



C3-Cloud

“A Federated Collaborative Care Cure Cloud Architecture for Addressing the Needs of Multi-morbidity and Managing Poly-pharmacy”

PRIORITY Objective H2020-PHC-25-2015 - Advanced ICT systems and services for integrated care

D7.1 Evidence Based Clinical Guideline Definitions and Flowcharts for Individual Chronic Conditions

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Contributors (Benef.)	Gunnar Klein, Liron Karni (ORU) Mikael Lilja (RJH) Arritzu Etxeberria, Rafael Rotaecche (OSAKIDETZA) Esteban de Manuel, Lola Verdoy (KG) Sarah N. Lim Choi Keung, Eda Bilici (WARWICK) Christopher Marguerie, Peter Hutchinson, Timothy Robbins, Phil Goode, Danny Roberts, Marie Beach (SWFT) Gokce Banu Laleci Erturkmen, Mustafa Yuksel (SRDC) Dipak Kalra (Eurorec)			
Responsible Author	Gunnar Klein		Email	gunnar.klein@oru.se
	Beneficiary	ORU	Phone	+46-768 090 460

EXECUTIVE SUMMARY

The core objective of this deliverable D7.1 “Evidence Based Clinical Guideline Definitions and Flowcharts for Individual Chronic Conditions” is to present logical flowcharts for the clinical guidelines to be used in the project for the four diseases Diabetes, Heart Failure, Chronic Kidney Disease and Depression. The three pilot sites have identified the guideline documents that are currently in use in the three regions. Even when restricted to these four health problems, there are a number of partially overlapping guidelines in use in all three countries with different audiences and origins. Guidelines are developed by national health agencies, regional bodies and professional societies. While European countries generally share the scientific background and interpretations, there are slight variations in the recommendations. It is also noted that there is no case of existing computerized guidelines for these four diseases being used with patient specific data in an algorithmic way as proposed in the C3-Cloud project.

The project partners decided to base the common work in C3-Cloud on the available guidelines from the English National Institute for Clinical Excellence (NICE) that are well known and appreciated in the three countries as being well researched. It is noteworthy that although there are four diseases there are a number of other linked guidelines for various details of the therapies recommended, some of which are common for several diseases, e.g. blood pressure treatment.

The major part of the deliverable consists of the 43 flowcharts that model the clinical recommendations from the NICE text documents. In a few cases, there are national deviations to the English recommendations. These have been noted as comments to the flowcharts and will be taken into account in the localisations to be developed in the project.

In addition to the guidelines based on the four diseases of C3-Cloud, the deliverable analyses the availability and need for some guidance supported by ICT, relating to medication, which will also be implemented in C3-Cloud. Medication guidance relates to Contraindications, Interactions, Registered hypersensitivity, special concerns for the elderly, and finally, the management of multimorbidity.

It is important to note that the work in Task 7.1 will be continued in two tracks within the project that will further the analysis and make the necessary pragmatic decisions on the actual design of the C3-Cloud pilot application. This is the work flow analysis in Task 4.1 and the clinical decision support modules in Task 7.2.

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1. INTRODUCTION

1.1. Purpose and role of this task in the project

The purpose of Task 7.1 is to identify the evidence based clinical guidelines for individual chronic conditions that are targeted in the project, namely diabetes, heart failure, renal failure and depression. This task includes the refinement and localization of existing guidelines, but does not cover the development of new guidelines. The definitions of the guidelines will be represented clearly and enriched with flowcharts, in a way that can be easily understood by the technical partners and modelled in computer executable manners.

Other work tasks that depend on the outcomes of Task 7.1 include: Task 7.2 (*Clinical Decision Support Modules for Personalised Care Plan Development and Execution*), Task 7.4 (*Development of Coordinated Care and Cure Delivery Platform through Integration of C3-Cloud Components*), and Task 4.1 (*Guidance of the Development of New Patient Pathways and Corresponding Care Plans*).

1.2. Methodology

This task started with the identification of the clinical guidelines in use for the selected focus areas of the project: Diabetes, Chronic Heart Failure, Chronic Kidney Disease and Depression in the three pilot regions of Spain, Sweden and the UK. Different sources were identified from regional and national government agencies as well as professional societies. The project also searched for the existence of clinical recommendations of European professional societies. This survey of national and international recommendations identified a large number of guiding documents.

In addition to guidance on the different aspects of managing the four chronic diseases, the project had to consider sources of knowledge for some common aspects of supporting the use of medicinal products to avoid contraindications, drug interactions and hypersensitivity. The project also identified the need to manage special recommendations to deal with polypharmacy problems and the special risks with certain medicinal products for the elderly, our target population.

The clinical partners were then tasked with looking for commonalities in the guidelines for the development of the automatic decision support and care planning functionality.

The main task has been to select the core content of agreed guidelines and model that into flowcharts that can guide the further technical developments of the project by the technical partners. This is indeed a challenging task since the source guidelines are written for intelligent knowledgeable clinicians to consider and act upon, they are not designed in an algorithmic way. This analysis was carried out by clinicians who collaborated with modelling experts of the project resulted in a total of 43 flowcharts defining the major content of various aspects for all the four diseases.

The project decided to use the Modelio¹ freeware modelling tool and Business Process Model and Notation (BPMN) for the notations of the flowcharts.

In addition to the task of modelling the core common knowledge of the domain, the clinical parties identified in some cases the need for national deviations in the recommendations. These are described in the text associated with each relevant flowchart, to be taken into account in the further development and localisation of the C3-Cloud tools.

¹ <https://www.modelio.org/>

1.3. Definitions and Acronyms

Table 1: List of abbreviation/acronyms and their definition

Abbreviation/Acronym	Definition
A II	Angiotensine Receptor II Blocker. Same as ARB.
ACE	Angiotensine Converting Enzyme
ACEi	Angiotensine Converting Enzyme Inhibitor
ACR	Albumin: Creatinine Ratio
ADA	The American Diabetes Association
ADL	Activities Of Daily Living
ARB	Angiotensin Receptor Blockers
ATC	Anatomical Therapeutic Chemical
BB	Beta Blocker
BMI	Body Mass Index
BP	Blood Pressure
CBT	Cognitive Behavioral Therapy
CCB	Calcium Channel Blocker
CDSS	Clinical Decision Support Systems
CHF	Chronic Heart Failure
CKD	Chronic Kidney Disease
CPG	Clinical Practice Guidelines
CVD	Cardio Vascular Disease
DPP-4	Dipeptidylpeptidase-4
DSM-V	Diagnostic And Statistical Manual Of Mental Disorders, Fifth Edition
EASD	The European Association For The Study Of Diabetes
ECT	Electroconvulsive Therapy
eFI	Electronic Frailty Index
eGFR	Estimated Glomerular Filtration Rate
EHR	Electronic Health Records
Es	Electrolytes (Na, K)
FBC	Full Blood Count
GFR	Glomerular Filtration Rate
GLP-1	Glucagon-Like Peptide-1
GP	General Practitioner

Abbreviation/Acronym	Definition
HbA1c	Glycated Hemoglobin A1c
IPT	Interpersonal Therapy
K	Serum Potassium
NDR	The Swedish National Diabetes Register
NICE	National Institute For Health And Care Excellence (In England)
NPH	Neutral Protamine Hagedorn
NYHA IV	New York Heart Association Classification Class Iv
ORU	Örebro University
PEONY	Predicting Emergency Admissions Over The Next Year
QRISK2	Cardiovascular Disease Risk Calculator 2
RASA	Renin-Angiotensine System Antagonist (ARB or ACEi)
RCGP	Royal College Of General Practitioners (England)
RJH	Region Jämtland Härjedalen
SALAR/SKL	The Swedish Association Of Local Authorities And Regions
SBU	The Swedish Agency For Health Technology Assessment
SGLT-2	Sodium/Glucose Cotransporter 2
SIGN	Scottish Intercollegiate Guidelines Network
SSRI	Selective Serotonin Reuptake Inhibitor
START	Screening Tool To Alert To Right Treatment
STOPP	Screening Tool Of Older People's Prescriptions
SWFT	South Warwickshire Foundation Trust
U	Urea

2. GUIDELINES USED IN THE THREE PILOT REGIONS

2.1. Clinical Guidelines used in Osakidetza, Basque Country, Spain

2.1.1. Introduction

The clinical guidelines used are developed by institutions recognized by their high methodological rigor: National (Spanish) Program of Clinical Practice Guideline, SIGN (Scottish Intercollegiate Guidelines Network), NICE (The English National Institute for Health and Care Excellence), National Guidelines Clearinghouse, etc.

GuíaSalud² is the organisation of the National Health System of Spain. It includes the participation of 17 autonomous communities and the Health Ministry. It was created in 2002 to improve the quality of health care in the National Health System. The clinical guidelines from GuíaSalud are not regularly updated. **Osakidetza**³ (The Basque Health Public Service) also develops Clinical Practice Guidelines (CPG) [1], although there is no corporate strategy on this topic. The CPG from Osakidetza are updated every 5 years. **Fisterra**⁴ is another source of clinical guidelines used primarily in the primary care area.

The real use of the guidelines is very uneven among the different professionals, finding large differences between primary and hospital care. On top on this, there is far too little concrete information on its use. In general, the specialists use more the clinical guidelines from their scientific societies and less the ones from Osakidetza or GuíaSalud. While in primary care, the practice clinical guidelines most used are from Fisterra and Osakidetza.

It has been agreed to base the C3-Cloud project on the NICE guidelines. These guidelines are well-known in the Basque Country and the ones targeting the four pathologies of interest for C3-Cloud project have been recently updated.

2.1.2. Diabetes Guidelines

The guidelines used for diabetes are:

- Clinical practice guideline about Diabetes developed by Osakidetza in 2013 [2]
- NICE guideline NG28: Type 2 diabetes in adults: management (published in December 2015) [3]
- NICE Pathway - Type 2 diabetes in adults [4]

2.1.3. Chronic Heart Failure Guidelines

The main sources for chronic heart failure (CHF) are:

- Clinical practice guideline about heart failure being developed by GuíaSalud [5]
- NICE guideline CG108: Chronic heart failure in adults: management [6]

² <http://portal.guiasalud.es/>

³ <http://www.osakidetza.euskadi.eus/>

⁴ <http://www.fisterra.com/>

2.1.4. Chronic Kidney Disease Guidelines

Currently a clinical practice guideline about Chronic Kidney Disease (CKD) is in an edit phase by GuíaSalud [7]. Until this is ready, the NICE guideline on Chronic Kidney Disease in adults: assessment and management (CG182) [8, 9] is used in the Basque Country.

2.1.5. Depression Guidelines

Among the GuíaSalud institutional guidelines, the one about depression has been updated in 2014 [10]. The NICE guideline [11] and clinical pathway [12] on Depression are also used in the Basque Country.

2.1.6. Computer-use, multimorbidity and other guidelines of interest

The clinical guidelines from GuíaSalud have not been designed with the purpose of being computer interpretable. There is no guideline in use for the specific diseases that is using EHR data to provide patient specific advice. The pathways from NICE are designed to be read from a computer screen and contain hypertext.

The multimorbidity guidance is identified as a pending and suboptimal task. Thus, some efforts are already being committed on this issue and currently there are several available resources that can provide some guidance:

- Chapter of “Manual for the Development of Clinical Practices Guidelines (CPG)” in the National Health System (in press): Addressing comorbidity and multiple pathologies [13].
- Fistera comorbidity and bibliographic support tool [14].
- Literature review carried out by Arritxu Etxeberria and Rafa Rotaecche (OSAKIDETZA project partner team members)
- Diseases (ICD-9-10), drugs (ATC classification implemented in Presbide, the electronic prescription system in the Basque Country), Preferential Offer (OP) “Recommended drugs” in Osakidetza (with alerts when they have not been met / not achieved; and goals envisaged for the four diseases).

2.2. Clinical Guidelines used in Region Jämtland-Härjedalen, Sweden

2.2.1. Introduction

There is no central approval process in the region for the guidelines and generally, there are no guidelines produced by the region itself. The region uses national or sometimes international guidelines.

The National Board of Health and Welfare (Socialstyrelsen) in Sweden [15] publishes guidelines on a few but important health problems including Diabetes, Depression and Heart Diseases relevant for C3-Cloud. In addition, the Swedish Medical Products Agency (Läkemedelsverket) [16] produces guidelines for some diseases and reviews the evidence for treatment with medicinal products. In addition, the Swedish Agency for Health Technology Assessment (SBU) [17] produces literature reviews in the Cochrane style for certain diseases and treatments. Furthermore, the Swedish Association of Local Authorities and Regions (SALAR/SKL) [18] produces guidelines for nurses and primary care. For some diseases, Sweden uses European or other international guidelines or recommendations from national professional societies which is the case for Chronic Kidney Disease.

There are no cases where these guidelines are available as easy-to-use computerized clinical pathways. These are a collection of text files or sometimes websites with useful information mainly for continuous education purposes and rarely as a look-up tool for the treatment of individual patients.

2.2.2. Diabetes Guidelines

- a. Guidelines from the National Board of Health and Welfare:
 - National guidelines for diabetes care “Nationella riktlinjer för diabetesvård” [19]
 - Guideline for food and nutrition [20]
- b. Guidelines from the Swedish Medical Products Agency:
 - Drug treatment for type 2 Diabetes [21]
- c. Guidelines from the American Diabetes Association and the European Association for the Study of Diabetes (ADA/EASD) on hyperglycemia [22]
- d. Guidelines from SALAR/SKL (The Swedish Association of Local Authorities and Regions) mainly for nurses, and group education for patients.
 - Treatment Strategies for type 1, type 2 diabetes and for elderly with diabetes [23].

2.2.3. Chronic Heart Failure Guidelines

- a. Guidelines from the National Board of Health and Welfare: National guidelines for cardiac care “Nationella riktlinjer för hjärtsjukvård” [24].
- b. Guidelines from the European Society for Cardiology, 2016 [25].

2.2.4. Chronic Kidney Disease Guidelines

- a. Guidelines from the Swedish association of nephrologists [26]. Several international guidelines are mentioned, including:
 - Kidney Disease: Improving Global Outcomes (KDIGO). KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease [27].

2.2.5. Guidelines used for Depression

- a. Guidelines from the National Board of Health and Welfare: National guidelines for the treatment of depression and anxiety disorders “Nationella riktlinjer för vård vid depression och ångestsyndrom” [28].

2.2.6. Computer-use, multimorbidity and other guidelines of interest

There are no cases where these guidelines are available as easy-to-use computerized clinical pathways. These are a collection of text files or sometimes websites with useful information, mainly for continuous education purposes and rarely as a look-up tool for the treatment of individual patients.

Other guidelines that may be relevant for C3-Cloud are:

- a. Drug treatment of the frail elderly from the Committee on medication of the Uppsala-Örebro region [29].
- b. Guidelines for the seponation of drug treatment, especially for elderly⁵.
- c. Guidelines for the recognition of common health issues and risks in elderly, Deals with Fall Risks, Nutrition, Pressure ulcers, Oral hygiene, Urinary bladder function from Senior Alert⁶.

2.3. Clinical Guidelines used in South Warwickshire, United Kingdom

2.3.1. Introduction

Guidelines tend to be applied differently, and to differing degrees, across the various health care settings and by individual practices or practitioners. Additionally, the needs of individual patients mean that they often require bespoke management plans, which may not always conform strictly to guidance.

The specialist services, which manage the four diseases, generally follow NICE guidelines. It should be noted that there is a large volume of NICE guidance available for these conditions and the references provided are for the main resources, which have further links to more specialised guidance.

However, there are some local guidelines and pathways, which have been developed within South Warwickshire NHS Foundation Trust (SWFT), which tend to be based primarily on the prevailing NICE guidance at the given time. Again, only the high-level local guidelines have been included but more detailed guidelines are available which look at more specific aspects.

General Practitioners (GPs) follow NICE guidance and this is encouraged by the Quality Outcomes Framework (QOF) [30]. Patient journeys are outlined below for the four conditions specifically in general practice and community nursing.

2.3.2. Diabetes Guidelines

- a. National Institute for Health and Care Excellence (NICE):
 - Useful ‘map’ of the NICE guidance, with focus particularly directed to “NICE Pathways - mapping our guidance” set of resources [31].
- b. Joint British Diabetes Society (JBDS) guidelines [32].
- c. Scottish Intercollegiate Guidelines Network (SIGN)⁷, guidelines more focused on Scotland: Diabetes management [33].

2.3.3. Chronic Heart Failure Guidelines

- a. National Institute for Health and Care Excellence (NICE) CHF guideline [34].

⁵ <http://www.fasut.nu/>

⁶ <http://plus.rjl.se/senioralert>

⁷ <http://www.sign.ac.uk>

- b. Collection of guidelines (British Society for Heart Failure), with focus on multi-morbidity [35].
- c. Scottish Intercollegiate Guidelines Network (SIGN), guideline on heart failure [36].

2.3.4. Chronic Kidney Disease Guidelines

- a. NICE guideline on CKD [9].
- b. International Kidney Disease/Improving Global Outcomes - KDIGO Guidelines [27].
- c. SIGN Guideline on CKD [37].
- d. Renal Association guidelines [38].

2.3.5. Depression Guidelines

- a. NICE guidelines for depression [12].
- b. Royal College of General Practitioners (RCGP) guidelines [39], especially focused on:
 - “*Management of Depression in Older People: Why this is Important in Primary Care*” [40, 41].
 - “*Primary Care Guidance: Treating Depression in People with Coronary Heart Disease*” [42].
- c. SIGN guidelines on depression [43].

2.3.6. Computer-use, multimorbidity and other guidelines of interest

No guidelines for the four diseases used in SWFT are directly interacting with the patient record data despite the support for contraindications in relation to prescribing of medication. Recently (September 2016), NICE has published a guideline for clinical assessment and management of multimorbidity [44].

3. DESCRIPTION OF EUROPEAN GUIDELINES

3.1. General reflections

The C3-Cloud project at an early point of analysis of the strategy for dealing with clinical guidance in the project assumed that we could study and possibly use consensus guidelines agreed at a European scale. We present some of these which are relevant and important scientific publications taken into consideration by various national bodies providing clinical advice. However, we did not find it a useful strategy since they are not covering many of the issues we wanted to cover in C3-Cloud and because they are not used directly in any of the three pilot regions.

3.2. Diabetes clinical guidelines

There is no general European guideline on diabetes - instead, aspects of diabetes have separate guidelines. Probably the most suitable guideline is the ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD: the Task Force on diabetes, pre-diabetes, and cardiovascular diseases of the European Society of Cardiology (ESC) and developed in collaboration with the European Association for the Study of Diabetes (EASD) [25].

3.3. Chronic Heart Failure clinical guidelines

The European Society for Cardiology has published a guideline for CHF [45], used as a reference for some of the national guidelines.

3.4. Chronic Kidney Disease clinical guidelines

The European Renal Best Practice organization has a guideline on CKD in the elderly [46].

3.5. Depression clinical guidelines

There is no clear European guideline for depression. BMJ Best Practice provides a list of guidelines related to depression in adults [47].

4. GUIDELINES ANALYSIS

4.1. General reflections and Analysis approach

The original idea that was considered for our analysis was to compare every single recommendation of the relevant national guidelines to each other or with a common European guideline. That has not been feasible partly because of a lack of a clear European guideline in most cases. Another important issue was that the guideline documents contain a very large amount of recommendations presented in different structures and national languages, meaning that a complete comparison would have been an enormous task which also would include a lot of difficult clinical judgement which the project is not really set up to manage.

However, we found that the available clinical experts of all three regions agreed to base the C3-Cloud approach on the English guidelines from NICE. They are respected as they are well researched and well known. The controls that have been done reveal that the therapeutic practices are in fact quite similar in these three European countries. However, the clinical groups in the three pilot regions have reviewed the common flowcharts produced and where national deviations have been identified, these were noted to be taken into account in the further C3-Cloud development process.

It is also noteworthy that the guidelines are only advisory and does not algorithmically dictate any clinical practice. It will be the responsibility of each clinical expert involved in the project to make the final judgement on the therapies ordered taking into account a number of individual patient specific issues and possible deviations in some situations from the recommendations presented by C3-Cloud.

The focus on one set of clinical guidance from NICE does not mean the task was easy. We have analysed the detailed recommendations originally written and intended to be read by an expert clinician; and we considered how this text could be transformed into a logical flowchart and later to be implemented in a computer interpretable form in the C3-Cloud project.

This process required the following steps:

1. First phase review of the guidelines

The lead partner ORU first identified different sections related to the following processes, which were indicated in colour in the NICE documents:

- **YELLOW**: diagnostic recommendation
- **BLUE**: medication and other therapeutic recommendations
- **GREEN**: monitoring and follow-up
- **PURPLE**: possible interactions with other guidelines.

2. Identification of the major sections suitable for an individual flowchart diagram

These were presented in a spreadsheet referencing a specific chapter in the NICE documents.

3. Development of the flowchart diagrams based on careful review of the guideline documents

This task was divided among the pilot site partners, with RJH doing Diabetes, SWFT Heart Failure, KG Depression and ORU Chronic Kidney Disease. It included identifying different partial processes and showing both the patient process pathways and the decision logics (to be implemented in the Clinical Decision Support Modules of the project). Hand-drawn flowcharts were modeled into BPMN using the Modelio freeware tool. The project maintains Modelio project files and the images of each diagram are included in this deliverable.

It is important to note that the work in this Task 7.1 will be continued in two tracks within the project that will further the analysis and make the necessary pragmatic decisions on the actual design of the C3-Cloud pilot application. This is the work flow analysis in T4.1 and the clinical decision support modules in Task 7.2.

4.2. Focus area: Initial diagnostic process

In our analysis of the guidelines, we note that there are recommendations on the diagnostic process where C3-Cloud needs to identify the process steps where interaction with the EHR data and the care plan shall be made. However, the pilot use of the system will mainly take at its starting point patients that have already been diagnosed with one or more of the four chronic diseases. In some cases, there might be additional diagnostic challenges during the pilot phase and certainly if this system is used routinely in clinical practice, the diagnosis aspect will need to be addressed.

- The presentation of diagnostic or suggestive criteria already known
 - For symptoms and signs recorded in the EHR, an attempt should be made to retrieve these and present when applicable next to the criteria for diagnosis.
 - For laboratory values recorded in the EHR, one should similarly present them in relation to diagnostic cut off values.
- For symptoms and signs not recorded, the system shall either prompt the immediate recording or create a diagnostic plan to find out if they exist.
 - If laboratory tests or imaging need to be done there should be a link with the test ordering of the EHR system.
 - Note that this may be done in steps where additional tests are made based on the previous results.
- Finally, a clear decision point shall be prompted from the guideline where a responsible person integrates all of the information available and makes a decision and thus recording of the presence of one of our four diseases.

