



COST-EFFECTIVENESS ON THE IMPLEMENTATION OF GUIDELINE-DIRECTED MEDICAL THERAPIES IN DIABETES AND CKD

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DISCLOSURES

No conflicts to declare

Scope of talk

- Overview of the trends of healthcare expenditure in managing the burden of diabetes and CKD globally
- Evaluate the cost-effectiveness in implementing guideline-directed medical therapies (GDMT) (especially new drugs) and how this calculation may or may not facilitate implementation of GDMT



Background

- International Diabetes Federation's (IDF) Diabetes Atlas 2021:
 - One in 10 adults has diabetes (537 million people)
 - One in two adults undiagnosed with diabetes
 - 11.5 % of global health expenditure (USD\$966 billion p.a.) is spent on diabetes
- In the US \$1 out of every \$4 in US health care costs is spent on diabetes care (US CDC)


Background

- Substantial burden of costs for CKD
- 31 country study
- Mean annual costs of CKD increase substantially by disease stage
 - Stage G3a – US\$ 3,070
 - Haemodialysis – \$ 57,334 ; Peritoneal dialysis \$49,490
 - Transplant – \$75,326 (incident); \$16,672 (ongoing)
- Compared to other diseases
 - \$18,294 p.a. for myocardial infarction
 - \$8463 p.a. for heart failure
 - \$5975 p.a. for acute kidney injury

Global Economic Burden Associated with Chronic Kidney Disease: A Pragmatic Review of Medical Costs for the Inside CKD Research Programme

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Background

- Practice Guidelines:
 - Structured diabetes self-management education programs improve self-efficacy and clinical outcomes
 - First line treatment for diabetes and CKD should include metformin and an SGLT2 inhibitor to improve CVD outcomes and limit CKD progression
- Backed by strong evidence of clinical effect on eGFR[Ⓟ] CKD progression, CVD events, mortality
- Cost-effectiveness?

Practice Guidelines

Chronic Kidney Disease in Diabetes:
Guidelines from KDIGO

Systematic review

Yoshida et al, 2020:

- Cost-effectiveness of **SGLT2 Inhibitors** for **T2DM**
- 24 studies , good quality
 - SGLT2i vs dipeptidyl peptidase-4 inhibitors (DPP-4i) (n=7 studies);
 - SGLT2i vs sulfonylureas (SU) (n=3 studies);
 - SGLT2i vs glucagon-like peptide-1 receptor agonist (GLP-1 RA) (n=3 studies);
 - SGLT2i vs SGLT2i (n=2 studies);
 - SGLT2i vs other antidiabetic therapies including TZD, AGI or insulin (n=3 studies);
 - SGLT2i vs standard care/metformin.
- Almost all showed **SGLT2i was cost effective vs comparator except 2 studies showed GLP-1 RA to be cost-effective.**

Recent cost-effectiveness studies

Reifsnider et al 2021

- Cost effectiveness of **Empagliflozin** in patients with **diabetic kidney disease** in the USA
- Modelled cost-effectiveness analysis based on EMPA-REG OUTCOME trial from payer perspective
 - Empagliflozin on top of standard care vs standard care alone
- Findings: **ICER: \$25,974 (cost-effective)**
- Results sensitive to rates of CV death, non-fatal MI and HF hospitalisation; drug costs and time horizon.

Recent cost-effectiveness studies

Tisdale et al (2022)

- Cost-effectiveness of **Dapaliflozin** for **non-diabetic CKD** in USA
- Modelled cost-effectiveness analysis based on DAPA-CKD trial – lifetime horizon and health sector perspective
 - Dapaliflozin plus standard care vs standard care
- Increased QALYs from 6.75 to 8.06 and lifetime costs \$245,900 to \$324,900
- ICER: **\$60,000 per QALY gained (deemed cost-effective)**
- 1 year budget impact on all US non-diabetic CKD population up to \$21 billion.

Recent cost-effectiveness studies

Sim et al (2023)

- Cost effectiveness of **various glucose lowering therapies** as add-on to standard care for **T2DM** in Malaysia
 - **Standard care, SGLT2i, DPP-4i, GLP-1 RA**
 - Modelled cost-effectiveness analysis from health sector perspective
- Costs of medicines based on publicly available sources for reimbursement rates in Malaysia
- Findings: **SGLT2i was the most cost-effective treatment**
 - **ICER of RM 12,279 per QALY gained**
- Robust to numerous assumptions in sensitivity analysis and consistent with previous findings.

Recent cost-effectiveness studies

McEwan et al 2021

- Cost-effectiveness of **Dapagliflozin** in treating **high-risk patients with T2DM** in UK
- Modelled economic evaluation using data from DECLARE-TIMI 58 trial (Industry funded)
 - **Dapagliflozin vs placebo**
 - Lifetime: costs and outcomes in trial population and subgroups
- Finding: **Dapagliflozin dominant – increase in QALYs (0.06) and cost saving (2,552 pounds)**
 - Most cost-effective in the prior heart failure subgroup

Recent cost-effectiveness studies

McEwan et al 2023

- Cost-effectiveness of **SGLT2i** in the **management of type 2 diabetes** in UK.
- Modelled economic evaluation: Cost effectiveness of intensification points associated with updated 2022 NICE T2DM guidelines (from 2015) – industry-funded
 - “advocate the use of SGLT2i in those with atherosclerotic CVD, chronic heart failure or at high risk of CVD.”
 - Previous guidelines placed “less emphasis of cardiorenal benefits of therapies such as SGLT2 inhibitors”
 - T2DM at high risk of CVD
 - T2DM with atherosclerotic CVD
 - T2DM with co morbid heart failure
 - T2DM with co morbid CKD
- Results:
 - **New guidelines dominated new (lower costs and improved outcomes (0.58 to 1.12 QALY gain) in all 4 sub-populations**
 - Although pharmacy costs higher, offset by HF hospitalisations and CKD costs.

Recent cost-effectiveness studies

McEwan et al (2022)

- Cost effectiveness of Dapagliflozin for **CKD** in UK, Germany and Spain
- Modelled economic evaluation from health sector perspective: **Dapagliflozin plus standard therapy vs standard therapy** (industry funded)
- **ICERs – cost per QALY gained**
 - **\$8280 UK**
 - **\$17,623 Germany**
 - **\$11,687 Spain**
- Factors that influence cost-effectiveness
 - Drug acquisition costs, cost of CKD management (given that individuals with longer survival will experience greater costs for lifetime CKD management) and differences in complication rates.

Conclusions

- **High and growing burden** of CKD and diabetes, particularly in LMICs
- New treatments offer promise, **are generally cost effective but expensive and substantial budget impact given large treatment population.**
 - **High out of pocket costs** on top of other factors such as **clinical inertia and lack of patient awareness** in some settings pose major barrier to treatment
 - Cost-effectiveness will improve with **competition pushing down drug prices and reductions in costs of long-term treatment** of CKD.
- Ultimately measures to substantially address the global burden need to go beyond medical therapies and address **prevention and public health** including inter-sectoral programs.