Introduction to Database Searching

Why do we do database searches?

By Dr David Page
Chilliwack, BC, 2012
1. Those of you that want to learn to write your own searches.

2. Those of you that simply want to learn to use searches that exist and make simple modifications.
Basic Background Knowledge

- Most of the information in an EMR is stored in a database in what are called “Tables”
  (picture a filing cabinet with lots of drawers)

- This is to allow easy retrieval and use of the information

- OSCAR uses MySQL as its opensource database

- Essentially an EMR is just an interface to the database tables
  (Picture a secretary and her labeled filing cabinet)
In the same way that the secretary stands up from her desk and goes to each filing cabinet to retrieve the information that she has filed away, we use electronic tools to do this retrieval.

They both retrieve the same information, the difference is that the electronic method is way faster and allows more powerful information retrieval.

“Please pull all patient’s charts if they are diabetic and not had an A1C lab test in the last 6 months…..”
“I Quit!!!!”
Agenda for today

1) Using premade queries and templates

2) The basics to make/customize your own
Lets start with Reports by Template

- Go to the OSCAR website: http://www.oscarcanada.org/
- OSCAR Users
- EMR and Case Management Resources
- Database report templates
Here you will find 60 of our most useful Reports by Template

You can either use them as is, or customize them for specific use for your circumstances
How to upload to your server

- Method 1:

  Copy the report that you are wanting and save as a text file (eg in Notepad)

  Go to Admin: Report by Template: Add template and then upload
• **Method 2:**

Go to Admin: Report by Template: Add template and then upload multiple instances of the “Blank” report by template.

Then copy the Report by Template that you require.

Open the “Blank” location, Show/hide options, Edit template, Paste the template, Edit
Why method 2??

- When you upload the Report by Templates they come in sequentially, with NO way of ordering later....this way you can have some limited control over the order

- If you want to customize a Report by Template, I open the Template, copy it and paste it onto a blank location and that way I don’t lose the original
Running a Report by Template

- Admin
- Report by Template
- Choose the one to run (eg Disease Registry Lookup)
- Insert the variable and run it
- It can be printed or exported to a spreadsheet like excel

SIMPLE!!!!
Query by Example (QBE)

- This is the standard interface to a database table
- I hardly use this interface now that we have Report by Template (except in the production of the Report by Template)

They are essentially the same except Report by Template is the “Cadillac” and has more user friendly features like variable inputs and ability to export and print.
Go to the OSCAR website: http://www.oscarcanada.org/

OSCAR Users

EMR and Case Management Resources

Query by Example

Select the one you want: Eg Find children under a certain age

Copy the Query
Admin
Query by Example
Paste into box
Query

SIMPLE!!!
Now the theory......
What is a table?

<table>
<thead>
<tr>
<th>doctor#</th>
<th>doctor_name</th>
<th>phone_no</th>
<th>hair_color</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>Dr Smith</td>
<td>6048585756</td>
<td>brown</td>
</tr>
<tr>
<td>244</td>
<td>Dr Ross</td>
<td>6048586778</td>
<td>grey</td>
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<tr>
<td>177</td>
<td>Dr Viljoen</td>
<td>6048583458</td>
<td>blond</td>
</tr>
</tbody>
</table>
What is a table?

## doctor

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Columns
What is a table?

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Rows
### What is a table?

#### doctor

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#### Fields

- **doctor#**: A unique identifier for each doctor.
- **doctor_name**: The name of the doctor.
- **phone_no**: The phone number of the doctor.
- **hair_color**: The color of the doctor's hair.
I want you to remember these three words, and I will later ask you to repeat them to me.....

SELECT
FROM
WHERE

and a few others......
SQL SYNTAX

```
SELECT {column name}
FROM {table name}
WHERE {= <> > < >= <=}
    AND {both are true}
    OR {one or other or both}
LIMIT 20

Other syntax:
BETWEEN, NOT BETWEEN, LIKE, NOT LIKE, IN, NOT IN,
ORDER BY, GROUP BY, DISTINCT
```
Want to know who the doctors are?

<table>
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SELECT doctor_name FROM doctors
## Want to know who the doctors are?