4.3. Focus area: Medication

- The guideline advice is often a series of recommendations on medication to be followed one after another if sufficient effect is not achieved. The process steps in relation to time between follow-up and new medication orders need to be elaborated and can only rarely be derived from the guideline.
- A link should be established between the recommendation of an active ingredient (often presented as a class of agents such as ACE inhibitors but it could also be quite specific as Metformin for diabetes) and the Medication prescribing system of the EHR. Usually the guidelines do not use ATC codings for medications but the project will need to use that in the further steps enhancing the guidelines with this information, noting that coding may need to occur on different levels of specificity. We should also consider if we need retroactive

notification (i.e. if a patient is diagnosed long time ago and already has one or two medications as recommended by the guideline) for positive acknowledgement and for reminders to reconsider if something is lacking or on the contrary should be taken away according to the recommendation. In addition to the general advice from guidelines on medication, a prescriber may need to take note of a local list of recommended medicinal products. This is often done in the prescription system but we need to consider if the general guideline need to be localized with such advice that may point at a specific product.

- Note that in several of the guidelines, there are treatment recommendations, which are not about medication, which we also need to consider.

4.4. Focus area: Continued monitoring and follow-up

- Many guidelines also contain recommended follow-up intervals and we need to agree in the project in what way those will be implemented in the clinical decision support modules. Options include requesting that a workflow engine runs in the background that automatically sets reminders, e.g. every two years for an ophthalmologist eye control and implementing reminders at each patient contact (with some conditions).
- Some indicators of patient state should clearly be indicated in the care plan and followed up. Like in the diagnostic process, some of these indicators require tests, others require physical examinations (e.g. take a blood pressure). We need to clarify the border between what is solved in the C3-Cloud by the care plan system and what is continued use of the decision support modules for the chronic conditions.

4.5. Focus area: Interaction between the different guidelines

We need to present an analysis of such potential conflicts, especially with regards to medication advice, but also taking different goals of the plan into account. There are certain provisions for several diseases already existing in some guidelines for individual diseases. Moreover, there are guidelines that are specifically trying to address multimorbidity. The very new guideline on Multimorbidity that became available from NICE in September 2016 is analysed separately, in Chapter 7.

In addition to the four diseases, this deliverable includes at least the following guidelines:




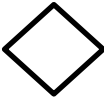

- Blood Pressure as it follows as a link from Diabetes and Renal Failure
- Recommendations on Polypharmacy Reduction for Elderly Patients
- Identification of Risk Medication for Elderly
- Risk Scores for Fall of Frail Elderly and Malnutrition but not CHADS (score for stroke risk assessment in atrial fibrillation)
- The deliverable also addresses Identification of Contraindications for the medications that are explicitly recommended by the C3-Cloud CDS but not Interactions, which are presumed to be already available in the Prescription Modules of the EHR systems we work with.
- The deliverable also makes explicit the starting point (Patient inclusion Criteria) for the Guidelines used.

5. FLOWCHARTS OF THE GUIDELINES

In this chapter, the guidelines that will be used in the project are represented as flowcharts.

5.1. Flowcharts Symbols

The following symbols are used at the modelling process:

Name	Flowchart Symbol	Usage
Start point		Indicates the starting of a process.
End point		Indicates the ending of a process.
Process		Represents a process, action, or function.
Decision		Indicates a point where the outcome of a decision dictates the next step. There can be multiple outcomes.
Flow arrow		Indicates the flowcharting path.

5.2. Flowcharts for Diabetes

5.2.1. Patient education

This flowchart is based on the NICE diabetes guideline, Chapter 1.2 [48, pp. 11–13].

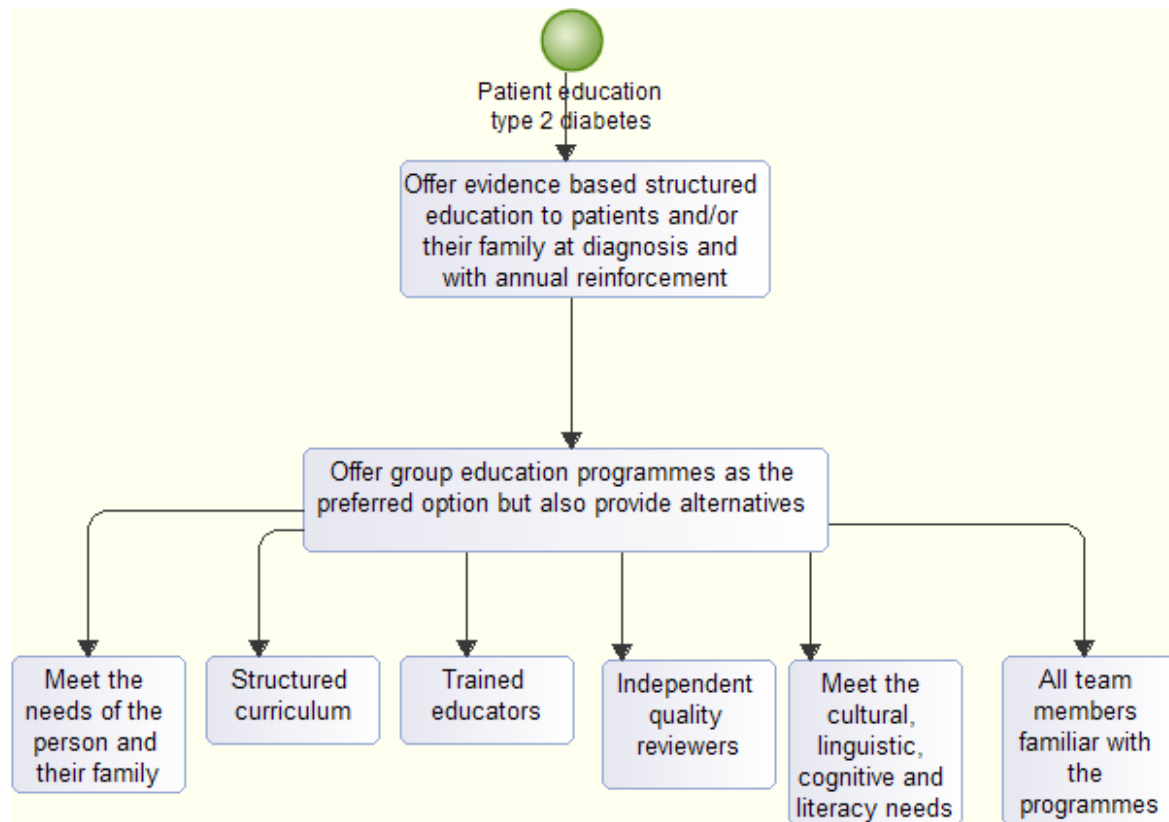


Figure 1: Diabetes - Patient education

5.2.2. Dietary advice

This flowchart is based on the NICE diabetes guideline, Chapter 1.3 [48, pp. 13–14].

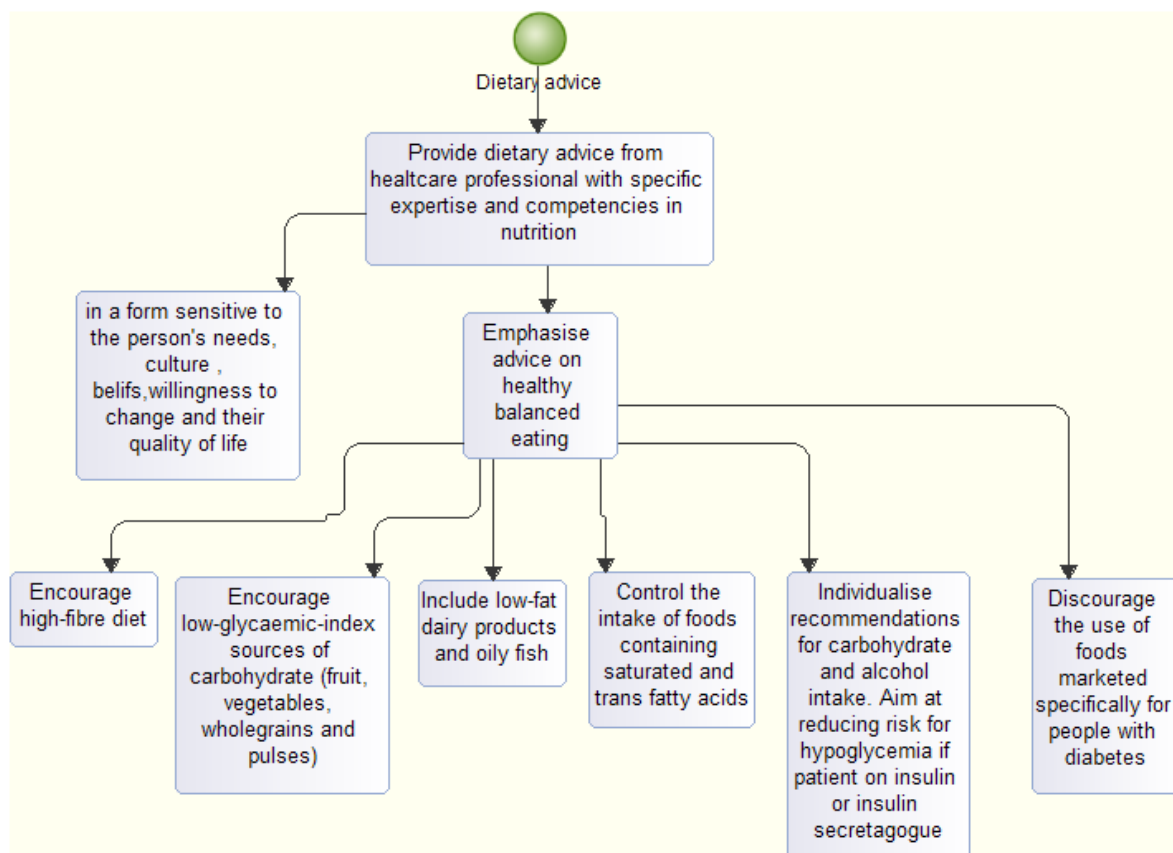


Figure 2: Diabetes - Dietary advice

5.2.3. Blood pressure management

This flowchart is based on the NICE diabetes guideline, Chapter 1.4 [48, pp. 14–16].

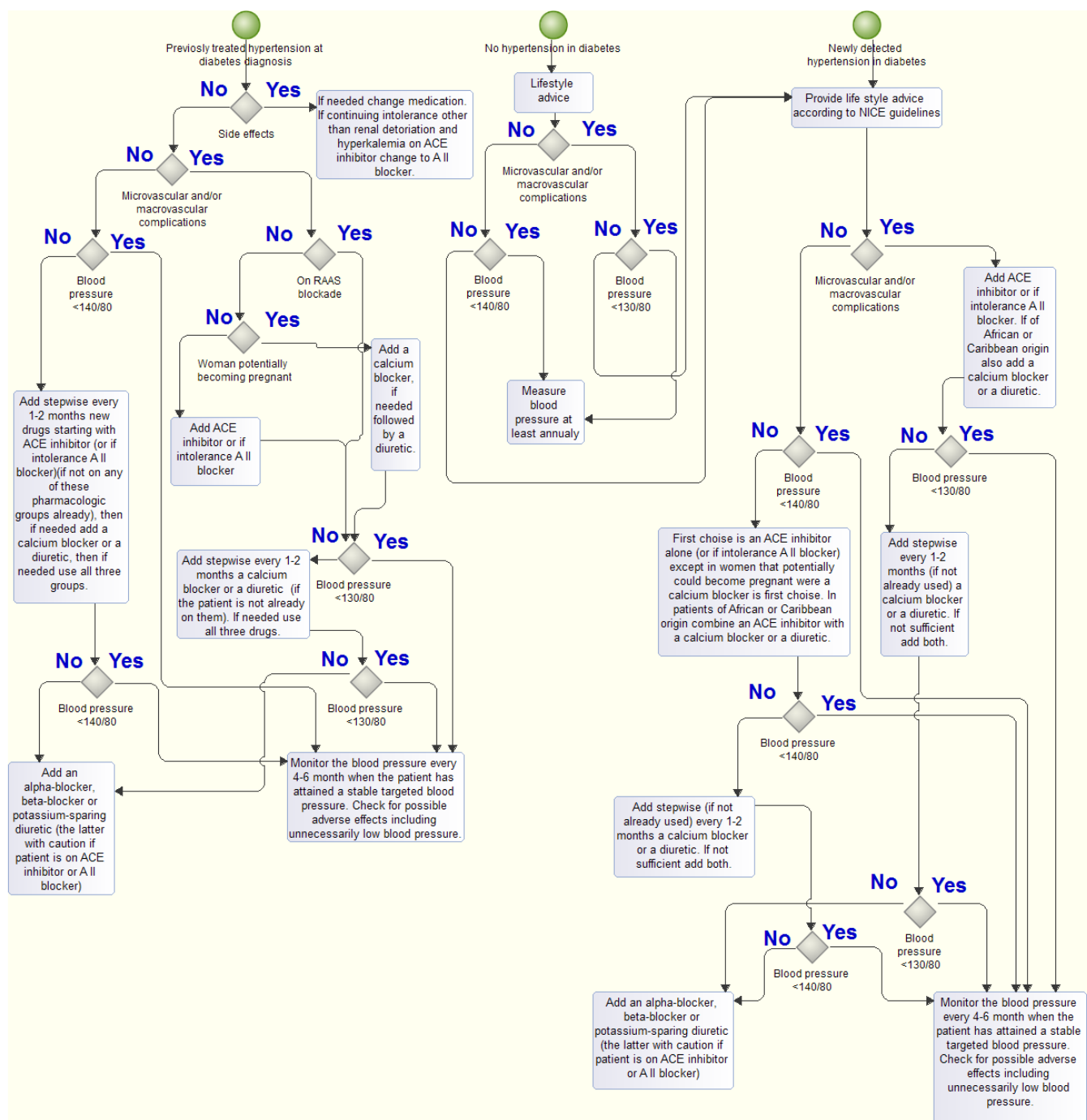


Figure 3: Diabetes - Blood pressure management

Abbreviations:

ACE: Angiotensin Converting Enzyme Inhibitor

A II: Angiotensine Receptor II

Deviation in Jämtland-Härjedalen, Sweden local guideline

Blood pressure target is <140/85 mmHg for uncomplicated diabetes type 2.

No other major differences.

Deviation in Basque Country, local guidelines

Diabetes guideline in is being updated. It recommends blood pressure targets of 140/90 mmHg, in both flows/branches. Proposal: 140/90 mmHg without complications, and with complication "Considering stricter blood pressure control, up to 120/80 mm Hg in patients with good antihypertensive tolerance and without a high degree of comorbidity". It affects all flows of the flowchart, which contain these figures.

5.2.4. Lipid lowering

This flowchart is based on the NICE guideline “Cardiovascular disease: risk assessment and reduction, including lipid modification”, Chapter 1.3.20-1.3.51 [49, pp. 20–26].

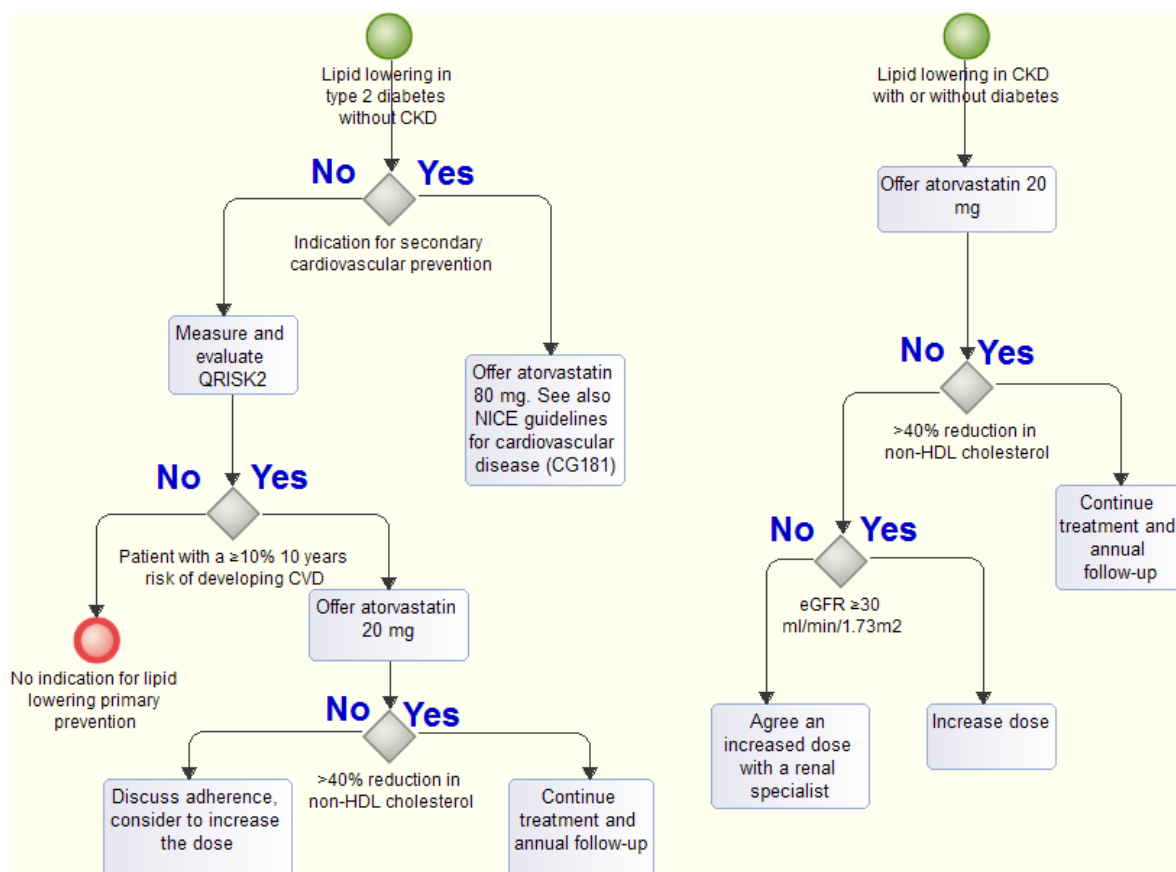


Figure 4: Diabetes - Lipid lowering

Abbreviation:

QRISK2: Cardiovascular Disease Risk Calculator⁸.

This cardiovascular risk score has been developed by the English National Health Service. Background and validation reports can be found on the QRISK website [50].

Deviations in Jämtland-Härjedalen, Sweden local guideline

The treatment with a statin is the target, not the amount of lipid lowering per se.

40-80 mg of a statin is recommended in secondary prevention.

20-40 mg in primary prevention.

QRISK2 is not a specific tool to evaluate risk in diabetes, it is a general cardiovascular risk tool. In the Swedish region, the Swedish National Diabetes Register (NDR) risk calculator⁹ is used.

At a five-year risk >8% statin treatment is recommended.

Deviation in Basque Country, local guideline

Use of Simvastatin 20-40 mg.

⁸ <https://www.qrisk.org/2016/>

⁹ <https://www.ndr.nu/IFrameRisk/>

5.2.5. Lipid modification therapy: follow up and monitoring

This flowchart is based on the NICE pathway “Lipid modification therapy for preventing Cardiovascular disease”, chapter 9 on follow-up and monitoring [51, pp. 11–12].

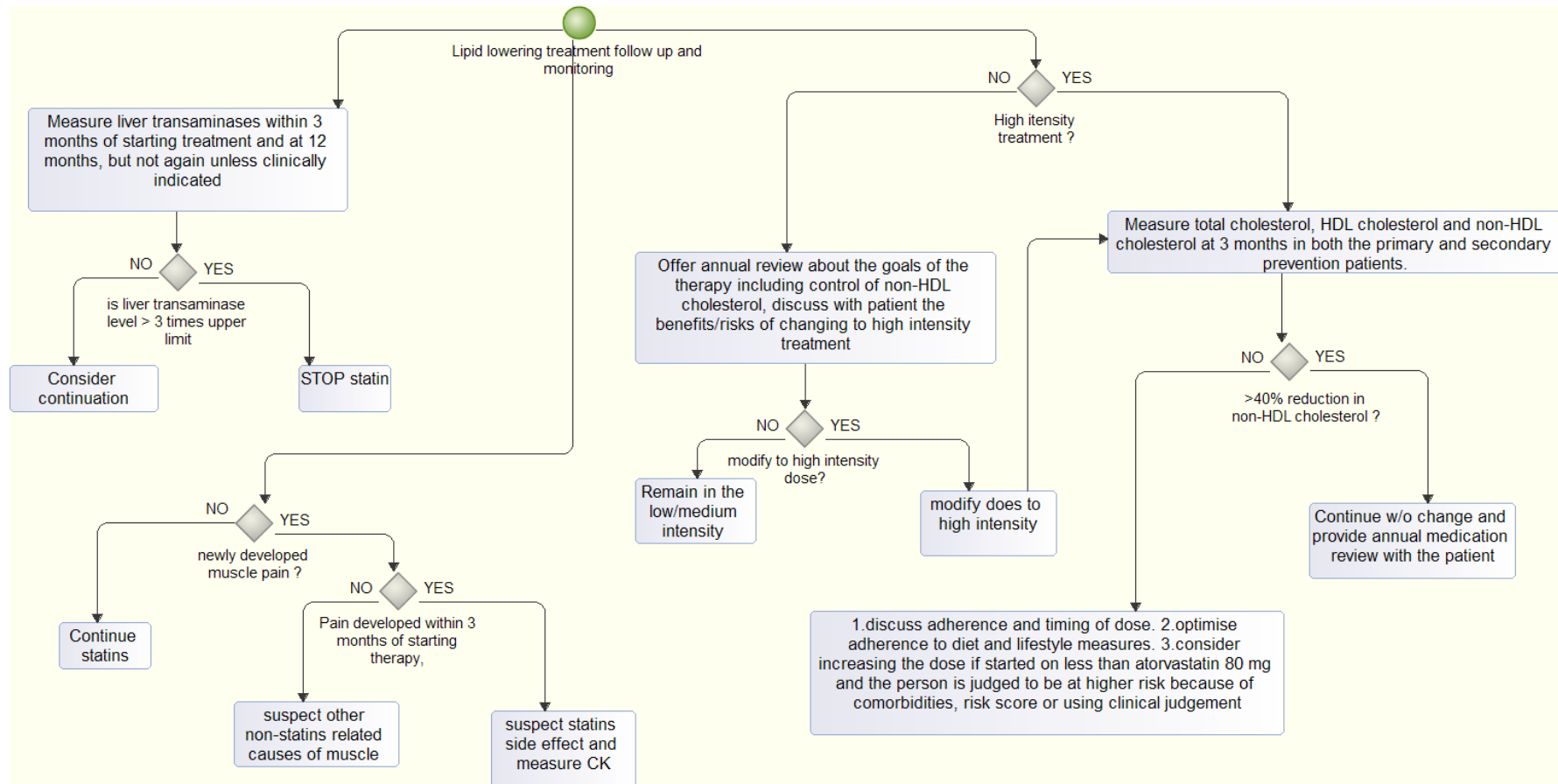


Figure 5: Diabetes - Lipid lowering treatment: follow up and monitoring

5.2.6. HbA1c measurements and targets

This flowchart is based on the NICE diabetes guideline, Chapter 1.6.1-1.6.11 [48, pp. 16–18].

