Using Laboratory Folate Status Assessment to Strengthen NTD Prevention

Interactive Webinar

Join us on March 4th at 9 a.m. EST to learn about a regional laboratory training approach to improve folate status assessment to advance neural tube defect (NTD) prevention.

March 4th, 2019 / Click Here to Register

09:00AM – 10:30AM EST

Hosted by the Folate Task Team

Nutrition International
Nourish Life
The Folate Task Team

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Core Engagement
List of Speakers

Homero Martinez  MD, PhD
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Christine Pfeiffer  BS, MS, PhD
Chief, Nutritional Biomarkers Branch, Division of Laboratory Sciences, CDC National Center for Environmental Health

Renuka Jayatissa  MBBS, MSc, MD
Department Head, Nutrition Medical Research Institute, Sri Lanka

Kehkashan Begum  MSc, Manager, Nutrition Research Laboratory, Karachi, Pakistan

FOLATE TASK TEAM
Dr. Homero Martinez
MD, PhD
Senior Technical Advisor
Nutrition International

FOLATE TASK TEAM
SUPPORTING A GLOBAL STRATEGY FOR THE CONTROL OF FOLATE DEFICIENCY AND FOLIC ACID RESPONSIVE NEURAL TUBE DEFECTS (ANENCEPHALY AND SPINA BIFIDA)

A grant by the
Bill & Melinda Gates Foundation
to Nutrition International
Background

• In 2016/2017, the Micronutrient Forum convened at NI a technical consultation on Folate Status in Women and NTD prevention.

• Main objectives of the consultation were:
  ✓ To develop a roadmap for low- and middle-income countries to better inform and prioritize investments in NTD risk-reduction
  ✓ To help guide implementation efforts in terms of feasibility of interventions and the potential for acceleration
  ✓ To identify the knowledge gaps that remain including addressing any questions on safety and efficacy of folic acid interventions
Two original contributions relevant for this work


Main challenges to address

✓ Improving the folate status of women of reproductive age (WRA) before they are pregnant can help prevent the majority of folate-responsive NTDs

✓ However, several challenges remain, including:
  • Limited information on folate status in WRA, using a harmonized microbiological assay to measure red blood cell folate
  • Limited use and availability of laboratories properly trained in the recommended method to assess folate status
To address and overcome these challenges, Nutrition International proposed to:

- Build capacity in selected LMIC to assess folate status, with a view to establish a future global network of regional laboratories

  • In collaboration with CDC-DLS, the project seeks to:
    ✓ Identify 5 regional labs to send 2 trainees each to CDC-DLS
    ✓ Provide these labs with equipment/reagents to conduct MBA to determine RBC folate
    ✓ Produce a training video to shorten training time and provide long-lasting support
    ✓ Set the basis for a future global network of regional lab
A systemic capacity building approach
Dr. Christine Pfeiffer
BS, MS, PhD

Chief, Nutritional Biomarkers Branch
Division of Laboratory Sciences
CDC National Center for Environmental Health

FOLATE TASK TEAM
Using Laboratory Folate Status Assessment to Strengthen Neural Tube Defect Prevention: A Regional Training Approach

Christine M Pfeiffer, PhD
Chief, Nutritional Biomarkers Branch
Disclosure

Funding for this project has been provided by the Bill & Melinda Gates Foundation and Nutrition International, Canada to the CDC Foundation
Outline

- Why the folate microbiologic assay?
- Why a regional approach?
- Components of successful capacity building
- Project goal and objectives
- Training approach
- Laboratory engagement
- Progress
- Way forward
Good folate status is needed during periods of growth and development
Folate lab measurements face multiple analytical challenges

**Compound related**
- Several folate derivatives
- Susceptibility to oxidation, decomposition, and interconversions
- Folate derivatives have different affinities to folate binding protein
- Low serum folate levels in serum and blood
- Deconjugation of folate polyglutamates in RBCs

**Sample collection related**
- Need well-controlled collection, processing, and storage conditions
- Need to accurately generate whole blood hemolysate for RBC folate
Outline

