to minimise cross infection. The humidifier reservoir attached to the oxygen flowmeter contains water, but this is not changed on a daily basis.

The CD has only one axillary thermometer in use at one time. This is kept in a small medicine bottle that contains a cotton plug and a few ML of fluid (saline).

Food for patient consumption is brought to the unit in uncovered containers, and the food is left exposed throughout the day.

Recommendations

- Improve the day-to-day supervision of the cleaning staff. Provide written assignments if necessary. Establish daily and weekly cleaning regime that is monitored by shift charge nurse and deficits reported to Matron. Weekly inspection or weekly environmental rounds should be performed by charge nurses or Matron along with Public Health Officer. Assign cleaning staff to CD only, increasing their availability on the unit.
- As part of the renovation program, fix or replace leaking faucets, repair leaking sinks.
- Remove or repair broken utility lights throughout the department.
- Perform major cleaning and repainting of all walls and storage room surfaces.
- Replace burned out light bulbs, repair light wire or replace fixture. Repair or remove ceiling fans.
- Remove broken appliances from sluice room, repair bed pan washer.
- Remove felled tree from atrium, remove trash, mattress, and cement over the garden.
- Collected garbage to be removed from atrium at disposed of properly.
- Plastic buckets used for soiled dressing and other waste to be lined with plastic or cleaned each shift.
- Large trash bins to be lined with heavy-duty plastic liners. These were available, but locked in Matron's office.
- Establish procedure for cleaning suction machine after each patient use. While disposable items are costly, the reusing of a suction catheter from patient to patient is synonymous with reusing a Foley catheter. Investing in disposable suction catheters and oxygen masks is a must for prevention of cross contamination and infection control.
- Provide more than one thermometer, to be rinsed after each patient use, and stored in dry container.
- Provide soap, either bar soap or liquid soap dispensers, at all sinks. The lack of soap discourages handwashing.
- All CD beds and stretchers should be washed down every day with soap/disinfectant. While it is unrealistic to perform major cleaning after each patient vacates a bed or stretcher, there should be some periodic attempt to sponge down the surfaces of the plastic covered mattresses throughout the day, especially in the G/E area.
- Install curtains in the main observation section, ensuring patient privacy. Also install curtains in the doorways of the examination/treatment rooms. If curtains are not available, provide at least three privacy screens in the main casualty observation ward.
- Paint all metal beds and IV stands with white oil-base paint.

H. Management and supervision

With the goal of decentralisation of hospital management and moving towards a state of autonomy, an added burden will fall on middle and senior management to ensure greater accountability of performance by hospital staff. Management and supervisory staff should be highly visible at assigned areas of responsibility to monitor quantity and quality of patient care.

There are two supervisors assigned to the CD, one Matron and one Asst. Matron. Both work only the day shift, and for the most part, work Monday to Friday. When the Matrons do work the weekends, they are assigned to cover the "house" for general administrative duties.

During the course of the assessment, the Asst. Matron was deployed to cover the OPD. The Matron attends morning report in the main nurses conference room from about 7:30 - 8:00 to 9:30 or 10:00 AM. The Matron was often involved in administrative duties away from the department.

A "charge nurse" (a KRN on the day and evening shift, an ECN on the night shift) makes out the daily assignments for the KRN and ECNs and is supposed to do ordering of supplies, problem solve, and make patient care decisions if necessary. The charge nurse is usually the most senior nurse working the shift; thus there is no formally trained charge nurse on each shift.

During the times that the Matron was on the unit, nurses referred various issues to her for intervention. The presence of the Matron on the unit did have a positive impact on staff productivity and staff behaviour with patients. The Matron was able to push for admissions to be processed faster, and was more assertive than most of the staff nurses in assessing sicker patients and making "nursing" decisions (such as starting an IV on a semi-comatose patient). During the brief time that the Asst. Matron was on duty in the CD, he was also able to co-ordinate patient care and assisted with routine duties in the CD observation ward.

Staff meetings were rarely held either as a forum to air grievances or review new procedures and policies. Continuing education specific to the CD was infrequent. According to staff interviewed, routine or annual performance evaluations were not given.

Nursing Department Policies, Procedures, Guidelines

Written policies and procedures guiding nursing practice in the CD do not exist. Administrative guidelines were said to be available for annual leave, compassionate leave, maternity leave and such. Written and available job descriptions for each cadre of nursing and support staff are not available. There are no annual reviews of critical procedures and policies (such as evacuation procedures, disaster drills etc).

Recommendations

- Supervisory staff (Matrons) spend more time in the CD. The presence of the supervisory staff did promote a more positive nurse - patient climate, as well as encouraged greater staff productivity.
- Supervisory staff holds monthly staff meeting for all three shifts with a specific agenda of discussion.
- Central nursing service produces job descriptions for each cadre of employee and for specialty unit staff.
- Job descriptions should be used as an evaluation tool to review employee performance annually.
- Policies for administrative issues specific to the CD be developed by CD management staff and shared with all CD staff i.e. patient transfer to another facility, policy for admission (admission criteria), policy for referrals, etc.
- Standards of Care (procedures) should be developed for CD specific interventions to be used to guide staff performance, orientation of new staff, and quality assurance audit review. These are supplemental to general nursing department Standards of Care. Such topics as diagnostic paracentesis, intraosseous infusion, splinting of fractures are samples of procedure standards to be developed.
- Department management staff should formulate quality assurance program for the CD. For example, staff may want to monitor time of registration and time of disposition of patient to determine length of time in CD.
- An acuity rating scale should be developed and each patient rated at the time of admission or discharge by the CD nurse. Evaluating the acuity scale is one tool useful in determining cost of CD care. Usually a four level acuity scale is initiated, with determining criteria such as time spent with nurse, number of treatments - interventions, amount of time for discharge teaching, etc. used to assign an acuity level.

