

# **Type 2 diabetes in adults management (update)**

**Search strategies**

*NICE guideline <number>*

*Search strategies*

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# 1. Scoping search strategies

## 1.1 Main searches

Scoping searches were undertaken on the following websites and databases (listed in alphabetical order) in October 2019 to provide information for scope development and project planning. Browsing or simple search strategies were employed.

Guidelines/website	Systematic review/economic evaluations
Agency for Healthcare Research and Quality (AHRQ)	Campbell Collaboration
All Wales Medicines Strategy Group	Cochrane Database of Systematic Reviews (CDSR)
American Association of Clinical Endocrinologists and American College of Endocrinology	Database of Abstracts of Reviews of Effects (DARE) – last updated April 2015
American College of Physicians	DUETS
American Diabetes Association	Health Technology Assessment (HTA) Database – last updated October 2016
American Heart Association	NHS Economic Evaluation Database (NHS EED) – last updated April 2015
Association of Anaesthetists of Great Britain & Ireland	NIHR Health Technology Assessment Programme
Association of British Clinical Diabetologists (ABCD)	NIHR Health Services and Delivery Research (HS&DR) Programme
Audit Commission (Archived)	PROSPERO
BMJ Best Practice	TRIP Database
British Columbia Guidelines and Protocols Advisory Committee	
British National Formulary	
Canadian Diabetes Association	
Canadian Geriatrics Society	
Canadian Medical Association Infobase	
Care Quality Commission	
Centers for Disease Prevention and Control	
Core Outcome Measures in Effectiveness Trials (COMET)	
Cross Border Patient Registries (PARENT)	
Danish Health Authority	
Department of Health & Social Care	
DESMOND	
Diabetes and Nutrition Study Group of the Association for the Study of Diabetes	
Diabetes Canada	
Diabetes UK	
Diabetes Research & Wellness Foundation	
DTN	
Dutch College of General Practitioners	
Electronic Medicines Compendium	
Endocrine Society	
European Society of Endocrinology	
FDA	
French National Authority for Health	
General Medical Council	

Guidelines/website	Systematic review/economic evaluations
<p>German Agency for Quality in Medicine Guidelines &amp; Audit Implementation Network (GAIN) Guidelines International Network (GIN) Guidelines Trust (ECRI) Health &amp; Social Care Information Centre Health Foundation Healthcare Quality Improvement Partnership Healthtalk Online HTA Unit, Ministry of Health, Malaysia ISD – NHS Scotland International Diabetes Federation Institute for Quality and Efficiency in Health Care (IQWiG) International Guideline Library Kaiser Permanente National Integrated Cardiovascular Health (ICVH) Work Group Medicines and Products Regulatory Agency (MHRA) Ministry of Public Health/Qatar National Audit Office National Clinical Audit and Patient Outcomes Programme National Health and Medical Research Council – Australia National Heart, Lung &amp; Blood Institute National Institute for Health and Care Excellence (NICE) - published &amp; in development guidelines National Institute for Health and Care Excellence (NICE) - Topic Selection NHS Choices NHS Digital NHS England NICE Clinical Knowledge Summaries (CKS) NICE Evidence Search Office for National Statistics Patient UK PatientsLikeMe PatientVoices PCORnet PrescQipp Public Health England Queensland Health Registered Nurses' Association of Ontario Royal Australian College of General Practitioners Royal College of Anaesthetists Royal College of General Practitioners Royal College of Midwives Royal College of Obstetricians and Gynaecologists Royal College of Ophthalmologists</p>	

Guidelines/website	Systematic review/economic evaluations
Royal College of Nursing Royal College of Pathologists Royal College of Paediatrics and Child Health Royal College of Physicians Royal College of Psychiatrists Royal College of Radiologists Royal College of Speech & Language Therapists Royal College of Surgeons Scottish Intercollegiate Guidelines Network (SIGN) Scottish Medicines Consortium UK Data Service UK National Statistics UK Research & Innovation University of Michigan Health System US National Guideline Clearinghouse Welsh Government WHO Europe YouthHealthTalk	

## 1.2 Main searches

Bibliographic databases searched for the guideline

- Cochrane Database of Systematic Reviews – CDSR (Wiley)
- Cochrane Central Register of Controlled Trials – CENTRAL (Wiley)
- Database of Abstracts of Reviews of Effects – DARE (CRD)
- EMBASE (Ovid)
- MEDLINE (Ovid)
- MEDLINE Epub Ahead of Print (Ovid)
- MEDLINE In-Process (Ovid)

## 1.3 Identification of evidence for review questions

Searches were conducted in November 2020

Where appropriate, McMaster and health-evidence.ca study design filters were used, with standard NICE modifications, to limit the retrieval to, for example, randomised controlled trials. Details of the study design filters used can be found in section 2. Other filter or search strategies were used where appropriate to limit results.