### doctors

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SELECT doctor_name FROM doctors
Want to see a row?

---

doctors

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</tbody>
</table>

SELECT doctor#, doctor_name, phone_no, hair_color
FROM doctors
WHERE doctor# = 103

OR

SELECT * FROM doctors WHERE doctor# = 103
Want to see a row?

SELECT doctor#, doctor_name, phone_no, hair_color
FROM doctors
WHERE doctor# = 103
OR

SELECT * FROM doctors WHERE doctor# = 103
Want to know who the doctors are with brown hair?

<table>
<thead>
<tr>
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</tr>
</tbody>
</table>

```
SELECT doctor_name
FROM doctors
WHERE hair_color = 'brown'
```
Want to know who the doctors are with brown hair?

docs

dr# | doctor_name | phone_no | hair_color
--- | ----------- | -------- | ----------
103 | Dr Smith   | 6048585756 | brown     
244 | Dr Ross    | 6048586778 | grey      
167 | Dr Voth    | 6048587523 | brown     
177 | Dr Viljoen | 6048583458 | blond     

SELECT doctor_name 
FROM doctors 
WHERE hair_color = brown
So far so good?

- Often information is stored in more than one table with a “key” that connects the two tables.
- This is to save duplication of information in the different tables.
## Example of two tables

### residents

<table>
<thead>
<tr>
<th>resident#</th>
<th>resident_name</th>
<th>hair_color</th>
<th>doctor#</th>
<th>address</th>
<th>postal_code</th>
<th>phone_no</th>
</tr>
</thead>
<tbody>
<tr>
<td>345</td>
<td>Mike</td>
<td>brown</td>
<td>103</td>
<td>Courbould Ave</td>
<td>v2r 2r3</td>
<td>604824563</td>
</tr>
<tr>
<td>456</td>
<td>Cathy</td>
<td>red</td>
<td>244</td>
<td>Mary St</td>
<td>v2r 4t1</td>
<td>604824793</td>
</tr>
<tr>
<td>553</td>
<td>Jake</td>
<td>blond</td>
<td>103</td>
<td>Edwards St</td>
<td>v2r 5w7</td>
<td>604824833</td>
</tr>
<tr>
<td>521</td>
<td>Mary</td>
<td>brown</td>
<td>167</td>
<td>Courbould Ave</td>
<td>v2r 2r3</td>
<td>604824563</td>
</tr>
</tbody>
</table>

### doctors

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</tbody>
</table>
Another way of looking at it

<table>
<thead>
<tr>
<th>doctors</th>
<th>residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>doctor#</td>
<td>resident#</td>
</tr>
<tr>
<td>doctor_name</td>
<td>resident_name</td>
</tr>
<tr>
<td>phone_no</td>
<td>hair_color</td>
</tr>
<tr>
<td>hair_color</td>
<td>doctor#</td>
</tr>
<tr>
<td></td>
<td>address</td>
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<tr>
<td></td>
<td>postal_code</td>
</tr>
<tr>
<td></td>
<td>phone_no</td>
</tr>
</tbody>
</table>
Want to know which residents are working with brown haired doctors?

SELECT resident_name
FROM residents, doctors
WHERE hair_color = brown
Why won’t this work?

- You need to LINK the tables
- And you need to give each column a UNIQUE name

Otherwise the computer will produce an infinite number of permutations and combinations……
SELECT residents.resident_name 
FROM residents, doctors 
WHERE doctors.hair_color = brown 
AND resident.doctor# = doctors.doctor#
## resident

<table>
<thead>
<tr>
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<th>resident_name</th>
<th>hair_color</th>
<th>doctor#</th>
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## doctors

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</table>

```
SELECT residents.resident_name   FROM residents, doctors
WHERE doctors.hair_color = brown
AND resident.doctor# = doctors.doctor#
```
Aliases- a convenient abbreviation

SELECT r.resident_name
FROM residents r, doctors d
WHERE d.hair_color = brown
AND r.doctor# = d.doctor#

SELECT residents.resident_name
FROM residents, doctors
WHERE doctors.hair_color = brown
AND resident.doctor# = doctors.doctor#
Enough theory, lets do some hands on