I. Disaster Preparedness and Response

Several disaster incidents have occurred in Kenya in the recent past increasing the awareness for a strong disaster preparedness and response program within the community. The Likoni Ferry disaster, the Nairobi U.S. Embassy bombing, and the Kenya Railways derailment at Taveta are examples of recent mass casualty incidents/disasters.

A multi-casualty incident occurred during the period of this assessment. First hand observation of the CD staff response to the arrival of about 15 injured patients secondary to a road traffic accident (RTA). The quick response of the CD staff was admirable, with everyone providing assistance and care to the injured. Basic supplies such as IV cannulas and fluids were readily available, as were suture supplies and wound dressing materials. Additional staff were pulled from the wards; nurses, MOs, COs and students arrived to assist the CD staff in providing emergency treatment. Within a relatively short period of time, most of the patients had been assessed; given basic emergent care; and either discharged or admitted.

Interviews with staff and unit managers highlighted the fact that at least one major multi-casualty incident occurs each fortnight or more frequently. Staffs in the CD and wards are familiar with such situations and can mobilise a quick response. Dr. Getambu assured me that there were written procedures for disaster response, however, they were not available at the time of our meeting.

While the CD department staff response to the multi-casualty RTA was commendable, there are areas where co-ordination, triage, patient care, and supply distribution could be improved.

Recommendations

- Supplies be organised onto one or two "trauma carts", so that these may supplement the unit resuscitation cart. Staff pulled multiple supplies out from a storeroom and placed them onto the countertops in the trauma area, and loaded additional supplies on a movable stainless steel table in the corridor. The Matron shuttled back and forth to move supplies from storage rooms into the central trauma areas. Trauma carts should be equipped with airway - breathing assist devices, large wound dressing supplies, splints, emergency instrument trays - tracheotomy, chest tube insertion, and minor instrument sets as well as additional suture sets and routine supplies. These carts are usually stainless steel carts on wheels, with four to five wire mesh shelves, about five or six feet high, five feet wide, and two feet in depth. Supplies are in bins and labelled for easy access. The cart is covered with a plastic drape, and routine inventory is taken to ensure availability of supplies when needed.
- CD registration should have numbered, prepared casualty records prepared. These disaster charts are numbered, with several consultation forms attached, as well as wrist-bands (ID bands), valuable envelopes, lab requisitions and other chart forms such as head injury sheet and observation sheets all clipped together for quick distribution as one packet to each victim. The CD staff distributes one packet to each victim as they arrive in the department and applies the numbered ID band. Blood can be drawn and sent to lab with the numbered requisition and documentation of patient condition can start immediately. The staff will not have to wait for the registration clerk to assemble charts.
- The CD MO or head CO takes charge to assign one person to triage all victims and determine priority cases to minimise a general free-for-all atmosphere. The lead practitioner should then assign each patient to a team of CO/Nurse.
- Trauma consumable supplies were available, but no fracture splints! Staffs were improvising with cardboard boxes to make impromptu splints. The time to prepare splints is not when the patient arrives at the CD. Even if "regulation" splints are not available, improvised splints can be constructed by staff during "down" time and reserved for trauma situations. Most mass casualty incidents involve fractures!
- Heavy-duty trauma gauze dressing material should be made available instead of the 90-meter gauze rolls that have to be unwound and cut (nobody has scissors!). CD or CSSD staff can cut the gauze rolls and make improvised large trauma dressings during "down" time and have them sterilised and put into drums.

- Vital signs: stethoscopes and sphygmomanometers to be available for every two patients for monitoring purposes. During the incident observed, not one patient had observations taken during the first one hour after arrival.
- A chart with Glasgow Coma Scale (GCS) should be available in each trauma cubicle. There are also standardised trauma scales in use as well. Each injured patient should be assessed according to the GCS and Trauma Scale on arrival, updated as needed and documented on their record.
- Resuscitation equipment and monitoring equipment for trauma care: oxygen, appropriate intubation equipment, pulse oximeter and suction, as well as ECG monitor for more acutely injured. A non-invasive automatic sphygmomanometer is also invaluable for continuous blood pressure and pulse monitoring.
- Security staff from other areas of the hospital should also respond to multi or mass casualty incident for crowd control.
- All CD staff attends BTLS course as well as select MOs and COs not assigned to CD. BTLS course to include review of START triage (Simple triage and rapid treatment) triage, See Appendix K.
- Select CD staff attends ATLS course.
- Establish a Hospital Disaster Committee with representatives from each hospital department. Each hospital department head (for lab, pharmacy, kitchen, CSSD, etc.) prepares a written department specific disaster plan as part of Hospital Disaster Program and reviews with all department employees.

VI. CONCLUSIONS

The quality of patient care at CPGH Casualty Department could be greatly enhanced by re-organising patient flow, the addition of nursing triage, continuous filtering of patients, and training in triage and nursing assessment. Improving the emergency nursing skills of the CD nurses, through the provision of training in Emergency Nursing Care and resuscitation will have a positive impact on patient care as well. Proposed renovations in the department, coupled with additional furniture and equipment, will make the flow of patients through the CD smoother, more timely, and assist in the provision of better care by all CD staff. More intense day-to-day supervision of nursing care and support staff will also improve patient satisfaction and the quality of care. While emergency medicine and nursing as specialties are not yet recognised in Kenya, the quality of emergency care would be enhanced if all staffs working in the CD were given training in resuscitation, trauma care, as well as basic concepts of emergency medicine and nursing.

Increasing the number of professional nurses, MOs and COs may not be viable at this time. However, the addition of support and auxiliary staff may be a less expensive alternative, providing assistance to the nursing cadre by eliminating many of the non-nursing and clerical duties that are performed by the nursing staff.