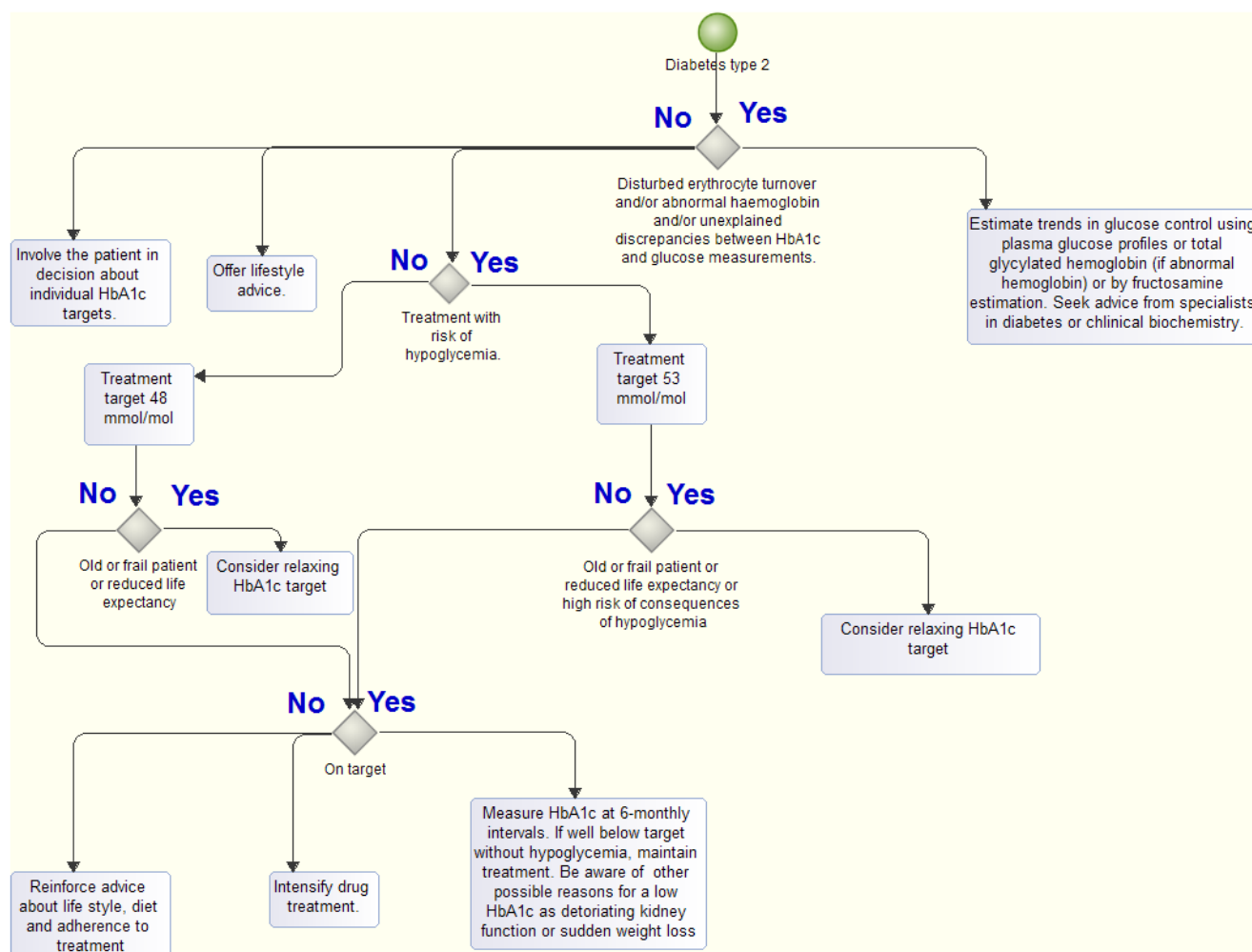


Figure 6: Diabetes - HbA1c measurements and targets

Abbreviations:

QRISK2: Cardiovascular Disease Risk Calculator 2

NDR: The Swedish National Diabetes Register

HbA1c: Glycated Hemoglobin A1c

Deviation in Jämtland-Härjedalen, Sweden local guideline

HbA1c target is < 52 mmol/mol, “lower early after diagnosis”.

Deviation in Basque Country, local guidelines

The general recommendation of the guidelines of the Ministry in this specific situation is 53 mmol/mol instead of 48 mmol/mol (7% instead of 6.5%), so the flow indicating 53 mmol/mol could be removed in our case.

53 mmol/mol (HbA1c 7%) as a general objective, if there is no risk of hypoglycaemia. In young patients, recently diagnosed and without comorbidity values of 48 mmol/mol (6.5%) can be considered.

5.2.7. Self-monitoring of blood glucose

This flowchart is based on the NICE diabetes guideline, Chapter 1.6.12-1.6.16 [48, pp. 18–19].

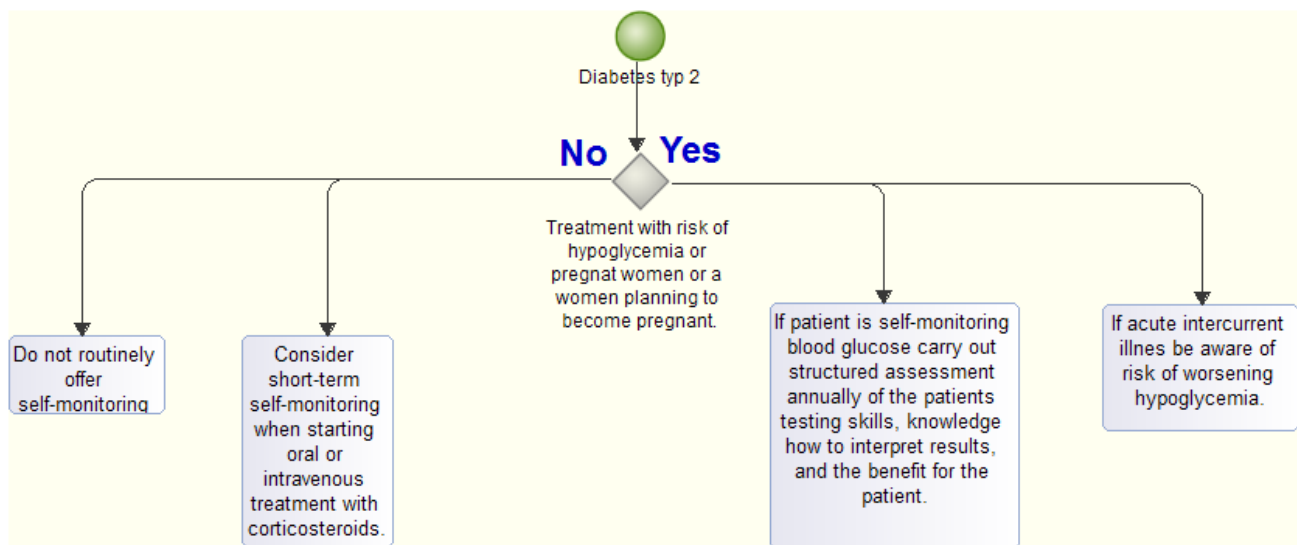


Figure 7: Diabetes - Self-monitoring of blood glucose

5.2.8. Initial drug treatment

This flowchart is based on the NICE diabetes guideline, Chapter 1.6.19-1.6.24 [48, pp. 20–22].

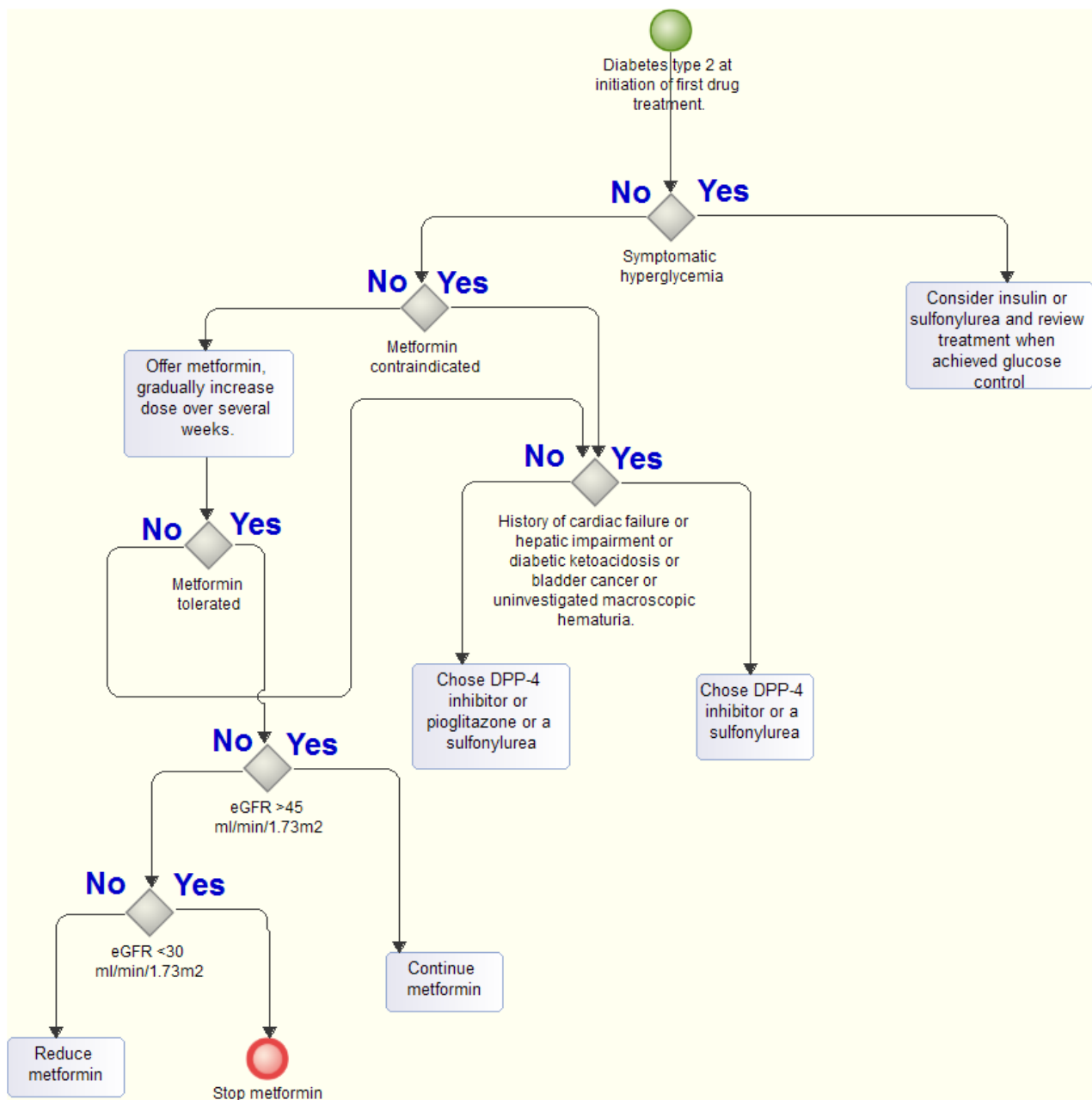


Figure 8: Diabetes – Initial drug treatment

Abbreviation:

DDP-4: Dipeptidylpeptidase-4

eGFR: Estimated Glomerular Filtration Rate

Deviation in Jämtland-Härjedalen, Sweden local guideline

Insulin is the first option in symptomatic hyperglycemia. If metformin is contraindicated, sulfonylurea or insulin are the first options.

Deviation in Basque Country, Spanish local guidelines

Use of repaglinide is an alternative to sulfonylurea in the situations where this is recommended in the flowchart. In Spain, it is approved to use it with and without metformin. It is a very useful alternative in renal failure.

5.2.9. First and second intensification of drug treatment

This flowchart is based on the NICE diabetes guideline, Chapter 1.6.25-1.6.31 [48, pp. 22–24].

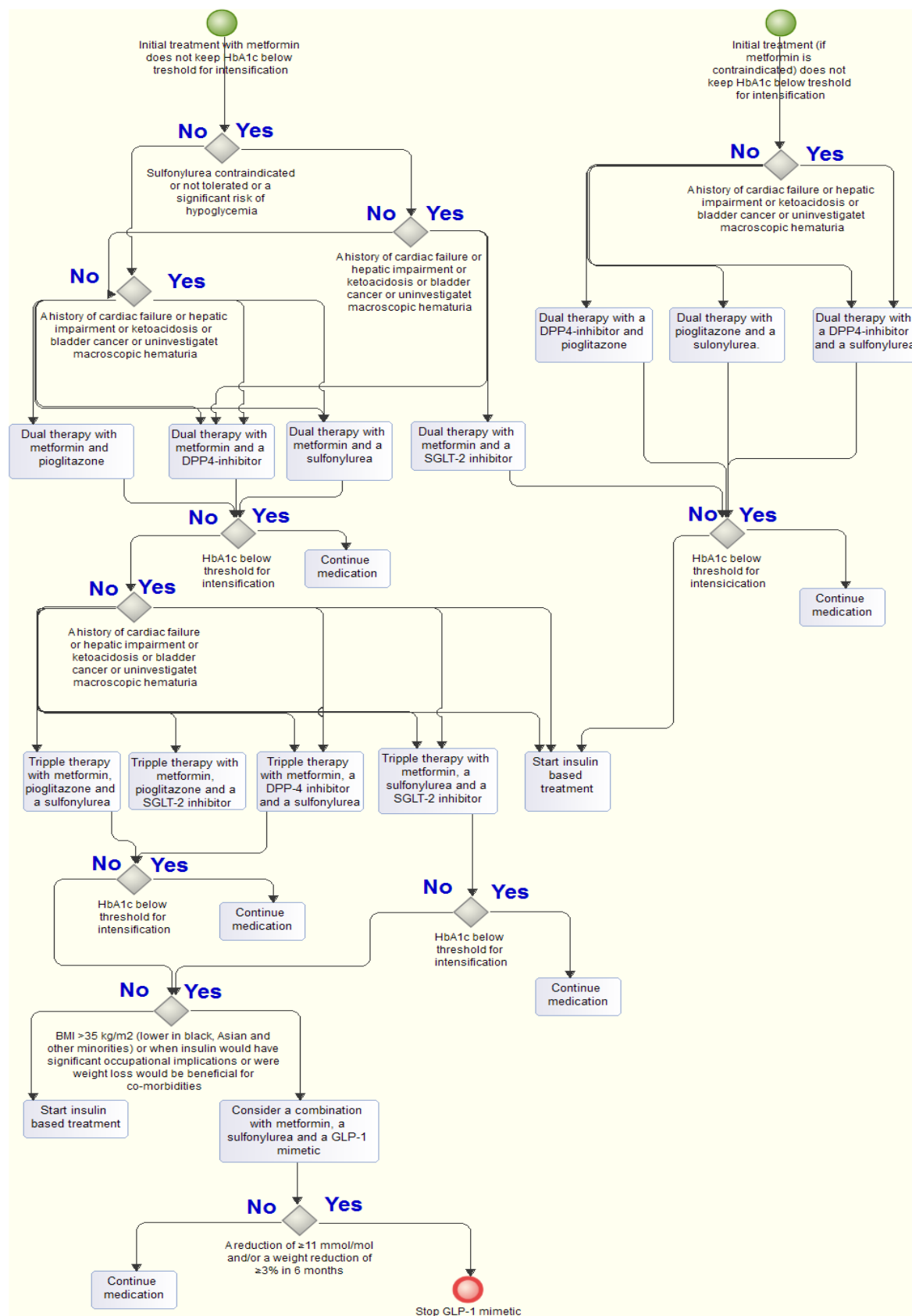


Figure 9: Diabetes - First and second intensification of drug treatment

Abbreviations:

SGLT-2: Sodium/Glucose Cotransporter 2

GLP-1: Glucagon-Like Peptide-1

BMI: Body Mass Index

DDP-4: Dipeptidylpeptidase-4

Deviations in Jämtland-Härjedalen, Sweden local guideline

Second line is metformin together with a sulfonylurea or metformin together with insulin, if metformin is not tolerated insulin is the first option.

A third line with three oral drugs is not in the Swedish guidelines.

Pioglitazon is on no recommendation list in Sweden.

5.2.10. Insulin based treatment

This flowchart is based on the NICE diabetes guideline, Chapter 1.6.32-1.6.37 [48, pp. 24–26], as shown in Figure 10.

Abbreviations:

NPH: Neutral Protamine Hagedorn

HbA1c: Glycated Hemoglobin A1c

SGLT-2: Sodium/Glucose Cotransporter 2

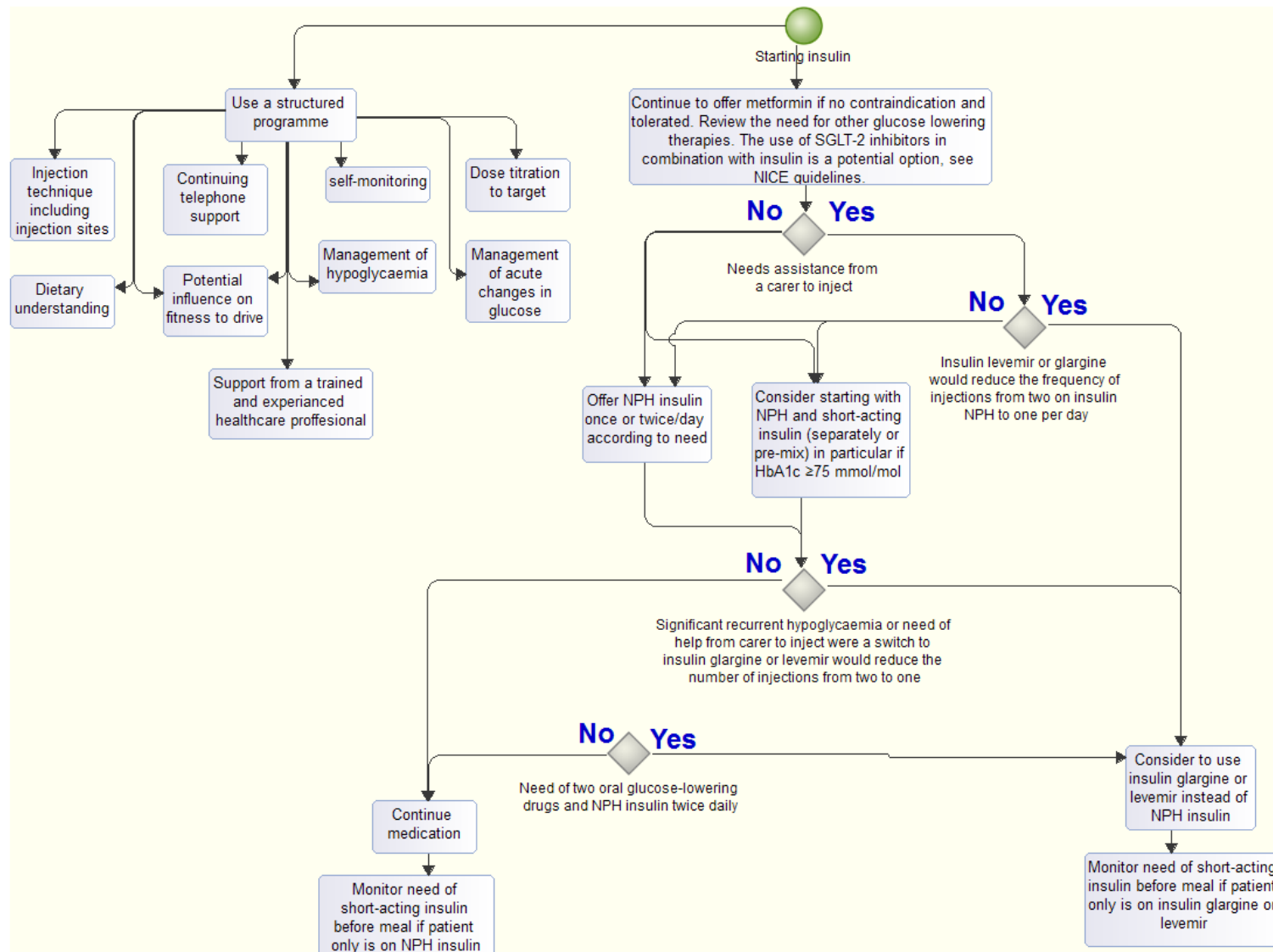


Figure 10: Diabetes - Insulin based treatment

5.2.11. Insulin delivery

This flowchart is based on the NICE diabetes type 2 guideline, Chapter 1.6.38 [48, p. 26]. See the NICE diabetes type 1 guideline [52].

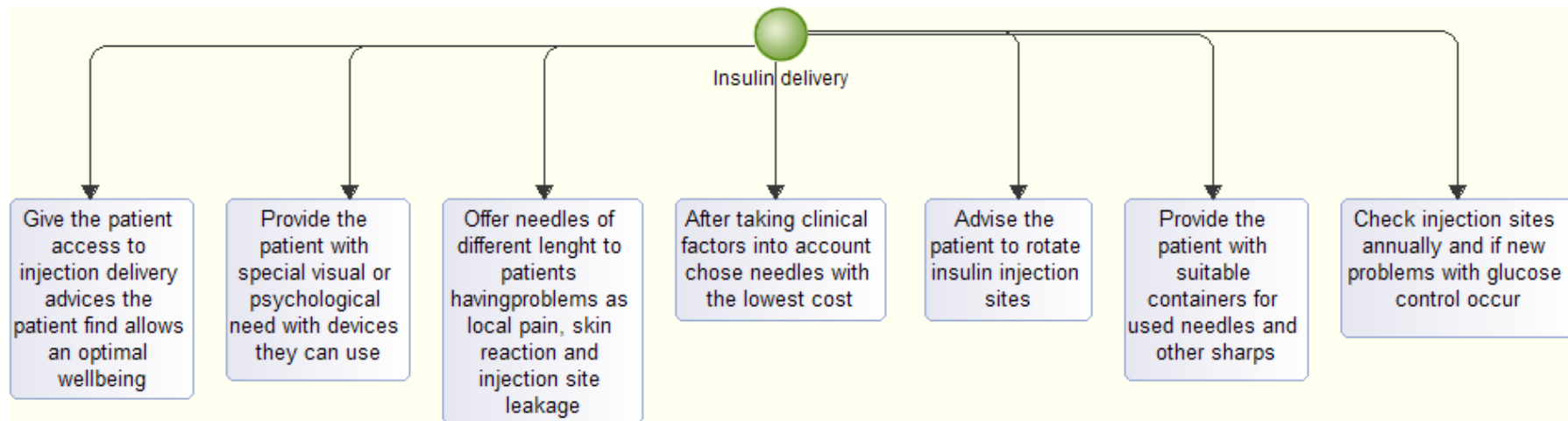


Figure 11: Diabetes - Insulin delivery

5.2.12. Gastroparesis

This flowchart is based on the NICE diabetes guideline, Chapter 1.7.1-1.7.4 [48, pp. 26–27].

