# FunSQL A library for compositional construction

of SQL queries

https://github.com/MechanicalRabbit/FunSQL.jl

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## Find all patients born in or after 1970.

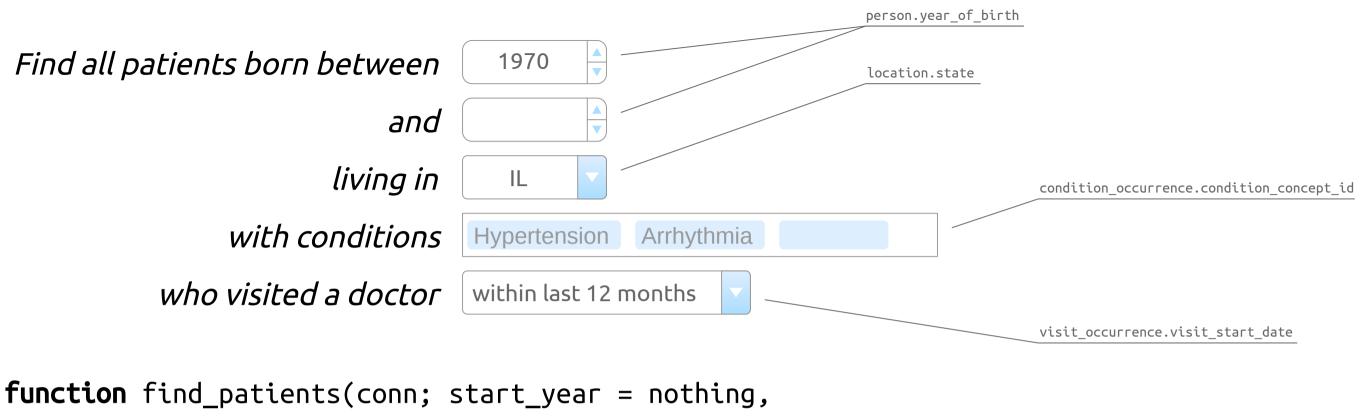


SELECT p.person\_id
FROM person p
WHERE p.year\_of\_birth >= 1970



```
function find_patients(conn)
    sql = """
    SELECT p.person_id
    FROM person p
    WHERE p.year_of_birth >= 1970
    """
    DBInterface.execute(conn, sql)
end
```

```
function find_patients(conn; start_year = nothing, end_year = nothing)
    sql =
    SELECT p.person_id
    FROM person p
    predicates = String[]
    if start year !== nothing
        push!(predicates, "p.year_of_birth >= $start_year")
    end
    if end_year !== nothing
        push!(predicates, "p.year_of_birth <= $end_year")</pre>
    end
    if !isempty(predicates)
        sql *= "\nWHERE " * join(predicates, " AND ")
    end
    DBInterface.execute(conn, sql)
end
```



```
runction find_patients(conn; start_year = nothing, end_year = nothing, state = nothing, conditions = [], latest_visit = nothing)

sql = ???

DBInterface.execute(conn, sql)

end
```



A fragment of OMOP CDM https://github.com/OHDSI/CommonDataModel

```
using FunSQL: SQLTable
const person =
    SQLTable(name = :person,
             columns = [:person_id, :year_of_birth, :location_id])
const location =
    SQLTable(name = :location,
             columns = [:location id, :city, :state, :zip])
const visit_occurrence =
    SQLTable(name = :visit_occurrence,
             columns = [:visit_occurrence_id, :person_id, :visit_concept_id,
                        :visit start date, :visit end date])
```

### Find all patients born in or after 1970.

using FunSQL: From, Get, Select, Where, render

FROM person p



FROM person p
WHERE p.year\_of\_birth >= 1970

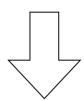


SELECT p.person\_id
FROM person p
WHERE p.year\_of\_birth >= 1970

q = From(person)



q = From(person) |>
 Where(Get.year\_of\_birth .>= 1970)



q = From(person) |>
 Where(Get.year\_of\_birth .>= 1970) |>
 Select(Get.person\_id)

sql = render(q, dialect = :postgresql)

```
q1 = From(person)
q2 = q1 |> Where(q1.year_of_birth .>= 1970)
q3 = q2 |> Select(q2.person_id)
                                               bound references
q = From(person) |>
    Where(Get.year_of_birth .>= 1970) |>
    Select(Get.person_id)
                                               unbound references
BornInOrAfter(Y) = Get.year_of_birth .>= Y
q = From(person) |>
    Where(BornInOrAfter(1970)) |>
    Select(Get.person_id)
```

	person
PK	person_id
	year_of_birth
FK	location_id

#### using FunSQL: Fun

SELECT p.person\_id
FROM person p
WHERE p.year\_of\_birth >= 1970

# Show patients with their state of residence.

using FunSQL: Join

q = From(person)

PK person\_id

year\_of\_birth

FK location\_id

# → PK location\_id city

state

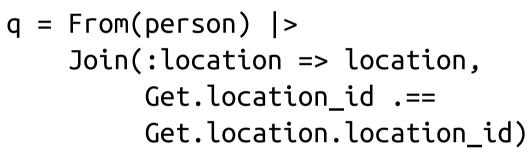
#### FROM person p



FROM person p

JOIN location l

ON (p.location\_id = l.location\_id)

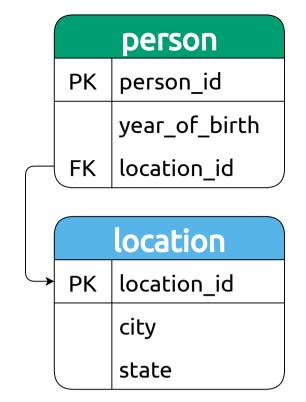




SELECT p.person\_id, l.state
FROM person p
JOIN location l
ON (p.location\_id = l.location\_id)



```
q1 = From(person)
q2 = From(location)
q3 = q1 |> Join(q2, q1.location_id .== q2.location_id)
                                                               person id
                                                                year_of_birth
                                                   Get
                                                                location_id
                                                                city
                                                                state
q = From(person) |>
    Join(:location => From(location),
          Get.location_id .== Get.location.location_id)
                                                           person_id
                                                           year_of_birth
                                              Get
                                                           -location id
                                                                             location_id
                                                           -location •
                                                                             city
```



state