VII. IMPLEMENTATION PLAN

The recommendations made in this document are to be analysed by the administrative staff of CPGH, in concert with representatives of MSH and the MOH, to determine their

appropriateness in light of staffing, financial resources, and overall organisational improvement strategy.

It is unrealistic to develop an implementation plan of the proposed recommendations without significant input from MSH staff and CPGH administrative and clinical staff. The proposed training outline (Appendix F) is open to revision, with a time frame for implementation of priority courses to be set by the department management staff. The implementation of training programs is contingent on the availability of training resources and trainers.

Revision of nursing assignments and the initiation of triage is contingent on pre-requisite training in assessment and triage as well as the availability of certain diagnostic and assessment equipment. Once these mechanisms are ready, alterations in the flow of patients can be piloted and evaluated.

Major renovations are planned for the CD as well as the purchase of furniture and other assets. However, the provision of essential resuscitation, monitoring, and routine patient care equipment is most important in enhancing the effectiveness of training programs.

Nursing Service Department should also re-evaluate its method of unit supervision, since a critical element in the success of the CD improvement strategy is closer supervision of nursing and support staff performance.

VIII. CONTACTS at CPGH

Hospital Administrator	Dr. E. Getambu
Director Clinical Services	Dr. Mwangi
Hospital Matron	Ms. M. Ndongo
Acting Hosp. Matron	Ms. T. Mbukugu
Casualty Matron	Ms. E. Nyagah
Casualty Asst. Matron	Mr. Ngonga
Director of Casualty	Dr. Calleb
Casualty MO	Dr. Muita
Casualty MO	Dr. Jari
Casualty Senior CO	Mr. Ikenya
Casualty CO	Ms. Seje
Casualty CO	Ms. Eisha
Orthopedic Technician	Mr. Karissa
Orthopedic Tehcnician	Mr. Mzae
O.T. Matron	Ms. Likoyi
CSSD Matron	Ms. Z. Yusuf
Pharmacy In Charge	Mr. S. Maina
ICU Matron	
Laboratory In Charge	
Casualty Registration Clerk	
24 Casualty KRN and ECNs	

APPENDIX A

SCOPE OF WORK

APPENDIX B

ACTIVITY SCHEDULE – GEORGIANNA PLATT

COAST PROVINCE GENERAL HOSPITAL

ACCIDENT & EMERGENCY SERVICES (CASUALTY DEPARTMENT ASSESSMENT)

Date/Time	Place	Activity/Appointment	Intended purpose
Day 1 – 26/5/99	Travel to Mombasa	Met with J. Clark J. Kamau	Review scope of work/admin. Orientation
Day 2 – 27/5/99	CPGH		
9:00 AM	Administrator's Office	Met with Dr. Getambu Dr. Calleb	Review of scope of work, assessment activities
10:00 AM	Casualty	Met with Matron Nyaga, S/N Ngonga	Review scope of work/assessment activities
11:00 AM		Tour of Casualty/Introduction to Staff	Familiarization with physical layout of department
12:00-3:00 PM		Observation of ward activities/shift handover	
3:00- 5:00PM		Observe afternoon shift activities	
Day 3 28/5/99	CPGH Casualty	Observed ward routines	Determine staffing levels of professional and support staff
9:00 AM- 5:30 PM		Accompanied staff on admission Interviewed day shift staff Interview ward charge nurse – Matron Mr. Ngonga	Assessed admission proced ure

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<p>Day 4 29/5/99 10:00 AM – 3:00 PM</p>	<p>CPGH Casualty</p>	<p>Observed ward routines Injection room Orthopedic room Minor Theatre Reviewed ward records</p>	
<p>Day 5 31/5/99 10:00 AM – 5:30 PM</p>	<p>CPGH Casualty</p>	<p>Observed ward routines ICU Radiology Lab Reviewed role of support staff</p>	
<p>Day 6 1/6/99 12:00 – 8:00 PM</p>	<p>CPGH All patient wards</p>	<p>Observed Hospital Matron with House Coverage for Holiday All wards Observed Nursing Supervisors Handing over reports</p>	
<p>Day 7 2/6/99 9:00 AM- 4:00 PM</p>	<p>CPGH Casualty</p>	<p>Observed ward routines Observed M.O. / RCO on duty Interviewed M.O. Dr. Jari Met with Dr. Getambu Dr. Calleb, Matron Nyagah Reviewed department records – census/staffing ratios</p>	<p>Reviewed preliminary finding</p>

APPENDIX B - Page 3

Day 8 3/6/99 10:00 AM – 4:30 PM	CPGH Casualty	Complete records review (census/staff ratios) Group Discussion – Training needs – Day Shift	
Day 9 4/6/99 8:00 AM – 2:00 PM 2:30 PM- 9:00 PM	Hotel CPGH Administrators Office Casualty Dept.	Prepared preliminary report Met with Dr. Getambu, Dr. Calleb, Matron Nyaga – reviewed preliminary report findings Observed CO and MO Casualty department	
Day 10 5/6 10:00 AM - 1:00 PM	Casualty Depart.	Reviewed proposed CD renovations with Dr. Getambu and Dr. Calleb Observed CD staff	
Day 11 7/6/99 10:00 AM- 6:00 PM	CPGH Casualty	Observed CD staff routines	
Day 12 8/6 - 9/6/99 7:30 PM - 2:00 AM	CPGH Casualty Dept.	Met with night staff, observed CD night routines	
Day 13 9/6/99 2:00 PM - 10:00 PM	CPGH Casualty Department	Met with in-charge Pharmacy Observed Evening staff in CD	
Day 14 10/6/99 9:00 AM - 5:30 PM	CPGH Casualty	Met OT Matron, Hospital Matron, Lab In-Charge Observed CD staff	

