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# Determinants of Inpatient Expenditure for Chronic Kidney Failure Patients in Guangzhou, China

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# Outline

- Introduction
- Objectives
- Methodology
- Results
- Conclusions



# Introduction

- Information concerning the treatment costs of Chronic Kidney Failure (CKF) is scarce in China.
- Two health insurance schemes for urban population in China now.
  - UEBMI**: Urban **E**mployee Basic Medical Insurance
  - URBMI**: Urban **R**esident Basic Medical Insurance



# Objectives

- Investigate the direct medical costs for inpatient services of Chronic Kidney Failure
- Explore determinants of inpatient expenditure for Chronic Kidney Failure (CKF) patients in Guangzhou, China



# Methodology

- Data Sources: Reimbursement claim database cover entire enrollees of UEBMI and URBMI in Guangzhou.
- Chronic Kidney Failure patients in hospitals between 2010 January and 2012 December were all included.
- Total **5,823** hospitalization records were analyzed.





# Methodology

- Econometric Model
- Extended Estimating Equations (EEE) model  
(Extended Generalized Linear Model)
  - Factors associated with total inpatient expenses
- OLS model
  - Factors associated with % of out-of-pocket expenses for inpatient treatment of CKF



# Results: Descriptive Statistics

**Table 1. Social demographics, clinical characteristics and healthcare utilization of hospitalized patients with chronic kidney failure**

	All cases	UEBMI cases	URBMI cases
Number of cases	5823	5234	589
Social demographics			
Gender: Male (%)	55.18	56.06	47.02
Age (Mean±SD, years)	60.24±17.49	60.02±17.33	62.18±18.75
<60 (%)	43.72	44.80	34.13
60-70 (%)	21.26	20.42	28.69
>70 (%)	35.02	34.77	37.18
Clinical characteristics (%)			
Renal Compensation (ICD10: N18.003)	16.02	16.26	13.92
Azotemia (ICD10: N18.001)	4.21	4.11	5.09
Uremia (ICD10: N18.002)	40.34	39.99	43.46
Unspecified Uremia (ICD10: N19.02)	39.43	39.64	37.52
Hospital level (%)			
Primary	0.81	0.71	1.70
Secondary	16.92	16.39	21.56
Tertiary	82.28	82.9	76.74
Length of stay (Mean±SD, days)	14.69±12.51	14.76±12.46	14.04±12.96
Referred from other hospital (%)	1.41	1.45	1.02
Readmission in 15 days (%)	2.18	2.10	2.89
ICU admission (%)	0.55	0.61	0.00
Transplant surgery (%)	2.03	2.25	0.00
Year 2010	978	891	87
Year 2011	1978	1782	196
Year 2012	2867	2561	306



