

Type 1 diabetes in adults: diagnosis and management

Search strategies

NICE guideline <number>

Search strategies

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for Health and Care Excellence*

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1. Scoping search strategies

1.1 Scoping searches

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

| Guidelines/website | Systematic review/economic evaluations |
|--|--|
| American Diabetes Association | Campbell Collaboration |
| American Heart Association | Cochrane Database of Systematic Reviews (CDSR) |
| Audit Commission (Archived) | Database of Abstracts of Reviews of Effects (DARE) – last updated April 2015 |
| Australasian Association of Clinical Biochemists | DUETS |
| BMJ Best Practice | Health Technology Assessment (HTA) Database – last updated October 2016 |
| Canadian Medical Association Infobase | NHS Economic Evaluation Database (NHS EED) – last updated April 2015 |
| Care Quality Commission | NIHR Health Technology Assessment Programme |
| Clinical Effectiveness Group | NIHR Health Services and Delivery Research (HS&DR) Programme |
| Core Outcome Measures in Effectiveness Trials (COMET) | PROSPERO |
| Cross Border Patient Registries (PARENT) | TRIP Database |
| Department of Health & Social Care | |
| Diabetes Canada | |
| Diabetes UK | |
| Guidelines & Audit Implementation Network (GAIN) | |
| Guidelines International Network (GIN) | |
| Guidelines Trust (ECRI) | |
| Health & Social Care Information Centre | |
| Health Foundation | |
| Healthcare Quality Improvement Partnership | |
| Healthtalk Online | |
| ISD – NHS Scotland | |
| Medicines and Products Regulatory Agency (MHRA) | |
| National Audit Office | |
| National Clinical Audit and Patient Outcomes Programme | |
| National Health and Medical Research Council – Australia | |
| National Institute for Health and Care Excellence (NICE) - published & in development guidelines | |
| National Institute for Health and Care Excellence (NICE) - Topic Selection | |
| NHS Choices | |
| NHS Digital | |
| NHS England | |
| NHS London | |
| NICE Clinical Knowledge Summaries (CKS) | |

| Guidelines/website | Systematic review/economic evaluations |
|---|--|
| NICE Evidence Search Patient UK PatientsLikeMe PatientVoices PCORnet Public Health England Royal College of General Practitioners Royal College of Midwives Royal College of Nursing Royal College of Obstetricians and Gynaecologists Royal College of Ophthalmologists Royal College of Paediatrics and Child Health Royal College of Pathologists Royal College of Physicians Royal College of Radiologists Scottish Intercollegiate Guidelines Network (SIGN) UK Data Service UK National Statistics UK Research & Innovation US National Guideline Clearinghouse 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 (CDSR)
- EMBASE (Ovid)
- Health Technology Assessment Database – HTA (CDSR)
- MEDLINE (Ovid)
- MEDLINE Epub Ahead of Print (Ovid)
- MEDLINE In-Process (Ovid)
- PsycINFO (Ovid)

1.3 Identification of evidence for review questions

Searching was conducted on 22nd and 25th January 2021

Where appropriate, in-house and health-evidence.ca study design filters were used, to limit the retrieval to, for example, systematic reviews. 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

1: In adults with diabetes, what is the best combination of clinical characteristics to distinguish between a diagnosis of type 1 diabetes, type 2 diabetes and other forms of diabetes?

2: In adults with diabetes, what is the best marker (c-peptides plus or minus antibodies) to distinguish between a diagnosis of type 1 diabetes (caused by an absolute insulin deficiency usually resulting from autoimmune destruction of the insulin-producing beta cells in the pancreas), type 2 diabetes (insulin resistance and a relative insulin deficiency resulting in persistent hyperglycaemia) and other forms of diabetes

