Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex

PALESTINIAN HEALTH SECTOR REFORM AND DEVELOPMENT PROJECT (FLAGSHIP PROJECT)

SHORT-TERM TECHNICAL ASSISTANCE REPORT (FINAL)

Prepared by:

Douglas Deming, MD  
Professor of Pediatrics  
Division of Neonatology  
Loma Linda University  
School of Medicine  
Loma Linda University Children’s Hospital

AND

J. Harry Gunkel, MD  
Medical Advisor  
The Flagship Project

Submitted on 13 AUGUST 2010

Contract No. 294-C-00-08-00225-00
## CONTENTS

Acronyms ......................................................................................................................... 3  
Abstract ............................................................................................................................ 4  
Summary of Recommendations ....................................................................................... 5  
Section I: Introduction ..................................................................................................... 6  
Section II: Activities Conducted ..................................................................................... 7  
Section III: Findings, Challenges, Recommendations, and Next Steps .......................... 8  
Annex A: Scope of Work .................................................................................................. 13  
Annex B: Assignment Schedule ...................................................................................... 16  
Annex C: Consultant CV .................................................................................................. 18  
Annex D: Bibliography of Documents Collected and Reviewed ....................................... 44  
Annex E: List and Copy of Materials Utilized During Assignment .................................... 45
ACRONYMS

BP – Blood Pressure
CMV – Conventional Mechanical Ventilation
CPAP – Continuous Positive Airway Pressure
ECMO – Extra Corporeal Membrane Oxygenation
Fr – French (unit of tubing diameter)
HFJV – High Frequency Jet Ventilation
HFOV – High Frequency Oscillatory Ventilation
ICU – Intensive Care Unit
IMV – Intermittent Mandatory Ventilation
IPPV – Intermittent Positive Pressure Ventilation
LLUCH – Loma Linda University Children’s Hospital
NICU – Neonatal Intensive Care Unit
NRP – Neonatal Resuscitation Program
PICC – Percutaneously Inserted Central Catheter
PICU – Pediatric Intensive Care Unit
PMC – Palestine Medical Complex
RH – Rafidia Hospital
RGH – Ramallah General Hospital
RN – Registered Nurse
RT – Respiratory Therapist
SIMV – Synchronized Intermittent Mandatory Ventilation
USAID – United States Agency for International Development
ABSTRACT

The consultant is a Professor of Pediatrics in Neonatology at Loma Linda University School of Medicine and a practicing neonatologist at Loma Linda University Children’s Hospital. He consulted for the USAID/Flagship Project in Ramallah from July 4 – 24, 2010 as part of a neonatal intensive care unit (NICU) consultant team comprised also of a clinical nurse educator and respiratory therapist.

The consultant spent the first half of the consultancy evaluating the current status of the neonatal intensive care services at Rafidia Hospital in Nablus. The consultant provided technical advice to improve care at the NICU. The consultant provided educational lectures for staff and bedside education for the medical staff, residents, and nursing staff regarding care of the high risk neonate, infection control, communication, high frequency ventilation, and early enteral nutrition.

The consultant spent the second half of the consultancy at the Palestine Medical Complex (PMC) in both the NICU at Ramallah General Hospital (RGH) and the Children’s Wing. The consultant participated in the morning report with the faculty and residents and in the daily rounds in the NICU at RGH. In addition, the consultant provided educational lectures for staff and bedside education for the medical staff, residents, and nursing staff regarding care of the high risk neonate, infection control, and gestational age assessment.

The consultant had multiple discussions with the Flagship Project staff and the NICU consulting team regarding the Project, how to continue with assistance, and how to improve NICU services at RH and the PMC.
SUMMARY OF RECOMMENDATIONS

Recommendations are presented in two categories: first, those that are feasible in the near-term and compatible with Flagship Project plans; and second, those that could benefit the quality of clinical services but are constrained at the current time by budgetary or other circumstances.

Recommendations for the Near-Term

1. Help both RH and PMC develop protocols, policies, and procedures for basic and advanced neonatal care.

2. Reinforce with hospital staffs the process for obtaining needed equipment and supplies through the approved MoH procedures.

3. Place a Blood Gas Analyzer in the NICUs at RH and PMC and train a staff member (e.g., nurse) to operate it and be responsible for blood gas testing.

4. Identify possible sources to acquire some basic equipment and supplies for both RH and PMC to better support the NICU:
   a. Diaper Scales
   b. Neonatal Pulse Oximeter Probes
   c. Neonatal Oxygen Cannulae
   d. Sterile Water
   e. Oxygen Blenders
   f. Alcohol Cleansing Units – for hand hygiene

Other Recommendations

5. Identify physicians to receive additional subspecialty training in neonatology for both RH and PMC.

6. Improve nurse to patient ratios in the NICU.

7. Develop ancillary support personnel for cleaning and stocking in the NICU at RH and PMC.

8. Develop interdisciplinary team building between physicians, nurses, and respiratory care.
SECTION I: INTRODUCTION

The Flagship Project is a five-year initiative funded by the U.S. Agency for International Development (USAID), designed and implemented in close collaboration with the Palestinian Ministry of Health (MoH). The Project’s main objective is to support the MoH, selected non-governmental organizations, and selected educational and professional institutions in strengthening their institutional capacities and performance to support a functional and democratic Palestinian health sector able to meet its priority public health needs. The Project works to achieve this goal through three components: (1) supporting health sector reform and management, (2) strengthening clinical and community-based health, and (3) supporting procurement of health and humanitarian assistance commodities.

This consultancy was to assess the current status of neonatal intensive care in RH and PMC. It also provided education to the clinical staff (MD, RN) in both of these institutions. The assessment was used to create recommendations to improve the status of neonatal intensive care in these MoH hospitals.

This report contributes to Flagship Project Component 2, Objective 2.1 of the Flagship Project: Improving the Quality of Essential Health Services for Palestinians. This consultancy also contributed to the MoH IDP module number 1, Create a Center of Excellence at the Palestine Medical Complex; and module number 12, Improve the Quality of Clinical Services in the Palestinian MoH Hospital System.
SECTION II: ACTIVITIES CONDUCTED

The consultancy included daily clinical rounds in the RH and PMC NICUs. Additionally, the consultant provided didactic and interactive education with the physician (RH and PMC), nursing (RH and PMC), and respiratory therapy staffs (PMC). Several lectures were presented, including:

- Handwashing
- ECMO
- Chronic Lung Disease
- Oxygen Therapy Devices with Emphasis on the Oxyhood and Nasal Cannula

The consultant spent time with the Pediatric Department Heads at both RH and PMC. Processes to improve neonatal care and develop protocols were discussed. The consultant provided copies of numerous clinical guidelines and policies from Loma Linda University Children’s Hospital (LLUCH) to the Flagship Project for later distribution to the hospital staffs. Focused discussions occurred on the topics of Thermoregulation and Infection Control and policies for those topics are appended to this report as a basis that could be adopted.

Plans for a new NICU at PMC were reviewed with Dr. Meriam Albasser, MD, Director of Pediatrics. The consultant also showed and discussed with Dr. Meriam a set of schematic drawings of the current LLUCH NICU. The functionality and flexibility that was part of the design of this unit was discussed. The consultant recommends for the new unit a minimum of 4 sinks, wide availability of alcohol cleansing stations, a minimum of 2 sets of gas outlets per patient, (3 sets of gas outlets per patient would be better), and a minimum of 12 electrical outlets per patient.
SECTION III: FINDINGS, CHALLENGES, RECOMMENDATIONS, AND NEXT STEPS

A. Findings

Many of the findings of this consultant had been previously noted by the Flagship Project and by prior consultants. They are reiterated here to re-validate them and to encourage the continuing efforts toward filling the identified needs.

1. Neonatologists – The PMC medical staff includes pediatricians that have some neonatology training, however neither the RH or PMC has a fully-trained neonatologist on staff.

2. Monitors – There is not a cardiorespiratory monitor for each baby in the NICU at either RH or PMC. Some of the monitors that are present are not being used, apparently because of faulty operation or staff not familiar with the equipment.

3. Nursing staff is currently as follows:
   a. RH – Nurse : Baby ratio 1:7 – 1:10
   b. PMC – Nurse : Baby ratio 1:4
   c. Nursing personnel also perform non-nursing tasks, e.g. cleaning, stocking of supplies, in addition to their nursing responsibilities.

