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Using SAS® Programing to Identify Super-utilizers and Improve Healthcare Services

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ABSTRACT

Super-utilizers are the small subset of population who account for the highest utilization of healthcare services. The purpose of this study is to combine inpatient stays (IS) and emergency-department visits (EV) to identify super-utilizers in the Medicaid population, in order to enhance the quality of healthcare, decrease Medicaid costs, and improve healthcare management systems. Medicaid claims data with dates of payment in fiscal year 2014 were used to create 16 scenarios of combined IS and EV. These scenarios represent 16 interactions between four IS groups and four EV groups. Among them, super-utilizers are beneficiaries under the condition: $IS \geq 4$ and $EV \geq 6$. The first step of SAS programming was to classify Medicaid beneficiaries into two groups, based on Medicaid management/payment systems: managed care organization (MCO) enrollees and fee-for-service (FFS) beneficiaries. Second, PROC SQL was used to count the number of IS and EV services for each beneficiary. Subsequently, IF statements were used to create dummy variables to categorize IS and EV counts into four groups, respectively, and then to categorize combined IS and EV counts into 16 sub-groups. Afterwards, PROC SQL and PROC TABULATE were used to obtain numbers of beneficiaries and Medicaid costs for each scenario. Lastly, PROC FREQ was used to identify top three diseases in each scenario. Results show MCO super-utilizers account for 0.1% of MCO enrollees and 4.0% of MCO expenditures. FFS super-utilizers account for 0.8% of FFS beneficiaries and 9.8% of FFS expenditures. This method easily identified super utilizers, and could facilitate governments, healthcare industries, and researchers to evaluate costs, performance of healthcare services, and improvement of public health.

INTRODUCTION

Improving public health, enhancing the quality of healthcare services, and reducing unnecessary costs are important healthcare issues. The rise in costs for most health care systems around the world has not translated completely to higher quality of care for patients or beneficiaries. It has been recognized that a relatively small group of individuals account for a large proportion of spending in Medicare, Medicaid, and private insurance plans. (Santon, 2006) For example, high-utilizers (HU) are the small subset of the population who account for the high utilization of healthcare services. Super-utilizers (SU) are patients with high medical costs from recurring, preventable inpatient or emergency department (ED) visits (Emecbe, 2015). Super-utilizers make up only five percent of the Medicaid beneficiaries, yet these beneficiaries with complex needs account for more than 50 percent of overall program spending (Bodenheimer, 2013). Health care reform has focused on how to achieve the best outcomes at the lowest costs, especially for these high- and super- utilizers.

The Centers for Medicare & Medicaid Services (CMS) is providing financial and technical support to states for the development and testing of state-led, multi-payer health care payment and service delivery models through the State Innovation Models (SIM) Design Award, in order to improve health system performance, increase quality of care, and decrease costs for Medicare, Medicaid, and Children's Health Insurance Program (CHIP) beneficiaries. (Centers for Medicare & Medicaid Services, 2015) The Health Care Reform & Innovation Administration (HCRIA) within the District of Columbia (DC) Department of Health Care Finance received funding for Round One of the SIM Design Award, which is to design or test innovative health care payment and service delivery models. Consequently, the District is developing strategies and methods to improve health outcomes through initiatives made by the SIM Award. One of the initiatives includes a population-focused initiative that will serve high-cost, high-need individuals through greater coordination of health care and social services. Another goal of this initiative is to reduce the mortality rate through access to quality health care and to decrease avoidable use of emergency rooms, as well as 30-day hospital readmission rates. The purpose of this research is to study one of the initiatives of DC's SIM award, which combines inpatient stays (IS) and emergency-department visits (EV) to identify high- and super- utilizers in the Medicaid population, in order to enhance the quality of healthcare, decrease Medicaid costs, and improve healthcare management systems.

