Data and Application

Project Phase – I

Group No. 60

• Rayaan Khan: 2021101120

• Santhoshini Thota: 2021101097

• Yash Shivhare: 2021101105

GLOBAL HEALTH COMMITTEE(GHC)

About our Universe of Discourse

The target of our mini world is to provide a database storing all the information regarding various levels of this Global Health Committee, to provide a simple architecture to get the data regarding various developments in the health sector all across the globe and if their programs and policies are being implemented properly. The main aim of this Global Health Committee is to ensure a good health for every living human in this world.

The committee has its own constitution that consists of a representatives of various countries that have joined this committee by agreeing to abide by their constitution. The committee has 3 levels 1) Health association (consists of all the representatives and are the supreme decision-making body in terms of presenting bills, approving budget for a program, etc.) 2) Executive board (few members of the health association voted by the health association that passes the bills and consists of only health specialists) and 3) Secretariat (the group responsible for implementing these policies and programs on various diseases and assigning these tasks to its various branches around the world who further assign tasks to multiple ground level organizations in that country).

Purpose of the Database

The purpose of our database is proper management of various levels under the Global Health Committee, to check the progress of various schemes and developments at various places, to take care of the medical sector and to provide help when anyone needs it especially in the case of pandemics (like covid). Also, to check which programs and sub organizations are working on it and keep track of the progress rate of the programs/researches taking place for various health issues.

Users of the Database

a. Executive board
b. Director General (Head of the secretariat group)
c. Assistant director general
d. Head of multiple divisions under assistant director generals
e. Chairman (Head of the executive board)
f. Members of the secretariat group.
g. Members of the world health assembly
h. Health ministers of the countries

Users can ask for …

a. Implementation and working of various health policies and programs
b. Subjects on which current biomedical researches are taking place
c. Mortality and fertility rates caused due to pandemic or a particular disease.
d. Health statistics on major diseases in various countries
e. Medical facilities available in each country
f. The elected representatives of various countries, their roles and designations

Database Requirements

A. Assumptions and Constraints:
- The branches of GHC have only been opened in countries that are its members.

- Policies are being made by Global Health Committee and it may or may not be implemented by any country
- Every country has a unique name.
- No country has more than one representative or branches
- Research labs have been opened only in the countries that are the members of the GHC.
- A branch has only single local organization working under it which can work on various health issues.
- There can only be one disease targeted by one policy
- A member of executive board can have multiple members of health association working under them but a member of health association can work under only one member of executive board

B. Entity Types
  i. Strong Entities
    a. Health policies/programs
      - Policy/Program name
      - Policy/Program Number **(Primary Key)**
      - Locations – where it is to be implemented
      - Policy/Program type
        - Domain = {Disability and rehabilitation, Blindness prevention and control, Maternal and child health, Food safety, Mental Health, etc. (since multivalued)}
      - Duration (i.e., for how long the policy is to be implemented)
    b. Members (Countries that have agreed to abide by the constitution of GHC)
      - Country name **(Candidate Key, Key Attribute)**
      - Country ID **(Primary Key, Key Attribute)**

- Representative (Name, Designation, Year of Term) (**Composite Attribute**)
- c. Bio-Medical researches
    - Research Type
        - Domain = {mental health, communicable diseases, non-communicable diseases, enhancement of immune system, etc.}
    - Country ID (**Foreign Key**)
    - Name of the Head ((1) First name (2) Last name) (**Composite Attribute**)
    - Status of completion
        - Domain = Percentage (0-100%)
- d. Disease
    - Disease ID (**Primary Key**)
    - Disease Name
    - Disease Type
        - Domain = {acquired, acute, chronic, congenital, genetic, iatrogenic, idiopathic, incurable, pathogenic, terminal, etc.(since multivalued)}
    - R-naught (R_0) (Measurement of rate of spread ability)
        - it represents the number of new infections estimated to stem from a single case
        - Domain = $[0, \infty)$
- ii. Weak Entities
- a. Branches/Offices
    - Branch ID (**Partial Key**)
    - Country ID (**Foreign Key**)
    - Location in the country (state name) (**Multivalued Attribute**)
    - Name of Head (**Composite Attribute**)