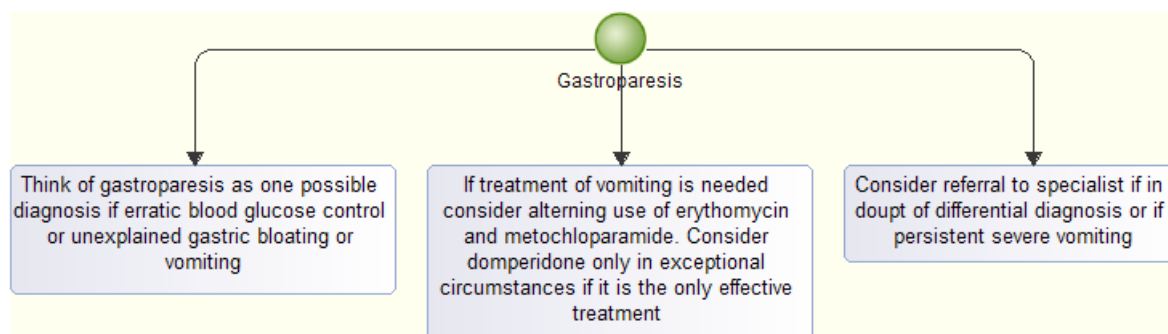


Figure 12: Diabetes - Gastroparesis

5.2.13. Neuropathic pain

This flowchart is based on the NICE diabetes guideline, Chapter 1.7.5 [48, p. 27]. See NICE guideline on neuropathic pain in adults [53].

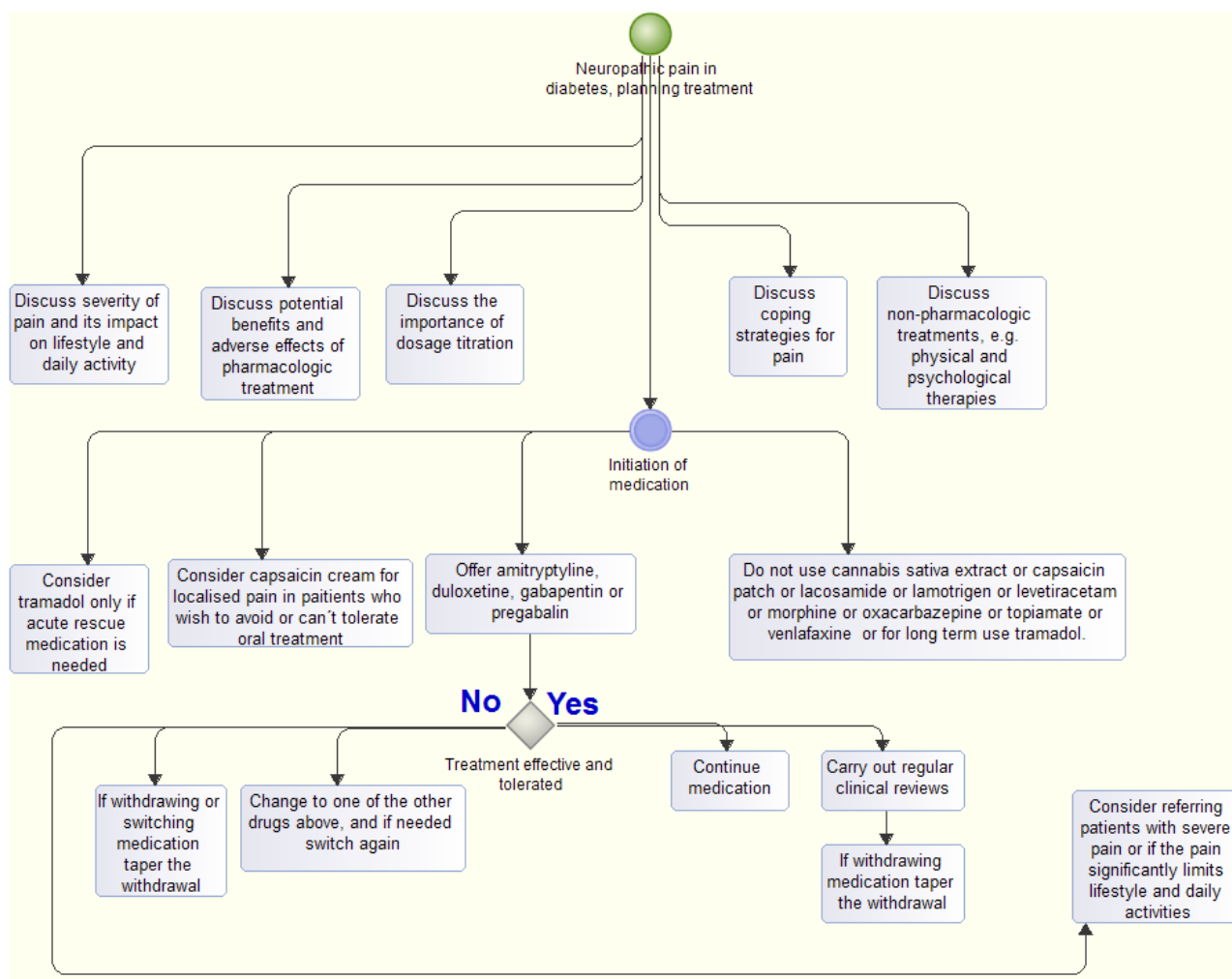


Figure 13: Diabetes - Neuropathic pain

5.2.14. Autonomic neuropathy

This flowchart is based on the NICE diabetes guideline, Chapter 1.7.6-1.7.10 [48, p. 27].

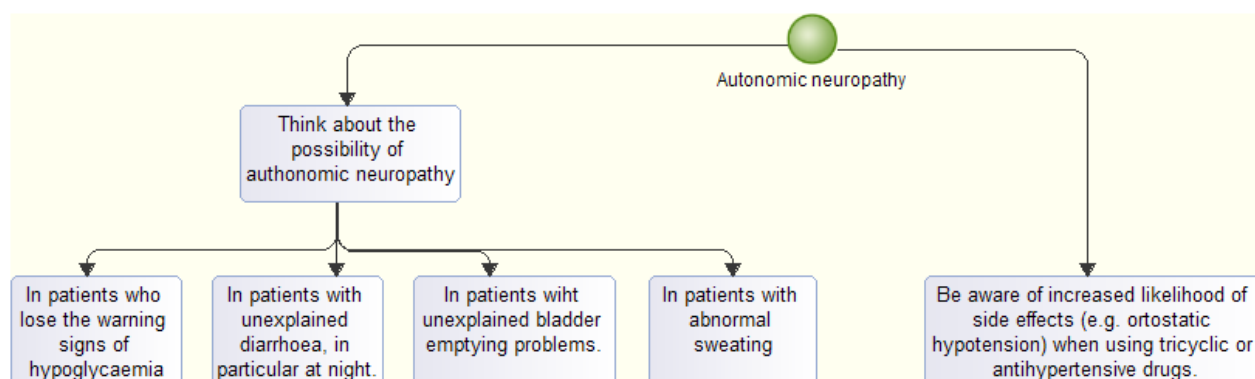


Figure 14: Diabetes – Autonomic neuropathy

5.2.15. Diabetic foot problem

This flowchart is based on the NICE diabetes guideline, Chapter 1.7.11 [48, p. 28]. See the NICE guideline on diabetic foot problem [54].

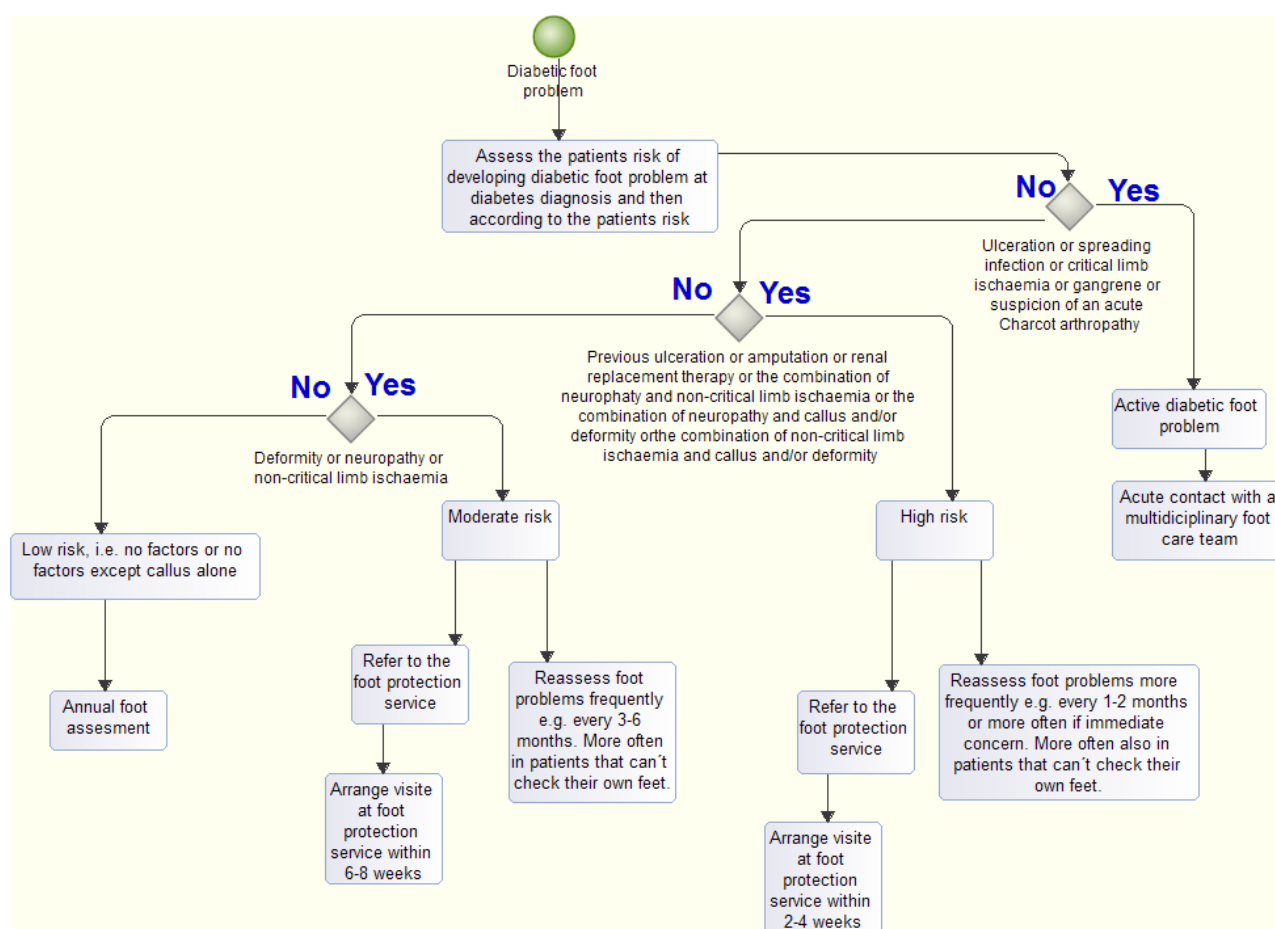


Figure 15: Diabetes - Diabetic foot problem

Deviation in Basque Country

Discuss the “Refer to foot protection service” - in the Basque Country, this should be “Or to specialized care”. There are no standing units in all hospitals, patients are referred to the endocrine or vascular services.

5.2.16.Diabetic foot problem organisation

This flowchart is based on the NICE guideline on diabetic foot problem: prevention and management, Chapter 1.2 [55, pp. 14–15].

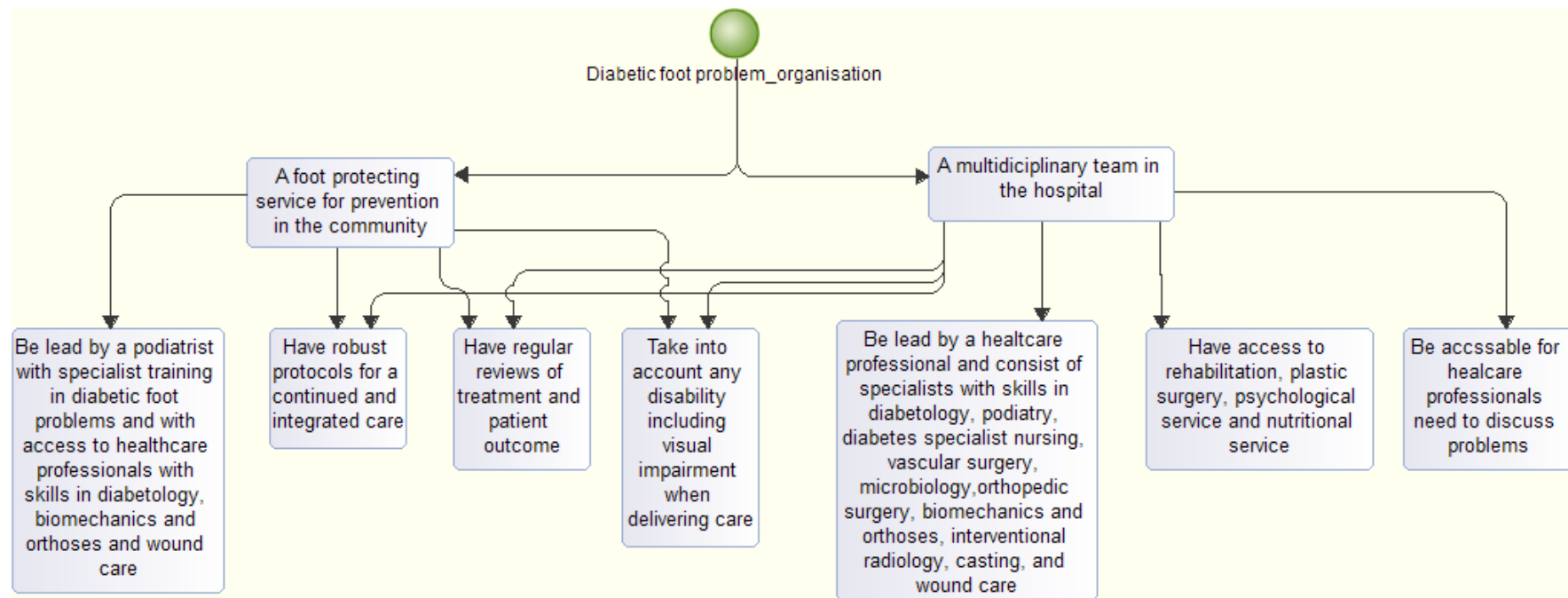


Figure 16: Diabetes - Diabetic foot problem organisation

5.2.17.Diabetic kidney problem

See chronic kidney disease in adults (Section 5.4).

5.2.18.Erectile dysfunction

This flowchart is based on the NICE diabetes guideline, Chapter 1.7.13-1.7.16 [48, p. 28].

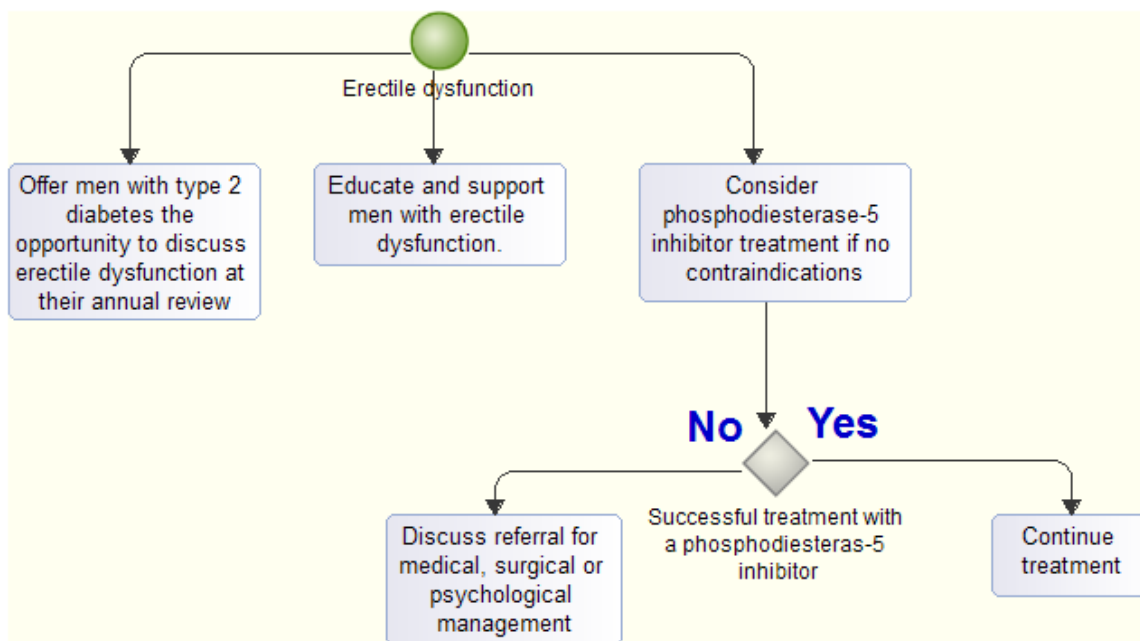


Figure 17: Diabetes - Erectile dysfunction

Deviation in Jämtland-Härjedalen, Sweden local guideline

Other treatment options could be tried before referral.

5.2.19.Eye disease

This flowchart (Figure 18) is based on the NICE diabetes guideline, Chapter 1.7.17-1.7.25 [48, pp. 28–29].

Deviation in Jämtland-Härjedalen, Sweden local guideline

All photos are taken and controlled at specialist care and there is thus no need for referral based on photo findings as the patient is taken care of automatically.

Other options with longer time intervals than annual check-ups are used based on a normal eye photo in an older patient.

Deviation in Basque Country, local guideline

There is a screening program with retinography and with the following screening frequency: every 3 years for type 2 diabetic patients without retinopathy, annual in which they suffer mild nonproliferative retinopathy with poor metabolic and biennial control in those with good control metabolic.

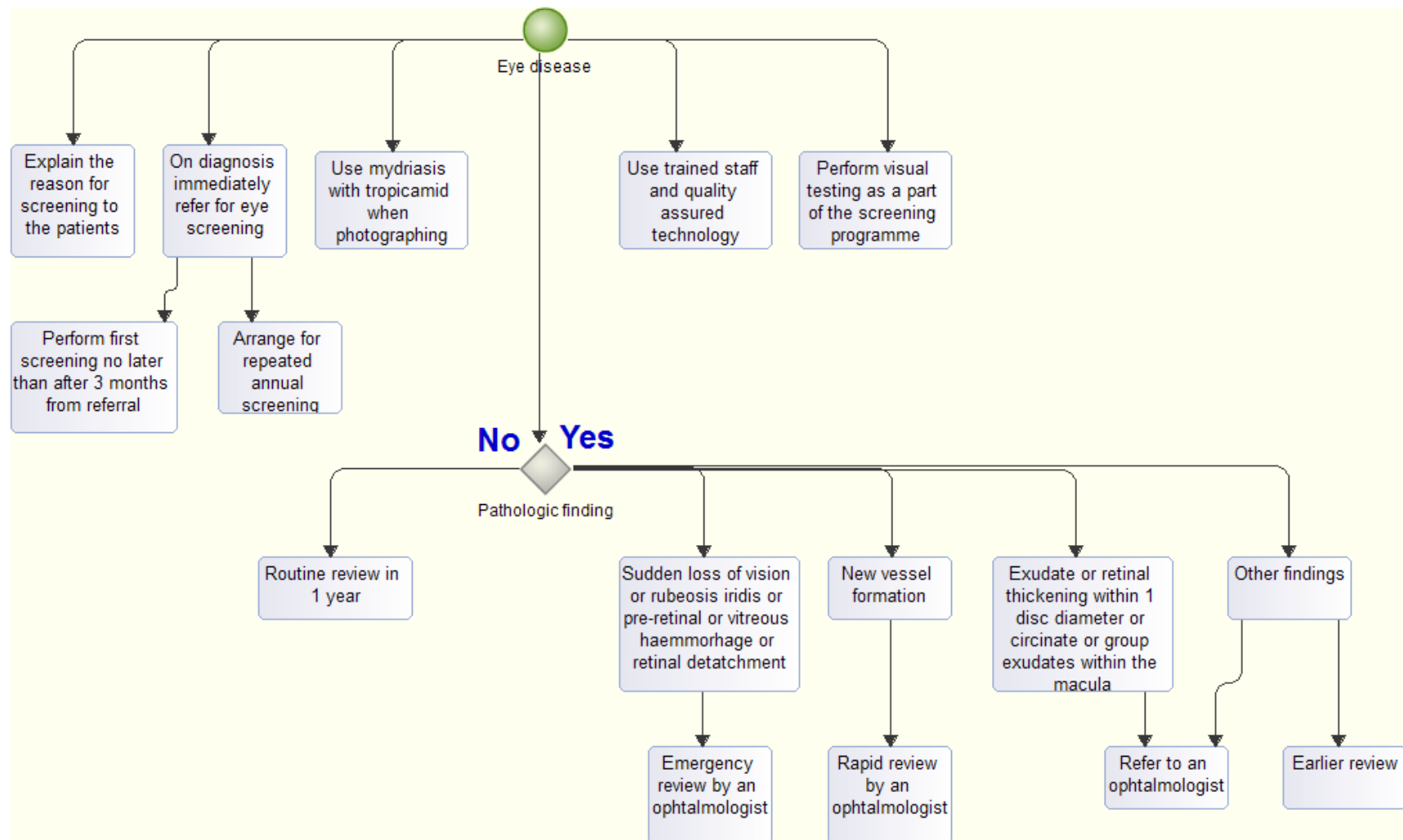


Figure 18: Diabetes - Eye disease

5.2.20. Algorithm for blood glucose lowering therapy in adults with type 2 diabetes

This figure is taken from the NICE diabetes guideline, Chapter 1.6 [48, pp. 16–26]. It summarizes the previous flowcharts on diabetes.