- Why the folate microbiologic assay?
- Why a regional approach?
- Components of successful capacity building
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- Way forward
Three major types of folate analytical methods

**1950s & 1960s**
- Microbiologic assay (MBA)
  - Inexpensive & valid
  - Simple & inexpensive
  - Requires low specimen volume (<50 µL)
  - Acceptable accuracy & precision
  - In-house control of performance
  - Lengthy manual assay
  - Inhibited by antibiotics or anti-folates

**1970s & 1980s**
- Protein-binding assay (PBA)
  - Easy but not comparable
  - Commercially available
  - Fully automated & high throughput
  - Good precision, but questionable accuracy
  - No in-house control
  - Lot-to-lot variability

**2000s**
- Chromatography assay (e.g., LC-MS/MS)
  - Expensive & complex
  - Can achieve highest accuracy & precision
  - In-house control of performance
  - Expensive & technically complex
MBA – practical choice for low-resource labs

- Assay used to derive cutoff values for folate deficiency (megaloblastic anemia) and insufficiency (risk of neural tube defects, NTDs)
- Assay recommended by WHO for population surveys
Lab-to-lab variability improved with use of common critical reagents (microorganism and calibrator)

Zhang et al., J Nutr 2018

23 serum and WB samples from US blood bank donors analyzed in replication (n=2)
Outline

- Why the folate microbiologic assay?
- Why a regional approach?
- Components of successful capacity building
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- Way forward
Each country has a limited need for blood folate measurements at the population level

- Periodic nature of surveys (baseline, follow-up to assess impact, periodic monitoring)
- Routine lab can handle ~10,000 samples/year
- Interruptions of routine analysis may lead to problems when assay is restarted

Efficient approach - **Network of regional resource laboratories**:

- Proficient at conducting the MBA
- Willing to perform fee-for-service work for other countries
- Produce reliable folate data that can be compared across labs and over time
Outline

- Why the folate microbiologic assay?
- Why a regional approach?
- Components of successful capacity building
- Project goal and objectives
- Training approach
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- Way forward
Building and sustaining lab capacity entails more than just training.

- Training tools
- Lab training
- Lab supplies
- Network of labs & Umbrella org
- Performance verification program
- Assay kit
- Tools
- Skills
- Staff and Infrastructure
- Structures, Systems, Roles

Capacity pyramid by Potter & Brough, 2004
Outline

- Why the folate microbiologic assay?
- Why a regional approach?
- Components of successful capacity building
- Project goal and objectives
- Training approach
- Laboratory engagement
- Progress
- Way forward
Facilitate the development of regional resource labs to assess folate insufficiency and monitor prevention strategies globally

- Train 6-12 laboratories worldwide (across WHO regions)
- Provide critical supplies to new resource laboratories
- Develop a training video for the folate MBA
- Develop comprehensive tool package (training manual, posters, SOPs)
- Provide start-up and/or survey assay kit containing critical reagents
- Set up performance verification program for testing laboratories
- Initiate steps to develop a network of resource laboratories
- Identify an umbrella organization to host the network
Outline

- Why the folate microbiologic assay?
- Why a regional approach?
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CDC Training – 2018 Dec
Sri Lanka & Tanzania
Training planning and execution – expect the unexpected

Logistical planning
- Identify trainees
- Invitation letters
- Trainee visa/passport
- CDC Guest Researcher approval
- CDC Security Clearance
- Travel arrangements

Technical preparation
- Identify & fulfill supply needs
- Produce training video
- Generate training manual
- Develop training posters
- Assemble other training tools
- Prepare host lab for training

Training execution
- Lab safety orientation
- Demonstrate/observe procedure
- Allow for repeat experiments
- Review instrument operation & maintenance
- Teach proper data review
- Discuss QC rules & QA program
- Provide start-up kit & some supplies

Post-training follow-up
- Assist remotely with questions & troubleshooting
- Review & interpret trainee lab data
- Provide guidance on assay improvement
- Determine lab proficiency
### Traditional 2-week training format