METHODS

Medicaid data used in this study was pulled from the DC's Medicaid Management Information System (MMIS) via a SAS data warehouse. Medicaid claims data with dates of payment in fiscal year 2014 (FY14) were used to create 16 scenarios of combined IS and EV. These scenarios represent 16 interactions between four IS groups and four EV groups. Among them, high counts of IS and EV ($IS \geq 2$ and $EV \geq 3$) are considered as high utilization of healthcare services. Super-utilizers are beneficiaries under the condition: $IS \geq 4$ and $EV \geq 6$. This 4x4 Table (Table 1) displays the number of Medicaid beneficiaries who fall in to each category of utilization and their EV and IS costs. (Health Care Incentives Improvement Institute, 2015)

		Inpatient Stays (IS)			
		IS=0	IS=1	IS=2-3	IS=4+
Emergency-Department Visits (EV)	EV=0	Low utilizer	Low utilizer	High IS & low EV utilizer	High IS & low EV utilizer
	EV=1-2	Low utilizer	Low utilizer	High IS & low EV utilizer	High IS & low EV utilizer
	EV=3-5	High EV & Low IS utilizer	High EV & Low IS utilizer	High utilizer	High utilizer
	EV=6+	High EV & Low IS utilizer	High EV & Low IS utilizer	High utilizer	Super utilizer

Table 1. Inpatient and Emergency Department Utilization Categories

SAS Enterprise Guide 7.1[®] software was used to conduct SAS programing. SAS code for this research is described in nine steps below. In the following programing steps, the naming of data sets is not consistent numerically because I only highlighted relevant SAS codes.

Step 1. Create a Medicaid data set. First, Medicaid claim data were pulled from DC's data warehouse, and were constrained with the paid health care services in Fiscal Year 2014. These health care services include inpatient services, emergency department services, outpatient services, and so on. Based on management/payment systems, Medicaid beneficiaries were classified into two groups: managed care organization (MCO) enrollees and fee-for-service (FFS) beneficiaries. An IF-THEN/ELSE statement created a variable to identify data as MCO or FFS.

```
data Simscan.Hdrint2;
set Simscan.Hdrint1;

If C_Hdr_Enctr_Ind = "N" Then Payer = "FFS";
else If C_Hdr_Enctr_Ind = "Y" Then Payer = "MCO";

If Payer = "MCO" or Payer = "FFS" then output;
run;
```

Step 2. Create an indicator-variable to identify inpatient and emergency department health service. In our data warehouse, a service-provider category variable was used to indicate IS and EV claim.

```
data Simscan.Hdrint6;
set Simscan.Hdrint5;
If C_HDR_SVC_PRVD_CD='IO' or C_HDR_SVC_PRVD_CD='10' then claim='I';
else if C_HDR_SVC_PRVD_CD='12' then claim='E';
else delete;

run;
```

Step 3. Create MCO and FFS sub- data sets. In DC Medicaid, MCO and FFS are independent management and financial systems. Since the payment systems are different, the payments of MCO and FFS claims should be

analyzed separately. Therefore Medicaid payment data were separated into two subsets by combining a DO statement and IF-THEN/ELSE statement.

```

data Simscan.Hdrint_MCO Simscan.Hdrint_ffs;
set Simscan.Hdrint6;

if Payer = "MCO" then do;
  if C_HDR_MC_ENCTR_PD_AMT=0 then Paid=C_HDR_TOT_REIMB_AMT;
  else Paid=C_HDR_MC_ENCTR_PD_AMT;
  output Simscan.Hdrint_MCO;
end;

else if Payer = "FFS" then do;
  Paid=C_HDR_TOT_REIMB_AMT;
  output Simscan.Hdrint_FFS;
end;
run;

```

Step 4. Calculate counts and expenditures for inpatient stays and Emergency Department visits, respectively among MCO beneficiaries. Create subsets for IS and EV, respectively, among MCO beneficiaries. After IS and EV subsets were created, respectively, PROC SQL was used to calculate the unit counts for beneficiaries and summed paid amount. In this study, the financial transaction control numbers (TCN) for IS and EV were used to represent the number of IS and EV. In the example below, created variables for IS and EV counts are Icount and Ecount, respectively. The created variables for IS paid amount and EV paid amounts are Ipaid and Epaid, respectively.

```

*SAS codes for counts and expenditure for Inpatient stays in MCO;
proc sql;
  create table Simscan.MCO_I3 as
  select distinct C_HDR_MBR_CURR_ID, count(distinct New_id) as Icount, age_groupn,
  payer, sum(paid) as Ipaid
  from Simscan.MCO_I2
  where claim='I'
  group by C_HDR_MBR_CURR_ID;
quit;

*SAS codes for counts and expenditure for Emergency Department visits in MCO;

proc sql;
  create table Simscan.MCO_ED3 as
  select distinct C_HDR_MBR_CURR_ID, count(distinct New_ID) as Ecount, age_groupn,
  payer, sum(paid) as Epaid
  from Simscan.MCO_ED2
  where claim='E'
  group by C_HDR_MBR_CURR_ID;
quit;

