

# MODELLING THE PROJECTED CLINICAL AND ENVIRONMENTAL BURDEN OF CHRONIC KIDNEY DISEASE IN EGYPT AND MOROCCO BETWEEN 2025 AND 2030.

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## Objectives

The objective of this study was to project the clinical and environmental burden of chronic kidney disease (CKD) in Egypt and Morocco between 2025 and 2030.

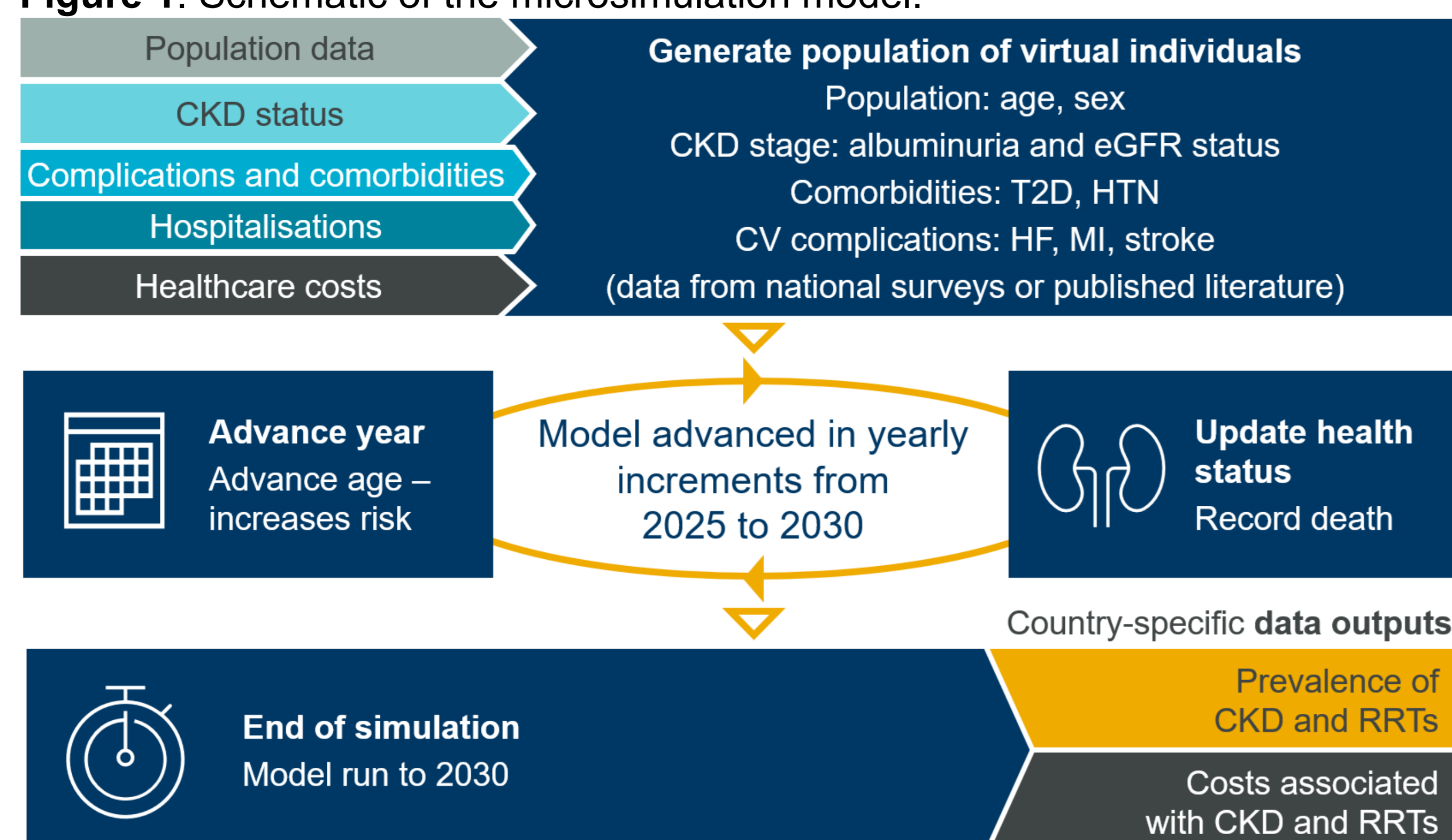
## Introduction

- The prevalence of CKD, a serious, progressive condition, is estimated to be 15.8% in Africa [1].
- Across the continent, diagnosis and treatment rates are low, with most patients being diagnosed in the later stages of disease – in part due to many cases of CKD presenting asymptotically, particularly for early-stage disease [2].
- CKD consequently imposes a significant burden on health systems, particularly due to increased risk of cardiovascular (CV) complications, and kidney replacement therapy (KRT).
- KRT, including haemodialysis (HD), is both resource and environmentally intensive, with KRT resulting in up to 18 times more healthcare emissions than a general patient [3].

## Methods

- Virtual populations representative of Egypt and Morocco were generated for the period 2025–2030 using a microsimulation model.
- Individuals were assigned discrete characteristics (including age, sex, and CKD status) based on country-specific demographic and epidemiological data.
- Proxy data were used where country-specific data were unavailable.
- Each year, modelled individuals progressed through CKD stages based on age-related estimated glomerular filtration rate (eGFR) decline rates, and associated comorbidities.
