

Budget impact analysis of empagliflozin for adults with Chronic Kidney Disease (CKD) in Greece

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Koulentaki M,¹ Vlahakos D,² Tsimihodimos V,³ Smyrniaios C,⁴ Delli E,⁴ Karpouzios G,⁴ Karathanou F,¹ Kourlaba G,⁵

1. Econcare Lp, Athens, Greece; 2. Scientific Advisor and President of the Scientific Council at Bioatriki Group; 3. Department of Internal Medicine, School of Medicine, University of Ioannina, Ioannina, Greece; 4. Boehringer Ingelheim, Athens, Greece; 5. Faculty of Health Sciences, University of Peloponnese, Tripoli, Greece.

Objective

To investigate the budgetary impact from the introduction of empagliflozin as add-on treatment to Standard of Care (SoC) for adults with Chronic Kidney Disease (CKD) in Greece.



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Introduction

- CKD is characterized by kidney abnormalities lasting over 3 months, classified by cause, glomerular filtration rate (GFR), and albuminuria (CGA staging)¹.
- Research shows low CKD awareness worldwide, leading to late-stage diagnoses and reduced treatment options²⁻⁴.
- Due to limited screening practices, approximately 8,236 per 100,000 individuals with CKD remain undiagnosed in Greece, with an increase of 3.7% over a five-year time horizon⁵.
- Global CKD prevalence is estimated at 9.1%, with stages three to five ranging from 4.1% to 10.6%^{6,7}.
- Traditional CKD treatments include Angiotensin-converting enzyme (ACE) inhibitors, angiotensin-receptor blockers (ARBs), statins, and antiplatelets, which slow progression but do not halt it, with limited options until recent advancements.
- Sodium-glucose transport protein 2 (SGLT-2) inhibitors, including dapagliflozin, canagliflozin, and empagliflozin, now offer new treatment options, showing benefits in CKD management^{8,9}.
- The EMPA-KIDNEY trial¹⁰⁻¹² found empagliflozin reduced CKD progression and cardiovascular death to 13.1% compared to 16.9% with placebo, proving effective and safe.

Methods

- The evaluation of economic consequences is derived from the comparison between the economic burden of CKD in a world without empagliflozin, with a burden in a world with empagliflozin, over a five-year period (2025-2029).
- The total costs for both scenarios are calculated by multiplying the per-patient costs with the global number of patients, allowing estimation of the budget impact of introducing the new intervention to the market.
- Epidemiological data, as retrieved from the literature and local clinical experts estimates, were used to estimate the number of people with CKD eligible for treatment with empagliflozin (Table 1).
- Market share of the analysis for both scenarios were calculated based on a local clinical experts' estimation (Table 2).
- The drug acquisition costs, costs of events and complications, and adverse event costs were derived from the literature and are detailed as total costs per category per treatment over a 5-year period (Table 3).
- A sensitivity analysis was performed, individually varying several model parameters and assumptions to assess the key drivers and robustness of the base case findings.

Table 1. Estimated target patient population

| Parameter | Number of patients | Source |
|---|--------------------|---|
| Prevalence of CKD (12.86%) | 1,115,991 | Local clinical experts estimation; Stafylas et al. ¹³ |
| Diagnosed patients with CKD (61.86%) | 690,317 | Local clinical experts |
| Patients who are diagnosed and treated with SoC treatment (59%) | 409,013 | Local clinical experts |
| People who have type 2 diabetes (12.5%) | 51,127 | Local clinical experts; Kibria et al. ¹⁴ ; Hounkpatin et al. ¹⁵ |

Note: According to clinical experts estimates, 7.7% of CKD patients are Urine albumin-creatinine ratio (uACR ≥ 22.6 mg/mmol) (and without T2D)

