BỘ GIÁO DỤC VÀ ĐÀO TẠO

TRƯỜNG ĐẠI HỌC KINH TẾ QUỐC DÂN

FINAL EXCERCISE

Subject: DATABASE

PROJECT: COVID-19 INFORMATION MANAGEMENT DATABASE

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I. The aim of the Covid-19 Information Management Database:

(1) Help the office Staff and medical Staff at local administration easy to: tracking, managing the information in quarantine camps and hospitals, monitoring the health status, receiving the personal information from outbreak-area, epidemiological declaration information, uncommon health issues information from citizens.

(2) Help the staff : Monitoring the epidemic status at local areas as well as statistics, checking patient/isolated patient information. Knowing the number of quarantined people at present, the people that left the quarantine camp or checked out from hospital, the number of people who tested positive with the virus,.. Help the Department of Health get the information of the pandemic as soon as possible, then give the suitable solution for local anti-epidemic steering committee.

*Utilities of "Covid-19 information management system":

(1) At Quarantine Camps: Users have access to add or update information about quarantined persons, update illness status, send people in quarantine camps to Hospital when they have a positive result on the test. Checking , searching, reporting , statistic the number of patients and labor force.

(2)At hospitals: users have access to add or update patient information, covid-19 test result, vaccine status; Receive people from quarantine camps or from other hospitals. Checking, searching , reporting , statistics the number of patients and labor force.

(3) At local administration: users can summarize the number of quarantined people/ patients , including isolating for epidemic check and isolating for treatment. Summary of the number of quarantined person/patients now in quarantine camp and hospital, and also details of them. Statistics of the number of positive tested persons, casualties, list of transferred to others hospital cases. Users are also able to search the information by specific characteristics : Name, Nationality, their vehicle , code of vehicle, illness status.

Covid-19 Information Management System is built towards 3 main target groups:

All the citizens: This is the main target of the system, the core of the database involved in almost every link.

Government, administrator at local area : This is the managing group, taking care of the collecting and summarizing the information for the system.

Leader, supreme leader : The final target group of the database, from the collected information , they will give the solution for the problem in a real life situation.

II. Description of the system

The way of the system operating :

System lets the citizen and administrator have access in the database to declaring, inserting information, notice related information to declarer and some general information of specific area or nationally in order to catch the latest situation of the pandemic. For example:

Citizens login the system and voluntarily declare health, epidemiological including: travel history, meeting history, health status, uncommon health issues and illness history. If the citizen required to go to quarantine camps (f0,f1,f2,f3…) then process to declare the isolated declaration.

System also asks the declarer to give some personal information like Date of Birth, gender, nationality and area that they're living in to help the area management and evaluate citizen's information declared on the system. However this is personal information then only the user that gives the information and the administrators have access to this kind of information.

Medical staffs and health center will responsible for collecting the information for testing Covid list (Information stored in TEST_COVID table): testing ID, testing person, result receiving time, how many time they tested , test form, test result, ID of the health center responsibility for test result) and vaccinating (Information stored in VACCINE table): Vaccinating ID, person who get the vaccine, name of the vaccine, vaccinating time, injector, ID of Health Center, Injection time) for the person want to check the information or want to get vaccinated at that health center.

On the other hand, a hospital must declare the information of itself: name of the center, address, ID given by system.

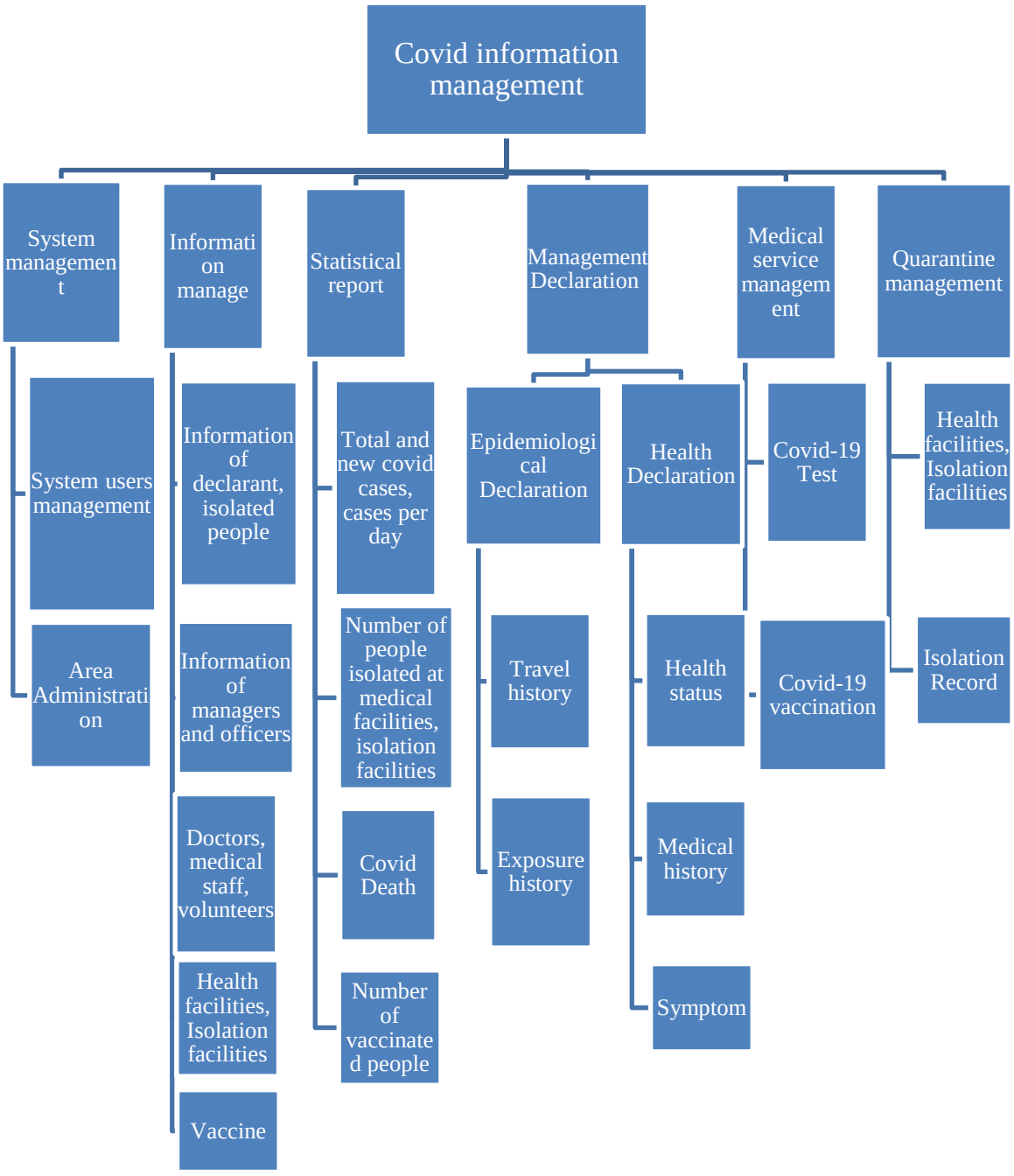
Every section has a manager, local administrators have responsibility to check the actual situation of prevention, managing status of that area. Thus, the system manages this group by ADMIN table. By ADMIN table, the database will store information like: manager ID, username, password and the area managed by that person.

