



Evidenced Care Pathways (ECPs) for
Chronic Obstructive Pulmonary
Disease in Japan, England, Canada
and Germany

January 2022



Evidenced Care Pathways for COPD

Chronic obstructive pulmonary disease (COPD) is a complex and challenging condition to treat. These Evidenced Care Pathways (ECPs) have been designed to bring to life this complexity as fully and simply as possible, in a way that tells the story of the condition overall and describes how care is currently delivered.

Data from the literature and clinician interviews (twenty-four respiratory healthcare professionals in primary and secondary care) were used to inform and validate the ECPs.

The ECPs are a valuable communications tool in healthcare evaluation and were used to help identify the key barriers for optimal COPD care, and therefore opportunities for policy change – to improve disease awareness, care management and patient outcomes while reducing resource use and costs.

The results of our research have been published [here](#). These ECPs are intended to accompany the paper.

1. [PAPER REF](#)

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Instructions for use



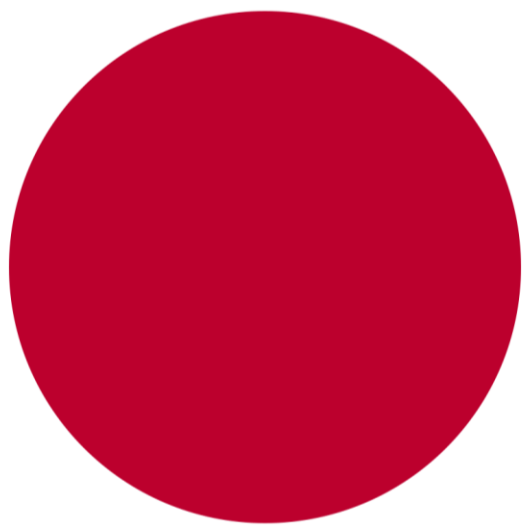
Evidenced Care Pathways for COPD

The Evidenced Care Pathways for COPD are intended to be used as an interactive communication tool.

- **To progress along the pathway, use Page Down arrow.**
- **To navigate to different parts of the pathway use your mouse to right-click the shape.**
- The pathway overview provides an overview of the pathway and contains the most important information.
- In the pathway overview, you can explore the pathway by clicking on steps which will take you to the corresponding detailed pathway view.
- Arrows between pathway steps are shaded to represent the proportions of patients undergoing that transition. (Lighter shading: lower percentage, darker shading: higher percentage).
- All costs are adjusted to 2019 and are in local currency (unless otherwise stated).

**Click here to get
started**





Canada

England



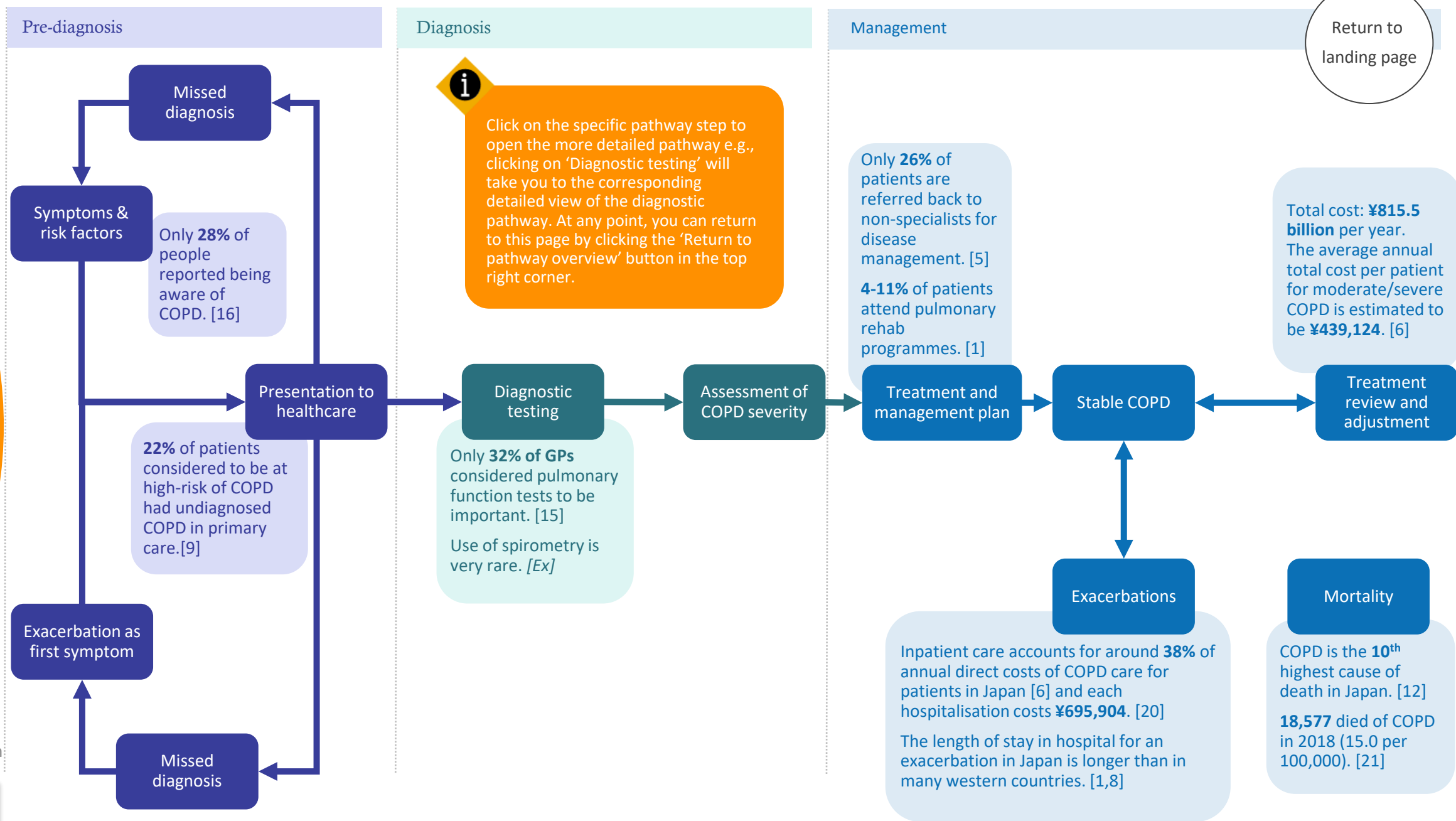
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flag to begin

