Investment case in adolescents' mental health and non-communicable diseases in Uzbekistan

Contents

1. Health interventions costing – using OHT

The health model for this study employs the OneHealth Tool. The tool estimates costs and benefits of interventions to address one of the major causes of the adolescent burden of disease in Uzbekistan, namely, *Non-communicable diseases*, and *Mental, neurological, and substance use disorders*.

For the costing within the OHT we use data and information on:

- Health (OHT default) interventions
- Target population, the proportion of target population, the population in need
- Intervention coverage rates
- Delivery channels
- Drugs and supplies unit costs
- Outpatient visits and inpatient days

1.1 Health (OHT default) interventions

To utilize the capacity of the OHT to calculate health impacts and benefits relevant to adolescent health and wellbeing, we use default interventions in the OHT that were used in the previous literature on adolescent health and wellbeing planning [1–5].

1.2 Target population, the proportion of target population, the population in need

The OHT was used to model those interventions for which impacts on aspects of adolescent health can be quantified and which can be costed. *The OneHealth Tool manual* [6] *does not recommend users changing the target population of default interventions because this may result in inconsistencies between cost and impact results, as the impact modules will continue to assume the original target population.*

Cost data within the OHT is not available by age and gender, so commodity costs were allocated using the proportion of adolescents in the target population for each intervention, similar to [7]. Some health outcomes in the OHT are provided by age and gender*. Where this was not the case, an allocation method similar to that for costs was used.* Thus, for costs, we use the default setting in the OHT on the target population and population in need and multiply the output calculations by the share of adolescents[1]. Below we report population in need – shares of adolescents based on the data from the State Statistics Committee:

Mental health and NCDs

- Share of adolescents (aged 15-19) out of the total population with mental disorders morbidity: **9.4%**

1.3 Intervention coverage

The determinants for intervention costs are the number of people receiving the intervention and the number of resources required to deliver the intervention per person.

Baseline coverage – this is the starting coverage in the base year (2021 in this study). Default values appearing here come from the impact modules. If the default value is zero, there may not be any data available as default for the specific intervention. We assume zero values mean no particular health services (interventions) identified in the selected health programs.

Target coverage (scale-up) – used to assess impact and intervention costs. This is the final target coverage for the end year of our projections. Values entered into this column drive the calculated estimates for the end year. We follow the recommendations of Sheehan et al (2017) on the procedure for setting coverage rates as described in Stenberg et al. (2014, supplementary web appendix, pp. 10–15). On average, we increase the scale-up scenario up to 2 – 10 times, depending on the initial – baseline coverage rate, and adjusting the health impacts numbers to the set targets in the strategy. For Mental, neurological, and substance use disorders interventions, the treatment coverage rates used by [5] in modelling the returns to investment in depression and anxiety were replicated. For example, baseline coverage for *Basic psychosocial treatment for mild depression* intervention is 5 percent, and we target 25 percent for 2026. List of interventions and baseline/target coverage rates are available in the section “3. List of interventions in the OHT” in this document[2].

[1] NCDs health module in the OHT produces health impact results by age groups

[2] We use the phrase scale-up / no scale-up in the report meaning increased / constant coverages rates

1.4 Delivery channels

The OneHealth Tool is designed primarily to cost health services activities. However, it is understood that many activities related to health are implemented outside the primary, district and regional level health care facilities, and these activities impact the health of a nation, including adolescents. Therefore, interventions coverage can be distributed across health channels under the control of the Ministry of Health and under channels not under the control of the Ministry of Health. Default delivery channels include Community, Outreach, Clinic, and Hospital. Since we use default interventions and setting in the OHT, we do not change default settings for delivery channels.

For example, *Basic psychosocial treatment and anti-depressant medication of first episode moderate-severe cases* intervention is delivered across Clinic (75%) and Hospital (25%) delivery channels – summing to 100% delivery for this intervention.

1.5 Drugs and supplies in the OHT

The *treatment inputs* editor assumes that a drug or supply can be conceptualized as follows: A percentage of patients needing service will receive X doses of medicine to be taken Y times per day for Z days. This is translated into a cost per average case by this equation:

$$Cost\ per\ average\ case\ =$$

$$Percent\ receiving * number\ of\ units * times\ per\ day * days\ per\ case * unit\ cost$$

Based on the formula above, we provide a sample of calculations for **Fluoxetine, 20 mg tab** that is used for *Basic psychosocial treatment and anti-depressant medication of first episode moderate-severe cases*:

$$Cost\ per\ average\ case\ (\mathbf{2.7\ USD})\ =$$

$$Percent\ receiving\ (\mathbf{75}\%) * number\ of\ units\ (\mathbf{1\ unit}) * times\ per\ day\ (\mathbf{1\ time}) * days\ per\ case\ (\mathbf{180\ days}) * unit\ cost\ (\mathbf{0.02\ USD})$$

The OHT reports aggregate costs for drugs and supplies from the results in the modules. Thus, we do not calculate each intervention individually but rather report drugs and supplies costs aggregated by program areas.