4. Facilities and Practice for Hand Hygiene – Hand hygiene practice in both RH and PMC would benefit with the addition of sinks and a consistent supply of soap and towels. At RH, garbage cans require the user to lift the lid of the can by hand in order to dispose of the towel that just dried the clean hand.

5. The consultant frequently noted absence or shortage of basic supplies and equipment that are necessary to implement best practices. Notable examples relevant to neonatal care services are:
   a. Sterile water for ventilator humidifiers and isoletes. It would significantly improve the care delivered to high risk, critically ill infants to have sterile water for both the ventilator humidifiers and the isoletes.
   b. Oxygen Blenders were not observed in use at any time during the consultancy. This means that anytime an infant requires oxygen without mechanical ventilator support, they are receiving 100% oxygen. Use of 100% oxygen has been shown to increase both mortality and morbidity.
   c. Neonatal Nasal Cannulae – Both RH and PMC are using oxygen hoods for the delivery of oxygen that does not require pressure support (i.e., either CPAP or mechanical ventilation). Oxygen hoods deliver oxygen inconsistently. It is easy to deliver inadequate flow through the hood and develop increased carbon dioxide retention in the baby.
   d. Pulse Oximeter Probes – It was observed that pediatric clip-on probes were used, instead of neonate-sized, which severely bruises infant’s hands, arms, feet, and legs. Neonatal-sized pulse oximeter probes were not stocked in either RH or the PMC.
e. Umbilical Arterial Catheters – Neither RH or PMC have umbilical arterial catheters (UAs).

f. Diaper Scales – Staff have no means of recording urine output, and thus cannot monitor accurate intake and output. Diaper scales are a quick and effective method of measuring patient output.

g. Percutaneously Inserted Central Catheters – Neither RH or PMC utilize PICC catheters.

6. High Frequency Ventilators – RH has a HFOV but this ventilator is not being used. It is recommended that this ventilator not be used until staff are fully trained to use it.

7. Physician Rotation Schedule – At RH the physicians each take care of their own patients. At the PMC the physician who rounds in the NICU changes each day. With different physicians every day, the quality of care is inconsistent because there is no overall lead to direct patient care. Residents may also become confused when the specialists’ approaches to management vary.

8. Clinical Laboratory Services – Laboratory services are sometimes not available around the clock, due to staffing constraints.

9. Neonatal Resuscitation Program Instructor – Staff would benefit from being trained in the NRP. There are currently no NRP trained care givers in either RH or PMC. A train-the-trainer model would be most effective to identify and certify a select group to become instructors, who will in turn provide education for the other staff.

10. Respiratory Therapist – The PMC has a single respiratory therapist for all of its entities. RH has no respiratory therapist at all. Respiratory therapy is a new discipline in the West Bank. The consultant observed that the NICU and pediatric staff see the value of this role.

11. Policies – There do not appear to be any written clinical guidelines and procedures for routine care in either RH or PMC NICUs. The consultant provided sample policies, including those related to thermal regulation and hand hygiene.

12. Team Building – The consultant’s observation was that nurses, physicians, and other paramedical personnel sometimes functioned independently, without an interdisciplinary, collaborative approach. The NICU consultants attempted to model effective interdisciplinary communication and collaborative interaction.

B. Challenges

The challenges identified by this consultant parallel many of the findings noted above; and the recommendations enumerated in the next section flow out of the challenges.

Two major challenges encompass many of the particulars. They are

1. Shortage or lack of resources, human as well as material. Implementation of best practices is seriously hampered when proper equipment is not available for monitoring, for example,
and when staffing shortages are severe enough that patients cannot be properly attended to. Even the very best trained and most highly motivated nurses, for example, cannot properly care for 7-10 critically ill patients as they are sometimes required to do at both RH and PMC.

2. Limited sub-specialty expertise. Neonatal intensive care is a highly specialized and technical field that required skills, knowledge, and trainings beyond general pediatrics. Physicians and nurses require specific trainings in order to implement best practices in an NICU. The MoH is currently challenged in finding the means and resources to provide such trainings for physicians, nurses, and paramedical personnel such as respiratory therapists.

C. Recommendations

1. Indigenous neonatologists would significantly enhance the quality of neonatal services. Although hiring or trainings these sub-specialists is not a feasible prospect at this time, it is a valid long-term goal and efforts should be made toward first steps.

2. Continue to implement trainings and workshops to promote best practices in Infection Prevention and Control.

3. Shortages of nurse staffing could be partially alleviated by training other paramedical staff to perform some of the non-nursing functions that nurses are currently performing; e.g., clean isolettes, and restock supplies for each shift in the NICU.

4. High Frequency Oscillating Ventilators – Neither RH or PMC provide care for the types of patients who benefit from this modality. Some patients might benefit from high frequency jet ventilation, but first would need substantially more training in this modality before applying its use. The HFOV might have better utilization elsewhere.

5. As previous consultants have identified, care could be enhanced in the NICU with more supplies and equipment. Efforts should be continued toward finding sources for the following items:
   a. Both RH and PMC need a monitor for every patient in the NICU
   b. Both RH and PMC need Umbilical Arterial Catheters 3.5 and 5 French
   c. Both RH and PMC need neonatal pulse oximeter probes
   d. Both RH and PMC need neonatal oxygen cannulae
   e. Both RH and PMC need to have and use oxygen blenders to regulate oxygen delivery to the minimal amount that is needed rather than 100% oxygen
   f. Both RH and PMC need to have sterile water readily available for both ventilator humidifiers and isolettes
   g. RH – needs foot operated garbage cans
   h. Both RH and PMC need alcohol cleansing units for hand hygiene throughout the NICU.

6. Work to improve Nurse:Baby ratios. While the ideal for NICUs is 1:2, even a 1:3 ratio would significantly improve care for critically ill newborns.
7. Develop at PMC a physician rotation schedule that promotes continuity care

8. Place a Blood Gas Analyzer in the NICUs at RH and PMC.

9. Develop NICU Policies, with first priority given to:
   a. Hand Hygiene
   b. Thermoregulation
   c. Care of umbilical arterial catheter

10. Assess the possibility of assisting in the development of the respiratory therapy discipline in the MoH and West Bank.
    a. Since the consultancy, PMC has begun some utilization of the single RT who is present at the PMC.
    b. Potentially the Flagship Project could utilize the PMC RT as a consultant for the development of respiratory therapy utilization in the West Bank.

11. Continue to promote and encourage interdisciplinary team building. This could include:
    a. Weekly Joint Physician/Nurses Rounds to discuss new or difficult cases
    b. Monthly Journal Club
    c. Daily Physician/Nurse rounds in the NICU

12. As circumstances allow, consider future NICU Consultants
    a. It is important for the consultants to come as a team to model effective communication and collaboration. The consultants would also build upon the efforts begun by this consultant. The team would include:
       i. Neonatologist
       ii. Nurse
       iii. Respiratory Therapist
       iv. Consider a Neonatal Nurse Practitioner
    b. Team should include members who can train local trainers for NRP, writing protocols, teach PICC line insertion and care, etc
    c. Have the new local instructors train and certify all the care givers (MD, RN, RRT) in NICUs.
    d. Embed the team in Nablus for several weeks to maximize their time spent with RH.

D. Next Steps

Of the recommendations above, the consultant advises that the most important for rapid implementation are

1. Encourage and facilitating development of policies for Hand Hygiene and Thermoregulation. The consultant provided protocols for each that could serve as models for policies (Annex E).
2. Develop a system for interdisciplinary team building, which may include:
   a. Weekly Joint Physician/Nurses Rounds to discuss new or difficult cases
   b. Monthly Journal Club
   c. Daily Physician/Nurse rounds in the NICU

3. Encourage and facilitate developing a Hand Hygiene Policy in RH and PMC. This needs to include goals, a means to follow-up with compliance, and a reporting mechanism so that all care givers (MDs, RNs, etc) will know corporate compliance. The consultant provided a Hand Hygiene Protocol that could serve as a model for a policy (Annex E).

4. Encourage and facilitate developing a Thermoregulation Policy. The consultant provided a Protocol (Annex E) that could serve as a model for policy to give them a template to do this.

