Forecasting Needs of RMNCH Medical Products

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Newborn and Child Health Commodities subgroup
June 2022
Introduction to the RMNCH Forecasting Supplement

Jane Briggs
Senior Principal Technical Advisor
Lead for MNCH and FP
USAID MTaPS
Outline

• Background
• The RMNCH Forecasting Supplement- updates and products
• Quantification & Forecasting
• Contents of the RMNCH Forecasting Supplement
• Forecasting example – Amoxicillin for pneumonia
• QAT* and the RMNCH Forecasting Supplement
• Experience from Nigeria
• Q&A
• Closing

* QAT: Quantification Analytics Tool
Background

• Increasing access to and appropriate use of RMNCH medical products could save the lives of more than 6 million women and children per year

• A major component of access is availability

• To ensure availability, accurate and timely estimates/quantifications of supply requirements are needed

• At the national level, results of quantifications are essential for budgeting, resource allocation and mobilization, and planning for procurement and supply chain operations
The RMNCH Forecasting Supplement

• Previous version was published in 2016
• Updates based on new recommendations:
  ➢ New condition: Management of severe hypertension in pregnancy
  ➢ New products used for management of PPH
  ➢ New classifications of PSBI or very severe disease in newborns 0-59 days with respective changes in treatment options
• Updated based on new incidence and related data
• Organization of supplement by condition instead of by product
• Alternative forecasting approach (allocation) for magnesium sulphate and calcium gluconate
• Updated list of “Tools and Resources”
Priority Life-Saving Medical products (RH and MH)

**Family Planning**
- emergency contraceptive pills
- female condoms
- contraceptive implants

**Maternal Health**
- oxytocin
- misoprostol
- Tranexamic acid
- MgSO₄
- Heat-Stable Carbetocin
- Calcium Gluconate

**USAID MTaPS Program**
Priority Life-Saving Medical Products (Newborn and CH)

Newborn Health
- newborn resuscitation kits
- antenatal corticosteroids (ACS)
- chlorhexidine

Child Health
- Gentamicin
- Ampicillin
- Ceftriaxone

Newborn Health
- ORS & zinc

Child Health
- amoxicillin
- ORS & zinc

USAID MTaPS Program
Complements other quantification resources

- Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement JSI 2017
- Quantification of Health Commodities: Contraceptive companion guide JSI 2011
What is quantification

Forecasting - estimating the quantities of the products required for a specific health program (or service) for a specific period of time

Supply Planning - determining when and in what quantity products should be delivered to prevent interruptions in supply
Quantification process


USAID MTaPS Program
Data for Forecasting

- **Historical consumption (logistics) data**
  - Quantities of *products* dispensed/issued or used over a specified period of time

- **Service data**
  - Number of *services provided* – number of visits where clients were treated or referred over a specified period of time

- **Demographic and morbidity data**
  - Number and characteristics of the *population* targeted for services over a specified period of time
  - Data on *prevalence* or *incidence* of a disease or health condition in a specific population
Challenges in the forecasting of RMNCH medical products

• Consumption data not available or reliable
• Lacking morbidity or incidence data for MNCH conditions
• Limited use of available data
• Programs may have ambitious scale-up plans
• Limited coordination between program and procurement units and sometimes donors too
• Limited use of standard treatment protocols (low dissemination, non-adherence etc.)
Content of the RMNCH Forecasting Supplement

- Introduction
- Forecasting considerations, algorithms, and examples for products used to manage 9 RMNCH conditions
  1. Reproductive Health: Family Planning and Prevention of STIs
  2. Prevention and Treatment of Postpartum Hemorrhage
  3. Prevention and Treatment of Hypertensive Disorders in Pregnancy
  4. Reduction of Risk of Respiratory Distress Syndrome in Preterm Births
  5. Newborn Resuscitation and Essential Care around the Time of Birth
  6. Newborn Cord Care
  7. Treatment of Possible Serious Bacterial Infection (PSBI) or Very Severe Disease in Newborns and Young Infants (0–59 days)
  8. Treatment of Pneumonia in Children 2–59 Months
  9. Treatment of Diarrhea in Children under 5 Years
- Glossary
- Tools and resources
What is in each chapter

For each health condition/service:

• Introduction to the condition/service
• Product characteristics and other forecasting considerations
• Required data and potential sources (condition specific)
• Forecasting algorithms
• Summary of proxy data
• Example of forecasting assumptions and results
• References
Flyer to describe the package
RMNCH forecasting supplement plus
RMNCH forecasting algorithms

and a set of RMNCH forecasting excel tools
Forecasting Amoxicillin Needs for Pneumonia: An Example

