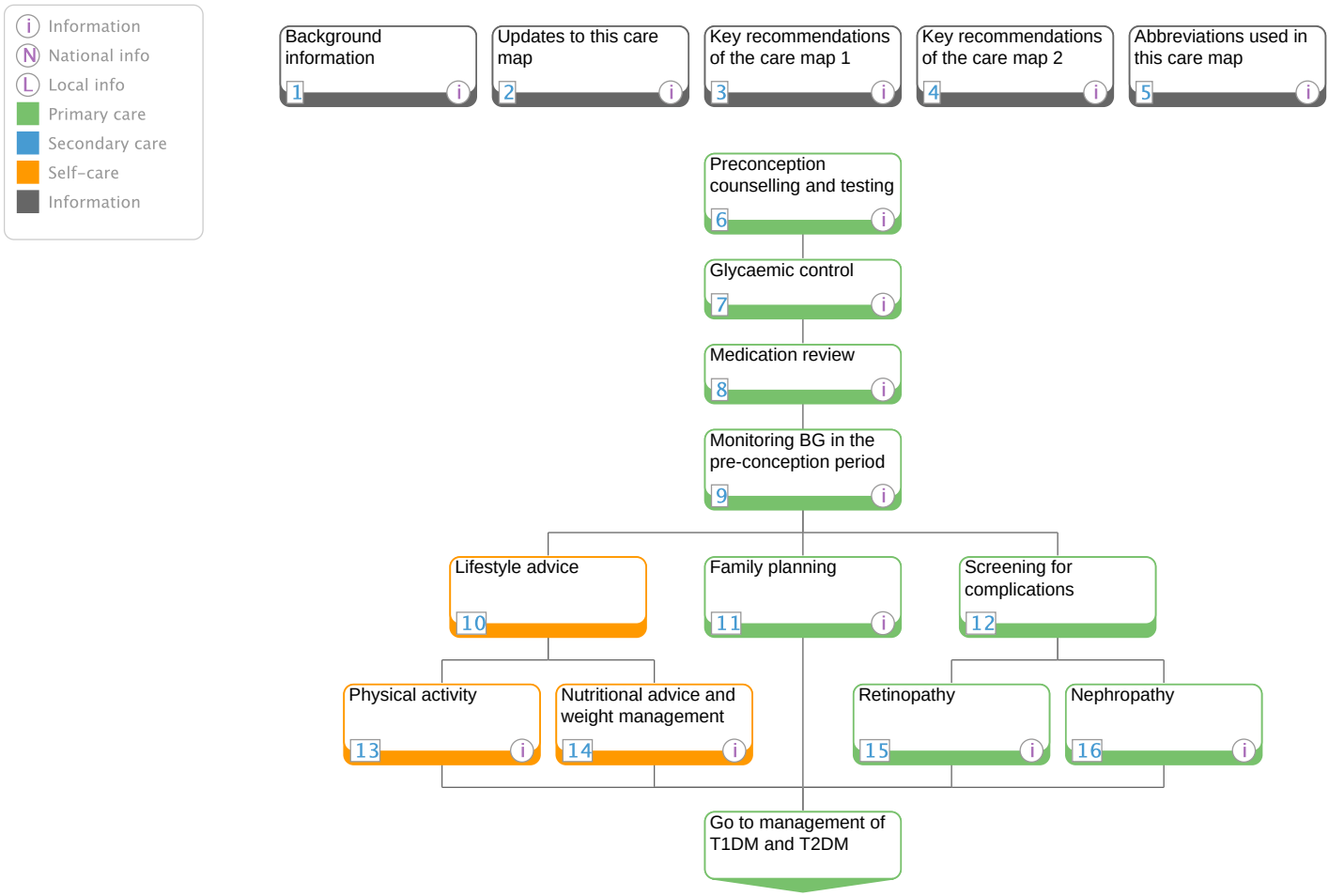
DM in pregnancy - preconception counselling and testing

Obstetrics and Gynaecology > Antenatal care > Diabetes mellitus (DM) in pregnancy



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DM in pregnancy - preconception counselling and testing

1 Background information

Quick info:

The purpose of this care map is to define the appropriate diagnosis and management of diabetes mellitus in pregnancy. The objective is to improve the appropriateness of investigation, prescribing, and referral of patients presenting to provider organisations in Qatar.