5. Pursue ways to provide the most needed supplies, including sterile water for humidification, oxygen blenders, and diaper scales.
ANNEX A: SCOPE OF WORK
Short-Term Consultancy Agreement Scope of Work

SOW Title: Neonatology Consultancy
SOW Date: May 19, 2010
SOW Status: Final
Consultant Name: Douglas Deming, MD
Job Classification: Short-Term US Expatriate Neonatology Clinical Consultant
Reporting to: Paul Rader, MHA, Ph.D., Advisor, Hospital Management

I. Flagship Project Objective

The Flagship Project is a five-year initiative funded by the U.S. Agency for International Development (USAID), and designed in close collaboration with the Palestinian Ministry of Health (MoH). The Project’s main objective is to support the MoH, select non-governmental organizations, and select educational and professional institutions in strengthening their institutional capacities and performance to support a functional, democratic Palestinian health sector able to meet its priority public health needs. The project works to achieve this goal through three components: (1) supporting health sector reform and management, (2) strengthening clinical and community-based health, and (3) supporting procurement of health and humanitarian assistance commodities.

The Flagship Project will support the MoH in implementing health sector reforms needed for quality, sustainability, and equity in the health sector. By addressing key issues in governance, health finance, human resources, health service delivery, pharmaceutical management, and health information systems, the Ministry will strengthen its dual role as a regulator and main health service provider. The Flagship Project will also focus on improving the health status of Palestinians in priority areas to the Ministry and public, including mother and child health, chronic diseases, injury prevention, safe hygiene and water use, and breast cancer screening for women.

II. Specific Challenges to Be Addressed by this Consultancy

The quality of Palestinian health services has been compromised by fragmentation among health service providers, resulting in multiple and varying clinical standards and norms. There has been little citizen participation and feedback solicited by the MoH, resulting in a gap between citizen expectations and MoH delivery of services. Improvement of pediatric services in MoH hospitals is a priority of the MoH and Flagship staff is committed to help initiate change and necessary reforms to deliver better secondary health care services to the Palestinian people.

III. Objective of this Consultancy

This consultancy will focus on improving MoH Neonatal Intensive Care Unit (NICU) services at the secondary health care level.

IV. Specific Tasks of the Consultant
Under this Scope of Work, the Consultant shall perform, but not be limited to, the specific tasks specified under the following categories:

A. **Background Reading Related to Understanding the Work and Its Context.** The Consultant shall read, but is not limited to, the following materials related to fully understanding the work specified under this consultancy:
   - Previous Flagship Project technical reports, Work Plan, etc.
   - MOH National Strategic Health Plan
   - USAID Flagship Project Quarterly Reports
   - USAID MOH Institutional Development Plan

B. **Background Interviews Related to Understanding the Work and Its Context.** The Consultant shall interview, but is not limited to, the following individuals or groups of individuals in order to fully understand the work specified under this consultancy:
   - Chemonics Project Management Unit (PMU), if appropriate
   - Chemonics Field Office Staff, as needed
   - Appropriate MOH Staff and others appropriate
   - Hospital Emergency Staff and others as appropriate
   - LLU Palestine Project leadership

C. **Tasks Related to Accomplishing the Consultancy’s Objectives.** The Consultant shall use his/her education, considerable experience and additional understanding gleaned from the tasks specified in A. and B. above to:
   - Work as a clinical consultant to help integrate and enhance neonatal intensive care services for the designated MoH hospital(s). Provide assessment report with recommendations for improving services
   - Mentor and advise MoH clinical staff while providing on-the-job clinical training for treatment of patients. Provide suggested clinical care guidelines
   - Conduct training and/or lecture on relevant neonatal intensive care medicine topics. Provide teaching aids (e.g., slides, textbooks, handbooks)
   - Mentor and advise MoH medical and nursing staffs on interdisciplinary approach to NICU care.
   - Assess and make recommendations regarding integration of neonatal services with perinatal services in MoH hospital(s)
   - Assess and make recommendations regarding development of neonatology subspecialty training in the West Bank. Provide sample neonatology training curriculum.
   - Assess and make recommendations regarding continuing physician education in the West Bank
   - Contribute to the ongoing review, recommendation, and development of policies, procedures, guidelines, and educational materials for neonatal services. Provide sample policies, procedures, guidelines, materials.
   - Assess and recommend improvements to NICU unit filing systems, protocols, guidelines, organizational structure, and training programs
   - Assess status of neonatal referral patterns among regional hospitals and make relevant recommendations
   - If requested, conduct assessments at other MOH facilities of neonatal intensive care services
– Work closely with MOH hospital staff to create ways to improve neonatal intensive care services and the standard of care at MOH facilities
– Prepare assessment reports of any sites visited
– In the event that new priority tasks are introduced during the consultancy, the consultant will work with the Flagship project staff to revise the tasks and expected products to accommodate for the new priorities
– In addition to the above-listed tasks, the Flagship Project welcomes additional contributions and creative ideas in support of the Flagship objectives
– The consultant is encouraged to support the identification of additional STTA and scopes of work to help accomplish Flagship goals and objective where possible

V. Expected Products.

– Within four days of the consultant’s arrival, the consultant should provide the methodology for successfully completing the work (using Annex I: STTA Methodology).
– The substance of, findings on, and recommendations with respect to the above-mentioned tasks shall be delivered by the Consultant in a written report that includes a policy statement, strategy, action plan, training materials, etc., for submission to USAID (using Annex II: the Flagship-provided STTA report template). A draft of this trip report is due prior to the consultant’s departure. The final version of the report is to be completed no later than 7 business days after the consultant’s departure.

VI. Timeframe for the Consultancy.

The timeframe for this consultancy is on or about July 5, 2010 to on or about July 24, 2010 in the West Bank.

VII. LOE for the Consultancy.

The days of level of effort are estimated to be 2 days for travel and 24 days for work in the West Bank (6 day work week maximum). Unless otherwise specified, up to two (2) days may be allocated for preparation of the work and up to two (2) days upon conclusion of work in West Bank to complete the assignment.

VIII. Consultant Qualifications.

The Consultant shall have the following minimum qualifications to be considered for this consultancy:

Educational Qualifications
• Shall be a currently licensed physician in good standing
• Shall be board certified in Pediatrics and sub-board certified in Neonatal/Perinatal Medicine

Work Experience Qualifications
• Minimum of three years of work in neonatal intensive care
• Successful involvement and participation in international health and/or development
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)

ANNEX B: ASSESSMENT SCHEDULE

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACTIVITY</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday, 7/4/2010</td>
<td>Depart</td>
<td>Loma Linda</td>
</tr>
<tr>
<td>Monday, 7/5/2010</td>
<td>Arrive</td>
<td>Tel Aviv</td>
</tr>
<tr>
<td>Tuesday, 7/6/2010</td>
<td>FLAGSHIP PROJECT OFFICE ORIENTATION</td>
<td>Ramallah</td>
</tr>
<tr>
<td></td>
<td>Rafidia Hospital</td>
<td>Nablus</td>
</tr>
<tr>
<td>Wednesday, 7/7/2010</td>
<td>Rafidia Hospital</td>
<td>Nablus</td>
</tr>
<tr>
<td></td>
<td>Met with Flagship Project Personnel</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Thursday, 7/8/2010</td>
<td>Rafidia Hospital</td>
<td>Nablus</td>
</tr>
<tr>
<td>Friday, 7/9/2010</td>
<td>Muslim Holiday, worked on STTA report and education in hotel</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Monday, 7/12/2010</td>
<td>Rafidia Hospital</td>
<td>Nablus</td>
</tr>
<tr>
<td>Tuesday, 7/13/2010</td>
<td>Rafidia Hospital</td>
<td>Nablus</td>
</tr>
<tr>
<td>Wednesday, 7/14/2010</td>
<td>Rafidia Hospital</td>
<td>Nablus</td>
</tr>
<tr>
<td>Thursday, 7/15/2010</td>
<td>PMC</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Friday, 7/16/2010</td>
<td>Worked in Flagship Project Office</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Sunday, 7/18/2010</td>
<td>PMC</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Monday, 7/19/2010</td>
<td>PMC</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Tuesday, 7/20/2010</td>
<td>PMC / Flagship Project Office</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Wednesday, 7/21/2010</td>
<td>PMC / Flagship Project Office</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Thursday, 7/22/2010</td>
<td>PMC / Flagship Project Office</td>
<td>Ramallah</td>
</tr>
<tr>
<td>Date</td>
<td>Activity</td>
<td>Location</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Friday, 7/23/2010</td>
<td>Meet with USAID Personnel</td>
<td>Tel Aviv</td>
</tr>
<tr>
<td></td>
<td>Departure</td>
<td>Tel Aviv</td>
</tr>
<tr>
<td>Saturday, 7/24/2010</td>
<td>Arrive</td>
<td>Loma Linda</td>
</tr>
</tbody>
</table>
Douglas Deming, MD
Curriculum Vitae