We use default data on drugs and supplies within the OHT. We multiply the average price values of drugs and supplies for each health program to the factor of retail pharmacy prices of drugs and supplies used for the analysis. We also review data on the used drugs and supplies from the International Medical Products Price Guide [8]. We adjust International Medical Products Price Guide 2015 prices to 2021 prices. Not all drugs and supplies used in the OHT analysis are found from the retail pharmacy in Uzbekistan and International Medical Products Price Guide. Based on our data, retail pharmacy prices are 5.58 times higher for Mental neurological and substance use disorders health program, compared to the default data prices.

1.6 Outpatient visits and inpatient days costs in the OHT

Similar to [3], for costs related to outpatient visit costs and inpatient days, the analysis uses country-specific estimates for costs associated with service provision of inpatient days and outpatient visits, as available through the WHO-CHOICE database [9], with the following assumptions for Uzbekistan:

- for outpatient visit costs, we used estimates for primary level hospital 3842.2 (2010 UZS) – adjusted for inflation **18783.40** (2021 UZS)[3]
- for inpatient bed days, we used estimates for primary level hospital 16305.48 (2010 UZS) – adjusted for inflation **79712.74** (2021 UZS)

The OHT produces results on the number of outpatient visits and inpatient days, which we multiply by the cost per outpatient visit and cost per inpatient bed day using data from the WHO-CHOICE database.

Outpatient visits and inpatient days costs are calculated as follows:

$$\boldsymbol{Outpatient\ visit\ costs\ for\ year\ X} =$$

$$= total\ number\ of\ outpatient\ visits * \%\ (adolescents) * cost\ per\ visit$$

$$\boldsymbol{Inpatient\ days\ costs\ for\ year\ X} =$$

$$= total\ number\ of\ inpatient\ days * \%\ (adolescents) * cost\ per\ day$$

For example, outpatient visits costs for *Mental, neurological, and substance use disorders - Depression* for 2022 is calculated as follows:

$$\boldsymbol{Outpatient\ visit\ costs\ for\ year\ 2022} =$$

$$= total\ number\ of\ outpatient\ visits\ (471415) * 9.4\%\ (adolescents)$$
$$* cost\ per\ visit(18783.40\ UZS) =\ \text{UZS}\ 799{,}508{,}951.57^{4}$$

Total outpatient visits and inpatient days costs are aggregated for all health programs in the OHT and scale-up years (2022-2026). Outpatient visits and inpatient days express service delivery costs, mainly including human resources and infrastructure running costs [3].

2. Program costing

We employ two methods to calculate program costs. First, program costs are based on previously published methods [3]. For NCDs it is adopted using previously published

[3] We use Inflation, GDP deflator (annual %) for Uzbekistan to estimate outpatient visits and inpatient days costs for 2021. Similar method is used for other costs sources from previous years, adjusted for Uzbekistan or US inflation rates.
[4] These calculations are discounted at 3%

methods for NCDs investment case[5]. *Some of the components of program costs would be a fixed investment that would not vary much with population growth or coverage expansion (e.g., policy development, mass media campaigns). Other inputs would be expected to be more substantial and intensive with population growth and coverage (e.g., monitoring surveys, additional training, and communication activities required as services are extended to cover a larger part of the population)* [3]. Program costs are discounted at 3 per cent, on average over 2.5 years.

Second, we follow ingredients-based and top-down approaches**.** In general, this method is used to estimate costs required to implement the strategy 2022-2026, mainly because we followed detailed identification of costing items/cost drivers of the proposed strategy interventions.

We first describe the second method in details. The costs of proposed policy (program) interventions were calculated based on the bottom-up (ingredients-based) and top-down approaches. The bottom-up method is mostly used for a program costing intervention (or activity-based costing approach) – since they require a certain number of resources to support the strategy development and implementation. In contrast, the top-down data collection method is mainly used to assess the baseline situation with infrastructure, human resources, and equipment. We employ techniques for data collection of costs proposed in the OneHealth Tool. The methodology of the OneHealth Tool uses ingredients-based costing or a bottom-up approach. However, due to both bottom-up and top-down data availability in a diverse context, we have developed modified data collection templates and costing reports in Excel.