Furthermore, the database also stores the list of nurses, doctors, volunteers that participated in epidemic prevention work grouped by area and some information: ID, name, phone number, active area, working place, job,…. Stored in the STAFF table.

Lastly, the database runs by distributing the work by the area. Every area has information about citizens, administrators, health centers, quarantine camps, medical staff,and volunteers. From that information, the system will summarize the figure and have the most accurate and general statistics to give to the Leader so as to have a correct and effective solution.

III. System's analysis

3.1. Function Hierarchy Diagram



3.2. Entities : 15

USERS

EPIDEMIOLOGICAL_DECLARATION,

HEALTH_DECLARATION

ISOLATED_DECLARATION,

CLOSED

CLOSED_HISTORY

HOSPITAL

VACCINE

STAFF

TEST_COVID

ADMIN

SECTION

PERSON_INFO

SYMPTOM

ILLNESS_HISTORY_ID

3.3. ERDs

-USERS () EPDEMIOLOGICAL_DECLARATION : 1-N

- USERS () HEALTH_DECLARATION : 1-N

- USERS () ISOLATED_DECLARATION :1 -N

- USERS () VACCINE : 1-1

- USERS () TEST_COVID: 1-N

- USERS () PERSON_INFO : 1-1

-USERS () CLOSED: M-N

- ILLNESS_HISTORY_ID () HEALTH_DECLARATION: 1-N

- SYMPTOM () HEALTH_DECLARATION: 1-N

- EPDEMIOLOGICAL_DECLARATION () CLOSED_HISTORY : N-N

- STAFF () HOSPITAL : 1- N

- STAFF () VACCINE : 1- N

-HOSPITAL () VACCINE: 1-N

-TEST_COVID() HOSPITAL : 1-N

- SECTION () PERSON_INFO : 1-N

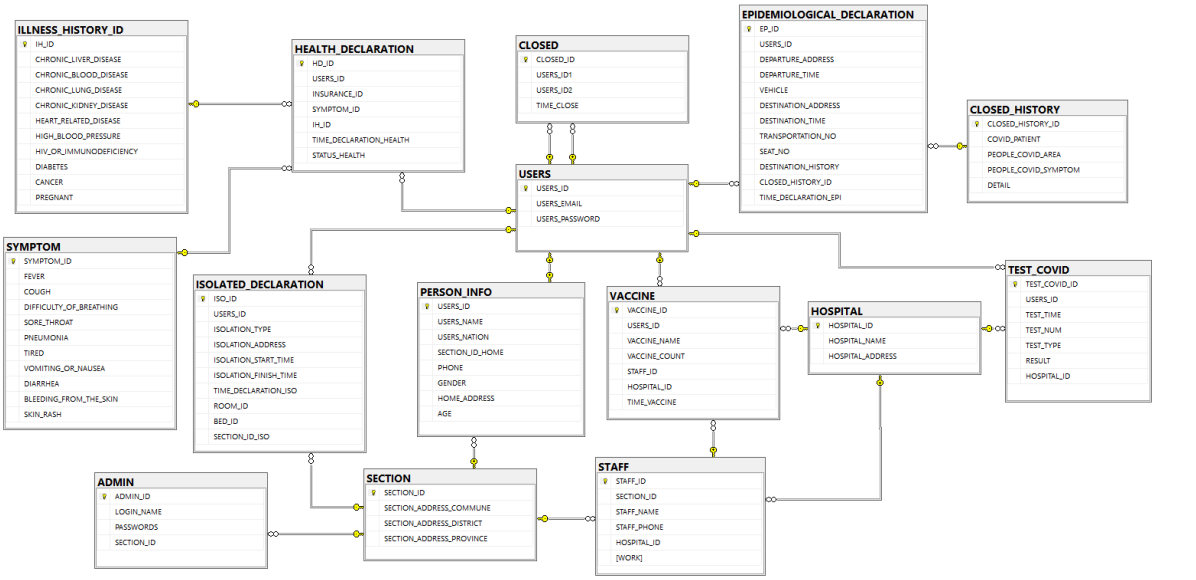
- SECTION () ISOLATED_DECLARATION : 1-N

- SECTION () ADMIN : 1-N

- SECTION () STAFF : 1-N

IV. Database Building

4.1. Diagram



4.2 Detail of Tables in Database

CLOSED_HISTORY

*The main function of this table is that it will receive and store the declaring information that has a high risk of infection like traveling to Infected area, meeting infected people or maybe being infected . All the information will be secured and managed carefully, only for public helping purposes like tracing the source of the infection has disappeared (F0).

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE

CLOSED_HISTORY_ID	ID of the Closed Case Declaration (14 Days)	VARCHAR	PK	12
COVID_PATIENT	Meet Covid-19 Patient	NVARCHAR		5
PEOPLE_COVID_AREA	Meet the person from infected area	NVARCHAR		5
PEOPLE_COVID_SYMPTOM	Meet the person have Covid-19 symptom	NVARCHAR		5
DETAIL	Detail (if it have)	NVARCHAR		50

ISOLATED_DECLARATION

*This table was created to store detailed information of infected cases (F0) or suspected cases (F1,F2,F3…)

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
ISO_ID	IID	VARCHAR	PK	1 2
USERS_ID	Citizen ID number	VARCHAR	FK	1 2
ISOLATION_TYPE	Isolated type (F0,F1,F2,F3)	NVARCHAR		50
IISOLATION_ADDRESS	Address of the camp	NVARCHAR		50
ISOLATION_START_TIME	When the quarantine start	DATE		
ISOLATION_FINISH_TIME	When the quarantine end	DATE		
TIME_DECLARATION_ISO	When did they declared	DATE		
ROOM_ID	ID of the Room	NVARCHAR		50

BED_ID	ID of the Bed	NVARCHAR		50
SECTION_ID_ISO	ID of the quarantine camp	VARCHAR	FK	10

ADMIN

This table is for the database manager. They need to log in. The manager will manage the area based on the ID of the area.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
ADMIN_ID	ID of manager	VARCHAR	PK	12
LOGIN_NAME	Username	NVARCHAR		20
PASSWORDS	Password	VARCHAR		20
SECTION_ID	Section that they manage	VARCHAR	FK	10

SECTION

The system applied nationally. The area is managed to “Phường/Xã” Level. Every area has its own ID.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
SECTION_ID	ID of section	VARCHAR	PK	10
SECTION_ADDRESS_COMMUNE	COMMUNE	NVARCHAR		50
SECTION_ADDRESS_DISTRICT	DISTRICT	NVARCHAR		50