Searches were limited to those in the English language. Animal studies were removed from results.

## 2. Review question search strategies

### 2.1 Search strategy review questions

RQ1.2a In which population groups should initial treatment other than metformin monotherapy be considered for the management of type 2 diabetes?

RQ1.2b What are the most effective pharmacological therapies in people with type 2 diabetes if therapy with metformin is insufficient, not tolerated or contraindicated at treatment initiation?

RQ1.3.1 What are the most effective pharmacological therapies in people with type 2 diabetes when treatment escalation is required from initial monotherapy?

RQ1.3.2 What are the most effective pharmacological therapies in people with type 2 diabetes when treatment escalation is required from dual therapy?

RQ1.3.3 What are the most effective pharmacological therapies in people with type 2 diabetes when treatment escalation is required from third line therapy?

RQ1.3.4 Which pharmacological therapies are most effective at providing cardiovascular and other benefits in addition to blood glucose control in people with type 2 diabetes?

Table 1: search strategy

<b>Medline Strategy, searched 30<sup>th</sup> November 2020</b>	
<b>Database: Ovid MEDLINE(R) 1946 to November 25, 2020</b>	
<b>Search Strategy:</b>	
1	exp Diabetes Mellitus, Type 2/ (135890)
2	(Type* adj4 ("2" or "II" or two*) adj4 (diabete* or diabetic*).tw. (126080)
3	((Maturit* or adult* or slow*) adj4 onset* adj4 (diabete* or diabetic*).tw. (2843)
4	((Ketosis-resistant* or stable*) adj4 (diabete* or diabetic*).tw. (897)
5	((Non-insulin* or Non insulin* or Noninsulin*) adj4 depend* adj4 (diabete* or diabetic*).tw. (11552)
6	NIDDM.tw. (6747)
7	or/1-6 (174173)
8	exp Glucagon-Like Peptide 1/ (8811)
9	(Glucagon* adj Like adj Peptide adj "1").tw. (9438)
10	(GLP* adj "1").tw. (9162)
11	GLP1*.tw. (594)
12	Exenatide/ (2466)
13	(Exenatide* or Byetta* or Bydureon* or Saxenda*).tw. (1629)
14	(Liraglutide* or Victoza*).tw. (2047)
15	(Dulaglutide* or Trulicity*).tw. (235)
16	(Semaglutide* or Ozempic* or Rybelsus*).tw. (253)
17	(Lixisenatide* or Lyxumia*).tw. (286)
18	Sodium-Glucose Transporter 2/ (1222)
19	(Sodium* adj4 Glucose* adj4 Transporter* adj4 "2").tw. (1019)
20	(Sodium* adj4 Glucose* adj4 (co-transporter* or cotransporter* or co transporter* adj4 "2").tw. (2261)
21	(SGLT* or gliflozin*).tw. (3802)
22	Canagliflozin/ (655)



