The nutritional status of an individual exerts a major influence on his or her response to treatment ability to avoid infections during recovery, and the overall duration of recuperation. Appropriate nutrition support to patients in hospital settings is increasingly seen as part of a comprehensive and holistic patient management system to ensure good recovery and health outcomes.

The Technical Consultation on Hospital Nutrition Practices in South-East Asia, held in New Delhi, India, from 30 November to 1 December 2010, addressed the present status of hospital nutrition support services in the Region and the bottlenecks preventing improvements. The development of a roadmap towards improved protocols and appropriate interventions was also discussed. This report presents the deliberations and recommendations of the consultation.
Technical Consultation on Hospital Nutrition Practices in South-East Asia

New Delhi, India, 30 November – 1 December 2010
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1. Introduction

A regional consultation on hospital nutrition practices in South-East Asia was organized by the Nutrition Foundation of India in collaboration with the World Health Organization’s Regional Office for South-East Asia, from 30 November to 1 December 2010, in New Delhi, India.

The technical consultation addressed the following issues:

(1) The present status of hospital nutrition support services in the Region and bottlenecks preventing improvements;

(2) Appropriate interventional approaches under various conditions, the optimal use of parenteral versus enteral nutrition, access devices, and appropriate formulations;

(3) A roadmap towards improving protocols, developing cost-effective approaches to nutrition intervention, and addressing the lacunae in availability of formulations, devices and personnel so as to improve health outcomes for patients.

Nineteen experts representing a wide range of specialties related to nutrition issues in hospitals, participated in the consultation.

The consultation was inaugurated by Dr Poonam Khetrapal Singh, Deputy Regional Director, WHO South-East Asia Region. Dr Singh also delivered the message from Dr Samlee Plianbangchang, Regional Director, WHO South-East Asia Region. In his message, the Regional Director said that the nutritional status of an individual exerted a major influence on his/her response to treatment, avoidance of infections during recovery and the overall duration of recuperation. A pre-existing or ensuing nutrition disorder could lead to an impaired immune response and wound healing among others, which would then have an adverse effect on treatment response and recovery. In recognition of these issues, appropriate nutrition support to patients in a hospital setting was increasingly seen as part of a comprehensive and holistic patient management system to ensure good recovery and health outcomes. In developed countries nutrition support systems had witnessed major advances in recent times and hospitals have
established protocols, a range of readily-available formulations and adequate expertise in appropriate intervention techniques.

Dr Plianbangchang said that a number of issues and questions needed to be considered: why and to what extent was hospital nutrition important in the Member States of the South-East Asia Region, given the endemic poor nutritional status of sizeable sections of the Region’s populations; how to bring about an optimum balance between parenteral and enteral nutrition, access devices and appropriate nutrition formulations, against the perspective of economic considerations, benefits and controversies; and would there be a single gold standard for all secondary and tertiary-level hospitals in the Region or would each Member State need to establish its own references and standards.

The two-day consultation was divided into five sessions: team approach to nutrition intervention; enteral and parenteral formulations; nutrient delivery – access devices and techniques; nutrition intervention in paediatric patients; solutions and recommendations. Each session was followed by group discussion on specific issues related to the theme for that particular session.

The consultation was based on a detailed background paper on the status of hospital nutrition in South-East Asia, prepared by the Nutrition Foundation of India. This paper reported that appropriate nutrition support to patients in secondary and tertiary care hospitals in South-East Asia countries is, by and large, ad hoc in nature with only a few hospitals maintaining proper protocols and trained staff. Availability of appropriate nutrition formulations and affordability of some of the sophisticated devices to facilitate nutritional intake of hospitalized patients, remain major constraints. All these issues needed to be addressed urgently as adequate, appropriate and timely nutrition support can save lives, shorten hospital stay, save costs and help in the quicker restoration of the patient to total health.