It is intended that the care map will be used primarily by midwives, nurses, and all physicians responsible for women with gestational diabetes or those with diabetes who become, or are intending to become, pregnant.

Scope

Aspects of care covered in this care map include the following:

- Assessment and management of diabetes mellitus in pregnancy, including:
  - Preconception counselling care.
  - Screening for diabetes in pregnancy.
  - Management of gestational diabetes and women with pre-existing diabetes mellitus.
  - Intrapartum and postnatal considerations.
  - Management of common complications.

Definition

GDM is defined as carbohydrate intolerance of variable severity, with onset or first recognition during pregnancy, that is neither pre-existing T1DM or T2DM [1].

Diabetes mellitus may predate conception and be either known to the patient or discovered during pregnancy [1-3]. Women who are discovered to have diabetes in the first trimester of pregnancy are classified as having diabetes in pregnancy, rather than GDM [1,3].

Epidemiology

The worldwide prevalence of hyperglycaemia in pregnancy is rising with the increasing prevalence of diabetes globally [2]. In 2015, the International Diabetes Federation estimated that 16.2% of all live births in women aged 20-49 were affected by hyperglycaemia [2].

The prevalence of GDM in Qatar may be as high as 16.3%, this is similar to developed countries such as Canada (17.8%) and France (12.1%) [4]. A Qatar-based study demonstrated that 45% of GDM is reported in women between the ages of 35-45 years [4].

It is expected that over the next 20 years the regions of the Middle East and North Africa will see the largest increase in the population of female diabetes mellitus patients [5]. 60% of women diagnosed with GDM subsequently develop T2DM within 4 years after delivery, increasing to 70% after 10 years [6].

References:

Please see the care map's Provenance.

2 Updates to this care map

Quick info:

Date of publication: 15-Sep-2017

Please see the care map's Provenance for additional information on references, contributors, and the editorial process.

3 Key recommendations of the care map 1

Quick info:

The key recommendations of this care map are:

Preconceptual care:

- Women of childbearing age with known diabetes should receive pre-conceptual care [1][**L2, RGA1**].
- Pre-pregnancy care should be part of their routine diabetes care irrespective of the setting [**R-GDG**].
- Care in a specialist pre-conception clinic should be provided jointly by the adult diabetes services and the maternity service for women wishing to become pregnant [**R-GDG**].
- Aim to keep HBA_{1C} <6.5% prior to conception, if it can be achieved without problematic hypoglycaemia [1,7,9][**L2, RGA1**].
- If HBA_{1C} is ≥10%, the absolute risk of congenital malformation increases significantly and women should therefore be advised not to become pregnant [7,9].
- Patients with T2DM should be managed with [1,7,9]:

- Diet alone; or
- Diet plus metformin; or
- Metformin plus insulin.
- NB: Metformin has been shown to be safe and efficacious during pregnancy [10-12].
- The safety profile of other oral hypoglycaemic agents is not known and should be stopped prior to conception [13-16].

- Insulin use in pregnancy [7,9,13-17]:
  - Rapid-acting insulin analogues – aspart and lispro – are approved in pregnancy and should be continued. They are more advantageous than soluble human insulin during pregnancy in reducing the risk of hypoglycaemia.
  - Insulin glulisine is not approved in pregnancy.

Screening for diabetes in pregnancy:

- See the '*Screening for diabetes in pregnant women*' care point in the '*DM screening during pregnancy*' page for screening tests to be undertaken in average-risk and high-risk women during pregnancy.
- See the '*RED FLAG! Referral to the Emergency Department*' and '*Urgent referral to specialist antenatal care*' care points in the '*DM screening during pregnancy*' page for referral criteria for women who are diagnosed with GDM or diabetes during pregnancy.