**Medline Strategy, searched 30<sup>th</sup> November 2020**

**Database: Ovid MEDLINE(R) 1946 to November 25, 2020**

**Search Strategy:**

- 23 (Canagliflozin\* or Invokana\* or Dapagliflozin\* or Forxiga\* or Ertugliflozin\* or Steglatro\* or Empagliflozin\* or Jardiance\* or Glyxambi\*).tw. (1926)
- 24 exp Sulfonylurea Compounds/tu [Therapeutic Use] (5475)
- 25 (Sulfonylurea\* or Sulphonylurea\*).tw. (9192)
- 26 (Gliclazide\* or Diamicron\*).tw. (1212)
- 27 (Glimepiride\* or Amaryl\*).tw. (1716)
- 28 (Glipizide\* or Minodiab\*).tw. (972)
- 29 Tolbutamide\*.tw. (4301)
- 30 Thiazolidinediones/ (11311)
- 31 (Thiazolidinedione\* or Glitazone\*).tw. (5687)
- 32 Pioglitazone/ (3831)
- 33 (Pioglitazone\* or Actos\*).tw. (4771)
- 34 exp Dipeptidyl-Peptidase IV Inhibitors/ or Dipeptidyl Peptidase 4/ (7839)
- 35 (Dipeptidyl\* adj2 Peptidase\* adj2 ("4" or "iv") adj Inhibitor\*).tw. (2170)
- 36 (DPP\* adj2 ("4" or "iv")).tw. (5030)
- 37 gliptin\*.tw. (218)
- 38 (Saxagliptin\* or Onglyza\* or Komboglyze\* or Qtern\*).tw. (534)
- 39 (Vildagliptin\* or Galvus\*).tw. (799)
- 40 (Sitagliptin\* or Januvia\*).tw. (1780)
- 41 (Alogliptin\* or Vipdomet\*).tw. (368)
- 42 (Linagliptin\* or Trajenta\* or Jentadueto\*).tw. (555)
- 43 Metformin/ (13785)
- 44 (Metformin\* or Glucophage\*).tw. (16703)
- 45 (Competact\* or Janumet\* or Eucreas\* or Synjardy\* or Vokanamet\* or Xigduo\*).tw. (24)
- 46 Biguanides/ (3217)
- 47 Biguanide\*.tw. (2599)
- 48 exp Glycoside Hydrolase Inhibitors/ (3827)
- 49 glycosid\*.tw. (40091)
- 50 (glycosyl adj4 hydrolases).tw. (675)
- 51 ((intestinal adj4 alpha adj4 amylase adj4 inhibitor\*) or (intestinal adj4 alpha-amylase adj4 inhibitor\*)).tw. (9)
- 52 ((pancreatic adj4 alpha adj4 amylase adj4 inhibitor\*) or (pancreatic adj4 alpha-amylase adj4 inhibitor\*)).tw. (84)
- 53 Acarbose/ (1358)
- 54 (Acarbose\* or Glucobay\*).tw. (2232)
- 55 exp Insulins/ad, tu [Administration & Dosage, Therapeutic Use] (39827)
- 56 exp Insulin/ad, tu [Administration & Dosage, Therapeutic Use] (37821)
- 57 Insulin Infusion Systems/ (5394)
- 58 (Insulin\* adj4 (treat\* or therap\* or administrat\* or dos\* or human\* or analogue\* or biphasic\* or basal\* or protamine\* or isophane\* or inject\* or pen\* or deliver\* or device\* or system\* or pump\* or syringe\* or needle\* or infusion\*)).tw. (76850)
- 59 (Insulin\* adj4 (Intermediate\* or shortact\* or short-act\* or short act\* or longact\* or long-act\* or long act\* or ultralong\* or ultra-long\* or ultra long\* or rapidact\* or rapid-act\* or rapid act\*)).tw. (2817)
- 60 (Actrapid\* or Humulin\* or Hypurin\*).tw. (328)
- 61 Aspart\*.tw. (93721)
- 62 (Glulisine\* or Apidra\*).tw. (254)
- 63 (Lispro\* or Humalog\*).tw. (1046)
- 64 (Insulin\* adj4 zinc\* adj4 (suspension\* or protamine\*)).tw. (275)
- 65 (Detemir\* or Levemir\*).tw. (732)

**Medline Strategy, searched 30<sup>th</sup> November 2020**

**Database: Ovid MEDLINE(R) 1946 to November 25, 2020**

**Search Strategy:**

- 66 (Glargine\* or Lantus\* or Toujeo\*).tw. (2216)
- 67 (Degludec\* or Tresiba\*).tw. (394)
- 68 (Isophane\* or Insulatard\* or Insuman\* or Novomix\*).tw. (226)
- 69 (Fiasp\* or Lyumjev\* or Suliqua\* or Xultophy\* or NovoRapid\*).tw. (51)
- 70 (LY2963016 or Abasaglar\* or MYK-1501D or MYK1501D or Semglee\*).tw. (18)
- 71 Biosimilar pharmaceuticals/ (2129)
- 72 (biosimilar\* or biologics).tw. (10059)
- 73 Nateglinide/ (391)
- 74 (Meglitinide\* or Repaglinide\* or Nateglinide\*).tw. (1180)
- 75 or/8-74 (301426)
- 76 7 and 75 (43057)
- 77 animals/ not humans/ (4726676)
- 78 76 not 77 (38148)
- 79 limit 78 to english language (34479)

*Original search designed in 2012 for NG28. No date limit was used due to a change in the scope of the questions.*

### 3. Study Design Filters

**Table 2: Study design filters**

The study filters and limiting search strategies used as part of the literature searches are presented below.