Personal

Birthday
Birthplace
Business Address

Loma Linda University
School of Medicine
Department of Pediatrics
Loma Linda, CA  92350

Present Title

Professor of Pediatrics
Medical Director, ECMO Program
Medical Director, Neonatal Respiratory Care

Fellowship Training

1/82 - 6/82 Research Fellow
Cardiovascular Research Institute
University of California at San Francisco
San Francisco, CA  94131

7/81 - 6/82 Fellow in Neonatology
Children’s Hospital of San Francisco
Division of Neonatology
San Francisco, CA  94117

3/79 - 6/81 Fellow in Neonatology
Loma Linda University Medical Center
Division of Neonatology
Loma Linda, CA  92350
Residency Training

1/77 - 2/79
Resident in Pediatrics
Loma Linda University Medical Center
Department of Pediatrics
Loma Linda, CA 92350

Internship

1/76 - 12/76
Intern in Pediatrics
Loma Linda University Medical Center
Department of Pediatrics
Loma Linda, CA 92350

Education

1975
Doctor of Medicine
Loma Linda University
School of Medicine
Loma Linda, CA 92350

1972
Bachelor of Arts in Religion and Philosophy
Walla Walla College
Walla Walla, WA

Certifications:

2009
Maintenance of Certification
American Board of Pediatrics
Sub-board in Neonatal-Perinatal Medicine

2002
Recertification
American Board of Pediatrics
Sub-board in Neonatal-Perinatal Medicine

1996
Recertification
American Board of Pediatrics
Sub-board in Neonatal-Perinatal Medicine

1981
American Board of Pediatrics
Sub-board in Neonatal-Perinatal Medicine

1980
American Board of Pediatrics

1977
National Board of Medical Examiners
### Licensure

1977 - Present  
California

### Academic Appointments

<table>
<thead>
<tr>
<th>Period</th>
<th>Position</th>
<th>Institution</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002 - Present</td>
<td>Professor of Pediatrics</td>
<td>Loma Linda University</td>
<td>Loma Linda, CA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>School of Medicine</td>
<td>92350</td>
</tr>
<tr>
<td>1994 - 2002</td>
<td>Associate Professor of Pediatrics</td>
<td>Loma Linda University</td>
<td>Loma Linda, CA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>School of Medicine</td>
<td>92350</td>
</tr>
<tr>
<td>1982 - 1994</td>
<td>Assistant Professor of Pediatrics</td>
<td>Loma Linda University</td>
<td>Loma Linda, CA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>School of Medicine</td>
<td>92350</td>
</tr>
<tr>
<td>1981 - 1982</td>
<td>Instructor in Pediatrics</td>
<td>Loma Linda University</td>
<td>Loma Linda, CA</td>
</tr>
</tbody>
</table>

### Society Memberships

<table>
<thead>
<tr>
<th>Period</th>
<th>Position</th>
<th>Organization</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 – 2006</td>
<td>Program Services Committee</td>
<td>Inland Empire Region March of Dimes</td>
<td></td>
</tr>
<tr>
<td>2002 – present</td>
<td>San Bernardino County Medical Society</td>
<td>California Medical Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>American Medical Association</td>
<td></td>
</tr>
<tr>
<td>2001 – 2003</td>
<td>Editor, News letter</td>
<td>California Association of Neonatologists</td>
<td></td>
</tr>
<tr>
<td>12/2001</td>
<td>Nominating Committee, Chairman</td>
<td>California Association of Neonatologists</td>
<td></td>
</tr>
<tr>
<td>7/1999 – 2002</td>
<td>Executive Committee</td>
<td>California Association of Neonatologists</td>
<td></td>
</tr>
<tr>
<td>10/89 – present</td>
<td>Subsection of Perinatal Medicine</td>
<td>American Academy of Pediatrics</td>
<td></td>
</tr>
</tbody>
</table>
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)

10/83 - present
American Thoracic Society

3/83 - 1992
San Bernardino County Medical Society

3/83 - 1992
California Medical Association

3/83 - 1992
Hinterland Pediatric Society

1/83 - present
Fellow, American Academy of Pediatrics

Professional Experience

7/2003 – Present
Director, ECMO Program
Loma Linda University Children’s Hospital
Loma Linda, CA 92350

7/83 – 9/2003
Director, Training Program in Neonatal-Perinatal Medicine
Loma Linda University Medical Center
Department of Pediatrics
Loma Linda, CA 92350

8/82 - Present
Medical Director, Neonatal Respiratory Care
Loma Linda University Medical Center
Loma Linda, CA 92350

1988 – 1/90
Medical Staff
Riverside Community Hospital
Riverside, CA

7/82 – 9/99
Medical Staff
Riverside General Hospital University Medical Center
Riverside, CA

7/82 - Present
Medical Staff
Loma Linda University Medical Center
Loma Linda, CA 92350

Committees

Medical Center Committees

1/2008 - present
LLUCH Patient Care Committee, Chairman
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)

7/2003 – present  Critical Care Committee
3/2003 – present  Physician Well-being Committee
2003 – present  Pediatric Bronchoscopy Committee
4/2002  Medical Staff Nominating Committee, Chairman
1982 - 1997  Respiratory Care Committee
1988 - 1998  Graduate Medical Education Committee
1988 to 1990  Physician Order Entry Subcommittee
              Chairman
1989 - 1994  Patient Care Subcommittee

Department of Pediatrics Committees

1988 - 1989  Space Committee
1/90 to 1991  Equipment and Space Committee

Miscellaneous Activities

1982 - 1988  Design specifications of LLUMC NICU

Programming

1988 - 1989  Design specifications for NICU patient tracking databases
              Diagnosis tracking
              Location tracking
              Physician tracking

1989 - 1995  Maintenance of NICU patient tracking databases

Classes

1989  

MS-DOS
Nine session class on the Microsoft Disk Operating System
Given for faculty and trainees in the Division of
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)

1989
MS-Word
Eighteen session class on Microsoft Word
Given for faculty and secretaries of the Department of Pediatrics

1992
An Introduction to the Research Process Design, Statistics, and Writing
33 Session Class to the Neonatology Fellows
Oxford University Press

1996
Scientific Writing
12 Session Class to Neonatology Fellows

1998
Research Design and Statistics
10 Session Class to Neonatology Fellows

1999
Introduction to Research Design & Methodology
8 Session Class to Neonatology Fellows & Respiratory Care Department

2000
Respiratory Physiology and Mechanical Ventilation
10 Session Class to Neonatology Fellows & Respiratory Care Department

2000
Introduction to Biomedical Statistics
14 Session Class to Neonatology Fellows, Respiratory Care Department, & Pediatric Faculty

2001
Scientific Writing
12 Session Class to Neonatology Fellows

2002
Introduction to Biomedical Statistics
14 Session Class to Neonatology Fellows, Respiratory Care Department, & Pediatric Faculty
(Text) Bland M, An Introduction to Medical Statistics.
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)

2003
- Introduction to Research Design & Methodology
  8 Session Class to Neonatology Fellows

2004
- Respiratory Physiology and Mechanical Ventilation
  10 Session Class to Neonatology Fellows

2005
- Research Design & Methodology
  4 Session Class to Neonatology Fellows

Scientific Writing
12 Session Class to Neonatology Fellows

Visiting Professorships

<table>
<thead>
<tr>
<th>Date</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/2007</td>
<td>Zheijiang University Children’s Hospital</td>
</tr>
<tr>
<td></td>
<td>Hangzhou, Zheijiang Province, China</td>
</tr>
<tr>
<td>10/2008</td>
<td>Zheijiang University Children’s Hospital</td>
</tr>
<tr>
<td></td>
<td>Hangzhou, Zheijiang Province, China</td>
</tr>
</tbody>
</table>