- These transitions were used to generate population-level projections of the clinical burden of CKD.
- Greenhouse gas (GHG) emissions associated with KRT (modelled as in-centre HD) were estimated and scaled using per-patient healthcare resource utilisation.
- Hospitalisation-related GHG emissions were estimated based on average daily emissions for a general ward.
- Emission estimates were scaled to produce population-level GHG burden estimates for Egypt and Morocco.

**Figure 1.** Schematic of the microsimulation model.



## Results

### Prevalence of CKD, KRT, and cardiovascular (CV) disease

- Between 2025 and 2030, CKD prevalence was projected to increase substantially in both countries.
- In Egypt, prevalence increased from 4.8% to 6.1%, while in Morocco it increased from 4.1% to 4.7%.
- Across both settings, only 6–7% of CKD cases were expected to be clinically diagnosed and recorded.
- CV comorbidity prevalence was projected to rise over the study period.

## Results

**Table 1: Projected prevalence over time and percentage increase of CKD, and CV complications between 2025 and 2030.**

Output	Country	2025	2030	Percentage increase (%)
Prevalence of CKD	Egypt	5.58 million CKD cases	7.72 million CKD cases	38.31%
	Morocco	1.58 million CKD cases	1.86 million CKD cases	18.20%
CV comorbidity prevalence	Egypt	0.98 million CV cases	1.23 million CV cases	25.13%
	Morocco	0.78 million CV cases	0.87 million CV cases	11.11%

### Haemodialysis and environmental impact

- By 2030, the number of CKD patients receiving in-centre haemodialysis was projected to increase to 83,048 in Egypt and 42,056 in Morocco.
- HD utilisation corresponded to an estimated 1,500 tonnes in Egypt and 888 tonnes of GHG emissions in Morocco.

