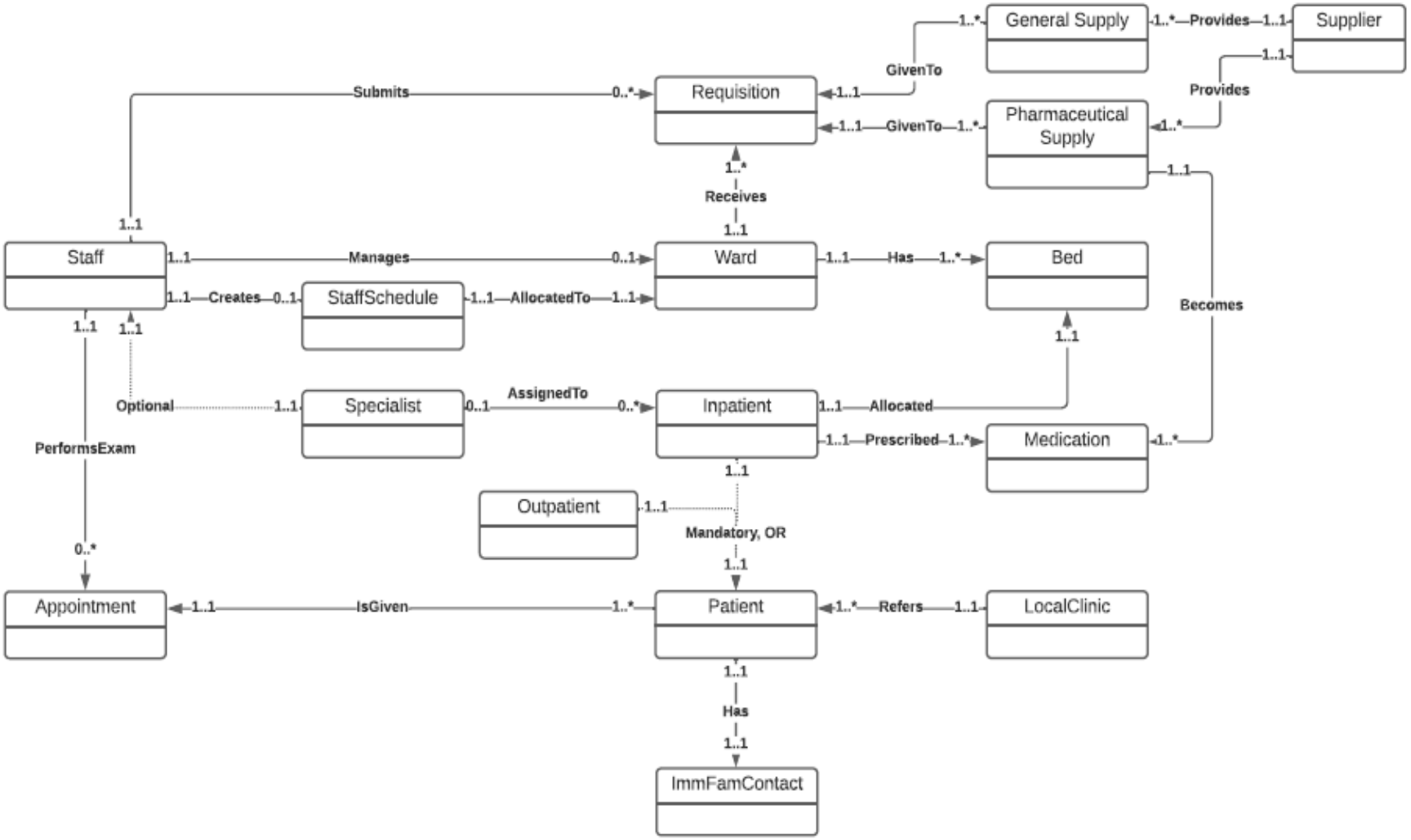
John Kramarczyk

ER Diagram



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Assumptions:

(MDir-1) Staff must be allocated to one ward, and only one ward, at a time.

(MDir-2) ChargeNurse is recorded in Staff entity since ChargeNurse is considered staff.

(MDir-3) General Supply and Pharmaceutical Supplies are completely unique supplies with different primary keys so two entites are created to store their information. These are not subclasses of a "Supply" superclass because they don't share a common primary key. Do not want to create them as subclasses of an entity called something like "Supply" because this will require a primary key to be created for both General Supply and PharmSupply which is redundant data taking up additional space in the database.