Outside Classes Taught on a Yearly Basis

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988 – present</td>
<td>Neonatal Lung Disease</td>
</tr>
<tr>
<td></td>
<td>Combined Schools of Respiratory Care</td>
</tr>
<tr>
<td></td>
<td>Crafton Hills College</td>
</tr>
<tr>
<td></td>
<td>Victor Valley College</td>
</tr>
<tr>
<td>2001 – 2008</td>
<td>Surfactant Therapy</td>
</tr>
<tr>
<td></td>
<td>Perinatal/Pediatric Respiratory. Care Specialist Program</td>
</tr>
<tr>
<td>2001 - present</td>
<td>Neonatal Surgical Emergencies</td>
</tr>
<tr>
<td></td>
<td>Lung Development</td>
</tr>
<tr>
<td></td>
<td>Respiratory Distress Syndrome</td>
</tr>
<tr>
<td></td>
<td>Chronic Lung Disease in the Newborn</td>
</tr>
<tr>
<td></td>
<td>Perinatal/Pediatric Respiratory. Care Specialist Program</td>
</tr>
<tr>
<td>2007 – present</td>
<td>Respiratory Distress Syndrome</td>
</tr>
<tr>
<td></td>
<td>Combined Schools of Respiratory Care</td>
</tr>
<tr>
<td></td>
<td>Crafton Hills College</td>
</tr>
<tr>
<td></td>
<td>Victor Valley College</td>
</tr>
<tr>
<td>2008 – present</td>
<td>Hypoxic Respiratory Failure in the Newborn</td>
</tr>
<tr>
<td></td>
<td>Perinatal/Pediatric Respiratory. Care Specialist Program</td>
</tr>
</tbody>
</table>

Selected Lectures

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1988</td>
<td>Neonatal Respiratory Care</td>
</tr>
<tr>
<td></td>
<td>Continuing Medical Education</td>
</tr>
<tr>
<td></td>
<td>Doctor's Hospital Montclair</td>
</tr>
<tr>
<td>1/1989</td>
<td>Clinical Research in Bronchopulmonary Dysplasia</td>
</tr>
<tr>
<td></td>
<td>School of Nursing</td>
</tr>
<tr>
<td></td>
<td>Loma Linda University</td>
</tr>
</tbody>
</table>
2/1989  
*Aerosol Usage in Neonates: Witchcraft and Science*  
High Sierra Critical Care Conference  
Reno, Nevada

9/1989  
*Aerosol Usage in Neonates*  
Pediatric Grand Rounds  
Loma Linda University Medical Center

11/1989  
*Pathophysiology of Bronchopulmonary Dysplasia*  
School of Respiratory Care  
Loma Linda University

12/1989  
*High Frequency Ventilation*  
Advanced Neonatal Respiratory Class  
School of Respiratory Care  
Nichols Hall

2/1990  
*High Frequency Ventilation*  
Advanced Neonatal Respiratory Class  
School of Respiratory Care  
Nichols Hall

5/1990  
*Respiratory Management of the Neonatal Patient*  
Advanced Neonatal Respiratory Class  
Jerry L. Pettis Memorial Veterans Hospital

5/1991  
*Respiratory Management of the Neonatal Patient*  
Advanced Neonatal Respiratory Class  
Jerry L. Pettis Memorial Veterans Hospital

2/1992  
*Pulmonary Function Testing*  
Advanced Neonatal Respiratory Class  
School of Respiratory Care  
Nichols Hall

5/1992  
*Respiratory Management of the Neonatal Patient*  
Advanced Neonatal Respiratory Class  
Jerry L. Pettis Memorial Veterans Hospital

5/1992  
*Bronchopulmonary Dysplasia. Role of Steroids in Treatment*  
Grand Rounds  
Loma Linda University Medical Center

4/1993  
*Pulmonary Function Testing*  
Advanced Neonatal Respiratory Class  
School of Respiratory Care  
Nichols Hall

Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex  
Palestinian Health Sector Reform and Development Project (Flagship Project)
9/1993

*High Frequency Ventilation*

Swedish Pediatric Association
Örebro, Sweden

2/1994

*Bronchopulmonary Dysplasia: Pathophysiology*

Advanced Neonatal Respiratory Class
School of Respiratory Care
Nichols Hall

3/1994

*Pulmonary Function Testing*

Advanced Neonatal Respiratory Class
School of Respiratory Care
Nichols Hall

4/1994

*High Frequency Ventilation*

Pediatric Grand Rounds
Loma Linda University Medical Center

3/1995

*High Frequency Ventilation*

3rd Annual Conference on Mechanical Ventilation
Sao Paulo, Brazil

3/1995

*Physiology of Mechanical Ventilation in Infants*

3rd Annual Conference on Mechanical Ventilation
Sao Paulo, Brazil

5/1995

*Synchronized Ventilation in Infants*

22nd Annual Conference on Care of the High Risk Neonate
UCI, Orange County, CA

9/1996

*Respiratory Management of Surgical Emergencies in the Newborn*

Perinatal/Pediatric Respiratory Specialist Program
School of Allied Health Professions

9/1996

*Research Opportunities for the Respiratory Care Practitioner*

Respiratory Care Fall Symposium
Loma Linda University Medical Center
Randall’s Visitor Center

9/1997

*Bronchopulmonary Dysplasia (BPD)*

Advanced Neonatal Respiratory Care Class
School of Allied Health Professions

3/1997

*Pulmonary Function Tests in the Newborn Infant*

Advanced Neonatal Respiratory Care Class
School of Allied Health Professions
<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1997</td>
<td>Common Respiratory Diseases in the Newborn</td>
<td>Columbia Los Robles Hospital/Medical Center</td>
</tr>
<tr>
<td></td>
<td>Management of Respiratory Support/Symposium on the ELBW</td>
<td></td>
</tr>
<tr>
<td>6/1997</td>
<td>Pediatric Grand Rounds</td>
<td>Loma Linda University Medical Center</td>
</tr>
<tr>
<td>8/1997</td>
<td>Normal Gas Transport</td>
<td></td>
</tr>
<tr>
<td>9/1997</td>
<td>Neonatal Surgical Emergencies 7th Annual</td>
<td></td>
</tr>
<tr>
<td>9/1997</td>
<td>Chronic Lung Disease in the Newborn</td>
<td></td>
</tr>
<tr>
<td>9/1997</td>
<td>Lung Mechanics</td>
<td>7th Annual Respiratory Care Symposium, LLUMC</td>
</tr>
<tr>
<td>4/2000</td>
<td>RDS, Surfactant, and the New Millennium</td>
<td></td>
</tr>
<tr>
<td>6/2000</td>
<td>Pharmacotherapy for the Newborn Lung</td>
<td>California Society of Health Systems Pharmacists – Palm Springs, CA</td>
</tr>
<tr>
<td>10/2000</td>
<td>Congenital Heart Disease: a Neonatologists Perspective. Cardiothoracic Surgery Teaching Conference</td>
<td></td>
</tr>
<tr>
<td>9/2001</td>
<td>Don’t Need No Stinking Tubes, No More Aerosols</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 lectures for the Respiratory Care Fall Symposium</td>
<td></td>
</tr>
<tr>
<td>5/2002</td>
<td>FRC and the Zen of Mechanical Ventilation</td>
<td></td>
</tr>
<tr>
<td>10/2002</td>
<td>Neonatal Surgical Emergencies</td>
<td></td>
</tr>
</tbody>
</table>
5/2003  
Respiratory Distress Syndrome  
Transport Nurses & Physicians  
Loma Linda University Medical Center

6/2003  
Respiratory Distress Syndrome: The current state of surfactant therapy  
University of Connecticut  
Hartford, CN

9/2003  
Respiratory Distress Syndrome: The current state of surfactant therapy  
Brigham and Women’s Hospital  
Boston, MA

9/2004  
Respiratory Distress Syndrome: The current state of surfactant therapy  
George Washington University Hospital  
Washington, DC  
National Children’s Hospital  
Washington, DC

