

Automating Output from Multiple Sources

Using PROC REPORT to make your life easier!

WAAAAAY easier!

SASKATCHEWAN
**HEALTH
QUALITY**
COUNCIL



MEASURING AND
REPORTING FOR
LEARNING AND
IMPROVEMENT



SASKATCHEWAN
HEALTH
QUALITY
COUNCIL



SK Health Quality Council

Vision

- Saskatchewan residents have the highest quality of health care.

Mission

- Improve the quality of care and the caring experience in Saskatchewan.

SK Health Quality Council

Government-funded independent agency

- Measure and report
 - Administrative data
- Promote improvement
- Engage partners

**BUILD A BETTER
HEALTH CARE SYSTEM**



The Project

Risk-adjustment for comorbidity

SASKATCHEWAN
**HEALTH
QUALITY**
COUNCIL



MEASURING AND
REPORTING FOR
LEARNING AND
IMPROVEMENT



Risk-adjustment for comorbidity

Comorbidity

Diseases that are present along with a specific condition.

Objective

Identify best way to adjust for burden of disease in statistical modeling.

Risk-adjustment for comorbidity

Diabetes

Hypertension

Osteoporosis

Lung disease

General population



Diabetic Cohort

MEASURES

1. Physician visit count
2. Diagnosis count
3. Charlson – HOSP
4. Charlson – HOSPMD
5. Elixhauser – HOSP
6. Elixhauser – HOSPMD
7. Drugs count
8. Chronic disease score

OUTCOMES

1. Heart attack
2. Stroke
3. LE amputation
4. End-stage renal disease
5. Hospitalization – any
6. Hospitalization – multiple
7. Hospitalization – DM
8. Death

Diabetic Cohort

Age + sex = OUTCOME

Age + sex + MD_VISITS = OUTCOME

Age + sex + DX_COUNT = OUTCOME

Age + sex + CHARLSON = OUTCOME

Age + sex + DRUG_CNT = OUTCOME

Age + sex + ELIXHAUSER = OUTCOME

The LOGISTIC Procedure

Model Information

Data Set DW_DW_0102_AGE75
Response Variable ABI_0204
Number of Response Levels 2
Model binary logit
Optimization Technique Fisher's scoring

Number of Observations Read 9918
Number of Observations Used 9914

Response Profile

Ordered Value	ABI_0204	Total Frequency
1	1	296
2	0	9618

Probability modeled is ABI_0204=1.

NOTE: 4 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	2663.789	2642.499
SC	2670.990	2685.709
-2 Log L	2661.789	2640.499

-2LL

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	81.2893	5	<.0001
Score	31.0830	5	<.0001
<u>Wald</u>	30.6516	5	<.0001

df

The MEANS Procedure

Analysis Variable: brier

N	Mean	Std Dev	Minimum	Maximum
9914	0.102868	0.1590263	0.000183476	0.9753754

Brier

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-2.4368	0.2203	122.3521	<.0001
<u>sex</u>	1	-0.4190	0.1189	12.4070	0.0004
<u>age_lo</u>	1	-0.1877	0.1801	1.5632	0.2112
<u>age_hi</u>	1	-0.3420	0.1695	4.0730	0.0436
<u>sex</u>	1	-0.4237	0.1204	12.3875	0.0004
<u>incDM</u>	1	-0.3380	0.2463	1.8831	0.1700

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
<u>sex</u>	0.658	0.521	0.830
<u>age_lo</u>	0.829	0.618	1.112
<u>age_hi</u>	0.710	0.510	0.990
<u>sex</u>	0.655	0.517	0.829
<u>incDM</u>	0.713	0.440	1.156

Association of Predicted Probabilities and Observed Responses

Percent Concordant	52.7	Somers' D	0.181
Percent Discordant	34.6	<u>Gama</u>	0.207
Percent Tied	12.7	<u>Tau-a</u>	0.010
Pairs	2846928	c	0.591

Obs	n	Obs	Est	95% Wald CI	95% Wald CI
1	9914	0.028868	0.028872	.000002543	-.002120647

C-statistic

ROC	Estimate	Std Error	95% Wald Confidence Intervals	
<u>brier</u>	0.5905	0.0167	0.5578	0.6233