APPENDIX B - Page 4

Day 15 11/6/99 10:00 AM - 6:00 PM	CPGH Casualty	Met with CD staff Observed admission process	
Day 16 12/6/99 11:00 AM - 4:00 PM	CPGH Casualty	Observed staff performance	
8:00 PM - 11:00 PM	Hotel	Prepared preliminary report for MSH and CPGH CD staff	
Day 17 14/6/99 9:00 AM - 4:30 PM	CPGH	Reviewed CD procedures Met with MSH representative	
Day 18 15/6/99 9:00 AM - 4:30 PM	CPGH	Met with Ward 10 staff, toured MCH facility Observed CD staff	
Day 19 16/6/99 8:00 - 10:00 AM	CPGH	Meet Casualty Matron Review assessment Review training plan Wrap up sessions with casualty staff Finalize assessment	
11:00	Travel to Nairobi		
12:30 - 1:30 PM	MSH Office	Met with MSH staff to finalise trip expenses	
5:00 - 8:00 PM	Travel Nairobi to Kakamega		
Day 20, 21, 22	Prepare final report		

APPENDIX C

**COAST PROVINCE GENERAL HOSPITAL
PROPOSED RENOVATIONS
ACCIDENT AND EMERGENCY DEPARTMENT
(CASUALTY DEPARTMENT)**

APPENDIX D

TRAUMA - RESUSCITATION EQUIPMENT AND SUPPLIES

	Quantity
1. Equipment (Major Asset)	
a. Cardiac monitor - table top model	2
b. Pulse oximeter - portable or table top model.	2
c. Monitor/defibrillator with external pacing module	1
d. Volume cycle ventilator	1
e. Blood gas analyser (if not available in lab)	1
f. Stretcher, hydraulic adjustable	2
g. Portable/mobile lamp	2
h. Portable x-ray machine	1
i. Suction machines (if wall suction not available)	3
j. Fluid warmer	1
k. X-ray view boxes	3
2. Instrument sets (available on trauma cart, in trauma room)	
a. Chest set - for thoracentesis, chest tube insertion	
b. Minor surgical set - for cutdowns, major suturing, DPL open technique	3
c. Tracheotomy set	1
d. Surgical cricothyroidotomy set	1
3. Respiratory Resuscitation Equipment/Supplies	
a. Ambu bags (bag, valve, mask devices) - adult	6
b. Ambu bags - paediatric	4
c. Disposable face masks for ambu bags, adult/paediatric	20
e. Oral airways: Guedel # 3 (adult small x 4), Guedel #4 (adult medium x 6) Guedel #5 (adult large x 4), paediatric sizes (0 - 4)	
f. Nasopharyngeal airways: adult large 8-9 i.d., adult medium, 7-8 i.d., Adult small, 6-7 i.d. x 4 of each	
g. Laryngoscope set - adult blades (curved/straight), paediatric set (straight blades)	
h. Endotracheal tubes, adult sizes 6.5 - 8 mm i.d. x 4 of each	
i. Intubating malleable stylets	5
j. Endotracheal tube holders or adhesive tape	
k. Magill forceps	2
l. Oxygen tubing, disposable face masks, oxygen cannulas	
m. Syringes for inflating ET cuff (10 - 12 ml)	
n. Oxygen flowmeters	
o. Oxygen tank	
p. Suction catheters - disposable flexible catheter, tonsil suction tip (Yankeur)	

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4. Chest trauma management supplies/equipment

- a. Chest tubes without trocars - assorted sizes 28 Fr. - 38 Fr. X 4 each size.
- b. Underwater seal device or Heimlich valve (flutter valves) with appropriate connecting tubing.
- c. Minor instrument set (see above)
- d. Needles - #14-gauge over-the-needle catheters, 5 cm long for needle decompression of the chest.
- e. Needles - #18-gauge over-the-needle catheters, 12-15 cm long for pericardiocentesis
- f. Swabs, disinfectant, gauze, paraffin gauze, dressing supplies
- g. Silk suture material 2-0 and 3-0 with cutting needle and taper needle
- h. Syringes/lidocaine, 25ga and 21 ga needles
- i. Surgical blades (#10 and #11 blades)

5. Routine patient care supplies - trauma

- a. Foley catheters/drainage bags
- b. N/G tubes, connecting tubes (to connect to suction device)
- c. Water soluble lubricant
- d. Trauma dressings (large absorbent sterile gauze dressings)
- e. Splints - long leg, short leg, long arm, short arm
- f. Hare traction device
- g. Crepe bandages (to apply splints)
- h. Semi rigid cervical collars, small, medium, large
- i. Backboard with neck/head immobilisation pillows
- j. Scoop stretcher
- k. ECG electrodes
- l. ECG recording paper
- m. Sterile gloves - assorted sizes
- n. Un-sterile latex gloves, med/large
- o. Syringes - 2ml, 5ml, 10ml
- p. Needles, 25ga, 18ga, 21ga
- q. Butterfly needles
- r. IV cannulas
- s. IV Fluids
- t. IV arm boards
- u. Adhesive tape
- v. Sterile gauze
- w. Unsterile gauze (rolls, swabs)
- x. Trauma/disaster charts

6. Paediatric Specialty Equipment/Supplies

- a. Braslow's tape (colour coded tape with weight/size guides for infant, child resuscitation)
- b. Endotracheal tubes - 2.5, 3.0, 3.5, 4.0, 4.5, 5.0 mm sizes.
- c. Laryngoscope set with straight blade # 1

APPENDIX D - Page 3

- d. Stylet
- e. Infant and child size oxygen masks
- f. Ambu bag with infant/child size disposable masks
- g. Butterfly needles, 23, 25 ga.
- h. IV cannula 24, 22, 20 ga.
- i. Intraosseous or bone marrow needles
- j. 8, 10, 12 Fr. urinary catheters, drainage bags
- k. paediatric urine collection bags
- l. suction catheters, 8, 8, 10, 14 Fr.
- m. Oral airways #0 - 4