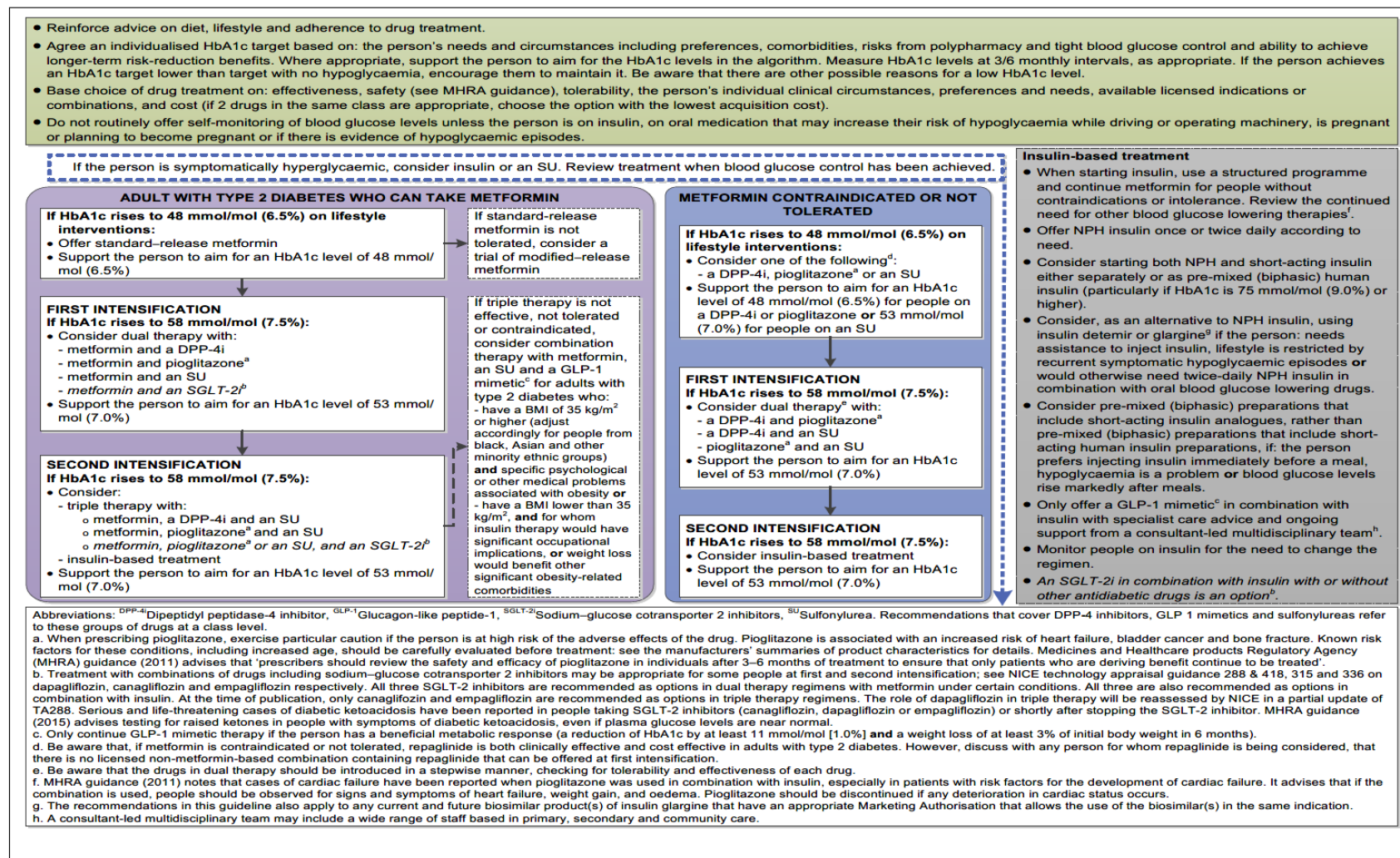


Figure 19: Algorithm for blood glucose lowering therapy in adults with type 2 diabetes (reproduced from [56])

Deviation in Jämtland-Härjedalen, Sweden local guideline

Metformin is recommended early together with life style intervention, not after.

HbA1c target is < 52 mmol/mol, “lower early after diagnosis”.

Second line is metformin together with sulfonylurea or metformin together with insulin insulin

A third line with three oral drugs is not in the Swedish guidelines.

Pioglitazon is on no recommendation lists in Sweden.

New national recommendations will come early 2017.

5.3. Flowcharts for Chronic Heart Failure

5.3.1. CHF and lifestyle

This flowchart is based on the full NICE CHF guideline CG108, Chapter 5.1.1 [57, p. 72].

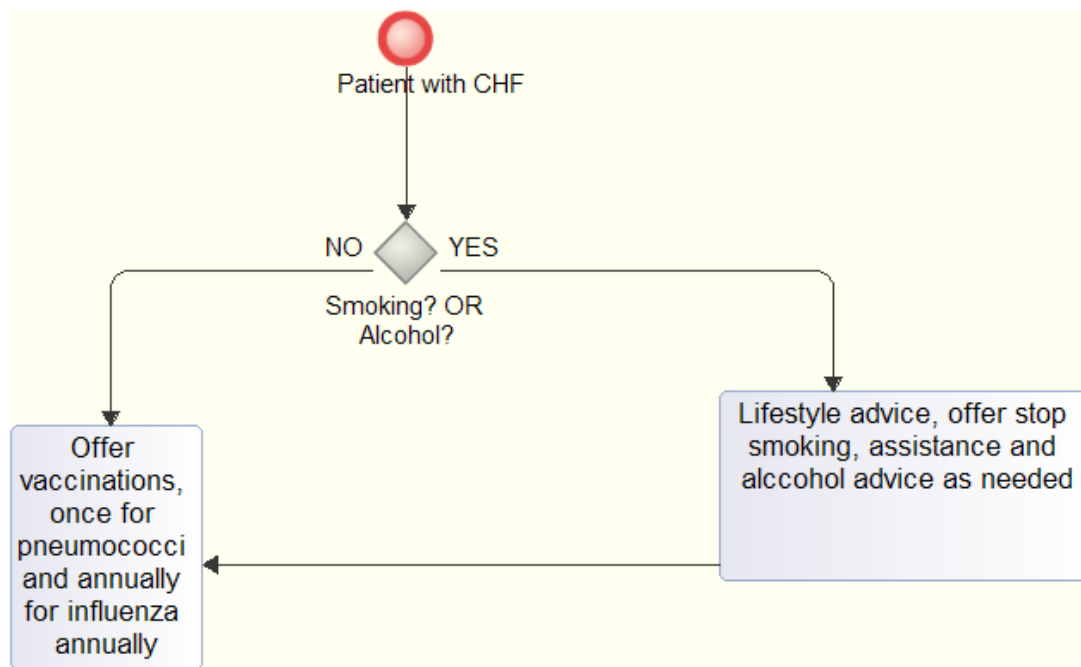


Figure 20: CHF - Lifestyle

Deviation in Basque Country, local guideline

Physical exercise programs are more structured and not as well developed in our environment as post-infarction rehabilitation.

5.3.2. CHF management summary

This flowchart (Figure 21) is based on the full NICE CHF guideline CG108, Chapter 5.4 for the overview algorithm [57, p. 153].

NOTE: This diagram has been enhanced adding the introduction of ARB as an alternative to ACEi.

Abbreviations:

ARB: Anatomical Therapeutic Chemical

BB: Blood Blocker

ACEi: Angiotensin Converting Enzyme Inhibitor

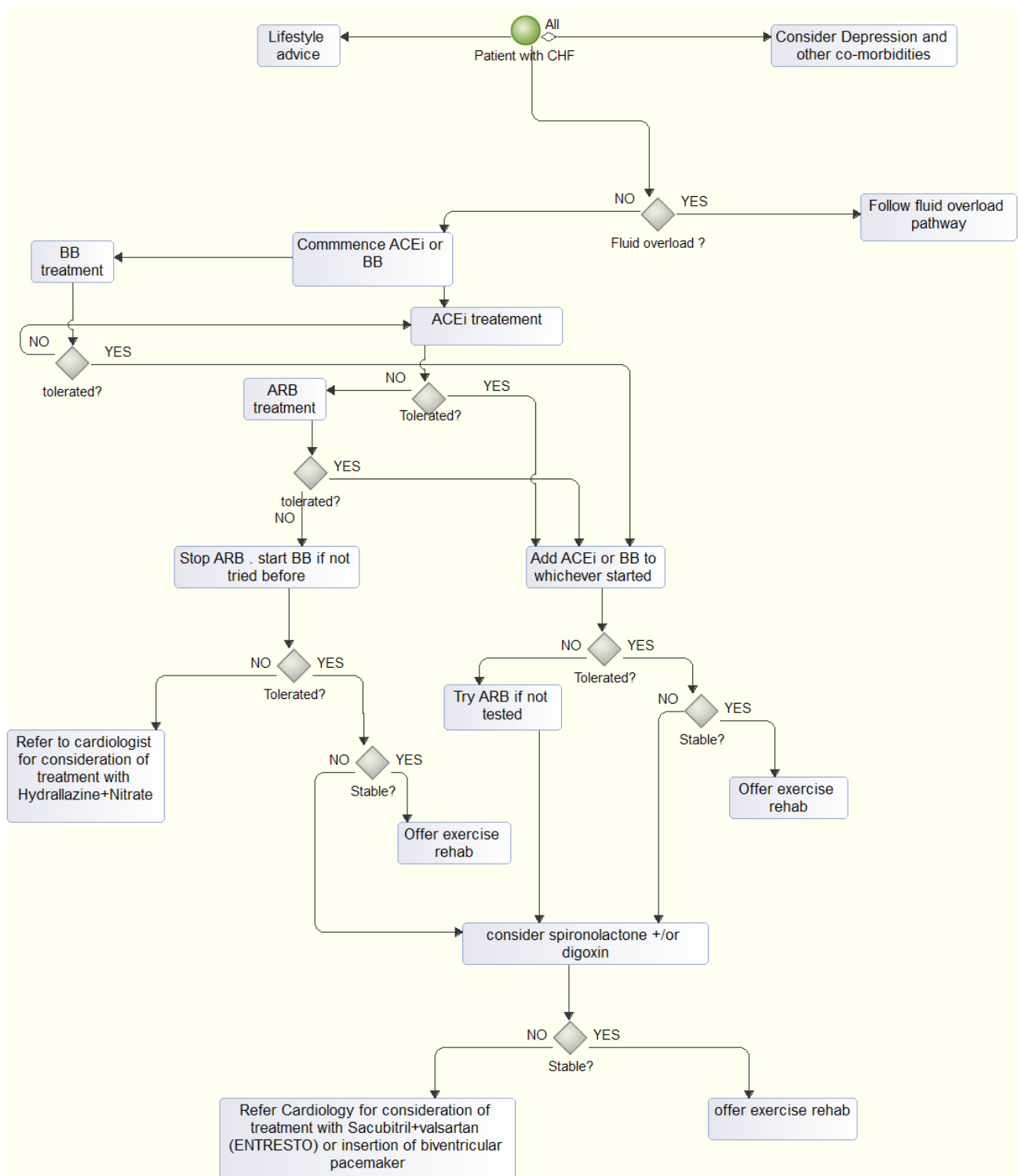


Figure 21: CHF - CHF management

5.3.3. CHF and fluid overload

This flowchart is based on NICE CHF guideline CG108, Chapter 1.2.2.17 [58, p. 20].

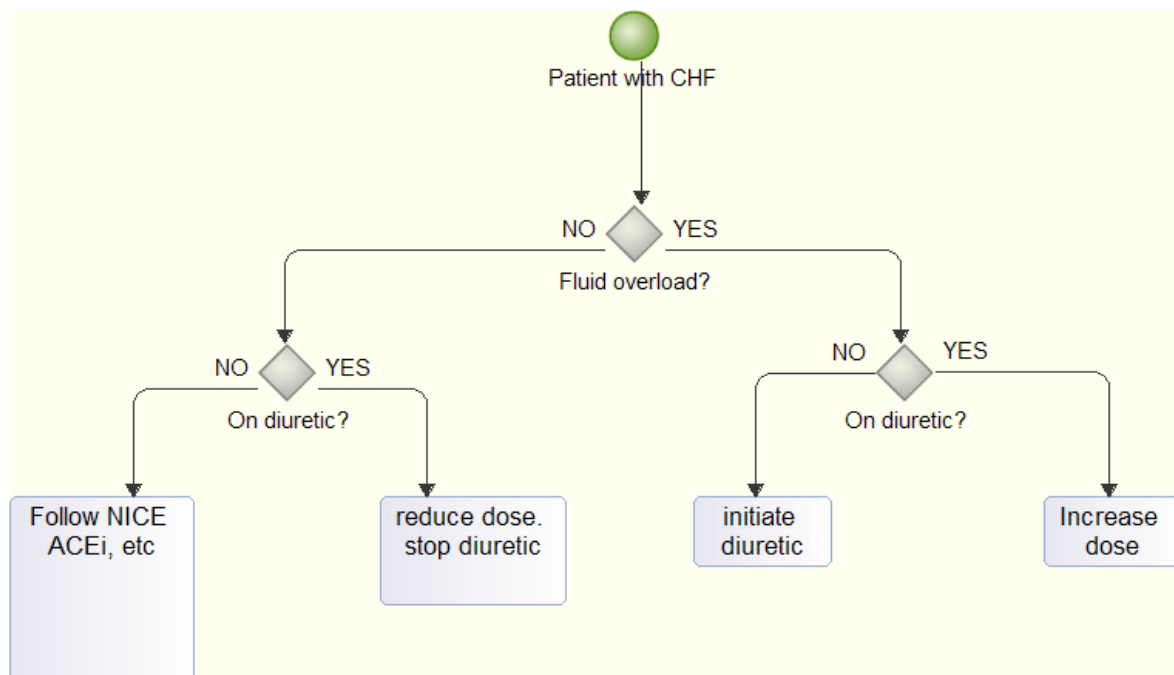


Figure 22: CHF - Fluid overload

Abbreviation:

ACEi: Angiotensine Converting Enzyme Inhibitor

5.3.4. Stable CHF

This flowchart is based on the NICE CHF guideline CG108, Chapter 1.3.1.1 [58, p. 23].

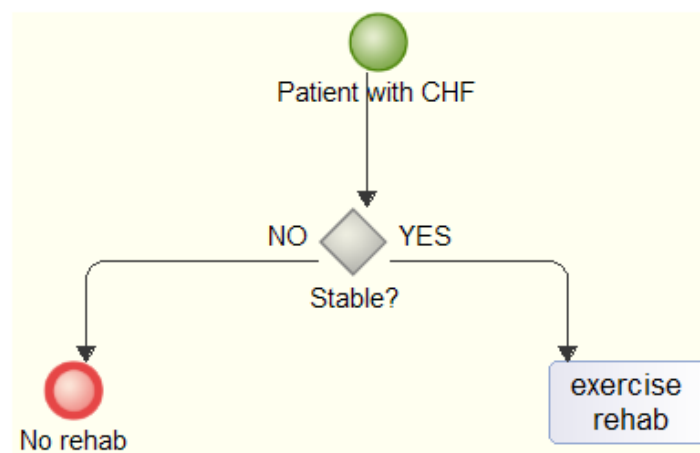


Figure 23: CHF - Rehabilitation

5.3.5. CHF referral criteria

This flowchart is based on the full NICE CHF guideline CG108, Chapter 8.2 [57, p. 204].

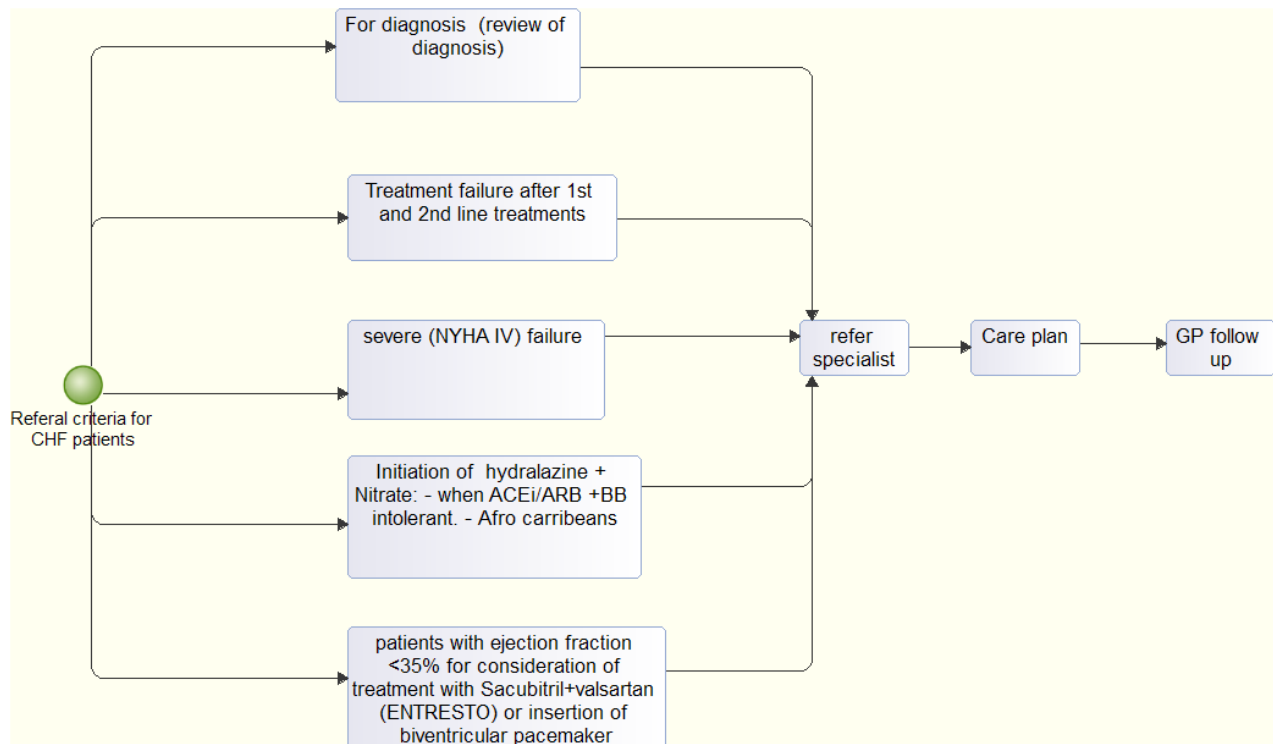


Figure 24: CHF - Referral

Abbreviations:

NYHA IV: New York Heart Association Classification Class IV

ARB: Angiotensine Receptor Blocker

BB: BetaBlocker

ACEi: Angiotensine Converting Enzyme Inhibitor

5.3.6. CHF self-management

This flowchart is based on NICE CHF guideline [58, p. 8].

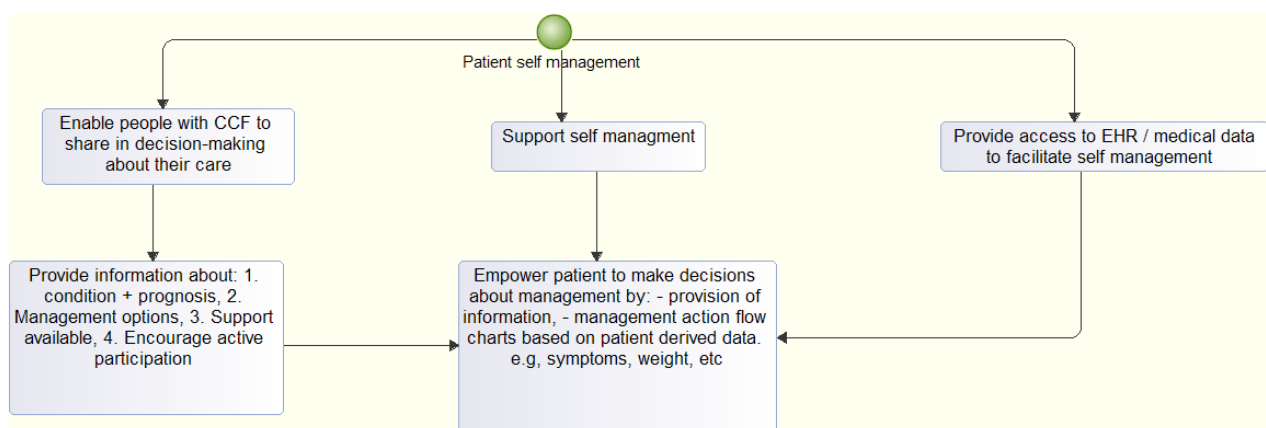


Figure 25: CHF - Self-management

5.3.7. CHF monitoring

This flowchart is based on NICE CHF guideline CG108, Chapter 1.4 [58, p. 24].

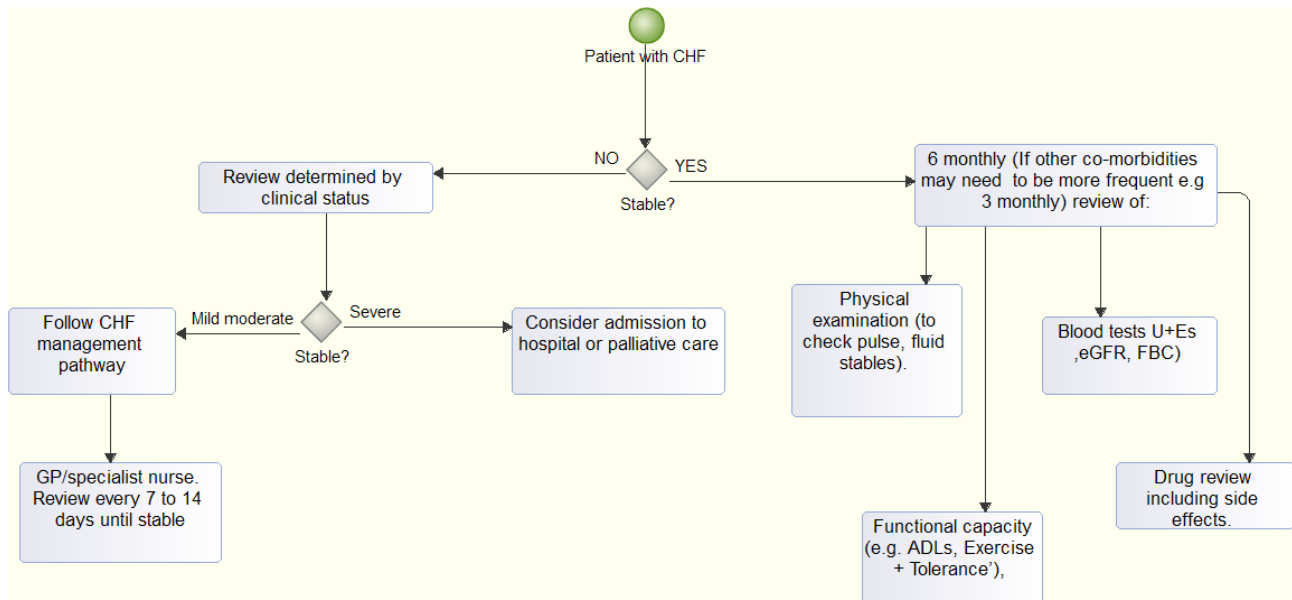


Figure 26: CHF – CHF monitoring

Abbreviations:

U: Urea

Es: Electrolytes (Na, K)

FBC: Full Blood Count

eGFR: Estimated Glomerular Filtration Rate

ADLs: Activities Of Daily Living

5.3.8. CHF and depression

This flowchart is based on the NICE CHF guideline CG108, Chapter 1.5.8 [58, p. 28].

