

Relational Translation

- Vaccines(manufacturer, numdoses, waitperiod)
- Batches(batchnum, manufacturer, manufdate, expdate, vname)
 - manufacturer foreign key references Vaccines
 - vname foreign key references VacLocations
- Vial(vialnum, batchnum, manufacturer, sid)
 - (batchnum, manufacturer) foreign keys reference Batches
 - sid foreign key references Slots
- VacLocations(vname, city, postcode, street)
- Employer(ename)
 - Ename foreign key references VacLocations
- Slots(sid, stime, sdate, vname, hin, licensenum, assigndate)
 - vname foreign key references VacLocations
 - hin foreign key references RegIndividuals
 - licensenum foreign key references Nurses
- Nurses(licensenum, nname, ename)
 - ename foreign key references Employer
- NurseAssignment(licensenum, vname, ndate)
 - licensenum foreign key references nurses
 - vname foreign key references VacLocations
- RegIndividuals(HIN, rdate, iname, phonenum, datebirth, gender, city, postcode, street, cname)
 - cname foreign key references Category
- Category(cname, prioritynum)

Pending constraints:

- The database does not constrain that multiple doses given to an individual must be from the same vaccine
- The database does not constrain the respect of the waiting period of a dose
- The database does not constrain that vials used for slots of a vaccination location are from the batch stored there.
- The database does not constrain that individuals only receive the number of doses required at a maximum.
- The database does not constrain that nurses who administers a vial for a slot of a vaccination location is assigned to that particular location on that particular day.
- The database allows for future scheduling of slots for an individual and for assigning a nurse and vial to that slot. However, only those entries prior to and including today's date are "administered" entries.

SQL queries

a)

SELECT sid, stime, sdate

FROM Slots

WHERE hin IS NULL AND vname = 'Jewish General' AND sdate = '2021-03-20'

;

```
[db2 => SELECT sid, stime, sdate FROM Slots WHERE hin IS NULL AND vname = 'Jewish General' and sdate = '2021-03-20';
```

SID	STIME	SDATE
600	15:00:00	03/20/2021

1 record(s) selected.

b)

SELECT expdate

FROM Batches, Vial, Slots, RegIndividuals

WHERE Batches.batchnum = Vial.batchnum AND Vial.sid = Slots.sid AND Slots.hin =

RegIndividuals.hin AND RegIndividuals.iname = 'Jane Doe'

;

```
[db2 => SELECT expdate FROM Batches, Vial, Slots, RegIndividuals WHERE Batches.batchnum = Vial.batchnum AND Vial.sid = Slots.sid AND Slots.hin = RegIndividuals.hin AND RegIndividuals.iname = 'Jane Doe';
```

EXPDATE

04/01/2021

1 record(s) selected.

c)

SELECT COUNT(hin) AS count

FROM Slots, VacLocations

WHERE Slots.vname = VacLocations.vname AND VacLocations.city = 'Montreal'

;

```
[db2 => SELECT COUNT(hin) AS count FROM Slots, VacLocations WHERE Slots.vname = VacLocations.vname AND VacLocations.city = 'Montreal'
```

COUNT

4

1 record(s) selected.

d)

SELECT iname, phonenum, RegIndividuals.hin

FROM Vial, Slots, RegIndividuals

WHERE Slots.sdate < '2021-02-01' AND Vial.manufacturer = 'Pfizer-BioNTech' AND Vial.sid =

Slots.sid AND Slots.hin = RegIndividuals.hin

GROUP BY iname, phonenum, RegIndividuals.hin

HAVING COUNT(*) = 1

;

```
db2 => SELECT iname, phonenum, RegIndividuals.hin FROM Vial, Slots, RegIndividuals WHERE Slots.sdate < '2021-02-01'
AND Vial.manufacturer = 'Pfizer-BioNTech' AND Vial.sid = Slots.sid AND Slots.hin = RegIndividuals.hin GROUP BY iname
, phonenum, RegIndividuals.hin HAVING COUNT(*) = 1;
```

INAME	PHONENUM	HIN
Tom Bee	514-200-3021	P345321

1 record(s) selected.