7. Emergency Drugs

- a. Adrenaline (epinephrine)
- b. Atropine
- c. Lidocaine
- d. Sodium bicarbonate
- e. Calcium chloride
- f. Magnesium
- g. Dopamine
- h. Isoproterenol
- i. Furosemide
- j. 50% Dextrose
- k. Normal saline diluent

APPENDIX E

STANDARDS OF EMERGENCY NURSE PRACTICE

NURSING PROCESS

1. TRIAGE NURSE

- a. Immediately and rapidly assesses patient on presentation to the CD.
- b. Documents patient complaints, past medical history, vital signs, allergies, medications, and other pertinent information.
- c. Determines patient priority and the appropriate location for further evaluation.
- d. Administers first-aid and other triage nursing interventions.
- e. Continuously monitors patient until further placement.
- f. Keeps family and significant others informed of patient's status and progress while in the CD.

2. PATIENT CARE NURSE

- a. Places patient into appropriate treatment area within the CD (if this is not done by triage nurse).
- b. Conducts secondary and systems evaluation of the patient.
- c. Utilises standards of care developed and approved by the department.
- d. Co-ordinates patient care with the CD physician or CO.
- e. Evaluates the effectiveness of nursing and medical interventions.
- f. Educates patient and family regarding the patient's illness or injury.
- g. Develops a plan for patient discharge or co-ordinates patient admission.
- h. Reviews discharge instructions with the patient and family member.
- i. Validates patient understanding of follow-up information.
- j. Documents patient understanding of the discharge instructions.

APPENDIX F

TRAINING PROGRAM

CASUALTY DEPARTMENT STAFF

COURSE	NO. OF HOURS/DAYS	PARTICIPANTS
Basic Life Support - CPR	2.5 days (20 hours)	All MO, CO, Nurses
Cardio-pulmonary Resuscitation (CPR) Patient Extrication/transport	8 hours	All non-professional staff (registration clerks, cleaners, attendants)
Triage - Nursing Assessment	40 hours	All CD nurses
ECG Course	40 hours	All CD nurses, MO, CO
Basic Trauma Life Support (BTLS)	16 - 20 hours	All CD staff (MO, CO, Nurses)
Advanced Cardiac Life Support (ACLS)	25 - 30 hours	All CD staff (MO, CO, Nurses)
Advanced Trauma Life Support (ATLS)	25 hours	All MO, CO, select nurses
Paediatric Advanced Life Support (PALS)	16- 20 hours	All MO, CO, select nurses
Emergency Nurse Training Program	160 hours	All CD nurses
Basic Life Support Instructor Course	16 hours	Select staff (MO, CO, Nurses) with instructor potential
Advanced Resuscitation Instructor Course (ACLS and PALS)	16 - 20 hours	Select staff (MO, CO, Nurses) with instructor potential

APPENDIX G

Coast Provincial General Hospital
Casualty Department Census - Staff Comparison

Page 1

Month - April 1999	Fri 9/4				Sat 10/4				Sun 11/4				Mon 12/4				Tues 13/4				Wed 14/4				Thur 15/4			
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total
Patients	36	45	58	139	32	150	58	240	38	124	62	224	37	71	97	205	40	55	64	159	40	64	56	160	40	68	59	167
Admitted	20	7	19	46	13	7	14	34	18	10	16	44	18	7	19	44	24	9	22	55	30	3	31	64	21	5	18	44
Referrals	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	1	1
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deaths in Cas	0	0	0	0	0	0	0	0	0	0	1	1	0	3	0	3	0	0	0	0	0	1	0	1	0	0	0	0
Theatre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1	0	0	1
G/E	6	0	0	6	3	3	1	7	1	4	2	7	3	2	2	7	5	1	2	8	3	4	0	7	7	8	5	20
No. of Nurses	3	9	8		3	7	8		3	5	6		3	7	7		3	6	7		3	9	7		3	7	8	

	Fri 16/4				Sat 17/4				Sun 18/4				Mon 19/4				Tues 20/4				Wed 21/4				Thur 22/4			
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total
Patients	35	68	59	162	51	95	64	210	35	128	66	229	35	66	80	181	35	46	63	144	29	68	46	143	23	62	65	150
Admitted	20	8	18	46	25	12	20	57	22	16	22	60	17	10	38	65	23	10	13	46	19	15	26	60	15	11	26	52
Referrals	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	3	0	0	0	0	0	0	0	0
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deaths in Cas	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1	1	1	1	3	0	0	0	0	0	0	0	0
Theatre	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1
G/E	3	4	5	12	8	0	0	8	0	5	0	5	4	4	2	10	2	2	3	7	4	3	3	10	3	4	5	12
No. of Nurses	3	7	6		3	4	4		3	5	4		3	6	5		3	7	7		3	9	8		3	9	6	

	Fri 23/4				Sat 24/4				Sun 25/4				Mon 26/4				Tues 27/4				Wed 28/4				Thur 29/4			
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total
Patients	27	58	61	146	35	58	61	154	35	109	48	192	21	90	41	152	24	59	55	138	34	77	62	173	29	59	43	131
Admitted	23	13	17	53	17	13	17	47	17	6	13	36	15	7	16	38	9	9	23	41	24	10	31	65	18	12	20	50
Referrals	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deaths in Cas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	1	0	0	0	0
Theatre	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
G/E	3	4	6	13	7	4	6	17	7	6	8	21	7	2	2	11	2	0	2	4	2	1	1	4	1	2	1	4
No. of Nurses	3	10	7		3	6	6		3	6	6		3	8	7		3	8	8		3	6	6		3	8	8	