(MDir-4) Supplier and Supplies relationships are 1..1 and 1..* because although two or more Suppliers cannot provide the same items as the other supplier, it is assumed that they can provide multiple different items, as long as it is not the same item supplied by another supplier.

(MDir-5) LocalClinic entity created to contain local doctor info and clinic info because local doctor cannot be apart from a localclinic. Also, query #8 from the MD view requires to "List the details for each local clinic..." which indicates that the info should be contained as a LocalClinic.

(MDir-5) Although some local doctors work for the hospital, there is no connection between the "LocalClinic" entity and the "Staff" entity because it is irrelevant - Local doctors are a different category, regardless of whether or not they work for the hospital because the local doctor works for a clinic outside the hospital. So even if a hospital doctor also had a private practice as a local doctor and was referring patients in, we would still need to record their information in the LocalClinicentity to show they have their own practice (we can always pull their hospital staff info from the Staff entity as needed).

(MDir-6) ImmFamContact entity is created because the info for Immediate Family Contacts within the patient entity is a multi-valued attribute.

(MDir-7) Consultant is a staff of the hospital so they do not get their own entity. Since Appointment is an entity to record appointment info, the consultant (staff) has a relationship "PerformsExam" with the Appointment entity instead of directly with the patient entity.

(MDir-8) Outpatients require patientNo etc., so Outpatients are subclass of Patient entity since they are still under the care of the hospital.

(MDir-9) "Patients in a ward" and "patients on a waiting list" require the same information including the Patient info so the Inpatient subclass is created with the Patient entity to

combine both categories to prevent duplication of data. The attributes "date placed on waiting list" and "date placed in ward" can be used to indicate if a patient is on a waiting list or has been placed in a ward. Also, one of the mission objectives of the project is to obtain data on "in-patients." So, "Patients currently placed in a ward and those on a waiting list for a place on a ward" are both considered Inpatients, thus creating a subclass called Inpatient that holds all information for those on a waiting list and those placed in a ward.

(CN-2) Again, the waiting list is simply combined into the Inpatient entity because it has the same exact information as patients fully admitted to a ward. Any patient on the waiting list can be identified by the the attributes "date placed on waiting list" and "date placed in ward".

(CN-3) Bed entity created to account for its unique number and which ward it is in.

(CN-3) Since patients are only prescribed medication when they enter the ward, the medication entity has a "prescribed" relationship with the Inpatient entity.

(CN-4) The Specialist subclass of the Staff entity is created to optimize the database so when the Charge Nurse needs to pull a list of specialities for the staff, the DBMS doesn’t have to read every single row in the staff table thereby eliminating redundancy.

(CN-4) The Specialist can be assigned to more than one Inpatient but the Inpatient can only be assigned one Specialist.

(CN-4) Schedule entity created to track its attributes and eliminate the many-to-many relationship between staff and ward (assuming that staff can be assigned to more than one ward). Although the requirements specify that the Charge Nurse creates the schedule for the nursing staff, it is assumed other staff (like doctors, consultants, etc.) create schedules for their staff as well. Since they all fall under the staff category, "Staff" has a relationship with "Schedule" and then "Ward".

(CN-5) Requisition entity is created because the Charge Nurse can obtain supplies as needed which requires certain information to be stored to track each supply obtained, such as a requisition number, staff name and number, etc.

(CN-5) Since the Charge Nurse (staffNo) oversees a ward, the requisition/supplies are ultimately received by the ward and not the specific charge nurse (staff) to hand-off to staff, under the assumption that Charge Nurse is delegating these tasks.

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Relational Model

Staff (staffNo, firstName, lastName, address, phoneNo, position, weeklyHours, shift) Primary key staffNo
Specialist (staffNo, specialistType) Primary key staffNo, specialistType Foreign key staffNo references Staff(staffNo)
Ward (wardNo, wardName, phoneNo, location, numberOfBeds, staffNo) Primary key wardNo Foreign key staffNo references Staff(staffNo)
Bed (bedNo, wardNo) Primary key bedNo, wardNo Foreign key wardNo references Ward(wardNo)
LocalClinic (docName, clinicNo, docAddress, docPhoneNo) Primary key docName, clinicNo
StaffSchedule (shift, weekNo, staffNo, wardNo) Primary key staffNo, wardNo, weekNo Foreign key staffNo references Staff(staffNo) Foreign key wardNo references Ward(wardNo)
Supplier (supplierNo, supplierName, supplierAddress, supplierPhoneNo, supplierFaxNo) Primary key supplierNo
GeneralSupply (itemNo, itemName, itemDesc, stockQuantity, reorderLevel, unitCost, supplierNo) Primary key itemNo Foreign key supplierNo references Supplier(supplierNo)
PharmSupply (drugNo, drugName, drugDesc, dosage, stockQuantity, reorderLevel, unitCost, supplierNo) Primary key drugNo Foreign key supplierNo references Supplier(supplierNo)
Requisition (reqNo, staffNo, wardNo, itemNo, DrugNo, quantReq, orderDate, dateReceived) Primary key reqNo Foreign key staffNo references Staff(staffNo) Foreign key wardNo references Ward(wardNo) Foreign key itemNo references GeneralSupply(itemNo) Foreign key DrugNo references PharmSupply(drugNo)

