

# A comparison of cost distribution during the transition to ESRD in the US & Taiwan

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## Introduction

- The burden of ESRD in the US and in Taiwan is among the heaviest in the world, according to USRDS reports.
- Incident ESRD patients in the US usually generate substantial medical costs pre- and postdialysis initiation; hospitalization is the major component of the sharp increase in costs around the time of dialysis initiation (St. Peter et al, 2004).
- Understanding medical costs during the transition from CKD to ESRD is important for appropriate interpretation of pre-ESRD care and outcomes of incident dialysis patients (Wei et al, 2010).
- The transition costs to ESRD have not been well studied in Taiwanese incident ESRD patients.
- The objective of this study was to compare the distribution of costs during the 6 months before and 6 months after dialysis initiation for older incident ESRD patients in the US Medicare and Taiwan National Health Insurance (NHI) populations.

## Methods

- Included in the analysis were incident ESRD patients, identified in USRDS ESRD data, who initiated dialysis in 2007, were age 66 and older at initiation, and had Medicare as their primary payer for at least one year before initiation (n=34,006).
- Based on the 1% random sample of the entire NHI population in Taiwan, a cohort of Taiwanese incident ESRD patients age 66 and older, who initiated dialysis between 2000 and 2008 was established for comparison (n=287).
- Taiwan's NHI program uses the same billing format as US Medicare claims data, which provide a beneficial structure for comparison.
- Comorbid conditions were derived from Medicare and NHI claims 1 year prior to dialysis initiation.
- Total costs of Medicare Part A and Part B services and total costs of Taiwanese NHI outpatient and inpatient services were calculated by per-patient-per-month (PPPM).
- Hospitalization costs were also calculated by PPPM for Medicare and NHI incident ESRD patients.

## Results

- Compared with Medicare incident ESRD patients, Taiwanese patients were significantly younger, and a higher proportion were women ( $P < 0.001$ ).
- Except for CKD, DM, and cancer, prevalence of each comorbid condition differed in the two populations ( $P < 0.05$ ); Medicare patients had more comorbid conditions (4.9 vs. 3.6).
- 75% of US Medicare and 80% of Taiwan NHI patients were hospitalized in the month of dialysis initiation (Figure 1;  $P < 0.05$ ); significantly lower percentages of Medicare than Taiwanese patients were hospitalized in the 6 months pre-dialysis ( $P < 0.05$ ).
- Average length of stay was longer for Taiwan NHI hospitalized incident patients (Figure 2), but not for all study incident ESRD patients as a whole (Figure 3).
- PPPM hospitalization costs were highest in the month of dialysis initiation in both study cohorts.
- Total transition costs for Medicare patients peaked in the first dialysis month; highest total PPPM cost for Taiwan NHI patients was in the second month post-initiation.

Table 1

	US Medicare (N=34006)	Taiwan NHI (N=287)	P-Value
<b>Patient Characteristics of US Medicare and Taiwan NHI Incident ESRD Patients</b>			
Age (mean ±SD)	74.6 ± 7	75.6 ± 10	0.000
46-74 (%)	42.3	51.2	0.0007
75-84	44.4	42.5	
85+	13.2	6.3	
<b>Gender (%)</b>			
Male	53.9	46.0	0.0074
Female	46.1	54.0	
<b>Comorbidity (%)</b>			
Hypertension	80.2	66.9	0.0001
CKD	79.7	80.8	0.6355
Anemia	66.4	32.8	0.0001
Diabetes	51.2	46.7	0.1315
CHF	42.1	23.3	0.0001
ASHD	40.1	20.9	0.0001
Dysrhythmia	30.5	11.2	0.0001
Cardiac (other)	25.2	7.3	0.0001
PVD	23.1	6.27	0.0001
COPD	20.8	10.5	0.0001
CVA/TIA	11.6	16.4	0.0124
Cancer	11.3	11.2	0.9333
GI	7.7	23.3	0.0001
Liver disease	2.2	4.9	0.0027
Average No of comorbidities	4.9	3.6	0.0001

Figure 1  
Comparison of hospitalization % during the transition to ESRD

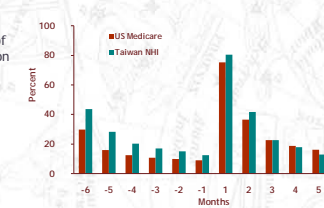


Figure 2  
Comparison of average length of stay (ALOS), hospitalized patients only

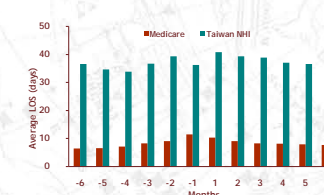


Figure 3  
Comparison of average length of stay (ALOS), all study incident patients

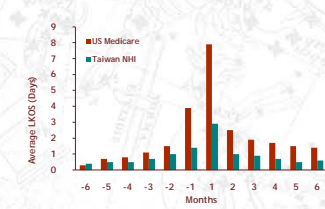


Figure 4  
Per person per month (PPPM) hospitalization expenditures during the transition to ESRD

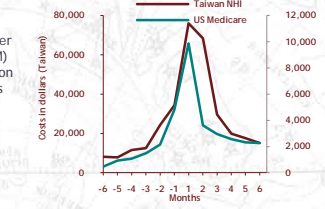
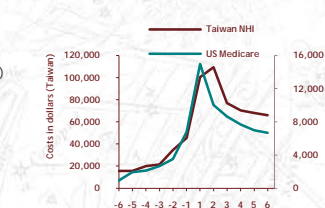


Figure 5  
Overall per person per month (PPPM) expenditures during the transition to ESRD



## Conclusions

- PPPM hospitalization costs began to increase in the last 6 months before dialysis initiation and reached a peak in the first month of dialysis initiation in both study cohorts.
- The time lags between peaks of PPPM total cost for the US Medicare and Taiwanese incident ESRD patients may exist because 48% of Taiwanese ESRD patients were continuously hospitalized in the second month after dialysis initiation, and average length of stay was almost four times longer for Taiwanese hospitalized patients than for Medicare patients (40.8 days vs. 10.3 days).
- Future study is needed to compare differences in use of nephrology care, hospitalization management policy, and other health system factors that might explain why the dialysis initiation period seems to be longer, in terms of cost distribution, for Taiwanese than for US incident ESRD patients.
- The inclusion criteria limiting entry to incident ESRD patients age 66 and older limits the generalizability of the study.