We use market and tender (vendor) prices to calculate program-specific costs. The required number of resources are based on baseline data (number of adolescents at schools, number of schools, baseline situation numbers, etc.). We also rely on the estimations (budget) of the previous project "Investing in a resilient future of Karakalpakstan by improving health, nutrition, water, sanitation, hygiene, and wellbeing of adolescents and by harnessing the talents of youth during and after COVID- 19". Where applicable, we use estimations from that document for similar/close activities in this study, including for training, development, consultants' costs, etc.

Table 1. *Program costing steps*

Program costing steps	Description
1. Identification of actions to implement intervention	• Review of local standards (SanPiN, other protocols) • Review of international standards/guidelines (best practices of UNICEF, WHO, school and adolescent programs)

[5] https://www.who.int/publications/i/item/WHO-NMH-NVI-18.8

2. Identification of costing items/cost drivers	• Identified from actions – resources required to implement
3. Review of baseline situation using secondary data	• Review of baseline situation for school meals, sports, education, etc. infrastructure / current capacities, based on the secondary data (data from websites of the relevant Ministries, State Committee on Statistics, U-Report, government decrees, UNICEF reports for Uzbekistan)
4. Review of previously conducted projects by UNICEF	• Review of previously conducted projects by UNICEF to identify costs and required resources for a program costing
5. Costing for program interventions	• Using data and information from steps 1-4, program interventions are manually costed.

For Mental, neurological, and substance use disorders we include only program costs calculated within the strategy - ingredients-based approach.

For non-communicable diseases, we follow similar methods of health program administration activities drawn upon earlier work by WHO for the High Level Taskforce for Innovative International Financing of Health Systems 2009 program costs [10]. This method was proposed by [3]. We use per capita costs (in 2009 US dollars adjusted for 2021 price level) on Infrastructure, equipment and vehicles, and other costs, using program costs per capita per year adopted from WHO study [11].

Program administration costs for NCDs Per capita in 2018 US dollars					
Policy	Reduce Tobacco Use	Reduce the harmful use of alcohol	Reduce Unhealthy Diets	Reduce Physical Inactivity	Total
	0.05	0.06	0.05	0.00	0.16
				Total at 2021 price level	**0.17**

We use this estimation per year, and multiply to five years and total number of adolescents – 5,857,762. We also add to this number calculated costs using ingredients-based approach.

We do not include HR costs (salaries) and Drugs and commodities, since they are considered in the health intervention costs within the OHT.

2.1 Health impacts using OHT

Each health program area within the OHT is linked to health impacts modules. Below we tabulate health program areas with health impact modules and health impact (results) indicators from the OHT:

Selected health programs in the OHT	**Impact module**	**Health impact indicator**
Non-communicable diseases	NCD	- Healthy years lived (Health life-years gained) (10 - 19)
Mental, neurological, and substance use disorders		

2.2 Return on investment analysis

We present ROI metrics referring to both the benefit-cost ratio (BCR) and the return-on-investment ratio (ROI). Below are formulas used to calculate them [12]:

$$\text{ROI} = \frac{\big((\text{increased wellbeing} + \text{increased productivity and income}) - \text{intervention costs}\big)}{\text{intervention costs}}$$

A simple way of interpreting an ROI ratio is "for every 1 dollar invested, there are X dollars' worth of benefits".

$$\text{BCR} = \frac{\text{increased wellbeing} + \text{increased productivity and income}}{\text{intervention costs}}$$

Methods settings described here are mostly adopted from previous literature (Sheehan, P. *et al.* 2017).

Healthy years lived measure is used to calculate economic benefits from investing in Mental, neurological, and substance use disorders and NCDs [2,3]. Authors in the previous studies distinguish between the social and economic components of the value of a life-year saved. We multiple the total value of a life year across these two components to 1.5 times GDP per capita. This is made up of a social value equal to 0.5 times the GDP per capita. The economic benefits of increased labor force participation are calculated at 1.0 times GDP per capita.

3. List of interventions in the OHT

Mental, neurological, and substance use disorders	**Target population in the OHT settings**	**Target population: adolescents**	2021 (baseline)	2022	2023	2024	2025	2026 (target)
Anxiety disorders								
Basic psychosocial treatment for anxiety disorders (mild cases)	People with anxiety	9.4% of people with anxiety	5	9	13	17	21	25
Basic psychosocial treatment and anti-depressant medication for anxiety disorders (moderate-severe cases)	People with anxiety	9.4% of people with anxiety	10	14	18	22	26	30
Intensive psychosocial treatment and anti-depressant medication for anxiety disorders (moderate-severe cases)	People with anxiety	9.4% of people with anxiety	5	9	13	17	21	25
Depression								
Basic psychosocial treatment for mild depression	People with depression	9.4% of people with depression	5	9	13	17	21	25
Basic psychosocial treatment and anti-depressant medication of first episode moderate-severe cases	People with depression	9.4% of people with depression	10	14	18	22	26	30
Intensive psychosocial treatment and anti-depressant medication of first episode moderate-severe cases	People with depression	9.4% of people with depression	5	9	13	17	21	25
Intensive psychosocial treatment and anti-depressant medication of recurrent moderate-severe cases on an episodic basis	People with depression	9.4% of people with depression	5	9	13	17	21	25
Intensive psychosocial treatment and anti-depressant medication of recurrent moderate-severe cases on a maintenance basis	People with depression	9.4% of people with depression	1	2	4	6	8	10
Psychosocial care for peri-natal depression	Live births	9.4% of live births	10	14	18	22	26	30
Epilepsy								
Basic psychosocial support, advice, and follow-up, plus anti-epileptic medication	People with epilepsy	9.4% of people with epilepsy	40	46	52	58	64	70
Alcohol use/dependence								

