Resource Allocation Formula (RAF)

Concepts and Application

Purpose of this session

• To explain the role of mathematical formulae in resource allocation of health sector funds to local health agencies in order to ensure equal access to services for equal need for interventions contained in the health benefits package (HBP)

• To present a sample excel-based tool which has been applied locally to simulate and determine geographical resource allocations based on different formulae
Flow of funds in the health system

The focus of this session

A. National Taxes

B. Funding Mechanism

C. Local taxes

D. User Charge

E. Provider Payment

G. Donor funds

H. Donor funds

National Government

Local agencies or insurers

Citizen/patient

Service Provider
Rationale for Formula Funding

A systematic approach towards funding local agencies is an essential prerequisite of successful decentralization policies.

1. **Efficiency**: Allocative, managerial and technical

2. **Equity**: Horizontal and Vertical
   - Horizontal equity/ Health care equity - equity between people with the same health care needs
   - Vertical equity/ Health equity - those with unequal needs who should receive different or unequal health care

3. **Political considerations**: Non-partisan solution to political conflicts
# Approaches to Formula Funding

<table>
<thead>
<tr>
<th>Approach</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Political Patronage</td>
<td>No economic argument</td>
</tr>
<tr>
<td>2. Historical Precedent</td>
<td>Perpetuation of existing inequities</td>
</tr>
<tr>
<td>3. Local bids</td>
<td>Administratively costly</td>
</tr>
<tr>
<td>4. Actual spending</td>
<td>Perverse incentive to increase expenditure</td>
</tr>
<tr>
<td>5. Mathematical Formula</td>
<td></td>
</tr>
<tr>
<td>5A. Case-based (Actual level of local activity)</td>
<td>Perverse incentives, Cream-skimming</td>
</tr>
<tr>
<td>5B. Expected level of local activity</td>
<td>Appropriate modelling of needs</td>
</tr>
</tbody>
</table>
Pre-requisites of Formula Funding

1. **Devolution**: The organization and purchasing of health services must be to some extent devolved to the local agencies.

2. **Data**: Adequate data must be available on a consistent basis for the application of the formula.

3. **Adherence**: There must be an incentive to adhere to the formula-based financial allocation.
1. **Explicit objective:** eg. efficiency of insurance market operations, equity (give local agencies the opportunity to provide a standard package of health services)

2. **Entities in receipt of funds:** eg. small, single purpose health agencies are at greater risk in case of an inaccurate formula

3. **Services covered:** line-by-line estimate of each component of the health benefits package or demographic variables

4. **Categories of expenditure:** Drug costs, personnel costs, other recurrent costs, capital investments
4. **Counting the population**: source of data, demographic groups with different health needs, citizens not using public healthcare

5. **Risk-adjustment**: modelling probability of requiring services and intensity of service use
   - Challenges – administratively demanding data collection, possibility of misrepresentation by local authorities, rewarding local agencies for poor historical performance, perverse incentives for increased provision of services, parsimony versus sensitivity

6. **Measuring costs**: Probability of need for services, intensity of service use, cost of service provision, cost-sharing arrangements

7. **Cross-border flows**: difficult to account for unless the net flow of patients is known
Use of a spreadsheet tool for
Formula-funding

The case of Malawi
29 local health administrative units charged with the provision of community, primary and secondary healthcare services

Current allocation mechanism – historical precedent

In 2008, a formula based on five-weighted factors was developed - outpatient utilization rate (15%), stunting percentage below -3 standard deviations (50%), bed capacity (15%), land area (5%) and infant mortality (15%)

An explicit, costed health benefits package consisting of 106 prioritized interventions was developed in 2017. This allowed for the application of a more comprehensive way to measure expected service delivery costs
Figure: Current Drug and ORT Budget Allocation in Malawi (FY 2018/19) – prior to the formula

Note: District names have been anonymized to maintain focus on the fairness of the logic behind the allocations rather than the outcomes.
RAF Options (as presented in the tool)

1. Crude population allocation
2. Standardized mortality rate allocation
3. EHP intervention need (Full coverage)
4. EHP intervention need (Realistic coverage)
RAF Option 1: Crude population allocation

- Based on 2008 Census population projections. These estimates are to be updated by the recently available 2018 census estimates.
- Based on this formula, the 2018/19 Drug and ORT budget allocation would have been MK 1,485 per person
RAF Option 1: Crude population allocation