- From appointment screen in OSCAR
- Admin
- oscarReport
- Query by Example
show tables;
This will display all the tables in OSCAR

**Commonly used tables in OSCAR**

- demographic
- eChart
- dxresearch
- drugs
- measurements
- appointment
- billing
- billingmaster
- provider
- preventions
describe {table};

This will list the columns in that particular table
(eg demographic, look at a patients demographics page first)

describe demographic;
Let's ask some questions

- First let us see what is in the demographic table
  (refer to the demographic table property handout)

```sql
select  *
from    demographic
limit  20
(* = select all)

select first_name, last_name
from    demographic
limit  20
```
Let us find the patients older than 100!

```sql
select first_name, last_name
from demographic
where year_of_birth < 1911
limit 200;
```
Let us filter out the 0000-00-00

```sql
select first_name, last_name
from demographic
where year_of_birth < 1911
and year_of_birth <> 0000
limit 200;
```
Let's only look at the active patients

```
select first_name, last_name
from demographic
where year_of_birth < 1911
and year_of_birth <> 0000
and patient_status = 'AC'
limit 200;
```
Doing Arithmetic with selected Information

SYNTAX

* / - +
MAX MIN
SUM AVG
COUNT
Want to find your oldest patient?

```
select min(year_of_birth)
from demographic
where year_of_birth <> '0000'
and patient_status = 'AC';

Then

select first_name, last_name
from demographic
where year_of_birth = 1904
and patient_status = 'AC';
```
Some more interesting searches...

1) What is the average year of birth of our patients?

```sql
select avg(year_of_birth) from demographic where patient_status = 'AC';
```

2) What is the sum of our patients year of births?

```sql
select sum(year_of_birth) from demographic where patient_status = 'AC';
```

3) How many patients are listed as active in our server?

```sql
select count(demographic_no) from demographic where patient_status = 'AC';
```
Now lets try using two tables...

Let us list all our patients that have been entered into the Disease Registry with CHF (ICD 428)

(refer to the dxresearch table properties)

```
select demographic_no
from dxresearch
where dxresearch_code = 428;
```
This works, but we want names....

```sql
select demo.first_name, demo.last_name
from dxresearch dx, demographic demo
where dx.dxresearch_code = 428
and dx.demographic_no = demo.demographic_no;
```
Now to the Cadillac of searches, “Report by Templates”

This is a Query by Example engine with two differences:

1. It allows easy export of the results to a spreadsheet like Excel
2. It allows “variable inputs”
Now to the Cadillac of searches, “Report by Templates”

This is a Query by Example engine with two differences:

1. It allows easy export of the results to a spreadsheet like Excel
2. It allows “variable inputs”
Basic structure of a Report by template

```
<report title="Title" description="Description of what the report does" active="1">

  <query>
    Place query here
  </query>

  <param id="name" type="(text)(list)(date)" description="Description">
    This is the type of input
  </param>

</report>
```
So this is how the Disease Registry search would look:

```xml
<report title="Disease Registry lookup" description="Search for patients in the Disease Registry by ICD 9 code"
active="1">

<query>
select demo.first_name, demo.last_name
from dxresearch d,demographic demo
where d.dxresearch_code = 428
and d.demographic_no = demo.demographic_no;

</query>

<param id="searchtext" type="text" description="ICD 9 code"/>

</report>
```
So this is how the Disease Registry search would look:

```xml
<report title="Disease Registry lookup" description="Search for patients in the Disease Registry by ICD 9 code" active="1">

<query>

select demo.first_name "First Name", demo.last_name "Last Name"
from dxresearch d,demographic demo
where d.dxresearch_code = {ICD9}
and d.demographic_no = demo.demographic_no;

</query>

<param id="ICD9" type="text" description="ICD 9 code">  </param>

</report>
```
Wrap up

Hopefully you now know:

• How to list the Tables
  (show tables;)

• How to see the columns in a particular Table
  (describe {table name};)

• How to retrieve data from a Table
  (Select {column name} From {table name} Where {filter};)

• How to insert the Query into a Report by Template

• How to upload and edit “Reports by Template”
The End