RECOMMENDATIONS FOR INFECTION PREVENTION AND OUTBREAK CONTROL

Karl Heusner Memorial Hospital, Belize City, Belize

17/6/2013
Acknowledgments
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Special Thanks
To the Ministry of Health of Belize and Hospital authorities and staff from Karl Heusner Memorial Hospital

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PAHO/WHO
- Jorge Matheu, AMR surveillance Specialist, PAHO/WHO Washington DC
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### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>AMR</td>
<td>Antimicrobial Resistance</td>
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<tr>
<td>BHIS</td>
<td>Belize Health Information System</td>
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<td>CVC</td>
<td>Central Venous Catheter</td>
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<td>HAI</td>
<td>Health Care Associated Infection</td>
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<td>ICU</td>
<td>Intensive Care Unit</td>
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<td>ICP</td>
<td>Infection Control Program</td>
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<td>KHMH</td>
<td>Karl Heusner Memorial Hospital</td>
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<tr>
<td>NICU</td>
<td>Neonatal Intensive Care Unit</td>
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<td>MRSA</td>
<td>Methicillin Resistant <em>Staphylococcus aureus</em></td>
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<td>PAHO/WHO</td>
<td>Pan American Health Organization/World Health Organization</td>
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<tr>
<td>QC</td>
<td>Quality Control</td>
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<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
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<tr>
<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>VRE</td>
<td>Vancomycin Resistant Enterococcus</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Executive Summary

In response to an increased number of deaths in premature neonates occurring in Neonatal Intensive Care Unit at Karl Heusner Memorial Hospital (KHMH) between the 18th of April and May 20th, 2013, the National Health Authorities of Belize and the Pan American Health Organization agreed on the technical visit of a team of experts on infection prevention and control.

An analysis of the outbreak situation and assessment of the Infection Prevention and Control Program was conducted by a team of professionals from the Belize’s Ministry of Health in collaboration of the Infection Prevention and Control Program from KHMH on May 22, 2013. The assessment revealed several deficiencies on the supportive environment, policies and procedures in place, and the current practices for infection prevention and control. These findings were assessed by the team using the Pan American Health Organization Rapid Evaluation Guide for Hospital Programs for Prevention and Control of Nosocomial Infections, 2011.

Two consultants reviewed the information collected by the National Team, conducted rounds in specific areas of the Karl Heusner Memorial hospital and interviewed health care personnel about current practices of care.

In the first part of the document, (Part I), a description of the Infection Control Program, the environment of care at KHMH; managerial and technical support for the Infection Control Program; availability of standard operating procedures for infection prevention practices; lines of communication with supportive services such as the Microbiology Laboratory, Housekeeping Department and Pharmacy; and observation of health practices, are followed by recommendations. The second part, (Part II), contains the main conclusions of the report. In the Annex, a summary of findings with the recommendations are laid out as a proposed plan for the improvement of each elements of a program that lead to the reduction of health care associated infections in a sustainable manner as part of a consolidated Infection Prevention and Control Program as recommended by the World Health Organization. (1)
Background

In response to an increased number of deaths in premature neonates occurring in Neonatal Intensive Care Unit at Karl Heusner Memorial Hospital (KHMH) between the 18th of April and May 20th, 2013, the National Health Authorities of Belize and the Pan American Health Organization agreed on the technical visit of a team of experts on infection prevention and control. The purpose of the visit is to strengthen the capacity of the KHMH to investigate and contain the current outbreak in the neonatal intensive care unit and help assessing the Infection Prevention and Control Program, including the necessary microbiology support.

Karl Heusner Memorial Hospital with 150 beds is the largest hospital in the country and with the highest complexity. It is the referral establishment to six other public hospitals in the country for critical patient care in adults, pediatrics and neonates. Lately, with the support of a surgical team from abroad, open heart surgery is being performed on a campaign basis.