Table 1: search strategy

| Medline Strategy, searched 22nd January 2021 | |
|--|---|
| Database: Ovid MEDLINE(R) 1946 to January 20, 2021 | |
| Search Strategy: | |
| 1 | exp Diabetes Mellitus/ (435104) |
| 2 | diabet*.ti,ab. (560314) |
| 3 | (DM adj4 ("type 1" or type1 or "type I" or "type one" or T1 or T-1 or TI or T-I)).ti,ab. (1707) |
| 4 | lada.ti,ab. (548) |
| 5 | (dm1 or iddm or t1d* or dka).ti,ab. (19864) |
| 6 | (dm2 or t2d* or mody or niddm).ti,ab. (33965) |
| 7 | (DM adj4 (autoimmun* or auto immun* or brittle or labile or insulin depend* or insulin deficien*)).ti,ab. (320) |
| 8 | (DM adj4 onset* adj4 (maturit* or adult* or slow*)).ti,ab. (62) |
| 9 | (DM adj4 depend* adj4 (non-insulin* or non insulin* or noninsulin*)).ti,ab. (93) |
| 10 | (DM adj4 (earl* or sudden onset or juvenile or child*)).ti,ab. (868) |
| 11 | (DM adj4 (keto* or acidi* or gastropare*)).ti,ab. (77) |
| 12 | (DM adj4 ("type 2" or type2 or "type ii" or "type two" or T2 or T-2 or TII or T-II)).ti,ab. (4388) |
| 13 | (DM adj4 ("type 4" or type4 or "type iv" or "type four" or T4 or T-4 or TIV or T-IV)).ti,ab. (26) |
| 14 | or/1-13 (625888) |
| 15 | *Diabetes, Gestational/ (9473) |
| 16 | (gestation* or pregnan*).ti. (240132) |
| 17 | 15 or 16 (241299) |
| 18 | 14 not 17 (606366) |
| 19 | C-Peptide/ (8480) |
| 20 | ("c peptide*" or c-peptide or Cpeptide or ((connect* or gamma*) adj4 peptide)).ti,ab. (14059) |
| 21 | (creatinine* adj4 (ratio* or quota* or proportion*)).ti. (958) |
| 22 | Autoantibodies/ (68445) |
| 23 | (antibod* or anti bod* or autoantibod* or auto-antibod* or auto-anti-bod* or autoantigen* or auto-antigen* or auto-anti-gen*).ti,ab. (809480) |
| 24 | 22 or 23 (836306) |
| 25 | (islet cell or beta cell or decarboxylase or glutamic or insulin*).ti,ab. (391050) |
| 26 | "Islets of Langerhans"/ (36377) |
| 27 | glutamate decarboxylase/ (8348) |
| 28 | (glutam* adj4 (decarbox* or carbox*)).ti,ab. (9735) |
| 29 | insulinoma/ (4596) |
| 30 | glucose-6-phosphatase/ (5007) |

Medline Strategy, searched 22nd January 2021

Database: Ovid MEDLINE(R) 1946 to January 20, 2021

Search Strategy:

- 31 (glucose 6 phosphatase or glucosephosphatase).ti,ab. (4516)
- 32 Zinc Transporter 8/ (358)
- 33 zinc transporter 8.ti,ab. (214)
- 34 (islet adj4 (phosphatase or catalytic or subunit* or sub-unit*)).ti,ab. (193)
- 35 (igrp* or iaa* or ica* or ia-2* or ia2* or znt8* or gad* or CA512).ti,ab. (88151)
- 36 or/25-35 (491823)
- 37 24 and 36 (26275)
- 38 or/19-21,37 (42152)
- 39 Body Mass Index/ (130391)
- 40 ((body mass or quetelet*) adj2 index).ti,ab. (161895)
- 41 BMI.ti,ab. (124677)
- 42 "Age of Onset"/ (38449)
- 43 ((age* adj2 onset*) or age-of-onset or age-at-onset).ti,ab. (32173)
- 44 Ketones/ (15644)
- 45 ketone*.ti,ab. (22996)
- 46 Diabetic Ketoacidosis/ (6557)
- 47 (diabetic adj4 (ketoacidosis* or acidosis*)).ti,ab. (5276)
- 48 DKA.ti,ab. (1610)
- 49 Family Health/ (23544)
- 50 Genetic Predisposition to Disease/ (140910)
- 51 ((famil* or household* or forebear* or parent* or relativ*) adj4 health*).ti,ab. (51727)
- 52 (genetic* adj4 (predispos* or suscept*)).ti,ab. (36134)
- 53 addison disease/ (4603)
- 54 ((Addison* adj4 diseases*) or ((primar* adj4 (adren* adj4 insuff*)) or hypoadren*)).ti,ab. (4671)
- 55 anemia, hemolytic, autoimmune/ (5877)
- 56 ((H?emolyt adj4 An?emi*) or (cold adj4 (agglutin* or antibod*) adj4 diseases*)).ti,ab. (423)
- 57 anti-glomerular basement membrane disease/ (2034)
- 58 (((((Anti Glomerul* or Antiglomerul*) adj4 Basement* adj4 Membran*) or anti gbm) adj4 Diseases*) or (goodpasture* adj4 syndrom*) or (lung adj4 purpura adj4 nephrit*)).ti,ab. (1662)
- 59 anti-neutrophil cytoplasmic antibody-associated vasculitis/ (1866)
- 60 (((Anti Neutrophil adj4 Cytoplasm* adj4 Antibod*) or ANCA or pauci immune) adj4 Vasculit*).ti,ab. (3177)
- 61 antiphospholipid syndrome/ (8278)
- 62 ((anti phospholipid* or antiphospholipid* or hughes*) adj4 syndrom*).ti,ab. (8792)
- 63 arthritis, juvenile/ (10552)
- 64 arthritis, rheumatoid/ (100516)
- 65 ((Juvenil* or Rheumat*) adj4 (Arthrit* or oligoarthritis* or still or still*)).ti,ab. (103667)
- 66 "autoimmune diseases of the nervous system"/ (1245)
- 67 ((autoimmun* or immun*) adj4 (diseas* or disorder*) adj4 (nervous or neurologic*)).ti,ab. (3297)
- 68 autoimmune hypophysitis/ (121)
- 69 (((autoimmun* or idiopath* or lymphoid* or lymphocyt* or igg4*) adj4 (hypophys* or adenohypophys* or infundibuloneurohypophys*)) or (anti pit 1 adj4 antibod* adj4 syndrom*)).ti,ab. (708)
- 70 autoimmune lymphoproliferative syndrome/ (210)
- 71 (((autoimmun* adj4 lymphoproliferat*) or canale smith or caspase*) adj4 (syndrom* or deficien*)).ti,ab. (1324)
- 72 autoimmune pancreatitis/ (56)

Medline Strategy, searched 22nd January 2021

Database: Ovid MEDLINE(R) 1946 to January 20, 2021

Search Strategy:

- 73 (((autoimmun* or idiopath* or igg4*) adj4 pancreatit*) or type 1 aip or type 2 aip).ti,ab. (2689)
- 74 birdshot chorioretinopathy/ (105)
- 75 (birdshot adj4 (chorioretin* or retinochoroid*)).ti,ab. (320)
- 76 dermatitis herpetiformis/ (2711)
- 77 ((dermatit* adj4 herpetiform*) or (duhring* adj4 diseas*)).ti,ab. (2197)
- 78 glomerulonephritis, iga/ (6220)
- 79 (((IGA or immunoglob*) adj4 (glomerulonephrit* or neph*) or (berger* adj4 diseas*)).ti,ab. (7767)
- 80 glomerulonephritis, membranous/ (3253)
- 81 (((membran* or extramembran*) adj4 (glomeruloneph* or neuropath*)) or ((heyman or (idiopath* adj4 membran*)) adj4 nephrit*)).ti,ab. (4839)
- 82 graves disease/ (15216)
- 83 (((graves* or basedow*) adj4 diseas*) or (exophthal* adj4 goiter*)).ti,ab. (12330)
- 84 hepatitis, autoimmune/ (3663)
- 85 (autoimmun* adj4 hepatit*).ti,ab. (5702)
- 86 immunoglobulin g4-related disease/ (485)
- 87 (((Immunoglob* adj4 (G4-Related or G4related or "G4 Related"))) or IGG4*) adj4 (Diseas* or RD)).ti,ab. (2496)
- 88 linear iga bullous dermatosis/ (163)
- 89 (Linear* adj4 (Bullous* or IGA) adj4 Dermatos*).ti,ab. (535)
- 90 lupus erythematosus, systemic/ (55215)
- 91 ((Lupus* adj4 Erythemat*) or libman sacks).ti,ab. (54765)
- 92 ophthalmia, sympathetic/ (722)
- 93 (sympathetic* adj4 (ophthal* or uveit*)).ti,ab. (780)
- 94 pemphigoid, bullous/ (3769)
- 95 pemphigus/ (8304)
- 96 pemphig*.ti,ab. (13113)
- 97 polyendocrinopathies, autoimmune/ (1260)
- 98 ((autoimmun* adj4 (polyendocrin* or polygland*)) or apeced or ((aire or multiple endocrin*) adj4 deficien*) or aps type 1 or (schmidt* adj4 syndrom*)).ti,ab. (1584)
- 99 purpura, thrombocytopenic, idiopathic/ (6473)
- 100 (((autoimmune* or idiopath* or immun*) adj4 thrombocytopen) or (werlhof* adj4 diseas*)).ti,ab. (263)
- 101 thyroiditis, autoimmune/ (7095)
- 102 ((autoimmun* or lympho*) adj4 thyroidit*).ti,ab. (4534)
- 103 undifferentiated connective tissue diseases/ (106)
- 104 (Undifferent* adj4 Connect* adj4 Tissue* adj4 Diseas*).ti,ab. (347)
- 105 Celiac Disease/ (20209)
- 106 ((c?eliac* or nontropic* or non-tropic*) adj4 (diseas* or sprue*)).ti,ab. (16804)
- 107 (gluten* adj4 enteropath*).ti,ab. (956)
- 108 exp Hypothyroidism/ (32985)
- 109 hypothyroid*.ti,ab. (31537)
- 110 ((tsh or thyroid stimulat* hormone*) adj4 deficienc*).ti,ab. (435)
- 111 exp Hyperthyroidism/ (43541)
- 112 hyperthyroid*.ti,ab. (21545)
- 113 Gastritis, Atrophic/ (2659)
- 114 (atrophic* adj4 gastrit*).ti,ab. (3909)

Medline Strategy, searched 22nd January 2021

Database: Ovid MEDLINE(R) 1946 to January 20, 2021

Search Strategy:

- 115 Population Characteristics/ (11414)
- 116 (populat* adj4 (character* or heterogen* or statistic*)).ti,ab. (43708)
- 117 (ethnic* or nationalit*).ti,ab. (130158)
- 118 Weight Loss/ (37326)
- 119 (weigh* adj4 (loss* or reduc*)).ti,ab. (112549)
- 120 Time-to-Treatment/ (7646)
- 121 ("time to treatment*" or "door to treatment*" or (delay* adj4 (treatment* or therap*))).ti,ab. (40610)
- 122 or/39-121 (1229839)
- 123 38 or 122 (1264950)
- 124 18 and 123 (120102)
- 125 (sensitiv: or predictive value:).mp. or accurac:.tw. (1926164)
- 126 124 and 125 (14119)
- 127 animals / not humans/ (4745641)
- 128 126 not 127 (13366)
- 129 Comment/ or Letter/ or Editorial/ or Historical article/ or (conference abstract or conference paper or "conference review" or letter or editorial or case report).pt. (2099477)
- 130 128 not 129 (13263)
- 131 limit 130 to english language (12626)

Note: *In-house observational, McMaster optimal diagnostic and health-evidence.ca systematic review filters were appended. No date limit was used as these were new 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.