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Run 1</td>
<td></td>
<td></td>
<td></td>
<td>Run 3</td>
<td></td>
<td>Run 2</td>
<td></td>
<td>Run 4</td>
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<td></td>
<td>Run 5</td>
<td></td>
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</tr>
</tbody>
</table>

### New 5-day training format – video-assisted

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run 1</td>
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<td>Run 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Run 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Review folate MBA training video and other materials ahead of time*
## Training components – Folate MBA step-by-step

<table>
<thead>
<tr>
<th>Prepare reagents</th>
<th>Dilute samples</th>
<th>Prepare 96-well plates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Prepare reagents" /></td>
<td><img src="image2.png" alt="Dilute samples" /></td>
<td><img src="image3.png" alt="Prepare 96-well plates" /></td>
</tr>
<tr>
<td>Dilute calibrator &amp; add to 96-well plate</td>
<td>Add samples to 96-well plates</td>
<td>Seal &amp; incubate plates</td>
</tr>
<tr>
<td><img src="image4.png" alt="Dilute calibrator &amp; add to 96-well plate" /></td>
<td><img src="image5.png" alt="Add samples to 96-well plates" /></td>
<td><img src="image6.png" alt="Seal &amp; incubate plates" /></td>
</tr>
<tr>
<td>Read plates</td>
<td>Review results</td>
<td>Clean up &amp; disposal</td>
</tr>
<tr>
<td><img src="image7.png" alt="Read plates" /></td>
<td><img src="image8.png" alt="Review results" /></td>
<td><img src="image9.png" alt="Clean up &amp; disposal" /></td>
</tr>
</tbody>
</table>
Outline

- Why the folate microbiologic assay?
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## Selection criteria for trainee labs to ensure successful technology transfer

<table>
<thead>
<tr>
<th>INSTITUTION</th>
<th>TRAINEE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requirements to ensure successful assay implementation in country laboratories</strong></td>
<td><strong>Requirements to ensure efficient training</strong></td>
</tr>
<tr>
<td>- Laboratory conducts public health related work</td>
<td>- Proficiency written &amp; spoken English</td>
</tr>
<tr>
<td>- Supportive management</td>
<td>- Bachelor of Science degree</td>
</tr>
<tr>
<td>- Provide laboratory space</td>
<td>- Advanced degree (MS or PhD) desirable</td>
</tr>
<tr>
<td>- Continuity in personnel</td>
<td>- Research experience highly desirable</td>
</tr>
<tr>
<td>- Equipment &amp; supplies available or readily procurable</td>
<td>- Experience with biological specimens and pipettes</td>
</tr>
<tr>
<td>- Quality assurance program in place</td>
<td>- Ability to work with MS Office</td>
</tr>
<tr>
<td></td>
<td>- Good interpersonal &amp; organizational skills</td>
</tr>
</tbody>
</table>
Needs assessment of trainee labs

Developed detailed folate MBA supply checklist:

- Essential chemicals, supplies and equipment – 37 item list @ $23K US
- “Helpful” chemicals, supplies and equipment – 12 item list @ $16K US

### Folate Microbiologic Assay – Essential (tier I) chemicals, supplies, and equipment

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Unit price</th>
<th>Units needed</th>
<th>Total price</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folic acid case medium (Himedia M543, 100 g). No alternative available as of 2018.</td>
<td>$130</td>
<td>3</td>
<td>$390</td>
<td>One bottle sufficient for 3 runs with 5-6 plates/run (~100 samples) or 12 runs with 2-4 plates/run; purchase 3 bottles to set up assay and have some extra for a small study.</td>
</tr>
<tr>
<td>L-sodium ascorbate, 99% purity (Ex: Fisher item # AC352685000, 500 g). Alternate brand can be used.</td>
<td>$113</td>
<td>1</td>
<td>$113</td>
<td>One bottle lasts for several years; need only 3.5 g/run</td>
</tr>
<tr>
<td>Tween-80 (Ex: Fisher Item # T054625G, 25 g). Brand can be substituted.</td>
<td>$16</td>
<td>1</td>
<td>$16</td>
<td>One bottle lasts for several years; need only 60 µL for 200 mL medium</td>
</tr>
<tr>
<td>Ethyl alcohol, 100%, USP (Ex: Fisher Item# 07-678-005, 500 mL). Alternate brand can be used.</td>
<td>$43</td>
<td>1</td>
<td>$43</td>
<td>Used to clean pipettes</td>
</tr>
<tr>
<td>Bleach or alternate disinfectant</td>
<td></td>
<td></td>
<td></td>
<td>Added to leftover medium to deactivate non-pathogenic bacteria</td>
</tr>
<tr>
<td>Disinfectant hand soap – can be purchased from household store</td>
<td></td>
<td></td>
<td></td>
<td>Used to wash hands after lab work</td>
</tr>
<tr>
<td><strong>SUM</strong></td>
<td><strong>$302</strong></td>
<td></td>
<td><strong>$562</strong></td>
<td></td>
</tr>
</tbody>
</table>
Capacity assessment of potential network labs