Infections associated with health care (nosocomial infections) pose a problem, affecting approximately one out of twenty hospital patients. (1) Lately, Enterobacter cloacae have emerged as an important pathogen in neonatal units, with several outbreaks of infection being reported in different countries. (2). A systematic review conducted in 2007 by the Institute for Medical Microbiology and Hospital Epidemiology, Medical School, Hannover, Germany found that bacteria member of the Enterobacteriaceae family were significantly more often responsible for NICU outbreaks, whereas non-fermenting bacteria was more frequently identified in other ICU types. In addition, it was found that in 48.6% of NICU outbreaks the authors were unable to identify the sources compared with 38.0% in other ICU outbreaks. (3).

Infection prevention and control programs have demonstrable benefits in reducing related morbidity and mortality and hospital costs. One of the best ways to improve the effectiveness of a program for prevention and control of infections is through systematic and rigorous evaluation of the structural, functional, and practical elements that have to be implemented in hospitals. (1)

An analysis of the outbreak situation and assessment of the Infection Prevention and Control Program was conducted by a team of professionals from the Belize’s Ministry of Health in collaboration of the Infection Prevention and Control Program from KHMH on May 22, 2013. The assessment revealed several deficiencies on the supportive environment, policies and procedures in place, and the current
practices for infection prevention and control. These findings were assessed by the team using the Pan American Health Organization Rapid Evaluation Guide for Hospital Programs for Prevention and Control of Nosocomial Infections, 2011.

Epidemiological situation

During the month of May 2013, 8 patients in the NICU were confirmed with clinical signs and symptoms of sepsis, having *E. cloacae* as the common pathogen in all cases, between 5\(^{th}\) and 17\(^{th}\) of this month. All these patients died. Under these circumstances the hospital authorities and the local Infection Control Committee initiated measures to mitigate further spread of the infection.

As an initial measure the immediate closure of the NICU was ordered, transferring the hospitalized newborns to one room in adult’s intensive care unit (ICU) and to a room in the pediatric ward. No new cases of sepsis among the hospitalized neonates have been described until

The local team established a case definition as “a newborn infant infected in the NICU between February and present May 2013, with clinical signs of sepsis and isolation of *Enterobacter cloacae* in blood culture”, starting a review through laboratory results for this period of time. Reviewing the information provided, medical charts and local epidemiological study, the outbreak should be restricted only to those patients infected during May 2013. A case in February 2013 carried a similar resistance pattern to the isolates of May, therefore there is a too wide span of time between that case and the latter to establish a clear link between them.

Of the cases confirmed in May, the first one detected on May 5\(^{th}\) and dead the same day had a high sensitivity pattern not totally comparable to the *E. cloacae* isolates of the other 6 cases confirmed afterwards, which do carry similarities with an extended multi drug resistance. The neonates affected had a gestational age from 30 to 34 weeks and a birth weight, ranging between 1300 and 1800 grams which confers them a high risk condition for acquiring a nosocomial infection with an uncertain prognosis.
I. On site study and findings

Meetings with the hospital authorities, local infection control team and on ground observation was the source for information on different aspects dealing with the outbreak and the current situation of the infection control program in the hospital in its different scopes. These findings are to be the standpoint from where recommendations will come up to enforce aspects that need to be modified or improved regarding structural considerations and the existence and compliance of processes to help preventing and controlling infections within the hospital.

1. Infection Control Program

An Infection Control Program is to be structured upon guidelines or regulations, training, surveillance and monitoring practices. These fields of concern once established and in regular practice in a hospital, give final results to be assessed in their impact on reducing infections, mainly through differences in specific nosocomial infection rates.

The Hospital has adopted de “National Guidelines on Infection Prevention and Control for Health Facilities” developed by the Ministry of Health that defines the organization to be set up for this program and matters dealing directly to infection control basic principles and areas of concern to be under their scope. The personnel responsible for Infection Control Program (ICP) in the hospital fall under the Quality Assurance Coordinator who reports to the CEO. This program includes an Infection Control Committee (ICC) with specific duties in surveillance, product review, policies and procedures and administration of the program.

The ICC has a physician assigned to it with no specific references as to weekly hours specially dedicated to ICP. In the time visiting the Hospital there was neither permanent nor partial participation of this professional with the external team from PAHO. There is an Infection Control Unit staffed with two infection control nurses, one of them with specific training. No written annual goals for ICP are known for the hospital.

