# Empagliflozin vs. DPP-4 inhibitors and GLP-1 Receptor Agonists Cost of Care Study: a German claims data analysis

**First published:** 25/10/2019

**Last updated:** 16/10/2026

Study Finalised

## Administrative details

**EU PAS number**

EUPAS31950

**Study ID**

45480

**DARWIN EU® study**

No

**Study countries**

Germany

**Study description**

Study design: - Retrospective non-interventional comparative cost study using real-world data German sickness funds (claims). Research question and objectives: - Comparison of direct and indirect healthcare cost of type-2 diabetes mellitus (T2D) patients treated with Empagliflozin vs. DPP-4 Inhibitors (DPP-4i) / Sitagliptin or GLP-1 receptor agonists (GLP-1-RA) - Assessment of characteristics as well as previous and concomitant treatments of T2D patients treated with Empagliflozin or DPP-4i / Sitagliptin or GLP-1-RA

**Study status**

Finalised

# Research institutions and networks

## Institutions

### Institut für Pharmakoökonomie und Arzneimittellogistik (IPAM)

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**Institution**

# Contact details

**Study institution contact**

Maximilian Gabler maximilian.gabler@boehringer-ingelheim.com

**Study contact**

maximilian.gabler@boehringer-ingelheim.com

**Primary lead investigator**

Maximilian Gabler

**Primary lead investigator**

## Study timelines

**Date when funding contract was signed**

Planned: 31/10/2019

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**Study start date**

Planned: 03/02/2020

Actual: 16/11/2020

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**Date of final study report**

Planned: 30/06/2022

Actual: 11/03/2022

## Sources of funding

- Pharmaceutical company and other private sector

## More details on funding

Boehringer Ingelheim

## Study protocol

1245-0221_CTP_final-rule_Redacted.pdf (1.11 MB)

# Regulatory

**Was the study required by a regulatory body?**

No

**Is the study required by a Risk Management Plan (RMP)?**

Not applicable

# Other study registration identification numbers and links

1245-0221

NCT04295005

# Methodological aspects

## Study type

## Study type list

**Study topic:**

Human medicinal product

**Study type:**

Non-interventional study

**Scope of the study:**

Healthcare resource utilisation

Other

**If ‘other’, further details on the scope of the study**

Comparative cost evaluation

**Data collection methods:**

Secondary use of data

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**Main study objective:**

Comparison of direct and indirect healthcare cost of T2D patients treated with Empagliflozin vs. DPP-4i or GLP-1-RA

## Study drug and medical condition

**Study drug International non-proprietary name (INN) or common name**

EMPAGLIFLOZIN

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**Anatomical Therapeutic Chemical (ATC) code**

(A10BH) Dipeptidyl peptidase 4 (DPP-4) inhibitors

Dipeptidyl peptidase 4 (DPP-4) inhibitors

(A10BJ) Glucagon-like peptide-1 (GLP-1) analogues

Glucagon-like peptide-1 (GLP-1) analogues

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**Medical condition to be studied**

Type 2 diabetes mellitus

## Population studied

**Short description of the study population**

T2DM patients continuously insured by the respective sickness funds

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**Age groups**

- Adults (18 to < 46 years)
- Adults (46 to < 65 years)
- Adults (65 to < 75 years)
- Adults (75 to < 85 years)
- Adults (85 years and over)

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**Estimated number of subjects**

25.000

## Study design details

**Setting**

Claims data from several German public sickness funds.

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**Outcomes**

Total direct healthcare cost of T2D patients treated with Empagliflozin vs. DPP-4i or GLP-1-RA, - Direct healthcare cost segments (hospital cost, outpatient cost, drug cost, remedies and aids cost) of T2D patients treated with Empagliflozin vs. DPP-4i or GLP-1-RA- Indirect healthcare cost of T2D patients treated with Empagliflozin vs. DPP-4i or GLP-1-RA

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**Data analysis plan**

Before a comparison will be done, a propensity score matching (PSM) will be performed, to control for potential differences of baseline characteristics

between the patients. In that PSM, all available baseline characteristics will be initially included (logistic regression that predicts belonging to one of the two compared cohorts). In a stepwise exclusion procedure, only those which influence significantly the probability to belong to one of the pre-defined groups will remain in the model . Finally, PS-matched samples will be compared.

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**Summary results**

Of 24,465 patients included, 3,285 received EMPA, 19,443 DPP-4i (thereof 18,382 Sitagliptin), and 1,747 GLP-1-RA. Matched cohorts were balanced on baseline characteristics (EMPA vs. DPP-4i: n1/n2 = 3,100/3,100; and EMPA vs. GLP-1-RA: n3/n4 = 1,346/1,346). The median follow-up time in the EMPA group was 242 days when matched to DPP-4i (vs. 458 days), and 259 days when matched to GLP-1-RA (vs. 302 days).

After adjustment for differences in length of follow-up, significantly higher expenses for healthcare were observed among patients initiating DPP-4i (mean: € 7,009 vs. € 4,274; p<0.001) and GLP-1-RA (mean: € 6,851 vs. € 4,895; p<0.001) in comparison with EMPA. The highest differences between EMPA and DPP-4i were observed in terms of inpatient care (€ 1,455 vs. € 3,040; p<0.001) and pharmacy sales for prescribed drugs (€1,966 vs. € 2,689; p<0.001), whereas incremental cost differences vs. GLP-1-RA were mainly driven by medication costs alone (€ 2,433 vs. € 3,575; p<0.001).).

Significantly higher healthcare expenses were also observed among patients initiating SITA (mean: € 6,535 vs. € 4,319; p<0.001) in comparison with EMPA. The highest cost differences between EMPA and SITA were observed in terms of inpatient care (€ 1,486vs. € 2,806; p<0.001) and medication (€ 1,970 vs. € 2,516; p<0.001).

# Documents

**Abstract of study report**

1245-0221_Synopsis.pdf (215.78 KB)

# Data management

## ENCePP Seal

The use of the ENCePP Seal has been discontinued since February 2025. The ENCePP Seal fields are retained in the display mode for transparency but are no longer maintained.

## Data sources

**Data sources (types)**

Administrative healthcare records (e.g., claims)

## Use of a Common Data Model (CDM)

**CDM mapping**

No

## Data quality specifications

**Check conformance**

Unknown

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**Check completeness**

Unknown

**Check stability**

Unknown

**Check logical consistency**

Unknown

## Data characterisation

**Data characterisation conducted**

No