- Number of Local organizations
  - b. Health Statistics
    - Serial No. **(Surrogate Key)**
    - Disease ID **(Foreign Key)**
    - Number of people affected
    - Number of people recovered
    - Mortality rate (**Derived Attribute)**
    - Vaccination Status
      - Domain = Percentage (0-100%)
    - Most affected country ID **(Foreign Key)**
  - c. Medical Infrastructures in a country
    - Number of Hospitals/Clinics
    - Number of equipments required (**Multivalued Attribute)**
    - Country ID **(Foreign Key)**
    - Number of doctors/nurses
- C. Relationship Types
  1. Implement
     - a. Degree: Binary
     - b. Entities participating: Members & Health policies/programs
     - c. Participation constraint:
       - i. Members: Partial since it's possible that no country implements it
       - ii. Health Policies: Partial
     - d. Cardinality Ratio: (M: N)
  2. Affects
     - a. Degree: Quaternary
     - b. Entities participating: Health policies/ programs, Bio-Medical Researches, Health Statistics & Medical Infrastructure
     - c. Participation constraint:

  i. Health policies/ programs:
- Has partial participation on health statistics, bio-medical researches (since they may or may not require a research), medical infrastructures (since it may not require any updation on the current infrastructure)

  ii. Bio-Medical Researches:
- Has partial participation

  iii. Health Statistics:
- Has total participation since all the other entities have direct and complete impact on the statistic

  iv. Medical Infrastructure:
- Has partial participation

3. Reduces
   a. Degree: Binary
   b. Entities participating: Diseases & Health policies/programs
   c. Cardinality Ratio: 1: N
   d. Participation constraint:
       i. Diseases: Partial participation as a disease may or may not have a policy
       ii. Health policies/programs: Total participation as a policy is made only for a disease

4. Works_Under
   a. Degree: Binary
   b. Entities participating: Bio-Medical Researches, Branches
   c. Cardinality Ratio: N:1
   d. Participation constraint
       i. Bio-Medical Researches: total since every research will take place under the supervision of a branch

ii. Branches: partial as a branch may not be having any research under it.

5. Supervision

a. Degree: Unary

b. Entities participating: Members (Health Association) & Members (Executive Board)

c. Cardinality Ratio: N:1

d. Participation constraint:

i. Members (Health Association): Total Participation since every member would be working under a member of executive board.

ii. Members (Executive Board): Partial Participation

Functional Requirements

1. Retrieval

a. Queries

- Selection

i. Retrieve complete data regarding all the diseases

ii. Finding the entire data about the world's health stats

iii. Finding all the offices along with their data

- Projection

i. List of all Bio-Medical researches with status of completion >= 90%

ii. List of all the branches in a particular country with more than 30 local organizations

iii. List of all Disease IDs with more than 0.6 mortality rate

- Aggregate

i. Maximum duration of a health policy/program

  ii. Sum of all the deaths caused by all diseases

  iii. Sum of all local organizations of all branches

 • Search

  i. List of all the countries whose name starts with 'Ans'

  ii. Number of all representatives with name ending with 'an'

  iii. List of all diseases having 'ler' between their name

b. Analysis

 i. R_0 value of the disease with maximum number of recoveries

 ii. Mortality rate of the country with minimum number of doctors/nurses

 iii. Representative of the country with maximum numbers of local organizations

2. Modification

a. Insertion

 1. Adding any new policy being deployed by some country

 2. Adding any new members who wants to join GHC

 3. Inserting any new disease being found

 4. Adding new branches and infrastructures formed.

b. Update

 1. Change in representative of any country

 2. Change in location of any branch

 3. Change in status of completion of any Bio-Medical research

 4. Updating the percentage of vaccination status of a disease

 5. Updating member of the executive boards and secretariats

c. Deletion

 1. Deleting any policy after its expiry

 2. Removing any country who wants to leave GHC group

 3. Removing member of an executive board

4. Removing the research that has been completed