SECTION_ADDRESS_PROVINCE	PROVINCE	NVARCHAR		50

CLOSED:

This table will store the information based on user 1 code and user 2 code. Thus, it will be easier to trace those who meet the Covid-patient

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
CLOSED_ID	ID of the table	VARCHAR	PK	12
USERS_ID1	User 1 ID	VARCHAR	FK	12
USERS_ID2	User 2 ID	VARCHAR	FK	12
TIME_CLOSE	Day that they meet each other	DATE		

TEST_COVID:

This table is used to store the result of the covid test.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
TEST_COVID_ID	ID of the table	VARCHAR	PK	12
USERS_ID	ID of the user	VARCHAR	FK	12
TEST_TIME	Time that they've tested	DATE		
TEST_NUM	Tested number	INT		
TEST_TYPE	Testing type	NVARCHAR		20

RESULT	Result	NVARCHAR	FK	10
HOSPITAL_ID	ID of the hospital that they went to test	VARCHAR	FK	12

EPIDEMIOLOGICAL_DECLARATION

This table is used to save all the places that a person went to the last 14 days. This helped to control who went to the infected area as well as the people who went with them. Besides, this table linked with CLOSED_HISTORY for easier tracing.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
EP_ID	ID of the table	VARCHAR	PK	12
USERS_ID	User ID	VARCHAR	FK	12
DEPARTURE_ADDRESS	The address where they start to travel	NVARCHAR		50
DEPARTURE_TIME	Day that they start to travel	DATE		
VEHICLE	Vehicle	NVARCHAR		50
DESTINATION_ADDRESS	They address of the place that they came	NVARCHAR		50
DESTINATION_TIME	Day that they came	DATE		
TRANSPORTATION_NO	Code of the vehicle	NVARCHAR		50
SEAT_NO	Number of the seat	NVARCHAR		10

DESTINATION_HISTORY	Province/Country they went to in the last 14 days	NVARCHAR		50
CLOSED_HISTORY_ID	ID of Closed history table	VARCHAR	FK	12
TIME_DECLARATION_EPI	Day that they declared	DATE		

VACCINE:

Vaccine table will be used by staff, they will update the information frequently about who is vaccinated, how many times they took the vaccine ,….

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
VACCINE_ID	Vaccine ID	VARCHAR	PK	10
USERS_ID	User ID	VARCHAR	FK	12
VACCINE_NAME	Vaccine Name	NVARCHAR		50
VACCINE_COUNT	How many times they took the vaccine	INT		
STAFF_ID	Staff ID (Injector)	VARCHAR	FK	12
HOSPITAL_ID	Hospital ID (Where)	VARCHAR	FK	12
TIME_VACCINE	Day that they took the vaccine.	DATE		

ILLNESS_HISTORY:

This table is for the user to give the database the illness that they used to have, then compare it to the symptom table to determine if they have covid or not. Moreover, this table is also used to determine if the person can use the vaccine or not, if they can ,which one they will use. (People need to tick on the square)

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
IH_ID	Mã ill_history	VARCHAR	PK	12
CHRONIC_LIVER_DISEASE	Bệnh gan mãn tính	NVARCHAR		5
CHRONIC_BLOOD_DISEASE	Bệnh máu mãn tính	NVARCHAR		5
CHRONIC_LUNG_DISEASE	Bệnh phổi mãn tính	NVARCHAR		5
CHRONIC_KIDNEY_DISEASE	Bệnh thận mãn tính	NVARCHAR		5
HEART_RELATED_DISEASE	Bệnh tim mạch	NVARCHAR		5
HIGH_BLOOD_PRESSURE	Huyết áp cao	NVARCHAR		5
HIV_OR_IMMUNODEFICIENCY	HIV / Suy giảm miễn dịch hay không	NVARCHAR		5
DIABETES	Tiểu đường	NVARCHAR		5
CANCER	Ung thư	NVARCHAR		5
PREGNANT	Có đang trong thời kì mang thai hay không	NVARCHAR		5

SYMPTOM

This table is for determining if a person has Covid symptoms or not.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
SYMPTOM_ID	Mã bảng triệu chứng	VARCHAR	PK	12
FEVER	Sốt	NVARCHAR		5
COUGH	Ho	NVARCHAR		5
DIFFICULTY_OF_BREATHING	Khó thở	NVARCHAR		5
SORE_THROAT	Đau họng	NVARCHAR		5
PNEUMONIA	Viêm phổi	NVARCHAR		5
TIRED	Mệt mỏi	NVARCHAR		5
VOMITING_OR_NAUSEA	Nôn hoặc buồn nôn	NVARCHAR		5
DIARRHEA	Bệnh tiêu chảy	NVARCHAR		5
BLEEDING_FROM_THE_SKIN	Chảy máu từ da	NVARCHAR		5
SKIN_RASH	Phát ban da	NVARCHAR		5

HOSPITAL:

This table is for managing and tracking patient in Hospital

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
HOSPITAL_ID	Hospital ID	VARCHAR	PK	12

HOSPITAL_NAME	Hospital Name	NVARCHAR		50
HOSPITAL_ADDRESS	Địa chỉ bệnh viện	NVARCHAR		60

USERS:

This table allow invidual to login and see their details. This will monitored by staff, tracking every user then will notice them if there is something wrong.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
USERS_ID	User ID	VARCHAR	PK	12
USERS_EMAIL	Email	NVARCHAR		50
USERS_PASSWORD	Password	NVARCHAR		20

STAFF:

Staff table is used to store information of staff including doctor, nurse and volunteer.

ATTRIBUTES	DETAIL	DATA TYPE	PK/FK	SIZE
STAFF_ID	Staff's ID	VARCHAR	PK	12
SECTION_ID	Area ID	VARCHAR	FK	10
STAFF_NAME	Staff's name	NVARCHAR		50
STAFF_PHONE	Staff's Phone Number	VARCHAR		12
HOSPITAL_ID	ID of the Hospital	VARCHAR	FK	12
WORK	What they need to	NVARCHAR		50

	do			

V . System Activity

5.1. SELECT

5.1.1. Information about passengers on Public Vehicles.

Eg: Detailed information about passenger that have been on Flight QH104 at 30-4-2021

```
SELECT P.* FROM PERSON_INFO AS P
JOIN  EPIDEMIOLOGICAL_DECLARATION AS E
ON P.USERS_ID=E.USERS_ID
WHERE E.TRANSPORTATION_NO='QH104' AND E. TIME_DECLARATION_EPI='2021-4-30'
```

Purpose: Help medical staff find the details of people who are related to that flight which is reported to have covid patients on board so as to trace them easier.