For the consultation, the term hospital nutrition included: systems/protocols/teamwork and other methodologies that hospitals employ to deliver nutrition support to patients; use of enteral formulations (home-based or commercial) and parenteral formulations, including disease-specific use; the use of access devices for nutrient delivery and the techniques involved in using them.
2. **Hospital malnutrition and nutritional therapy**

Hospital malnutrition exists and has an impact on both the care and the outcome of the patient and economic status of both patient and the hospital. Nutrition plays an important role in the clinical management of the hospital-based patient and should be regarded as active therapy in contrast to adjunctive therapy. The appropriate term to use in the clinical nutrition management of the hospitalized patient is “nutritional therapy”.

Nutritional therapy is a structured process which is best implemented by a multidisciplinary team composed of a physician, dietician/clinical nutritionist (as applicable), nurse and pharmacist. The best term for this team is Nutrition Therapy Team (NTT). There is enough evidence to show the effectiveness of a (NTT) in improving patient outcome by reducing infections, morbidity and mortality. It is practiced in major hospitals in the world. Each member of the team is required to understand the disease process and the appropriate nutrition therapy to be delivered. They are therefore expected to have the required training and experience in clinical nutrition management. [See Annex 3]

The optimum balance between awareness of the status of hospital malnutrition, the number of patients requiring priority nutritional therapy and the appropriate use of cost-effective measures of nutrition care delivery needs effective communication between the hospital administration and the nutrition therapy team.

3. **Nutrition in paediatric patients**

Malnutrition is common in critically ill children. They are also more prone to develop “in-hospital malnutrition” unless special attention is paid to the management such as steps to replace significant losses that take place from drains, wounds, stomas, procedures, specimen collection and restrictions imposed by poor gut functions, renal dysfunction, or fluid constraints.

Critically ill children are potentially more susceptible to catabolic stress potentiating malnutrition. Children have significantly higher resting energy expenditure (REE) and lower nutritional reserves per unit body weight; the quantity of protein as a percentage of body weight, lipid stores and
carbohydrate reserves are reduced. The REE of critically ill children ranges widely with the stage of illness, use of sedation and neuro-muscular blockade, type of major surgeries, post-operative period, presence of multiple organ system failure and use of mechanical ventilation. All these factors should be considered when estimating nutritional requirement.

Malnutrition adversely affects the outcome in critically ill children and also contributes to longer Paediatric Intensive Care Unit (PICU) stay and higher ventilation requirements, thus increasing hospital costs. Administration of enteral and/or parenteral formulations will help treat/prevent malnutrition in the hospital setting successfully. For treatment of severe malnutrition in children, the guidelines published by WHO are adequate. Growth monitoring in hospitalized patients is inadequate. Most methods used in growth monitoring have their limitations.

If a functional gut is available, enteral nutrition is preferable to parenteral nutrition. Total parenteral nutrition (TPN) or mixed nutrition is needed if there is intestinal failure, or if there are barriers to deliver optimum energy through the enteral route. In patients intolerant to enteral feeding, prokinetic agents can be used.

Infants and children may suffer biochemical essential fatty acid deficiency within one week if administered a fat-free diet. Administration of commercially available lipid solutions to parenterally-fed, critically ill neonates and children obviates the risk of essential fatty acid deficiency and results in improved protein utilization.

Enteral and/or parenteral nutrition should be made available to all paediatric patients. Standard enteral formulations are readily available. However, there are no individual parenteral nutrition formulations for paediatric patients; therefore, there is a need for compounding.

4. Parenteral nutrition

Parenteral nutrition is a lifesaving therapy; hence, it should be made available to all patients who need it, in a cost-effective manner. It should, however, be resorted to only when enteral nutrition is not feasible or is inadequate.
Parenteral nutrition is practiced in the Asia Pacific region with diverse indications and formulations. However, the availability of guidelines, though controversial, for the use of parenteral nutrition in different clinical situations has helped to keep the standards of practice acceptable for all practitioners. Parenteral nutrition in adults is different from parenteral nutrition in paediatric patients in the following areas: a) formulations for adult patients are available as “All in One” bags that make it easier for patient infusion and for long term storage. Formulations that need compounding usually cost more than the standardized “All in One” formulations; b) formulations for paediatric patients, especially newborns, are generally individualized. Therefore, compounding is essential. Short-term parenteral nutrition is feeding for a period of less than 14 days; while long-term parenteral nutrition is parenteral nutrition usage for more than fourteen 14 days. The currently available delivery devices and formulations in most countries of South-East Asia are inadequate especially from the standpoint of micronutrients and phosphates.