95% CI

Contrast Coefficients
brier
Row1 1

Tests and 95% Confidence Intervals for Contrast Rows	Estimate	Std Error	Confidence Limits	Chi-square	Pr > ChiSq
<u>Row1</u>	0.5905	0.0167	0.5578 0.6233	1250.2704	<.0001

Contrast Test Results		
Chi-Square	DF	Pr > ChiSq
1250.2704	1	<.0001

Diabetic Cohort

MEASURES

1. Physician visit count
2. Diagnosis count
3. Charlson – HOSP
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6. Elixhauser – HOSPMD
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OUTCOMES

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7. Hospitalization – DM
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Diabetic Cohort

MEASURES

1. Physician visit count
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5. Elixhauser – HOSP
6. Elixhauser – HOSPMD
7. Drugs count
8. Chronic disease score

9

72

OUTCOMES

1. Heart attack
2. Stroke
3. LE amputation
4. End-stage renal disease
5. Hospitalization – any
6. Hospitalization – multiple
7. Hospitalization – DM
8. Death

8

Diabetic Cohort

3 cohorts

- 1997/98
- 2001/02
- 2001/02 – newly diagnosed DM only



Diabetic Cohort

3 cohorts

- 1997/98
- 2001/02
- 2001/02 – newly diagnosed DM only

$$3 \times 72 = 216$$

Diabetic Cohort

3 cohorts

- 1997/98
- 2001/02
- 2001/02 – newly diagnosed DM only

$$3 \times 72 = 216$$

Age stratified

- FULL
- 20-44
- 45-64
- 65-74
- 75+

Diabetic Cohort

3 cohorts

- 1997/98
- 2001/02
- 2001/02 – newly diagnosed DM only

$$3 \times 72 = 216$$

Age stratified

- FULL
- 20-44
- 45-64
- 65-74
- 75+

$$5 \times 216 = 1080$$

The LOGISTIC Procedure

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Wald	30.6516	5	<.0001

The MEANS Procedure

Analysis Variable: brier

N	Mean	Std Dev	Minimum	Maximum
9914	0.123683	0.1590263	0.000183476	0.9753764

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-2.4368	0.2203	122.3521	<.0001
<u>sex</u>	1	-0.4190	0.1189	12.4070	0.0004
<u>age_lo</u>	1	-0.1877	0.1801	1.5632	0.2112
<u>age_hi</u>	1	-0.3420	0.1695	4.0730	0.0436
<u>sex</u>	1	-0.4237	0.1204	12.3875	0.0004
<u>incDM</u>	1	-0.3380	0.2463	1.8831	0.1700

Odds Ratio Estimates

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<u>sex</u>	0.655	0.517	0.829
<u>incDM</u>	0.713	0.440	1.156

Association of Predicted Probabilities and Observed Responses

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Percent Tied	12.7	<u>Tau-a</u>	0.010
Pairs	2846928	c	0.591

Obs	n	Obs	Est	Lower	Upper
1	9914	0.028868	0.028872	.000002543	-.002120647

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ROC Curve Areas and 95% Confidence Intervals

ROC Area	Std Error	Confidence Limits	
<u>brier</u>	0.5905	0.0167	0.5578 0.6233

Contrast Coefficients

brier

Row1 1

Tests and 95% Confidence Intervals for Contrast Rows

Estimate	Std Error	Confidence Limits		Chi-square	Pr > ChiSq
<u>Row1</u> 0.5905	0.0167	0.5578	0.6233	1250.2704	<.0001

Contrast Test Results

Chi-Square	DF	Pr > ChiSq
1250.2704	1	<.0001

ODS TRACE ON;

```
ODS TRACE ON;
```

```
PROC LOGISTIC;
```

```
model ami_9800 = age sex;
```

```
run;
```

```
ODS TRACE OFF;
```

```
8581  
8582 ODS TRACE on;  
8583 proc logistic desc data=ss.dm_9798;  
8584     model ami_9800 = age_4564 age_6574 age_75 sex inc_low inc_hi geo diag_recency / outroc=or roceps=0;  
8585     output out=ami predicted=phat xbeta=base;  
8586     ods output association=assoc;  
8587 run;
```

Output Added:

Name: ModelInfo
Label: Model Information
Template: Stat.Logistic.ModelInfo
Path: Logistic.ModelInfo

Output Added:

Name: NObs
Label: Observations Summary
Template: Stat.Logistic.NObs
Path: Logistic.NObs

Output Added:

Name: ResponseProfile
Label: Response Profile
Template: Stat.Logistic.ResponseProfile
Path: Logistic.ResponseProfile

NOTE: PROC LOGISTIC is modeling the probability that AMI_9800=1.

