

#First, we import the Medicare Provider Charge Inpatient CSV file into SAS.

```
/* Generated Code (IMPORT) */  
/* Source File: Medicare_Provider_Charge_Inpatient_DRGALL_FY2015 copy.csv */  
/* Source Path: /folders/myfolders/sasuser.v94 */
```

```
%web_drop_table(WORK.IMPORT);
```

```
FILENAME REFFILE '/folders/myfolders/sasuser.v94/  
Medicare_Provider_Charge_Inpatient_DRGALL_FY2015 copy.csv';
```

```
PROC IMPORT DATAFILE=REFFILE  
    DBMS=CSV  
    OUT=WORK.IMPORT;  
    GETNAMES=YES;  
RUN;
```

```
PROC CONTENTS DATA=WORK.IMPORT; RUN;
```

```
%web_open_table(WORK.IMPORT);
```

#Next, we open the CSV file as a SAS Table.

#Then, we select for the all records from BALTIMORE, MD for hospital records related to patients with this diagnosis: 689 - KIDNEY & URINARY TRACT INFECTIONS W MCC.

```
PROC SQL;  
CREATE TABLE WORK.query AS  
SELECT DRG_Definition , Provider_Id , Provider_Name , Provider_Street_Address ,  
Provider_City , Provider_State , Provider_Zip_Code ,  
Hospital_Referral_Region__HRR__D , Total_Discharges , Average_Covered_Charges ,  
Average_Total_Payments , Average_Medicare_Payments FROM WORK.QUERY  
WHERE Provider_State = "MD" and Provider_City = "BALTIMORE" and DRG_Definition  
= "689 - KIDNEY & URINARY TRACT INFECTIONS W MCC";  
RUN;  
QUIT;
```

```
PROC DATASETS NOLIST NODETAILS;  
CONTENTS DATA=WORK.query OUT=WORK.details;  
RUN;
```

```
PROC PRINT DATA=WORK.details;
RUN;
```

Obs	DRG_Definition	Provider_Id	Provider_Name	Provider_Street_Address	Provider_City	Provider_State	Provider_Zip_Code	Hospital_Referral_Region__HRR_D	Total_Discharges	Average_Covered_Charges	Average_Total_Payments	Average_Medicare_Payments
1	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210002	UNIVERSITY OF MARYLAND MEDICAL CENTER	22 SOUTH GREENE STREET	BALTIMORE	MD	21201	MD - Baltimore	24	13639.54	12578.88	11869.38
2	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210008	MERCY MEDICAL CENTER INC	301 SAINT PAUL PLACE	BALTIMORE	MD	21202	MD - Baltimore	11	15414.45	14226.55	12884.64
3	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210009	JOHNS HOPKINS HOSPITAL, THE	600 NORTH WOLFE STREET	BALTIMORE	MD	21287	MD - Baltimore	27	14772.59	13622.26	12932.04
4	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210011	SAINT AGNES HOSPITAL	900 CATON AVENUE	BALTIMORE	MD	21229	MD - Baltimore	47	14757.19	13611.28	12760.89
5	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210012	SINAI HOSPITAL OF BALTIMORE	2401 WEST BELVEDERE AVENUE	BALTIMORE	MD	21215	MD - Baltimore	39	13488.82	12440.56	11706.51
6	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210015	MEDSTAR FRANKLIN SQUARE MEDICAL CENTER	9000 FRANKLIN SQUARE DRIVE	BALTIMORE	MD	21237	MD - Baltimore	34	14909.29	13753.5	12800.32
7	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210029	JOHNS HOPKINS BAYVIEW MEDICAL CENTER	4940 EASTERN AVENUE	BALTIMORE	MD	21224	MD - Baltimore	25	12584.08	11668.76	10320.32
8	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210044	GREATER BALTIMORE MEDICAL CENTER	6701 NORTH CHARLES STREET	BALTIMORE	MD	21204	MD - Baltimore	29	10629.52	9857.07	8732.52
9	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210056	MEDSTAR GOOD SAMARITAN HOSPITAL	5601 LOCH RAVEN BOULEVARD	BALTIMORE	MD	21239	MD - Baltimore	39	14690.59	13413.67	12551.51

#Then, we open a file downloaded from US Census data with information about the median household income in the zip codes of our list of hospitals.

#Note: the original Medicare Provider Charge CSV file incorrectly listed the zip code of Johns Hopkins Hospital on North Wolfe Street as 21287 while in fact, this should have been 21218. This would lead to missing values while merging the data files by zip codes. Hence, we would need to address this error before performing statistical analysis on the dataset.

```
PROC SQL;
CREATE TABLE WORK.query AS
SELECT Provider_Zip_Code , Median_Income , Margin_of_Error FROM
WORK.IMPORT1;
RUN;
QUIT;
```

```
PROC DATASETS NOLIST NODETAILS;
CONTENTS DATA=WORK.query OUT=WORK.details;
RUN;
```

```
PROC PRINT DATA=WORK.details;
RUN;
```

#We now open the RUCA file we have obtained as well.

```
%web_drop_table(WORK.RUCA);
```

```
FILENAME REFFILE '/folders/myfolders/sasuser.v94/RUCA.csv';
```

```
PROC IMPORT DATAFILE=REFFILE
```

```

DBMS=CSV
OUT=WORK.RUCA;
GETNAMES=YES;
RUN;

PROC CONTENTS DATA=WORK.RUCA; RUN;