5. Parenteral nutrition access devices and techniques

Access devices and infusion pumps for parenteral nutrition are sufficiently available in tertiary care health facilities for safe and effective therapy. Peripheral lines can be used for parenteral nutrition, especially in a combined enteral nutrition and parenteral nutrition setup, and for short-term parenteral nutrition (less than two weeks.)

6. Enteral nutrition, enteral access devices and techniques

Enteral nutrition has an integral role in the management of disease as much as pharmaceuticals do. The components of the enteral nutrition regimen vary per patient and per disease process. Enteral nutrition formulas, devices, and peripherals should be considered as medical treatment and should be reimbursable.
7. Consensus statement

7.1 Hospital nutritional therapy

(1) Criteria for ideal and minimum standards of hospital nutrition practice should be set for the country.

(2) An accreditation system to determine the quality and acceptability of the standards of hospital nutrition care by the institution should be set up and performed on a regular basis.

(3) This criteria and accreditation system should be defined by designated and/or appropriate agencies from either the government or private sector.

(4) Criteria should be defined which require the presence of a nutrition therapy team in the hospital.

(5) A nutrition therapy team should be multidisciplinary and function with clear delineation of roles for each member.

(6) A nutrition therapy team delivers the best nutrition care compared to a multi-tasking nutrition caregiver.

(7) All nutrition therapy team members should have training/exposure in clinical nutrition and their duties defined:
   – Individual members should be responsible for their actions in the overall clinical nutrition management of the patient.
   – There should be information flow in all directions as all members of the team should be clear on what the others’ plans and/or actions are.

(8) A physician is the preferred leader of the NTT; however, if there is no physician who is qualified, the team can make or recommend its choice.

(9) Full recognition and utilization of unique professional attributes and capabilities of nurses, dietician / clinical nutritionist (as applicable) and pharmacist should be made to enhance the quality of the nutrition care of the patient due to capabilities unique to their profession.
(10) There should be outcomes determined (in the form of improvement, adverse events, and subsequent changes) and collected from each nutrition intervention.

(11) Hospital administration should provide full support and cooperation to the nutrition team.

(12) The number of patients served by a nutrition team should be determined. Thus, the total number of nutrition therapy teams required per hospital can be determined. Ideally one team per hospital will suffice. However, certain situations may warrant more teams:
- If the work load is high
- If required by different sections like surgery, neonatology, paediatrics, diabetic centres, renal centres and others.

(13) Governments should be committed in pursuing this programme as proper nutrition therapy is important as much as pharmaceuticals and other interventions required in patient care.

7.2 Nutrition in paediatric patients

(1) Special enteral nutrition and modular formulas for specific disease conditions, such as chronic renal and liver diseases need to be made available commercially.

(2) Paediatric parenteral formulations should be made available, especially a small volume (250 ml) “all-in-one” parenteral nutrition bag designed specifically for infants and children. Availability of dextrose 50% and multivitamins mix for infusion should also be addressed.

(3) A bacterial filter should be used in all parenteral nutrition infusions.

(4) Compounding facilities with adequate sterility and clean room, and pharmacy personnel with adequate training in compounding should be made widely available. In the absence of these specialists, only the physician should be allowed to compound the parenteral nutrition formulations.

(5) It is recommended that central mixing facilities for compounding should be created in cities and regions, which can provide
service to other hospitals in the city and act as ‘centres of excellence’ for training of professionals.

(6) Severe acute malnutrition with complications should be managed in hospitals.

(7) Ready-to-use foods (RUTF) from local sources should be made available for treatment of severe acute malnutrition. A micronutrient mix containing important micronutrients and vitamins recommended in WHO’s guidelines for treatment of severe malnutrition should also be made available.

(8) The nutritional status of all children admitted to the hospital/visiting out patients department, should be assessed and categorized appropriately.

(9) It is recommended that development of an appropriate formulation for use in case of allergy, is facilitated.

7.3 Parenteral nutrition

(1) Indications for parenteral nutrition should be clearly defined. Macronutrient and micronutrient needs should be adequately addressed.

