**Introduction**

Chronic kidney disease (CKD) is a debilitating and progressive condition that affects ~10% of the global population.1 CKD is associated with high risk of cardiovascular (CV) events, and end-stage kidney disease, the need for renal replacement therapies (RRTs) and premature mortality.2

Management of CKD and its complications is associated with significant healthcare costs and substantial resource use.3

Therefore, detailed projections of CKD prevalence and associated costs are critical considerations for public health and policy planning.

**Objective**

Inside CKD aims to project the global clinical and economic burden of CKD from 2021 to 2026 using country-specific, patient-level microsimulation modeling.

**Method**

We used the Inside CKD microsimulation model to project the burden of disease and healthcare costs for patients with CKD from 2021 to 2026 for the following 11 countries: Australia, Belgium, Brazil, Canada, China, Germany, Italy, Japan, Spain, the UK and the US (Figure 1).

The Inside CKD microsimulation model validates software developed by HealthLumen (London, UK).5–8

**Results**

In 2021, the prevalence of CKD in each national population was 6.6–16.8% across the 11 countries included (Figure 2). Costs associated with CKD are projected to increase by 5.7–22.8% from 2021 to 2026 for the 11 countries (Figure 4).

Although patients receiving RRTs in 2026 are projected to account for 3.3–7.7% of the diagnosed CKD population in the 11 countries, RRT costs are expected to represent 19–57% of the total cost burden (Figure 6).

**Conclusions**

Inside CKD demonstrates that the clinical and economic burden of CKD is projected to increase by 2026 for all 11 countries included in the analysis.

In all 11 countries, the number of patients receiving RRTs is substantially lower than the pre-RRT populations but contributes disproportionally to the economic burden of CKD.

These results demonstrate the continued need for national policies aimed at early diagnosis and intervention to slow disease progression and to reduce the costs associated with CKD.

**References**


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**Figure 1. Overview of the flexible Inside CKD microsimulation model.**

- A dynamic open-cohort, virtual population was developed for each country using national surveys, published literature and country-specific estimates.
- Country-specific inputs were used, including demographics, the prevalence of CKD, RRTs, comorbidities and CV complications, CKD- and RRT-associated costs, and the threshold values for RRT initiation.
- For any given input, if no country-specific data were available, a predefined algorithm was used to select proxy data methodically.
- Validity assessments and sensitivity analyses were conducted to assess the impact of input parameters and to validate projections. Part of these analyses included the validation of inputs and outputs by country-specific members of the Inside CKD scientific steering committee.
- CKD stages were defined according to Kidney Disease Improving Global Outcomes (KDIGO) 2012 recommendations, and patients were categorized according to estimated glomerular filtration rate (eGFR) and albuminuria status.4
- When possible, RRT modeling was calibrated against historical trends from country-specific renal registries.
- The following cost assumptions were included in the model:
  - Costs associated with CKD stages 1 and 2 were assumed to be zero.
  - Costs are presented as US dollars and were calculated for patients with diagnosed CKD.

**Figure 2. Epidemiological and economic burden of CKD, including RRTs, in 2021.**

- In 2021, the prevalence of CKD is projected to increase from 6.6%–16.8% across the 11 included countries.
- Costs associated with CKD are projected to increase by 5.7%–22.8% from 2021 to 2026 across the 11 included countries.

**Figure 3. Projected burden of RRT by modality in 2026.**

- The projected increase in CKD prevalence correlates with a projected increase in prevalence of RRTs of 1.8–8.3% across the 11 included countries.
- Annual costs associated with CKD and RRTs are projected to increase by 5.7–22.8% from 2021 to 2026 for the 11 countries.
- Although patients receiving RRTs in 2026 are projected to account for 3.3%–7.7% of the diagnosed CKD population in the 11 countries, RRT costs are expected to represent 19%–57% of the total cost burden.

**Figure 4. Projected annual costs of CKD and RRTs in 2021 to 2026.**

- Although patients receiving RRTs in 2026 are projected to account for 3.3%–7.7% of the diagnosed CKD population in the 11 countries, RRT costs are expected to represent 19%–57% of the total cost burden.

**Figure 5. Percentage increase projected 2021 to 2026.**

- In 2021, the prevalence of CKD in each national population was 6.6–16.8% across the 11 included countries.
- Costs associated with CKD are projected to increase by 5.7%–22.8% from 2021 to 2026 across the 11 included countries.
- Annual costs associated with CKD and RRTs are projected to increase by 5.7%–22.8% from 2021 to 2026 for the 11 countries.

**Figure 6. Key to projections.**

- Inside CKD demonstrates that the clinical and economic burden of CKD is projected to increase by 2026 for all 11 countries included in the analysis.
- In all 11 countries, the number of patients receiving RRTs is substantially lower than the pre-RRT populations but contributes disproportionally to the economic burden of CKD.
- These results demonstrate the continued need for national policies aimed at early diagnosis and intervention to slow disease progression and to reduce the costs associated with CKD.

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