

Data Analytics and Visualization Project - Diabetes Management

Summary:

After being diagnosed with Diabetes earlier this year I committed to making some drastic lifestyle changes in the hopes of being able to manage my diagnosis with diet and exercise alone. I have leveraged SQLite and created a database to log the information requested of my healthcare team: glucose levels, diet and exercise. With a variety of SQL statements I have used Tableau Public to create dashboards to share the results with my healthcare team.

What is it you want to know exactly?

I want to know if I can manage my diabetes through diet and exercise alone.

What is your hypothesis on this?

I believe with hard work and determination I can achieve my goal.

What is a realistic outcome for you?

Realistically I anticipate being able to manage my diagnosis through a strict diet and exercise routine.

What will you do with the outcome?

I will share the outcomes with my healthcare team.

Do we have the right data in place?

I have been collecting data since my diagnosis, so I do believe I have all the required data.

In early conversations with my healthcare team I shared my desire to develop a database to track and extract the ongoing results from my daily log and created these SQL scripts to provide the data the healthcare team is most interested in:

1. **30 Days of Diabetes** - The results in sharing this visualization with my healthcare team eliminated the need for pre-meal insulin.
2. **Managing Diabetes** - The results in sharing this visualization with my healthcare was stopping the daily insulin requirement.

/*

author: Darryl Masterson

date: 09/06/2022

description: this script selects data to create a Tableau header

*/

SELECT

P.first_name,

P.last_name,

P.age,

P.height,

D.name as 'Diagnosis',

DATE(D.date) as 'Diag. Date'

FROM Patients P

LEFT JOIN Diagnosis D

ON P.patient_id = D.patient_id

WHERE

P.patient_id = 1

;

/*

author: Darryl Masterson

date: 09/06/2022

description: this script selects data to include prescription info in Tableau header

*/

SELECT

D.name as 'Diagnosis',

Rx.name as 'Rx',

Rx.dose as 'Dose',

M.name as 'Measurement',

Rx.frequency as 'Frequency',

DATE(Rx.prescription_date) as 'Diag. Date'

FROM Diagnosis D

LEFT JOIN Medications Rx

ON D.diagnosis_id = Rx.diagnosis_id

LEFT JOIN Measurements M

ON Rx.measurement_id = M.measurement_id

WHERE

D.diagnosis_id = 1

AND Rx.dose > 0

;

/*

author: Darryl Masterson

date: 09/2/2022

description: Find glucose results from a specified day to current date and group into "over", "in" and "below" target ranges

*/

SELECT

count(LB.value) AS '# of Records',

CASE

 WHEN LB.value > HT.maximum THEN 'Over Target Range'

 WHEN LB.value >= HT.minimum THEN 'In Target Range'

 ELSE 'Below Target Range'

END AS 'Target_Results'

FROM Log_Book LB

LEFT JOIN Health_Targets HT

ON LB.patient_id = HT.patient_id

LEFT JOIN Measurements M

ON LB.measurement = M.measurement_id

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

WHERE LT.name LIKE 'glucose'

AND HT.name LIKE 'glucose'

AND DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

GROUP BY Target_Results

;

/*

author: Darryl Masterson

date: 09/2/2022

description: Find results of low glucose records from a specified day to current date and group
by time of day

*/

SELECT

count(LB.timestamp) AS '# of Records',

CASE

 WHEN time(LB.timestamp) > time('17:00:00.000') THEN 'Evening'

 WHEN time(LB.timestamp) > time('11:30:00.000') THEN 'Afternoon'

 ELSE 'Morning'

END AS 'Time_of_Day'

FROM Log_Book LB

LEFT JOIN Health_Targets HT

ON LB.patient_id = HT.patient_id

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

WHERE LT.name LIKE 'glucose'

AND LB.value < HT.minimum AND HT.name LIKE 'glucose'

AND DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

GROUP BY Time_of_Day

ORDER BY time(LB.timestamp)

;

/*

author: Darryl Masterson

date: 09/06/2022

description: this script selects all data from a specified day to current date.