9/2004  
A New Look at Thyroid Function in Preterm Newborns.  
Academic Day for Neonatologists of Southern California, Irvine, CA

3/2006  
Lung Disease in the Term Infant  
Alumni Postgraduate Convention  
Loma Linda, CA

Chronic Lung Disease in the Newborn  
Zhejiang University Children’s Hospital  
Hangzhou, Zhejiang Province, China

Differential Diagnosis of the Unusual Appearing Infant  
Zhejiang University Children’s Hospital  
Hangzhou, Zhejiang Province, China

Lung Development  
Zhejiang University Children’s Hospital  
Hangzhou, Zhejiang Province, China

Lung Function and Mechanics  
Zhejiang University Children’s Hospital  
Hangzhou, Zhejiang Province, China

Mechanical Ventilation  
Zhejiang University Children’s Hospital  
Hangzhou, Zhejiang Province, China
<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/2007</td>
<td>Lung Disease in the Newborn</td>
<td>Zhejiang University Children’s Hospital Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>4/2007</td>
<td>Respiratory Distress Syndrome</td>
<td>Zhejiang University Children’s Hospital Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>4/2007</td>
<td>Persistent Pulmonary Hypertension of the Newborn</td>
<td>Zhejiang Province Pediatric Directors Meeting Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>4/2007</td>
<td>Cardiopulmonary Failure and ECMO</td>
<td>Grand Rounds Zhejiang University Children’s Hospital Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>5/2008</td>
<td>Survey of Newborn Lung Disease</td>
<td>Combined Schools of Respiratory Care Crafton Hills College Victor Valley College</td>
</tr>
<tr>
<td>5/2008</td>
<td>Respiratory Distress Syndrome</td>
<td>Combined Schools of Respiratory Care Crafton Hills College Victor Valley College</td>
</tr>
<tr>
<td>6/2008</td>
<td>Advanced Ventilation Strategies</td>
<td>Pediatric Surgery Grand Rounds Loma Linda, CA</td>
</tr>
<tr>
<td>8/2008</td>
<td>Advanced Ventilation Strategies</td>
<td>Anesthesiology Grand Rounds Loma Linda, CA</td>
</tr>
<tr>
<td>8/2008</td>
<td>Respiratory Distress Syndrome: The current state of surfactant therapy</td>
<td>Arizona Society for Respiratory Care Phoenix, AZ</td>
</tr>
<tr>
<td>10/2008</td>
<td>Chronic Lung Disease in the Newborn</td>
<td>Chinese Neonatology Society Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>10/2008</td>
<td>Pulmonary Hypertension in the Newborn</td>
<td>Chinese Neonatology Society Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>10/2008</td>
<td>Death, Dying, and Grief</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Details</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10/2008</td>
<td>Total Parenteral Nutrition</td>
<td>Zhejiang University Children’s Hospital Hangzhou, Zhejiang Province, China</td>
</tr>
<tr>
<td>2/2009</td>
<td>Collegiality and Conflict Resolution</td>
<td>Neonatology Fellow’s Symposium California Association of Neonatologists San Diego, CA</td>
</tr>
<tr>
<td>5/2008</td>
<td>Survey of Newborn Lung Disease</td>
<td>Combined Schools of Respiratory Care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Crafton Hills College</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Victor Valley College</td>
</tr>
<tr>
<td>5/2008</td>
<td>Respiratory Distress Syndrome</td>
<td>Combined Schools of Respiratory Care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Crafton Hills College</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Victor Valley College</td>
</tr>
<tr>
<td>6/2009</td>
<td>Pulmonary Hypertension in the Newborn</td>
<td>California Society for Respiratory Care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Riverside, CA</td>
</tr>
</tbody>
</table>

**Refereed Articles**


5. Job L, Emery JR, Hopper AO, Deming DD, Nystrom GN, Clark SJ, Nelson JC: Serum free thyroxine concentration is not reduced in premature infants with


Chapters and Review Articles


**Abstracts** (*indicates acceptance for formal presentation*)


Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex Palestinian Health Sector Reform and Development Project (Flagship Project)

1983


1989


39. Peverini RL, Hopper AO, Nyström GA, Deming DD, Myruskí K, Shirali GS,
Solarte D. Inhaled nitric oxide improves oxygenation but worsens lung mechanics in experimental respiratory distress syndrome. Presented to the Society for Pediatric Research 1995, Pediatric Research 1995; 37:345A


catheter position in the neonate: Chest radiography versus echocardiography. Presented to the *European Society of Pediatric Radiology*, Jerusalem, Israel, May 1999


* 51. Ippisch HM, Osher Anne, Job L, Deming DD, Kuhn MACardiac Effects of Dexamethasone Given to Extremely Low Birthweight Infants within the First 24 Hours of Life. Presented to the *Society for Pediatric Research*, San Francisco. CA, May 1999.


* 54. Rabin CW, Hopper AO, Vyhmeister NR, Job L, Deming DD, Clark SJ. Is the measured transient hypothyroxinemia of prematurity real or artifactual? Presented to the *California Association of Neonatologists*, Los Angeles, CA March 2001


* 89. Hopper AO, Ninnis JR, Mulla NF, Peverini RL, Terry MH, Deming DD. Persistent pulmonary hypertension in very low birthweight infants: role for
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)


* 91. Goldstein M, Terry M, Kim S, Merritt TA, Hopper A, Deming D, Fayard E, Peverini R. Can high frequency oscillatory ventilation (HFOV) be used in tandem with high frequency jet ventilation (HFJV)? Presented to the Pediatric Academic Societies, May 2009
ANNEX D: BIBLIOGRAPHY OF DOCUMENTS COLLECTED AND REVIEWED

1. Flagship Project Quarterly Report
2. MoH Institutional Development Plan
4. National Strategic Health Plan
5. Orientation Packet
6. Y1Q4 (July-Sep09) Quarterly Report Draft
7. Year 2 Annual Implementation Plan – Revised Feb 12, 2010
8. Year 1 Annual Report Draft
ANNEX E: LIST OF MATERIALS DEVELOPED AND/OR UTILIZED DURING ASSIGNMENT

1. Residency Goals and Objectives**LLUCH Pediatric Residency – goals and objects for every clinical rotation

2. Resuscitation Videos with Critique**
   - Handouts of Lectures given**
   - Neonatal Sepsis
   - Handwashing and Hand Hygiene
   - Early Infant Enteral Nutrition
   - High Frequency Ventilation
   - Gestation Age Assessment
   - Introduction to ECMO

3. Handout for SBAR Communication Skills**

4. Gestational Age Assessment – Lecture and handouts**

5. Protocol for Cooling of Infants with Hypoxic Ischemic Encephalopathy**

6. Hand Hygiene Protocol and Lecture – multiple documents**

7. These documents include the lecture given at RH and PMC, as well as support documents given to RH and PMC personnel for implementing a Hand Hygiene program * ‡

8. Thermoregulation Protocol ‡

‡ Document attached
* Electronic copies placed on the Flagship Project shared network drive
The following books and supplies were provided to RH and PMC:

<table>
<thead>
<tr>
<th>Item</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines for Perinatal care</td>
<td>2</td>
</tr>
<tr>
<td>Emergency Medicine Text Books</td>
<td>1</td>
</tr>
<tr>
<td>Perinatal and Pediatric. Respiratory Care</td>
<td>2</td>
</tr>
<tr>
<td>Neo Natal Resuscitation Textbook</td>
<td>2</td>
</tr>
<tr>
<td>Core Curriculum NICU Nursing</td>
<td>1</td>
</tr>
<tr>
<td>Care of the High Risk Neonatal</td>
<td>2</td>
</tr>
<tr>
<td>Manual of Neonatal Care</td>
<td>2</td>
</tr>
<tr>
<td>Egan’s Fundamentals of Respiratory Care</td>
<td>2</td>
</tr>
<tr>
<td>NICU Manuals</td>
<td>9</td>
</tr>
<tr>
<td>Manual of Neonatal Care</td>
<td>2</td>
</tr>
<tr>
<td>Certification and Reviews Neonatal Intensive Care Nursing</td>
<td>2</td>
</tr>
<tr>
<td>Neonatology Management Procedures</td>
<td>2</td>
</tr>
<tr>
<td>Adult Laryngoscope</td>
<td>3</td>
</tr>
<tr>
<td>Neonatal Laryngoscope</td>
<td>2</td>
</tr>
<tr>
<td>Perinatal and Pediatric Respiratory Care</td>
<td>1</td>
</tr>
<tr>
<td>Core Curriculum Neonatal Intensive Care Nursing</td>
<td>1</td>
</tr>
<tr>
<td>Feeding tubes</td>
<td>90</td>
</tr>
<tr>
<td>Enteral feeding tube with stylet</td>
<td>12</td>
</tr>
<tr>
<td>Emergency Medicine Textbook</td>
<td>1</td>
</tr>
<tr>
<td>S.T.A.B.L.E. materials</td>
<td></td>
</tr>
</tbody>
</table>
Infection Control Policy (see next page)
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Loma Linda University Children’s Hospital**  
**Operating Policy**  
**Department:** Neonatal ICU  
**Category:** Patient Care  
**Subject:** Infection Control  
**Code:** (314) M-302  
**Effective:** 08/2007  
**Replaces:** 12/2005  
**Page:** 1 of 3 |
| 1. | Those who may enter the NICU shall include the following:  
1.1 Persons directly involved in the care of or consulting regarding patients in the NICU.  
1.2 Persons involved in laboratory, x-ray or other approved studies involving patients in the NICU.  
1.3 Persons involved in providing supplies, housekeeping, food or medications.  
1.4 Other persons as per Nursing Policy (314) M-13 (Family Participation Guideline).  
1.5 Individuals with specific permission of one of the attending physicians or the Nurse Manager of the NICU. |
| 2. | Those who may not enter the NICU shall include the following:  
2.1 Persons not acknowledged by nursing and/or medical staff as having business in the NICU.  
2.2 Persons who have a known or suspected communicable illness. |
| 3. | The isolation rooms shall be used for transmission based precautions whenever indicated by Infection Control Policy M-50 (Standard and Transmission-Based Precautions). |
| 4. | Hands and arms shall be scrubbed for three minutes upon initial entry to the patient room for the purpose of direct interaction with an infant or equipment used in the care of infants. Alcohol liquid or foam may be used thereafter for non-soiled hand hygiene. |
| 5. | Appropriate gowning shall be required to enter the patient rooms for the purpose of direct interaction with an infant/equipment. |
| 6. | Only clean supplies and equipment may be taken into the patient rooms or to the supply lockers. Personal items e.g. staff purses, shall be stored in designated drawers in patient rooms. |
7. Employee unit approved apparel practice includes the following:

7.1 Employees are responsible for the purchase and maintenance of washable unit approved apparel.

7.2 The employee shall wear clean, hospital-provided cover gown when holding an infant.

7.3 Cover gowns are not required when leaving the unit.

7.4 Unit apparel shall not be considered personal protective equipment; therefore, it is imperative that for the protection of the employee that personal protective equipment be utilized appropriately as outlined in policy M-50 (Standard and Transmission-Based Precautions).

7.5 In the event an employee’s clothing becomes saturated with blood or body fluids, the employee shall be provided with a clean pair of hospital scrubs to complete their shift.

7.6 The employee’s personal soiled unit approved apparel must be placed in a plastic bag to prevent further contamination with other surfaces. The employee may wash the scrubs in normal laundry cycles according to the recommendations of the manufacturer.

8. Attached Guidelines (314) M-302.A shall be followed for the following requirements:

8.1 Hand hygiene

8.2 Isolation room procedure

8.3 Infectious disease environmental safety
Observations and Recommendations Regarding the Neonatal Intensive Care Unit at Rafidia Hospital and the Palestine Medical Complex

Palestinian Health Sector Reform and Development Project (Flagship Project)

<table>
<thead>
<tr>
<th>DEPARTMENT: NEONATAL ICU</th>
<th>Code: 314 M-302.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY: PATIENT CARE</td>
<td>Page: 1 of 2</td>
</tr>
<tr>
<td>SUBJECT: INFECTION CONTROL</td>
<td></td>
</tr>
</tbody>
</table>

### HAND HYGIENE PROTOCOL

1. **Hand Scrubbing:** As a person first enters the patient care areas of the unit he/she must remove all hand jewelry and watch and perform a thorough hand and forearm scrub/washing (including under nails) to decrease bacterial load.

2. **Subsequent Hand hygiene technique:**
   - Alcohol rub is as effective as good hand washing with antiseptic soap. It should be done with enough alcohol to rub and cover all fingers, hands and part of the forearm surfaces. It must be rubbed until dried. Hand washing when hands are soiled or when alcohol is not well tolerated. Hand washing should be performed for 15 seconds. Hands must be thoroughly dried thereafter.

3. **Timing of Hand Hygiene and Environment:**
   - Perform hand hygiene immediately before and after touching the infant or his/her clean environment (objects in direct contact with the infant: bed, linen, covering blanket, stethoscope, monitors and ventilator). Hand hygiene must also be performed immediately before manipulating patient tubing that is inserted in sterile body sites (i.e. IV tubing, art lines, chest tubes).
   - Consider area around patient (i.e. chart, peas, computer, chair etc) “dirty environment for patient’s sake”. If having hands involved in direct patient care use a clean glove as a barrier to touch these objects discarding the glove before touching the patient again.
   - Consider the monitor alarms and the ventilator knobs clean to the patient. This means that anyone silencing alarms or adjusting the ventilator should use hand hygiene before and after, just as if they were touching the patient. If you touch these areas without washing, they should be cleaned immediately afterwards.
   - Allow proper bed spacing between patients. Beds should have enough separation to allow a caretaker to walk between the beds without touching them. This would help to maintain the clean environment as such for each infant.

4. **Use of Gloves:**
   - Must wear gloves (CDC standard precautions) if touching non-intact skin, mucous membranes and body fluids (stool, urine, respiratory and oral secretions; i.e. Changing diaper, suctioning, feeding or placing NGs, dressing change, etc). Change gloves after diaper change before touching cleaner areas of the infant like NG and ET.
   - May wear gloves in direct patient care to enhance barrier and protect self, but still needs to wash or use alcohol before donning gloves for the initial patient contact and after discarding the gloves post patient contact.

5. No jewelry (rings, watches, bracelets of any kind) or acrylic nails are allowed when providing patient care. Bacterial count is several-fold higher in hands with these elements on. If physically unable to comply please talk with your manager to fill an exception petition form and wear gloves for all patient contacts.

Failing to perform proper hand hygiene, especially immediately after patient contact is not an oversight but a violation in patient care. Hand hygiene is considered your personal responsibility towards your patient.
ISOLATION ROOM PROCEDURE

1. Always follow transmission-based precautions sign when entering the isolation room. Gown, glove and mask as indicated on sign (even if only entering for a moment).
2. Discard contaminated gown/mask/gloves inside and use hand hygiene (sanitation/washing) before leaving the room. Once outside the room, perform hand hygiene again.
3. Do not use your own pens, clipboard or calculators inside the room. The unit provides for these items inside every isolation room. If needing to have data outside may write it on paper and stick it to the glass window to be able to read it from the outside (Please omit the name for patient confidentiality reasons)
4. Do not take patient’s charts outside the isolation room. If in need to write orders/notes use new, clean paper from the outside. Remember to stamp or hand write the correct patient’s name on the order sheet before handing them to the isolation nurse.

INFECTIONOUS DISEASE ENVIRONMENTAL SAFETY

1. No drinks or food are allowed in patient care areas
Thermoregulation Protocol

1. Ensure that the family understands the procedure, and answer their questions.
2. Identify the neonate using two patient identifiers.
3. Verify the prescribing practitioner’s order.
4. Gather and prepare needed supplies and equipment.
5. Perform hand hygiene.