Management of GDM:

- Antenatal care for women with GDM should be provided by a multidisciplinary team [**R-GDG**].
- Change in lifestyle is essential in the management of women with GDM, and in some cases may be the only treatment required [1,7][**L1**]:
  - Women should adhere to the acceptable weight gain limits (in the '*Weight management*' care point on the *'Management of GDM'* page) during pregnancy in order to minimise the risk of complications, but active weight loss should not be attempted [**R-GDG**].
  - All patients with GDM should be referred to a dietitian for dietary planning [1,7][**L2**].
- Every patient should have a reliable and recently calibrated glucometer at home [7].
- Patients on diet management alone, metformin therapy, or single dose of basal insulin should be advised to monitor their BG levels 4 times per day [7].
- Patients on multi-dose injections of insulin should be advised to monitor their BG levels, up to 6-7 times per day [7,18].
- If achievable without causing problematic hypoglycaemia, control should aim for [3,7,17,26][**L1, RGA2**]:
  - Fasting BG ≤5.3 mmol/L (<95 mg/dL).
  - 1 hour after meals ≤7.8 mmol/L (140 mg/dL).
  - 2 hours after meals ≤6.7 mmol/L (<120 mg/dL).
- Regular monitoring of HBA_{1C} is not recommended after measurement at initial diagnosis [7][**L2**].
- Metformin should be offered to patients with GDM if BG targets are not being achieved using diet and exercise within 1-2 weeks [7][**L1, RGA2**] (See the 'Metformin' care point in the 'Management of GDM' page).
- Insulin should be started if glycaemic control cannot be achieved with metformin, when metformin is contraindicated, or is not acceptable to patients [7] (See the 'Insulin' care point in the 'Management of GDM' page).

Fetal surveillance in women with GDM:

- Fetal surveillance includes [7]:
  - A viability scan and confirmation of gestational age, preferably at 7-9 weeks, but no later than 12 weeks, where possible.
  - Nuchal translucency scan at 11-13 weeks.
  - Fetal anomaly scan at 18-20 weeks.
  - Fetal growth and amniotic fluid volume assessment at 28-32 weeks and again at 36 weeks.
  - Further scans should depend upon glycaemic control and clinical judgment.
  - Maternal surveillance of fetal movements from 24 weeks onwards [**R-GDG**].

Post-natal care and advice:

- See recommendations in the *'Intrapartum and postnatal care'* page.

References:

Please see the care map's Provenance.

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4 Key recommendations of the care map 2

Quick info:

The key recommendations of this care map are:

Management of women with T1DM or T2DM in pregnancy:

- Every patient should have a reliable and recently calibrated glucometer at home [7].
- Patients on diet management alone, metformin therapy, or single dose of basal insulin should be advised to monitor their BG levels 4 times per day [7].
- Patient on multi-dose injections of insulin should be advised to monitor their BG levels up to 6-7 times per day [7,17].
- If achievable without causing problematic hypoglycaemia, control should aim for [3,7,17,26][**L1, RGA2**]:
  - Fasting BG <5.3 mmol/L (<95 mg/dL).
  - 1 hour after meals ≤7.8 mmol/L (140 mg/dL).
  - 2 hours after meals <6.7 mmol/L (<120 mg/dL).
- HBA_{1C} should be measured in the first clinic review and then at least once in each trimester or more frequently e.g. monthly [7,17,27].
- The HBA_{1C} target is ≤6.5% [1].
- An MDI regimen is recommended for the majority of patients [7,16,28].
- Patients with T2DM taking Metformin can be continued on their treatment as usual [7][**L2**].
- Patients should be empowered and taught how to adjust their own insulin doses.

Fetal surveillance in women with GDM:

- Fetal surveillance includes [7]:
  - A viability scan and confirmation of gestational age, preferably at 7-9 weeks, but no later than 12 weeks, where possible.
  - Nuchal translucency scan at 11-13 weeks.
  - Fetal anomaly scan at 18-20 weeks.
  - Fetal growth and amniotic fluid volume assessment at 28-32 weeks and again at 36 weeks.
  - Further scans should depend upon glycaemic control and clinical judgement.
  - Maternal surveillance of fetal movements from 24 weeks onwards [**R-GDG**].