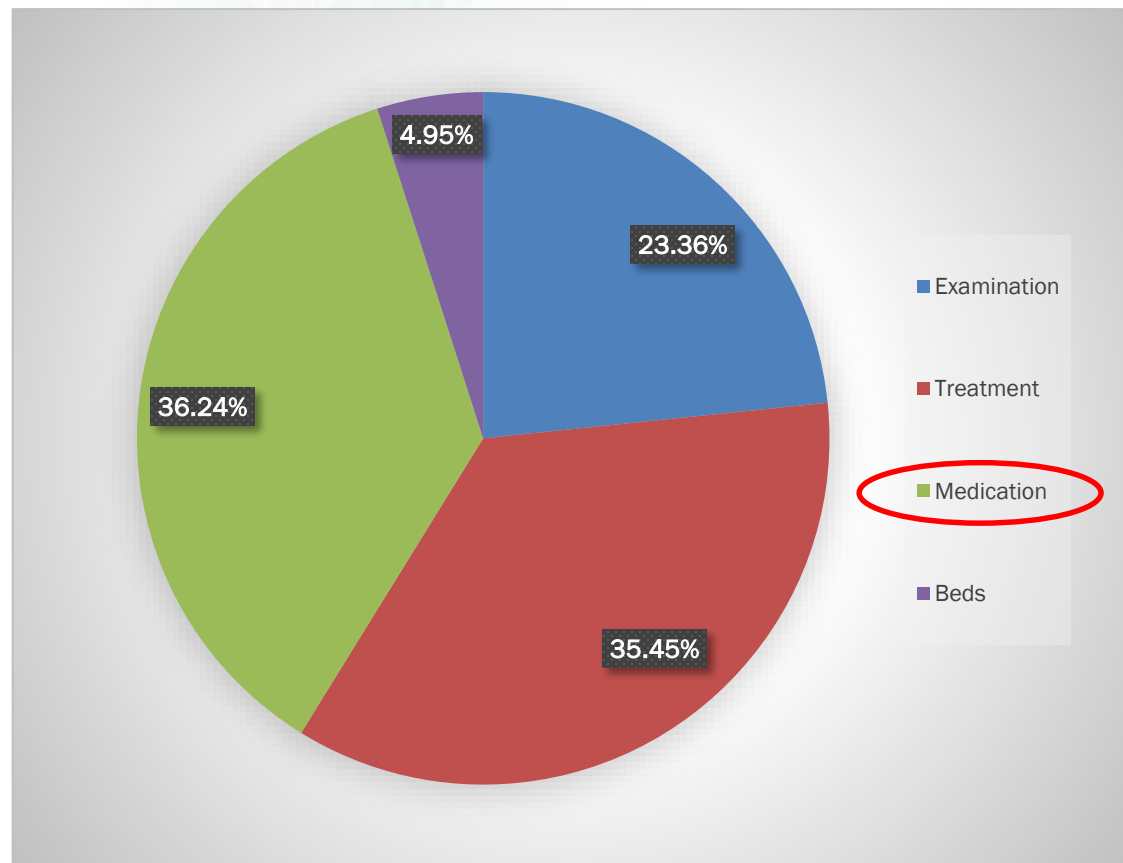
# Results: Descriptive Statistics

**Table 2. Hospitalization financial costs of patients with chronic kidney failure**

	All cases	UEBMI cases	URBMI cases
Number of cases	5823	5234	589
All cases			
<b>Medical expenditure per visit (Mean±SD, yuan)</b>	15790.29±22475.98	<b>15858.87±22731.50</b>	<b>15180.87± 20070.17</b>
Medical expenditure per visit (Median, yuan)	9893.17	9924.63	9582.79
Medication (%)	36.34	36.24	37.29
<b>Out-of-pocket (%)</b>	24.55	<b>22.05</b>	<b>46.70</b>
Renal Compensation (ICD10: N18.003)			
Medical expenditure per visit (Mean±SD, yuan)	14064.15±23316.26	14168.28±24113.9	12983.55±12331.21
Medical expenditure per visit (Median, yuan)	9983.92	9909.87	10638.90
Medication (%)	40.46	40.72	37.67
Out-of-pocket (%)	25.94	23.73	48.92
Azotemia (ICD10: N18.001)			
Medical expenditure per visit (Mean±SD, yuan)	11000.88±10261.92	11081.97±10340.56	10419.75±9827.682
Medical expenditure per visit (Median, yuan)	9154.26	9094.04	9283.09
Medication (%)	45.59	45.14	48.8
Out-of-pocket (%)	27.91	25.27	46.81
Uremia (ICD10: N18.002)			
Medical expenditure per visit (Mean±SD, yuan)	16487.79±21217.77	16603.70±21357.65	15540.16±20052.24
Medical expenditure per visit (Median, yuan)	10293.54	10357.39	9509.14
Medication (%)	36.09	36.05	36.49
Out-of-pocket (%)	24.13	21.64	44.51
Unspecified Uremia (ICD10: N19 02)			
Medical expenditure per visit (Mean±SD, yuan)	16289.18±24177.57	16295.88±24290.32	16226.28±23144.95
Medical expenditure per visit (Median, yuan)	9483.95	9505.273	9428.94
Medication (%)	33.94	33.67	36.51
Out-of-pocket (%)	24.05	21.45	48.38