Developed 7-part Lab Readiness Questionnaire to provide objective parameters for decision-making

1. Proficiency in conduct of folate MBA
2. Previous collaboration with CDC preferred
3. Participation in folate MBA harmonization efforts
4. Capacity and willingness to analyze samples from other countries
5. Skilled technical staff and stable workforce
6. Appropriate laboratory resources and infrastructure
7. Supportive organization and management

Round one – fall 2018:
• Contacted 18 labs from 17 countries
• 15 potential; 1 logistical issues; 2 no response

Round two – early 2019: Ongoing inquiry
Outline

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CDC Training – 2018 Dec
Sri Lanka & Tanzania
Training video development took nearly 4 months

- Select video production company

- Pre-production (~6 weeks)
  - Script preparation and visualization
  - Voice-over recording
  - Scout and prep shooting location

- Production (1 day)
  - Ten hour in-lab shoot

- Post-production (~8 weeks)
  - Editing, review and revision
  - Graphics addition

- Web hosting – CDC Foundation
Folate Microbiologic Assay Training Video
Training aids increase the efficiency & effectiveness of the folate MBA training
## Recently trained 5 countries from 4 WHO regions

<table>
<thead>
<tr>
<th>WHO Region</th>
<th>Country trained</th>
<th>Year of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Pacific</td>
<td>Philippines</td>
<td>2019 January</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>Viet Nam</td>
<td>2019 January</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>Pakistan</td>
<td>2019 January</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>Sri Lanka</td>
<td>2018 December</td>
</tr>
<tr>
<td>Africa</td>
<td>Tanzania</td>
<td>2018 December</td>
</tr>
<tr>
<td>Americas</td>
<td>Chile</td>
<td>2017 May</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>India (2 labs)</td>
<td>2016 September</td>
</tr>
<tr>
<td>Africa</td>
<td>Ethiopia</td>
<td>2015 August</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>China</td>
<td>2013 August</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>Iraq*</td>
<td>2010 November</td>
</tr>
<tr>
<td>Americas</td>
<td>USA**</td>
<td>2010 April</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>Jordan</td>
<td>2009 August</td>
</tr>
<tr>
<td>Americas</td>
<td>Venezuela**</td>
<td>2008 May</td>
</tr>
<tr>
<td>Europe</td>
<td>Uzbekistan**</td>
<td>2007 April</td>
</tr>
</tbody>
</table>

* Lab not available due to logistical issues  
** Lab no longer available
Outline

- Why the folate microbiologic assay?
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CDC Training – 2019 Jan
Pakistan, Philippines & Viet Nam
Once newly trained lab technicians can demonstrate proficiency, they need to put their skills into practice to maintain proficiency.