Andualem Oumer
Senior Technical Advisor
Supply chain and Pharmacovigilance
USAID MTaPS
Amoxicillin for pneumonia

Oral amoxicillin is recommended by WHO for the treatment of children with

• fast-breathing pneumonia with no chest indrawing or no general danger signs at the community level by qualified CHWs without the need for referral to HFs

• fast-breathing pneumonia or HIV-negative chest-indrawing pneumonia at first-level HFs without the need for referral to hospitals.
Amoxicillin forecast using demographic and incidence data

Steps
1. Calculate the total target number of cases to be treated for pneumonia
2. Calculate the number of cases per level to be treated with amoxicillin
3. Calculate the amount of amoxicillin needed per case
4. Calculate the total quantity of amoxicillin needed for the forecast period
Algorithm for pneumonia
Algorithm for pneumonia – Simplified

A: Total population

B: Total population of 2-59 m = A x % of 2-59 m

C: # of under 2-59 m pneumonia cases = B x incidence of pneumonia

D: # of under 2-59 m pneumonia cases treated in public health care services, including CHWs = C x % of cases treated in public sector

E: # of 2-59 m pneumonia cases treated by level of care
   E1: # at community level (by CHWs) = D x % treated at community level
   E2: # at 1st-level public HFs = D x % treated at public HFs

F: # of 2-59 m pneumonia cases treated by type: Community level
   F = E1 x % of fast breathing cases treated at community level

G: # of 2-59 m pneumonia cases treated by type: Public HFs
   G1 = E2 x % of fast breathing cases treated at public HFs
   G2 = E2 x % of HIV-infected and chest-in-drawing cases treated at public HFs

H: # of 2-59 m pneumonia cases treated with specific regimen: Community level
   H: # treated with 5-day oral amoxicillin = F x % treated with the regimen

I: # of 2-59 m pneumonia cases treated with specific regimen: Public HFs
   H: # treated with 5-day oral amoxicillin = (G1+G2) x % treated with the regimen

K: Qty. of each medicine required by age group: Community level
   K1: Amoxicillin 250 mg DT for 2-11 m = H x % of age group x J1; where J1: Qty per case = 10 DTs
   K2: Amoxicillin 250 mg DT for 12-59 m = H x % of age group x J2; where J2: Qty per case = 20 DTs

M: Qty. of each medicine required by age group: Public HFs
   M1: Amoxicillin 250 mg DT for 2-11 m = H x % of age group x L1; where L1: Qty per case = 10 DTs
   M2: Amoxicillin 250 mg DT for 12-36 m = H x % of age group x L2; where L2: Qty per case = 20 DTs
   M3: Amoxicillin 250 mg DT for 37-59 m = H x % of age group x L3; where L3: Qty per case = 30 DTs

N: Qty. of each medicine required to treat 2-59 m pneumonia cases in public sector
   N = Qty for Community (K) + Qty for public HFs (M)
   N1 Qty of Amoxicillin 250 mg DT = (K1 + K2) x (M1 + M2 + M3)
### Types of data useful for forecasting consumption of amoxicillin for pneumonia

<table>
<thead>
<tr>
<th>Data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population per year</td>
<td>National census and projections, DHS, US Census Bureau International Programs Database, UN world population projections</td>
</tr>
<tr>
<td>Proportion/# of children under 5 years</td>
<td>DHS, HMIS, national child morbidity and mortality surveys, special surveys, expert opinion, programmatic/strategic plans</td>
</tr>
<tr>
<td>Incidence of pneumonia in children under 5</td>
<td></td>
</tr>
<tr>
<td>Proportion/# of children with pneumonia with access to health services (at community, public, and private facilities)</td>
<td></td>
</tr>
<tr>
<td>Proportion/# of children with pneumonia by type (fast breathing, chest indrawing, and severe) identified in the public sector by level of care</td>
<td></td>
</tr>
<tr>
<td>Proportion/# of children with chest-indrawing and severe pneumonia cases identified at and referred by community and first-level HFs to higher-level HFs</td>
<td></td>
</tr>
<tr>
<td>Proportion/# of each type of pneumonia case treated at each level of public health care by age group (2–11m, 12–36m, 37–59m)</td>
<td>HMIS, special surveys, national STG, WHO STG, expert opinion, programmatic/strategic plans</td>
</tr>
<tr>
<td>Proportion/# of cases treated with specific antibiotic regimens by type of pneumonia</td>
<td></td>
</tr>
<tr>
<td>Quantity (formulation and dosage) of each medicine used in each regimen to treat one case by age group</td>
<td>National STG, WHO STG, expert opinion</td>
</tr>
</tbody>
</table>
Box 13. Example of country forecast of antibiotics to treat pneumonia in children 2–59 months based on morbidity method