**RCT**

- 1 randomized controlled trial.pt.
- 2 randomi?ed.mp.
- 3 placebo.mp.
- 4 or/1-3

**Systematic Review**

- 1 MEDLINE or pubmed).tw.
- 2 systematic review.tw.
- 3 systematic review.pt.
- 4 meta-analysis.pt.
- 5 intervention\$.ti.
- 6 or/1-5

## 4. Health economics search strategies

### 4.1 Economic evaluations and quality of life data

#### Sources searched to identify economic evaluations

- Econlit (Ovid)
- Embase (Ovid)
- MEDLINE (Ovid)
- MEDLINE In-Process (Ovid)
- NHS Economic Evaluation Database (CRD)
- HTA Database (CRD)
- INAHTA

The NICE cost utility search filter was appended to the population and intervention search for the guideline. The search was conducted in November 2020

The search was limited to those in the English language. Animal studies were removed from results. The NICE UK geographical filter was also applied.

**Table 3: cost utility and UK geographic filters**

Medline Strategy	
<b>Cost utility</b>	
1	Cost-Benefit Analysis/ (82509)
2	Quality-Adjusted Life Years/ (12639)
3	Markov Chains/ (14588)
4	exp Models, Economic/ (15289)
5	cost*.ti. (106438)
6	(cost* adj2 utilit*).tw. (4919)
7	(cost* adj2 (effective* or assess* or evaluat* or analys* or model* or benefit* or threshold* or quality or expens* or saving* or reduc*).tw. (179323)
8	(economic* adj2 (evaluat* or assess* or analys* or model* or outcome* or benefit* or threshold* or expens* or saving* or reduc*).tw. (29657)
9	(qualit* adj2 adjust* adj2 life*).tw. (11461)
10	QALY*.tw. (9058)
11	(incremental* adj2 cost*).tw. (11108)
12	ICER.tw. (3351)
13	utilities.tw. (6030)
14	markov*.tw. (18438)
15	(dollar* or USD or cents or pound or pounds or GBP or sterling* or pence or euro or euros or yen or JPY).tw. (39287)
16	((utility or effective*) adj2 analys*).tw. (16197)
17	(willing* adj2 pay*).tw. (5464)
18	(EQ5D* or EQ-5D*).tw. (7306)
19	((euroqol or euro-qol or euroquol or euro-col or euro-col) adj3 ("5" or five)).tw. (1757)
20	(european* adj2 quality adj3 ("5" or five)).tw. (353)
21	or/1-20 (341317)
<b>UK geographic</b>	

### Medline Strategy

- 1 exp United Kingdom/ (368393)
- 2 (national health service\* or nhs\*).ti,ab,in. (165546)
- 3 (english not ((published or publication\* or translat\* or written or language\* or speak\* or literature or citation\*) adj5 english)).ti,ab. (89155)
- 4 (gb or "g.b." or britain\* or (british\* not "british columbia") or uk or "u.k." or united kingdom\* or (england\* not "new england") or northern ireland\* or northern irish\* or scotland\* or scottish\* or ((wales or "south wales") not "new south wales") or welsh\*).ti,ab,jw,in. (1752383)
- 5 (bath or "bath's" or ((birmingham not alabama\*) or ("birmingham's" not alabama\*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle\* or "carlisle's" or (cambridge not (massachusetts\* or boston\* or harvard\*)) or ("cambridge's" not (massachusetts\* or boston\* or harvard\*)) or (canterbury not zealand\*) or ("canterbury's" not zealand\*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina\* or nc)) or ("durham's" not (carolina\* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds\* or leicester or "leicester's" or (lincoln not nebraska\*) or ("lincoln's" not nebraska\*) or (liverpool not (new south wales\* or nsw)) or ("liverpool's" not (new south wales\* or nsw)) or ((london not (ontario\* or ont or toronto\*)) or ("london's" not (ontario\* or ont or toronto\*)) or manchester or "manchester's" or (newcastle not (new south wales\* or nsw)) or ("newcastle's" not (new south wales\* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worcester not (massachusetts\* or boston\* or harvard\*)) or ("worcester's" not (massachusetts\* or boston\* or harvard\*)) or (york not ("new york\*" or ny or ontario\* or ont or toronto\*)) or ("york's" not ("new york\*" or ny or ontario\* or ont or toronto\*)))))).ti,ab,in. (1170252)
- 6 (bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in. (45980)
- 7 (aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia\*) or ("perth's" not australia\*) or stirling or "stirling's").ti,ab,in. (171245)
- 8 (armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in. (21857)
- 9 or/80-87 (2255130)
- 10 (exp africa/ or exp americas/ or exp antarctic regions/ or exp arctic regions/ or exp asia/ or exp australia/ or exp oceania/) not (exp United Kingdom/ or europe/) (2923862)
- 11 9 not 10 (2101698)