That means, analyzing samples, and more samples…
Build global network of ~12 resource laboratories proficient in the folate MBA across 6 WHO regions

Selection of resource laboratories based on assay performance and capacity

https://www.who.int/about/regions/en/
New proposed project components to enhance and expand the reach and impact of this project

- Collaborate with the future umbrella organization that will host the network to guide resource labs to self-sustainability
- Train additional laboratories in order to achieve required balance and representation in each WHO region
- Explore the potential to expand the scope of the resource laboratories to other micronutrients

CDC Training – 2019 Jan
Pakistan, Philippines & Viet Nam

CDC Training – 2018 Dec
Sri Lanka & Tanzania
Acknowledgments

CDC Global Micronutrient Team at Nutritional Biomarkers Branch
CDC Foundation
Collaborators at Nutrition International, Folate Task Team
Colleagues at CDC Birth Defects and Chronic Centers
Using Laboratory Folate Status Assessment to Strengthen NTD Prevention – Sri Lankan Experience

Dr. Renuka Jayatissa
Head, Department of Nutrition
Medical Research Institute
Ministry of Health
Sri Lanka
Why Sri Lanka need to assess folate status?

- Prevalence of folate deficiency in adults – 9.6%.
- Incidence of NTD - 1.2/1000 live births; 4000 per year (FHB 2015, Birth defects surveillance).
- Prenatal folic acid supplementation coverage - 48% with varied duration of the supplementation (MRI 2015).
- Iron deficiency anaemia of pregnant women - 10% due to many supplementation programmes.
- But the rate of anaemia is 30% over last 20 years (MRI 2015).
- Need folic acid contribution to explore etiology.

Figure 1: Prevalence of folic acid deficiency (<3ng/ml) in Sri Lankan adult 30-60 years (Source: MRI 2012)
National recommendation on folic acid

• A national level study on folate deficiency and insufficiency among the general population and women of reproductive ages
• Need baseline folate data for future evaluation of folate interventions.
• Challenge was our laboratory was not equipped and trained.
CDC Training opportunity for Sri Lanka

• Food Fortification Initiative, Nutrition International and CDC provided the training opportunity for Sri Lanka in December 2018.

• Our laboratory had basic supplies and well-trained permanent lab staff recruited by the MoH

• WFP Colombo, CDC and Nutrition International supported with other supplies.
Process of training

• Comprehensive and step by step – one of the best
• Individual attention and friendly atmosphere
• Provide sufficient time to repeat and re-repeat to improve the competency
• Whole process help us to streamline other test in our lab
Current status

First shipment of supplies received in end February

Second shipment expected in mid March

Establish the test in April and need further technical support from CDC

Blood collection of national micronutrient survey in May
Way forward

• Complete analysis of blood samples of National micronutrient survey to disseminate data in December 2019.
• Estimate cost per test to establish regional hub
• Challenges
  • Availability of appropriate calibration materials
  • Access to agents who can provide supplies
• Future support
  • CDC – Provision of external QC and calibration materials
  • Nutrition International – Link with other countries to share experience
Thank you
Kehkashan Begum
MSc
Manager, Nutrition Research Laboratory
Aga Khan University, Karachi

FOLATE TASK TEAM
USING LABORATORY FOLATE STATUS ASSESSMENT TO STRENGTHEN NTD PREVENTION.

KEHKASHAN BEGUM
COUNTRY: PAKISTAN
OCCUPATION: DESIGNATED AS MANAGER IN NUTRITION RESEARCH LABORATORY AT AGA KHAN UNIVERSITY BASED IN KARACHI, PAKISTAN.
VENUE:

- Held at CDC Chamblee campus, Atlanta, Georgia.
- 5 days training program (from 27\textsuperscript{th} Jan 2019 to 1\textsuperscript{st} Feb 2019)
- Trainers: Christine M Pfeiffer, Mindy Zhang, Shameem Jabbar.
- 3 countries participated (Pakistan, Vietnam & Philippines)
- Sponsored by Nutrition International and Global Affairs Canada
- Organized by Folate Task Team, Nutrition International, Canada.
OBJECTIVE:

Pakistan’s need to access folate deficiency.

To get expertise on quantifying folate using a globally recommended method.

Future Vision
Pakistan’s Need To Access Folate Deficiency.
• PAKISTAN is an economic mess. It is well behind other large Asian countries

• In low-income and middle-income countries, anaemia is a major public health problem. (1)

In Pakistan, anaemia, and vitamin B12 and folate deficiencies are a severe public health concern among WRA.