Results Messages

	USERS_ID	USERS_NAME	USERS_NATION	SECTION_ID_HOME	PHONE	GENDER	HOME_ADDRESS	AGE
1	038301010018	Ngô Diệc Phàm	CHINA	118675005	0854895354	M	số 9, Trần Phú, quận 1, TP Hồ Chí Minh	65
2	038301010019	Kim Tae Hee	KOREA	015670225	0854895355	F	số 66, Trần Huy Liệu, Cầu Giấy, Hà Nội	41
3	038301010020	Mai Ngô Ánh	VIETNAM	015670225	0854895356	F	số 22, Trần Huy Liệu, Cầu Giấy, Hà Nội	42

Eg: Information about passengers who is on Train SE5 in 13-5-2021

```
SELECT P.* FROM PERSON_INFO AS P
JOIN  EPIDEMIOLOGICAL_DECLARATION AS E
ON P.USERS_ID=E.USERS_ID
WHERE E.TRANSPORTATION_NO='SE5' AND E. TIME_DECLARATION_EPI='2021-5-13'
```

Purpose: Help medical staff find the details of people who are related to that train which is reported to have covid patients on board so as to trace them easier.

Results Messages

	USERS_ID	USERS_NAME	USERS_NATION	SECTION_ID_HOME	PHONE	GENDER	HOME_ADDRESS	AGE
1	038301010039	Thái Công Bằng	VIETNAM	010701221	0854895337	M	số 1302, HH4a , Hoàng Liệt, Hoàng Mai, Hà Nội	30
2	038301010038	Trần Xuân Đức	VIETNAM	015670225	0854895336	M	số 1, Trần Huy Liệu, Cầu Giấy, Hà Nội	62
3	038301010040	Trần Khánh Ly	VIETNAM	010701221	0854895338	F	số 21, Hoàng Liệt , Hoàng Mai, Hà Nội	27

5.1.2. Total number of infected people for a period of time

```
select count(USERS_ID) as TONG FROM ISOLATED_DECLARATION
WHERE (ISOLATION_TYPE ='F0' AND TIME_DECLARATION_ISO
BETWEEN '2021-4-27' AND '2021-5-27')
```

Purpose: Calculate total number and base on that to give comment about the speed of infection in specific time.

Results | Messages

	TONG
1	9

5.1.3. History of contact (last 14 days) of F0 who lost the source of infection.

Eg: History of contacts of F0 have ID ‘038301010050’

```
SELECT CH.* FROM CLOSED_HISTORY AS CH JOIN EPIDEMIOLOGICAL_DECLARATION AS EPI ON EPI.CLOSED_HISTORY_ID= CH.CLOSED_HISTORY_ID
JOIN USERS AS U ON U.USERS_ID=EPI.USERS_ID WHERE (U.USERS_ID='038301010050' AND TIME_DECLARATION_EPI BETWEEN '2021-5-12' AND '2021-5-26')
```

Purpose: Tracing the Source of Infection.

Results | Messages

	CLOSED_HISTORY_ID	COVID_PATIENT	PEOPLE_COVID_AREA	PEOPLE_COVID_SYMPTOM	DETAIL
1	32633314	không	có	không	Bắc Giang

5.1.4. The total number of people who is took the second dose of Vaccine

```
SELECT COUNT(USERS_ID) AS VCC2 FROM VACCINE WHERE VACCINE_COUNT=2
```

Purpose: Statistics on the total number of people who took the second dose of Vaccine in order to calculate herd immunity.

Results | Messages

	VCC2
1	2

5.1.5. Total number of provinces that are infected

```
SELECT COUNT(SECTION_ADDRESS_PROVINCE) AS NUM_PRO FROM SECTION AS S JOIN PERSON_INFO AS P
ON P.SECTION_ID_HOME=S.SECTION_ID JOIN USERS AS U ON U.USERS_ID=P.USERS_ID
JOIN TEST_COVID AS T ON T.USERS_ID=U.USERS_ID WHERE (RESULT=N'DƯƠNG TÍNH' AND TEST_TYPE='RT-PCR')
```

Purpose: to statistic, evaluate the situation then give the most efficient solution to prevent the virus from spreading.

Results | Messages

	NUM_PRO
1	7

5.1.6 . Total casualties of Covid-19

```
SELECT P.USERS_ID, USERS_NATION,AGE,GENDER, COUNT(P.USERS_ID) AS DIE FROM PERSON_INFO AS P
JOIN HEALTH_DECLARATION AS HD ON P.USERS_ID=HD.USERS_ID
JOIN USERS AS U ON U.USERS_ID=HD.USERS_ID
JOIN TEST_COVID AS T ON T.USERS_ID=U.USERS_ID
WHERE STATUS_HEALTH=N'TỬ VONG' AND RESULT=N'DƯƠNG TÍNH'
GROUP BY P.USERS_ID, USERS_NATION,AGE,GENDER
```

Purpose: Calculate the consequence of the Outbreak.

5.2. UPDATE

5.2.1 Update the test result of the patient.

Eg: Update the information for citizen who is have id:'030301010020'

```
UPDATE TEST_COVID
SET RESULT= N'DƯƠNG TÍNH' , TEST_NUM=2 , TEST_TIME='2021-05-08', TEST_COVID_ID=1070009900
WHERE USERS_ID='038301010020'
```

Purpose: Help staff update the information, confirm a case in order to zoning the infected area.

5.2.2. Update patient's vaccine status

Eg: Update status for a user who is have id :'03830101002'

```
UPDATE VACCINE
SET VACCINE_COUNT =1, STAFF_ID='012301000010', HOSPITAL_ID='01006', TIME_VACCINE='2021-06-05'
WHERE USERS_ID='038301010022'
```

Purpose: Update statuse for citzen.

18	0112340980	038301010022	Chua tiêm	0	NULL	NULL	NULL

Information before update

18	0112340980	038301010022	AstraZeneca	0	012301000010	01006	2021-06-05

Information after update

5.2.3. Update information of cizen

Eg: Update information of cizen having ID '038301010026' from F2 to F0

```
SELECT*FROM ISOLATED_DECLARATION
UPDATE ISOLATED_DECLARATION
SET ISOLATION_TYPE='F0', ISOLATION_ADDRESS='KTX PHÁP VÂN',
ISOLATION_START_TIME='2021-05-05', ISOLATION_FINISH_TIME=NULL,
TIME_DECLARATION_ISO='2021-05-05', ROOM_ID='110', BED_ID='01', ISO_ID='113355779900'
WHERE USERS_ID='038301010026'
```

Purpose: Help updating patient's information: when did then went to the hospital, where is that hospital, prepare necessary equipment for the patient.

