

East, Central and Southern Africa Health Community Fostering Regional Cooperation for Better Health



## Resource Allocation Formula (RAF)

### **Concepts and Application**

This session is based on McGuire, F., Revill, P., Twea, P., Mohan, S., Manthalu, G., & Smith, P. C. (2018). **Recommendations for the development of a health sector resource allocation formula in Malawi**. **(CHE Research Paper; No. 159).** York, UK: Centre for Health Economics, University of York.



### 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



### **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
  - <u>Horizontal equity/ Health care equity</u> equity between people with the same health care needs
  - <u>Vertical equity/ Health equity</u> 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

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

### 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.

### Elements of Capitation Funding (1)

- 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

### Elements of Capitation Funding (2)

- 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
- 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

### Background (1)

- 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

### Background (2)



### 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 = Observed number of deaths

Expected number of deaths

### Standardised Mortality Rate Calculation

	District A			District B		
Age group	Population	Number of deaths	Age-specific mortality rate	Population	Number of deaths	Age-specific mortality rate
Age group 1	20,000	1,500	75	35,000	2700	77
Age group 2	19,000	61	3	29,000	95	3
Age group 3	16,000	24	2	24,000	40	2
Age group 4	13,000	31	2	19,000	55	3
Age group 5	12,000	60	5	13,000	89	7
Total	80,000	1,677		120,000	2,979	





16

### Standardised Mortality Rate Calculation

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



**Total expected** expenditure on drugs and commodities for intervention

- 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

### RAF Option 4: EHP intervention need (realistic coverage)



Target population size (#)



Cost per person per year by intervention Total expected expenditure on drugs and commodities for intervention

#### • 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

Target population in need of the intervention (%)



Realistic coverage of intervention (%)

### 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%)