

# Economic burden of adverse events associated with erythropoiesis-stimulating agents for the treatment of anemia among chronic kidney disease patients in Taiwan



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## INTRODUCTION

- ◆ Anemia is one of the serious complications of chronic kidney disease (CKD) and is often associated with reduced quality of life and increased cardiovascular events, hospitalizations and mortality.
- ◆ Erythropoiesis-stimulating agent (ESA) is effective in treating anemia of CKD, improving symptoms and reducing the need for red blood cell (RBC) transfusions.
- ◆ However, ESA therapy in anemia of CKD has unfavorable risks for adverse events (AEs), including hypertension, thrombosis and probably death, which incur a substantial economic burden both individually and societally.
- ◆ Current studies have yet to study the economic burden of ESA-related AEs in patients with anemia of CKD, especially under a single-payer, mandatory, and high coverage rate of insurance program run in Taiwan.

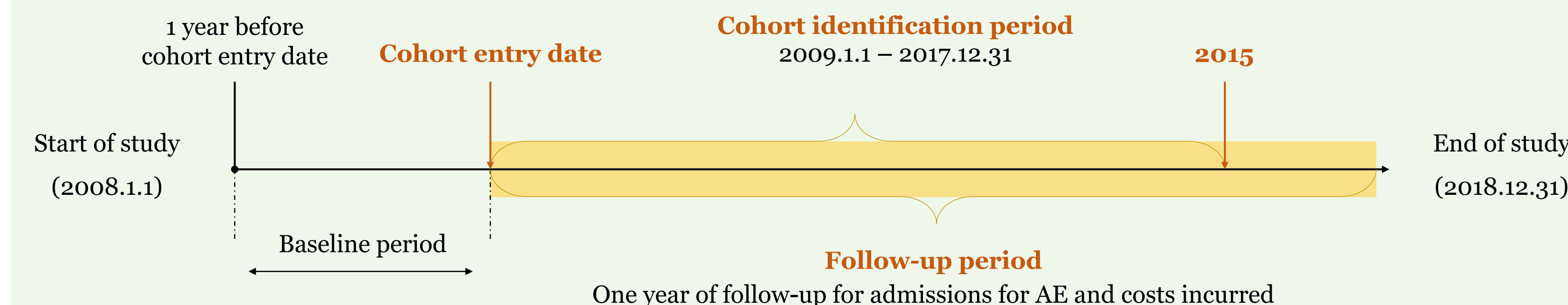
## OBJECTIVES

- ◆ This study aims to estimate the economic burden (direct medical cost) of AEs associated with ESA therapy among patients with anemia of CKD from Taiwan's healthcare perspective.

## METHOD

- ◆ Data source: National Health Insurance Research Database (NHIRD)
- ◆ Study design: a nationwide cohort study
- ◆ Study population: newly diagnosed incident CKD patients who use ESA further were categorized into 3 subgroups based on dialysis status
  - ❑ Non-dialysis (NDD) group
  - ❑ Dialysis dependent (DD) group
  - ❑ Incident dialysis (ID) group
- ◆ Outcomes of interest: crude incidence and costs per admissions for AEs
- ◆ All eligible study subjects needed to have at least one year of follow-up

## COHORT IDENTIFICATION



**Table 1. Baseline characteristics among the NDD, DD, and ID group in Taiwan**

	NDD group (N=888,785)		DD group (N=23,959)		ID group (N=29,979)	
Age, years						
Mean (SD)	64.8 (16.3)		62.5 (14.5)		62.2 (14.1)	
Median (Q1-Q3)	66 (55-77)		63 (53-73)		63 (53-73)	
Gender, n (%)						
Male	491,748	55.30	13,879	57.9	17,557	58.6
Female	397,037	44.70	10,080	42.1	12,422	41.4

**Table 2. Numbers and the mean costs (US dollar) per AEs among NDD, DD, and ID group in Taiwan**

	NDD group (N=65,079)		DD group (N=2,842)		ID group (N=9,030)	
	n (%)	costs*	n (%)	costs*	n (%)	costs*
<b>Deep vein thrombosis</b>	247 (0.38)	5,185.73	14 (0.49)	10,628.31	34 (0.38)	5,055.79
<b>Hypertensive emergency</b>	14204 (21.83)	3,719.74	130 (4.57)	5,143.06	685 (7.59)	4,328.03
<b>Vascular access thrombosis</b>	676 (1.04)	7,936.49	35 (1.23)	7,412.68	115 (1.27)	8,509.46

\*Costs were converted from Taiwan New Dollar (NTD) to US Dollar (USD); USD : TWD = 1 : 27.64

## RESULT

- ◆ A total of 942,723 incident CKD patients were identified from NHIRD during 2009-2017, of which 94.28% were in the NDD group, 2.54% in the DD group, and 3.18% in the ID group.
- ◆ The mean age ranged from 62.2-64.8, and the gender distribution were comparable across groups.
- ◆ Hypertensive emergency was the most frequently identified AE across groups (21.83%, 4.57%, 7.59% in the NDD, DD, ID group, respectively) despite the incidence varied in different groups.
- ◆ Nevertheless, deep vein thrombosis (DVT) incurred the largest costs (\$10628.31) in the DD group, while vascular access thrombosis (VAT) incurred the largest costs both in the NDD (\$7936.49) and the ID (\$8509.46) group.

## CONCLUSION

- ◆ ESA therapy related AEs added substantial economic burden to the healthcare system in Taiwan.
- ◆ Given the highest event rates of hypertensive emergency among AEs, blood pressure should be closely monitored after patients receiving ESA therapy.
- ◆ Future research to investigate both the direct and indirect costs of AEs associated with ESA is warranted to capture such economic burden from a societal perspective.

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