```

Step 5. Create counts and expenditures for combined Inpatient Stays and Emergency Department Visits among MCO beneficiaries. First, a MERGE statement was used to merge IS subset and EV subset into a combined data set. In this combined data set, the missing data of Icount and Ecount were treated as zero stays/visits.

```

data Simscan.MCO_comb1;
set Simscan.MCO_comb;
if Icount=. then Icount=0;
if Ecount=. then Ecount=0;
if Ipaid=. then Ipaid=0;
if Epaid=. then Epaid=0;

```

```
run;
```

After that, IF-THEN statements were used to create dummy variables to categorize IS and EV counts into four groups, respectively. For the IS group, if Icounts are 0, 1, 2-3, and ≥ 4 counts, the Icount_gr was categorized as 1, 2, 3, and 4, respectively. The same method was applied to Ecounts and Ecount_gr.

```
If Icount=0 then Icount_gr=1;
If Icount=1 then Icount_gr=2;
If Icount=2 or Icount=3 then Icount_gr=3;
If Icount>=4 then Icount_gr=4;

If Ecount=0 then Ecount_gr=1;
If Ecount=1 or Ecount=2 then Ecount_gr=2;
If Ecount=3 or Ecount=4 or Ecount=5 then Ecount_gr=3;
If Ecount>=6 then Ecount_gr=4;
```

Subsequently, using IF-THEN statements, IE_gr, an indicator variable, was created to categorize combined IS and EV counts into 16 sub-groups, meaning the interaction between 4-IS group and 4-EV group. Table 2 lists these 16 sub-groups to represent 16 scenarios of combined IS and EV. A combined paid-amount variable, IE_paid, was created to calculate the combined paid-amount, which is the sum of Ipaid and Epaid.

```
data Simscan.MCO_comb3;
set Simscan.MCO_comb2;

If Icount_gr=1 and Ecount_gr=1 then IE_gr=1;
If Icount_gr=1 and Ecount_gr=2 then IE_gr=2;
If Icount_gr=1 and Ecount_gr=3 then IE_gr=3;
If Icount_gr=1 and Ecount_gr=4 then IE_gr=4;
If Icount_gr=2 and Ecount_gr=1 then IE_gr=5;
If Icount_gr=2 and Ecount_gr=2 then IE_gr=6;
If Icount_gr=2 and Ecount_gr=3 then IE_gr=7;
If Icount_gr=2 and Ecount_gr=4 then IE_gr=8;
If Icount_gr=3 and Ecount_gr=1 then IE_gr=9;
If Icount_gr=3 and Ecount_gr=2 then IE_gr=10;
If Icount_gr=3 and Ecount_gr=3 then IE_gr=11;
If Icount_gr=3 and Ecount_gr=4 then IE_gr=12;
If Icount_gr=4 and Ecount_gr=1 then IE_gr=13;
If Icount_gr=4 and Ecount_gr=2 then IE_gr=14;
If Icount_gr=4 and Ecount_gr=3 then IE_gr=15;
If Icount_gr=4 and Ecount_gr=4 then IE_gr=16;

IE_paid=Ipaid+Epaid;
```

```
run;
```

		Inpatient Stays (IS)			
		Icount_gr=1	Icount_gr=2	Icount_gr=3	Icount_gr=4
Emergency- Department Visits (EV)	Ecount_gr=1	IE_gr=1	IE_gr=5	IE_gr=9	IE_gr=13
	Ecount_gr=2	IE_gr=2	IE_gr=6	IE_gr=10	IE_gr=14
	Ecount_gr=3	IE_gr=3	IE_gr=7	IE_gr=11	IE_gr=15
	Ecount_gr=4	IE_gr=4	IE_gr=8	IE_gr=12	IE_gr=16

Table 2. The Structure of Sixteen Scenarios

Note: Icount_gr = 1, 2, 3, 4 in Table 2 represent IS = 0, 1, 2-3, 4+ in Table 1, respectively. Ecount_gr = 1, 2, 3, 4 in Table 2 represent EV = 0, 1-2, 3-5, 6+ in Table 1, respectively.