Diagnostic studies (Optimal)

1. (sensitiv: or predictive value:).mp. or accurac:.tw.

Observational studies

1 Observational Studies as Topic/

2 Observational Study/

3 Epidemiologic Studies/

4 exp Case-Control Studies/

5 exp Cohort Studies/

6 Cross-Sectional Studies/

7 Controlled Before-After Studies/

8 Historically Controlled Study/

9 Interrupted Time Series Analysis/

10 Comparative Study.pt.

11 case control\$.tw.

12 case series.tw.

13 (cohort adj (study or studies)).tw.

14 cohort analy\$.tw.

15 (follow up adj (study or studies)).tw.

16 (observational adj (study or studies)).tw.

17 longitudinal.tw.

18 prospective.tw.

19 retrospective.tw.

20 cross sectional.tw.

21 or/1-20

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)
- International HTA Database (INAHTA)
- MEDLINE (Ovid)
- MEDLINE In-Process (Ovid)
- MEDLINE Epub Ahead of Print (Ovid)
- NHS Economic Evaluation Database (CRD)
- PsychINFO (Ovid)

Search filters to retrieve economic evaluations and quality of life papers were appended to the population search for the guideline and the McMaster optimal diagnosis filter. The search was conducted on 24th January 2021.

The search was limited to those in the English language. Animal studies were removed from results.

Table 3: Economic evaluation and quality of life filters

| Medline Strategy | |
|-----------------------------|--|
| Economic evaluations | |
| 1 | Economics/ |
| 2 | exp "Costs and Cost Analysis"/ |
| 3 | Economics, Dental/ |
| 4 | exp Economics, Hospital/ |
| 5 | exp Economics, Medical/ |
| 6 | Economics, Nursing/ |
| 7 | Economics, Pharmaceutical/ |
| 8 | Budgets/ |
| 9 | exp Models, Economic/ |
| 10 | Markov Chains/ |
| 11 | Monte Carlo Method/ |
| 12 | Decision Trees/ |
| 13 | econom\$.tw. |
| 14 | cba.tw. |
| 15 | cea.tw. |
| 16 | cua.tw. |
| 17 | markov\$.tw. |
| 18 | (monte adj carlo).tw. |
| 19 | (decision adj3 (tree\$ or analys\$)).tw. |
| 20 | (cost or costs or costing\$ or costly or costed).tw. |
| 21 | (price\$ or pricing\$).tw. |
| 22 | budget\$.tw. |
| 23 | expenditure\$.tw. |

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- 24 (value adj3 (money or monetary)).tw.
- 25 (pharmacoeconomic\$ or (pharmaco adj economic\$)).tw.
- 26 or/1-25

Quality of life

- 1 "Quality of Life"/
- 2 quality of life.tw.
- 3 "Value of Life"/
- 4 Quality-Adjusted Life Years/
- 5 quality adjusted life.tw.
- 6 (qaly\$ or qald\$ or qale\$ or qtime\$).tw.
- 7 disability adjusted life.tw.
- 8 daly\$.tw.
- 9 Health Status Indicators/
- 10 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).tw.
- 11 (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).tw.
- 12 (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).tw.
- 13 (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).tw.
- 14 (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).tw.
- 15 (euroqol or euro qol or eq5d or eq 5d).tw.
- 16 (qol or hql or hqol or hrqol).tw.
- 17 (hye or hyes).tw.
- 18 health\$ year\$ equivalent\$.tw.
- 19 utilit\$.tw.
- 20 (hui or hui1 or hui2 or hui3).tw.
- 21 disutili\$.tw.
- 22 rosser.tw.
- 23 quality of wellbeing.tw.
- 24 quality of well-being.tw.
- 25 qwb.tw.
- 26 willingness to pay.tw.
- 27 standard gamble\$.tw.
- 28 time trade off.tw.
- 29 time tradeoff.tw.
- 30 tto.tw.
- 31 or/1-30