Month - May 1999	Fri 30/4				Sat 1/5				Sun 2/5				Mon 3/5				Tues 4/5				Wed 5/5				Thur 6/5						
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E
Patients	13	65	42	120	31	100	69	200	30	98	143	271	28	68	65	161	25	60	75	160	46	62	75	183	30	44					
Admitted	6	9	13	28	10	8	13	31	17	9	29	55	11	4	24	39	20	18	20	58	21	12	27	60	15	12					
Referrals	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3	3	1	1					
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Deaths in Cas	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	2				
Theatre	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	1					
G/E	3	3	5	11	3	5	4	12	3	4	5	12	5	5	0	10	0	2	2	4	4	4	6	14	5	3					
No. of Nurses	3	9	9	0	3	6	6		3	6	6		3	6	5		3	6	7		3	6	5		3	6	6				

	Fri 7/5				Sat 8/5				Sun 9/5				Mon 10/5				Tues 11/5				Wed 12/5				Thur 13/5						
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E
Patients	36	73	48	157	32	105	56	193	34	103	60	197	54	65	66	185	30	51	70	151	36	60	72	168	39	58	50	147			
Admitted	32	7	32	71	18	18	21	57	16	10	22	48	16	7	19	42	11	8	22	41	16	8	15	39	15	8	31	54			
Referrals	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	1	3	2	0	0	2			
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Deaths in Cas	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	1	1	0	0	2	2	1	0	0	1			
Theatre	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
G/E	4	3	2	9	4	4	3	11	3	3	2	8	3	5	6	14	6	2	2	10	3	2	0	5	0	1	2	3			
No. of Nurses	3	6	5		3	5	4		3	4	4		3	6	6		3	5	5		3	6	4		3	5	5				

	Fri 14/5				Sat 15/5				Sun 16/5				Mon 17/5				Tues 18/5				Wed 19/5				Thur 20/5						
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E
Patients	30	58	50	138	36	157	59	252	35	64	60	159	55	78	49	182	55	59	54	168	38	48	50	136	35	53	48	136			
Admitted	6	13	31	50	21	13	19	53	18	6	15	39	17	13	15	45	21	15	16	52	21	8	24	53	23	8	22	53			
Referrals	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	1	3	1	0	0	1	0	0	0	0			
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Deaths in Cas	0	1	0	1	0	0	0	0	0	2	0	2	0	1	0	1	1	0	1	2	0	0	0	0	0	0	0	0			
Theatre	0	1	0	1	0	0	0	0	2	0	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1			
G/E	3	4	2	9	7	10	1	18	3	3	0	6	6	3	8	17	2	2	4	8	3	2	2	7	2	2	3	7			
No. of Nurses	3	7	6		3				3	5	5		3	6	5		3	4	4		3	4	4		3	5	5				

	Fri 21/5				Sat 22/5				Sun 23/5				Mon 24/5				Tues 25/5				Wed 26/5				Thur 27/5			
	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total	N	D	E	Total
Patients	50	56	38	144	45	132	79	256	35	42	54	131	35	51	61	147	25	42	60	127	31	65	62	158	23	64	54	141
Admitted	30	11	16	57	24	10	43	77	15	9	21	45	19	10	25	54	19	21	23	63	22	14	20	56	22	12	14	48
Referrals	0	0	0	0	0	2	0	2	0	0	1	1	0	1	0	1	1	0	2	3	0	0	0	0	0	0	1	1
BID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deaths in Cas	1	0	0	1	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1
Theatre	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	1	1	2	0	0	0	0	1	1	1	3
G/E	4	7	7	18	2	2	5	9	1	3	4	8	4	5	6	15	6	4	1	11	2	2	2	6	2	1	1	4
No. of Nurses	3				3	5	5		3	4	4		3	7	7		3	5	6		3	6	6		3	5	5	

Average No. Pt. Seen in CD	Friday				Saturday				Sunday				Monday				Tuesday				Wednesday				Thursday			
	143				215				200				173				149				160				145			
Average No. Pt. Seen by Shift	N	D	E		N	D	E		N	D	E		N	D	E		N	D	E		N	D	E		N	D	E	
	32	60	50		37	113	64		34	95	70		38	70	65		33	53	63		36	63	60		31	58	53	
Average No. Pt. Admitted by Shift	N	D	E		N	D	E		N	D	E		N	D	E		N	D	E		N	D	E		N	D	E	
	19	10	21		18	11	21		17	9	21		16	8	20		18	13	20		22	10	25		18	10	22	
Average No. Nurse	N	D	E		N	D	E		N	D	E		N	D	E		N	D	E		N	D	E		N	D	E	
	3	8	6		3	5.5	5.5		3	5	5		3	6.5	5		3	5.8	6.2		3	6.5	5.7		3	6.4	6	

PATIENT/NURSE RATIO			
	DAYS	EVENINGS	NIGHTS
Patient to Nurse Ratio	11.5	10.6	11.5
Pt. Admission to Nurse Ratio	1.6	3.7	6.1

APPENDIX H

CASUALTY DEPARTMENT EQUIPMENT ON ORDER

1. Stretchers	8
2. Trolley, general purpose	5
3. Bucket, stainless steel	10
4. Suction units	2
5. Bin, flip, stainless steel	3
6. X-ray viewer	2
7. Diagnostic instrument set	2
8. IV stands	5
9. Spot light	1
10. Trolley, dressing	2
11. Wheel chairs	5
12. Work table	1
13. Basins, stainless steel	5
14. Electric plaster saw	1
15. Kick buckets	3
16. Autoclave, table top	1
17. Cupboard	1