Japan

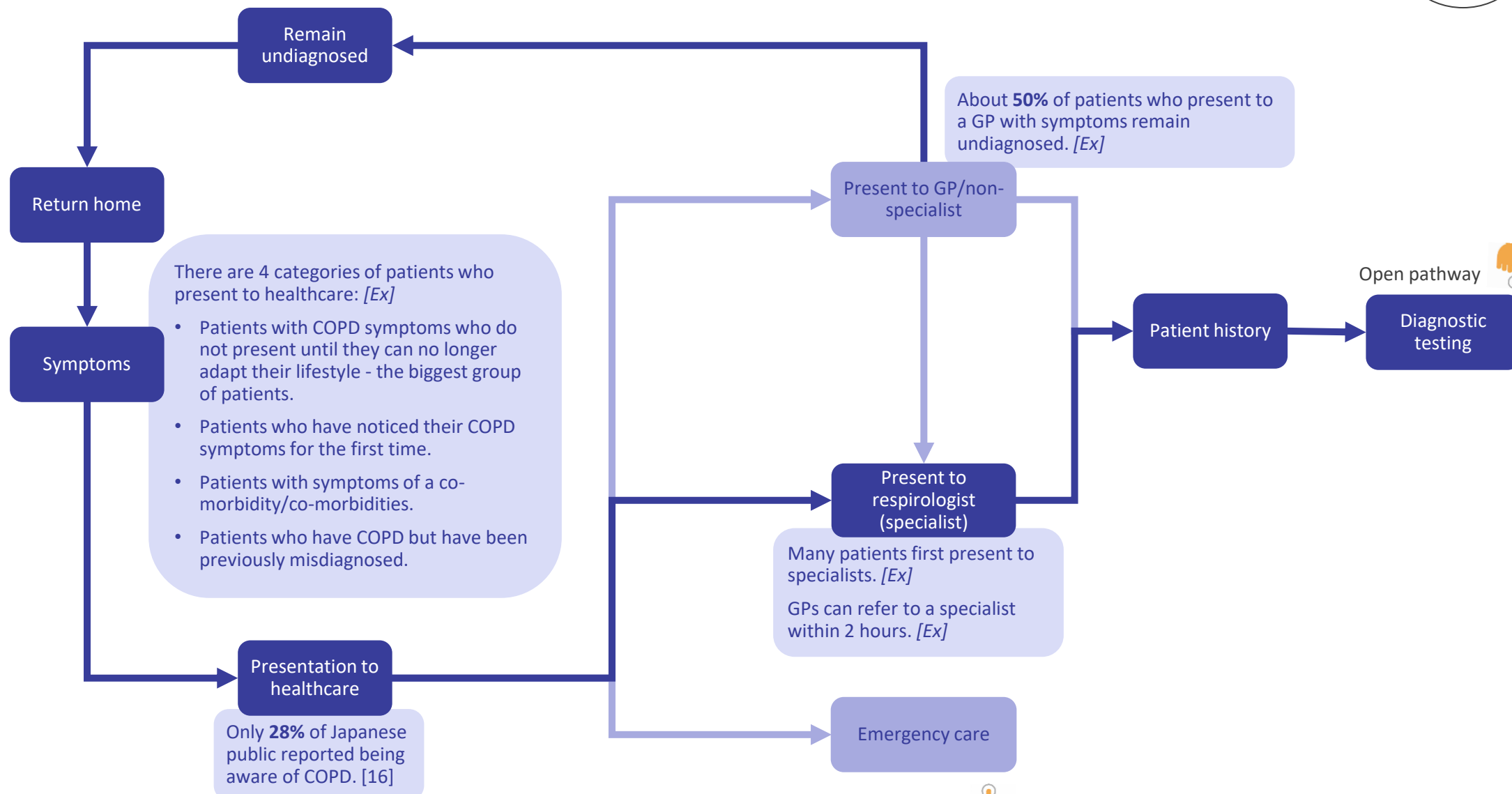
Germany

Pathway overview

Click Flag to open References



Presentation to healthcare



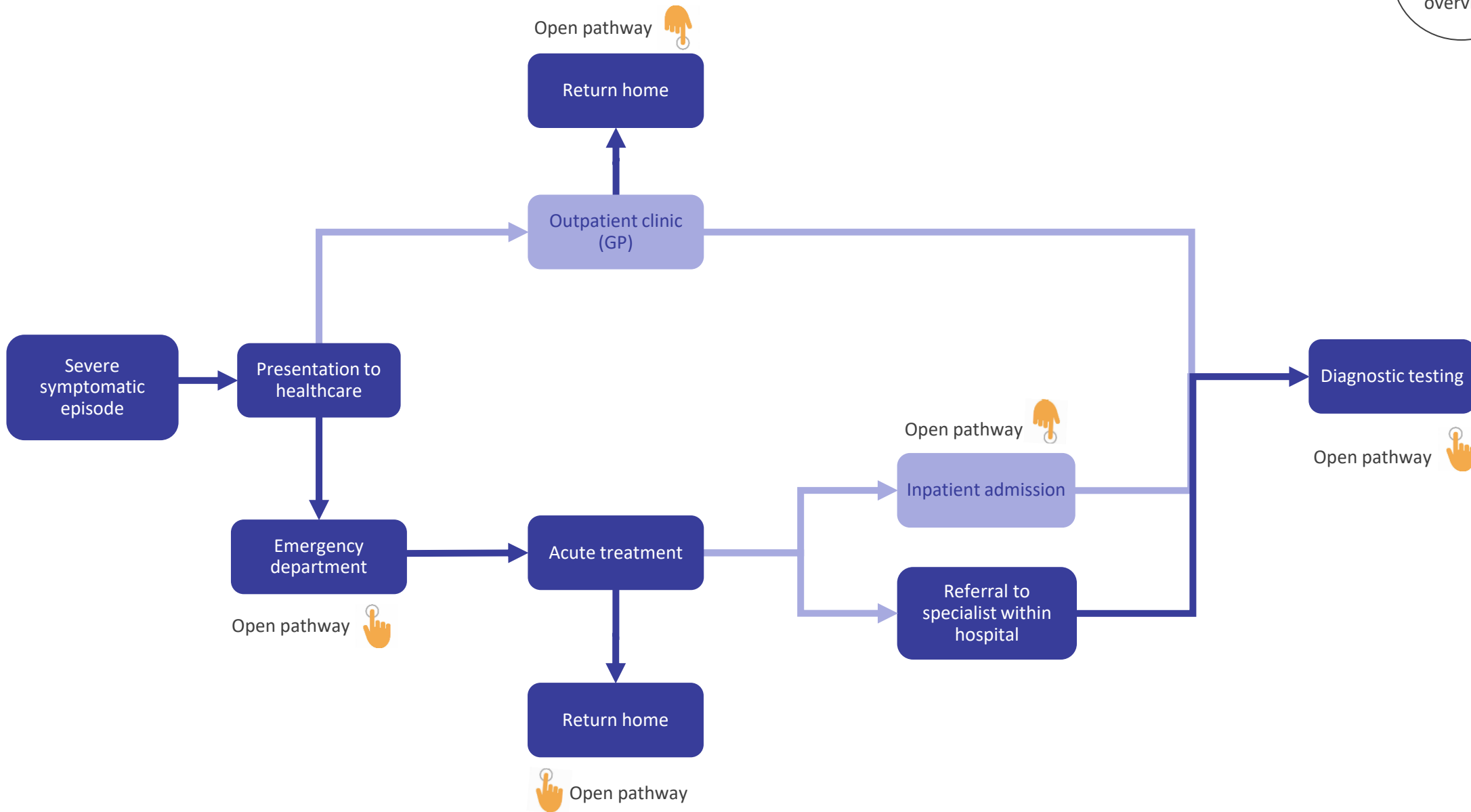
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References



Return
to pathway
overview

Pre-diagnosis

Presentation
to healthcare:
emergency
care

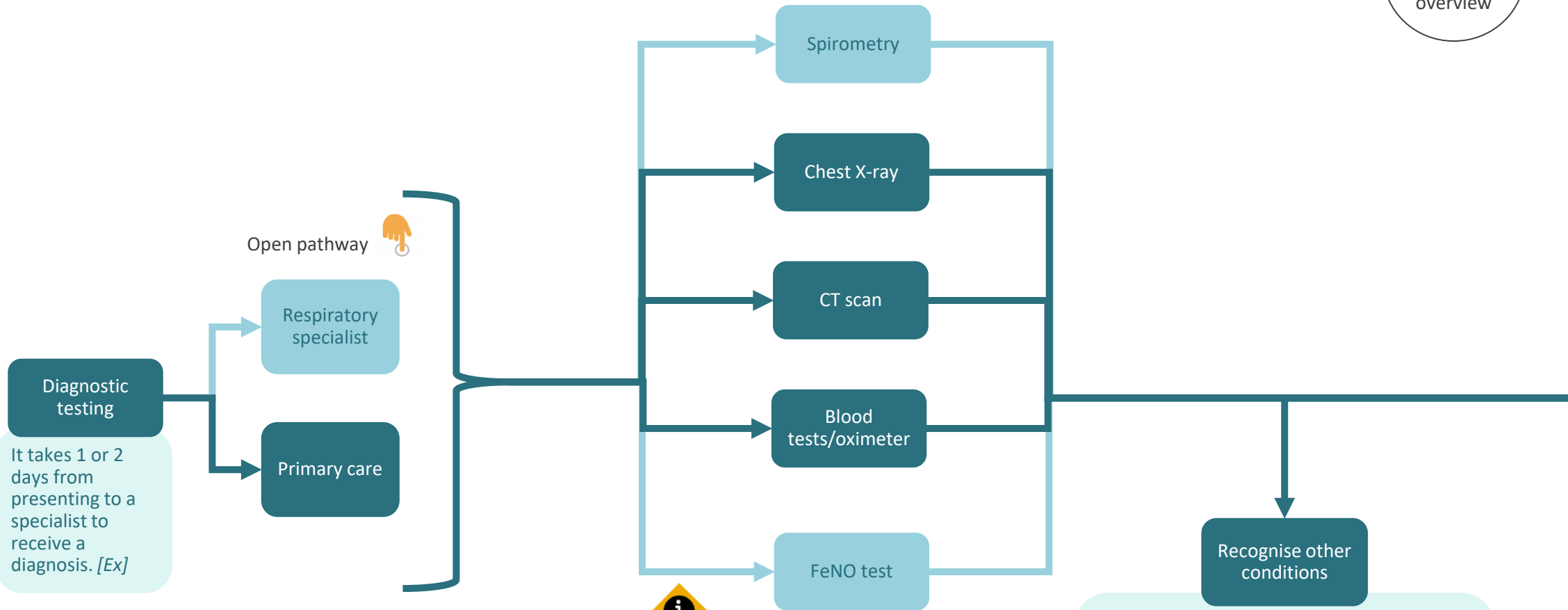


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References





Diagnostic
testing:
primary care



It takes 1 or 2 days from presenting to a specialist to receive a diagnosis. [Ex]

Additional information on the diagnostic tests.

- 42% of GPs possessed a spirometer but only 32% considered pulmonary function tests to be important. [15] Usually GPs don't have a spirometer in their clinics so therefore they cannot diagnose COPD. [Ex]
- If COPD is suspected, this will often be the first test and used to rule out cancer. Often used as a way to show the risk of smoking. [Ex]
- GP will do blood tests more often than CT to rule out asthma. [Ex]



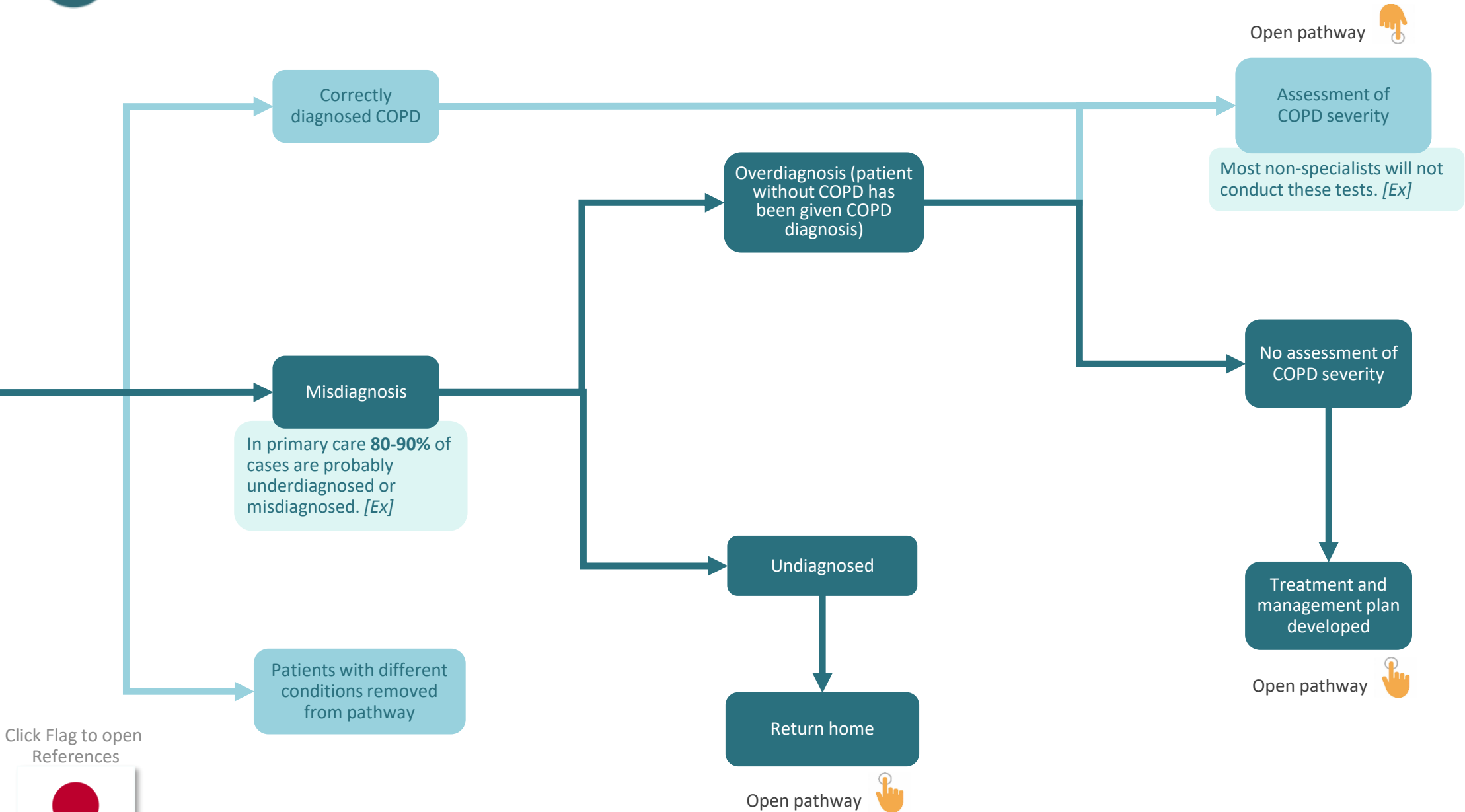
Common co-morbidities:
Hypertension: 25-45% [1]
Cardiovascular comorbidities: 16-22% [13]
Osteoporosis (male): 18-39% [13]
Asthma: 15-20% [1]
Diabetes: 4-15% [13]
Lung cancer: 6% [13]