Intrapartum care:

- Women with T1DM or T2DM:
  - Advise delivery by induction of labour (IOL) or elective caesarean section (if indicated) [7]:
    - Between 37^{+0} and 38^{+6} weeks of pregnancy – if there are no metabolic or other maternal or fetal complications and the diabetes is well controlled.
    - Before 37^{+0} weeks – if metabolic or other maternal or fetal complications are present, including poor maternal glycaemic control.
- Women with GDM:
  - Advise delivery no later than 40^{+6} weeks, if glycaemic control is satisfactory [7].
    - Offer elective delivery by IOL or caesarean section if delivery has not occurred by then.
  - If glycaemic control is unsatisfactory plan for delivery, as for women with T1DM or T2DM in pregnancy, as described above.

Glycaemic control during labour:

- Hourly BG monitoring is recommended, aiming to keep BG between 4-7 mmol/L [7][**L2**].
- For patients using insulin [7]:
  - Should be allowed light diet if desired.
  - VRII should be considered (as shown in this table) in the following situations:
    - With T1DM
    - All other patients with diabetes in pregnancy if the capillary BG is ≥7 mmol/L for two consecutive hours.
- For patients who are diet-controlled or using Metformin [7]:
  - VRII should only be commenced if the BG is ≥7 mmol/L for two consecutive hours.
- See the *'IOL'* and *'Caesarean section'* care points on the *'Intrapartum and postnatal care'* page for recommendations in women undergoing induction of labour or elective caesarean section.

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Women in pre-term labour:

- Diabetes is not a contraindication for steroid use [7].
- In the absence of contraindications, steroids should be given to women with diabetes in pregnancy in pre-term labour up to 36 weeks gestation [7].

Post-natal care and advice:

- See recommendations on the *'Intrapartum and postnatal care'* page.

References:

Please see the care map's Provenance.

5 Abbreviations used in this care map

Quick info:

The abbreviations used in this care map are as follows:

ACE
Angiotensin converting enzyme

ACR
Albumin-creatinine ratio

ARBs
Angiotensin receptor blockers

BG
Blood glucose

BMI
Body mass index

CGMS
Continuous glucose monitoring system

CTG
Cardiotocography

DKA
Diabetic ketoacidosis

eGFR
Estimated glomerular filtration rate

FBG
Fasting blood glucose (venous)

GDM
Gestational diabetes mellitus

HBA_{1c}
Glycated haemoglobin

HHS
Hyperglycaemic hyperosmolar state

IOL
Induction of labour

IUFD
Intrauterine fetal death

IUGR
Intrauterine growth restriction

MDI
Multi-dose injection

NPH
Neutral protamine Hagedorn

OGTT
Oral glucose tolerance test

PCOS

Polycystic ovary syndrome

SMBG

Self-monitoring of blood glucose

T1DM

Type 1 diabetes mellitus

T2DM

Type 2 diabetes mellitus

TSH

Thyroid stimulating hormone

VRII

Variable rate insulin infusion

6 Preconception counselling and testing

Quick info:

Women of childbearing age with known diabetes should receive pre-conceptual care [1][**L2, RGA1**]. Pre-pregnancy care outlined below should be part of their routine diabetes care irrespective of the setting. However, for women who cannot be managed in a primary/generalist care setting, referral to a specialist preconception clinic should be made [**R-GDG**].

Care in a specialist pre-conception clinic should be provided jointly by the adult diabetes services and the maternity service for women wishing to become pregnant [**R-GDG**].

The role of pre-conceptual care is as follows [1,3]:

- Health education and counselling on the risk of diabetes in pregnancy.
- Review medical and obstetric history.
- Advise on glycaemic control to optimise HBA_{1C}.
- Review medication.
- Screen for and manage complications.
- The complications of diabetes in pregnancy should be explained to the patients (see table attached below).

NB: 3-6 months' attendance for pre-pregnancy care is typically required to optimise glycaemic control and address all other issues [**R-GDG**].

The attached table outlines the possible complications to both mother and child as a result of maternal diabetes in pregnancy [3,7].

Serious, clinically significant hypoglycaemia is defined as a blood glucose (BG) of <3.0 mmol/L (54 mg/dL), while the BG alert value is defined as ≤3.9 mmol/L (70 mg/dL) [8]. The attached table outlines the thresholds for the classification of hypoglycaemia [8].

References:

Please see the care map's Provenance.