Results | Messages

	ISO_ID	USERS_ID	ISOLATION_TYPE	ISOLATION_ADDRESS	ISOLATION_START_TIME	ISOLATION_FINISH_TIME	TIME_DECLARATION_ISO	ROOM_ID	BED_ID	SECTION_ID_ISO
1	113522226788	038301010026	F2	số 8, Ngọc Hồi, Hoàng Liệt, Hoàng Mai, Hà Nội	2021-05-02	2021-05-23	2021-05-02	NULL	NULL	010701221

Before update

Results | Messages

	ISO_ID	USERS_ID	ISOLATION_TYPE	ISOLATION_ADDRESS	ISOLATION_START_TIME	ISOLATION_FINISH_TIME	TIME_DECLARATION_ISO	ROOM_ID	BED_ID	SECTION_ID_ISO
1	113355779900	038301010026	F0	KTX PHÁP VÂN	2021-05-05	NULL	2021-05-05	110	01	010701221

After update

5.2.4. Update the symptom in health declaration

Eg: Update symptom for a citzen who is have ID: '038301010004'

```
UPDATE HEALTH_DECLARATION
SET SYMPTOM_ID='29650154', TIME_DECLARATION_HEALTH='2021-04-30', HD_ID='101999777000'
WHERE USERS_ID='038301010004'
```

Purpose : People will always update the latest information about their health status to help the staff find suspicious case faster.

Results | Messages

	HD_ID	USERS_ID	INSURANCE_ID	SYMPTOM_ID	IH_ID	TIME_DECLARATION_HEALTH	STATUS_HEALTH
1	101999777000	038301010004	3823638215	29650154	56342732	2021-04-30	Bình thường

Before update

Results | Messages

	SYMPTOM_ID	FEVER	COUGH	DIFFICULTY_OF_BREATHING	SORE_THROAT	PNEUMONIA	TIRED	VOMITING_OR_NAUSEA	DIARRHEA	BLEEDING_FROM_THE_SKIN	SKIN_RASH
1	29650154	có	không	không	có	không	không	không	không	không	không

After Update

5.2.5. Update information about Epidemiological Declaration

```
UPDATE EPIDEMIOLOGICAL_DECLARATION
SET DEPARTURE_ADDRESS =N'HÀ NỘI', DESTINATION_ADDRESS=N'THÁI BÌNH',
DEPARTURE_TIME='2021-04-26', VEHICLE=N'CÁ NHÂN',TRANSPORTATION_NO='29B-50812',
SEAT_NO=NULL,DESTINATION_HISTORY=N'KHÔNG',
TIME_DECLARATION_EPI='2021-04-26',EP_ID='111858585850'
WHERE USERS_ID='038301010005'
select * from EPIDEMIOLOGICAL_DECLARATION WHERE USERS_ID='038301010005'
```

Purpose: update the travel history of citizens to help the administrators know who went in the area that was managed by that administrator.

Results | Messages

	EP_ID	USERS_ID	DEPARTURE_ADDRESS	DEPARTURE_TIME	VEHICLE	DESTINATION_ADDRESS	DESTINATION_TIME	TRANSPORTATION_NO	SEAT_NO	DESTINATION_HISTORY	CLOSED_HISTORY_ID	TIME_DECLARATION_EPI
1	1111980001	038301010005	TP Hồ Chí Minh	2021-04-22	tàu hỏa	Hà Nội	2021-04-24	SE4	B10	Khánh Hòa, Đồng Nai	90418416	2021-04-24

Before update

Results Messages

	_ID	USERS_ID	DEPARTURE_ADDRESS	DEPARTURE_TIME	VEHICLE	DESTINATION_ADDRESS	DESTINATION_TIME	TRANSPORTATION_NO	SEAT_NO	DESTINATION_HISTORY	CLOSED_HISTORY_ID	TIME_DECLARATION_EPI
1	1858585850	038301010005	HÀ NỘI	2021-04-26	CÁ NHÂN	THÁI BÌNH	2021-04-24	29B-50812	NULL	KHÔNG	90418416	2021-04-26

After update

5.2.6. Update the health status for citizen

```
UPDATE HEALTH_DECLARATION
SET STATUS_HEALTH='TỬ VONG', TIME_DECLARATION_HEALTH='2021-06-05', HD_ID='166775588888'
WHERE USERS_ID='038301010025'
```

Purpose: Let people know their health status.

Results Messages

	HD_ID	USERS_ID	INSURANCE_ID	SYMPTOM_ID	IH_ID	TIME_DECLARATION_HEALTH	STATUS_HEALTH
1	123475869595	038301010025	3823638234	29260869	36577123	2021-04-26	Nhiễm Covid-19

Before update

Results Messages

	HD_ID	USERS_ID	INSURANCE_ID	SYMPTOM_ID	IH_ID	TIME_DECLARATION_HEALTH	STATUS_HEALTH
1	166775588888	038301010025	3823638234	29260869	36577123	2021-06-05	T? VONG

After update

5.3. VIEW

5.3.1. View of total people who is positive with Covid-19 nationally

```
---V1: VIEW SỐ CA DƯƠNG TÍNH TRONG NGÀY-> TÌM NGÀY CÓ SỐ CA DT CAO NHẤT, TÌM SỐ CA DT TRUNG BÌNH/NGÀY
CREATE VIEW positive_No
AS
SELECT TEST_TIME AS T,count(USERS_ID) as positive  FROM TEST_COVID WHERE (RESULT=N'DƯƠNG TÍNH' AND TEST_TIME
BETWEEN '2021-4-27' AND '2021-5-27') GROUP BY TEST_TIME
```

Purpose: with this view, medical staff will acknowledge the situation, infection per day, as well as find the highest infection rate day that will help in statistics work, and also give solutions.

```sql
SELECT*FROM  positive_No
SELECT TOP 1 *from positive_No ORDER BY positive DESC
SELECT AVG(positive) as avg_po_day FROM positive_No
```

	T	positive
1	2021-05-10	4
2	2021-05-11	1
3	2021-05-12	2
4	2021-05-13	2
5	2021-05-14	1
6	2021-05-15	1

	T	positive
1	2021-05-10	4

	avg_po_day
1	1

5.3.2. View the total number that have been to quarantine camp.

```sql
------VIEW số người cách ly ở từng khu vực cách ly
CREATE VIEW TOTAL_ISOLATION
AS
SELECT COUNT(USERS_ID) AS TOTAL, ISOLATION_ADDRESS FROM ISOLATED_DECLARATION GROUP BY ISOLATION_ADDRESS
```

Purpose: with this view, staff will know the number of people that are in quarantine camp. Thus, they will calculate which camp right now is too crowded and distribute the equipment and medical staff efficiently.

```sql
------VIEW số người cách ly ở từng khu vực cách ly

SELECT*FROM TOTAL_ISOLATION
SELECT TOP 3 * FROM TOTAL_ISOLATION ORDER BY  TOTAL  DESC
```