e)

```
SELECT c.cname, prioritynum, COUNT(DISTINCT s.hin) AS count
FROM Category c, Vial v, RegIndividuals r RIGHT OUTER JOIN Slots s
ON r.hin = s.hin
WHERE s.hin IS NOT NULL AND c.cname = r.cname AND s.licensenum IS NOT NULL AND v.sid =
s.sid AND sdate <= CURRENT DATE
GROUP BY c.cname, prioritynum
;
```

```
db2 => SELECT c.cname, prioritynum, COUNT(DISTINCT s.hin) AS count FROM Category c, Vial v, RegIndi
viduals r RIGHT OUTER JOIN Slots s ON r.hin = s.hin WHERE s.hin IS NOT NULL AND c.cname = r.cname
AND s.licensenum IS NOT NULL AND v.sid = s.sid AND sdate <= CURRENT DATE GROUP BY c.cname, priori
tynum;
```

CNAME	PRIORITYNUM	COUNT
Health Care Workers	1	1
Teacher	2	1
Physical proximity to priority 2	3	1
Everybody else	4	1

4 record(s) selected.

Montreal Nurses

```
CREATE VIEW mtlnurses (LicenseNumber, Name, Employer, PostalCode, Street)
AS SELECT licensenum, n.nname, n.ename, postcode, street
FROM VacLocations v, Employer e, Nurses n
WHERE v.vname = e.ename AND n.ename = e.ename AND v.city = 'Montreal'
```

Creation of view:

```
db2 => CREATE VIEW mtlnurses (LicenseNumber, Name, Employer, PostalCode, Street) AS SELECT license]
num, n.nname, n.ename, postcode, street FROM VacLocations v, Employer e, Nurses n WHERE v.vname =
e.ename AND n.ename = e.ename AND v.city = 'Montreal'
DB20000I The SQL command completed successfully.
```

Truncated to 5 records

```
db2 => SELECT * FROM mtlnurses FETCH FIRST 5 ROWS ONLY
```

LICENSENUMBER	NAME	EMPLOYER	POSTALCODE	STREET
P318273	Julie O	Jewish General	H3W2N4	Chemin De la Cote-Sainte-Catherine
P392503	Yejin B	Super Hospital	L5J5U4	Decarie Blvd
P382930	Derek P	Jewish General	H3W2N4	Chemin De la Cote-Sainte-Catherine
P999888	John P	Super Hospital	L5J5U4	Decarie Blvd

4 record(s) selected.

Only nurses working in the Jewish General:

```
db2 => SELECT * FROM mtlnurses WHERE employer = 'Jewish General' FETCH FIRST 5 ROWS ONLY
```

LICENSENUMBER	NAME	EMPLOYER	POSTALCODE	STREET
P318273	Julie O	Jewish General	H3W2N4	Chemin De la Cote-Sainte-Catherine
P382930	Derek P	Jewish General	H3W2N4	Chemin De la Cote-Sainte-Catherine

2 record(s) selected.

Inserting into the view: Inserting an entry into a view results in an error because the view itself involves multiple tables, which cannot be each updated automatically by the insert.

```
db2 => INSERT INTO mtlnurses VALUES('P333999', 'Maryan A', 'Jewish General', 'H3K2J3', 'Keller');
DB21034E  The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0150N  The target fullselect, view, typed table, materialized query table,
range-clustered table, or staging table in the INSERT, DELETE, UPDATE, MERGE,
or TRUNCATE statement is a target for which the requested operation is not
permitted.  SQLSTATE=42807
```

Check Constraints

```
db2 => ALTER TABLE Batches ADD CONSTRAINT edate CHECK (manufdate < expdate)
DB20000I  The SQL command completed successfully.
```

Inserting an invalid entry:

```
db2 => INSERT INTO Batches VALUES(10, 'Moderna', '2021-03-10', '2020-03-10', 'Jewish General');
DB21034E  The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0545N  The requested operation is not allowed because a row does not
satisfy the check constraint "JPAN16.BATCHES.EDATE".  SQLSTATE=23513
```