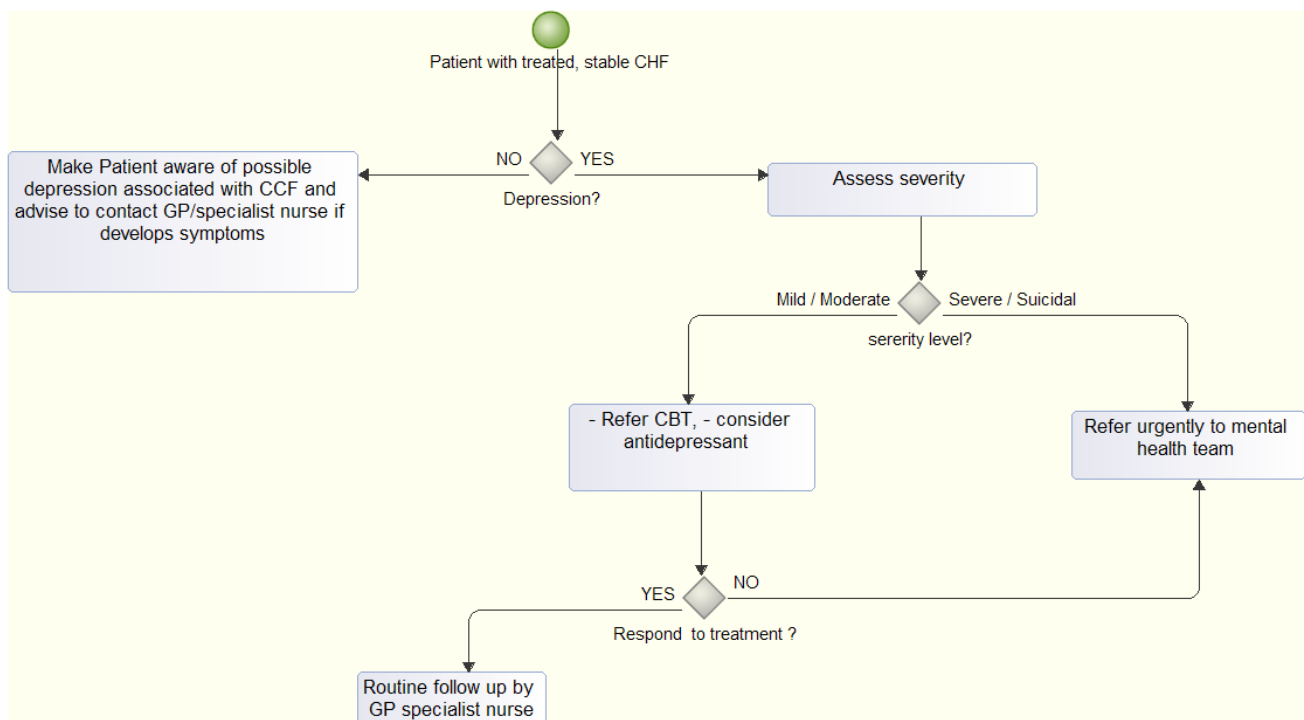


Figure 27: CHF – CHF and depression

Abbreviation:

CBT: Cognitive Behavioral Therapy

5.4. Flowcharts for Chronic Kidney Disease

5.4.1. Introduction

The NICE guideline on CKD management CG182 [8] includes a heterogeneous chapter under the title of “kidney conditions”, including guidelines and recommendations regarding some aspects of the following conditions: glomerular disease, renal stones, autosomal dominant polycystic kidney disease, pelviureteric junction obstruction, simple renal cysts, diverse urogenital conditions, and renal cancer. These recommendations are not part of the current chapter due to lack of relevance.

Some aspects of CKD which are discussed under “possible complications” are also omitted from this chapter. These include the management of CKD-related anemia, hyperphosphatemia, bone conditions and metabolic acidosis. Similarly, this chapter does not discuss or show flowcharts about specific CKD care in stage 5 disease, such as dialysis care and transplantation. The common reasons for leaving these topics out of focus were their sole dependence on specialist care. The lack of or marginal involvement of GP practitioners and lack of interactive care in the management of these conditions disqualify them from the C3-Cloud project.

This chapter discuss the blood pressure management in CKD by dividing it into several, inter-related flowcharts. It shows the blood pressure control therapy separately based on the presence or absence of diabetes mellitus, it details the renin-angiotensin-aldosterone antagonist (RASA) treatment including its intolerance and shows the antihypertensive therapy in case of RASA intolerance separately.

Recommendations about monitoring of CKD are based on the severity of disease and focus on the follow-up of eGFR. This is summarized in a separate flowchart.

5.4.2. CKD Management summary

This flowchart is based on NICE pathway “Management of chronic kidney disease” [59, p. 2].

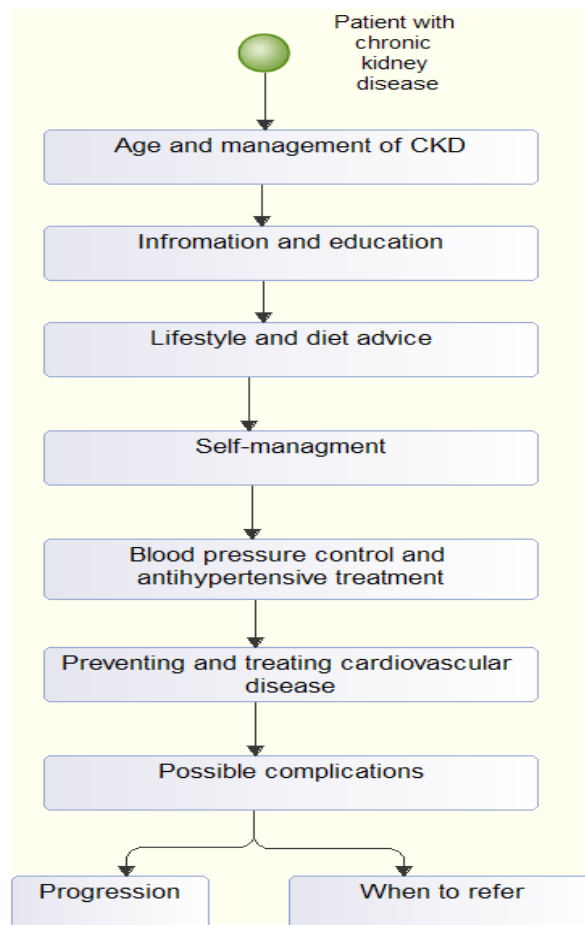


Figure 28: CKD - Management summary

5.4.3. Self-management

This flowchart is based on NICE CKD guideline CG182, Chapter 1.4.10-1.4.11 [60, p. 30].

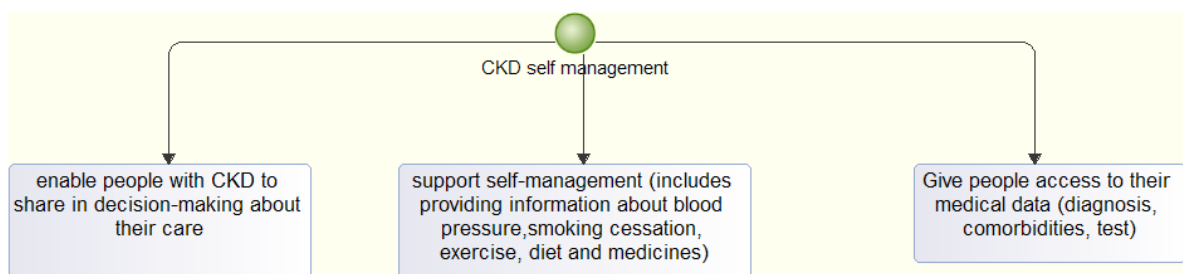


Figure 29: CKD - Self-management

5.4.4. Lifestyle and Dietary Advice

This flowchart is based on the NICE CKD guideline CG182, Chapter 1.4.6-1.4.9 [60, pp. 29–30].

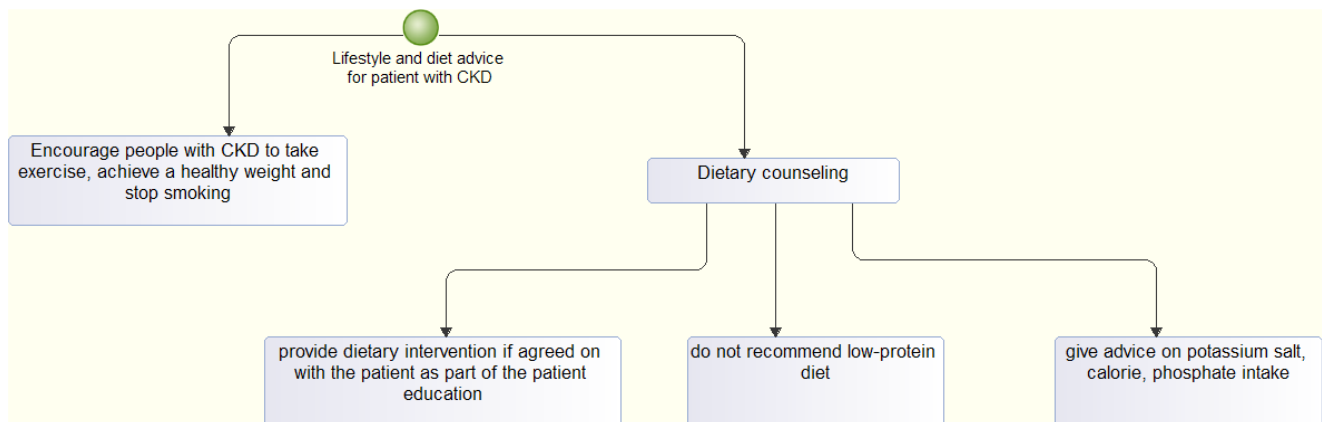


Figure 30: CKD - Lifestyle and dietary advice

5.4.5. Information and Education

This flowchart is based on the NICE CKD guideline CG182, Chapter 1.4.1-1.4.5 [60, pp. 28–29].

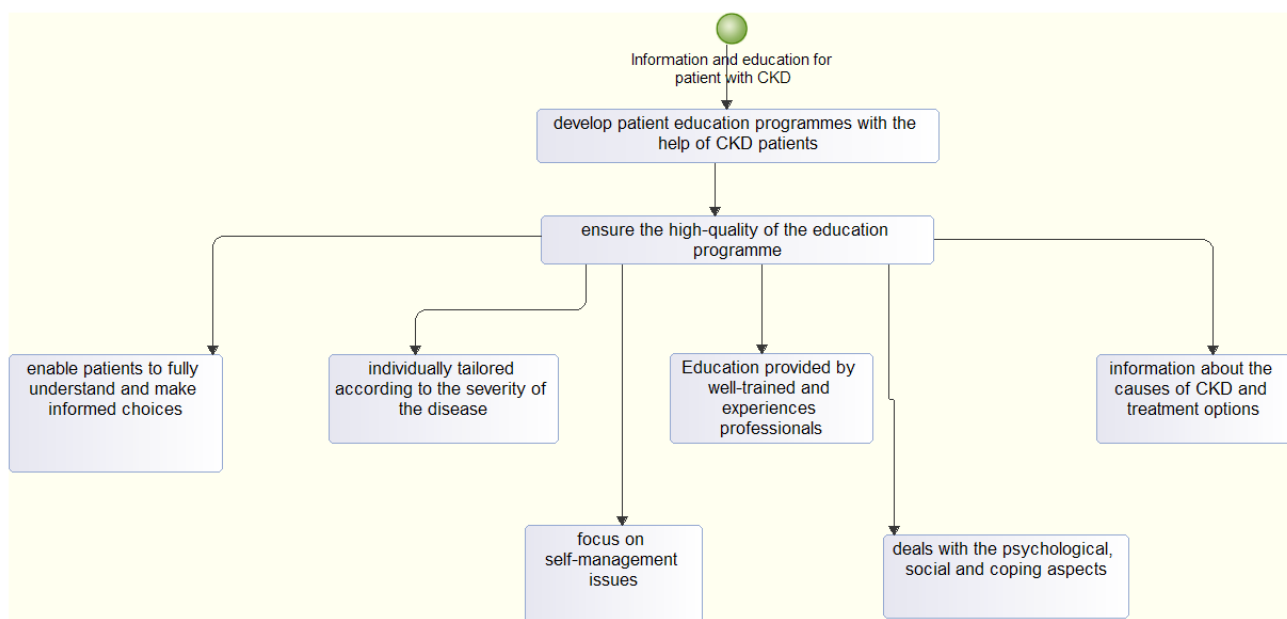
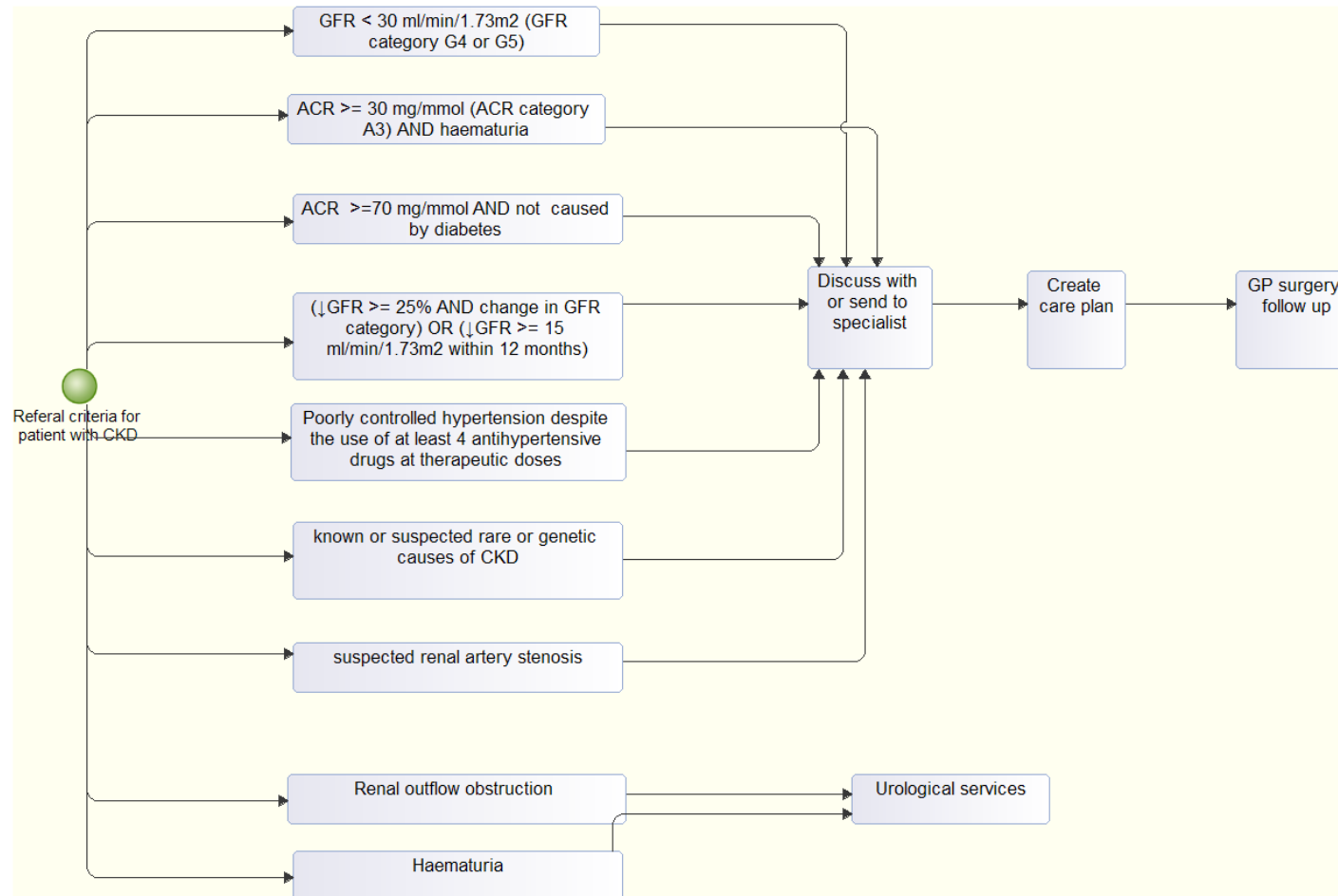


Figure 31: CKD - Information and education

5.4.6. Referral Criteria

This flowchart is based on the NICE CKD guideline CG182, Chapter 1.3, Table 2 [60, p. 26]. It describes the conditions for referral. The patient should not be referred if they are not met.



Abbreviations:

ACR Albumin: creatinine ratio
 GFR: Glomerular Filtration Rate
 GP: General Practitioner

Figure 32: CKD - Referral criteria

5.4.7. Frequency of eGFR control

This flowchart is based on NICE CKD guideline CG182, Chapter 1.3, Table 2 [60, p. 26]. It represents the frequency of monitoring of GFR (number of times per year, by GFR and ACR category) for people with, or risk of, CKD.

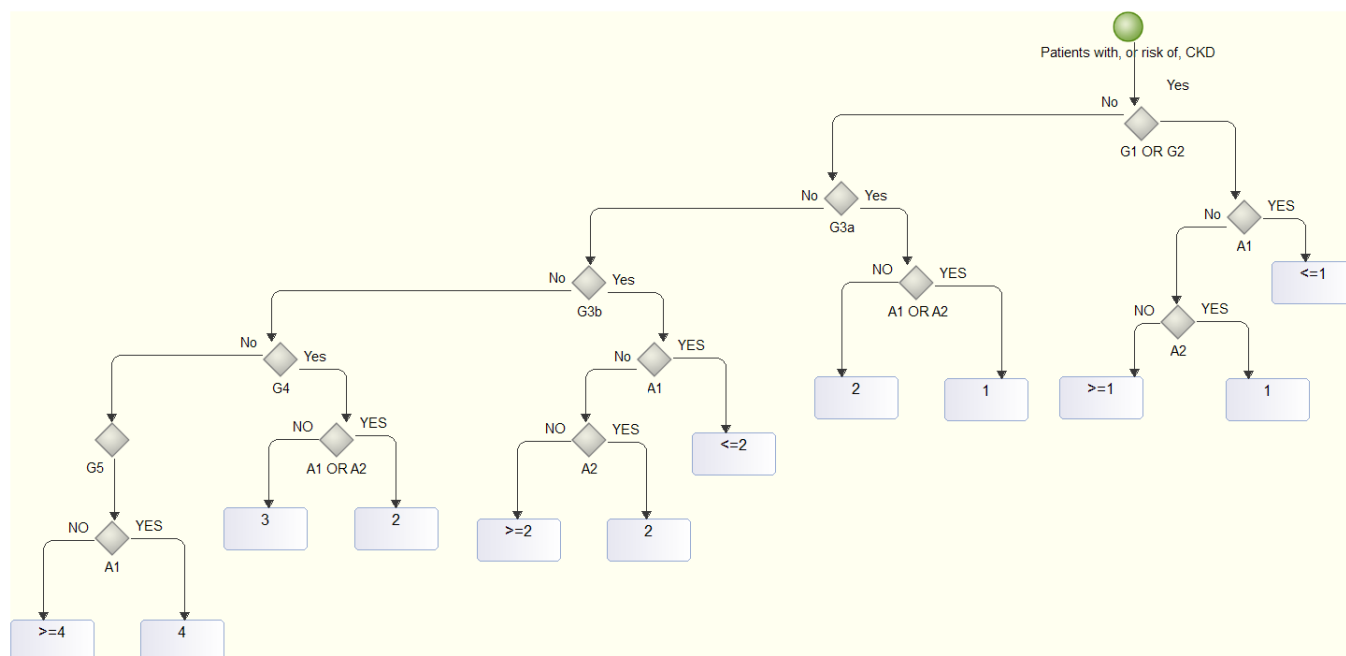


Figure 33: CKD - Frequency of eGFR control

Glomerular filtration rate (GFR) Categories in Chronic Kidney Disease		
GFR Category	GFR (mL/min/1.73m ²)	Description
G1	≥90	Normal or High
G2	60-89	Mildly decreased*
G3a	45-59	Mildly to moderately decreased
G3b	30-44	Moderately to severely decreased
G4	15-29	Severely decreased
G5	<15	Kidney failure
*Relative to young adult level		
Albumin: creatinine ratio (ACR) Categories		
ACR Category	ACR (mg/mmol)	Description
A1	<3	Normal to mildly increased
A2	3-30	Moderately increased
A3	>30	Severely increased

5.4.8. Blood Pressure Treatment in CKD

5.4.8.1. Blood pressure treatment in CKD without diabetes mellitus

This flowchart is based on the NICE guideline CG182, Chapter 1.6 [60, pp. 31–33].