Table 2. Market shares with and without empagliflozin in all CKD patients

| Therapeutic options | Current market (scenario without Empagliflozin) | | | | |
|---------------------|---|-------------|-------------|-------------|-------------|
| | 2025 | 2026 | 2027 | 2028 | 2029 |
| Empagliflozin+SoC | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| SoC | 85.0% | 80.0% | 75.0% | 70.0% | 65.0% |
| Dapagliflozin+SoC | 15.0% | 20.0% | 25.0% | 30.0% | 35.0% |
| Total | 100% | 100% | 100% | 100% | 100% |
| Therapeutic options | Projected market (scenario with Empagliflozin) | | | | |
| | 2025 | 2026 | 2027 | 2028 | 2029 |
| Empagliflozin+SoC | 5.0% | 10.0% | 21.3% | 25.0% | 32.5% |
| SoC | 85.0% | 75.0% | 57.5% | 50.0% | 40.0% |
| Dapagliflozin+SoC | 10.0% | 15.0% | 21.3% | 25.0% | 27.5% |
| Total | 100% | 100% | 100% | 100% | 100% |

Table 3. Five year costs per cost category for CKD patients (€)

| | Empagliflozin + SoC | SoC alone | Dapagliflozin |
|--|---------------------|-----------|---------------|
| Monitoring | 14,495 | 15,098 | 14,481 |
| Treatment | 5,401 | 1,270 | 5,343 |
| Adverse events | 1 | 0 | 1 |
| Total kidney replacement therapy | 2,381 | 6,184 | 2,343 |
| Total End-stage kidney disease | 708 | 740 | 716 |
| Cardiovascular complications | 9,221 | 9,054 | 9,200 |
| Anemia | 520 | 551 | 521 |
| Other chronic kidney disease complications | 1,708 | 1,765 | 1,703 |
| Bone and mineral disorder | 1,413 | 1,439 | 1,412 |
| Acute kidney injury | 300 | 348 | 297 |
| Infections | 650 | 633 | 650 |
| Cancers | 13 | 13 | 13 |