Prevalence and possible factors associated with anaemia, and vitamin B12 and folate deficiencies in women of reproductive age in Pakistan: analysis of national-level secondary survey data NNS 2011 data:

<table>
<thead>
<tr>
<th>Micronutrient deficiencies</th>
<th>%</th>
<th>SE</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>50.4</td>
<td>0.5</td>
<td>49.4</td>
<td>51.5</td>
<td>10787</td>
</tr>
<tr>
<td>Folate deficiency</td>
<td>50.8</td>
<td>0.6</td>
<td>49.7</td>
<td>51.9</td>
<td>8371</td>
</tr>
<tr>
<td>Vitamin B₁₂ deficiency</td>
<td>52.4</td>
<td>0.6</td>
<td>51.3</td>
<td>53.5</td>
<td>8400</td>
</tr>
</tbody>
</table>
Forty-six patients with neural tube defects were seen among 3310 deliveries during a study period in Peshawar (KPK Province), Pakistan.

Incidence of NTDs in our study was 13.90 per 1000 deliveries where as in UK, USA, Denmark and Oman it is around 1-5 per 1000 deliveries.
NEURAL TUBE DEFECTS & FOLATE DEFICIENCY IN PAKISTAN.

- A study was conducted in tertiary care hospital of Karachi catering to lower socioeconomic background. Maternal factor related to neural tube defects in same study showed >80% mothers had not taken folic acid during pregnancy.

Table 4: Effect of intake of Folic Acid on neural tube defects.

<table>
<thead>
<tr>
<th>Folic acid intake</th>
<th>Neural tube defect</th>
<th>Normal pregnancy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td>500</td>
<td>501</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>2810</td>
<td>2855</td>
</tr>
</tbody>
</table>

To Get Expertise On Quantifying Folate Using A Globally Recommended Method.
NEED OF LABORATORY HARMONIZATION:

1. For Laboratory correlation: (For Quality control purpose)

This could be achieved by:

Getting an opportunity to learn proper PPEs and specific laboratory working environment required for assuring good quality results.

Assuring the Lab proficiency by looking at the advanced equipment being used in well-developed labs.

Observing the standard pre analytical, analytical and post-analytical procedures.
To establish a generalizable cut-off value for folate deficiency assessment.

As of Pakistan’s socioeconomic condition, a cost-effective and reliable technique is required for surveying such a highly populated region.
3. ADVANCEMENT OF NUTRITION RESEARCH LAB

- The Aga Khan Hospital serves as the main contributor in the government of Pakistan’s health related projects and surveys.

- Aga Khan is the only CAP accredited hospital in Pakistan and also one of the top most biological & biomedical research institute of Pakistan.

- Our laboratories’ quality and SOPs serve as a benchmark for other labs all over the Pakistan.
Experience Of Training At CDC.
• Training was provided by highly skilled and innovative researchers.

• Lab was well-equipped and had co-operative and friendly environment.

• Brain storming sessions to achieve informative technical expertise.

• Got opportunity to have hands on experience to perform the assay & QC.
• Came across with the modified and improved techniques of performing microplate assays.
• CDC helped with providing the supplies useful for quick and easy performance of the assay.
• Step by step practical demonstration.
Future Vision
• To become a reference lab in Pakistan for assessing RBC folate.

• To train laboratories on regional basis to individually perform this assay.

• To set a quality control foundation in Pakistan for other laboratories in Pakistan to periodically check the assay performance quality.

• To be able to have a robust folate status in the population of Pakistan and get a way forward for the required intervention for a healthy Pakistan.
THANKS
Dr. Homero Martinez

MD, PhD

Senior Technical Advisor
Nutrition International
Folate Task Team

Secretariat
- Project Lead
- Knowledge Translation Officer
  + Project Consultant

Core Working Group
Composed of 3 individuals with expertise on:
- Folate nutrition
- Epidemiology/birth defect surveillance
- Programmatic experience

Expert Advisory Group
Composed of the CWG and 7 individuals with expertise on:
- Laboratory training and capacity building
- Birth defects surveillance
- Pediatrics
- Nutritional program implementation and technical assistance
- Advocacy and representation of affected populations
- Food fortification and policy
  - 4 Ex-officio members
  - Senior CDC lab scientist
  - 4 “As needed” advisors

Stakeholders and Partners Groups
Nutrition Folate Task Team

A global nutrition Task Team for the control of folate insufficiency and folic acid responsive neural tube defects.