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Patient (patientNo, firstName, lastName, address, phoneNo, dob, maritalStatus, docName, clinicNo, immFamPhoneNo) Primary key patientNo Foreign key docName, clinicNo references LocalDoctor(docName, clinicNo) Foreign key immFamPhoneNo, patientNo references immFamContact(patientNo, immFamPhoneNo)
ImmFamContact (immFamFirstName, immFamLastName, immFamRelationship, immFamAddress, immFamPhoneNo, patientNo) Primary key patientNo, immFamPhoneNo Foreign key patientNo references Patient(patientNo)
Appointment (apptNo, apptDate, apptTime, examRoom, patientNo, staffNo, staffLastName) Primary key apptNo Foreign key patientNo references Patient(patientNo) Foreign key staffNo references Staff(staffNo)
Inpatient (patientNo, waitListDate, reqWard, datePlacedWard, expDurStay, dateLeftWard, bedNo, wardNo, staffNo) Primary key patientNo, waitListDate, datePlacedWard Foreign key patientNo references Patient(patientNo) Foreign key bedNo references Bed(bedNo, wardNo) Foreign key staffNo References Staff(staffNo)
Outpatient (patientNo, outApptDate, outApptTime) Primary key patientNo, outApptDate Foreign key patientNo references Patient(patientNo)
Medication (unitsPerDay, startDate, finishDate, patientNo, staffNo, drugNo) Primary key drugNo, patientNo, staffNo, startDate Foreign key drugNo references PharmSupply(drugNo) Foreign key patientNo references Patient(patientNo) Foreign key staffNo references Staff(staffNo)

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DATA QUERIES

MEDICAL DIRECTOR VIEW

1. **List the details of a specific ward.**

```
SELECT *
FROM WARD
WHERE wardno = 'A1'
```

cript Output x | Query Result x | Query Result 1 x | Query Result 2 x

SQL | All Rows Fetched: 1 in 0.058 seconds

	WARDNO	WARDNAME	PHONENO	LOCATION	NUMBEROFBEDS	STAFFNO
1	A1	WestWing	630-594-4648	Block A	50	1

2. **List each ward number and a count of the number of beds for each ward.**

```
SELECT wardno, numberofbeds
FROM WARD
```

cript Output x | Query Result x

SQL | All Rows Fetched: 4 in 0.

	WARDNO	NUMBEROFBEDS
1	A1	50
2	B2	55
3	C3	60
4	D4	65

3. **List each surgical supply and the total quantity in stock, ordered by total quantity in stock descending.**

Worksheet | Query Builder

```
FROM generalsupply
WHERE itemdesc = 'Surgical'
ORDER BY stockquantity DESC
```

Script Output x | Query Result x

SQL | All Rows Fetched: 3 in 0.061 seconds

	ITEMNAME	ITEMDESC	STOCKQUANTITY
1	Gauze	Surgical	4775
2	Gloves	Surgical	4375
3	Masks	Surgical	3467

4. **List each surgical supply and a sum of the quantity in stock for each item that has a re-order level greater than 10.**

Worksheet | Query Builder

```
SELECT itemname, itemdesc, stockquantity
FROM generalsupply
WHERE itemdesc = 'Surgical' and reorderlevel > 10
ORDER BY stockquantity DESC
```

Script Output | Query Result | SQL | All Rows Fetched: 2 in 0.058 seconds

	ITEMNAME	ITEMDESC	STOCKQUANTITY
1	Gauze	Surgical	4775
2	Gloves	Surgical	4375

5. **List the details for each surgical supply item that has a cost per unit greater than $9.00.**

Worksheet | Query Builder

```
SELECT *
FROM generalsupply
WHERE itemdesc = 'Surgical' and unitcost > 9
```