As mentioned previously, the HU were defined as the condition: $IS \geq 2$ ($IS=2-3$ and $IS=4+$) and $EV \geq 3$ ($EV=3-5$ and $EV=6+$) (Table 1). Therefore, in Table 2, scenarios of $IE_gr=11, 12, 15, 16$ represent HU. Among HU, the SU is defined as the condition: $IS = 4+$ and $EV = 6+$ in Table 1, which means $IE_gr=16$ in Table 2. Analyses for HS ad SU below would focus on $IE_gr=11, 12, 15, 16$.

Afterwards, PROC TABULATE (Cody, 2012) was used to list the analyzed results of expenditures in each scenario.

```
proc tabulate data=Simscan.MCO_comb3;
class IE_gr;
var IE_paid;
table IE_gr, IE_paid;
run;
```

In order to have the unique count of beneficiaries in each scenario, PROC SORT with NODUPKEY option was used to remove duplicated beneficiary's identification number (ID). Then, PROC TABULATE was used to list the analyzed results of counts in each scenario.

```
proc sort data=Simscan.MCO_comb3 nodupkey out=Simscan.MCO_comb4;
by C_HDR_MBR_CURR_ID;
run;
```

```
proc tabulate data=Simscan.MCO_comb4;
class IE_gr C_HDR_MBR_CURR_ID;
table IE_gr, C_HDR_MBR_CURR_ID;
run;
```

Step 6. Create counts and expenditures for IS and EV, respectively, in FFS. Repeat the same methods in Step 4.

Step 7. Create counts and expenditures for combined IS and EV in FFS. Repeat the same methods in Step 5.

Step 8. Analyze top three diseases for high- and super-utilizers of IS and EV among MCO beneficiaries. First, use %LET statement to create 2 macro variables that contains variables of primary diagnosis codes, admit diagnosis codes, diagnosis codes 1-12, TCN, Beneficiary ID. Second, create an array dx(*) with diagnosis codes defined as the macro variable in the previous sentence. By using a DO statement to assign the values of all diagnosis codes to a new variable named Diag, and a new record would be created for each non-missing value of Diag. Third, merge the resultant data set with the data set that defines 16-scenarios by Hash-Lookup technique. Subsequently, PROC SORT was used to sort out the data by the indicator variable of IS and EV (IE_gr), and then PROC FREQ with ORDER=FREQ option was used to run the frequency of diagnosis ICD-9 code. The top three diagnosis ICD-9 codes were used to represent the top three diseases. Below are SAS codes to analyze top diseases for all 16 scenarios which includes 3 scenarios of HU ($IE_gr=11, 12, 15$) and 1 scenario of SU ($IE_gr=16$).

```
*Create two macro variables;

%let var_grp = C_HDR_TCN_ID interim_id num_in_interim C_HDR_FDOS_DT C_HDR_MBR_CURR_ID;

%let var_dxpr = C_HDR_DIAG_PRIM_CD C_HDR_ADMIT_DIAG_CD C_HDR_DIAG_1_CD
C_HDR_DIAG_2_CD C_HDR_DIAG_3_CD C_HDR_DIAG_4_CD C_HDR_DIAG_5_CD C_HDR_DIAG_6_CD
C_HDR_DIAG_7_CD C_HDR_DIAG_8_CD C_HDR_DIAG_9_CD C_HDR_DIAG_10_CD C_HDR_DIAG_11_CD
C_HDR_DIAG_12_CD C_HDR_DIAG_13_CD;

*Create an array and use a DO statement;

data simscan.diagcode_MCO (keep= &var_grp &var_dxpr diag dx_seqno);
set simscan.wayne_MCO;
```

```

array dx(*) &var_dxpr;

do i= 1 to dim(dx);
  if dx(i) ^= " " then do;
    diag = dx(i);
    dx_seqno = i;
    output;
  end;
end;
run;

*Merge all diagnosis codes with defined 16-scenarios among MCO;

%hash_lkup(inds_list          =Simscan.diagcode_MCO,
           keyvar             =C_HDR_MBR_CURR_id,
           altkey             =C_HDR_MBR_CURR_ID,
           var_list           =diag dx_seqno ,
           inds_tgt           =Simscan.MCO_comb4,
           query              =,
           tgtwhere           =,
           tgtkeep            =,
           tgtdrop            =,
           outds_m            =Simscan.diagcode_MCO1,
           outds_nom          =,
           tag                 =N,
           dupkey             =Y);

*Run frequency analysis;

Proc sort data=Simscan.diagcode_MCO1;
by IE_gr;
run;

proc freq data=Simscan.diagcode_MCO1 order=freq;
by IE_gr;
table diag/nocum;
run;

```

Step 9. Analyze top three diseases for high- and super- utilizers of IS and EV among FFS beneficiaries. Repeat the same method in Step 8.