Figure: Comparison of crude population allocation to current allocation
RAF Option 2: Age-standardized Mortality Rates Allocation (ASMR)

- Mortality rates based on 2008 Census
- This captures the variations in mortality rates across districts, independent of the demographic structure
- Standardised mortality rate = \( \frac{\text{Observed number of deaths}}{\text{Expected number of deaths}} \)
# Standardised Mortality Rate Calculation

<table>
<thead>
<tr>
<th>Age group</th>
<th>Population</th>
<th>Number of deaths</th>
<th>Age-specific mortality rate</th>
<th>Population</th>
<th>Number of deaths</th>
<th>Age-specific mortality rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group 1</td>
<td>20,000</td>
<td>1,500</td>
<td>75</td>
<td>35,000</td>
<td>2700</td>
<td>77</td>
</tr>
<tr>
<td>Age group 2</td>
<td>19,000</td>
<td>61</td>
<td>3</td>
<td>29,000</td>
<td>95</td>
<td>3</td>
</tr>
<tr>
<td>Age group 3</td>
<td>16,000</td>
<td>24</td>
<td>2</td>
<td>24,000</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Age group 4</td>
<td>13,000</td>
<td>31</td>
<td>2</td>
<td>19,000</td>
<td>55</td>
<td>3</td>
</tr>
<tr>
<td>Age group 5</td>
<td>12,000</td>
<td>60</td>
<td>5</td>
<td>13,000</td>
<td>89</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80,000</strong></td>
<td><strong>1,677</strong></td>
<td></td>
<td><strong>120,000</strong></td>
<td><strong>2,979</strong></td>
<td></td>
</tr>
</tbody>
</table>

The overall mortality rate is calculated as 36% for District A and 64% for District B.
# Standardised Mortality Rate Calculation

<table>
<thead>
<tr>
<th>Age group</th>
<th>National</th>
<th>District A</th>
<th>District B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Population</td>
<td>Standardised number of deaths</td>
<td>Standardised number of deaths</td>
</tr>
<tr>
<td>Age group 1</td>
<td>55,000</td>
<td>4,125.00</td>
<td>4,242.86</td>
</tr>
<tr>
<td>Age group 2</td>
<td>48,000</td>
<td>154.44</td>
<td>157.24</td>
</tr>
<tr>
<td>Age group 3</td>
<td>40,000</td>
<td>60.48</td>
<td>67.36</td>
</tr>
<tr>
<td>Age group 4</td>
<td>32,000</td>
<td>77.00</td>
<td>92.63</td>
</tr>
<tr>
<td>Age group 5</td>
<td>25,000</td>
<td>125.21</td>
<td>171.04</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200,000</strong></td>
<td><strong>4,542</strong></td>
<td><strong>4,731</strong></td>
</tr>
</tbody>
</table>

- National: 49%
- District A: 51%
- District B: 49%
RAF Option 2: Age-standardized Mortality Rates Allocation (ASMR)

Figure: Comparison of age-standardized mortality rates allocation to current allocation
RAF Option 3: EHP intervention need (full coverage)

- Assumptions:
  - All residents who need an intervention receive it
  - There is no geographical variation in the cost of delivering interventions
RAF Option 3: EHP intervention need (full coverage)

Figure: Comparison of EHP needs (full coverage) allocation to current allocation

Allocation as per formula (%)  Current allocation (%)  % change from current allocation
RAF Option 4: EHP intervention need (realistic coverage)

- **Assumption:**
  - All districts have the same coverage level of each intervention (due to lack of availability of district-specific data)
  - There is no geographical variation in the cost of delivering interventions
RAF Option 4: EHP intervention need (realistic coverage)

Figure: Comparison of EHP needs (realistic coverage) allocation to current allocation
Other considerations

1. Partner contributions
2. Cost variations
3. Ring-fenced health services (which should be prioritized in the event of a national budget reduction)
4. Pace of change
5. Frequency of revision
6. Within district allocation
Examples of other formulae

• Tanzania:
  • population size (70%),
  • under-five mortality rate (10%) – proxy for burden of disease,
  • mileage covered (10%) – cost variation in service supervision and distribution of supplies, and
  • poverty level (10%)

• Uganda:
  • population size in different age groups (60%),
  • inverse of Human Development Index (per capita income, life expectancy, school enrollment ratios) (20%),
  • Inverse index of per capita donor and NGO spending in the district (20%)