Script Output | Query Result | SQL | All Rows Fetched: 1 in 0.057 seconds

	ITEMNO	ITEMNAME	ITEMDESC	STOCKQUANTITY	REORDERLEVEL	UNITCOST	SUPPLIERNO
1	6454	Gauze	Surgical	4775	2465	10	45

6. **List all the suppliers that do not have a phone number on file.**

Worksheet | Query Builder

```
SELECT *
FROM supplier
WHERE supplierphoneno IS null
```

Script Output | Query Result | SQL | All Rows Fetched: 2 in 0.112 seconds

	SUPPLIERNO	SUPPLIERNAME	SUPPLIERADDRESS	SUPPLIERPHONENO	SUPPLIERFAXNO
1	346	MedLine	3039 Lane, Los Angeles, CA	(null)	786-787-3969
2	48	InnovativeSupply	3249 Circle, Dallas, TX	(null)	632-594-9762

7. **List each supplier and a count of the different products that they currently supply.**

```
SELECT generalsupply.itemno, generalsupply.itemname, generalsupply.supplierno, supplier.suppliername, generalsupply.stockquantity
FROM generalsupply
INNER JOIN supplier ON generalsupply.supplierno=supplier.supplierno
UNION
SELECT pharmsupply.drugno, pharmsupply.drugname, pharmsupply.supplierno, supplier.suppliername, pharmsupply.stockquantity
FROM pharmsupply
INNER JOIN supplier ON pharmsupply.supplierno=supplier.supplierno
```

All Rows Fetched: 10 in 0.056 seconds

	ITEMNO	ITEMNAME	SUPPLIERNO	SUPPLIERNAME	STOCKQUANTITY
1	7	Ibuprofen	67	BudgetSupply	235
2	76	Cortisol	23	QualitySupply	9248
3	234	Aspirin	45	MedSupply	356
4	235	Tylenol	346	MedLine	867
5	523	Advil	48	InnovativeSupply	624
6	6454	Gauze	45	MedSupply	4775
7	45645	Gloves	23	QualitySupply	4375
8	49494	Masks	48	InnovativeSupply	3467
9	65494	Bandages	346	MedLine	235
10	341354	Ointment	67	BudgetSupply	3468

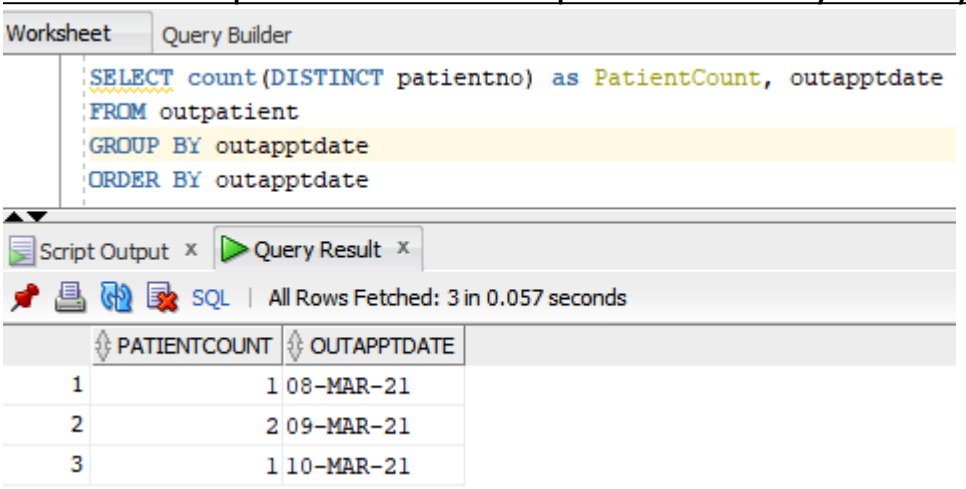
8. **List the details for each local clinic and the number of patients that they have referred over the past year.**

```
WITH inpatientclinic as (
    SELECT I.PATIENTNO, P.CLINICNO FROM PATIENT P, INPATIENT I
    WHERE P.PATIENTNO = I.PATIENTNO
    AND ( (WAITLISTDATE BETWEEN add_months( trunc(sysdate), -12) AND sysdate)
    OR
    (DATEPLACEDWARD BETWEEN add_months( trunc(sysdate), -12) AND sysdate))
), outpatientclinic as (
    SELECT I.PATIENTNO, P.CLINICNO FROM PATIENT P, OUTPATIENT I
    WHERE P.PATIENTNO = I.PATIENTNO
        AND OUTAPPTDATE BETWEEN add_months( trunc(sysdate), -12) AND sysdate
), clinics as (
    SELECT * FROM inpatientclinic
    UNION
    SELECT * FROM outpatientclinic
), distinctclinics as (
    SELECT DISTINCT * FROM clinics
), numberofpatients as (
    SELECT CLINICNO, count(PATIENTNO) as patient_count
    FROM distinctclinics
    GROUP BY CLINICNO
)
    SELECT C.*, N.patient_count FROM
    numberofpatients N,
    LOCALCLINIC C
    WHERE C.CLINICNO = N.CLINICNO
```