(2) For the paediatric population the determination of energy and nutrient requirements should be addressed appropriately.

(3) For parenteral nutrition (PN) formulations currently available in the South-East Asia Region, issues regarding the effect of extreme temperature and humidity on the shelf-life of these formulations need to be addressed by:

- Following the manufacturer’s recommendations
- Performing the appropriate check lists for compounding facilities.

(4) All additions to the parenteral formulas such as multivitamins or pharmaconutrients should be done using a strict aseptic technique.

(5) A bacterial filter should be used for all parenteral nutrition infusions:
If it is a “two-in-one” PN bag solution, use a 0.22 micron filter.

If it is a “three-in-one” PN bag solution (which includes lipid), use a larger filter (5 micron size).

(6) Regarding utilization of a bottle or bag for delivery of parenteral nutrition (PN):

– Bottled PN solutions are ideal for situations where compounding is required especially for paediatric patients.

– For “ready-to-use” PN solutions, bags are preferable.

(7) Aseptic techniques are mandatory for infusion of solution from PN bags.

(8) Administering and monitoring parenteral nutrition is the main responsibility of the attending physician or team in consultation with the nurse and pharmacist.

(9) To maximize utilization of compounding and reduce cost, it is recommended to establish certified facilities to handle compounding and administration of intravenous nutrition according to good pharmaceutical practice (‘centres of excellence’ for compounding) to serve a group of hospitals in the area.

7.4 Parenteral nutrition access devices and techniques

(1) Antibiotic-/antiseptic-coated devices should be preferred to standard venous catheter depending on availability and affordability.

(2) Central venous catheters with multiple ports should be used with a dedicated line for parenteral nutrition.

(3) Pharmacy units should be equipped to compound parenteral nutrition products.

(4) Infusion pumps should be used to deliver parenteral nutrition solutions. However, in the absence of a pump, parenteral nutrition should not be denied.

(5) When giving peripheral parenteral nutrition, it is recommended to use extension tubing.
7.5 **Enteral nutrition, enteral access devices and techniques**

1. Diet formulation should meet all the nutrient requirements for the day.

2. Ready-made, balanced, complete and packaged formulations can be used to provide required diseasespecific nutrients and they should be made available through the pharmacy.

3. Blenderized diets have not been shown to be effective in delivering adequate nutrients and should be avoided especially in the very sick hospitalized patient (e.g. severely malnourished critical care or geriatric patient). These may be given if the ready-made enteral formulas are not available.

4. Enteral access devices should be readily available in all institutions. These should be made of biocompatible material such as silicone and polyurethane.

5. Finer bore feeding tubes should be preferred; these reduce occurrence of nosocomial sinusitis.

6. If enteral feeding goal is not achieved supplemental parenteral nutrition is needed.
### Annex 1

#### Programme

**Day 1 (30 November 2010)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8.30 – 9.00 AM</td>
<td>Registration</td>
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<tr>
<td>9.00 – 9.05 AM</td>
<td>Welcome Address by the President of NFI – <strong>Dr. C. Gopalan</strong></td>
</tr>
<tr>
<td>9.05 – 9.15 AM</td>
<td>Message from the Regional Director, WHO South-East Asia Region (to be read by Dr Poonam Khetrapal Singh, Deputy Regional Director, WHO-SEAR)</td>
</tr>
<tr>
<td>9.15 – 9.20 AM</td>
<td>Objectives of the meeting and introduction of participants – Representative of NFI</td>
</tr>
<tr>
<td>9.20 – 9.30 AM</td>
<td>What WHO expects from this meeting – representative of WHO</td>
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</table>

**10.20 – 1.15 PM**  
**Session 1: “Team approach to nutrition intervention”**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>10.20 – 10.30 AM</td>
<td>Potential benefits of a team-based approach to nutrition intervention: <strong>Dr Luisito Lido</strong></td>
</tr>
<tr>
<td>10.30 – 1.15 PM</td>
<td><strong>Group Discussion</strong></td>
</tr>
</tbody>
</table>

Lead discussant – **Dr. Luisito Lido**

Discussants – Dr. K. Sriram, Dr. R.K. Tandon, Dr. Thanyadej Nimmewudipong, Dr. Pravin Amin, Dr. Varsha, Ms. A. Ketmek, Dr. Harbans K. Dhillon

Moderator – Dr. Sarath Gopalan

Rapporteur – Dr. Pujitha Wickramasinghe

**Suggested issues for discussion:**

- Effectiveness of nutrition support teams
- Specific role of team members
- Decision-making regarding nutrition intervention
- Practical issues involving nutrition support teams and implication
• Total Parenteral Nutrition (TPN) teams – are they effective?
• Modification of approach based on hospital setting – how to improvise?