7 Glycaemic control

Quick info:

Emphasise the importance of glycaemic control:

- Aim to keep HBA_{1C} <6.5%, prior to conception, if it can be achieved without problematic hypoglycaemia [1,7,9][**L2, RGA1**]:
  - Good glycaemic control is necessary to reduce the risk of congenital abnormalities, miscarriage, stillbirth, and neonatal death [1,7,9].
  - However, explain that risks can be reduced but not entirely eliminated [7].
- If HBA_{1C} is ≥10%, the absolute risk of congenital malformation increases significantly and women should therefore be advised not to become pregnant. The patient should be informed of the associated risks should pregnancy occur (see attached table) [7,9].
- Patients with T2DM should be managed with [1,7,9]:
  - Diet alone; or
  - Diet plus metformin; or
  - Metformin plus insulin.

- NB: Metformin has been shown to be safe and efficacious during pregnancy [10-12] whilst the safety profile of other oral hypoglycaemic agents is not known and should be stopped prior to conception [13-16].

References:

Please see the care map's Provenance.

8 Medication review

Quick info:

Insulin use in pregnancy [7,9,13-17]:

- Rapid-acting insulin analogues – aspart and lispro, are approved in pregnancy and should be continued. They are more advantageous than soluble human insulin during pregnancy in reducing the risk of hypoglycaemia.
- Insulin glulisine is not approved in pregnancy.
- Intermediate-acting insulin (NPH) and basal insulin detemir are both approved in pregnancy.
- Insulin glargine initiation during pregnancy is not recommended currently. Patients whose diabetes is well controlled on insulin glargine do not need to discontinue it during pregnancy [16][**L2, RGA1**].
- Continuous subcutaneous infusion of insulin (insulin pump) may be considered for those otherwise unable to meet glycaemic targets. Patients should be referred to an endocrinologist with experience in pump management [**R-GDG**].

Other medication [1,7,9,18,19]:

- ACE inhibitors and ARBs should not be used during pregnancy. They should be discontinued before conception or as soon as pregnancy is confirmed. Alternatives include:
  - Labetalol, nifedipine, and methyldopa [7][**L2, RGA1**].
- Statins should be discontinued before conception or as soon as pregnancy is confirmed [7].

References:

Please see the care map's Provenance.

9 Monitoring BG in the pre-conception period

Quick info:

Advise the patient of the following [3,7]:

- Newer reliable glucometers or recently-calibrated glucometers should be used and the patient's monitoring technique should be reviewed [**R-GDG**].
- Women should be encouraged to record their BG measurements at a minimum of 3-4 times per day up to a maximum of 6-7 times per day.
- The ideal frequency of BG measurement will depend on the insulin regimen used and the frequency of hypoglycaemia – at a minimum this should include:
  - Fasting measures; and
  - Two hours after meals.
- If nocturnal hypoglycaemia is suspected, patients should be advised to measure their BG levels during the night also.

References:

Please see the care map's Provenance.

11 Family planning

Quick info:

Discuss family planning [1][**L1**]:

- Avoidance of unplanned pregnancy should be an essential component of diabetes education from adolescence for all women with diabetes [7].
- The need for preparation for pregnancy and pre-conceptual counselling should be emphasised during each and every diabetes annual review appointment.
- Prescribe contraception until HBA_{1C} has been optimised [1,7][**L1**]:

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- Choice of contraception should be based on the patient's preferences and risk factors.
- Oral contraceptives may be used in the absence of contraindications, e.g. cardiovascular disease, hypertension, proliferative retinopathy, or nephropathy:
  - In such patients, consider the use of the progesterone-only pill or Mirena coil.

- Before discontinuing contraception [7]:
  - Offer the patient preconception care and advice as above.

References:

Please see the care map's Provenance.

13 Physical activity

Quick info:

Physical activity in non-diabetic patients:

- Preconception physical activity reduces the risk of GDM [21].
- Physical activity is also an important part of a healthy pregnancy, and once pregnant, regular participation should be encouraged [22].

Physical activity in patients with diabetes mellitus [1]:

- At least 150 minutes per week of moderate-intensity aerobic exercise (50-70% of maximum heart rate) is recommended:
  - Spread-out over at least 3 days per week.
  - Ensure there are no more than two consecutive days without exercise.
- In patients with T2DM, if there are no contraindications, resistance training is recommended twice per week.
- Patients with T1DM should be advised about [18]:
  - Safe pre-exercise BG levels (typically ≥100 mg/dL depending on the individual and type of physical activity); and
  - Appropriate adjustment of insulin and meals/snacks to reduce hypoglycaemia.
  - Having a simple carbohydrate food readily available before, during, and after exercise for prevention or treatment of hypoglycaemia.

