Detailed information on the hackathon themes

1. Overweight and obesity.

Overweight and obesity are becoming a problem in Kazakhstan, which in recent years have been affected the health of young children. As the researchers of the Diabetic Education Foundation stressed, young people who are overweight and obese have mostly the diabetes of the 2-type, more than 100 schoolchildren are found with this disease. A nationwide survey of the Ministry of Health of Kazakhstan showed that every fourth child in Kazakhstan suffers from excessive weight.

According to the latest data from the Academy of Nutrition of Kazakhstan, there is a trend of overweight, especially among children ages. The key causes of this phenomenon among children and adolescents are the methods, nutrients and types of feeding used by parents and mothers from the first day of the life of newborns.

The mobile nutrition app will aim to prevent overweight and obesity (O & O) in early childhood by creating an integrated national standardized balanced nutrition framework and strengthening the capacity of counseling specialists for pregnant women, parents and caregivers of children of 0-36 month in partnership with the Ministry of Health across the country, academia and civil society.

According to the findings of WHO, adequate nutrition during infancy and early childhood is essential to ensure the full growth of the potential, health and emotional development of children. Of key importance is the availability of mobile applications aimed at supporting exceptional breastfeeding and a diverse and balanced complementary feeding of infants and young children, a well-supported information solution combined with appropriate training for primary health care workers, including the nurses visiting homes.

Meanwhile, in existing IT solutions there are no standards for counseling parents and guardians by PHC specialists. A developed nutritional solution for exclusive breastfeeding and supplemental nutrition can create an institutionalized platform to prevent overweight and obesity among young children in Kazakhstan.

To this end, UNICEF Kazakhstan intends to provide technical support to the Government in developing and implementing an IT solution for exclusive breastfeeding and supplemental feeding by raising parents and caregivers’ awareness of balanced feeding, including breastfeeding for infants from 0 to 6 months of age and the introduction of supplementary feeding among small children aged 6-36 month.

Tasks:
- On the basis of mobile application, to develop
  - improved learning process for parents / guardians,
  - improved nursing education process,
  - improved parent counseling process,
  - improved process of cooking complementary foods

Expected solutions:
The solution based on mobile application.
2. Prevention and treatment of STIs, hepatitis, HIV (support for patients, adolescents and raising awareness).

WHO defines adolescents as people between the ages of 10 and 19. Adolescence is considered a difficult period, and adolescents themselves – one of the most vulnerable groups. Adolescents are not always able to make decisions, are poorly informed, often experience financial difficulties, which can lead to different types of risky behavior.

In Kazakhstan, one of the most serious problems is the preservation of the reproductive health of adolescents. According to research results, about half of adolescents aged 15–19 live sexually and their sexual behavior is unsafe. The combination of this trend with illiteracy in sexual and reproductive health, prevention of unwanted pregnancies and STIs / HIV leads to an increase in the number of abortions, sexually transmitted diseases and reproductive health disorders. The result of this kind of “adolescent activity” is, first of all, unwanted pregnancy, unsafe abortion, bad habits, early motherhood, stimulated early marriage, child abandonment, sexually transmitted infections including HIV and hepatitis.

In Kazakhstan today there are 430 children and teenagers of school age from 7 to 19 years old living with HIV. In addition to the physical changes and emotional ups and downs experienced by adolescents during the period when they become adults, they face issues such as access to education, health care and other social services.

Today, the availability of antiretroviral drugs for HIV-positive patients is 100%. A simple method of taking regimens on these drugs and good tolerability reduce the risk of spreading HIV infection, but at the same time ensuring that adolescents and adults living with HIV take ARV drugs in accordance with the treatment regimen, that is, to achieve high adherence is still difficult.

The results of UNICEF studies among adolescents show that in the scale of values, priority issues for them are health (97.9%) and education (87.8%). Adolescents living with HIV say that they would like to receive more information on HIV infection and modern methods of its treatment, measures to prevent other diseases (tuberculosis, hepatitis, mental disorders), prevention of the use of harmful substances and stress. High school teens and college students also showed low awareness of the consequences of unsafe sexual behavior, sexually transmitted infections, and the consequences of unsafe abortion.

There are many information channels, including parents, relatives, health workers, the Internet, and school teachers, but at the same time, there is a low level of information on the part of school teachers, and information on the Internet is different.