RESULTS and DISCUSSION

Tables 3 and 4 show the number of beneficiaries, average expenditures, and the top three diseases in sixteen scenarios among MCO and FFS beneficiaries, respectively. MCO super-utilizers account for 0.1% of MCO enrollees and 4.0% of MCO expenditures. FFS super-utilizers account for 0.8% of FFS beneficiaries and 9.8% of FFS expenditures. Among MCO beneficiaries, the most common diagnosed symptoms/diseases for high- and super-utilizers are hypertension, chest pain, and symptoms involving abdomen and pelvis. Among FFS beneficiaries, the most common diagnosed symptoms/diseases for high- and super- utilizers are hypertension, end-stage renal disease, diabetes, and chest pain. The diagnosis analysis was based on the primary diagnosis code, admit diagnosis code, diagnosis codes 1-12 of claim data.

The methodology developed in this study can effectively identify HU and SU. Understanding the average cost and top diseases of HU and SU will help address the following goals: (1) to clearly identify system inefficiencies and their link to low-value care; (2) to help Medicaid beneficiaries who often are not getting the kind of care they need; and (3) to develop the SU strategy on reducing preventable hospital visits, employing data-driven evidence, stakeholder engagement, and clinical redesign. Moreover, results from this methodology can provide guidance with implementing

multidisciplinary community-based care coordination, which is to help SU through primary care and community resources by patients, payers, community, health care resources, licensed nurses, and social workers (Emeche, 2015). The efficacy of community based care coordination has proven successful in health systems. (Silo-Carroll and Lamphere, 2013) For example, three of the health service programs in Pennsylvania demonstrated a 34% reduction in hospital admissions and savings of \$1.2 million over 12 months (Waring et al., 2014). In addition, this methodology encourages those strategies and processes to be data-informed such as the development of strategies to help SU in the healthcare system transformation.

CONCLUSION

This methodology using SAS programing easily identified high- and super-utilizers in DC's Medicaid population, and will help to facilitate the development of strategies and methods to improve healthcare system through DC's SIM Design Award. Not only was this methodology useful for Medicaid data in this study, but also it can be applied for Medicare and private health insurance data. Improving care delivery for high- and super-utilizers can transform overall health care delivery. Therefore, this methodology is timely, especially after Affordable Care Act (ACA) was launched in 2010, since the primary purpose of the ACA law was to protect Americans from health issues with healthcare coverage, to increase health benefits, and to lower healthcare costs. In conclusion, this methodology could empower governments, healthcare industries, and researchers in evaluating costs, delivering healthcare services, and improving public health.

MCO	IP (0)	IP (1)	IP (2-3)	IP (4+)
ED (0)	---	n = 3,995 (5.6% of N) Avg. Cost/Bene.: \$11,729 Top Diagnoses: 1. Pregnancy-Related Visit 2. Hypertension 3. Routine Child Check Up	n = 565 (0.8% of N) Avg. Cost/Bene.: \$33,372 Top Diagnoses: 1. Hypertension 2. Diabetes 3. Respiratory Failure	n = 73 (0.1% of N) Avg. Cost/Bene.: \$143,074 Top Diagnoses: 1. Hypertension 2. Heart Failure 3. Abdomen/Pelvis
ED (1-2)	n = 47,248 (65.8% of N) Avg. Cost/Bene.: \$677 Top Diagnoses: 1. Routine Child Check Up 2. Hypertension 3. Asthma	n = 3,400 (5.6% of N) Avg. Cost/Bene.: \$10,486 Top Diagnoses: 1. Pregnancy-Related Visit 2. Hypertension 3. Routine Child Check Up	n = 591 (0.8% of N) Avg. Cost/Bene.: \$29,995 Top Diagnoses: 1. Hypertension 2. Diabetes 3. Abdomen/Pelvis	n = 97 (0.1% of N) Avg. Cost/Bene.: \$86,742 Top Diagnoses: 1. Hypertension 2. Heart Failure 3. Diabetes
ED (3-5)	n = 11,143 (15.5% of N) Avg. Cost/Bene.: \$1,397 Top Diagnoses: 1. Routine Child Check Up 2. Hypertension 3. Asthma	n = 1,304(1.8% of N) Avg. Cost/Bene.: \$11,183 Top Diagnoses: 1. Hypertension 2. Pregnancy-Related Visit 3. Asthma	n = 354 (0.5% of N) Avg. Cost/Bene.: \$28,823 Top Diagnoses: 1. Hypertension 2. Abdomen/Pelvis 3. Chest Pain	n = 56 (0.1% of N) Avg. Cost/Bene.: \$77,812 Top Diagnoses: 1. Hypertension 2. Chest Pain 3. Diabetes
ED (6+)	n = 2,299(3.2% of N) Avg. Cost/Bene.: \$3,573 Top Diagnoses: 1. Hypertension 2. Asthma 3. Upper Respiratory	n = 465 (0.7% of N) Avg. Cost/Bene.: \$13,866 Top Diagnoses: 1. Hypertension 2. Asthma 3. Abdomen/Pelvis	n = 169 (0.2% of N) Avg. Cost/Bene.: \$27,889 Top Diagnoses: 1. Hypertension 2. Alcohol Abuse 3. Abdomen/Pelvis	n = 92 (0.1% of N) Avg. Cost/Bene.: \$105,064 Top Diagnoses: 1. Hypertension 2. Chest Pain 3. Abdomen/Pelvis