APPENDIX I

EMERGENCY NURSE TRAINING

CORE CURRICULUM

I. ABDOMINAL EMERGENCIES

1. Abdominal Emergencies - general approach to abdominal emergencies
2. Specific abdominal emergencies
 - a. Gastritis, ulcers
 - b. Bowel obstruction
 - c. Gastro-enteritis
 - d. Intussusception
 - e. Appendicitis
 - f. Pancreatitis
 - g. Liver injuries
 - h. Varices
 - i. Splenic injuries

II. CARDIOVASCULAR EMERGENCIES

1. Specific Medical - Cardiovascular Emergencies
 - a. Angina
 - b. Myocardial infarction
 - c. Congestive cardiac failure/pulmonary oedema
 - d. Cardiac dysrhythmias
 - e. Malignant hypertension
 - f. Pericarditis/endocarditis
 - g. Acute arterial occlusion
 - h. Venous thrombosis
2. Surgical Cardiovascular Emergencies
 - a. Cardiac contusion
 - b. Cardiac tamponade
 - c. Arterial trauma

I. DENTAL, EAR, NOSE, AND THROAT EMERGENCIES

1. Dental
 - a. Fractured tooth
 - b. Abscess
 - c. Post-extraction bleeding
2. Ear
 - a. Acute otitis media
 - b. Acute otitis externa
 - c. Ruptured tympanic membrane
 - d. Foreign body in the ear
 - e. Meniere's disease

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3. Nose
 - a. Epistaxis
 - b. Nasal fracture
 - c. Foreign body nose

4. Throat
 - a. Infections
 - b. Fractured larynx
 - c. Peritonsillar abscess
 - d. Foreign body

IV. ENVIRONMENTAL EMERGENCIES

1. Heat related emergencies
2. Burns
3. Inhalation injury
4. Electrical injury
5. Chemical injury
6. Hazard material emergencies

V. FACIAL EMERGENCIES

1. Temporomandibular joint dislocation
2. Bell's palsy
3. Trigeminal neuralgia
4. Facial lacerations, soft tissue injuries
5. Mandibular, maxillary fractures
6. Zygomatic fractures

VI. GENERAL MEDICAL EMERGENCIES

1. General medical emergencies
 - a. Hepatitis
 - b. Meningitis
 - c. Pertusis
2. Endocrine emergencies
 - a. Diabetic Ketoacidosis
 - b. Hyperglycemic Hyperosmolar Nonketotic Coma
 - c. Hypoglycemia
 - d. Thyroid storm
3. Fluid and Electrolyte emergencies
 - a. Dehydration

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- b. Electrolyte imbalances

- 4. Hematological emergencies
 - a. Haemophilia
 - b. Sickle cell crisis

- 5. Other medical emergencies
 - a. Alcoholic ketoacidosis
 - b. Coma
 - c. Fever
 - d. Malaria

VII. GENITOURINARY - GYNECOLOGICAL EMERGENCIES

- 1. Genitourinary emergencies
 - a. Urinary tract infections
 - b. Pyelonephritis
 - c. Urinary calculi
 - d. Testicular torsion
 - e. Epididymitis
 - f. Ruptured bladder
 - g. Renal trauma

- 2. Gynaecological emergencies
 - a. Pelvic inflammatory disease
 - b. Vaginal bleeding
 - c. Sexual assault

VIII. NEUROLOGICAL EMERGENCIES

- 1. Medical neurological emergencies
 - a. Headache - migraine
 - b. Cerebrovascular Accidents
 - c. Seizures

- 2. Surgical neurological emergencies
 - a. Increased intracranial pressure
 - b. Concussion
 - c. Epidural hematoma
 - d. Subdural hematoma
 - e. Subarachnoid haemorrhage
 - f. Spinal cord injuries
 - g. Skull fractures

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IX. OBSTETRICAL EMERGENCIES

1. Abortion
2. Placenta previa and abruptio placentae
3. Pregnancy induced hypertension
4. Postpartum haemorrhage
5. Ectopic pregnancy
6. Trauma in pregnancy
7. New-born resuscitation

X. OCCULAR EMERGENCIES

1. Medical ocular emergencies
 - a. Conjunctivitis, iritis
 - b. Glaucoma
2. Surgical ocular emergencies
 - a. Corneal abrasion
 - b. Extraocular foreign bodies
 - c. Retinal detachment
 - d. Orbital fractures
 - e. Chemical burns
 - f. Eyelid laceration
 - g. Globe rupture

XI. ORTHOPEDIC EMERGENCIES

1. Soft tissue emergencies
 - a. Contusions
 - b. Strains/sprains
2. Emergencies of bony structures
 - a. Dislocations
 - b. Fractures
 - c. Traumatic amputations
3. Life threatening complications associated with orthopaedic injuries
 - a. Haemorrhage from fractures
 - b. Fat embolism syndrome
 - c. Compartment syndrome

XII. PSYCHIATRIC EMERGENCIES

1. Anxiety/panic
2. Depression
3. Suicide
4. Violent behaviour
5. Psychotic behaviour
6. Situational crisis

XIII. RESPIRATORY EMERGENCIES

1. Medical respiratory emergencies
 - a. Adult respiratory distress syndrome
 - b. Asthma
 - c. Acute bronchitis
 - d. Croup - laryngotracheobronchitis
 - e. Acute epiglottitis
 - f. Pneumonia
 - g. Pulmonary embolism
2. Surgical respiratory emergencies
 - a. Rib fracture
 - b. Flail chest
 - c. Pneumothorax
 - d. Hemothorax
 - e. Open pneumothorax
 - f. Pulmonary contusion
 - g. Esophageal disruption
 - h. Ruptured bronchus, trachea, diaphragm