	TOTAL	ISOLATION_ADDRESS
1	6	bệnh viện Nhiệt đới TW cơ sở 2
2	1	khách sạn InterContinental Westlake
3	3	khách sạn Lake Side
4	2	KTX Pháp Vân
5	1	số 30, Ngọc Hồi, Hoàng Liệt, Hoàng Mai, Hà Nội
6	1	177, Giải Phóng, Hai Bà Trưng, Hà Nội
7	1	bệnh viện đa khoa Hải Dương
8	1	bệnh viện đa khoa tỉnh Khánh Hòa
9	1	bệnh viện Nhiệt đới TW cơ sở 2
10	1	chùa Mỹ Khê

	TOTAL	ISOLATION_ADDRESS
1	6	bệnh viện Nhiệt đới TW cơ sở 2
2	5	KTX Pháp Vân
3	3	khách sạn Lake Side

5.3.3 View of total infected case sort by province

```sql
CREATE VIEW No_po
AS
SELECT SECTION_ADDRESS_PROVINCE AS PROVINCE , COUNT(P.USERS_ID) AS NUM FROM SECTION AS S
JOIN PERSON_INFO AS P ON P.SECTION_ID_HOME=S.SECTION_ID
JOIN USERS AS U ON U.USERS_ID=P.USERS_ID
JOIN TEST_COVID AS T ON T.USERS_ID=U.USERS_ID
WHERE (RESULT=N'DƯƠNG TÍNH' AND TEST_TYPE='RT-PCR') GROUP BY SECTION_ADDRESS_PROVINCE
```

Purpose: with this view, staff will know which province now has the biggest outbreak. From that create the best solution to eliminate the virus efficiently and also prevent the virus infecting the nearby province.

```
SELECT*FROM TEST_COVID
SELECT*FROM No_po
SELECT TOP 1 *FROM No_po ORDER BY NUM DESC
```

Results Messages

	TEST_COVID_ID	USERS_ID	TEST_TIME	TEST_NUM	TEST_TYPE	RESULT	HOSPITAL_ID
1	499501000001	038301010008	2021-04-30	1	TEST NHANH	ÂM TÍNH	48002
2	499601010101	038301010020	2021-05-04	1	RT-PCR	ÂM TÍNH	01939
3	499630222000	038301010023	2021-05-04	1	TEST NHANH	ÂM TÍNH	48002
4	499650010101	038301010019	2021-05-05	1	RT-PCR	ÂM TÍNH	01939
5	499750030405	038301010026	2021-05-06	1	TEST NHANH	ÂM TÍNH	01939
6	590502000001	038301010018	2021-05-05	1	RT-PCR	ÂM TÍNH	01939
7	599620333333	038301010020	2021-05-11	2	RT-PCR	DƯƠNG TÍNH	01939
8	599920112233	038301010045	2021-05-13	1	TEST NHANH	ÂM TÍNH	01117

	PROVINCE	NUM
1	ĐÀ NẴNG	1
2	HÀ NỘI	4
3	NAM ĐỊNH	1
4	NGHỆ AN	1

	PROVINCE	NUM
1	HÀ NỘI	4

5.3.4. View of total vaccinated people (Both 1 dose given and 2 dose) group by area

```
------view tổng số người đã tiêm vaccine (cả mũi 1+2) của từng khu vực
CREATE VIEW VAC_3
AS
SELECT SECTION_ADDRESS_PROVINCE, COUNT(USERS_ID) AS TONG_SO_TIEM FROM VACCINE
JOIN STAFF ON VACCINE.STAFF_ID= STAFF.STAFF_ID
JOIN SECTION ON SECTION.SECTION_ID=STAFF.SECTION_ID
WHERE VACCINE_COUNT>0
GROUP BY SECTION_ADDRESS_PROVINCE
```

Purpose: This view will let the staff know how to distribute vaccine efficiently.

```
SELECT *FROM VAC_3
SELECT*FROM VACCINE
```

Results Messages

	SECTION_ADDRESS_PROVINCE	TONG_SO_TIEM
1	HÀ NỘI	8
2	TP HỒ CHÍ MINH	1

	VACCINE_ID	USERS_ID	VACCINE_NAME	VACCINE_COUNT	STAFF_ID	HOSPITAL_ID	TIME_VACCINE
1	0101000112	038301010003	AstraZeneca	1	012301000003	01006	2021-04-15
2	0101000134	038301010004	chua tiêm	0	NULL	NULL	NULL
3	0101121314	038301010012	Chua tiêm	0	NULL	NULL	NULL
4	0101223356	038301010009	Stunik V	1	012301000025	01901	2021-05-06
5	0101223445	038301010005	AstraZeneca	1	012301000003	01006	2021-04-15
6	0101234567	038301010011	AstraZeneca	1	012301000025	01901	2021-04-15
7	0101252525	038301010016	Chua tiêm	0	NULL	NULL	NULL
8	0101330789	038301010006	Chua tiêm	0	NULL	NULL	NULL
9	0101332255	038301010052	Chua tiêm	0	NULL	NULL	NULL
10	0101336699	038301010015	Chua tiêm	0	NULL	NULL	NULL
11	0101555888	038301010013	Chua tiêm	0	NULL	NULL	NULL
12	0101558879	038301010010	Chua tiêm	0	NULL	NULL	NULL
13	0101789589	038301010014	Chua tiêm	0	NULL	NULL	NULL
14	0102030405	038301010007	AstraZeneca	2	012301000010	01006	2021-05-06
15	0111345678	038301010028	AstraZeneca	1	012301000014	01910	2021-05-06
16	0111473890	038301010053	Chua tiêm	0	NULL	NULL	NULL
17	0112313410	038301010047	Chua tiêm	0	NULL	NULL	NULL

5.3.5. View of Detail about citizen's health status in local area

```
-----view thông tin tình trạng sức khỏe của người dân địa phương
CREATE VIEW HEALTH_PP_VIEW
AS
SELECT USERS_NAME, HOME_ADDRESS, SECTION_ID_HOME, PHONE, STATUS_HEALTH
FROM PERSON_INFO AS P JOIN USERS AS U ON  P.USERS_ID = U.USERS_ID
JOIN HEALTH_DECLARATION AS H ON H.USERS_ID = U.USERS_ID
```

Purpose: This view helps the local staff know the health status of the local people, so they will create a suitable plan to prevent virus outbreak.

```
SELECT*FROM HEALTH_PP_VIEW
SELECT*FROM HEALTH_PP_VIEW WHERE SECTION_ID_HOME='015670225'
```