In the Delivery Room

6. If the temperature of the room can be adjusted, warm the delivery room to above 25° C (78.8° F). Also, close doors and adjust vents in the room.
7. Before delivery of the high-risk or preterm neonate, place a radiant warmer in the delivery room.
8. If the stabilization nursery is not next door to the delivery room, prewarm a transport incubator for use in moving the neonate to the nursery.
9. Place the radiant warmer in the delivery room, out of the way so that it is not in a walkway or near air drafts.
10. Turn on and prewarm the radiant warmer with manual settings to a temperature of 36.5° to 37° C (97.7°-98.6° F).
11. Place all supplies that will be used for resuscitation or will touch the neonate on the warmer. Warm the hands and stethoscopes.
12. Ensure that a head covering more than ½-inch thick is available.
13. Ensure that blankets from a nearby blanket warmer are available.
14. Once the neonate is born, catch or place the neonate in a warmed sterile towel or blanket.
15. If medically indicated, stop momentarily for the mother and family to see and touch the neonate, and then proceed to place the neonate in the radiant warmer.
16. If needed, use additional warming techniques, such as an occlusive polyethylene body bag or plastic wrap, immediately after delivery and during stabilization for a very-low-birth-weight neonate.
17. Dry the neonate quickly, remove the wet towels or blankets from the bed space, and wrap the neonate in dry warmed blankets. Cover the neonate's head with a ½-inch thick hat.
18. Allow the parents to touch the neonate, after warming their hands, if possible.
19. Provide oxygen support as needed.
20. Transport the neonate in a prewarmed double-walled incubator to the NICU.
21. On entry into the NICU, weigh the neonate. If the incubator does not come equipped with a scale, place a heater over the freestanding scale, and prewarm the cover on the scale. Perform the weight measurement quickly and smoothly, and place the neonate in an incubator or on a radiant warmer.

Use of a Double-Walled Incubator

22. Once the decision to bring the neonate to the NICU has been made, prewarm a double-walled incubator or radiant warmer on air control (manual) at 37° C (99° F). Then set the incubator to the thermoneutral range (differs for age and size). Once the neonate has been placed in the incubator, set the air control inside the incubator according to the gestational and postnatal age of the neonate. Placed the neonate less than 1500 grams or thermally
unstable on skin temperature control. Always set radiant warmers on skin or servo mode to prevent overheating.

23. Place the double-walled incubator in a bed space that is free of drafts and away from doorways or air vents and, if in the winter season, outside windows.

24. Secure the temperature probe on the abdomen in accordance with the manufacturer’s guidelines. Choose a site that is away from bony areas and where the neonate will not be positioned or lying on top of the probe. Switch the incubator to skin (servo) control, and set at 36.5° C (97.7° F).

25. Take an axillary temperature for routine monitoring of core temperature. Hold the probe in place for 3 minutes or longer or in accordance with the manufacturer’s recommendations for an accurate reading.

26. Place all supplies that will be used to care for the neonate or will touch the neonate in the incubator. Warm the hands and stethoscopes.

27. In a neonate of less than 30 weeks of gestation, add 70% to 90% humidity to a double-walled incubator for the first 7 days of life (depending on the gestation and the permeability of the neonate’s skin). After the first week, continue humidity at 50% to 60% until the neonate reaches 30 to 32 weeks of postconception age.

28. If recommended by the manufacturer, use sleeves on portholes, especially if the neonate is premature, is of low birth weight, or exhibits thermal instability.

29. Perform more frequent monitoring of temperature regulation when the incubator is covered with blankets or is covered and then uncovered.

Use of a Radiant Warmer

30. Secure the temperature probe on the neonate’s abdomen using a foil-backed shield in accordance with the manufacturer’s guidelines. Choose a site that is away from bony areas and brown fat deposits; the neonate should not be positioned on top of the probe. Switch the radiant warmer to skin (servo) control set at 36.5° C (97.7° F).

31. Place all supplies that will be used to care for the neonate or will touch the neonate in the warmer. Warm the hands and stethoscopes.

32. Place a commercially approved chemical mattress or commercially approved warming pad with controlled heat settings under a neonate in a radiant warmer or incubator if an additional source of heat is required to maintain the neonate’s temperature.

33. If needed, place a polyethylene bag or plastic wrapping over the neonate from chin to feet.

http://app44.webinservice.com/NursingSkills/ContentPlayer/SkillContentInIFrame.aspx?...
07/02/2010

Rewarming a Hypothermic Infant

34. Closely monitor the neonate’s vital signs, level of consciousness, and acid-base status during rewarming.

35. If using an incubator for rewarming set the air temperature 0.5° to 1° C (0.9°-1.8° F) above the neonate’s rectal temperature. Once the core temperature reaches the air temperature and the neonate remains stable, increase the air temperature 0.5° to 1.5° C (0.9°-1.8° F) again. Continue the process until the neonate’s temperature is normothermic.

36. If using a radiant warmer for rewarming, set the servo control temperature at 36.5° C (97.7° F). Do not place a temperature probe over a bony service.
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex
Palestinian Health Sector Reform and Development Project (Flagship Project)

Treating Hyperthermia

37. If a neonate becomes hyperthermic (a temperature over 37.5° C [99.5° F]), identify the cause (i.e., environment, dehydration, withdrawing, sepsis, maternal hyperthermia).
38. Closely monitor the hyperthermic neonate, and perform interventions to decrease temperature to normothermic range depending on the cause. (Decrease the temperature of the incubator or warmer, partially undress or uncover the neonate, remove positioning devices to allow for extension, and evaluate and treat for dehydration and infection.)

Skin-to-Skin Contact

39. If medically indicated, encourage skin-to-skin contact (SSC) in full-term and preterm neonates for mild hypothermia of 36° to 36.4° C (96.8°-97.5° F).
40. Have the mother wear clothing with the opening in the front. Place the neonate on the mother's bare chest between the breasts, upright, with head turned to the side in contact with the mother's skin, wearing only a diaper. Place a warm blanket over the neonate, and a hat on the neonate's head.

Bathing the Neonate

41. Delay bathing until the neonate's temperature has been stabilized in the normal range for 2 to 4 hours; consider the metabolic effects of temperature stability such as glucose needs and oxygen requirements. Remove excess vernix, but the removal of all vernix is not necessary for hygienic purposes.
42. Monitor temperature closely before, during, and after the bath. Ensure that warmed towels and bedding are available, and discontinue the bath if the neonate displays distress. Encourage SSC directly after the bath if medically indicated.

Weaning to an Open Crib

43. Carry out weaning to an open crib slowly. Decrease the incubator temperature by 1° to 2° C (1.8°-3.6° F) every 12 to 24 hours until the incubator is at room temperature.
44. During weaning, dress the neonate with a hat and two blankets.
45. Place the neonate in an open crib, and keep the neonate away from drafts. Monitor the axillary temperature closely during this time.
46. Document the procedure in the neonate's record.


Last Reviewed: November 2009
**Alert**

The following findings in the neonate should be reported if they persist despite nursing interventions:

- Axillary core temperature less than 36.5°C (97.7°F)
- Incubator air temperature greater than 37.5°C (99.5°F)
- Increase of oxygen needs above baseline
- Weight loss or consistent inability to gain weight
- Temperature instability (hypothermia and hyperthermia)

**Overview**

High-risk and preterm neonates are often unable to stabilize and maintain body temperature without support; providing a neutral thermal environment allows conservation of limited resources for other necessary bodily functions.

Infants at risk for developing hypothermia include those who are premature, small for gestational age, critically ill, or hypoglycemic; those with sepsis, electrolyte imbalance, nutritional issues, or open skin defects; and those receiving neuromuscular blocking agents.

The practitioner must be familiar with the anatomic and physiologic characteristics of the infant’s skin. Some important risk factors for thermoinstability in infants include a large surface-to-weight ratio, limited brown fat stores, prematurity, and transepidermal water loss.

Understanding the principles of heat loss through the neonate’s skin is important. Neonates can lose or gain heat through four different mechanisms: (1) heat transfer via direct contact with hot or cold surfaces, or conduction; (2) heat transfer via air flow over a large body mass, or convection; (3) heat transmission through absorption via indirect contact from emission of infrared rays, or radiation; and (4) heat loss that converts liquid into vapor, or evaporation.

Newborns use nonshivering thermogenesis to generate heat. This process is accomplished by the metabolism of brown fat stores located in the neck area, around the kidneys, in the mediastinum, and in the scapular region. Although nonshivering thermogenesis is an efficient method of
Observations and Recommendations Regarding the Neonatal Intensive Care Units at Rafidia Hospital and the Palestine Medical Complex

Palestinian Health Sector Reform and Development Project (Flagship Project)

Figure 1


Figure 2


http://app44.webinservice.com/NursingSkills/ContentPlayer/SkillContentPlayerIFrame.as...