

Fig. S1: Derivation of uncontrolled hypertension prevalence – part 1

The step-by-step derivation of population level uncontrolled hypertension prevalence is following:

Let,

Pop_a = No. of individuals of age a

H_a = No. of hypertensive individuals of age a

A_a = No. of hypertensive individuals of age a who are aware of their hypertensive condition

T_a = No. of aware individuals of age a who are receiving treatment

C_a = No. of treated individuals of age a who have hypertension under control

U_a = No. of individuals of age a who do not have hypertension under control

Hypertension prevalence among individuals of age a is:

$$htn_a = \frac{H_a}{Pop_a} \times 100\%$$

Among the hypertensive individuals of age a , the share of aware is:

$$aware_a = \frac{A_a}{H_a}$$

Among the aware individuals of age a , the share of treated is:

$$treat_a = \frac{T_a}{A_a}$$

Among the treated individuals of age a , the share of controlled is:

$$control_a = \frac{C_a}{T_a}$$

Hence, the total number of individuals of age a with uncontrolled hypertension is:

$$U_a = H_a - C_a$$

$$U_a = H_a - (T_a \times control_a)$$

$$U_a = H_a - ((A_a \times treat_a) \times control_a)$$

$$U_a = H_a - ((H_a \times aware_a) \times treat_a \times control_a)$$

$$U_a = H_a [1 - (aware_a \times treat_a \times control_a)]$$

$$U_a = Pop_a \times htn_a \times [1 - (aware_a \times treat_a \times control_a)]$$

Fig. S2: Derivation of uncontrolled hypertension prevalence – part 2

Let, there are 3 age groups, i.e., $a \in \{1,2,3\}$. Hence, total population is:

$$Pop = Pop_1 + Pop_2 + Pop_3$$

$$Pop = \sum_a Pop_a$$

Population level uncontrolled hypertension prevalence is defined as:

$$UHTN PRV = \frac{\text{Total no. of individuals with uncontrolled hypertension}}{\text{Total population}} \times 100\%$$

$$UHTN PRV = \frac{U_1 + U_2 + U_3}{Pop_1 + Pop_2 + Pop_3} \times 100\%$$

$$UHTN PRV = \frac{\sum_a U_a}{\sum_a Pop_a} \times 100\%$$

$$UHTN PRV = \frac{\sum_a Pop_a \times htn_a \times [1 - (aware_a \times treat_a \times control_a)]}{\sum_a Pop_a} \times 100\%$$

Alternatively, the population level prevalence can be calculated as a weighted average of age group specific prevalence rates.

The prevalence of uncontrolled hypertension among individuals of age a is:

$$UHTNPRV_a = \frac{U_a}{Pop_a} \times 100\%$$

$$UHTNPRV_a = \frac{Pop_a \times htn_a \times [1 - (aware_a \times treat_a \times control_a)]}{Pop_a} \times 100\%$$

$$UHTNPRV_a = htn_a \times [1 - (aware_a \times treat_a \times control_a)] \times 100\%$$

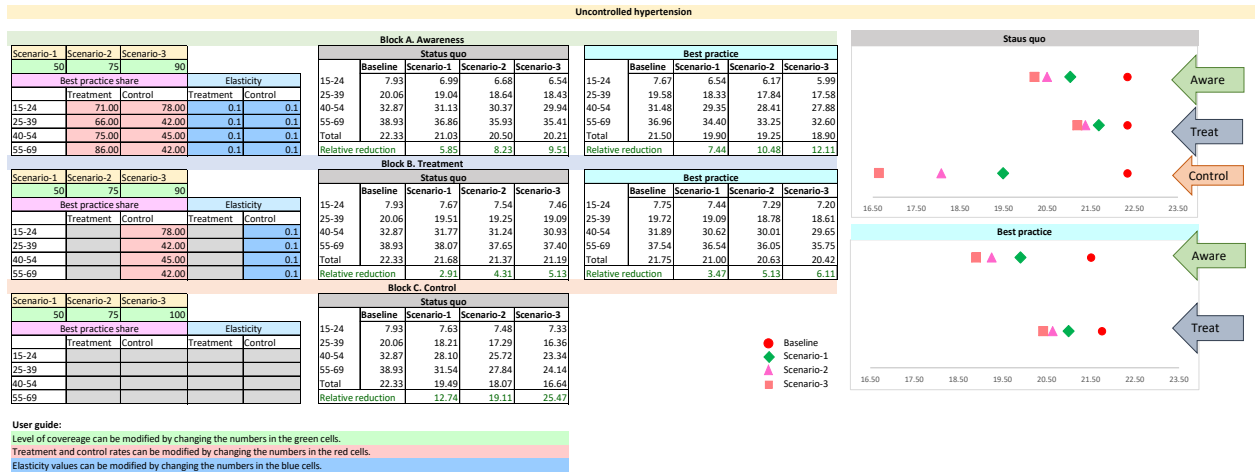
Population level prevalence of uncontrolled hypertension is a weighted average of the 3 prevalence rates where the weights are the size of population in respective groups, as follows:

$$UHTN PRV = \frac{(pop_1 \times UHTN PRV_1) + (pop_2 \times UHTN PRV_2) + (pop_3 \times UHTN PRV_3)}{pop_1 + pop_2 + pop_3} \times 100\%$$

$$UHTN PRV = \frac{\sum_a (Pop_a \times UHTN PRV_a)}{\sum_a Pop_a} \times 100\%$$

$$UHTN PRV = \frac{\sum_a (Pop_a \times htn_a \times [1 - (aware_a \times treat_a \times control_a)])}{\sum_a Pop_a} \times 100\%$$

Fig. S3: Excel interface dashboard



Note: User can change values in the green, red, and blue cells in the left. Status quo intervention refers to keep the status quo level of probabilities unchanged in subsequent cascade levels. Best practice intervention refers to setting probabilities as those of better performing health systems in the subsequent cascade levels. Scenarios represent user defined levels of population coverage at the different cascade levels. Scenario values range from 0 to 100 – 0 refers to no change in the status quo coverage and 100 refers to full coverage (i.e., all hypertensive individuals become aware of their condition, or all aware individuals receive treatment, etc.).

Fig. S4: Combining interventions at multiple cascade levels

Step 1: Choosing value of ρ

Scenario-1					Scenario-2					Scenario-3														
50					75					90														
Best practice share					Elasticity																			
Treatment					Control					Treatment					Control									
15-24					71.00					78.00					0.1					0.1				
25-39					66.00					42.00					0.1					0.1				
40-54					75.00					45.00					0.1					0.1				
55-69					86.00					42.00					0.1					0.1				

Block A. Awareness					
Status quo					
	Baseline	Scenario-1	Scenario-2	Scenario-3	
15-24	7.93	6.99	6.68	6.54	
25-39	20.06	19.04	18.64	18.43	
40-54	32.87	31.13	30.37	29.94	
55-69	38.93	36.86	35.93	35.41	
Total	22.33	21.03	20.50	20.21	

Step 2: Choosing value of θ

Scenario-1					Scenario-2					Scenario-3														
50					75					90														
Best practice share					Elasticity																			
Treatment					Control					Treatment					Control									
15-24					71.00					78.00					0.1					0.1				
25-39					72.00					42.00					0.1					0.1				
40-54					73.00					45.00					0.1					0.1				
55-69					74.00					42.00					0.1					0.1				
75.00																								
76.00																								
77.00																								
78.00																								

Block A. Awareness					
Status quo					
	Baseline	Scenario-1	Scenario-2	Scenario-3	
15-24	7.93	6.99	6.68	6.54	
25-39	20.06	19.04	18.64	18.43	
40-54	32.87	31.13	30.37	29.94	
55-69	38.93	36.86	35.93	35.41	
Total	22.33	21.03	20.50	20.21	

Block B. Treatment					
Status quo					
	Baseline	Scenario-1	Scenario-2	Scenario-3	

Step 3: Choosing value of λ

Scenario-1					Scenario-2					Scenario-3														
50					75					90														
Best practice share					Elasticity																			
Treatment					Control					Treatment					Control									
15-24					71.00					78.00					0.1					0.1				
25-39					66.00					78.00					0.1					0.1				
40-54					75.00					80.00					0.1					0.1				
55-69					86.00					81.00					0.1					0.1				
82.00																								
83.00																								
84.00																								
85.00																								

Block A. Awareness					
Status quo					
	Baseline	Scenario-1	Scenario-2	Scenario-3	
15-24	7.93	6.99	6.68	6.54	
25-39	20.06	19.04	18.64	18.43	
40-54	32.87	31.13	30.37	29.94	
55-69	38.93	36.86	35.93	35.41	
Total	22.33	21.03	20.50	20.21	

Block B. Treatment					
Status quo					
	Baseline	Scenario-1	Scenario-2	Scenario-3	

Note: For combining interventions at multiple cascade levels, user may first choose the desired level of awareness rate, followed by a desired level of treatment rate, and finally a desired level of control rate.