2.00 – 3.30 PM  Session 2: Enteral and parenteral formulations
2.00 – 2.10 PM “Standard” versus “disease-specific” enteral formulations:
Ms. Luciana B. Sutanto
2.10 – 2.20 PM “Standard” versus “disease-specific” parenteral formulations:
Dr. B. Ravinder Reddy
2.20 – 3.30 PM Group Discussion (2 Parallel Sessions)
I. Lead discussant for enteral formulations – Ms. Luciana Sutanto
Discussants for enteral formulations – Dr. Sun Sunatrio, Dr. Luisito Lido, Dr. Varsha, Dr. Pujitha Wickramasinghe
Moderator – Dr. K. Sriram
Rapporteur – Dr. Thanyadej Nimmewudipong
II. Lead discussant for parenteral formulations – Dr. B. Ravinder Reddy
Discussants for parenteral formulations – Dr. K. Sriram, Dr. Sunit Singhi, Dr. Thanyadej Nimmewudipong, Ms. A Ketmek, Dr. Harbans K Dhillon.
Moderator – Dr. Pravin Amin
Rapporteur – Dr. Sarath Gopalan

Suggested issues for discussion:-
• Do the formulations currently available address appropriately the energy and nutrient requirement in the specific setting?
• Experiences of the discussants regarding efficacy of the enteral and parenteral formulations.
• Applicability in the context of both cost-effectiveness and nutritional status of the patients in the Region.
“Home-based” versus “commercial” enteral formulations.

- “Centralized” PN mixing versus “individual” PN mixing units.

3.45 – 5.00 PM  Session 3: Nutrient delivery: access devices and techniques

3.45 – 3.55 PM  Overview of enteral access devices and techniques: Dr. Thanyadej Nimmanwudipong

3.55 – 4.05 PM  Overview of parenteral access devices and techniques: Dr. Pravin Amin

4.05 – 5.00 PM  Group Discussion (2 Parallel Sessions)

I. Lead discussant for enteral access devices – Dr. Thanyadej Nimmanwudipong

Discussants for enteral access devices – Dr. Luisito Lido, Dr. R.K. Tandon, Dr. B. Ravinder Reddy, Dr. Sun Sunatrio

Moderator – Dr. Varsha

Rapporteur – Ms. Luciana Sutanto

II. Lead discussant for parenteral access devices – Dr. Pravin Amin

Discussants for parenteral access devices – Dr. K. Sriram, Dr. Harbans K. Dhillon, Ms. A. Ketmek, Dr. Pujitha Wickramasinghe

Moderator – Dr. Sunit Singhi

Rapporteur – Dr. B. Ravinder Reddy

Suggested issues for discussion:-

- Are the available devices sufficient and suitable for appropriate enteral and parenteral access in specific clinical situations?

- Experiences of participants in using the devices and perceived lacunae.

- Suggestions by participants to ensure appropriate and effective nutrient delivery.
Day 2 (1 December 2010)

10.00-1.00 PM  Session 4: Nutrition intervention in the Paediatric patient

10.00 – 10.15 AM  Special requirements in the paediatric patient and modification of approach to nutrition intervention in the critically ill child: Dr. Sunit Singhi

10.15 – 1.00PM  Group Discussion

Lead discussant for Paediatric nutrition – Dr. Sunit Singhi
Discussants – Dr. Pujitha Wickramasinghe, Dr. Varsha, Dr. Harbans K. Dhillon
Moderator – Dr. Sarath Gopalan
Rapporteur – Dr. Luisito Lido

Suggested issues for discussion:-

- Issues related to energy, nutrient composition and osmolality of paediatric enteral formulations.
- Availability of disease-specific paediatric enteral formulations.
- Feasibility of all-in-one parenteral nutrition formulations for paediatric patients.