Click Flag to open
References





Return
to pathway
overview



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References



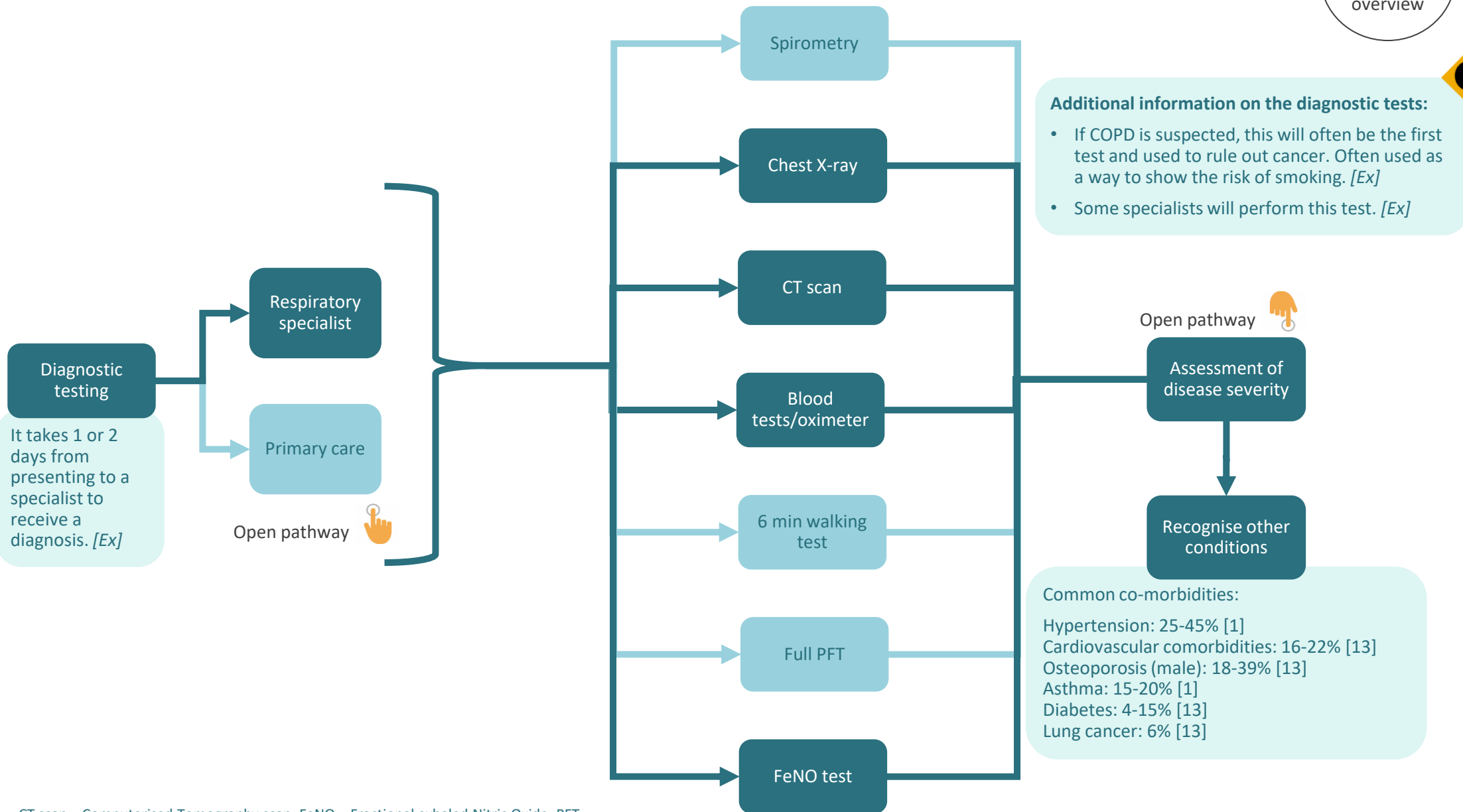
GP =General Practitioner



Return
to pathway
overview



Diagnostic testing: specialist



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References



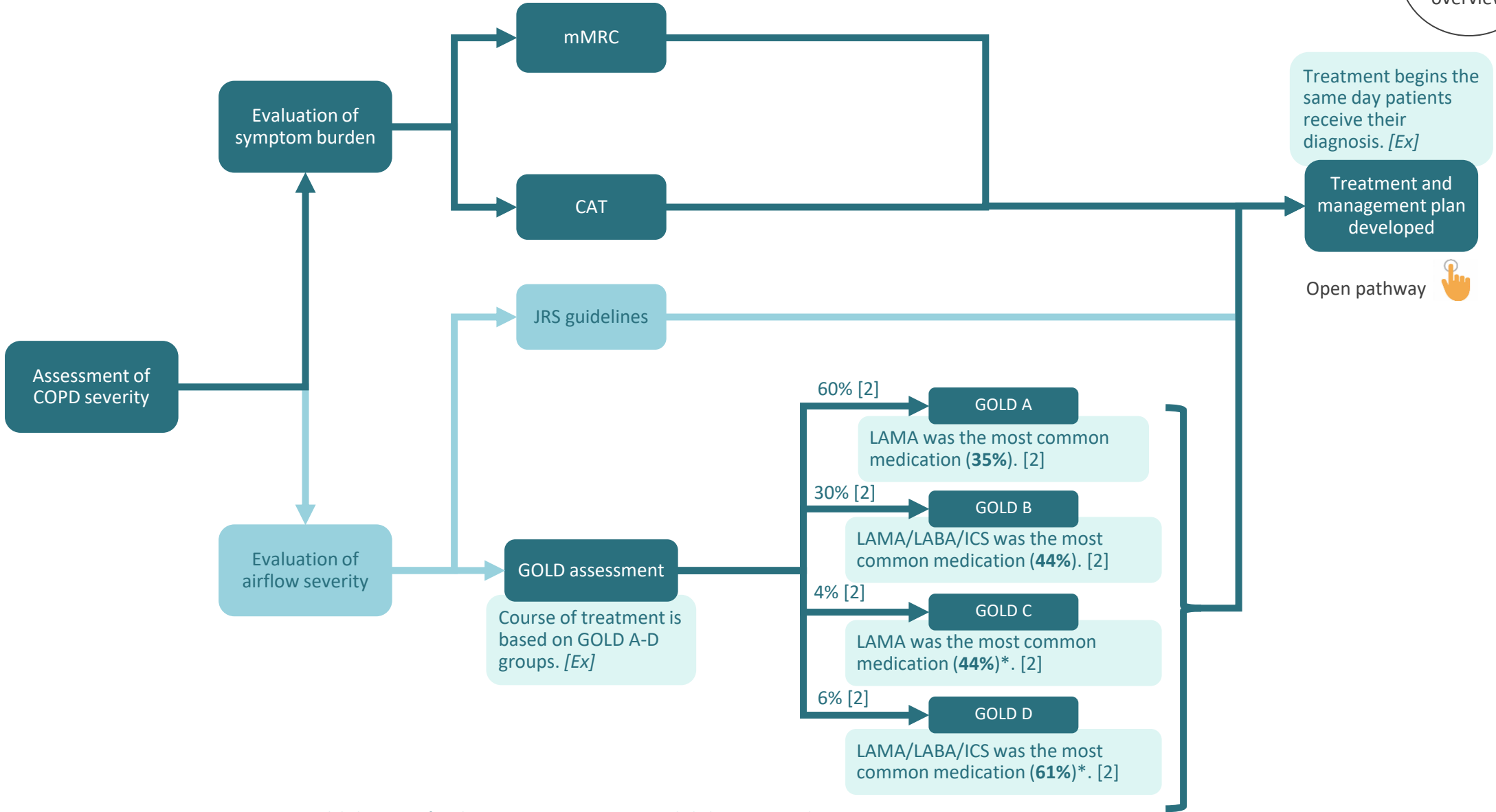
CT scan = Computerised Tomography scan; FeNO = Fractional exhaled Nitric Oxide; PFT = Pulmonary Function Test



Return
to pathway
overview

Diagnosis

Assessment
of COPD
severity



Treatment begins the
same day patients
receive their
diagnosis. [Ex]

Treatment and
management plan
developed

Open pathway

Click Flag to open
References



CAT = COPD Assessment Test; GOLD = Global Initiative for Obstructive Lung Disease; ICS = Inhaled Corticosteroids; LABA = Long-acting Beta Agonistic; LAMA= Long-acting Muscarinic Antagonist; mMRC = modified Medical Research Council Dyspnoea Scale

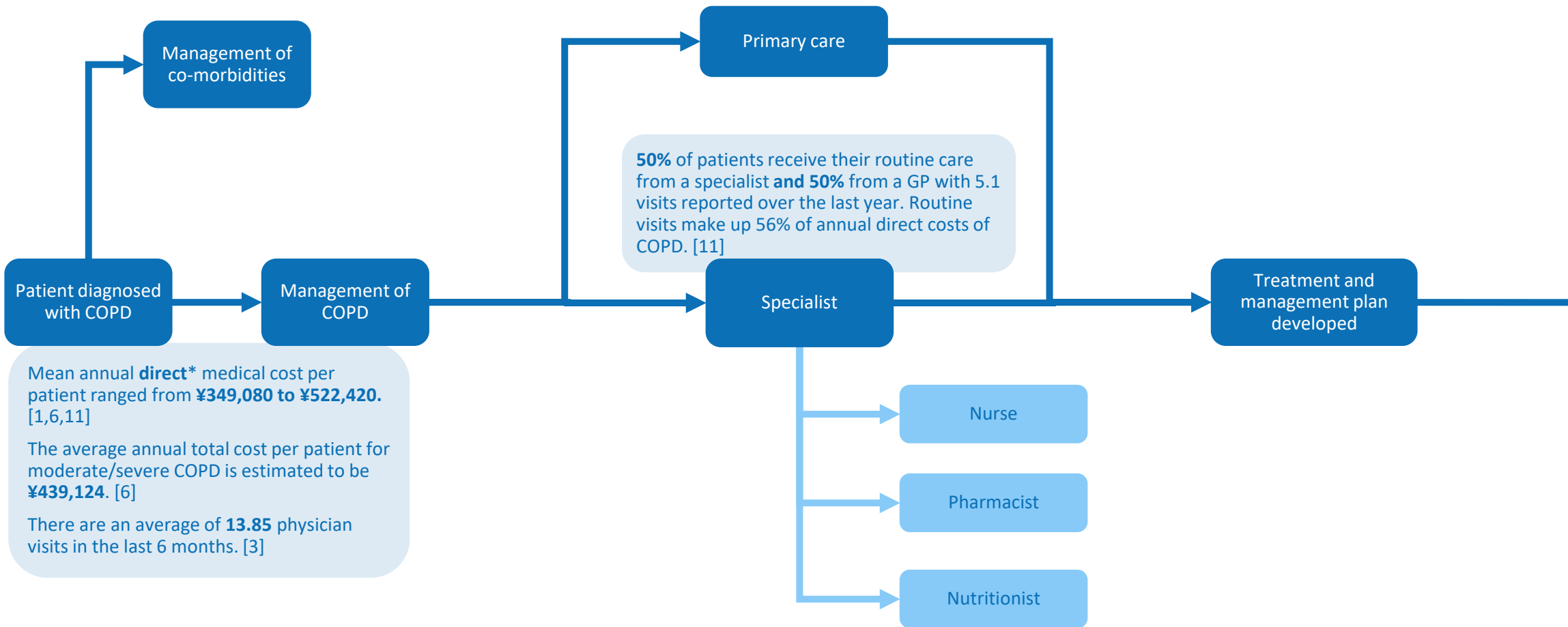
*Sample size was small for GOLD groups C (N=16) and D (N=23)