150 %

Results | Messages

	USERS_NAME	HOME_ADDRESS	SECTION_ID_HOME	PHONE	STATUS_HEALTH
1	Lisa kennia	số 5, Trần Huy Liệu, Cầu Giấy, Hà Nội	015670225	0854895332	Bình thường
2	Nguyễn Mạnh Duy	số 52, TRẦN HUY LIỆU , Cầu Giấy, Hà Nội	015670225	0854895357	Bình thường
3	Kim Tae Hee	số 66, Trần Huy Liệu, Cầu Giấy, Hà Nội	015670225	0854895355	Bình thường
4	Trần Ngọc Ánh	số 9d, TRẦN HUY LIỆU, Cầu Giấy, Hà Nội	015670225	0854895339	Bình thường
5	Mai Ngô Ánh	số 22, Trần Huy Liệu, Cầu Giấy, Hà Nội	015670225	0854895356	Bình thường
6	Mai Ngô Ánh	số 22, Trần Huy Liệu, Cầu Giấy, Hà Nội	015670225	0854895356	Nhiễm Covid-19
7	Trần Xuân Đức	số 1, Trần Huy Liệu, Cầu Giấy, Hà Nội	015670225	0854895336	Nghi ngờ nhiễm
8	Trần Hà Duy	số 6d, Trần Huy Liệu, Cầu Giấy, Hà Nội	015670225	0854895361	Bình thường

(Eg: Finding health information of local people that have local ID: '015670225')

5.4. TRIGGER

5.4.1 Trigger: TEST_COVID table

Create CHANGE_TEST_CV2 table to store how the information in TEST_COVID is added,deleted,edited . Including:

- Test_covid_id: TESDT_COVID primary key
- Field: name of column, field have been changed
- Old_data: Old data before deleted or edited. If add a new one then leave old_data with NULL
- New_data: New data after being edited or added. If delete data then New_data = NULL
- Action_time: when did the data have been added, deleted, edited.

(Code saved in a file named systemQLC_operation that is attached with this report.)

```
----UPDATE
UPDATE TEST_COVID
SET RESULT = N'DƯƠNG TÍNH'
WHERE USERS_ID='038301010023'
SELECT*FROM CHANGE_TEST_CV2
```

150 %

Results | Messages

	TEST_COVID_ID	FIELD	OLD_DATA	NEW_DATA	ACTION_TIME
1	499630222000	RESULT	ÂM TÍNH	DƯƠNG TÍNH	2021-06-07 11:36:00

(Eg: when updating the test result from ‘negative’ to ‘positive’ then the data will be stored in CHANGE_TEST_CV2 table like the screenshot above.)

*Reason to create trigger for TEST_COVID table: This is a table that has data must update continuously like test result, time, total taken doses . Thus, having so much data to keep track of then creating a trigger to store all the changes in data will be the solution.

5.4.2. Trigger: ISOLATED_DECLARATION table

Create CHANGEI2 to store the changes in ISOLATED_DECLARATION table like adding, removing, editing.

-ISO_ID: Isolated_declaration primary key

- Test_covid_id: TESDT_COVID primary key

- Field: name of column, field have been changed

- Old_data: Old data before deleted or edited. If add a new one then leave old_data with NULL

- New_data: New data after being edited or added. If delete data then New_data = NULL

- Action_time: when did the data have been added, deleted, edited.

(Code saved in a file named systemQLC_operation that is attached with this report.)

```
369
370  ----UPDATE
371  UPDATE ISOLATED_DECLARATION
372  SET ISOLATION_TYPE='F0' , ISOLATION_ADDRESS='KTX PHÁP VÂN', ISOLATION_START_TIME='2021-05-05', ISOLATION_FINISH_TI
373  WHERE USERS_ID='038301010026';
374  SELECT*FROM CHANGEI2
375
```

150 %

Results | Messages

	ISO_ID	FIELD	OLD_DATA	NEW_DATA	ACTION_TIME
1	113355779900	ISO_ID	113522226788	113355779900	2021-06-07 11:41:00
2	113355779900	ISO_TYPE	F2	F0	2021-06-07 11:41:00
3	113355779900	ISO_ADDRESS	số 8, Ngọc Hồi, Hoàng Liệt, Hoàng Mai, Hà Nội	KTX PHÁP VÂN	2021-06-07 11:41:00
4	113355779900	ISO_START_TIME	2021-05-02	2021-05-05	2021-06-07 11:41:00
5	113355779900	ISO_FINISH_TIME	2021-05-23	NULL	2021-06-07 11:41:00
6	113355779900	TIME_DECLARA...	2021-05-02	2021-05-05	2021-06-07 11:41:00
7	113355779900	ROOM_ID	NULL	110	2021-06-07 11:41:00

(Eg: When updating the data in ISOLATED_DECLARATION , the changes will be saved in CHANGEI2 table like the screenshot above)

*Reason to created this trigger: ISOLATED_DECLARATION table contain important information that are continuously updating. So if we have the history of the changes it’s much easier to tracing the source of infection and preventing virus.

5.4.3. Trigger: Vaccine table

Create CHANGE_VACC table to save all the changes in VACCINE table. Including:

-Vaccine_ID: Vaccine primary key

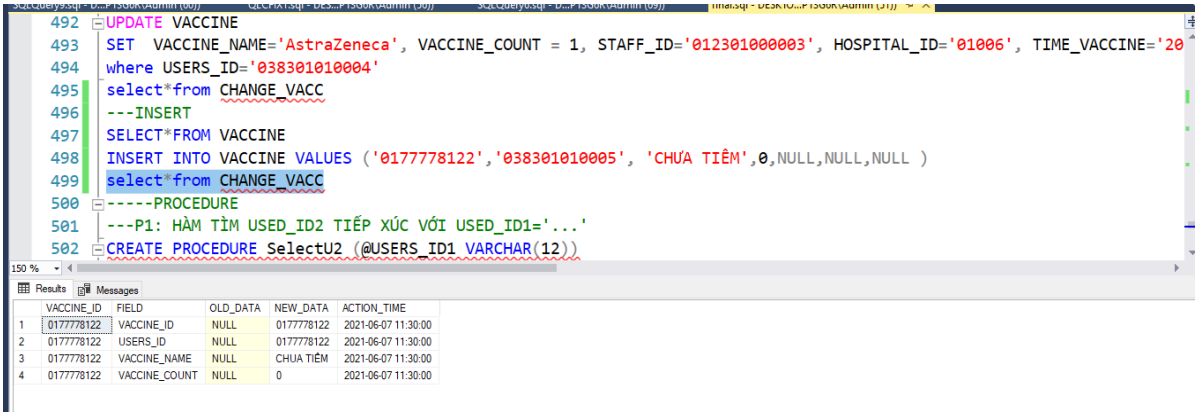
- Field: name of column, field have been changed

- Old_data: Old data before deleted or edited. If add a new one then leave old_data with NULL

- New_data: New data after being edited or added. If delete data then New_data = NULL

- Action_time: when did the data have been added, deleted, edited.