Output Added:

Name: ConvergenceStatus
Label: Convergence Status
Template: Stat.Logistic.MConvergenceStatus
Path: Logistic.ConvergenceStatus

NOTE: Convergence criterion (GCONV=1E-8) satisfied.

Output Added:

Name: FitStatistics
Label: Fit Statistics
Template: Stat.Logistic.FitStatistics
Path: Logistic.FitStatistics

Output Added:

Name: GlobalTests
Label: Global Tests
Template: Stat.Logistic.GlobalTests
Path: Logistic.GlobalTests

4. 9798 - Results - ALL - FULL COHORT *

```
64 *=====;  
65 title 'FULL COHORT - AMI';  
66 title2 'Base model';  
67 * Fit model:  
68 ODS OUTPUT Logistic.FitStatistics=_fitstatistics;  
69 ODS OUTPUT Logistic.GlobalTests=_globaltests;  
70 ODS OUTPUT Logistic.ConvergenceStatus=_convergencestatus;
```

```
* Main output dataset;  
data ami_base_9798 (keep = outcome model col1 col2 col3 reason);  
retain outcome model col1 col2 col3 reason;  
merge _areastab _brier _globaltests _fitstatistics _convergencestatus;  
by outcome;
```

VIEWTABLE: Ss.Results_9798_cohortfull

	outcome	model	col1	col2	col3	n
1	AMI	Base model	65.2 (63.3, 67.1)	0.021	5895.4 (8)	Convergence criterion (GCONV=1E-8) satisfied.
2	AMI	MD visit count	66.1 (64.2, 68.1)	0.021	5876.1 (12)	Convergence criterion (GCONV=1E-8) satisfied.
3	AMI	Diagnoses count	66.2 (64.3, 68.1)	0.021	5873.5 (11)	Convergence criterion (GCONV=1E-8) satisfied.
4	AMI	Charlson - HOSP	66.7 (64.7, 68.6)	0.021	5865.7 (11)	Convergence criterion (GCONV=1E-8) satisfied.
5	AMI	Charlson - HOSPM	66.4 (64.5, 68.3)	0.021	5872.9 (11)	Convergence criterion (GCONV=1E-8) satisfied.
6	AMI	Elixhauser - HOSP	66.5 (64.6, 68.5)	0.021	5860.1 (13)	Convergence criterion (GCONV=1E-8) satisfied.
7	AMI	Elixhauser - HOSPM	66.9 (65.0, 68.9)	0.021	5850.1 (16)	Convergence criterion (GCONV=1E-8) satisfied.
8	AMI	Drug count	67.1 (65.2, 69.1)	0.021	5856.8 (11)	Convergence criterion (GCONV=1E-8) satisfied.
9	AMI	Chronic Disease Score	67.0 (65.0, 68.9)	0.021	5859.5 (12)	Convergence criterion (GCONV=1E-8) satisfied.
10	Stroke	Base model	69.5 (67.6, 71.5)	0.019	5330.0 (8)	Convergence criterion (GCONV=1E-8) satisfied.
11	Stroke	MD visit count	70.3 (68.4, 72.2)	0.019	5311.6 (12)	Convergence criterion (GCONV=1E-8) satisfied.
12	Stroke	Diagnoses count	71.1 (69.2, 73.0)	0.019	5291.7 (11)	Convergence criterion (GCONV=1E-8) satisfied.
13	Stroke	Charlson - HOSP	70.7 (68.8, 72.6)	0.019	5296.8 (11)	Convergence criterion (GCONV=1E-8) satisfied.
14	Stroke	Charlson - HOSPM	71.2 (69.4, 73.1)	0.019	5284.5 (11)	Convergence criterion (GCONV=1E-8) satisfied.
15	Stroke	Elixhauser - HOSP	70.8 (68.9, 72.7)	0.019	5294.8 (14)	Convergence criterion (GCONV=1E-8) satisfied.