Return
to pathway
overview

Management

Treatment
and
management
plan

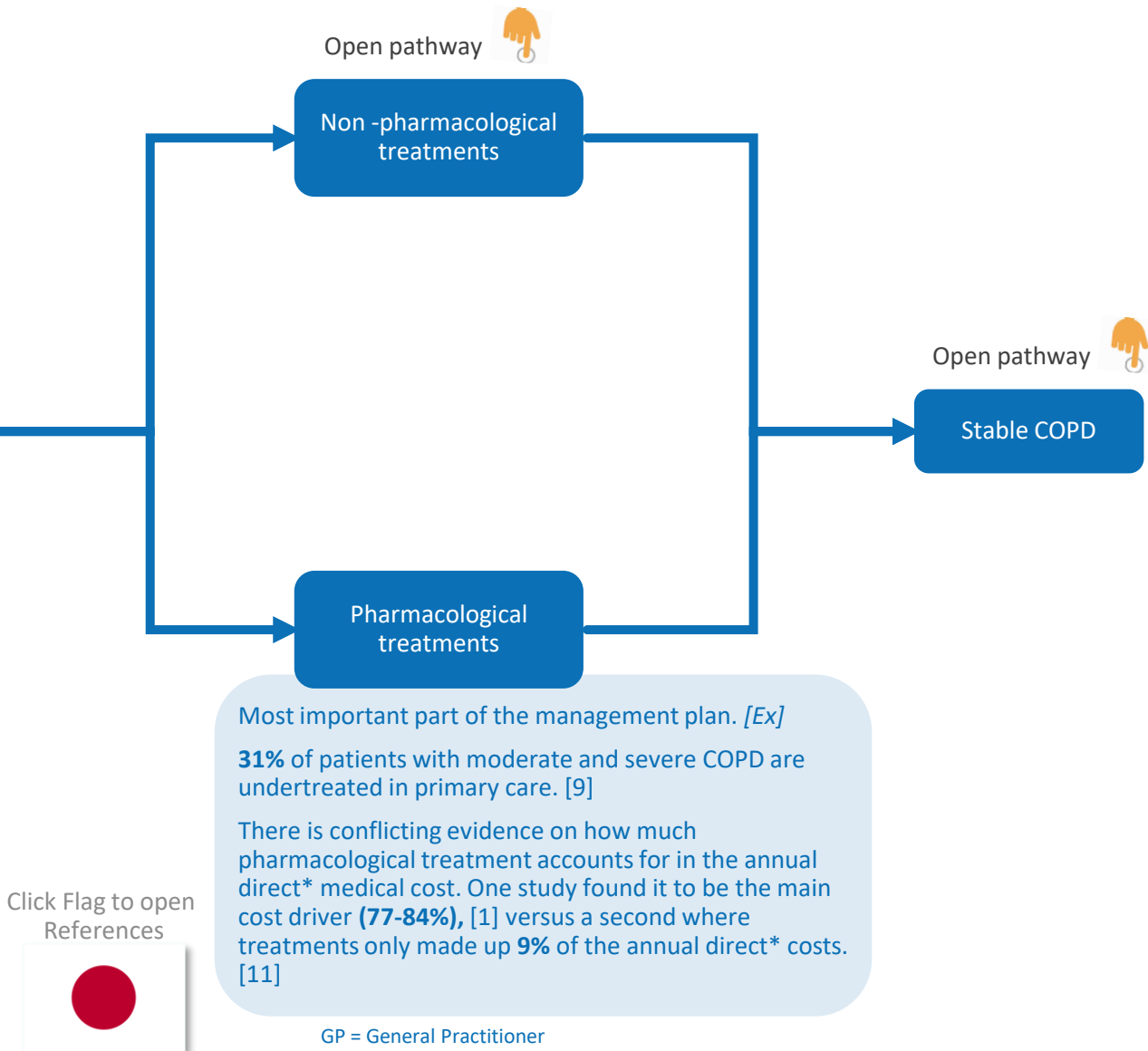


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References



*Direct costs includes pharmacological treatment, consultations with healthcare professionals, hospitalisation episodes, emergency room visits, pulmonary rehabilitation programs and oxygen therapy [1]; inpatient care, outpatient care and home oxygen therapy [6]; moderate and severe COPD exacerbations, contact with healthcare professionals, COPD medications, home oxygen use and influenza vaccination during the past 12 months. [11]

GP = General Practitioner



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References

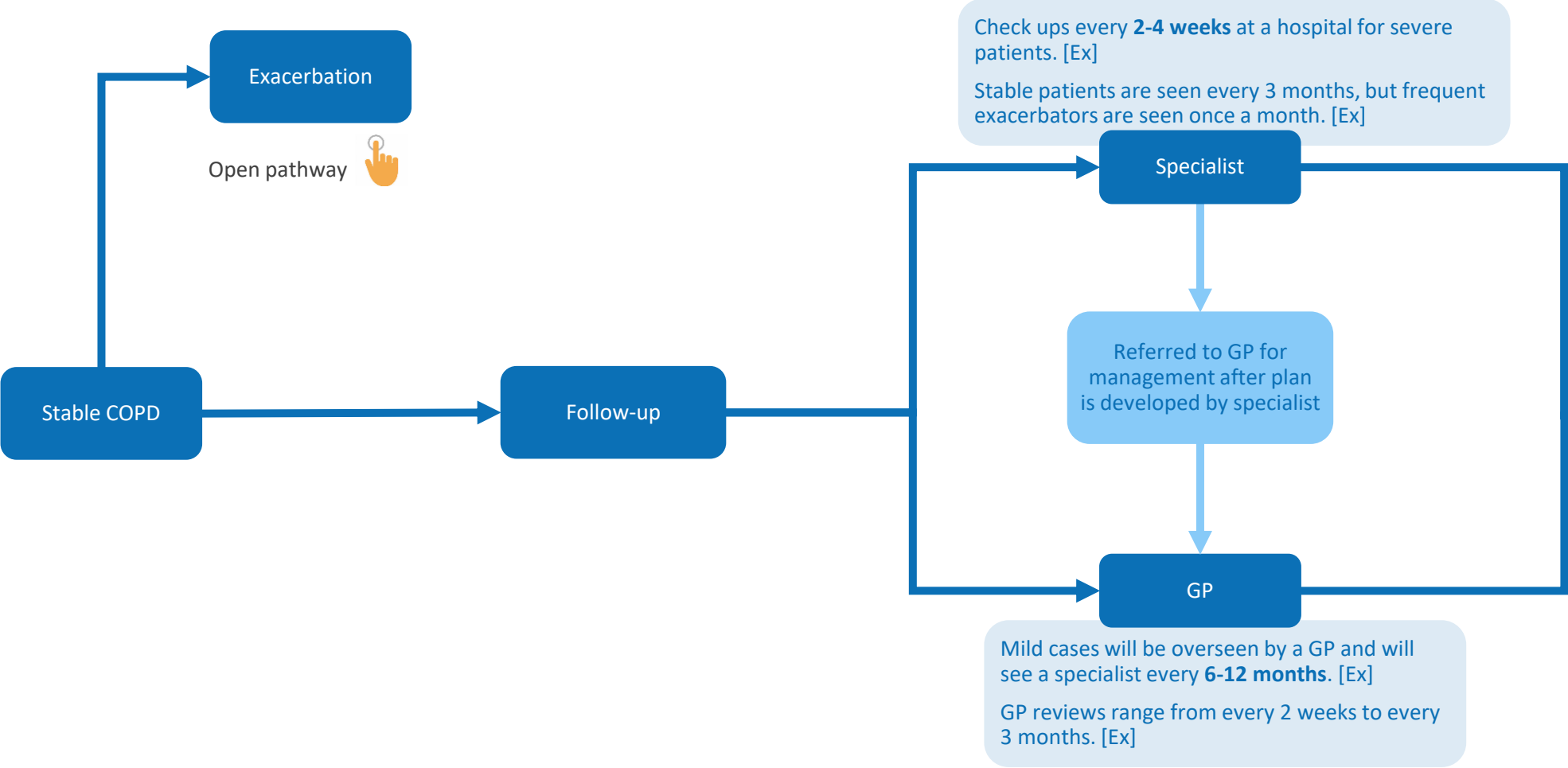




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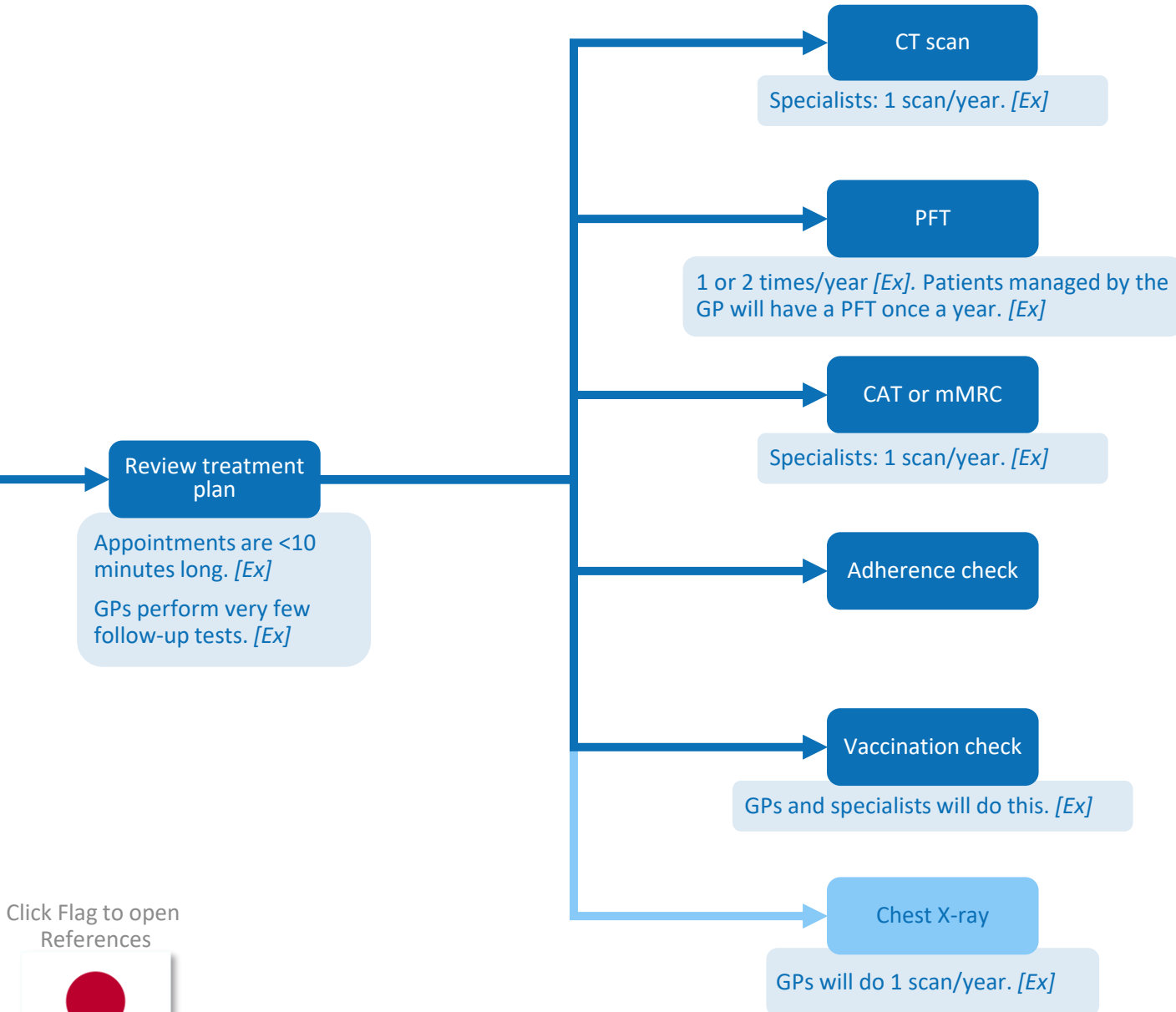
Management