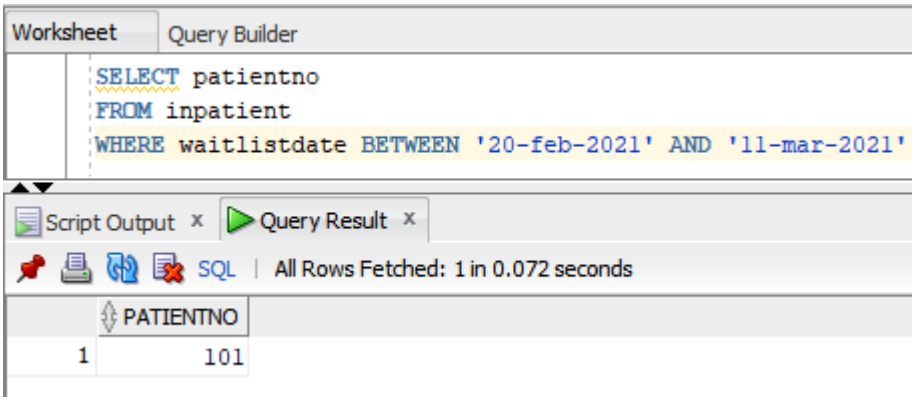
All Rows Fetched: 4 in 0.056 seconds

	CLINICNO	DOCNAME	DOCADDRESS	DOCPHONENO	PATIENT_COUNT
1	54	Johnson	9420 Lane, Chicago, IL	888-659-4823	2
2	23	Jones	2390 Street, Chicago, IL	498-498-8453	1
3	75	Brady	2420 Circle, Evanston, IL	595-458-7845	1
4	87	Jordan	9350 Blvd, Evanston, IL	569-564-4565	1

9. **List the number of patients treated at the outpatient clinic each day ordered by date.**



10. **List all of the patients currently on the waiting list for In Patient services.**



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CHARGE NURSE VIEW

1. **List the staff number and name of staff in a given ward, ordered by staff name.**

Worksheet | Query Builder

```
SELECT staff.staffno, staff.firstname, staff.lastname,staffschedule.wardno
FROM staff
INNER JOIN staffschedule ON staffschedule.staffno=staff.staffno
ORDER BY staff.lastname, staff.firstname
```

Script Output | Query Result | SQL | All Rows Fetched: 5 in 0.055 seconds

	STAFFNO	FIRSTNAME	LASTNAME	WARDNO
1	3	George	Brown	B2
2	1	Joe	Johnson	A1
3	4	Paul	Jones	C3
4	2	Mike	Murphy	A1
5	5	Melissa	Owens	D4

2. **List the name of each Charge Nurse on each ward, ordered by ward number.**

Worksheet | Query Builder

```
SELECT staff.firstname, staff.lastname, ward.wardno, ward.staffno
FROM staff, ward
WHERE ward.staffno=staff.staffno
ORDER BY ward.wardno
```

Script Output | Query Result | SQL | All Rows Fetched: 4 in 0.057 seconds

	FIRSTNAME	LASTNAME	WARDNO	STAFFNO
1	Joe	Johnson	A1	1
2	Paul	Jones	B2	4
3	Joe	Johnson	C3	1
4	Paul	Jones	D4	4

3. **List the name of each patient that has stayed in a specific bed.**

```
SELECT patient.firstname, patient.lastname, inpatient.bedno
FROM patient, inpatient
WHERE patient.patientno=inpatient.patientno
ORDER BY inpatient.bedno
```

Script Output | Query Result | SQL | All Rows Fetched: 3 in 0.058 seconds

	FIRSTNAME	LASTNAME	BEDNO
1	John	Barker	50
2	Luke	Paul	70
3	Josh	Stan	80

4. **List all of the supplies ordered on a specific day.**

```
SELECT itemno, drugno, orderdate
FROM requisition
WHERE orderdate = '01-mar-21'
```