There is evidence that the hospital staff in its different areas has been trained in basic principles for infection control and prevention since 2008, at a beginning as a very short introduction with a few hours of information and currently as a two days course. This training has been given to personnel on duty and to the newly hired entrants. There is no assessment of knowledge acquired in this training.
The ICC has not established an active surveillance process for specific infections according to local epidemiology. Hence the ICP has recently started working in criteria for these matters. There is no knowledge of rates of healthcare acquired infections (HAIs) being reported by the hospital. There is no reporting or definition of pathogens of epidemiological importance due to special resistance patterns or in relation to HAIs derived from community outbreaks. Recently they started defining type of infections to be under regular follow up and criteria to be used for diagnosis. There is no registered information regarding nosocomial infections aside from what is known through detection of outbreaks. Another area of development is a document meant to regulate use of antibiotics, currently in a draft that needs to be shared and consented by the healthcare professionals.

There have been sparse efforts in monitoring practices known to prevent and control nosocomial infections, not as part of an annual program that should cover different practices in different settings in the hospital (e.g., clinical wards, ICUs, operation rooms). A local assessment found out that there is investigation done monitoring compliance of processes included in injection safety standards outlined in the National Guidelines on ICP, defining strategies for improvement. Since there are no defined performance indicators, interventions applied do not obey to a unique pattern and as so are ad hoc and proved to be ineffective.

The lack of regular programs to be accomplished annually restricts the availability of information to assess impact on actions done, except for measures taken in outbreaks or cluster of infectious cases.

The ICP nurses have enforced compliance of measures for infection control and prevention mainly through posting of signs, warnings and alerts. There was no evidence shown regarding supervision in adherence to these measures by healthcare workers, either as a spontaneous activity or as part of an annual program.

2. Physical layout
The formal NICU was visited after it was closed for all clinical purposes. The space once assigned to hospitalized patients is restricted and favors overcrowding of patients and personnel, according to the demand for hospitalization being the reference NICU for the country. The area used as a clean area permanently had an assorted array of elements that endangered the processes to be held in that space. The circuit chamber area (electrical room) was used as a storage room, with piles of empty boxes adding a fire hazard to that zone. The air ducts according to pictures shown contained mold and other
environmental contaminants. The provision of sinks for hand washing seemed enough, considering adequate and regular provision of supplies of disposable paper towels and soap.

Two areas currently assigned for the newborns are reduced in size and cannot hold more than three patients each. Both of them, in ICU and maternity, are always kept with their doors closed and restriction for personnel entrance. This condition works as a barrier to potential contamination from the outside but makes it difficult viewing if prevention control practices are been accomplished at all times during patient assistance. Their limited spaces constrains the working areas, not facilitating procedures, forcing piling up materials, difficulty in adequate display and accessibility to elements needed to attend each newborn and increases the risk of non-compliance with infection prevention measures like proper hand hygiene. This requires a frequent supervision of the staff in labor.

False ceilings at different areas of the hospital, including one where two neonates were initially moved into, are either heavily damped or missing. During the visit there was work being done in some of these ceilings, next to critical patient areas with no physical barrier protection for them concerning dispersion of dust, bacteria and fungus spores.

3. Supportive areas
   a. Sterilization
   There is a Central Sterilizing Unit (CSU) responsible of reprocessing critical care reusable items using steam sterilizers. Washing of materials to be sterilized is done manually with no support of magnifying glasses to thoroughly check for organic matter. The sterilization process is being tested regularly through individual chemical strips and for biological agents to verify completion of the sterilization cycles. No Bowie Dick test is used. Sterile packages are labeled with expiry dates and stored in separate clean sterile storage area with restricted access. Flash autoclave is to be used in an emergency basis, not routinely, and it is kept in the sterilization area. Nowadays the CSU provides services to three regional Hospitals. There is no preventive maintenance program for the sterilization equipment. High level disinfection standards are in place, Cidex™, glutaraldehyde 2% is used in the CSU area to flush air tubing and soak respiratory equipment such as masks, which then are rinsed with sterile water, dried and packed. In the operating theater glutaraldehyde 2% is used for high disinfection of endoscopes in a room with inadequate ventilation, and no reports on air concentration of this compound.
b. Antiseptics and disinfectants
The National Guidelines describes in extent products to be used for cleaning and disinfection, in clinical settings there is regular use of acetic acid 1%, and acriflavin in spirit 0,4% which are not included in the guidelines. Both products are prepared in the hospital, with indications done by Pharmacy and dilutions done by Housekeeping staff with no evidence in monitoring these processes. Alcohol for cleaning purposes and for hand hygiene is also prepared locally in the same way as defined above for the other products. Exposure time for acetic acid was not verifiable.