Stable COPD



Click Flag to open
References



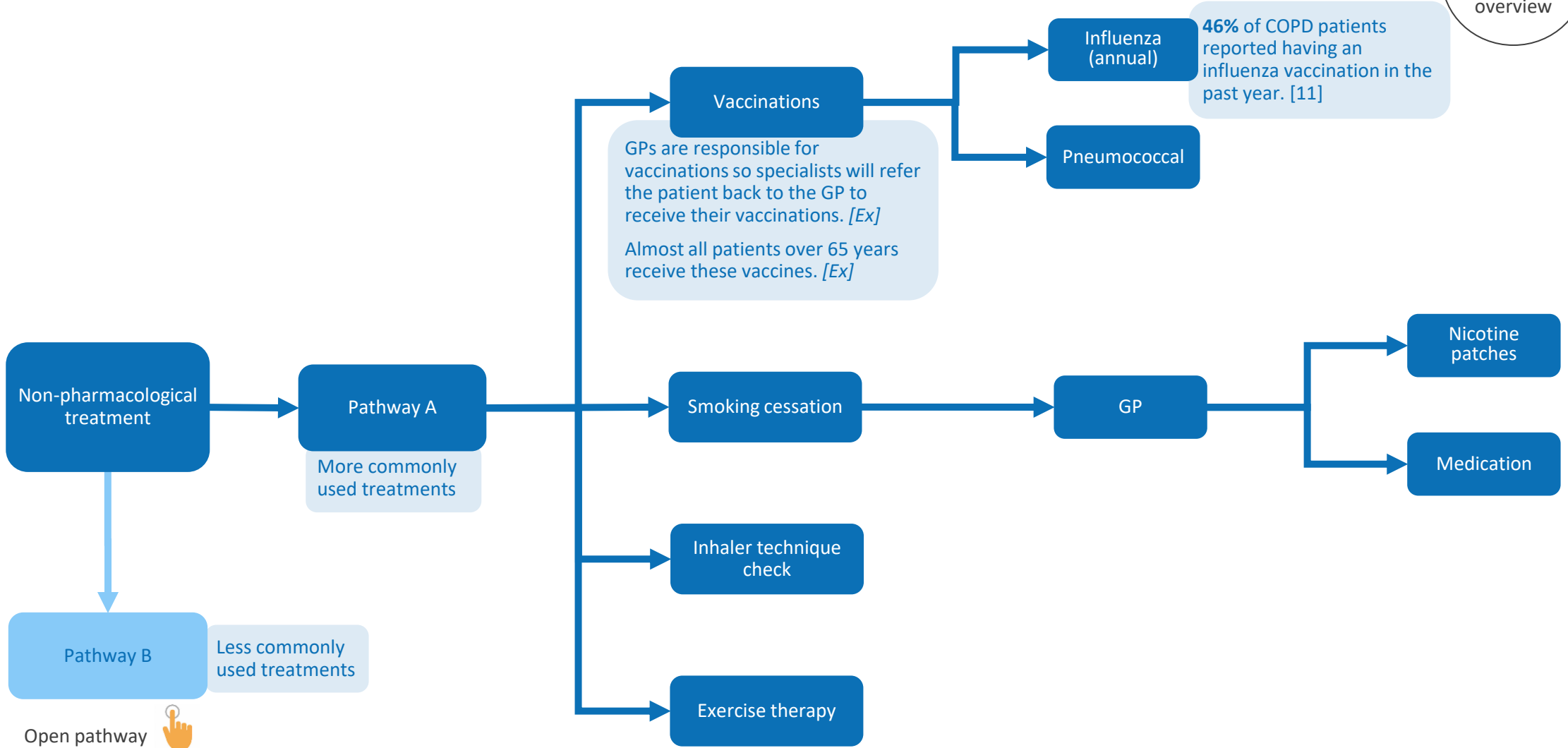


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References





Treatment
and
management
plan: non-
pharma-
cological
treatment



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References



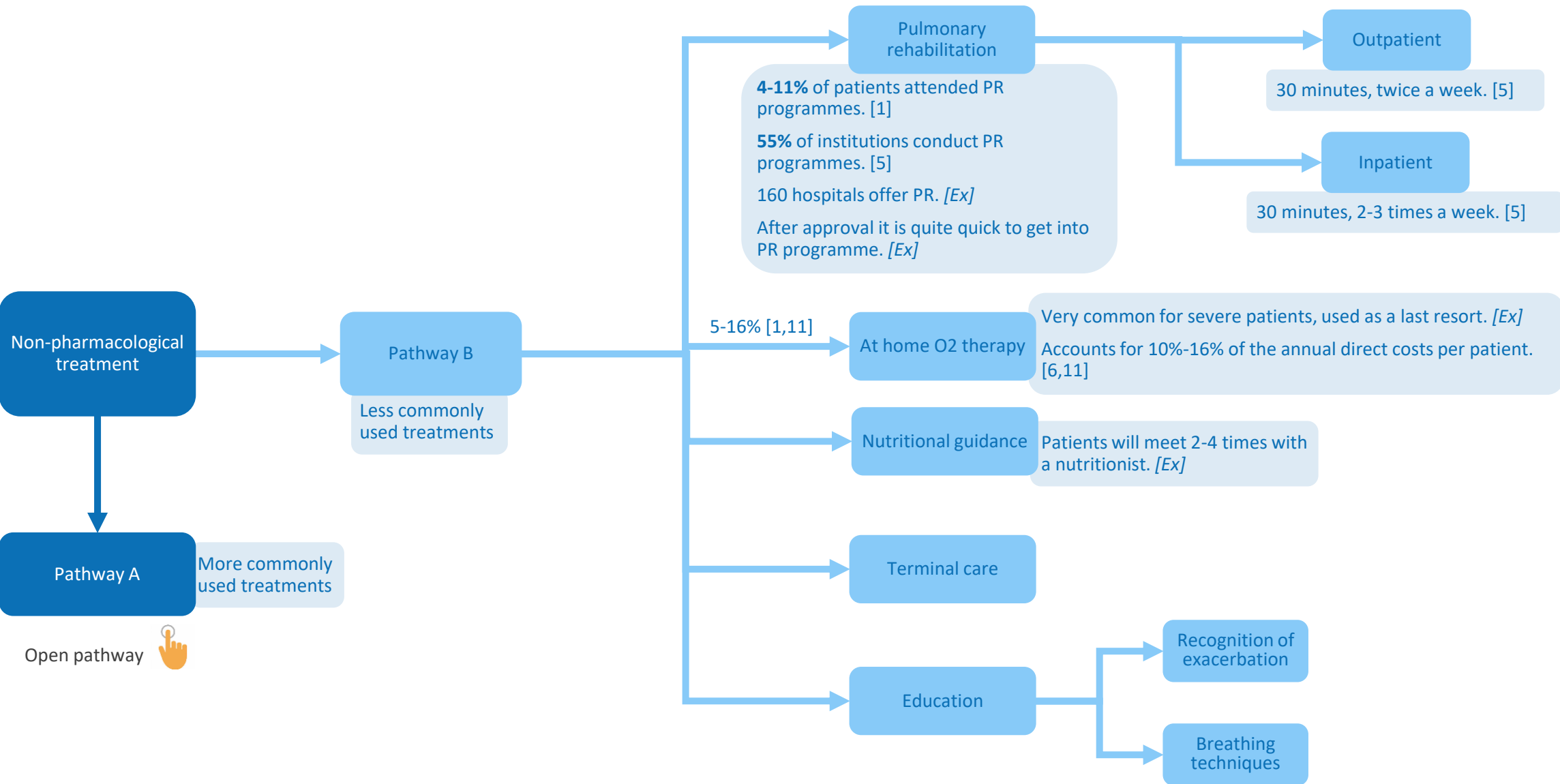
GP = General Practitioner



Return
to pathway
overview

Management

Treatment
and
management
plan: non-
pharma-
cological
treatment



Open pathway



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References



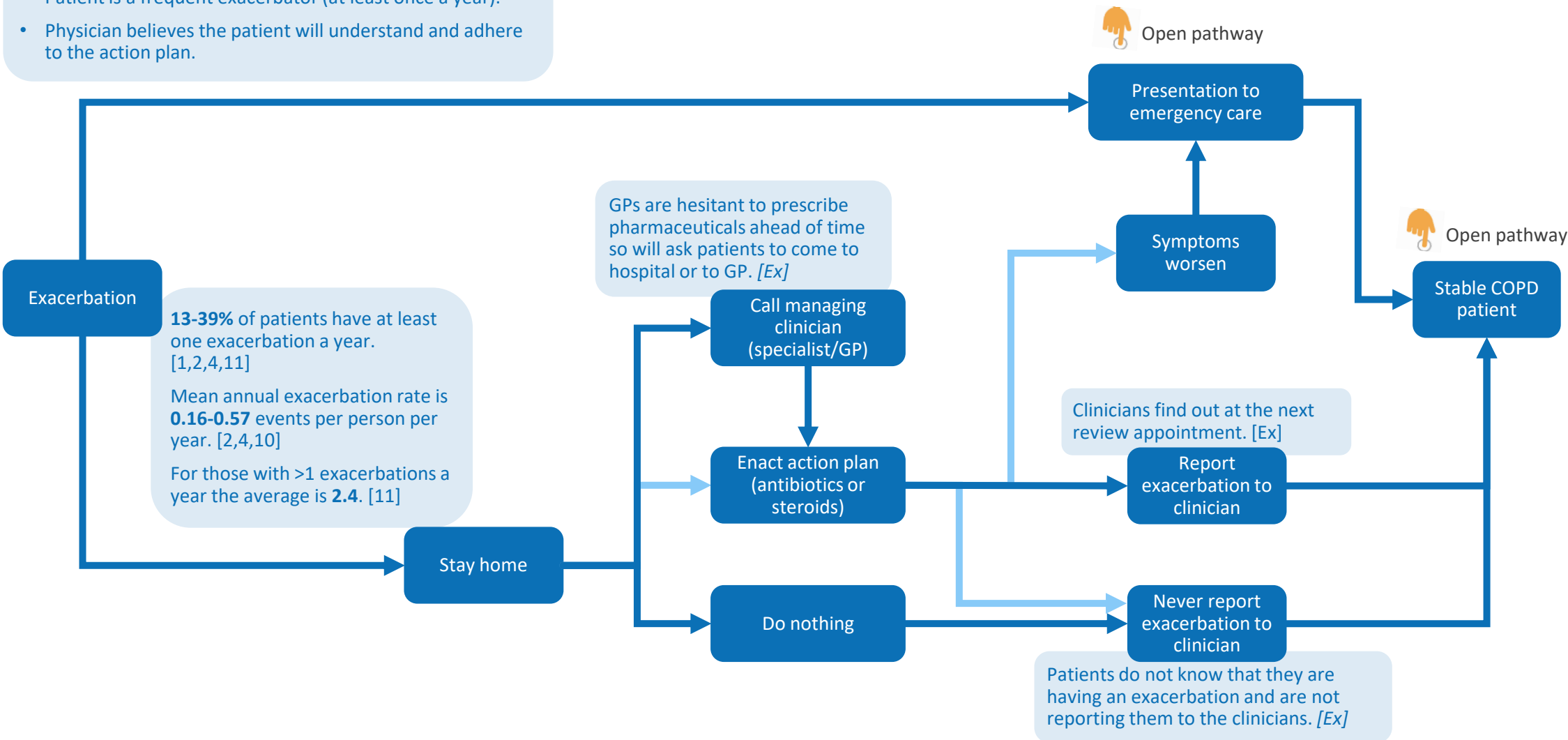


Action plans

Severe patients will be provided an action plan if the: [Ex]

- Patient is a frequent exacerbator (at least once a year).
- Physician believes the patient will understand and adhere to the action plan.