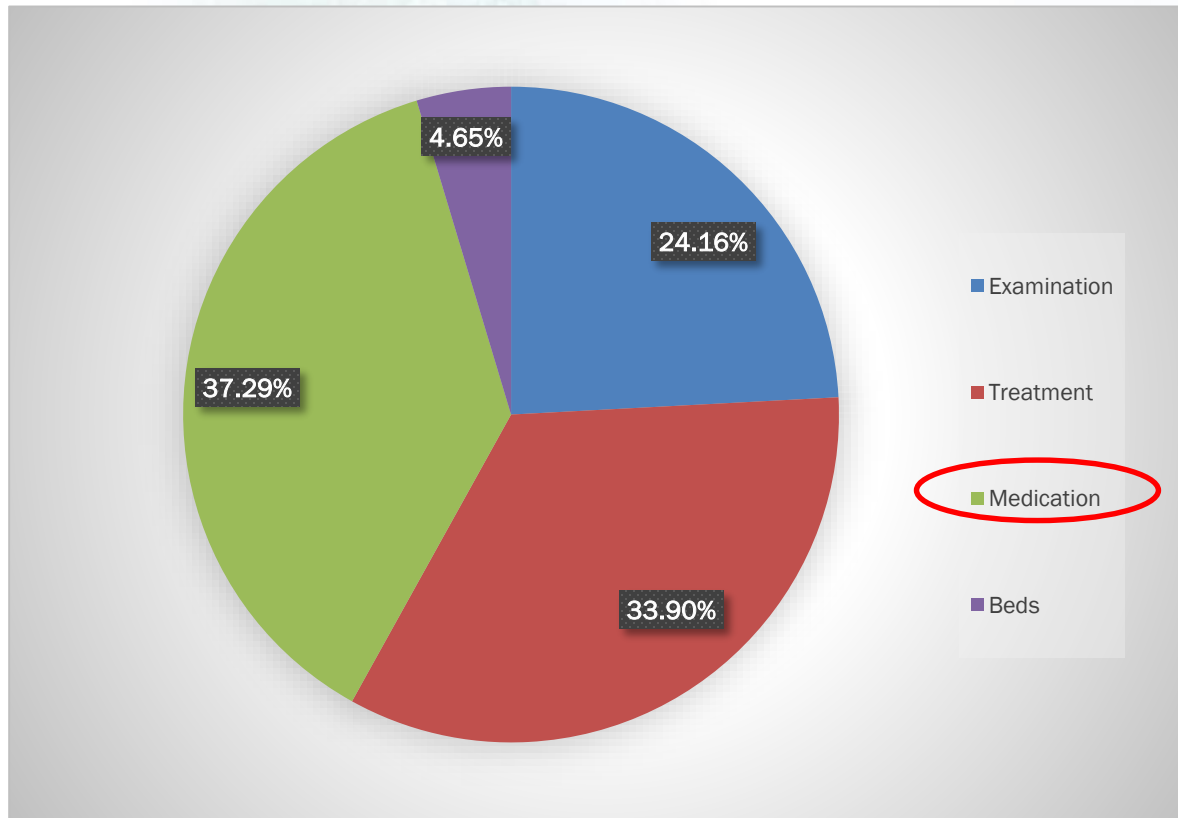


**Figure 1** The composition of total medical expenditure (UEBMI patients)





**Figure 2** The composition of total medical expenditure (URBMI patients)



# Results: EEE Model

**Table 3. Factors associated with total medical expenses per inpatient visit of chronic kidney failure (EEE model)**

	(1) All cases		(2) UEBMI cases		(3) URBMI cases				
	(N=5823)		(N=5234)		(N=589)				
	Coef.	Std. Err.	Marginal Effect	Coef.	Std. Err.	Marginal Effect			
Male	0.003	[0.011]	43.206	0.002	[0.011]	28.338	0.003	[0.026]	47.063
Age	0.002	[0.000]***	22.619	0.002	[0.000]***	24.272	<0.001	[0.001]	3.574
UEBMI	-0.046	[0.016]***	-674.441	--	--	--	--	--	--
Hospital level: primary	-0.426	[0.043]***	-5664.079	-0.420	[0.048]***	-5608.935	-0.388	[0.068]***	-5207.635
Hospital level: secondary	-0.221	[0.013]***	-3147.497	-0.218	[0.014]***	-3117.287	-0.234	[0.037]***	-3265.736
Referred from other hospital	0.170	[0.060]***	2576.261	0.179	[0.063]***	2737.515	0.067	[0.094]	976.338
Readmission in 15 days	-0.033	[0.053]	-488.120	-0.049	[0.053]	-719.033	0.046	[0.180]	666.302
ICU admission	2.434	[0.244]***	50704.410	2.420	[0.244]***	50763.370	--	--	--
Transplant surgery	1.219	[0.079]***	21890.430	1.220	[0.079]***	22031.040	--	--	--
Length of stay	0.058	[0.001]***	857.824	0.058	[0.001]***	853.681	0.062	[0.003]***	892.567
Renal Compensation (ICD10: N18.003)	-0.181	[0.018]***	-2567.823	-0.186	[0.019]***	-2634.201	-0.148	[0.040]***	-2064.094
Azotemia (ICD10: N18.001)	-0.050	[0.016]***	-735.735	-0.058	[0.017]***	-841.522	0.019	[0.046]	268.771
Unspecified Uremia (ICD10: N19 02)	0.038	[0.011]***	553.004	0.036	[0.012]***	535.297	0.023	[0.030]	326.745
Year 2011	-0.024	[0.016]	-357.498	-0.032	[0.018]*	-467.045	0.016	[0.032]	227.598
Year 2012	-0.026	[0.016]*	-386.841	-0.034	[0.017]*	-501.410	0.029	[0.036]	420.109
$\lambda$	0.642	[0.025]***		0.637	[0.027]***		0.725	[0.071]***	
$\theta_1$	0.327	[0.038]***		0.330	[0.042]***		0.292	[0.042]***	
$\theta_2$	2.120	[0.107]***		2.128	[0.117]***		2.144	[0.188]***	