c. Microbiology laboratory
The laboratory within the hospital does not have capability for culture and susceptibility microbiological tests, therefore the samples are processed in the Central Medical Lab (CML). The CML has the capacity to use automated identification systems (MicroScan) ® or commercial manual methods (API®), but lacks the supplies to run those tests in a routine basis. Due to the lack of supplies, since February, 2013 the lab has been using home-made manual methods for the identification of gram negative bacteria. Manual methods also limited the susceptibility reports to a few antibiotics. The manual methods for culture and sensitivity lacked quality control measures. Remaining media in stock was assessed by a Microbiologist expert revealing serious deficiencies on the media used during the outbreak situation. These findings might explain some of the results on the identification of microorganisms that was evidenced on the revision of records of patients. Different species of Enterobacter genus were isolated from same body sites on consecutive days on the same patients. In addition, different susceptibility pattern might be the result of inconsistencies on the media and not different infections by different strains of Enterobacter sp. with different susceptibility pattern. The laboratory capabilities and assurance as a resource to aid in the diagnostic of clinical infections and to assist in an epidemiological investigation are precarious and are compromising patient care.

The original specimens from the recent outbreak of E. cloacae were discarded due to the constrained space. Further testing and finger printing by pulse field gel electrophoresis that could have confirmed cross-transmission in the hospital environment could not be performed.

Preliminary reports of cultures the first 24 or 48 hours are restricted in its access to the medical staff, with information being delivered to the clinical areas in microbiology reports through BHIS after several days. ICP nurse has an access to this information via phone calls from the lab, and with special access to BHIS. 
4. Infection prevention and control practices

In rounds through the former neonatal intensive care unit, the new sites for newborns within the adults intensive care unit and maternity ward, the intensive care unit in itself, the pediatric ward, laboratory microbiology support and sterilization, several practices regarding infection prevention where looked over. From this observations arouse several highlights listed below that must be considered as priority matters for a proper development of the hospital ICP.

a. It is a regular practice seen in pediatrics and neonatology to prepare intravenous medications left in syringes for up to 48 hours. These syringes are piled up in a small container and are to be used for several patients up until their expiry date, which is labeled in a tape surrounding each syringe. This practice was already seen in the assessment done in August 2011, and was observed as a high risk practice. The only change observed since the first report was in shortening the expiry date from 7 days to 48 hours. **Being a high risk practice for patients (contamination) and for personnel (needle puncture) it should be eliminated.**

b. The former neonatology unit held up to 20 patients simultaneously, overcrowding the area and reducing the distance between patients to less than a meter. This condition favors cross contamination through personnel or parents visiting their newborns. **The areas for newborns to be placed until modifications and improvements are made in NICU, have to consider enough space to allow at least a distance of one meter in between patients.**

c. Hand hygiene is done mainly through hand washing. Dispensers with alcohol based solutions are not available at every site of patient assistance; in ICU is at the entrance, available for personnel and parents of patients. The dilution for this solution is established by Pharmacy using PAHO guidelines and is done by housekeeping staff. No monitoring of this process according to guidelines is being reported. **It is necessary for hand washing to provide regular and permanent supplies, regarding soap and disposable paper towels. The need of dispensers with alcohol based solutions for hand hygiene at patient bedside in intensive care units must be considered.**

d. Parenteral nutrition formulas are being prepared in the medication room in each intensive care unit. **This practice should be avoided and have this type of formula prepared in a central site for all the hospital, with strict protocols to be followed by trained professionals. This practice should be periodically monitored.**