XIV. SHOCK EMERGENCIES

1. Hypovolemic shock
2. Cardiogenic shock
3. Septic shock
4. Neurogenic shock
5. Anaphylactic shock

XV. SURFACE TRAUMA EMERGENCIES

1. Lacerations
2. Abrasions
3. Contusions
4. Avulsions

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5. Digit amputation
6. Puncture wounds
7. Foreign bodies
8. Bites and stings
 - a. Human bites
 - b. Animal bites
 - c. Snake bites
 - d. Aquatic organisms
9. Wound related infections

XVI. TOXOLOGICAL EMERGENCIES

1. Carbon monoxide poisoning
2. Salicylate poisoning
3. Sedative/hypnotic poisoning
4. Iron poisoning
5. Acid and alkali burns
6. Heavy metal poisoning
7. Petroleum distillate poisoning
8. Organophosphate poisoning
9. Bacterial food poisoning

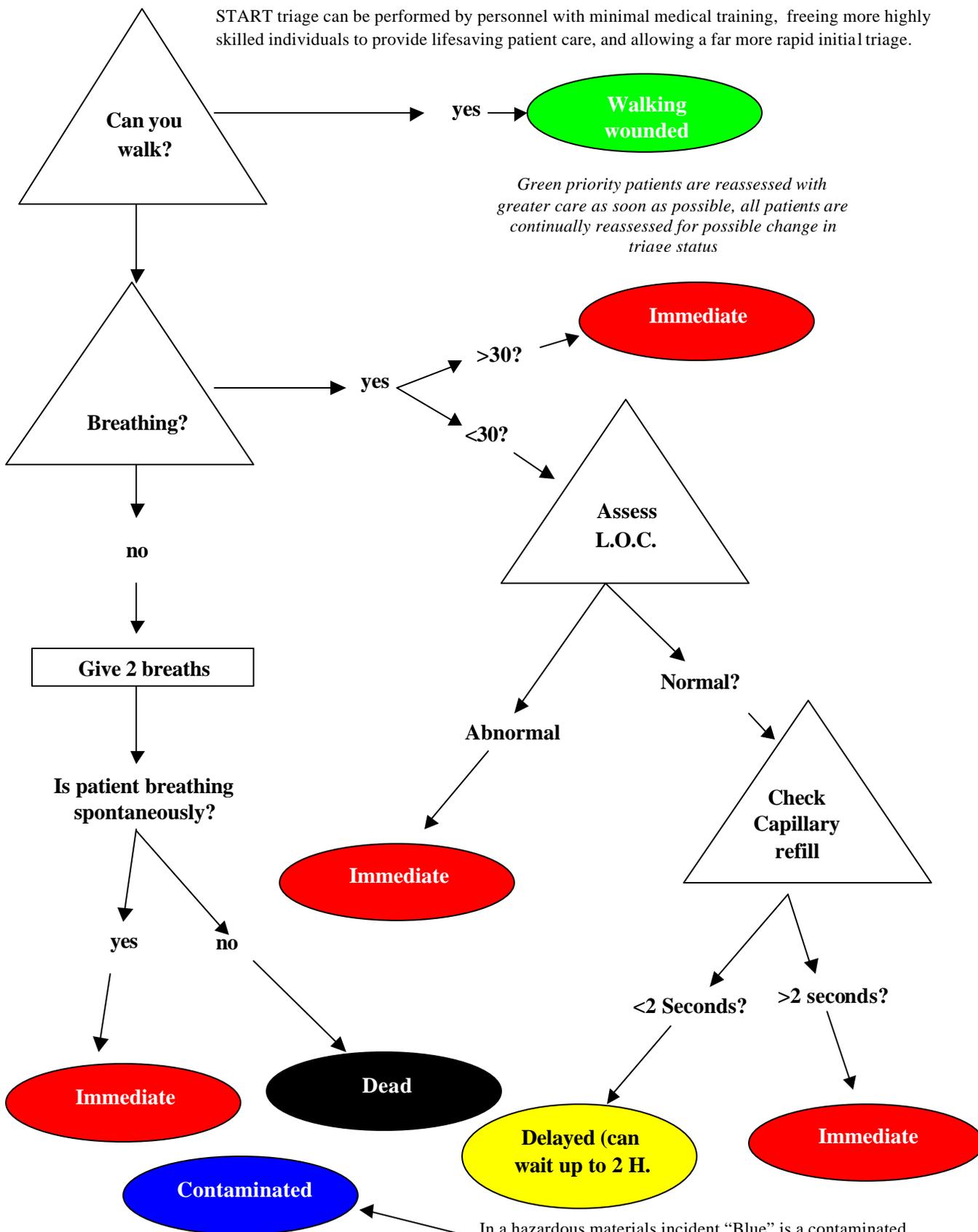
APPENDIX J

TRIAGE AND PATIENT ASSESSMENT

TOPIC	DETAILED CONTENT	HOURS
Triage	Triage Models Non-disaster Triage Model Disaster Triage Model	2 hours
Patient Assessment	Primary Assessment <ul style="list-style-type: none">• Airway• Breathing• Circulation• Cervical spine Secondary Assessment <ul style="list-style-type: none">• Subjective Data• Objective Data Focused Assessment Nursing Process <ul style="list-style-type: none">• Assessment• Nursing Diagnosis• Planning/Interventions• Expected outcome/Evaluation• Recording	12 hours
Respiratory Assessment	Percussion Auscultation - lung sounds	5 - 10hours
Cardiac Assessmert	Variations pulse, blood pressure	2 hour
Abdominal Assessment		2 hours
Skin/Wound Assessment		2 hours

START: (Simple Triage And Rapid Treatment) Triage

START triage can be performed by personnel with minimal medical training, freeing more highly skilled individuals to provide lifesaving patient care, and allowing a far more rapid initial triage.



Green priority patients are reassessed with greater care as soon as possible, all patients are continually reassessed for possible change in triage status

In a hazardous materials incident "Blue" is a contaminated patient, requires special handling