Country X has a generalized HIV prevalence of 2.5%. The national pediatric STG recommends the use of oral amoxicillin for 5 days for the treatment of fast-breathing-only and HIV-chest-indrawing pneumonia. Fast-breathing pneumonia cases without any other complications can be treated at all levels, including by trained CHWs. The CHWs are trained to screen and refer HIV-positive, chest-indrawing pneumonia and severe pneumonia cases to public HFs. HIV-negative chest-indrawing cases can be treated at first- or higher-level public HFs. The guideline states that all severe and/or HIV-positive chest-indrawing pneumonia case should be referred to hospitals for treatment with ampicillin (IV/IM) and gentamicin (IV/IM) injections as the first-line option. Cases that don’t respond to first line treatment should be treated with ceftriaxone IV/IM. Incidence of pneumonia in children under 5 is not known in the country; thus, the quantification team has agreed to take global average as a proxy.

Available data and assumptions:
- Total population: 20,000,000 (current year)
- Annual population growth: 2.0%
- Percentage of children 2–59m: 9%
- Incidence of pneumonia in children 2–59m: 231 episodes per 1,000 children (proxy)
- Percentage of pneumonia cases identified in the public sector, including at community level by CHWs, is estimated to increase by 5 percentage points per year (currently 60%).
- Percentage of 2–59m pneumonia cases treated in the public sector by level of care
  - Hospitals = 15%, expected to remain the same over the forecast period
  - First-level HFs = 65%, expected to decrease by 3 percentage points per year
  - Community level (by CHWs) = 20%, expected to increase by 3 percentage points per year
- Estimated proportions of pneumonia cases treated by level of care and type for the forecasting period based on HMIS data

<table>
<thead>
<tr>
<th>Community</th>
<th>First-level HFs</th>
<th>Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast breathing</td>
<td>100%</td>
<td>90%</td>
</tr>
<tr>
<td>HIV-negative chest-indrawing</td>
<td>0%</td>
<td>10%</td>
</tr>
<tr>
<td>Severe and/or HIV-positive chest-indrawing</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- Compliance to first-line treatment recommendations is estimated at 100% for all levels of care and is assumed to remain the same during the forecasting period.
- The following age groups and respective proportions were estimated based on HMIS data: 2–11m = 33%, 12–36m = 37%, and 37–59m = 30%; these were assumed to be the same for all levels of care.
- The following formulations and average quantities per case and age group were agreed by the quantification team, based on the STG and expert opinions:

<table>
<thead>
<tr>
<th>Level</th>
<th>Type of pneumonia</th>
<th>Formulations</th>
<th>Quantity per case by age group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Community</td>
<td>Fast breathing only</td>
<td>Amoxicillin 250 mg DT</td>
<td>2–11m: 10 tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12–59m: 20 tablets</td>
</tr>
<tr>
<td>2 First-level public HFs and public hospitals</td>
<td>Fast breathing only and HIV-negative chest-indrawing</td>
<td>Amoxicillin 250 mg DT</td>
<td>2–11m: 10 tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12–36m: 20 tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>37–59m: 30 tablets</td>
</tr>
</tbody>
</table>
### Example: amoxicillin for pneumonia – forecast (2)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>INPUT</th>
<th>CURRENT YEAR</th>
<th>FORECAST YEAR 1</th>
<th>FORECAST YEAR 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (A)</td>
<td>A: Population = previous year population + (previous year population x PGR) (annual PGR is 2%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2%</td>
<td>20,000,000</td>
<td>20,400,000</td>
</tr>
<tr>
<td>Total population of 2-59m (B)</td>
<td>B = A x % of population 2-59 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9%</td>
<td>1,800,000</td>
<td>1,836,000</td>
</tr>
<tr>
<td>Number of total 2-59m pneumonia cases/episodes (C)</td>
<td>C = B x Incidence of pneumonia in children 2-59 months: where 231 episodes per 1,000 children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23.1%</td>
<td>415,800</td>
<td>424,116</td>
</tr>
<tr>
<td>Number of 2-59m pneumonia cases treated at public health care services, including CHWs (D)</td>
<td>D = C x % of cases treated at public sector health care services (annual increase of 5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>249,480</td>
<td>275,675</td>
</tr>
<tr>
<td>Number of 2-59m pneumonia cases treated by level of public health care (E)</td>
<td>(E1) # treated in the community (by CHWs) = D x % treated at community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3%</td>
<td>49,896</td>
<td>63,405</td>
</tr>
<tr>
<td></td>
<td>(E2) # treated in first-level public HFs = D x % treated at first-level HFs (annual decrease of 3%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-3%</td>
<td>162,162</td>
<td>170,919</td>
</tr>
<tr>
<td></td>
<td>(E3) # treated in public hospitals = D x % treated at public hospitals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
<td>37,422</td>
<td>41,351</td>
</tr>
<tr>
<td>Number of 2-59m pneumonia cases treated at community level by type (F)</td>
<td>(F) # of fast-breathing cases treated at community (by CHWs) = E1 x % of fast-breathing cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
<td>49,896</td>
<td>63,405</td>
</tr>
<tr>
<td>Number of 2-59m pneumonia cases by type treated at first-level public HFs (G)</td>
<td>(G1) # of fast-breathing cases treated at first-level public HFs = E2 x % of fast-breathing cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>90%</td>
<td>145,946</td>
<td>152,827</td>
</tr>
<tr>
<td></td>
<td>(G2) # HIV-negative and chest-indrawing cases treated at first-level public HFs = E2 x % HIV-negative chest-indrawing cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>16,216</td>
<td>17,092</td>
</tr>
<tr>
<td>Number of 2-59m pneumonia cases by type treated at public hospitals (H)</td>
<td>(H1) # of fast-breathing cases treated at public hospitals = E3 x % of fast-breathing cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>3,742</td>
<td>4,135</td>
</tr>
<tr>
<td></td>
<td>(H2) # HIV-negative and chest-indrawing cases treated at public hospitals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20%</td>
<td>7,404</td>
<td>8,270</td>
</tr>
<tr>
<td></td>
<td>(H3) # of severe or HIV-positive chest-indrawing cases treated at public hospitals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>70%</td>
<td>26,195</td>
<td>28,946</td>
</tr>
</tbody>
</table>
Example: amoxicillin for pneumonia—forecast (3)

<table>
<thead>
<tr>
<th>Number of 2-59m pneumonia cases treated with specific regimen - Community/CHWs (I)</th>
<th>(i)</th>
<th># of cases treated with 5-day amoxicillin oral (fast breathing) = F x % treated with the regimen</th>
<th>100%</th>
<th>49.896</th>
<th>63.405</th>
<th>78.733</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of 2-59m pneumonia cases by type treated with specific regimen - first-level public (J)</td>
<td>(j)</td>
<td># of cases treated with 5-day amoxicillin oral (fast breathing and HIV-negative chest-indrawing) = (G1 + G2) x % treated with the regimen</td>
<td>100%</td>
<td>162.162</td>
<td>170.919</td>
<td>178.663</td>
</tr>
<tr>
<td>Number of 2-59m pneumonia cases by type treated with specific regimen - public hospitals (K)</td>
<td>(k)</td>
<td># of cases treated with 5-day gentamycin IV /IM and ampicillin IV /IM (severe or HIV-positive chest-indrawing) = H3 x % treated with the regimen</td>
<td>100%</td>
<td>26.195</td>
<td>28.946</td>
<td>31.796</td>
</tr>
<tr>
<td>Quantity of amoxicillin 250 mg DT - community level (M)</td>
<td>(M1) Quantity for 2-11m cases = L x % of age group x L1; where, L1: quantity per case = 10 DTs</td>
<td>33%</td>
<td>10</td>
<td>164.637</td>
<td>209.238</td>
<td>259.819</td>
</tr>
<tr>
<td></td>
<td>(M2) Quantity for 12-59m cases = L x % of age group x L2; where, L2: quantity per case = 20 DTs</td>
<td>67%</td>
<td>20</td>
<td>668.636</td>
<td>849.632</td>
<td>1,055.021</td>
</tr>
<tr>
<td>Quantity of amoxicillin 250 mg DT - first-level public HPs (O)</td>
<td>(O1) Quantity for 2-11m cases = J x % of age group x N1; where, N1: quantity per case = 10 DTs</td>
<td>33%</td>
<td>10</td>
<td>535.135</td>
<td>564.032</td>
<td>569.588</td>
</tr>
<tr>
<td></td>
<td>(O2) Quantity for 12-36m cases = J x % of age group x N2; where, N2: quantity per case = 20 DTs</td>
<td>37%</td>
<td>20</td>
<td>1,199.999</td>
<td>1,264.799</td>
<td>1,322.107</td>
</tr>
<tr>
<td></td>
<td>(O3) Quantity for 37-59m cases = J x % of age group x N3; where, N3: quantity per case = 30 DTs</td>
<td>30%</td>
<td>30</td>
<td>1,459.458</td>
<td>1,538.269</td>
<td>1,607.968</td>
</tr>
<tr>
<td>Quantity of amoxicillin 250 mg DT - public hospitals (Q)</td>
<td>(Q1) Quantity for 2-11m cases = K x % of age group x P1; where, P1: quantity per case = 10 DTs</td>
<td>33%</td>
<td>10</td>
<td>37.048</td>
<td>40.938</td>
<td>44.969</td>
</tr>
<tr>
<td></td>
<td>(Q2) Quantity for 12-36m cases = K x % of age group x P2; where, P2: quantity per case = 20 DTs</td>
<td>37%</td>
<td>20</td>
<td>83.077</td>
<td>91.800</td>
<td>100.839</td>
</tr>
<tr>
<td></td>
<td>(Q3) Quantity for 37-59m cases = K x % of age group x P3; where, P3: quantity per case = 30 DTs</td>
<td>30%</td>
<td>30</td>
<td>101.039</td>
<td>111.649</td>
<td>122.642</td>
</tr>
<tr>
<td>Total quantity of amoxicillin 250 mg DT for treatment of pneumonia in children 2-59m (R)</td>
<td>R = (M1+M2) + (O1+O2+O3) + (Q1+Q2+Q3)</td>
<td></td>
<td></td>
<td>4,249,019</td>
<td>4,670,335</td>
<td>5,102,951</td>
</tr>
</tbody>
</table>
QAT Forecasting Module
& the RMNCH Forecasting Supplement