e. The regular use of Acetic Acid 1% solution as skin disinfectant was observed. This compound is not included in the list of disinfectants in the Guidelines. It is prepared in the hospital with no reported monitoring of the process. **The use of this compound should be discarded.**
f. The regular use of Acriflavin 0.4% solution as skin disinfectant for central venous line site maintenance. This compound is not included in the list of disinfectants in the Guidelines. It is prepared in the hospital with no reported monitoring of the process. **The use of this compound should be discarded.**

g. Clean work areas frequently share space with areas processing used materials or waste, with certain delimitation between areas but with no clear compliance of staff on fully accomplishing their work in one area not sharing it simultaneously with the other. These spaces are also overcrowded with clean and used materials, with no certainty if they are not stored in a mixed way. **Efforts should be made in order to provide areas for clean work not to be shared with other procedures that may carry risk of contamination.**

h. Practice of triple hand gloving was seen in a respiratory therapist for handling a tracheal tube in a patient who said she was trained in Guatemala. The first pair of gloves was procedure gloves and the next two were sterile; the donning process did not assure that their sterile condition was maintained. She kept sterile material resting directly on a non-sterile surface, without laying out a sterile area with a drape. **This practice should be overlooked and corrected.**

i. Diluted chlorine solution is used to clean surfaces; formula is defined by Pharmacy and diluted by housekeeping staff. No monitoring of this process according to guidelines is being reported. Solution is kept in closed plastic bottles not labeled with product, neither dilution nor date it was prepared. **This practice should be overlooked and corrected, including it among practices that should be monitored.**

j. Work done in false ceilings was observed, right next to hospitalized newborn area without physical barriers to minimize risk of infection. **Any handling of false ceilings or remodeling areas, especially if it takes more than 4 hours or several days in areas next to critical care patients (e.g., immunosuppressed, oncological, surgical, NICU, PICU, ICU), must consider transferring patients to a safer area.** If not possible proper physical barriers should be installed to lessen risk of spreading dust, bacteria and fungus.

k. In sterilization a container is kept with glutaraldehyde 2%, said to be used for flushing air tubes and disinfecting respiratory masks, which are dried and packed. This container is placed in an area with no air extraction system, on a counter right next to basins where washing of materials is done, before packing and sterilization. No reports concerning environment concentrations of this compound are known. **This practice should be avoided, and be kept only for high disinfection of endoscopes in a properly designed area.**
All observations in infection prevention practices to be modified or avoided and for the purpose of improving compliance in prevention practices, reducing morbidity and mortality associated to health care associated infections (HAI), are included in an operational plan is proposed in the following chart.

II. Conclusions

During May 2013 seven premature infants in the neonatal intensive care unit acquired a bloodstream infection due to *Enterobacter cloacae* with a case fatality rate of 100%, with 6 of them sharing a presumably multi-resistant bacteria. This bacteria is part of the normal flora of the gastrointestinal tract in 40 to 80% of the population and widely distributed in the environment. Since this bacteria was isolated in blood samples and its transmission is via the oral-fecal route, the most plausible explanation for this infection is through contamination of any device for intravenous puncture or intravenous medication used in these patients. Their prematurity implies management with intravenous therapies permanently since their admission. The regular practice of using multi-dose syringes shared for many patients and kept in use for at least 48 hours confers a high risk of contamination by any handler. The revision done to the infection control program in place at Karl Heusner Memorial Hospital and Clinical Medical Laboratory revealed several aspects not included or insufficiently enforced that need to be urgently approached, developed and put into practice, namely:

1. Establish a strong support from the Hospital authorities to the Infection Control Program, including it as an important strategy for patient safety.
2. Consider a regular budget for infection control purposes such as training, provision of supplies and dissemination of information.
3. Appointment of a physician or experienced professional in Infection Prevention and Control with leadership skills permanently assigned with specific weekly hours for the infection control program.
4. Review the “National Guidelines on Infection Prevention and Control for Health Facilities”, including aspects not in place regarding some practices, include specific medical indications for urinary catheter and insertion of central venous lines, among other elements.
5. Settle a permanent active surveillance program for nosocomial infections to be defined locally, rendering periodical report of infection rates to Ministry of Health, hospital authorities and disseminate to healthcare professionals in the hospital. Assessment of results and if needed, according to outcomes, corrective measures should be installed.