Note: Standard errors in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. EEE - extended generalized linear model.

# Results: OLS Model

**Table 4. Factors associated with % of out-of-pocket expenses for inpatient treatment of chronic kidney failure (OLS model)**

	(1) All cases		(2) UEBMI cases		(3) URBMI cases	
	(N=5823)		(N=5234)		(N=589)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Male	0.010	[0.003]***	0.015	[0.003]***	-0.020	[0.011]*
Age	-0.003	[0.000]***	-0.003	[0.000]***	0.001	[0.000]**
UEBMI	-0.255	[0.005]***	--	--	--	--
Hospital level: primary	-0.023	[0.016]	0.002	[0.018]	-0.159	[0.040]***
Hospital level: secondary	-0.019	[0.004]***	-0.011	[0.004]***	-0.083	[0.013]***
Referred from other hospital	-0.036	[0.012]***	-0.022	[0.012]*	-0.188	[0.051]***
Readmission in 15 days	-0.017	[0.010]*	-0.016	[0.010]	-0.014	[0.031]
ICU admission	0.006	[0.020]	0.007	[0.019]	--	--
Transplant surgery	0.011	[0.011]	<0.001	[0.010]	--	--
Length of stay	-0.002	[0.000]***	-0.002	[0.000]***	-0.002	[0.000]***
Renal Compensation (ICD10: N18.003)	0.044	[0.008]***	0.047	[0.008]***	0.016	[0.024]
Azotemia (ICD10: N18.001)	0.029	[0.004]***	0.031	[0.004]***	0.026	[0.016]
Unspecified Uremia (ICD10: N19 02)	0.002	[0.003]	<-0.001	[0.003]	0.034	[0.012]***
Year 2011	-0.041	[0.004]***	-0.044	[0.004]***	-0.045	[0.016]***
Year 2012	-0.054	[0.005]***	-0.056	[0.004]***	-0.067	[0.015]***
R-squared	0.432		0.287		0.201	

Note: Standard errors in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. OLS - ordinary least square.



# Conclusions

- Both demand and supply side factors were significantly associated with the direct inpatient services costs of Chronic Kidney Failure.
- The establishment of urban medical insurance schemes has reduced some financial burden for the insured urban population.



# Conclusions

However,

- Medication spending remains high.  
(More than 35% of total inpatient expenditure)
- The insured urban enrollees are NOT completely free from the risk of large out-of-pocket payments.  
(Especially for URBMI enrollees)





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Thank you very much!