Exacerbations

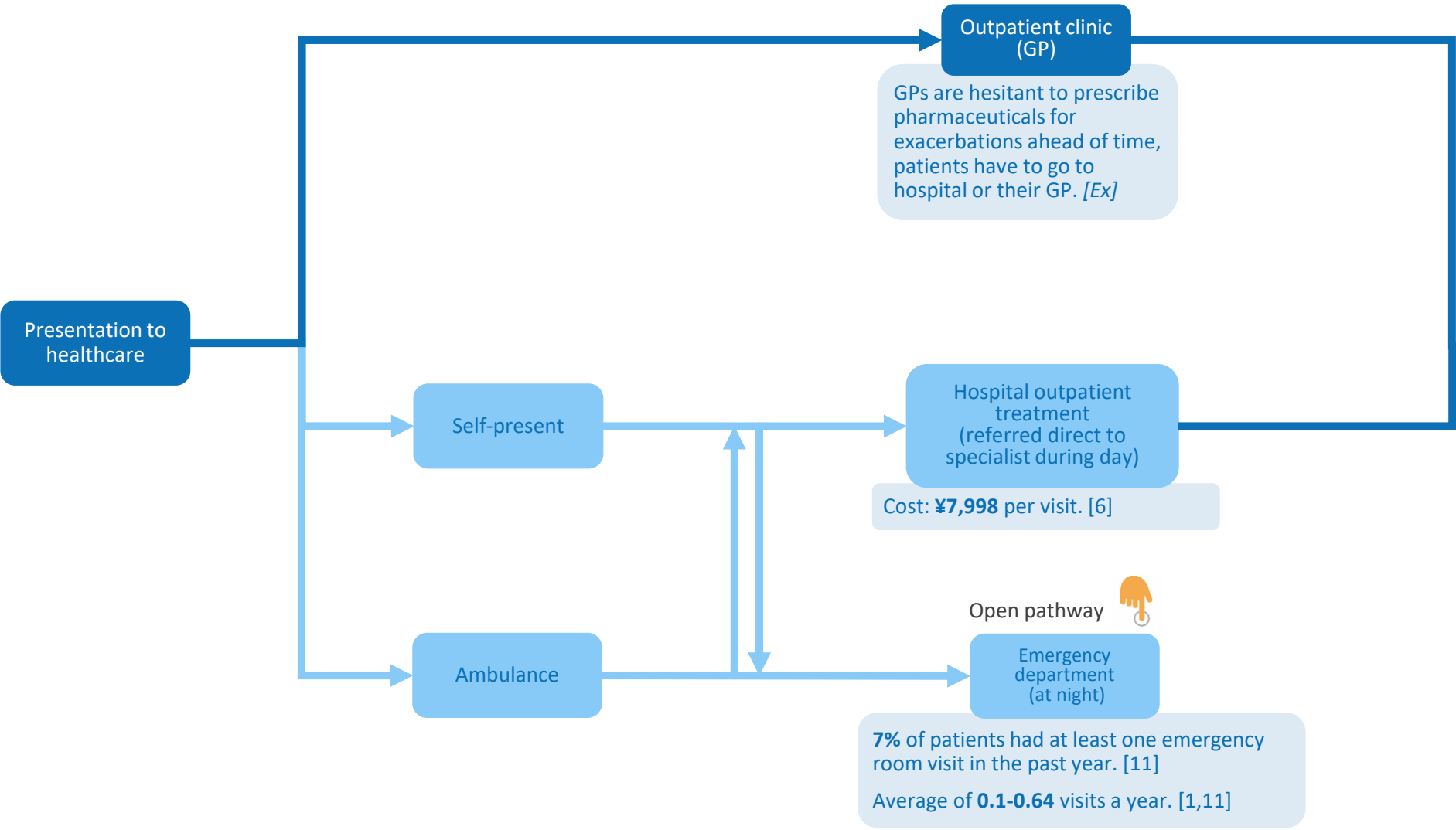


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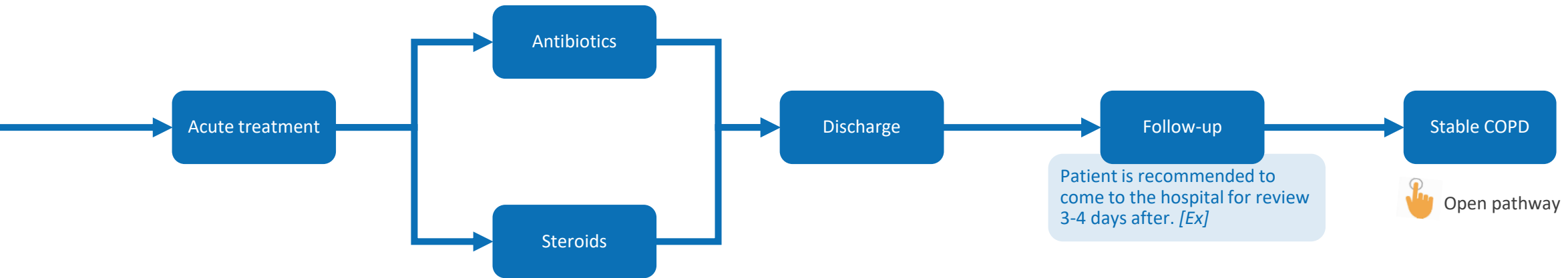


Exacerbations:
presentation to
healthcare



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References

GP = General Practitioner



Click Flag to open
References

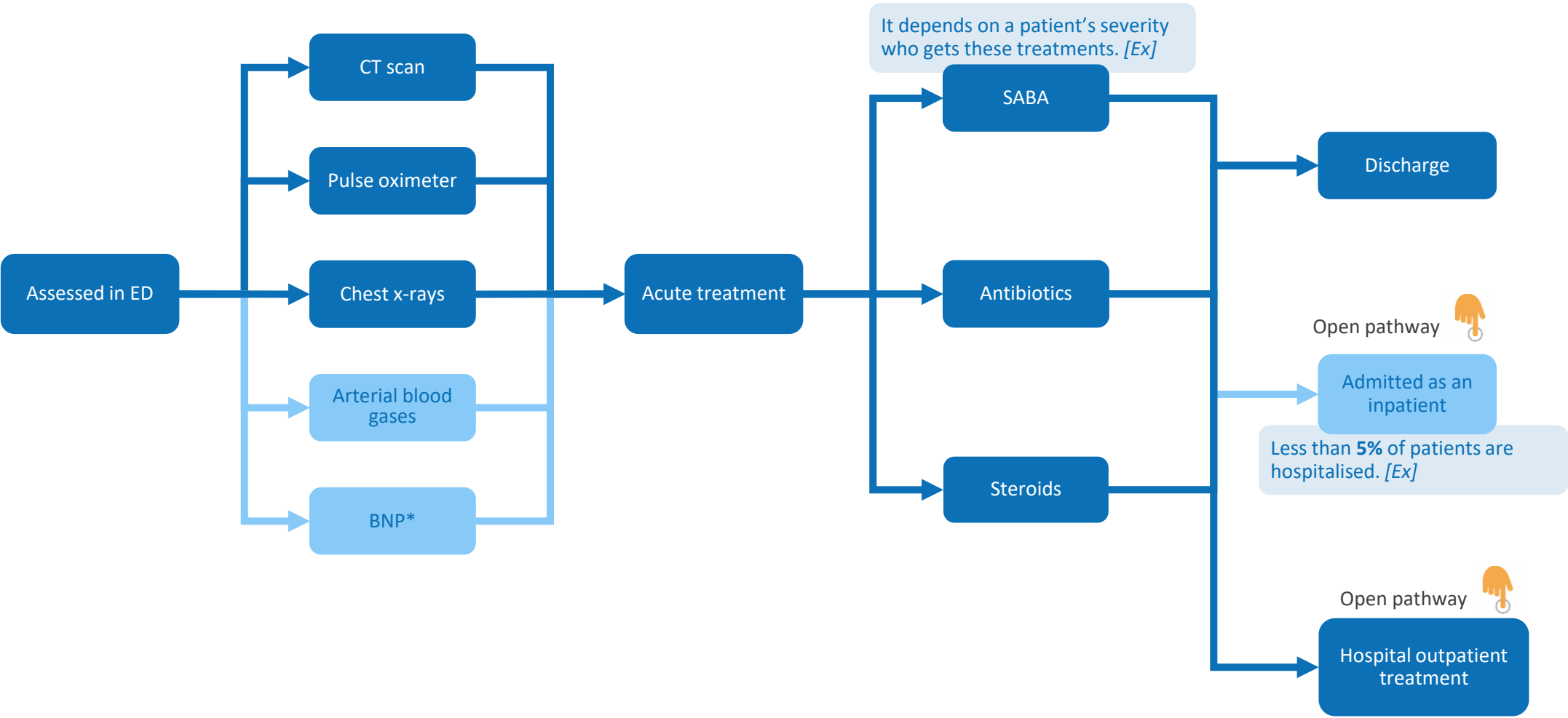




Return
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overview

Management

Exacerbations:
emergency
department



Click Flag to open
References



BNP = Brain Natriuretic Peptide; CT scan = Computerised Tomography; ED = Emergency Department; SABA = Short-acting Beta Agonist



Return
to pathway
overview

Management

Exacerbations:
inpatient
admission

Admitted as an
inpatient

3-13% of patients are hospitalised in a year. [1,11]
Average stay: **12-18** days. [Ex, 1]
Cost: **¥16,429** per day [6] - **¥695,904** per hospitalisation. [20]
0.1-4.0 admissions per patient in a year. [3,11]
Inpatient hospitalisation makes up **9-38%** of annual direct costs per patient. [6,11]

Acute specialist
ward

General ward

IV antibiotics

These tests may be repeated after a couple of days if the emergency department had already done them. [Ex]

Blood tests

EKG

Chest X-rays

Arterial blood
gases

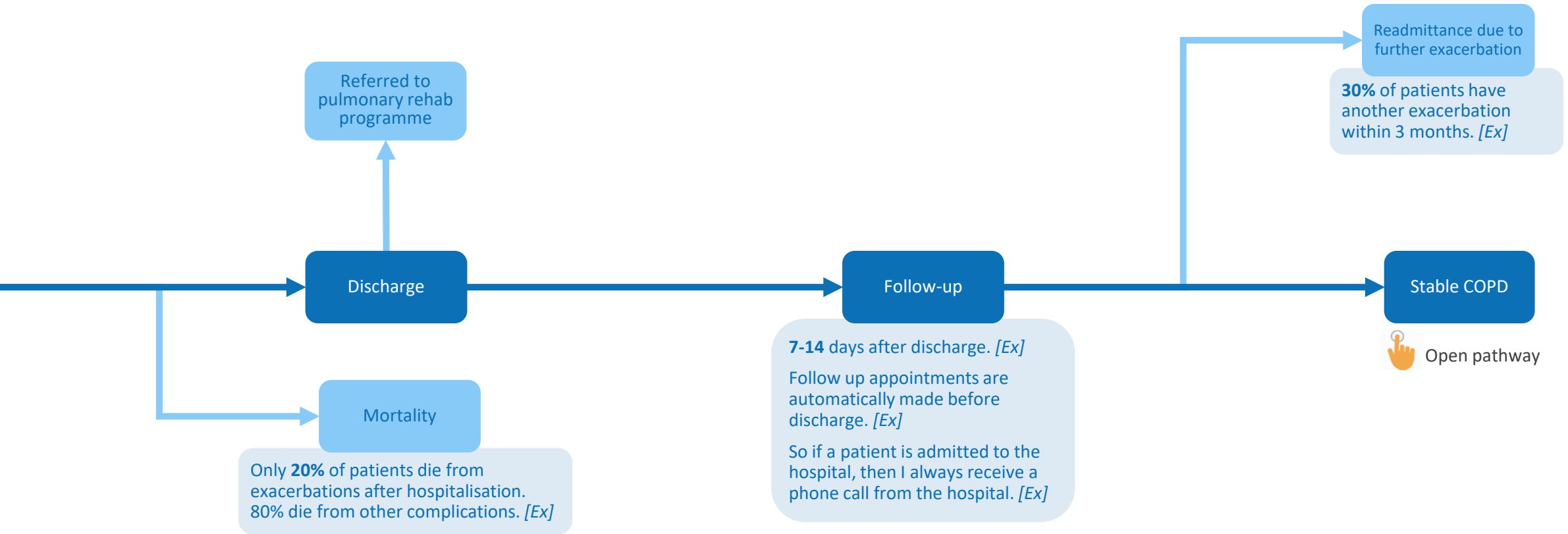
Respiratory
management
(NPPV*)

NPPV dependent on abnormal
arterial blood gas. [Ex]