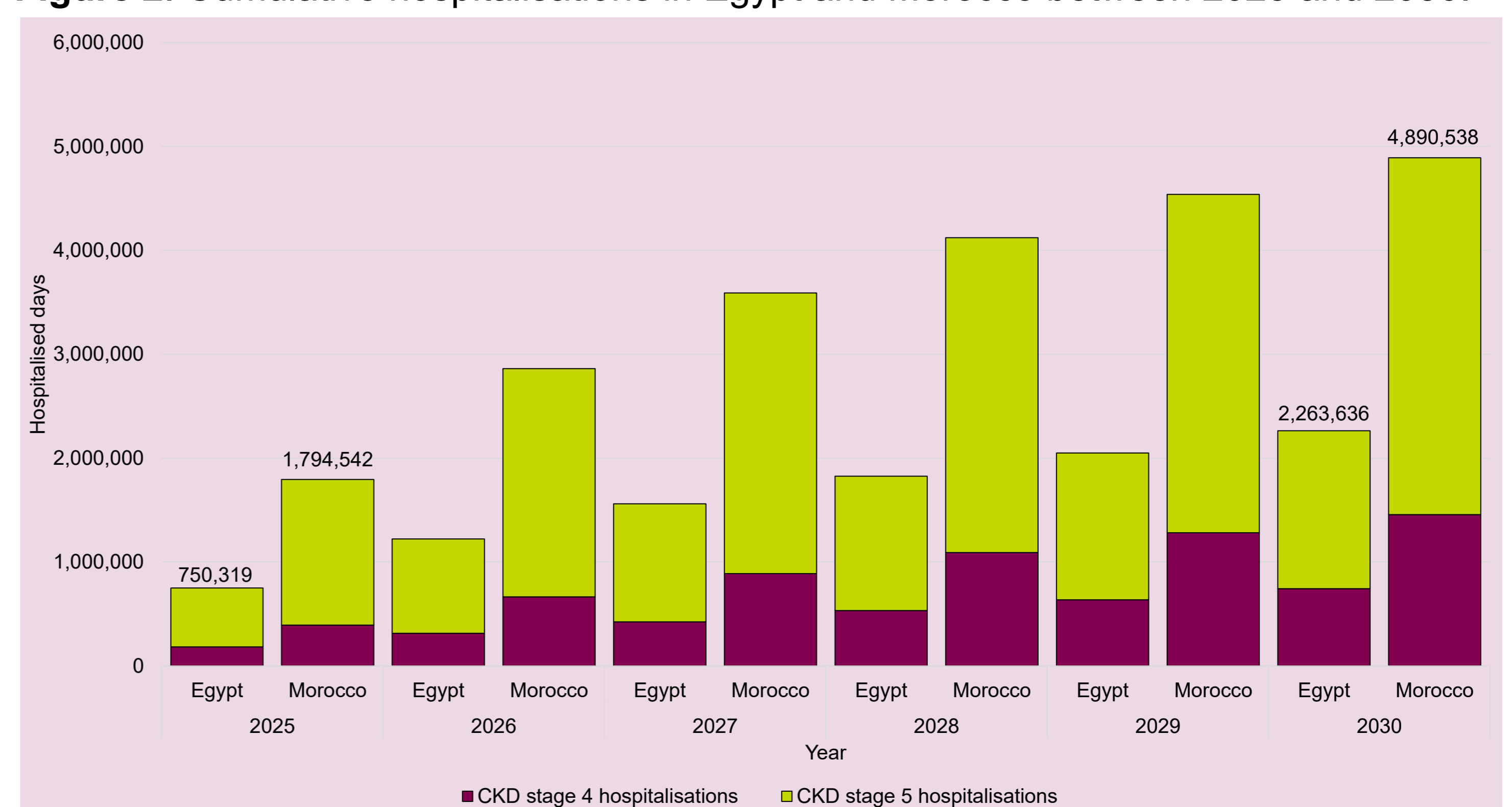
**Table 2. Projected CKD-associated GHG emissions between 2025 and 2030**

Setting1	Country	GDG emissions (tonnes)		Percentage increase (%)
		2025	2030	
KRT	Egypt	1,420	1,500	5.77%
	Morocco	887	888	0.18%
Hospitalisations	Egypt	19,600	59,100	201.69%
	Morocco	54,800	149,300	172.52%

### Hospitalisations and GHG emissions

- Between 2025 and 2030, CKD-related hospitalisations were projected to total 2.3 million days in Egypt and 4.9 million days in Morocco. These hospitalisations were associated with an estimated 59,100 tonnes of GHG emissions in Egypt and 149,300 tonnes in Morocco.

**Figure 2.** Cumulative hospitalisations in Egypt and Morocco between 2025 and 2030.



## Conclusions

- This study demonstrates a substantial future clinical and environmental burden of CKD in Egypt and Morocco under the current standard of care.
- The use of proxy data may limit the representativeness of the findings for these diverse populations.
- The high prevalence of cardiovascular complications, kidney replacement therapy (KRT) and hospitalisations highlights the need for earlier detection of CKD and improved disease surveillance.
- Potential responses include the implementation of national and regional strategies for early CKD screening and treatment, and integrated approaches to environmental sustainability to mitigate the projected clinical and environmental burden of CKD.