6. Define a broader training program in prevention and control of health care associated infections including basic principles and specific infection control measures in accordance with the infections included in surveillance. This program should be developed by the ICP and supported by physicians and nurses in the hospital and a professional trained in infection control.

7. Establish an annual monitoring program of practices dealing with basic aspects of infection control and specific aspects related to infections under permanent surveillance. This program should be developed throughout the year, with a periodical analysis and report of the results in monitoring. This information should be known by the hospital authorities.

8. Ensure a permanent and continuous link from supportive areas such as Microbiology Laboratory, Sterilization and Housekeeping staff. These areas should have procedures to be monitored periodically including at least methods to obtain and transport microbiological samples from patients, cleaning of used material prior to sterilization, and dilution of compounds used as disinfectant or antiseptics.

9. Develop and implement a laboratory Improvement plan that supports the Infection Prevention activities.

10. Microbiology Laboratory chief should be a member of the Infection Prevention and Control Committee and support the surveillance needs.

11. Improve the capacity of laboratory staff, training them in QC measures, Microbiology methodologies, and public health surveillance.

12. Develop and implement quality control procedures for media cultures and bio-chemicals used for identification and susceptibility testing, and provide continuous supplies for automated methods for the identification and/or confirmation of pathogens found in CSF and Blood specimens.

13. Improve communication between the Microbiology lab, clinicians, and the Infection Prevention Control Unit for laboratory reportable events:

14. Cluster of positive findings from the same hospital location and notify or report the findings to Infection Prevention and Control Committee.
15. Establish an alert system to detect and notify microbiology findings, emerging pathogens and resistance mechanism to the epidemiology and IPCC member to take prompt actions.

From a nationwide perspective it is necessary to anchor this Program in the Ministry of Health to ensure its spreading and progressive inclusion in every hospital of the country. Hospitals should send periodical reports to the Ministry of Health concerning outcomes, mainly through rates of infections under surveillance, to establish and enforce or modify policies for its best accomplishment.
REFERENCES


"http://www.ncbi.nlm.nih.gov/pubmed?term=Doma%C5%84sk%20J%5BAuthor%5D&cauthor=true&cauthor_uid=23411624" Doma%C5%84ski J, HYPERLINK

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### SUMMARY OF RECOMMENDATIONS FOR INFECTION PREVENTION AND OUTBREAK CONTROL