*/

SELECT

sum(LB.value) as 'Water',

--sum(LB.value) || ' ' || M.name as 'Water',

date(LB.timestamp) as 'Date'

FROM Log_Book LB

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

LEFT JOIN Measurements M

ON LB.measurement = M.measurement_id

WHERE LT.name LIKE 'water'

AND DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

GROUP BY date(LB.timestamp)

ORDER BY datetime(LB.timestamp)

;

/*

author: Darryl Masterson

date: 09/6/2022

description: this script selects all instances of Food_Items logged in the Food_Log_Link

use case: creating a word cloud in Tableau. someone on linked in had asked in a post what I have been eating while losing weight.

*/

SELECT

FI.short_name

FROM Log_Book LB

INNER JOIN Food_Log_Link FLL

ON LB.log_id = FLL.log_id

INNER JOIN Food_Items FI

ON FI.food_id = FLL.food_id

;

/*

author: Darryl Masterson

date: 09/6/2022

description: find low, avg and high glucose values from a specified day to current date

*/

SELECT

min(LB.value) || ' ' || M.name AS 'Low',
round(avg(LB.value)) || ' ' || M.name AS 'Avg',
max(LB.value) || ' ' || M.name AS 'High',
count(LB.log_id) AS '# of Records'

FROM Log_Book LB

LEFT JOIN Measurements M

ON LB.measurement = M.measurement_id

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

WHERE LT.name LIKE 'glucose'

AND DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

;

/*

author: Darryl Masterson

date: 09/2/2022

description: Select all carbs per day from a specified day to current date

*/

SELECT

round(sum(FI.carbs * FLL.quantity)) as 'Carbs',

date(LB.timestamp) as 'Date'

FROM Log_Book LB

INNER JOIN Food_Log_Link FLL

ON LB.log_id = FLL.log_id

INNER JOIN Food_Items FI

ON FI.food_id = FLL.food_id

WHERE DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

GROUP BY date(LB.timestamp)

ORDER BY datetime(LB.timestamp)

;

/*

author: Darryl Masterson

date: 09/2/2022

description: Select all water intake per day from a specified day to current date

*/

SELECT

sum(LB.value) as 'Water',

date(LB.timestamp) as 'Date'

FROM Log_Book LB

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

WHERE LT.name LIKE 'water'

AND DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

GROUP BY date(LB.timestamp)

ORDER BY datetime(LB.timestamp)

;

/*

author: Darryl Masterson

date: 09/2/2022

description: Select all walking exercise records from a specified day to current date

*/

SELECT

E.name as 'Exercise',

sum(LB.value) as 'Total',

date(LB.timestamp) as 'Date'

FROM Log_Book LB

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

INNER JOIN Exercise_Log_Link ELL

ON LB.log_id = ELL.log_id

INNER JOIN Exercise E

ON E.exercise_id = ELL.exercise_id

WHERE LT.name LIKE 'exercise'

AND E.name LIKE 'walk%'

AND DATE(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

GROUP BY E.exercise_id, date(LB.timestamp)

ORDER BY datetime(LB.timestamp)

;

/*

author: Darryl Masterson

date: 09/19/2022

description: this script selects data to include prescription info in Tableau header

*/

SELECT

D.name as 'Diagnosis',

Rx.dose || ' ' || M.name || ' ' || Rx.name || ' - ' || Rx.frequency as 'Rx'

FROM Diagnosis D

LEFT JOIN Medications Rx

ON D.diagnosis_id = Rx.diagnosis_id

LEFT JOIN Measurements M

ON Rx.measurement_id = M.measurement_id

WHERE

D.diagnosis_id = 1

AND Rx.dose > 0

;

/*

author: Darryl Masterson

date: 09/19/2022

description: Select all glucose results per day from a specified day to current date

*/

SELECT

LB.value as 'Glucose',

datetime(LB.timestamp) as 'Date'

FROM Log_Book LB

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

WHERE LT.name LIKE 'glucose'

AND datetime(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

ORDER BY datetime(LB.timestamp)

;

/*

author: Darryl Masterson

date: 09/22/2022

description: the healthcare team wanted to know how many instances my glucose level was below 80 during the current reporting timeframe.

*/

SELECT

count(LB.log_id) AS '# of Records'

FROM Log_Book LB

LEFT JOIN Measurements M

ON LB.measurement = M.measurement_id

LEFT JOIN Log_Types LT

ON LB.log_type_id = LT.log_type_id

WHERE LT.name LIKE 'glucose'

AND LB.value < 80

AND datetime(LB.timestamp)

BETWEEN date('2022-08-22') AND date('now')

;