16	Stroke	Elixhauser - HOSPM	71.5 (69.5, 73.4)	0.019	5283.5 (20)	Convergence criterion (GCONV=1E-8) satisfied.
17	Stroke	Drug count	70.4 (68.4, 72.3)	0.019	5308.6 (11)	Convergence criterion (GCONV=1E-8) satisfied.
18	Stroke	Chronic Disease Score	70.8 (68.9, 72.7)	0.019	5293.7 (12)	Convergence criterion (GCONV=1E-8) satisfied.
19	LEA	Base model	64.8 (61.8, 67.7)	0.010	3072.4 (8)	Convergence criterion (GCONV=1E-8) satisfied.
20	LEA	MD visit count	72.0 (69.1, 74.9)	0.009	2974.4 (12)	Convergence criterion (GCONV=1E-8) satisfied.
21	LEA	Diagnoses count	71.3 (68.5, 74.2)	0.009	2993.9 (11)	Convergence criterion (GCONV=1E-8) satisfied.
22	LEA	Charlson - HOSP	74.1 (71.2, 77.1)	0.009	2919.6 (11)	Convergence criterion (GCONV=1E-8) satisfied.
23	LEA	Charlson - HOSPM	73.8 (70.8, 76.7)	0.009	2941.8 (11)	Convergence criterion (GCONV=1E-8) satisfied.
24	LEA	Elixhauser - HOSP	76.2 (73.1, 79.2)	0.009	2788.2 (14)	Convergence criterion (GCONV=1E-8) satisfied.
25	LEA	Elixhauser - HOSPM	77.8 (74.8, 80.7)	0.009	2766.2 (16)	Convergence criterion (GCONV=1E-8) satisfied.
26	LEA	Drug count	69.4 (66.7, 72.2)	0.010	3019.3 (11)	Convergence criterion (GCONV=1E-8) satisfied.
27	LEA	Chronic Disease Score	68.7 (66.0, 71.4)	0.010	3029.6 (12)	Convergence criterion (GCONV=1E-8) satisfied.
28	ESRD	Base model	66.1 (61.7, 70.6)	0.004	1556.1 (8)	Convergence criterion (GCONV=1E-8) satisfied.
29	ESRD	MD visit count	73.4 (68.9, 77.9)	0.004	1501.8 (12)	Convergence criterion (GCONV=1E-8) satisfied.
30	ESRD	Diagnoses count	73.5 (69.2, 77.8)	0.004	1508.6 (11)	Convergence criterion (GCONV=1E-8) satisfied.

PROC REPORT

```
proc report data=deneme1 nowindows split='*'  
  style(report)      =[font=(Arial, 12pt)]  
  style(column)     =[font=(Arial, 12pt) cellwidth=1in cellheight=0.25in]  
  style(header)     =[font=(Arial, 12pt) foreground=white background=orange]  
  style(summary)    =[font=(Arial, 12pt)]  
  contents="";  
  
  columns outcome model col1 col2 col3;  
  
  define outcome    / group 'Variable'           order=internal left;  
  define model      / group 'Description'       order=internal left];  
  define col1       / group 'C-statistic (95% CI)' center;  
  define col2       / group 'Brier score'       center;  
  define col3       / group '-2 LL (dof)'       center;  
  
run;
```

VIEWTABLE: Ss.Results_9798_cohortfull

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6	AMI	Elixhauser - HOSP	66.5 (64.6, 68.5)	0.021	5860.1 (13)	Convergence criterion (GCONV=1E-8) satisfied.
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30	ESRD	Diagnoses count	73.5 (69.2, 77.8)	0.004	1508.6 (11)	Convergence criterion (GCONV=1E-8) satisfied.