2.00 – 3.30 PM  Solutions and Recommendations - All Participants

3.30 PM  Vote of thanks followed by tea
## Annex 2

### List of participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Role</th>
<th>Location</th>
<th>Email/Emails</th>
</tr>
</thead>
<tbody>
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<td></td>
</tr>
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</table>

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Annex 3

Hospital Nutritional Therapy

I. Processes

(1) Nutrition screening and assessment to determine patients who are at risk of developing nutrition related complications.

(2) Nutrition care plan development for the “at risk” patients
   a. Determination of nutrient requirements
   b. Formulation of solutions
      i. Oral nutrition
      ii. Enteral nutrition
      iii. Parenteral nutrition

(3) Nutrition care delivery of the formulated solutions

(4) Monitoring of the nutrition care plan delivery

(5) Reassessment or termination of the nutrition care plan delivery

(6) Nutrition audits

(7) Education and research.

II. Composition and functioning of the nutrition therapy team and role of members

(1) **Physician** – acts as the team leader who takes the final decision on the medical and/or surgical care of the patient. He/she performs nutrition assessment and formulates the nutrition care plan after discussions with other members of the team. It would be best to leave the leadership of the team in the hands of the chief physician as he/she is in-charge of the patient and as patients wish to have their physicians to have control over all issues pertaining to the treatment. The chief physician must take the final responsibility for nutrition prescription especially parenteral nutrition. However, the physician should have ongoing interaction and communication with other team members about the changes, progress and further plans.
Dietician /clinical nutritionist (as applicable) - is mainly in charge of the nutrition screening and assessment and the nutrient formulation for the patient mainly the oral and enteral nutrition. Also performs nutritional assessment and formulates the nutrition care plan.

[*Dietician - professional with basic nutrition course and training in institution (hospital) - based food preparation and delivery.
**Clinical nutritionist - professional who is mainly involved in hospital-based practice and focused on bedside patient care like critical care from nutrition screening to development and monitoring of nutrition care plan.

(3) Pharmacist – is mainly in charge of the parenteral nutrition and determines interactions among parenteral nutrient compounds as well as drug and stability issues.

(4) Nurse – is mainly in charge of performing nutrition screening, nutrition care plan delivery, and monitoring of the nutrition care process. These are the reasons why a nurse is an added asset to the nutrition therapy team:

a. They are closer to and have more contact with the patients
b. They spend more time with the patients
c. They directly execute the nutrition management plan
d. They are the first to spot any complication(s) or adverse effect(s) in the patient that could be related to the nutrition intervention (e.g. diarrhoea, allergic reaction, or presence of infected central line).
e. However, they need special training/exposure in clinical nutrition.

III. Standards for nutrition management in hospitals

Minimum standards – defined as the basic processes of nutrition management which may include the following:

a. Nutrition screening to detect severe malnutrition among hospitalized patients.
b. Nutrition care plan formulation and delivery for the severely malnourished patient.
Ideal standards – defined as the complete process of nutrition management.

IV. Limitations of a multi-tasking clinical nutrition caregiver

A multi-tasking clinical nutrition caregiver will need to perform the following functions: nutritional assessment; nutrition prescription; and followup of nutrition-related matters. However, the volume of emerging knowledge in clinical nutrition is so vast that no single person can adequately handle all activities related to clinical practice and nutrition intervention.
The nutritional status of an individual exerts a major influence on his or her response to treatment ability to avoid infections during recovery, and the overall duration of recuperation. Appropriate nutrition support to patients in hospital settings is increasingly seen as part of a comprehensive and holistic patient management system to ensure good recovery and health outcomes.

The Technical Consultation on Hospital Nutrition Practices in South-East Asia, held in New Delhi, India, from 30 November to 1 December 2010, addressed the present status of hospital nutrition support services in the Region and the bottlenecks preventing improvements. The development of a roadmap towards improved protocols and appropriate interventions was also discussed. This report presents the deliberations and recommendations of the consultation.