SUPPLEMENTARY TABLE 1. Vaccine effectiveness* of bivalent compared with effectiveness of original monovalent vaccination against COVID-19-related thromboembolic events† among Medicare beneficiaries aged ≥65 years with immunocompromise§ and beneficiaries aged ≥18 years with end stage renal disease receiving dialysis¶ with immunocompromise, by age group and time since vaccination — United States, September 2022–March 2023

	Beneficiaries with immunocompromise aged ≥65 years					Beneficiaries aged ≥18 years with ESRD receiving dialysis with immunocompromise				
Age group (yrs)/vaccination status	No. of beneficiaries	No. of outcomes	Total person-days	Median follow-up days contributed to category**	aVE (95% CI)††	No. of beneficiaries	No. of outcomes	Total person-days	Median follow-up days contributed to category	aVE (95% CI)§§
≥18										
Original Vaccine Only (Ref)§§	—	—	—	—	—	15,394	309	2,811,250	178	Ref
Bivalent Vaccine Overall¶¶	—	—	—	—	—	6,997	56	743,922	116	45 (24 to 60)
7–59 days since vaccination	—	—	—	—	—	853	17	350,878	53	60 (31 to 77)
≥60 days since vaccination	—	—	—	—	—	6,144	39	393,044	63	30 (–3 to 52)
18–64										
Original Vaccine Only (Ref)	—	—	—	—	—	5,631	79	1,000,206	181	Ref
Bivalent Vaccine Overall	—	—	—	—	—	1,718	8	168,256	104	51 (16 to 71)
7–59 days since vaccination	—	—	—	—	—	—	—	—	—	—
≥60 days since vaccination	—	—	—	—	—	—	—	—	—	—
≥65										
Original Vaccine Only (Ref)	1,249,427	5,807	268,287,165	130	Ref	9,763	230	1,811,044	149	Ref
Bivalent Vaccine Overall	1,097,154	1,625	134,307,620	130	46 (42 to 49)	5,279	48	575,666	116	43 (22 to 58)
7–59 days since vaccination	68,511	569	56,813,475	53	55 (50 to 59)	599	15	265,874	53	56 (21 to 75)
≥60 days since vaccination	1,028,643	1,056	77,494,145	77	39 (34 to 44)	4,680	33	309,792	63	36 (5 to 57)

Abbreviations: aVE = adjusted vaccine effectiveness; ESRD = end stage renal disease; Ref = reference group; TE = thromboembolic events.

* Vaccine effectiveness was calculated as (1 − hazard ratio) x 100%.

† Defined as the first occurrence of clotting outcomes (i.e., myocardial infarction, ischemic stroke, or venous thromboembolism) after index date and 7 days before to 30 days after COVID-19 diagnosis.

§ Defined as at least 2 encounters within 183 days before the index date for one or more of the following conditions: hematologic malignancy, other intrinsic immune conditions or immunodeficiency, solid malignancy, transplant, or rheumatologic/inflammatory disorders.

¶ Defined as having at least 1 dialysis encounter (excluding acute kidney injury) in the 90 days before the index date. Persons with end stage renal disease receiving dialysis are eligible for Medicare benefits, regardless of age.

** A single beneficiary can contribute follow-up time in multiple categories. The maximum number of follow-up time post-bivalent vaccination is 181 days.

†† Adjusted vaccine effectiveness was estimated using a doubly robust approach: implementing inverse probability of treatment weighting and further adjusting for adjusting for influenza vaccination status, receipt of original monovalent booster, time since original monovalent vaccine >150 days, and urban/rural residence.

§§ Adjusted vaccine effectiveness was estimated using a doubly robust approach: implementing inverse probability of treatment weighting and further adjusting for age, race, receipt of original monovalent booster, and time since original monovalent vaccine >150 days.

¶¶ Beneficiaries had documented claims for ≥2 original monovalent mRNA vaccine doses, ≥2 Novavax vaccine doses, or ≥1 Janssen vaccine dose. A single dose (i.e., Janssen), 2nd dose, 3rd dose, or monovalent booster administration code was considered adequate to meet the inclusion criteria.

*** Defined as receipt of a COVID-19 bivalent mRNA vaccine dose at least 7 days prior or receipt of original monovalent doses only. Bivalent doses were identified using codes from the Healthcare Common Procedure Coding System (HCPCS) and Current Procedural Terminology (CPT) and must have been administered after August 31, 2022. Beneficiaries could change vaccination status during the study period.