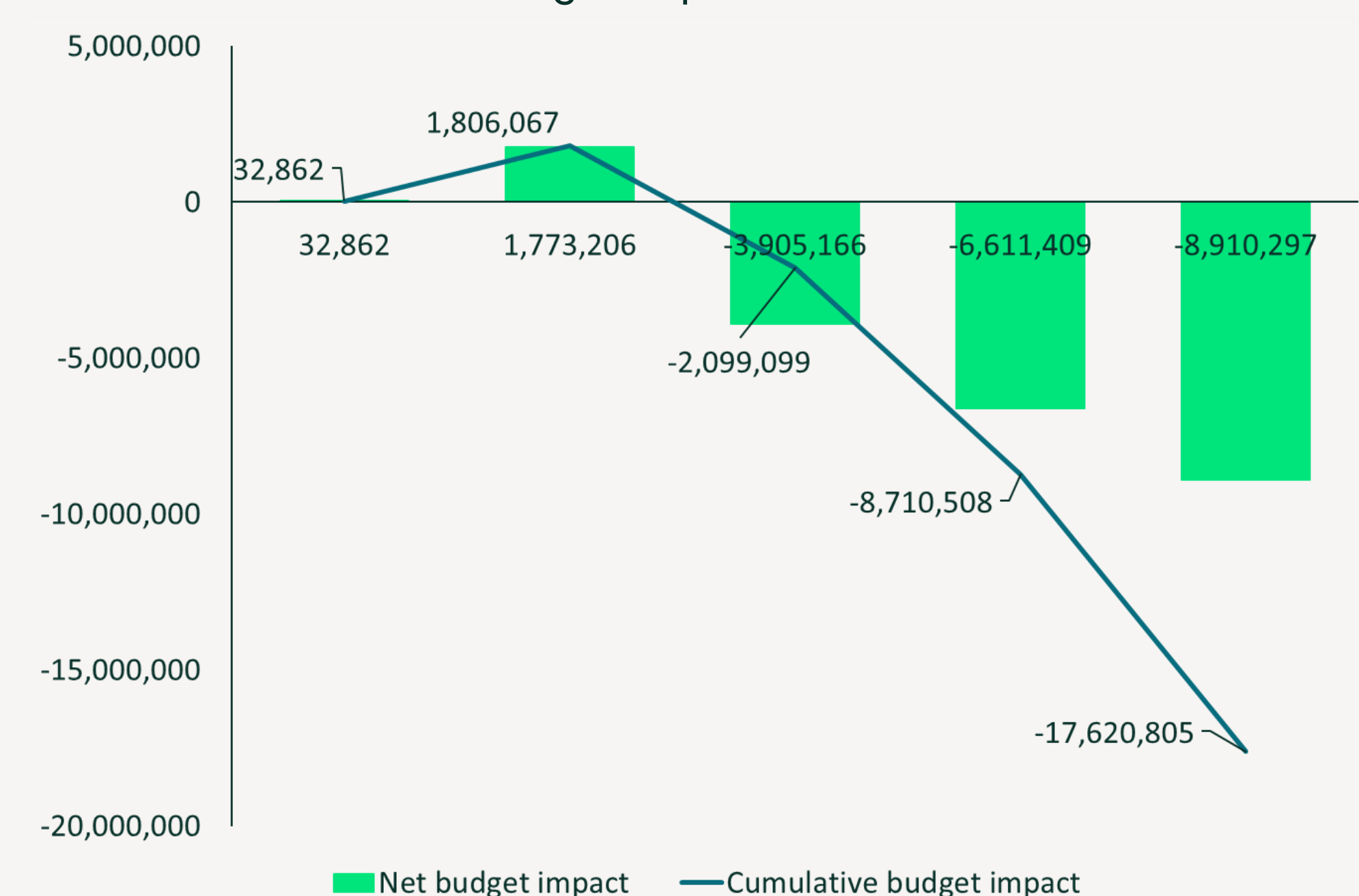
Results

- The total number of the eligible population was 409,013 patients per year and the number of patients treated with empagliflozin+SoC in the new market scenario was estimated to increase from 4,090 in 2025 to 26,586 patients in 2029.
- Due to faster CKD progression in the SoC arm, patients deteriorate more quickly and incur higher costs, leading to increased annual total costs from year three onward compared to the dapagliflozin and empagliflozin arms (Table 4).
- Over the five-year horizon, the inclusion of empagliflozin led to a decrease in public expenditures, with an average annual total cost savings of €17,620,805 (Figure 1).
- Results of sensitivity analysis were found fairly insensitive.

Table 4. Budget impact results of all CKD patients (€)

| | 2025 | 2026 | 2027 | 2028 | 2029 |
|----------------------------|---------------|------------------|-------------------|-------------------|-------------------|
| Current Scenario | 1,178,531,969 | 1,268,078,778 | 1,537,182,746 | 1,605,908,663 | 1,735,840,916 |
| New Scenario | 1,178,564,831 | 1,269,851,984 | 1,533,277,580 | 1,599,297,253 | 1,726,930,619 |
| Total budget impact | 32,862 | 1,773,206 | -3,905,166 | -6,611,409 | -8,910,297 |
| Cumulative budget impact | 32,862 | 1,806,067 | -2,099,099 | -8,710,508 | -17,620,805 |

Figure 1. Net and cumulative budget impact



Conclusion

This budget impact analysis indicates that introducing empagliflozin for CKD treatment in Greece provides significant clinical benefits with manageable budget impacts in the first two years and appears cost-saving for the public payer over five years.

Abbreviations

ACEi, angiotensin-converting enzyme inhibitors; ARBs, angiotensin-receptor blockers; CGA, Cause; GFR category and albuminuria category; CKD, Chronic Kidney Disease; EGFR, estimated GFR; ESKD, end-stage kidney disease; GFR, glomerular filtration rate; SGLT-2, sodium-glucose transport protein 2; SoC, Standard of care; T2D, Type 2 diabetes.

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Disclosure statement

- The authors meet criteria for authorship as recommended by the International Committee of Medical Journal Editors (ICMJE).
- The authors did not receive payment related to the development of the abstract/poster.
- Koulentaki M., MSc of Econcare Lp provided writing, editorial support, and formatting assistance, which was contracted and funded by Boehringer Ingelheim.
- Boehringer Ingelheim was given the opportunity to review the manuscript for medical and scientific accuracy as well as intellectual property considerations.
- The study was supported and funded by Boehringer Ingelheim.