June 2022
Lillian Gu, FASP team
Quantification Analytics Tool (QAT)

- A modernized solution for country-led supply planning and forecasting
  - Cloud-based with offline capabilities
  - Enhanced visuals & calculations
  - Built in data quality checks
  - Commodity agnostic

- Supply Planning Module
  - Launched Dec 2020
  - As of April 2022 – 117 supply plans onboarded; 27 countries trained

- Forecasting Module
  - Launched June 2022
  - Pilot: 4 countries / 16 users trained
USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM - Procurement and Supply Management

QAT Forecasting & RMNCH Guide

**RMNCH Guide**

- A: Total population
- B: Total population of under 5 years = A x % of <5 years
- C: # of under 5-year diarrhea cases = B x incidence of diarrhea
- D: # of under 5-year diarrhea cases treated in public health care services, including CHWs = C x % of cases treated in public sector services
- E: # of under 5-year diarrhea cases treated with 3-day ORS and 10-day zinc = D x % treated with the regimen

**QAT Tree Forecast**

- Country Population: 20,050,300
- Children <5: 9% of parent
- Diarrhea Cases: 18.2% of parent
- ORS: 10% of parent, 5% of children
- Zinc: 100% of parent, 10% of children
Comments from
Anthonia Ibeme GHSC – PSM Nigeria
How and when the supplement was used
1. The forecasting supplement adapted and used to generated a three-year forecast for MNCH commodities in 5 States
2. Constituted State quantification teams and trained over 50 members of the quantification team across the 5 States on the use of the supplement
3. The supplement will continue to be used by the State quantification team for annual forecast review.

Usefulness of the supplement
1. User friendly
2. Useful tool for data gathering
3. Algorithm follows a very detailed logic (the Excel forecast tool particularly very useful
4. Adaptable
5. Recommended assumptions/parameters
6. Regimens/products already selected in line with standard guidelines (useful for standardization and promotion of global best practices)

Other comments
Consumption based forecast should be generated and reconciled with the morbidity-based output where data is available
ACCESS AND DOWNLOAD:

OR

1. Go to www.mtapsprogram.org
2. Click on Resources on main menu bar
3. Search by MNCH focus area
Questions

jbriggs@mtapsprogram.org
aoumer@mtapsprogram.org
Resources

Engage with the **co-chairs**:

- Joseph: jmonehin@usaid.gov
- Patrick: pgaparayi@unicef.org

Subgroup information, recordings and presentations from previous webinars and meetings are available on the subgroup page of the Child Health Task Force website: [www.childhealthtaskforce.org/subgroups/newborn](http://www.childhealthtaskforce.org/subgroups/newborn)

*The recording and presentations from this webinar will be available on this page later today*

Become a member of the Child Health Task Force: [www.childhealthtaskforce.org/subscribe](http://www.childhealthtaskforce.org/subscribe)

Check out the Task Force Child Health & COVID-19 web page for additional resources!

Suggestions for improvement or additional resources are welcome. Please email childhealthtaskforce@jsi.com.