Diabetic Cohort 1997/98

Results - Full Cohort (n = 29,058)

Outcome: Acute Myocardial Infarction

Variable	Description	C-statistic (95% CI)	Brier score	-2 LL (dof)
AMI	Base model	65.2 (63.3, 67.1)	0.021	5895.4 (8)
	MD visit count	66.1 (64.2, 68.1)	0.021	5876.1 (12)
	Diagnoses count	66.2 (64.3, 68.1)	0.021	5873.5 (11)
	Charlson - HOSP	66.7 (64.7, 68.6)	0.021	5865.7 (11)
	Charlson - HOSPMD	66.4 (64.5, 68.3)	0.021	5872.9 (11)
	Elixhauser - HOSP	66.5 (64.6, 68.5)	0.021	5860.1 (13)
	Elixhauser - HOSPMD	66.9 (65.0, 68.9)	0.021	5850.1 (16)
	Drug count	67.1 (65.2, 69.1)	0.021	5856.8 (11)
	Chronic Disease Score	67.0 (65.0, 68.9)	0.021	5859.5 (12)

The base model includes age, sex, income, geography, and diagnosis recency.

~ Age in 4 categories: 20-44 (ref), 45-64, 65-75, 75+

~ Sex: male (ref), female

~ Income: low, middle (ref), high

~ Geography: urban (ref), rural

~ Diagnosis recency: prevalent (ref), incident



	var_cont	range	_0	_1	_2	_3	_4	
1	Age	20-103	62.5 (15.0)	36.2 (6.3)	55.5 (5.6)	69.5 (2.8)	80.6 (4.6)	meanSD
2	MD count	0-272	16.8 (16.5)	14.1 (16.5)	15.6 (17.1)	17.2 (15.8)	19.6 (15.7)	meanSD
3	Diagnoses	0- 47	6.6 (4.8)	6.0 (4.8)	6.2 (4.8)	6.7 (4.7)	7.4 (4.8)	meanSD
4	Charlson-HOSP	0- 11	0.4 (1.0)	0.2 (0.6)	0.3 (0.8)	0.4 (1.0)	0.6 (1.2)	meanSD
5	Charlson-HOSPM	0- 14	0.8 (1.4)	0.4 (0.8)	0.6 (1.2)	0.9 (1.5)	1.2 (1.7)	meanSD
6	Drug count	0- 26	4.7 (3.7)	3.1 (3.2)	4.2 (3.5)	5.3 (3.6)	5.9 (3.8)	meanSD
7	CDS	0- 19	4.3 (3.6)	2.5 (3.1)	3.9 (3.5)	5.0 (3.6)	5.3 (3.6)	meanSD

Diabetic Cohort 1997/98

Table 2: Descriptives - Continuous Variables

Variable	Range	Full cohort (n=29,058)	Age 20 to 44 (n=3,901)	Age 45 to 64 (n=10,659)	Age 65 to 74 (n=7,757)	Age 75+ (n=6,741)
Age	20-103	62.5 (15.0)	36.2 (6.3)	55.5 (5.6)	69.5 (2.8)	80.6 (4.6)
MD count	0-272	16.8 (16.5)	14.1 (16.5)	15.6 (17.1)	17.2 (15.8)	19.6 (15.7)
Diagnoses	0- 47	6.6 (4.8)	6.0 (4.8)	6.2 (4.8)	6.7 (4.7)	7.4 (4.8)
Charlson-HOSP	0- 11	0.4 (1.0)	0.2 (0.6)	0.3 (0.8)	0.4 (1.0)	0.6 (1.2)
Charlson-HOSPMD	0- 14	0.8 (1.4)	0.4 (0.8)	0.6 (1.2)	0.9 (1.5)	1.2 (1.7)
Drug count	0- 26	4.7 (3.7)	3.1 (3.2)	4.2 (3.5)	5.3 (3.6)	5.9 (3.8)
CDS	0- 19	4.3 (3.6)	2.5 (3.1)	3.9 (3.5)	5.0 (3.6)	5.3 (3.6)