Script Output | Query Result | SQL | All Rows Fetched: 2 in 0.056 seconds

	ITEMNO	DRUGNO	ORDERDATE
1	6454	234	01-MAR-21
2	65494	235	01-MAR-21

5. **List each ward and shift (early, late, etc.) and a count of staff on duty.**

```
SELECT weekno, shift, count(staffno) as StaffCount, wardno
FROM staffschedule
GROUP BY weekno, shift, wardno
ORDER BY wardno, shift
```

Script Output | Query Result | SQL | All Rows Fetched: 5 in 0.058 seconds

	WEEKNO	SHIFT	STAFFCOUNT	WARDNO
1	5	early	1	A1
2	5	late	1	A1
3	24	night	1	B2
4	40	early	1	C3
5	24	late	1	D4

6. **List the immediate family contact details for all patients.**

```
SELECT p.firstname, p.lastname, p.patientno, i.immfamfirstname, i.immfamlastname, i.immfamrelationship, i.immfamaddress, i.immfamphoneno
FROM immfamcontact i
RIGHT JOIN patient p ON p.patientno=i.patientno
ORDER BY i.patientno
```

Script Output | Query Result — All Rows Fetched: 5 in 0.061 seconds

	FIRSTNAME	LASTNAME	PATIENTNO	IMMFAMFIRSTNAME	IMMFAMLASTNAME	IMMFAMRELATIONSHIP	IMMFAMADDRESS	IMMFAMPHONENO
1	John	Barker	101	Melissa	Park	Sister	3498 Road, Chicago, IL	945-597-4974
2	Josh	Stan	202	Molly	Johnson	Wife	3548 Circle, Chicago, IL	955-564-6850
3	Luke	Paul	303	Stan	Joney	Brother	1209 Lane, Chicago, IL	945-656-4976
4	Murphy	Johnson	404	Phil	Petulla	Brother	2309 Blvd, Chicago, IL	986-546-5464
5	Sally	Jones	505	Mark	Lilly	Husband	2948 Way, Evanston, IL	528-567-4643

7. **List every staff person who provides specialist care on each ward.**

```
SELECT s.staffno, w.wardno, s.firstname, s.lastname
FROM staff s, ward w, specialist sp
WHERE s.staffno = w.staffno AND sp.staffno = w.staffno
```

Script Output | Query Result — All Rows Fetched: 2 in 0.058 seconds

	STAFFNO	WARDNO	FIRSTNAME	LASTNAME
1	4	D4	Paul	Jones
2	4	B2	Paul	Jones

8. **List the patient ID and the maximum dosage of the patient taking the highest dosage of a Pharmaceutical supply.**

```
SELECT *
FROM (
SELECT m.patientno, MAX(p.dosage) AS HighestDosage
FROM medication m JOIN pharmsupply p ON p.drugno = m.drugno
GROUP BY m.patientno
ORDER BY HighestDosage DESC)
WHERE rownum <= 1
```

Script Output | Query Result — All Rows Fetched: 1 in 0.058 seconds

	PATIENTNO	HIGHESTDOSAGE
1	303	92

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9. **List the details for the pharmaceutical supply that is most frequently ordered.**

```
SELECT *
FROM pharmsupply
WHERE reorderlevel = (SELECT MAX(reorderlevel)
                      FROM pharmsupply)
```

Script Output | Query Result | SQL | All Rows Fetched: 1 in 0.058 seconds

	DRUGNO	DRUGNAME	DRUGDESC	DOSAGE	STOCKQUANTITY	REORDERLEVEL	UNITCOST	SUPPLIERNO
1	523	Advil	Pharmaceutical	438	624	928	29	48

10. **List a count of patient appointments per week.**

```
CREATE VIEW NoApptsView AS
SELECT DISTINCT(apptdate), TO_CHAR((apptdate),'ww') "WeekOfYear", COUNT(apptdate)as NoAppts
FROM appointment
GROUP BY apptdate
```

Query Result | Script Output | Task completed in 0.078 seconds

```
View NOAPPTSVIEW created.
```

```
SELECT DISTINCT("WeekOfYear"), SUM(NoAppts)
FROM NoApptsView
GROUP BY "WeekOfYear"
```

Script Output | Query Result | SQL | All Rows Fetched: 6 in 0.061 seconds

	WeekOfYear	SUM(NOAPPTS)
1	50	2
2	14	1
3	01	1
4	49	2
5	45	1
6	06	1