```

```
%web_open_table(WORK.RUCA);
```

#Next, we merge the Medicare Charge data table with the median income table and then the RUCA file, by Provider_Zip_Code.

```

proc sort data=work.query1 out=work.query3;
  by Provider_Zip_Code;
run;

```

```

data MDBALCEN;
  merge work.import1 work.query3;
  by Provider_Zip_Code;
run;

```

Obs	Provider_Zip_Code	RUCA	Median_Income	Margin_of_Error	DRG_Definition	Provider_Id	Provider_Name	Provider_Street_Address	Provider_City	Provider_State	Hospital_Referral_Region_HRR_D	Total_Discharges	Average_Covered_Charges	Average_Total_Payments	Average_Medicare_Payments
1	21201	1.1	30853	3085	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210002	UNIVERSITY OF MARYLAND MEDICAL CENTER	22 SOUTH GREENE STREET	BALTIMORE	MD	MD - Baltimore	24	13639.54	12578.88	11869.38
2	21202	1.1	31638	3188	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210008	MERCY MEDICAL CENTER INC	301 SAINT PAUL PLACE	BALTIMORE	MD	MD - Baltimore	11	15414.45	14226.55	12884.64
3	21204	1.1	77535	10150	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210044	GREATER BALTIMORE MEDICAL CENTER	6701 NORTH CHARLES STREET	BALTIMORE	MD	MD - Baltimore	29	10629.52	9857.07	8732.52
4	21215	1.1	34885	2564	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210012	SINAI HOSPITAL OF BALTIMORE	2401 WEST BELVEDERE AVENUE	BALTIMORE	MD	MD - Baltimore	39	13488.82	12440.56	11706.51
5	21218	1.1	37959	2324	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210029	JOHNS HOPKINS BAYVIEW MEDICAL CENTER	4940 EASTERN AVENUE	BALTIMORE	MD	MD - Baltimore	25	12584.08	11668.76	10320.32
6	21224	1.1	56997	3073	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210011	SAINT AGNES HOSPITAL	900 CATON AVENUE	BALTIMORE	MD	MD - Baltimore	47	14757.19	13611.28	12760.89
7	21237	1.1	59405	3703	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210015	MEDSTAR FRANKLIN SQUARE MEDICAL CENTER	9000 FRANKLIN SQUARE DRIVE	BALTIMORE	MD	MD - Baltimore	34	14909.29	13753.5	12800.32
8	21239	1.1	50809	2851	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210056	MEDSTAR GOOD SAMARITAN HOSPITAL	5601 LOCH RAVEN BOULEVARD	BALTIMORE	MD	MD - Baltimore	39	14690.59	13413.67	12551.51
10	21287	.	.	.	689 - KIDNEY & URINARY TRACT INFECTIONS W MCC	210009	JOHNS HOPKINS HOSPITAL, THE	600 NORTH WOLFE STREET	BALTIMORE	MD	MD - Baltimore	27	14772.59	13622.26	12932.04

#Since Johns Hopkins Hospital had an erroneous zip code (21287) in the original Medicare data CSV, other data belong to this hospital would need to be merged with zip code 21218 (the correct zip code).

#After more data manipulation in SAS, our merged and cleaned dataset is as follows.

```

PROC SQL;
CREATE TABLE WORK.query AS
SELECT Zip_Code , RUCA , Median_Income , Average_Charges FROM
WORK.BMOREMEDICARE;
RUN;
QUIT;

```

```
PROC DATASETS NOLIST NODETAILS;
CONTENTS DATA=WORK.query OUT=WORK.details;
RUN;
```

```
PROC PRINT DATA=WORK.details;
RUN;Linear Regression for our dataset using SAS
```

Total rows: 9 Total columns: 4

	Zip_Code	RUCA	Median_Income	Average_Charges
1	21201	1.1	30853	13639.54
2	21202	1.1	31638	15414.45
3	21204	1.1	77535	10629.52
4	21215	1.1	34885	13488.82
5	21218	1.1	37959	14772.59
6	21224	1.1	56997	12584.08
7	21229	1.1	44485	14757.19
8	21237	1.1	59405	14909.29
9	21239	1.1	50809	14690.59

#Since the degree of urbanization or rurality is the same for all of the zip codes in our study, RUCA has a constant value throughout our dataset.

```
ods noproctitle;
ods graphics / imagemap=on;
```

```
proc glmselect data=WORK.BMOREMEDICARE
outdesign(addinputvars)=Work.reg_design;
class RUCA Zip_Code / param=effect;
model Average_Charges=Median_Income / showpvalues selection=none;
run;
```

```
proc reg data=Work.reg_design alpha=0.05 plots(only maxpoints=100)=(diagnostics
residuals partial fitplot observedbypredicted);
where RUCA is not missing and Zip_Code is not missing;
ods select DiagnosticsPanel ResidualPlot PartialPlot FitPlot
ObservedByPredicted;
model Average_Charges=&_GLSMOD / partial;
run;
quit;
```

```
proc delete data=Work.reg_design;
run;
```