References:

Please see the care map's Provenance.

14 Nutritional advice and weight management

Quick info:

Nutritional advice:

- It is good clinical practice to provide dietary advice before, during, and after pregnancy – the diet should be based on low glycaemic index foods which are not excessive in fat [7].
- Women should be encouraged to achieve a normal BMI prior to pregnancy [7,16,20].
- Women with diabetes who are planning to become pregnant should be advised to take folic acid (5 mg/day) starting at least 3 months prior to conception and continuing until 12 weeks of gestation to reduce the risk of neural tube defect [9][**L2**].

References:

Please see the care map's Provenance.

15 Retinopathy

Quick info:

Retinopathy [1,7,25]:

- Retinopathy can deteriorate significantly during pregnancy.
- Fundal examination is advised prior to conception if not performed in the last 6 months.
- Patients with active retinopathy should be under the care of an ophthalmologist [**R-GDG**].

References:

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Please see the care map's Provenance.

16 Nephropathy

Quick info:

Nephropathy [1,16,23,24]:

- There is a strong association between pre-existing nephropathy and a poor pregnancy outcome.
- Worsening nephropathy and superimposed pre-eclampsia are amongst the most common causes of pre-term delivery in women with diabetes.
- The following tests should be undertaken in all women:
  - ACR.
  - Serum creatinine and eGFR.
- Patients with an abnormal ACR confirmed on repeated testing should be referred to a diabetologist for specialist review [**R-GDG**].
- If the eGFR is <40 mL/min/m^2 prior to conception, the woman may experience irreversible further decline in renal function as a consequence of the pregnancy [2]:
  - Such patients should be referred to a nephrologist for review [**R-GDG**].

References:

Please see the care map's Provenance.

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Diabetes in pregnancy

Provenance Certificate

Overview

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

This care map was approved on **15 Sep 2017**.

For information on changes in the last update, see the information point entitled 'Updates to this care map' on each page of the care map.

Editorial approach

This care map has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The care map will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this care map, has involved the following critical steps:

- Extensive literature search for well reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising physicians and subject matter experts from across provider organisations in Qatar.
- Independent review of the guideline by the Clinical Governance body appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Explicit review of the care map by patient groups was not undertaken.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

Sources of evidence

The professional literature published in the English language has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a clinical editor and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals (i.e. journals that are read and cited most often within their field).
3. Address an aspect of specific importance to the guideline in question.

Where included, the ‘goal length of stay’ stated within this guideline is supported by and validated through utilisation analysis of various international health insurance databases. The purpose of database analysis is to confirm the reasonability and clinical appropriateness of the goal, as an achievable benchmark for optimal duration of inpatient admission.

Evidence grading and recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
  - Meta-analyses.
  - Randomised controlled trials with meta-analysis.
  - Randomised controlled trials.
  - Systematic reviews.

- **Level 2 (L2):**
  - Observational studies, examples include:
    - Cohort studies with statistical adjustment for potential confounders.
    - Cohort studies without adjustment.
    - Case series with historical or literature controls.
    - Uncontrolled case series.
  - Statements in published articles or textbooks.

- **Level 3 (L3):**
  - Expert opinion.
  - Unpublished data, examples include:
    - Large database analyses.
    - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A1 (RGA1):** Evidence demonstrates at least moderate certainty of at least moderate net benefit.
- **Recommendation Grade A2 (RGA2):** Evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C1 (RGC1):** Evidence demonstrates a lack of net benefit; additional research is recommended.
- **Recommendation Grade C2 (RGC2):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.

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The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the Clinical Governance Group. The GDG members have reviewed and provided feedback on the draft guideline relating to the topic. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

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[1] Dr Ahmed Babiker attended the MOPH in his capacity as a Clinical Pharmacist and advisor on the availability of medications in Qatar.

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Responsibilities of healthcare professionals

This care map has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.
The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or carers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

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