Click Flag to open
References



EKG = Electrocardiogram; NPPV = Non-invasive Positive Pressure Ventilation



Click Flag to open
References



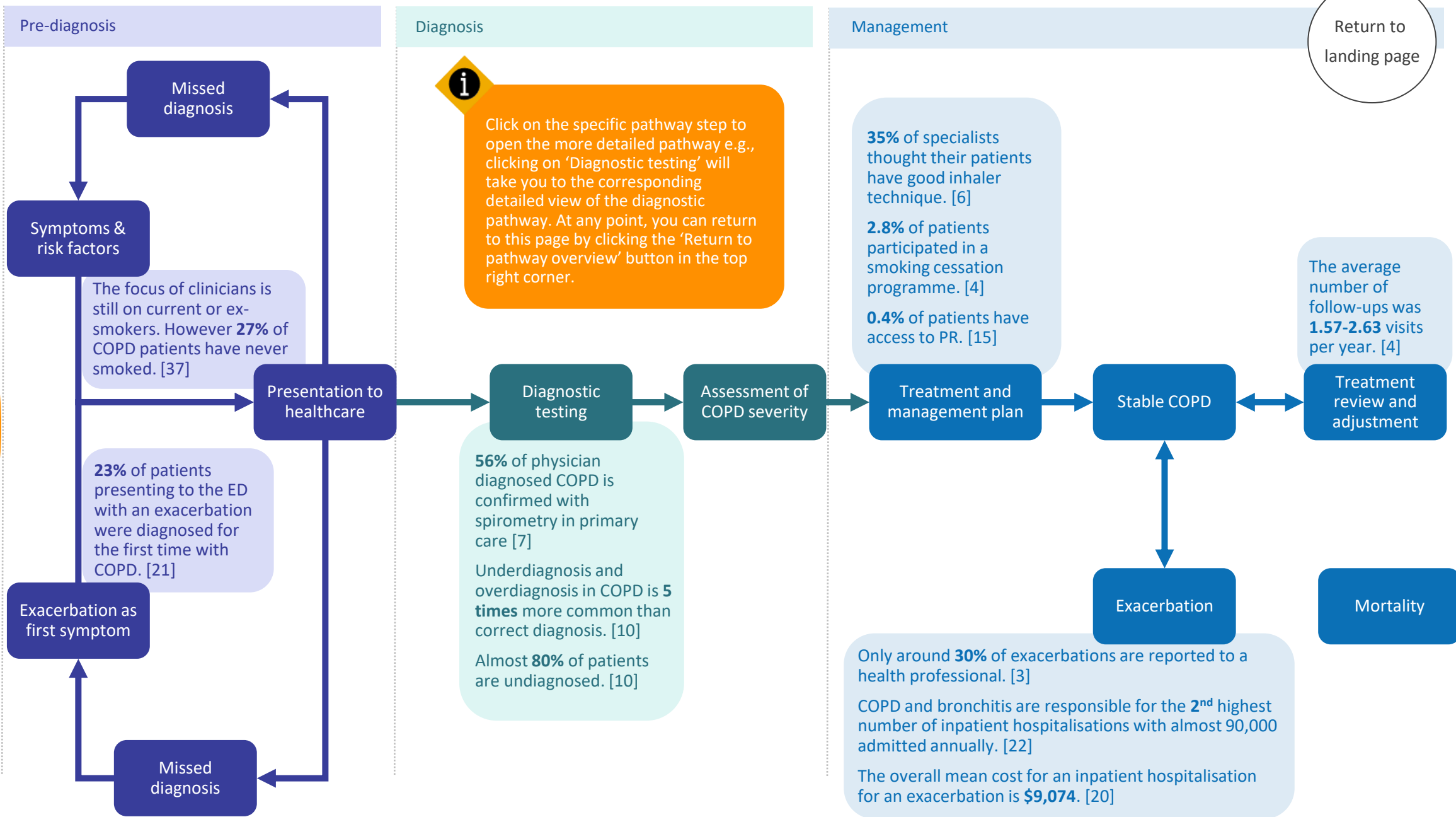
Pathway overview

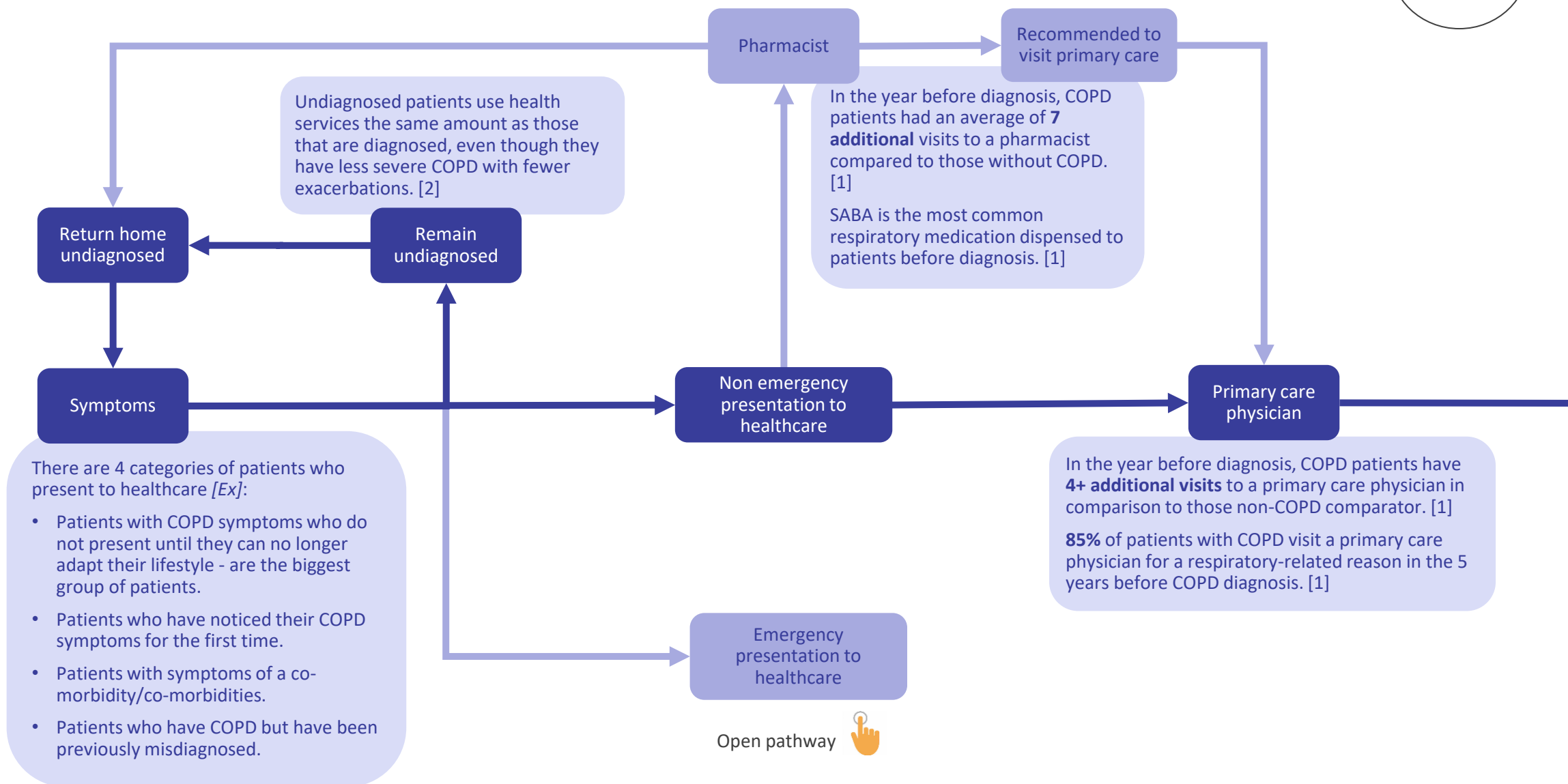
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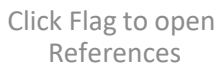
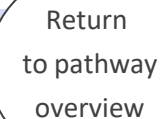