The work of the Folate Task Team is being supported by a grant from the Bill & Melinda Gates Foundation.

Through Nutrition Technical Assistance Mechanism (NTA)M's Folate Task Team project, Nutrition International is helping to lay the groundwork for implementing a global strategy for the control of folate insufficiency and prevention of related neural tube defects.

Maternal folate insufficiency in the first 28 days of pregnancy is a major cause of neural tube defects. The most common forms of these defects include spina bifida and anencephaly, which are important causes of elective pregnancy terminations, stillbirths, early neonatal deaths, or long-term disabilities. Improving maternal folate status through folic acid fortification or supplementation can dramatically reduce the number of affected births and significantly contribute to reducing neonatal and child mortality.

ADVANCING THE ROADMAP FOR ACTION

Supporting a global strategy for folate

A recent technical consultation convened by the Micronutrient Forum – whose Secretariat was hosted by Nutrition International between 2011 – 2017 – led to the development of a Roadmap for Action to advance and accelerate neural tube defects prevention globally. To advance the recommendations featured in this roadmap, Nutrition International has assembled a Folate Task Team, which will coordinate activities for the advancement of the Implementation agenda.
Technical Consultation: Folate status in Women and Neural Tube Defect Prevention

Resources

- [http://micronutrientforum.org/folate-consultation/](http://micronutrientforum.org/folate-consultation/)
- [http://micronutrientforum.org/content/user_files/2017/10/2017-07FolateTechnicalConsultation-FinalReport.pdf](http://micronutrientforum.org/content/user_files/2017/10/2017-07FolateTechnicalConsultation-FinalReport.pdf)
  ISBN: 978-0-9959892-1-4
- [https://www.nutritionintl.org/what-we-do/nteam/team-folate/](https://www.nutritionintl.org/what-we-do/nteam/team-folate/)
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FOLATE TASK TEAM

IMPROVING FOLATE STATUS IN WOMEN OF REPRODUCTIVE AGE TO PREVENT NEURAL TUBE DEFECTS

KNOWLEDGE BRIEF

FOLATE TASK TEAM

THE IMPORTANCE OF FOLIC ACID FOOD FORTIFICATION TO PREVENT NEURAL TUBE DEFECTS

ADVOCACY BRIEF

FOLATE TASK TEAM

SUPPLY CHAIN ANALYSES TO ASSESS THE FEASIBILITY OF NATIONAL FOOD FORTIFICATION PROGRAMS

KNOWLEDGE BRIEF
FOLATE MICROBIOLOGIC ASSAY TRAINING VIDEO

Through a Folate Task Team collaboration with the CDC Foundation, CDC is supporting training and facilitating capacity development to conduct folate microbiologic measurements in multiple international laboratories. Low blood folate concentrations in women of childbearing age increase the risk of neural tube birth defects in their offspring. The folate microbiologic assay will allow countries to assess population folate status. This will have a long-term global health impact by providing countries with the knowledge to identify folate insufficiency, determine appropriate interventions and reduce the risk of neural tube defects.

As part of the collaboration, lab technicians participate in training with CDC and various materials have been developed to assist with training needs. This featured video was created to aid in folate microbiologic assay training.

https://www.cdcfoundation.org/programs/capacity-building-folate-measurement
Further discussion

Please feel free to submit a question via the chat box for any of our speakers
Closing remarks from Dr. Martinez

For more information please contact Dr. Martinez at folatetaskteam@nutritionintl.org

A recording of this webinar and a PDF of the slides will be made available via the Folate Task Team webpage at https://www.nutritionintl.org/what-we-do/nteam/folate-task-team/
Thank you!