	variable	description	_0	_1	_2	_3	_4
1	Sex	Male	15144 (52.1%)	1869 (47.9%)	5955 (55.9%)	4186 (54.0%)	3134 (46.5%)
2	Sex	Female	13914 (47.9%)	2032 (52.1%)	4704 (44.1%)	3571 (46.0%)	3607 (53.5%)
3	Geography	Urban	14828 (51.0%)	2274 (58.3%)	5652 (53.0%)	3779 (48.7%)	3123 (46.3%)
4	Geography	Rural	14192 (48.8%)	1622 (41.6%)	4990 (46.8%)	3967 (51.1%)	3613 (53.6%)
5	Geography	Missing	38 (0.1%)	<6	17 (0.2%)	11 (0.1%)	<6
6	Income	Lowest	7882 (27.1%)	1276 (32.7%)	2781 (26.1%)	1998 (25.8%)	1827 (27.1%)
7	Income	Low	6795 (23.4%)	860 (22.0%)	2470 (23.2%)	1803 (23.2%)	1662 (24.7%)
8	Income	Middle	4950 (17.0%)	602 (15.4%)	1732 (16.2%)	1327 (17.1%)	1289 (19.1%)
9	Income	High	4137 (14.2%)	526 (13.5%)	1577 (14.8%)	1168 (15.1%)	866 (12.8%)
10	Income	Highest	4911 (16.9%)	600 (15.4%)	1943 (18.2%)	1348 (17.4%)	1020 (15.1%)
11	Income	Missing	383 (1.3%)	37 (0.9%)	156 (1.5%)	113 (1.5%)	77 (1.1%)
12	Dx recency	Prevalent	22269 (76.6%)	2827 (72.5%)	8067 (75.7%)	6073 (78.3%)	5302 (78.7%)
13	Dx recency	Incident	6789 (23.4%)	1074 (27.5%)	2592 (24.3%)	1684 (21.7%)	1439 (21.3%)
14	Outcomes	AMI	632 (2.2%)	18 (0.5%)	170 (1.6%)	224 (2.9%)	220 (3.3%)
15	Outcomes	Stroke	570 (2.0%)	11 (0.3%)	102 (1.0%)	206 (2.7%)	251 (3.7%)
16	Outcomes	LEA	280 (1.0%)	10 (0.3%)	89 (0.8%)	94 (1.2%)	87 (1.3%)
17	Outcomes	ESRD-prev	177 (0.8%)	42 (1.8%)	85 (1.1%)	39 (0.6%)	11 (0.2%)
18	Outcomes	ESRD-inc	124 (0.4%)	26 (0.7%)	54 (0.5%)	33 (0.4%)	11 (0.2%)
19	Outcomes	HOSP any	14819 (51.0%)	1338 (34.3%)	4656 (43.7%)	4465 (57.6%)	4360 (64.7%)
20	Outcomes	HOSP mult	8466 (29.1%)	638 (16.4%)	2482 (23.3%)	2686 (34.6%)	2660 (39.5%)
21	Outcomes	HOSP DM	7087 (24.4%)	726 (18.6%)	2266 (21.3%)	2061 (26.6%)	2034 (30.2%)
22	Outcomes	Death	2722 (9.4%)	35 (0.9%)	429 (4.0%)	777 (10.0%)	1481 (22.0%)
23	MD visits	<5	3737 (12.9%)	809 (20.7%)	1623 (15.2%)	815 (10.5%)	490 (7.3%)
24	MD visits	5 to 9	7238 (24.9%)	1103 (28.3%)	2920 (27.4%)	1872 (24.1%)	1343 (19.9%)
25	MD visits	10 to 19	9750 (33.6%)	1186 (30.4%)	3501 (32.8%)	2740 (35.3%)	2323 (34.5%)
26	MD visits	20 to 29	4412 (15.2%)	429 (11.0%)	1415 (13.3%)	1244 (16.0%)	1324 (19.6%)
27	MD visits	30+	3921 (13.5%)	374 (9.6%)	1200 (11.3%)	1086 (14.0%)	1261 (18.7%)
28	Diagnoses	<3	5149 (17.7%)	910 (23.3%)	2177 (20.4%)	1251 (16.1%)	811 (12.0%)
29	Diagnoses	3 to 5	9600 (33.0%)	1306 (33.5%)	3691 (34.6%)	2588 (33.4%)	2015 (29.9%)
30	Diagnoses	6 to 9	7984 (27.5%)	988 (25.3%)	2763 (25.9%)	2154 (27.8%)	2079 (30.8%)
31	Diagnoses	10+	6325 (21.8%)	697 (17.9%)	2028 (19.0%)	1764 (22.7%)	1836 (27.2%)
32	CH-HOSP	0	22864 (78.7%)	3296 (84.5%)	8873 (83.2%)	5994 (77.3%)	4701 (69.7%)
33	CH-HOSP	1	3538 (12.2%)	497 (12.7%)	1089 (10.2%)	941 (12.1%)	1011 (15.0%)
34	CH-HOSP	2	1525 (5.2%)	65 (1.7%)	404 (3.8%)	450 (5.8%)	606 (9.0%)
35	CH-HOSP	3+	1131 (3.9%)	43 (1.1%)	293 (2.7%)	372 (4.8%)	423 (6.3%)
36	CH-HOSPMD	0	17701 (60.9%)	2816 (72.2%)	7261 (68.1%)	4461 (57.5%)	3163 (46.9%)
37	CH-HOSPMD	1	5957 (20.5%)	808 (20.7%)	2017 (18.9%)	1610 (20.8%)	1522 (22.6%)
38	CH-HOSPMD	2	2908 (10.0%)	189 (4.8%)	784 (7.4%)	905 (11.7%)	1030 (15.3%)