Brief interventions and follow-up for alcohol use/dependence	People with alcohol use disorder	9.4% of people with alcohol use disorder	5	9	13	17	21	25
Management of alcohol withdrawal	People with alcohol use disorder	9.4% of people with alcohol use disorder	5	9	13	17	21	25
Non-communicable diseases								
Risk Factors								
Offer to help quit tobacco use: Brief intervention	Adults 15+	9.4% of adults 15+	0	6	12	18	24	30
Screening and brief intervention for hazardous and harmful alcohol use	Adults 15+	9.4% of adults 15+	0	6	12	18	24	30
Physical inactivity: Brief advice as part of routine care	Adults 15+	9.4% of adults 15+	0	6	12	18	24	30
Policy interventions - Under Programme Costing								
Tobacco: Monitor tobacco use/prevention policies	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Protect people from tobacco smoke	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Offer to help quit tobacco use: mCessation	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Warn about danger: Warning labels	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Warn about danger: Mass media campaign	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Enforce bans on tobacco advertising	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Enforce youth access restriction	Total population	9.4% of total population	0	6	12	18	24	30
Tobacco: Raise taxes on tobacco	Total population	9.4% of total population	100	100	100	100	100	100
Tobacco: Plain packaging of tobacco products	Total population	9.4% of total population	0	6	12	18	24	30
Hazardous alcohol use: Enforce restrictions on availability of retailed alcohol	Total population	9.4% of total population	0	6	12	18	24	30
Hazardous alcohol use: Enforce restrictions on alcohol advertising	Total population	9.4% of total population	0	6	12	18	24	30

Hazardous alcohol use: Enforce drunk driving laws (sobriety checkpoints)	Total population	9.4% of total population	0	6	12	18	24	30
Hazardous alcohol use: Raise taxes on alcoholic beverages	Total population	9.4% of total population	100	100	100	100	100	100
Physical inactivity: Awareness campaigns to encourage increased physical activity	Total population	9.4% of total population	0	0	0	0	0	0
Sodium: Surveillance	Total population	9.4% of total population	0	6	12	18	24	30
Sodium: Harness industry for reformulation	Total population	9.4% of total population	0	6	12	18	24	30
Sodium: Adopt standards: Front of pack labelling	Total population	9.4% of total population	0	6	12	18	24	30
Sodium: Adopt standards: Strategies to combat misleading marketing	Total population	9.4% of total population	0	6	12	18	24	30
Sodium: Knowledge: Education and communication	Total population	9.4% of total population	0	6	12	18	24	30
Sodium: Environment: Salt reduction strategies in community-based eating spaces	Total population	9.4% of total population	0	6	12	18	24	30
Reducing obesity: Complete elimination of industrial trans fats	Total population	9.4% of total population	0	6	12	18	24	30
Reducing obesity: Replace saturated fats with unsaturated fats through reformulation, labelling, and fiscal policy	Total population	9.4% of total population	0	6	12	18	24	30
Reducing obesity: Reduce sugar consumption through taxation on sugar-sweetened beverages	Total population	9.4% of total population	0	6	12	18	24	30

4. Program specific interventions, defined within the period of 2022 – 2026.

1	Conducting a comprehensive study of factors influencing the mental health of schoolchildren.
2	Development and implementation of training programs for specialists in the public education system, health care, and communities on mental development, psychosocial counselling, and providing psychosocial services to adolescents.

3	Implementation of social work approaches in the healthcare and public education systems.
4	Research into the needs of adolescents in general education institutions and factors affecting their mental health and well-being.
5	Based on the research results, develop and implement an action plan to improve adolescents' mental health.
6	Organization of a 24-hour crisis psychological online counselling service for adolescents and their families.
7	Creation of an interdepartmental system for providing psychosocial assistance to adolescents and their families, including mental health support services at all levels.

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