**KARL HEUSNER MEMORIAL HOSPITAL**

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<tr>
<th>ICP PROGRAM ORGANIZATION</th>
<th>FINDINGS</th>
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<td></td>
<td>1. No evidence of the activities of the Infection Control Committee (ICC) as advisory committee to the Infection Prevention and Control program of KHMH. 2. The program is led by trained personnel but lacks direction and evaluation by the ICC.</td>
<td>1. Develop an Infection Prevention and Control Plan with annual goals and monitoring activities that are evaluated annually by the Infection Prevention and Control Committee. 2. The implementation of infection prevention improvement plan should be the responsibility of the hospital leadership and the infection prevention and control Committee. 3. The improvement plan should have a strategy for improving hospital wide communication of microbiological significant findings that address the communication with clinicians and the staff of IPC Department.</td>
<td>Responsible: • Management Team • Infection Control Committee</td>
<td>September 30th, 2013 For the development and implementation of the plan</td>
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<td>SURVEILLANCE OF INFECTIONS</td>
<td>FINDINGS</td>
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|                           | 1. Infection surveillance activities have not been defined. 2. The hospital does not have reports of hospital associated infection rates. | 1. Assigned a health professional who is trained in health care epidemiology to the IPC team. 2. Develop a surveillance plan. The plan will be approved by the ICC and should outline the methods to be used for each of the surveillance targets which are based on a variety of factors that may include:  a. Medical device related infections such as central venous catheter  b. Invasive procedures such as surgical procedures  • High Risk procedures  • High Volume procedures  • New procedures  2. Organisms and conditions of epidemiological significance such as *N. meningitides* isolates from blood or CSF, multi-drug resistance organism (MRSA, VRE, ESBL Enterobacteria, Carbapenem Resistant *Klebsiella sp.*), Influenza TB, and others. 3. Define dissemination of information channels and distribution list. | Responsible:  • Infection Control Committee  • Infection Prevention and Control Department  • Microbiology Laboratory Director | September 30th, 2013  
For the implementation of targeted surveillance activities as defined in the IPC plan |
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<th>MICROBIOLOGY LABORATORY</th>
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<th>RECOMMENDATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>1. The microbiology laboratory has the capacity to identify relevant microbiological agents but functions in a constrained and reduced space to support staff supervision and guidance. (e.g. to display guidance charts).</td>
<td>1. Develop and implement a laboratory Improvement plan that supports the Infection Prevention activities.</td>
<td>Responsible:</td>
<td>June 20th, 2013. For lab improvements that support the surveillance activities and communication</td>
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<td>2. The lab has the capacity to use automated identification systems (Microscan) or commercial manual methods (API), but lacks the supplies to run those tests in a routine basis.</td>
<td>2. The Chief of the Central Microbiology Laboratory should be a Microbiologist, with at least a 4 year degree. This professional must be a member of the Infection Prevention and Control Committee and support the surveillance needs.</td>
<td>• Management Team &amp;</td>
<td>Immediately to assure quality of patients results.</td>
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<td>Due to the lack of supplies, since February, 2013 the lab has been using home-made manual methods for the identification of gram negative organisms. The methods lack quality control measures compromising patient’s results and antibiotics susceptibility patterns.</td>
<td>3. Further training in Microbiology is recommended to work as a supervisor of Microbiology. Please provide training to perform QC measures, Microbiology methodologies, public health surveillance as soon as possible.</td>
<td>• Laboratory Director and microbiology technicians</td>
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<td>3. The original specimens from the recent outbreak of <em>E. cloacae</em> were discarded due to the constrained space.</td>
<td>4. Develop and implement quality control procedures for media cultures and bio-chemicals used for identification and susceptibility testing, and provide continuous supplies for automated methods for the identification and/or confirmation of pathogens found in CSF and Blood specimens.</td>
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<td>4. The Microbiology laboratory is led by a technician in Microbiology, who does not have the knowledge or expertise to perform supervisory functions and to perform quality control measures. He is not a member of the ICC.</td>
<td>5. Improve communication between the Microbiology lab, clinicians, and the Infection Prevention Control Unit for laboratory reportable events:</td>
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<td>• Laboratory critical values such as findings in CSF and blood cultures</td>
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<td>• Lab important findings that require isolation including multi-drug resistant organisms</td>
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<td>• Cluster of positive findings from the same hospital location</td>
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<td>INTERVENTIONS STRATEGIES</td>
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<td>1. Standard Precautions practice are suboptimal for patient care due to the lack of a supportive environment for compliance such as the insufficient alcohol hand rub stations, and promotion of hand hygiene, soap, disposable towels, cluttered and disorganized spaces in the medication and treatment rooms, including cracked surfaces, and rusty furniture. In addition, unavailability of standard operating procedures.</td>