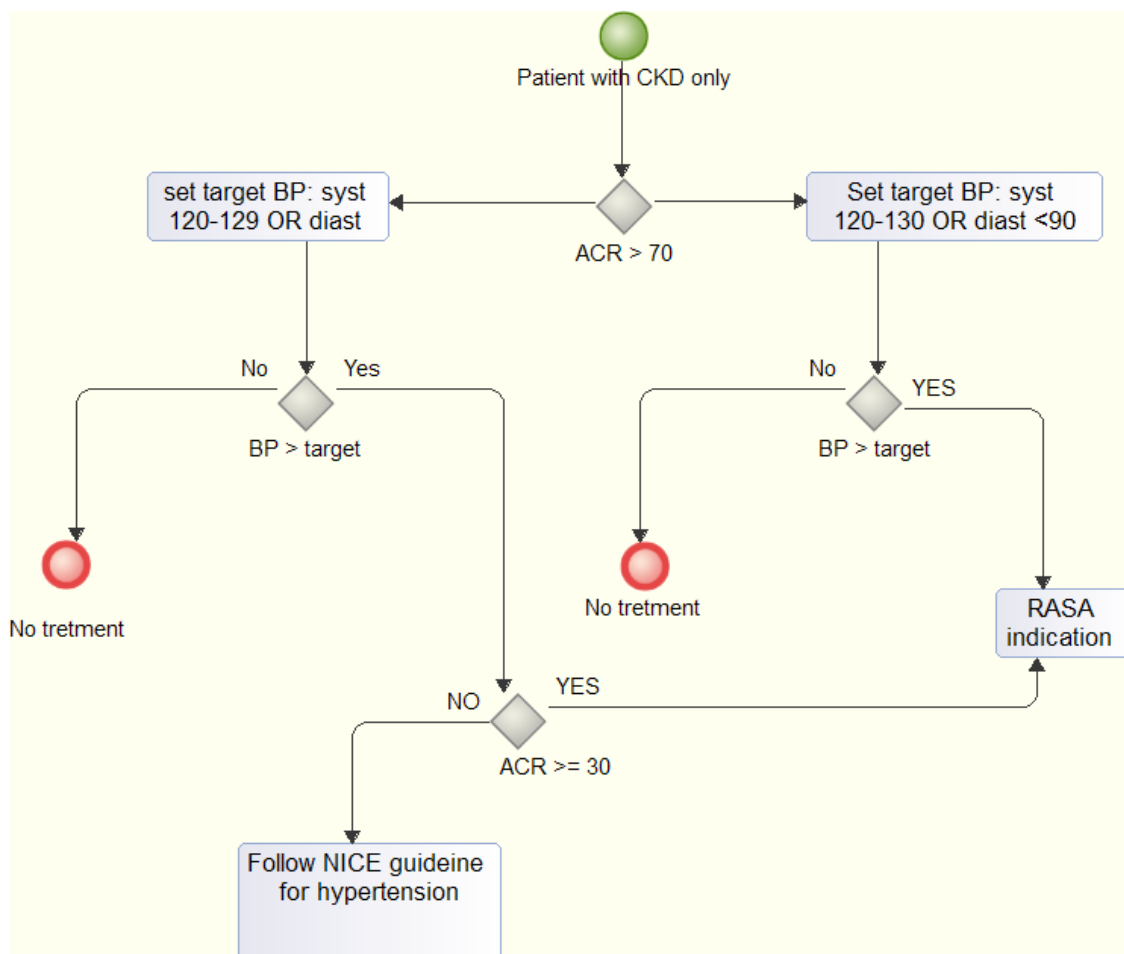


Figure 34: CKD - Blood pressure treatment without diabetes mellitus

Abbreviations:

ACR Albumin: creatinine ratio

RASA: Renin-Angiotensine system antagonist

BP: Blood Pressure

If patient required treatment with RASA, the patient should follow the “RASA indication in CKD” flowchart.

5.4.8.2. Blood pressure treatment in CKD with Diabetes

This flowchart is based on NICE guideline CG182, Chapter 1.6 [60, pp. 31–33].

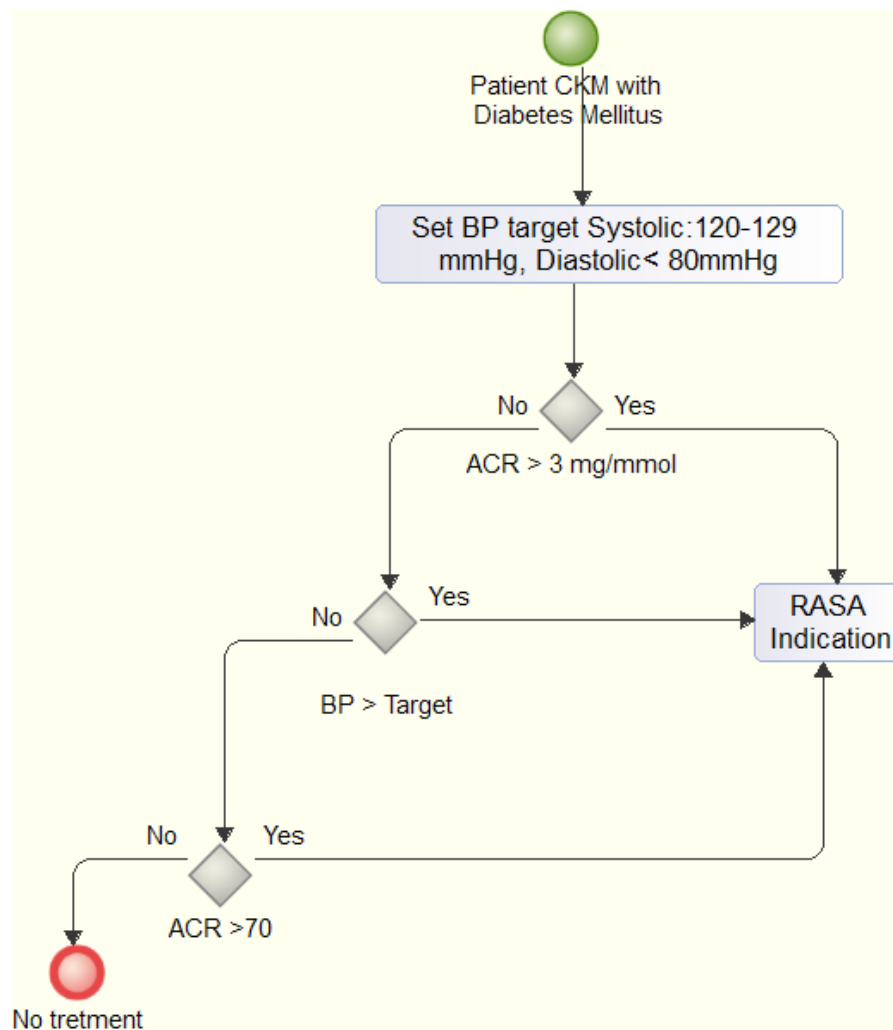


Figure 35: CKD - Blood pressure treatment with diabetes

Abbreviations:

ACR Albumin: creatinine ratio

RASA: Renin-Angiotensine system antagonist

If patient required treatment with RASA, the patient should follow the “RASA indication in CKD” flowchart (See Section 5.4.8.3).

5.4.8.3. RASA indication in CKD

This flowchart is based on the NICE guideline CG182, Chapter 1.6 [60, pp. 31–33].

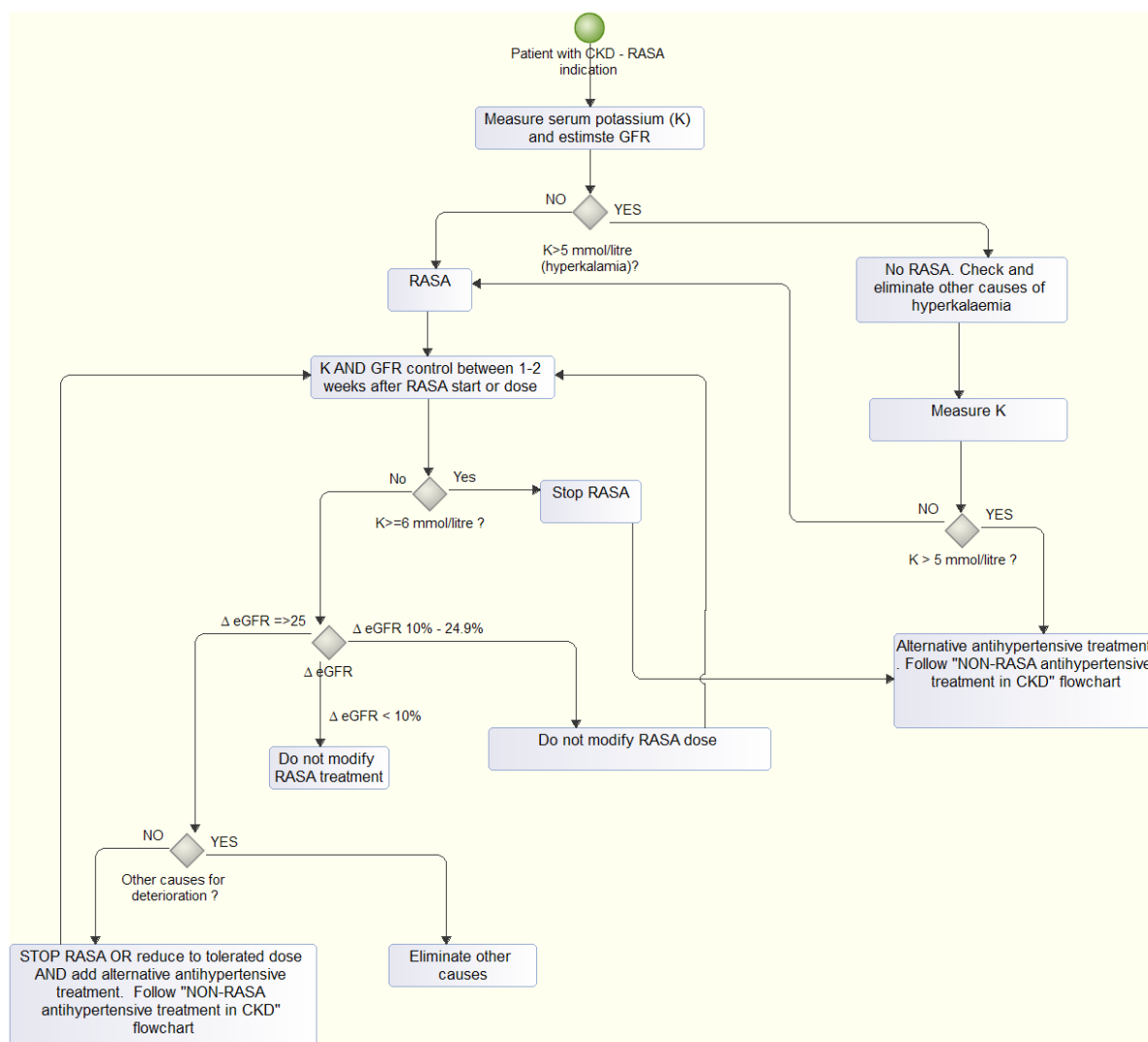


Figure 36: CKD - RASA indication

Abbreviations:

RASA: Renin-Angiotensine System Antagonist

K: serum potassium

eGFR: Estimated glomerular filtration rate

When the patient is referred to an alternative antihypertensive treatment or to stop RASA treatment, the patient should follow the “NON-RASA antihypertensive treatment in CKD” flowchart (See Section 5.4.8.4).

5.4.8.4. Non-RASA antihypertensive treatment in CKD

This flowchart is based on the NICE guideline “Hypertension in adults: diagnosis and management” (CG127), Chapter 1.6 [61, pp. 16–19].

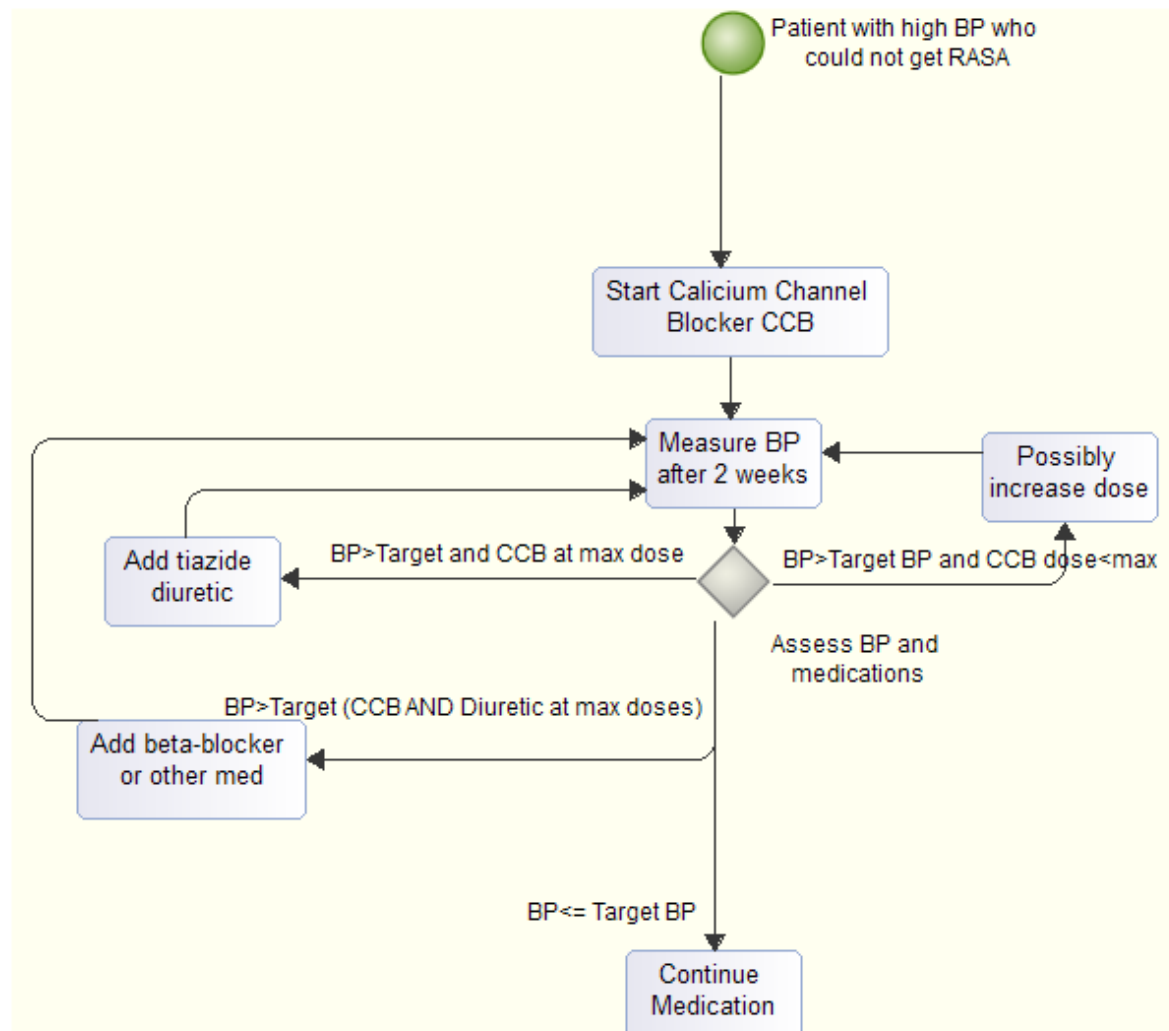


Figure 37: CKD - Non-RASA anti-hypertensive treatment

Abbreviations:

BP: Blood pressure

CCB: Calcium Channel Blocker

5.4.9. Cardiovascular disease prevention and treatment

This flowchart is based on the NICE guideline CG182, Chapter 1.6.16-1.6.17 [60, pp. 33–34].

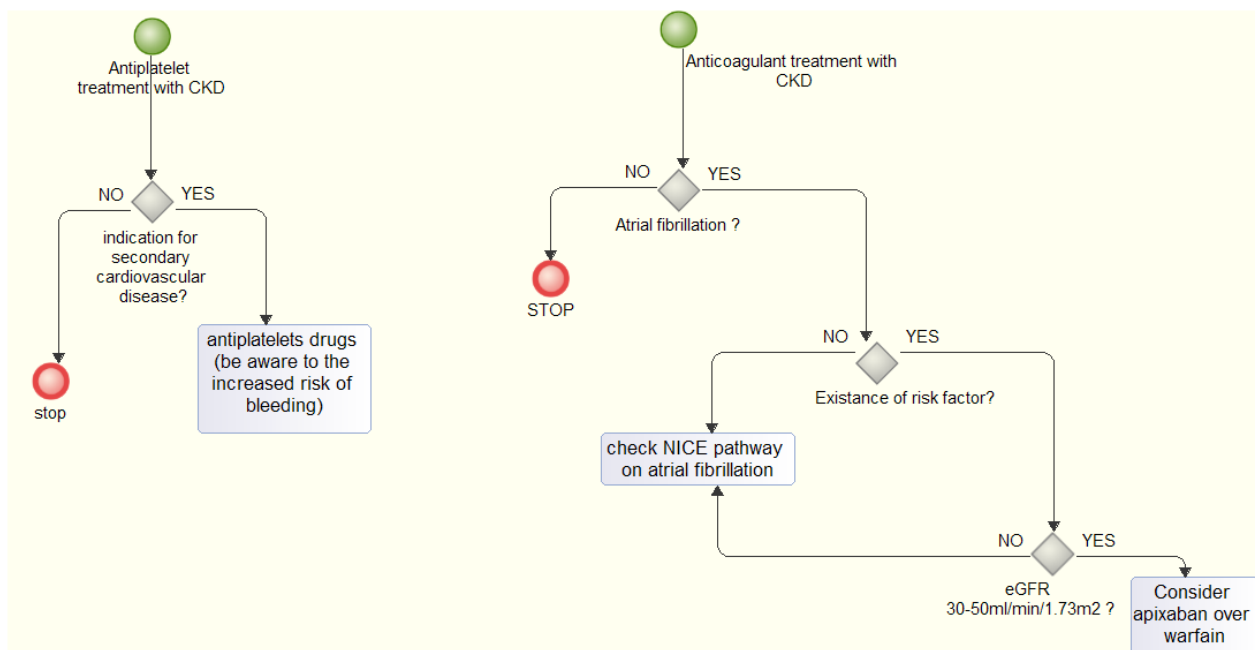


Figure 38: CKD - Oral antiplatelets and anticoagulants

Abbreviation:

eGFR: Estimated Glomerular Filtration Rate

Risk factors condition: if one or more risk factors exist:

- Prior stroke or transient ischaemic attack
- Age 75 years or older
- Hypertension.
- Diabetes Mellitus
- Symptomatic heart failure

5.5. Flowcharts for Depression

The starting point of this section states that the patient is already diagnosed with depression, so the algorithm does not study the diagnostic criteria of depression. We have followed the NICE Clinical Practice Guideline (CPG) CG90 on depression in adults [11]. Several notes have been included when deviations from the Spanish Guidelines (the Ministry of Health Clinical Practice Guideline) have been identified [62].

5.5.1. Classification - Assessing depression and its severity

This flowchart is based on NICE guideline CG90, Appendix C - Assessing depression and its severity [63, pp. 58–60].

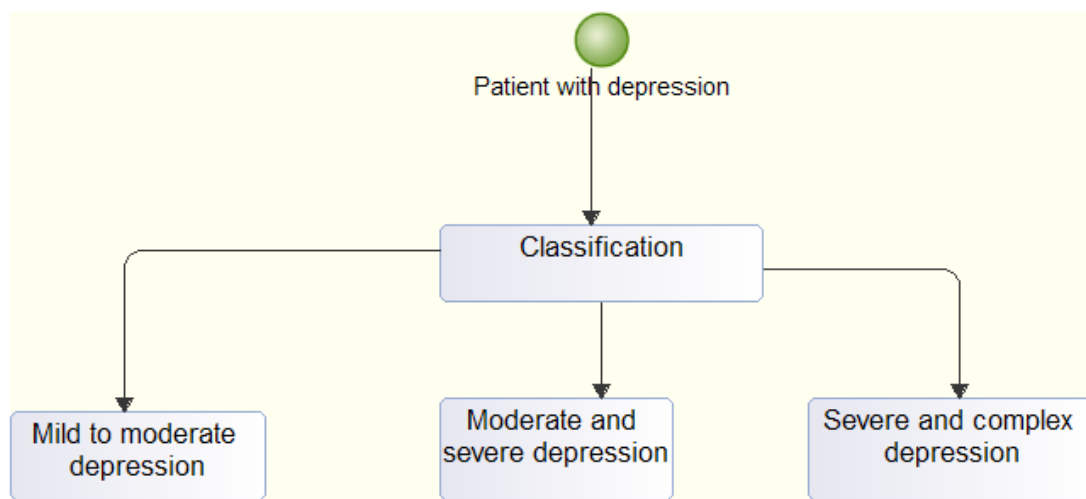


Figure 39: Depression - Assessment

The classification of the severity of the depression consists of three dimensions in the form of a checklist including:

- list of symptoms
- functional deterioration
- risk of suicide

However, since several checklists exist in the different sites it seems practical that the form/checklist is a reminder window and finally the professional classifies the severity of depression manually.

Proposal of the content of the checklist:

- *Key symptoms*
 1. Depressed mood most of the day, almost every day.
 2. Noticeable decrease in interest or pleasure in usual activities in all or almost all activities for most of the day, almost every day.
- *Somatic symptoms*

3. Significant weight loss without regimen or weight gain (more than 5% in a month), or loss or increase in appetite almost every day.
4. Insomnia or hypersomnia almost every day.
5. Psychomotor agitation or retardation almost every day (observable by others).
6. Fatigue, lack of energy, almost every day.
- *Other symptoms*
 7. Excessive or inappropriate feelings of worthlessness or guilt almost every day.
 8. Decreased capacity to think or concentrate, or indecision, almost every day.
 9. Recurring thoughts of death, recurrent suicidal thoughts.

Context and Flowchart explanation:

The classification of depression is necessary to individualize both the treatment modality and the prognosis and follow-up of the patients. The NICE CPG is based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) classification. Due to this, the CPG is used in research on the effectiveness of interventions in depression. The information has been gathered from the web version of CPG in Chapter 1.1 “Care of all people with depression” and Chapter 1.2 “Stepped care”.

Deviation in Basque Country

There is a difference between the document of the Spanish Ministry of Health and the NICE guideline since they use different criteria both to define depression and to classify the severity of depression: the DSM-V classification in the case of the NICE CPG and the International Classification of Diseases (ICD-10) in the case of the Spanish Ministry's GPC. The latest version also includes the DSM-V classification as an annex.

NICE guideline covers "the persistent subthreshold depressive symptoms" and major depression, while the Spanish guideline only refers to major depression. The treatment algorithm of the Spanish guide establishes the categories of mild, moderate and severe depression for the management of major depression, rather than mild to moderate, moderate and severe and complex.

5.5.2. Treatment of persistent mild to moderate depression

This flowchart is based on NICE guideline CG90, Chapter 1.4 “Persistent subthreshold depressive symptoms; mild to moderate / Mild to moderate depression” [63, pp. 18–21].