(Code saved in a file named systemQLC_operation that is attached with this report.)



```
492 UPDATE VACCINE
493 SET  VACCINE_NAME='AstraZeneca', VACCINE_COUNT = 1, STAFF_ID='012301000003', HOSPITAL_ID='01006', TIME_VACCINE='20
494 where USERS_ID='038301010004'
495 select*from CHANGE_VACC
496 ---INSERT
497 SELECT*FROM VACCINE
498 INSERT INTO VACCINE VALUES ('0177778122','038301010005', 'CHƯA TIÊM',0,NULL,NULL,NULL )
499 select*from CHANGE_VACC
500 -----PROCEDURE
501 ---P1: HÀM TÌM USED_ID2 TIẾP XÚC VỚI USED_ID1='...'
502 CREATE PROCEDURE SelectU2 (@USERS_ID1 VARCHAR(12))
```

Results | Messages

	VACCINE_ID	FIELD	OLD_DATA	NEW_DATA	ACTION_TIME
1	0177778122	VACCINE_ID	NULL	0177778122	2021-06-07 11:30:00
2	0177778122	USERS_ID	NULL	0177778122	2021-06-07 11:30:00
3	0177778122	VACCINE_NAME	NULL	CHUA TIÊM	2021-06-07 11:30:00
4	0177778122	VACCINE_COUNT	NULL	0	2021-06-07 11:30:00

(Eg: When inserting or updating data in VACCINE table , the changes will be stored in CHANGE_VACC like the screenshot above).

*Reason to create this trigger: VACCINE table contain important information that are continuously updating like change status from didn't vaccinated to vaccinated, doses count,…. So if we keep the changes it will help us in reporting and also preventing the virus,….

5.5 PROCEDURE

5.5.1. Procedure: Find the contact information of users

```
1
2  ---P1: HÀM TÌM USED_ID2 TIẾP XÚC VỚI USED_ID1='...'
3  CREATE PROCEDURE SelectF (@USERS_ID1 VARCHAR(12),@START DATE,@END DATE)
4  AS
5  BEGIN
6      SELECT P.USERS_ID, PHONE, HOME_ADDRESS, TIME_CLOSE FROM PERSON_INFO AS P
7      JOIN USERS ON P.USERS_ID=USERS.USERS_ID
8      JOIN CLOSED ON USERS.USERS_ID=CLOSED.USERS_ID2
9      WHERE USERS_ID1=@USERS_ID1 and TIME_CLOSE BETWEEN @START AND @END
10 END;
```

*Purpose: Help tracing F1,F2,F3 related to F0.

```
EXEC SelectF  @USERS_ID1='038301010008', @START='2021-04-27',@END='2021-05-27'
```

	USERS_ID	PHONE	HOME_ADDRESS	TIME_CLOSE
1	038301010005	0854895331	số 100a, Nguyễn Trãi, Thanh Xuân, Hà Nội	2021-04-28
2	038301010006	0854895332	số 5, Trần Huy Liệu, Cầu Giấy, Hà Nội	2021-04-28
3	038301010004	0854895325	số 6, Đội Cấn, Ba Đình, Hà Nội	2021-04-28

(Eg: When tracing F1 of F0 has USERS_ID '038301010008', the system will print out the number like the screenshot above. Afterward, we can trace F2,F3 by inserting USERS_ID of F1,F2 into @USERS_ID1 variable.)

5.2.2 Procedure: Find the total number of Infected Covid case.

```
CREATE PROCEDURE Select_POSITIVE_section (@PROVINCE NVARCHAR(50), @START DATE, @END DATE)
 AS
 BEGIN
 SELECT SECTION_ADDRESS_PROVINCE AS PROVINCE, COUNT(SECTION_ADDRESS_PROVINCE) AS NUM_POSITIVE FROM SECTION AS S
  JOIN PERSON_INFO AS P ON P.SECTION_ID_HOME=S.SECTION_ID JOIN USERS AS U ON U.USERS_ID=P.USERS_ID
  JOIN TEST_COVID AS T ON T.USERS_ID=U.USERS_ID
  WHERE (RESULT=N'DƯƠNG TÍNH' AND TEST_TYPE='RT-PCR' AND SECTION_ADDRESS_PROVINCE=@PROVINCE AND (TEST_TIME BETWEEN @START AND @END))

  GROUP BY SECTION_ADDRESS_PROVINCE
  END
```

*Purpose: tracing, calculate the number of Covid infection (Province/city) in a specific period.

```
EXEC Select_POSITIVE_section   @PROVINCE=N'HÀ NỘI',@START='2021-04-27',@END='2021-05-27'
```

	PROVINCE	NUM_POSITIVE
1	HÀ NỘI	4

(Eg: Find the number of infected citizen in Ha Noi in 1 month (from 27-04-2021 to 27-05-2021)

5.5.3. Procedure: Find the number of people who is vaccinated in specific area

```
CREATE PROCEDURE VACC (@PROVINCE NVARCHAR(50),@START DATE,@END DATE)
 AS
 BEGIN
 SELECT SECTION_ADDRESS_PROVINCE AS PRO, COUNT(SECTION_ADDRESS_PROVINCE) AS NUM_PEOPLE_VAC1 FROM SECTION AS S
  JOIN PERSON_INFO AS P ON P.SECTION_ID_HOME=S.SECTION_ID JOIN USERS AS U ON U.USERS_ID=P.USERS_ID JOIN VACCINE AS V ON V.USERS_ID=U.USERS_ID
  WHERE (VACCINE_COUNT>0  AND SECTION_ADDRESS_PROVINCE=@PROVINCE AND (TIME_VACCINE BETWEEN @START AND @END)) GROUP BY SECTION_ADDRESS_PROVINCE
  END
```

*Purpose: Tracking the number of people who are vaccinated in a specific area, check the progress in vaccinating citizens of a specific area.

```
EXEC VACC @PROVINCE=N'HÀ NỘI',@START='2021-04-27',@END='2021-05-27'
```

	PRO	NUM_PEOPLE_VAC1
1	HÀ NỘI	2

(Eg: Find the number of people who is vaccinated in Ha Noi in 1 month (From 27-04-2021 to 27-05-2021)

5.5.4. Procedure: Find total infected case sort by section

```
2
3  CREATE PROCEDURE NO_PO_SEC (@SECTION VARCHAR(10))
4  AS
5  BEGIN
6  SELECT COUNT(P.USERS_ID) AS NUM FROM SECTION AS S
7  JOIN PERSON_INFO AS P ON P.SECTION_ID_HOME=S.SECTION_ID
8  JOIN USERS AS U ON U.USERS_ID=P.USERS_ID
9  JOIN TEST_COVID AS T ON T.USERS_ID=U.USERS_ID
10 WHERE RESULT=N'DƯƠNG TÍNH' AND TEST_TYPE='RT-PCR' AND S.SECTION_ID=@SECTION
11 END
```

*Purpose: Find total infected case sort by section.

The manager of each area must capture the number of infections in the area they manage, so this procedure makes the lookup more convenient when just entering the id of the section into the variable @section.

```
12
13 EXEC NO_PO_SEC  @SECTION='010401221'
14
```

150 %

Results | Messages

	NUM
1	2

(Eg: Find total infected case sort by section having ID=’010401221’)