<td>1. Provide and promote a supportive environment for hand hygiene practice by increasing the availability of hand hygiene stations, hand hygiene signage and supplies. • Reorganize the spaces in patient care areas, and get rid of clutter in clean areas such as medication and treatment rooms. • Develop a mechanism to improve compliance of best practices such as the monitoring of central line insertions and IV solutions preparation and administration</td>
<td>Responsible: • Management Team • Infection Control Committee • Infection Prevention and Control Department</td>
<td>Immediately 1. Support the practice of Standard Precautions 2. Review and distribute the National Infection Prevention and Control Guidelines</td>
<td>3. September 30th, 2013 4. September 30th, 2013</td>
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<td>2. National Infection Prevention Guidelines have been developed in 2011, and recommendations for the improvement of infection prevention practices have been issued in the past, but implementation, and monitoring of practices does not exist.</td>
<td>2. Review, and distribute among relevant personnel the infection prevention guidelines and procedures including those for the prevention of central line associated blood stream infections. 3. Monitor compliance and consider the use of supervision, and checklist for CVC line insertion. 4. Develop guidelines for the use of antibiotics, and consider the restriction and approval of antibiotics (1) such as Vancomycin, and third-generation cephalosporin.</td>
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<tr>
<td>STERILIZATION AND DISINFECTION</td>
<td>FINDINGS</td>
<td>RECOMMENDATIONS</td>
<td>COMMENTS</td>
<td>TIME FRAME</td>
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|                                 | 1. There are no standards and procedures for all processes of disinfection | 1. Develop and implement procedures guidance for sterilization and disinfection. | Responsible:  
  - Central Sterilization Unit  
  - Infection Prevention and Control Department | Immediately Discontinue to supply acetic acid for surface disinfection |
|                                 | 2. Glutaraldehyde 2% and other Cidex® solution products are used in non-well ventilated areas. | 2. Follow the manufacturer recommendations for precautions when handling chemical disinfectants.  
   Provide adequate ventilation. Avoid inhalation of vapors/spray and contact with skin and eyes.  
   Use in well-ventilated area and use with appropriate exhaust ventilation, for example a minimum of 10 air exchanges per hour. Use appropriate Personal Protective Equipment. Wash thoroughly after handling. | | |
<p>|                                 | 3. Use of acetic acid 1% as surface disinfectant | 3. Surface disinfectant: After cleaning with soap and water use a 1:100 dilution of 5% sodium hypochlorite in all patient care areas. Prepare as 1 part bleach to 99 parts cold tap water. | | |</p>
<table>
<thead>
<tr>
<th>Hospital Environment and Sanitation</th>
<th>FINDINGS</th>
<th>RECOMMENDATIONS</th>
<th>COMMENTS</th>
<th>TIME FRAME</th>
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<tr>
<td>1. The hospital does not provide a safe and appropriate environment for the compliance of Standard Precautions practices such as: not enough hand washing sinks or hand hygiene solution dispensers. Many patient care areas have cracked benches that cannot be properly disinfected. 2. Construction and renovation activities were taking place in critical care patient areas such as PICU and near the new NICU area without appropriate barriers to prevent the spread of dust. 3. Many areas of the hospital found with walls and ceiling tiles with sign of exposure to water leaks and mold growth. 3. Rusty furniture, porous surfaces such as wood furniture in critical care areas.</td>
<td>1. The minimum requirement for a supportive environment for infection prevention is the availability of sufficient hand hygiene supplies in clean and organized spaces. 2. Construction and renovation activities in the hospital In addition to be approved by the Management must notify the Infection Prevention and Control Department who will coordinate the prevention of exposure of patients to dust and other hazards. (4) 3. Inspect and replace ceiling tiles and repair walls. (PICU) 4. Develop SOPs on hospital cleaning procedures, including the use of an approved surface disinfectants. (4) 5. Provide training to housekeeping staff on cleaning, disinfection, and use of disinfectants. (4) 6. Establish a formal link between housekeeping and IPC Department.</td>
<td>Responsible:  • Management Team  • Infection Control Committee  • Infection Prevention and Control Department</td>
<td>Immediately Increase the availability of hand-sanitizers dispensers  Immediately Notify Infection Control before initiating construction and renovation  September 30th, 2013: For SOPs and completion of training to housekeeping staff.</td>
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<tr>
<td>OTHERS</td>
<td>FINDINGS</td>
<td>RECOMMENDATIONS</td>
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<td>Infective Practices</td>
<td>Routine cultures of vascular catheter tips</td>
<td>A positive catheter tip by itself is not diagnostic for a CR-BSI; Do not routinely culture catheter tips on removal unless there are clinical signs and symptoms for infection. (5)</td>
<td></td>
<td>Immediately Discontinue this practice</td>
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<td>Unsafe practices</td>
<td>1. Multi-dose medication is being stored in 10cc syringes for 48hrs or more. Single doses are then prepared when needed. 2. Undated medication found in many areas.</td>
<td>Replace the use of multi-dose medication vials to single-dose vials. (1). Provide training to nurses on the preparation, handling and safe storage of medications.</td>
<td></td>
<td>Immediately Discontinue this practice</td>
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