Diabetic Cohort 1997/98

Table 1: Descriptives - Categorical Variables

Variable	Description	Full cohort (n=29,058)	Age 20 to 44 (n=3,901)	Age 45 to 64 (n=10,659)	Age 65 to 74 (n=7,757)	Age 75+ (n=6,741)
Sex	Male	15144 (52.1%)	1869 (47.9%)	5955 (55.9%)	4186 (54.0%)	3134 (46.5%)
	Female	13914 (47.9%)	2032 (52.1%)	4704 (44.1%)	3571 (46.0%)	3607 (53.5%)
Geography	Urban	14828 (51.0%)	2274 (58.3%)	5652 (53.0%)	3779 (48.7%)	3123 (46.3%)
	Rural	14192 (48.8%)	1622 (41.6%)	4990 (46.8%)	3967 (51.1%)	3613 (53.6%)
	Missing	38 (0.1%)	<6	17 (0.2%)	11 (0.1%)	<6
Income	Missing	383 (1.3%)	37 (0.9%)	156 (1.5%)	113 (1.5%)	77 (1.1%)
	Lowest	7882 (27.1%)	1276 (32.7%)	2781 (26.1%)	1998 (25.8%)	1827 (27.1%)
	Low	6795 (23.4%)	860 (22.0%)	2470 (23.2%)	1803 (23.2%)	1662 (24.7%)
	Middle	4950 (17.0%)	602 (15.4%)	1732 (16.2%)	1327 (17.1%)	1289 (19.1%)
	High	4137 (14.2%)	526 (13.5%)	1577 (14.8%)	1168 (15.1%)	866 (12.8%)
	Highest	4911 (16.9%)	600 (15.4%)	1943 (18.2%)	1348 (17.4%)	1020 (15.1%)
Dx recency	Prevalent	22269 (76.6%)	2827 (72.5%)	8067 (75.7%)	6073 (78.3%)	5302 (78.7%)
	Incident	6789 (23.4%)	1074 (27.5%)	2592 (24.3%)	1684 (21.7%)	1439 (21.3%)
Outcomes	AMI	632 (2.2%)	18 (0.5%)	170 (1.6%)	224 (2.9%)	220 (3.3%)
	Stroke	570 (2.0%)	11 (0.3%)	102 (1.0%)	206 (2.7%)	251 (3.7%)
	LEA	280 (1.0%)	10 (0.3%)	89 (0.8%)	94 (1.2%)	87 (1.3%)
	ESRD-prev	177 (0.8%)	42 (1.8%)	85 (1.1%)	39 (0.6%)	11 (0.2%)
	ESRD-inc	124 (0.4%)	26 (0.7%)	54 (0.5%)	33 (0.4%)	11 (0.2%)
	HOSP any	14819 (51.0%)	1338 (34.3%)	4656 (43.7%)	4465 (57.6%)	4360 (64.7%)
	HOSP mult	8466 (29.1%)	638 (16.4%)	2482 (23.3%)	2686 (34.6%)	2660 (39.5%)
	HOSP DM	7087 (24.4%)	726 (18.6%)	2266 (21.3%)	2061 (26.6%)	2034 (30.2%)
	Death	2722 (9.4%)	35 (0.9%)	429 (4.0%)	777 (10.0%)	1481 (22.0%)

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