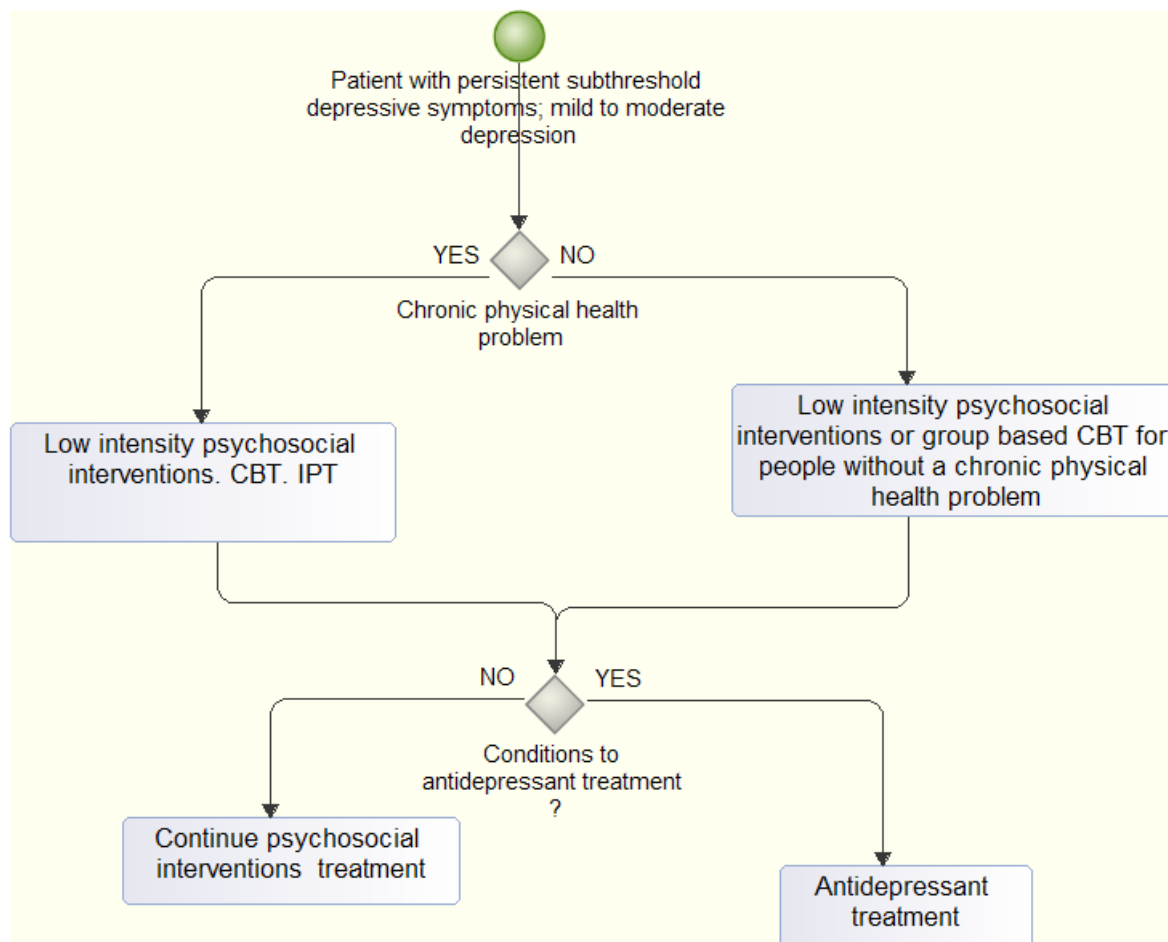


Figure 40: Depression - Treatment of persistent mild to moderate depression

Abbreviations:

CBT: Cognitive Behavioral Therapy

IPT: Interpersonal Therapy

Context and Flowchart explanation:

The NICE CPG proposes the approach to depression through a multiprofessional and collaborative model that includes interventions of greater intensity and complexity according to the initial severity (see previous algorithm) and response to treatment. This algorithm corresponds to Chapter 1.5 “Step 3” of the electronic version of the NICE GPC [63]. Basically, a combination pharmacological therapy is proposed with the high intensity psychological interventions that are indicated in the algorithm according to the preferences of the patients, the previous response, the adherence and the possible adverse effects. In the case of depression in patients with comorbidities, group therapies should be considered.

Conditions for antidepressant drug treatment:

- A past history of moderate or severe depression
- Initial presentation of subthreshold depressive symptoms
- Subthreshold depressive symptoms or mild depression persisting after other interventions
- Mild depression that complicates the care of the physical health problem
- Inadequate response to psychosocial interventions

Deviations in Region Jämtland-Härjedalen, Sweden

Swedish guidelines also mention physical activity as a part of the treatment in mild to moderate depression.

Deviations in the Basque Country, Spain

There are some differences between the two CPGs. The GPC of the Spanish Ministry recommends for mild major depression associated with comorbidity pharmacological therapy and psychological therapies while the NICE recommends group psychological therapy.

5.5.3. Moderate (and Severe) Depression

This flowchart is based on NICE guideline CG90 [63, pp. 22–34].

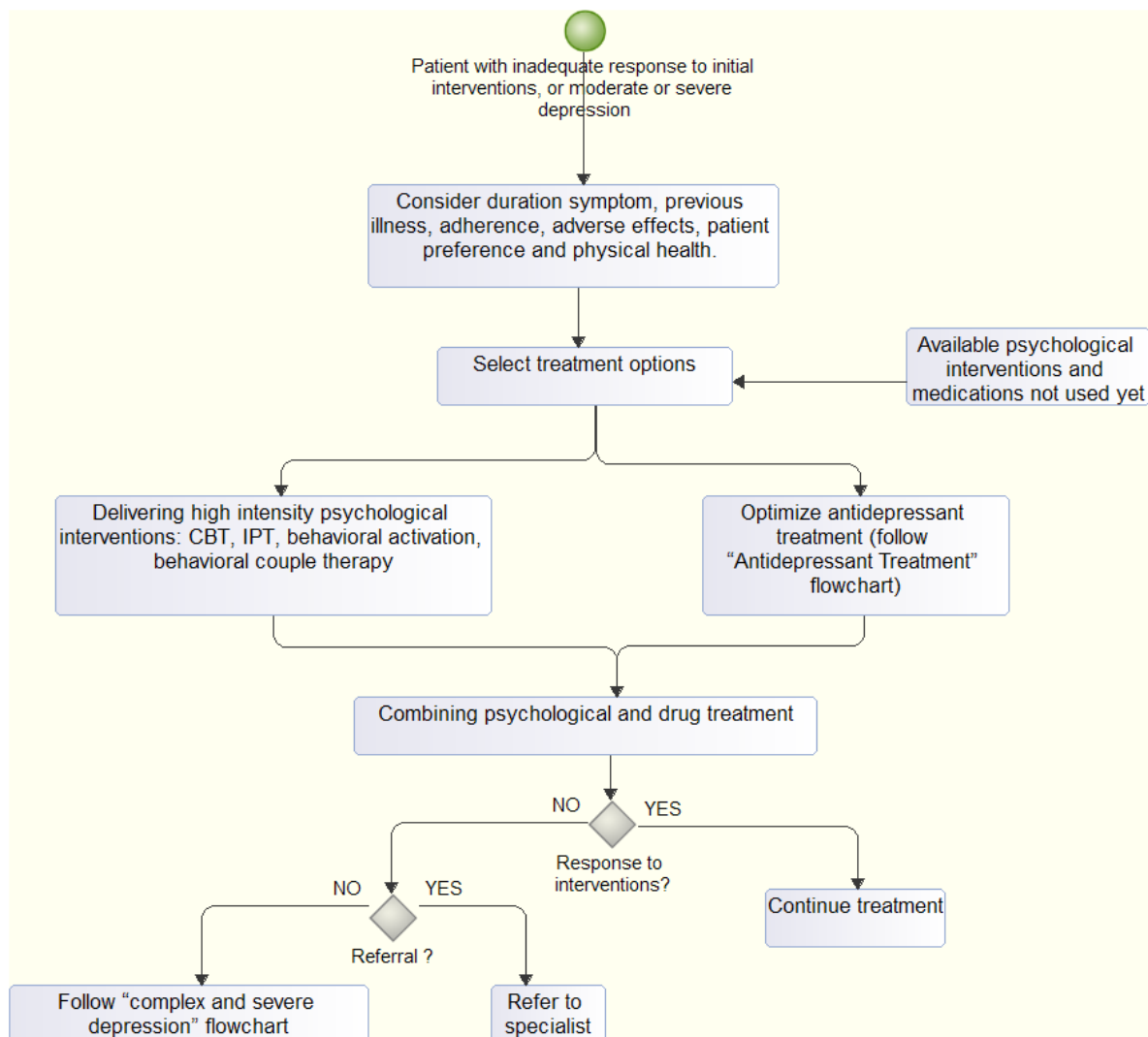


Figure 41: Depression - Moderate and severe depression

Abbreviations:

CBT: Cognitive Behavioral Therapy

IPT: Interpersonal Therapy

5.5.4. Treatment of Complex and severe depression

This flowchart is based on NICE guideline CG90, Chapter 1.10 [63, pp. 35–40].

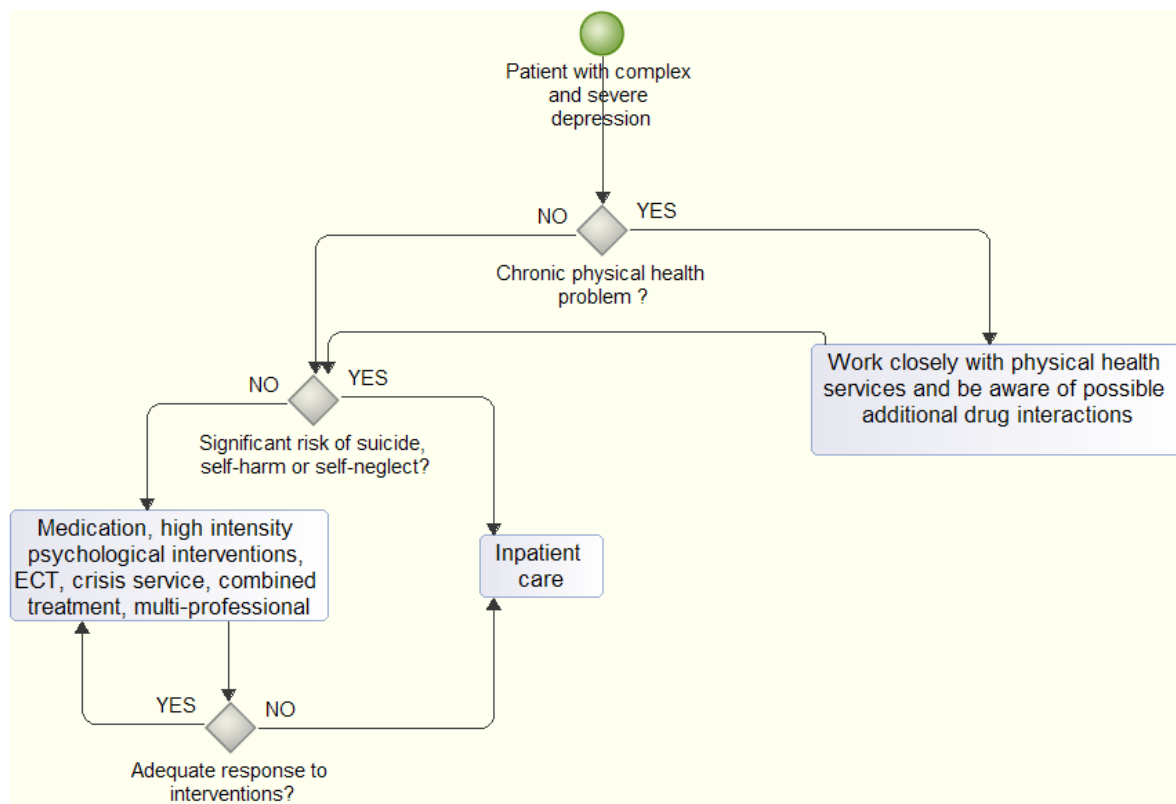


Figure 42: Depression - Treatment of complex and severe depression

Abbreviation:

ECT: Electroconvulsive Therapy

Context and Flowchart explanation:

The Clinical Practice Guideline considers complex interventions for the treatment of severe depression with the possibility of hospital admission in case of suicide risk. At this stage, the patients are treated in specialized mental health care. Complex interventions include combination of antidepressants, combination with other drugs groups and techniques such as electroconvulsive therapy. The action is based on Step 4 of the step-by-step treatment Chapter 1.10 of the electronic version of the NICE CPG CG90 [11].

5.5.5. Organization / Coordinated Care

This flowchart is based on NICE guideline CG90 [63, pp. 17–18].

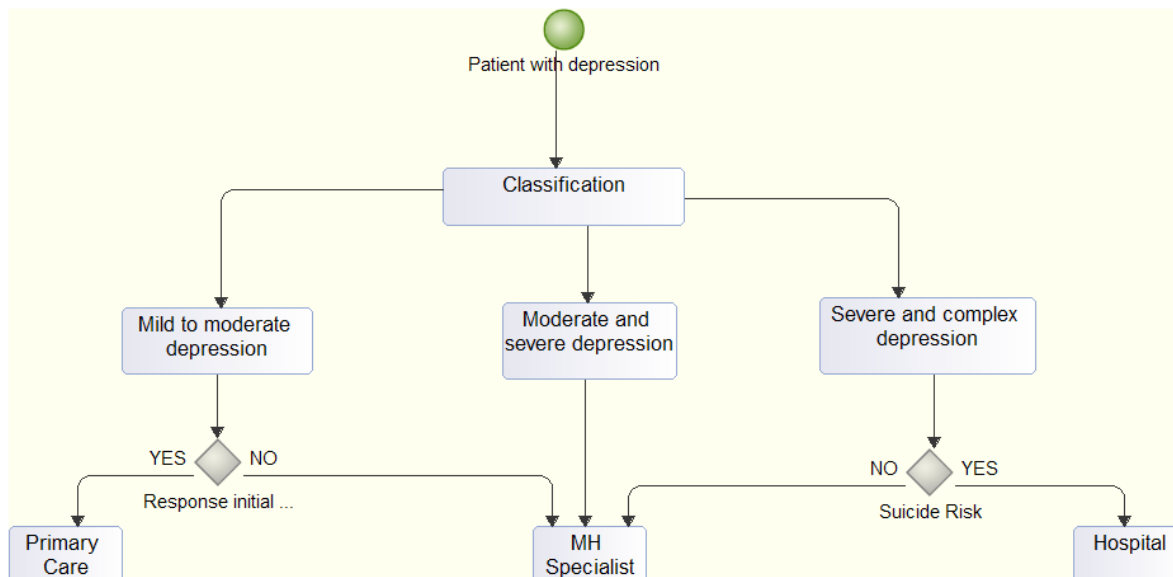


Figure 43: Depression - Coordinated care

Context and Flowchart explanation:

In the electronic version of the NICE CPG, the care to depression is developed according to its severity (Chapter 1.3, 1.4, 1.5) [63]. Due to the complexity of the nature of psychotherapeutic interventions, moderate and severe depression is considered as mild. No response to initial treatment should be evaluated by mental health specialists. The risk of suicide is considered a criterion of referral to a specialized hospital.

Deviations in the Basque Country, Spain

Both the NICE CPG as well as the Spanish ministry of health recommends shared care between primary and specialized care for the depressed patient. Treatment should be provided by competent and trained personnel.

The Spanish guideline takes into account the context of the health system and proposes more concrete criteria for referral, including the urgent referral, from primary to specialized than the NICE CPG: Risk of suicide or aggression towards others, severe depressive episode with psychotic symptoms, suspected bipolarity, highly recurrent moderate depression, prolonged depressive episodes, substance abuse, denial of disorder, after 2 or more failed treatment attempts, when symptoms raise diagnostic or therapeutic doubt.

5.5.6. Antidepressant Treatment

This flowchart is based on the NICE guideline CG90 [63, pp. 18–40].

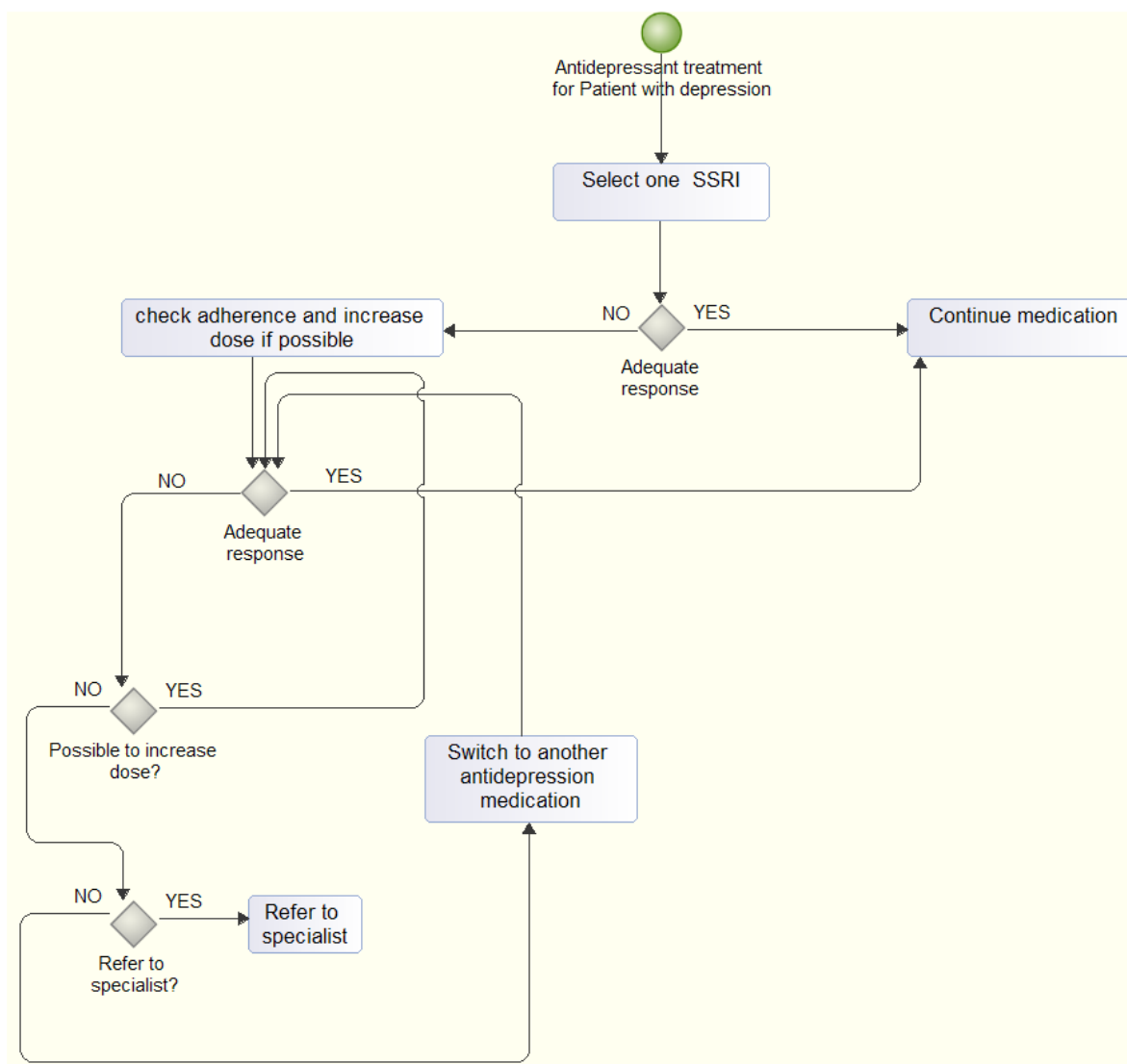


Figure 44: Depression - Antidepressant treatment

Abbreviation:

SSRI: Selective Serotonin Reuptake Inhibitor

For the selection of the proper antidepressant (SSRI) in patients with a chronic physical health problem, interactions (drug-drug and drug-disease) and specific considerations for elderly should be taken into account. Apart from checking the adherence and increasing the dose if possible, consider also to switch to another antidepressant.

Context and Flowchart explanation:

Taken from the NICE guideline CG90, Chapters 1.5, 1.6, 1.7 and 1.8, for successive deliverables, it is necessary to work in depth on the choice of drugs based on comorbidity and to detail the associations.

6. GENERAL MEDICATION GUIDELINES

6.1. Contraindications

In the different countries, there are knowledge bases that for each medication lists contraindications, these are available in the Summary of Product Characteristics according to the EU regulation on Medicinal products. In the UK primary care system, the prescribing software today automatically warns if such a contraindication is registered in the EHR of the patient. This will be implemented for the C3-Cloud for the medications recommended by our guidelines.

6.2. Interactions

In the three different pilot regions, the prescription software already has implemented warnings if there are possible interactions between the different medicinal products a patient has been or is being ordered. This includes also all the many medications that our patients will have also for other diseases. This is a resource that should be reused in C3-Cloud but not duplicated.

6.3. Registered hypersensitivity

There are already implementations of alert functions when an attempt is made to order a medication for which the patient is registered hypersensitive. These functions, different in the three pilot regions should be re-used.

6.4. Special concerns for elderly

The following list of medication categories are indicated as risk medication and the clinicians should be warned when considering issuing a medication order for one of these if the patient is above 75 years.

Risk medication for elderly >75 years

version 2016-12-08

Class name	ATC-Code
Benzodiazepines	N05BA
Selective SSRI	N06AA
Non-selective SSRI	N06AB
Opioids	N02A
Non-steriod anti-inflammatory drugs	M01A
Propiomazine	N05CM06
Zolpidem	N05CF02
Anticholinergica	N04A

7. MULTIMORBITY GUIDELINE

This is based on the NICE guideline on multi-morbidity: clinical assessment and management NG56 [44].

7.1. Objective of this guideline

To optimise care for adults with multi-morbidity (multiple long-term conditions) by reducing treatment burden (polypharmacy and multiple appointments) and unplanned or uncoordinated care.

7.2. NICE definition of multi-morbidity

Two or more out of the following:

- defined physical and mental health conditions such as diabetes or schizophrenia
- ongoing conditions such as learning disability
- symptom complexes such as frailty or chronic pain
- sensory impairment such as sight or hearing loss
- alcohol and substance misuse

7.3. Other potential inclusion criteria

- difficulty in managing treatments or day-to-day activities
- receiving care and support from multiple services and need additional services
- having both long-term physical and mental health conditions
- having frailty or falls
- frequently seeking unplanned or emergency care
- prescribed multiple regular medicines

7.4. Possible approaches to optimising treatment and care for patients with multi-morbidity

- maximising benefit from existing treatments
- considering treatments that could be stopped because of limited benefit
- reviewing medicines with a higher risk of adverse events
- introducing non-pharmacological treatments as possible alternatives to some medicines
- reviewing treatments and follow-up arrangements with a high burden
- making alternative arrangements for follow-up to coordinate or optimise the number of appointments, prioritising healthcare appointments
- assigning responsibility for coordination of care and ensuring this is communicated to other healthcare professionals and services

7.5. NICE definition of an individualised management plan

An individualised management plan is a management plan covering clinical aspects of a person's care, such as the medicines they are taking and the services they are attending. It includes information about which areas of care are most important to the person and whether treatments have been stopped to reduce treatment burden.

7.6. Tools which may be useful in the assessment and management of multi-morbidity

- Electronic Frailty Index (eFI) [64]
- Predicting Emergency admissions Over the Next Year (PEONY) [65]
- QAdmissions tools to identify adults with multimorbidity who are at risk of unplanned admission [66]
- PRISMA-7 tool to assess frailty [67]
- The screening tool of older people's prescriptions (STOPP) and screening tool to alert to right treatment (START) - the STOPP/START tool [68]
- The NICE database of treatment, for use in assessing the efficacy of treatments and the populations studied in relevant trials, to aid in shared decision making [69]

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