To this end, UNICEF Kazakhstan intends to provide technical support to the Government in the development and implementation of IT solutions regarding the awareness of various categories of population (urban / rural, adolescents living with HIV, high school and college adolescents, school teachers, health workers) on issues of sexual reproductive health, prevention and treating HIV, hepatitis, and
counseling adolescents with HIV. Intranet communication among various categories, as well as receiving online counseling and training, also takes an important place.

**Tasks:**
- On the basis of mobile application, to develop
  - improved learning process for parents / guardians,
  - improved learning process for doctors and nurses, for teachers of schools and colleges
  - improved counseling for parents and adolescents with HIV
  - improved counseling process for parents and teens of schools and colleges,
  - improved process of raising awareness on HIV, sexual and reproductive health for adolescents,
  - improved communication between teenagers

**Expected solutions:**
The solution based on mobile application.

### 3. Prevention of child injuries. *Hub – Child Injury Prevention Knowledge Lab*

Child injury is one of the social problems in Kazakhstan and in the world. This is evidenced by the high mortality rate of children from injuries. According to the World Report (WHO) and UNICEF on the prevention and evaluation of child injuries, 830,000 children die every year in the world, and tens of millions become people with disabilities as a result of injuries.

In 2018, UNICEF in Kazakhstan, in cooperation with the Information and Analytical Center of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, conducted a survey among parents and guardians of 0-14 aged children on knowledge, attitudes and practices on unintentional child injuries. The survey results show that only 15.7% of parents have smoke detectors at home, only 38% completed the course of first aid, and 30% of parents talk on a mobile phone while driving. Among the most troubling parents of probable places and causes of injuries were the probability of injuries in yards, injuries associated with kitchen, household and electrical appliances, and injuries in road accidents. Unfortunately, in Kazakhstan, children from 0 to 1 year old are left unattended for 10 minutes on average, children aged 1-2 years old – for 16 minutes, children 2-3 years old – for 33 minutes and children 3-4 years old – for 41 minutes.

**Tasks:**
- To develop, fill and test an online / mobile platform to raise awareness and knowledge about child injury and its prevention among parents, guardians and caregivers.

**Expected solutions:**
The created and tested online platform / hub / laboratory with a forum should contain information and training materials, tips, successful practices, experiments / interactive games / quests to raise awareness and improve knowledge
on how to identify and reduce the risk of injury at home, on the face, on the game / sports ground, on the road, in transport.

4. Remote monitoring of patients with chronic diseases

The idea should be socially oriented and applicable in the field of health. The possibility to monitor the health of the patient, who is in the dispensary, by the attending physician (or self-monitoring by the patient). Integration with sensors, fitness trackers, insulin pumps for tracking indicators of circulatory system diseases (Blood pressure, heart rate), blood sugar levels. The system should have a convenient and intuitively understandable interface for the patient (integration with the ERDP system and subsystems (information system “Electronic Register of Dispensary Patients” is possible).

5. Ensuring the vaccine delivery process in compliance with the conditions of storage and transportation (cold chain).

All vaccines used in Kazakhstan are delivered to the country from abroad by air. If stored improperly, vaccines lose activity. The main requirement is to comply with the temperature regime – vaccines should be stored at a temperature of 2-8 ° C, i.e. harm causes both temperature increase and freezing. Delivery to the regional centers is carried out by special cargo transport. Problems of compliance with the cold chain arise from the delivery of regional centers to district centers and further to local medical organizations (vaccination points), especially in spring (during floods), due to delays in transit.

Tasks:

To develop and test a system for controlling the movement of vaccines and observing the conditions for their storage and transportation, or a system for delivering vaccines at the final stage (before vaccination points) using drones (unmanned aerial vehicles). It is desirable to be able to track the full cycle of vaccine movement from the moment of entry into the country (deplanement, transportation to a central warehouse, delivery to the regional center, delivery to a medical organization, administration of a vaccine in a patient, direct administration of a vaccine).

Expected solutions:

Automated control system (and / or delivery of vaccines at the last stage using drones) with notifying the participants of the process, integration with the DSIS (Drug Supply Information System) and / or DMS (Drug Management System, Drug Monitoring) information system is desirable).