Table 3. Number of Beneficiaries, Average Cost, and Top Three Diagnosis Codes in 16 Scenarios among MCO Beneficiaries in FY14.

FFS	IP (0)	IP (1)	IP (2-3)	IP (4+)
ED (0)	---	n = 8,853 (26.7% of N) Avg. Cost/Bene.: \$5,610 Top Diagnoses: 1. Hypertension 2. Diabetes 3. End-Stage Renal	n = 2,766 (8.4% of N) Avg. Cost/Bene.: \$13,162 Top Diagnoses: 1. Hypertension 2. End –Stage Renal 3. Diabetes	n = 446 (1.4% of N) Avg. Cost/Bene.: \$41,121 Top Diagnoses: 1. End –Stage Renal 2. Hypertension 3. Diabetes
ED (1-2)	n = 14,037 (42.2% of N) Avg. Cost/Bene.: \$243 Top Diagnoses: 1. Hypertension 2. Intellectual Disabilities 3. Depression	n = 1,535 (4.6% of N) Avg. Cost/Bene.: \$12,892 Top Diagnoses: 1. Hypertension 2. End-Stage Renal 3. Diabetes	n = 654 (2% of N) Avg. Cost/Bene.: \$35,736 Top Diagnoses: 1. End –Stage Renal 2. Hypertension 3. Diabetes	n = 216 (0.7% of N) Avg. Cost/Bene.: \$89,350 Top Diagnoses: 1. End –Stage Renal 2. Hypertension 3. Kidney Disease
ED (3-5)	n = 2,191 (6.6% of N) Avg. Cost/Bene.: \$633 Top Diagnoses: 1. Hypertension 2. Intellectual Disabilities 3. Diabetes	n = 557 (1.7% of N) Avg. Cost/Bene.: \$11,880 Top Diagnoses: 1. Hypertension 2. Diabetes 3. Schizophrenia	n = 355 (1.1% of N) Avg. Cost/Bene.: \$31,762 Top Diagnoses: 1. Hypertension 2. End –Stage Renal 3. Diabetes	n = 166 (0.5% of N) Avg. Cost/Bene.: \$79,137 Top Diagnoses: 1. End –Stage Renal 2. Hypertension 3. Kidney Disease
ED (6+)	n = 570 (1.7% of N) Avg. Cost/Bene.: \$1,546 Top Diagnoses: 1. Hypertension 2. Diabetes 3. Schizophrenia	n = 245 (0.7% of N) Avg. Cost/Bene.: \$12,684 Top Diagnoses: 1. Hypertension 2. Diabetes 3. Tobacco Use Disorder	n = 243 (0.7% of N) Avg. Cost/Bene.: \$32,897 Top Diagnoses: 1. Hypertension 2. Diabetes 3. End –Stage Renal	n = 250 (0.8% of N) Avg. Cost/Bene.: \$92,908 Top Diagnoses: 1. End –Stage Renal 2. Hypertension 3. Chest Pain

Table 4. Number of Beneficiaries, Average Cost, and Top Three Diagnosis Codes in 16 Scenarios among FFS Beneficiaries in FY14.

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