PR = Pulmonary rehabilitation

Return to landing page





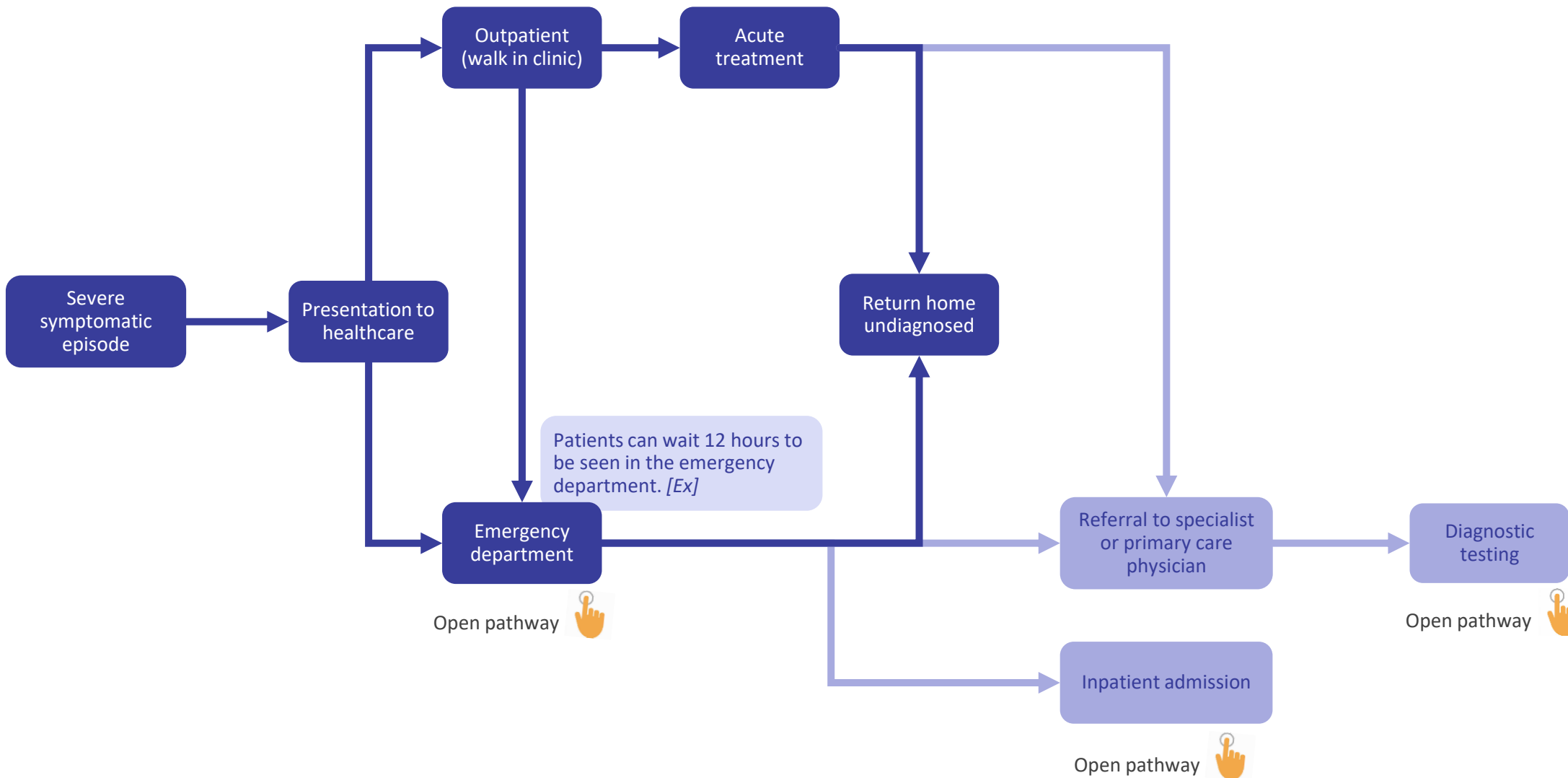




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Pre-diagnosis

Presentation
to healthcare:
emergency
care

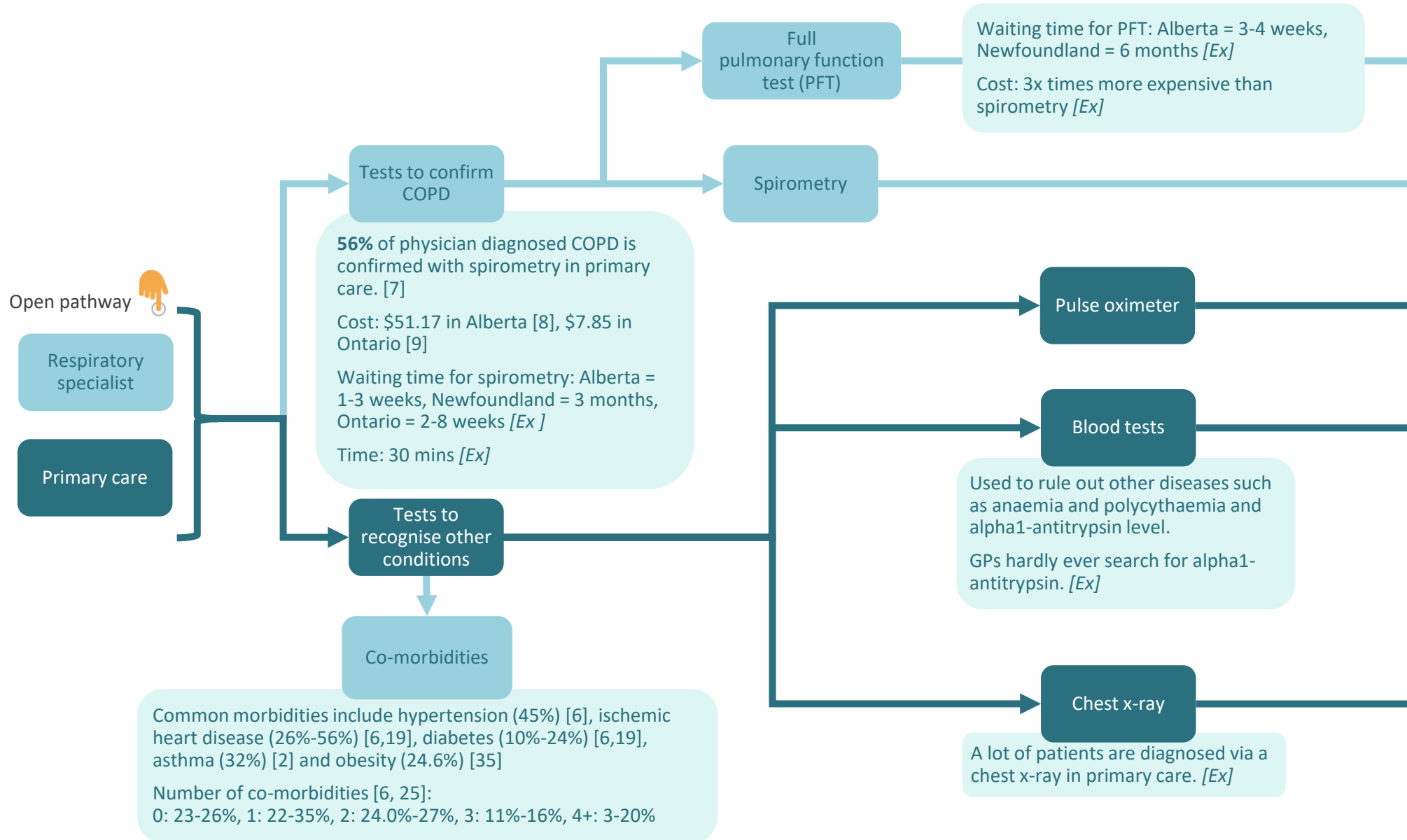


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References



Diagnosis

Diagnostic testing: primary care

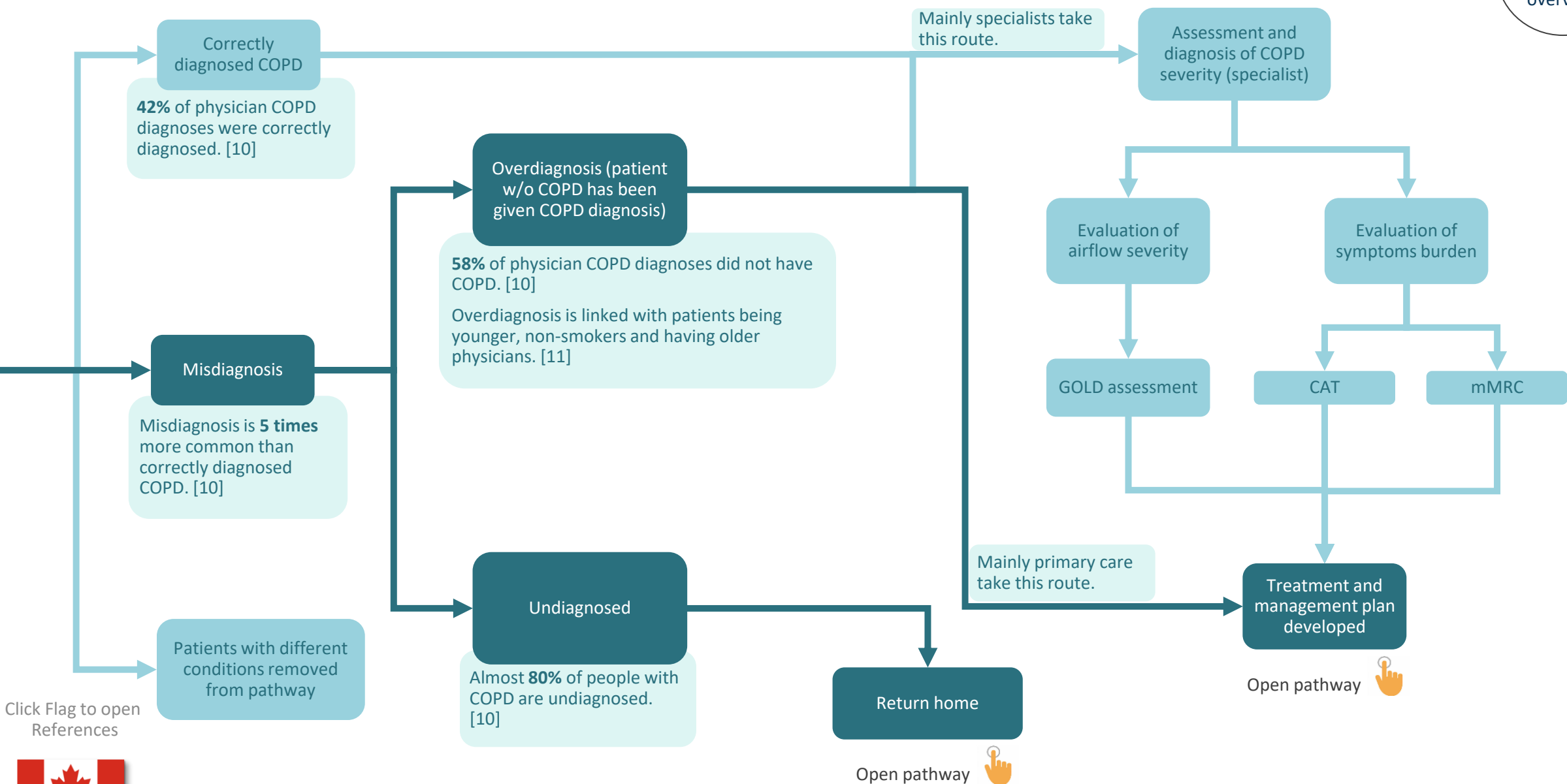


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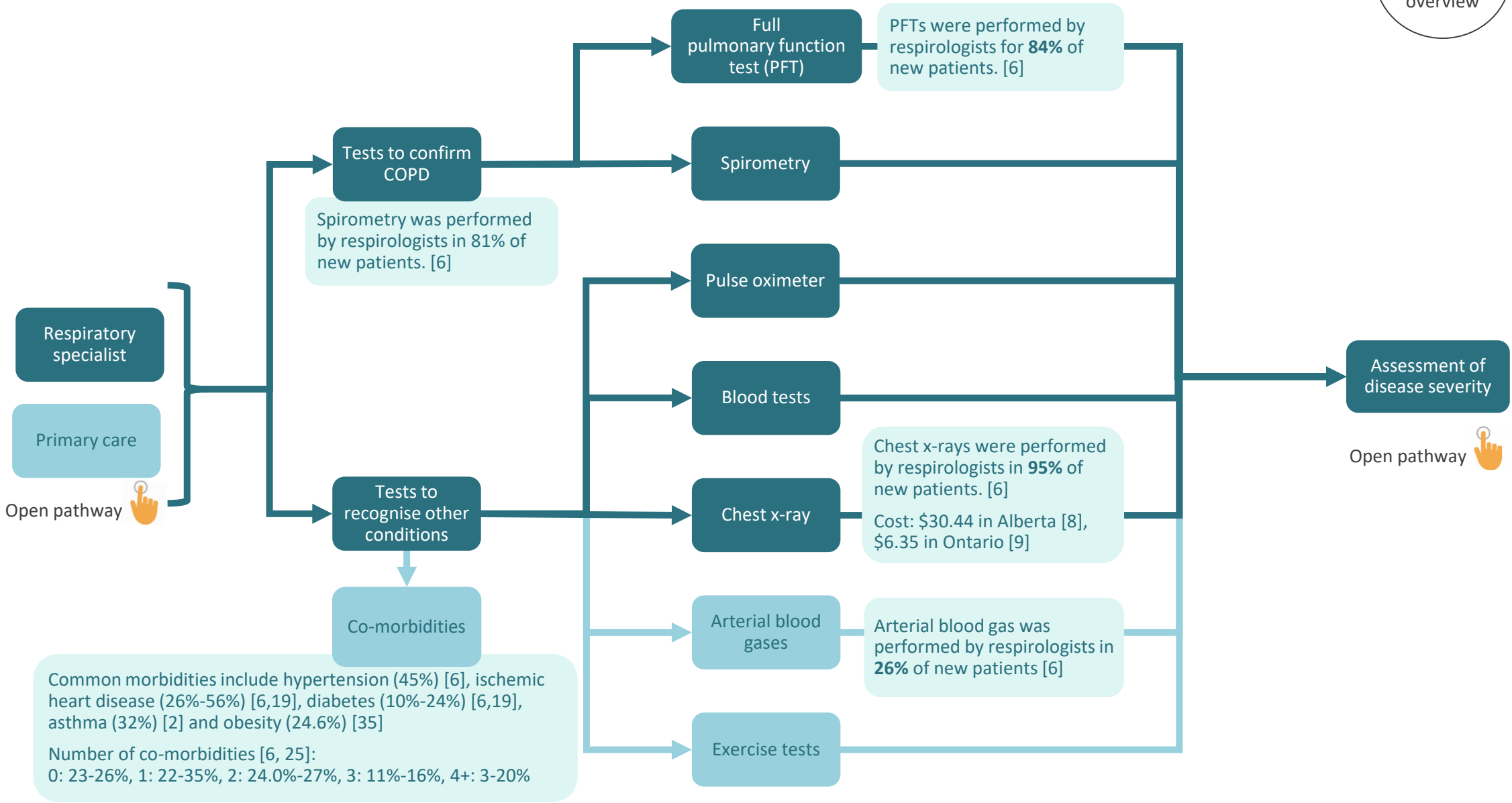
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References



CAT = COPD Assessment Test; mMRC = Modified Medical Research Council dyspnoea Scale;
GOLD = Global Initiative for Chronic Obstructive Lung Disease



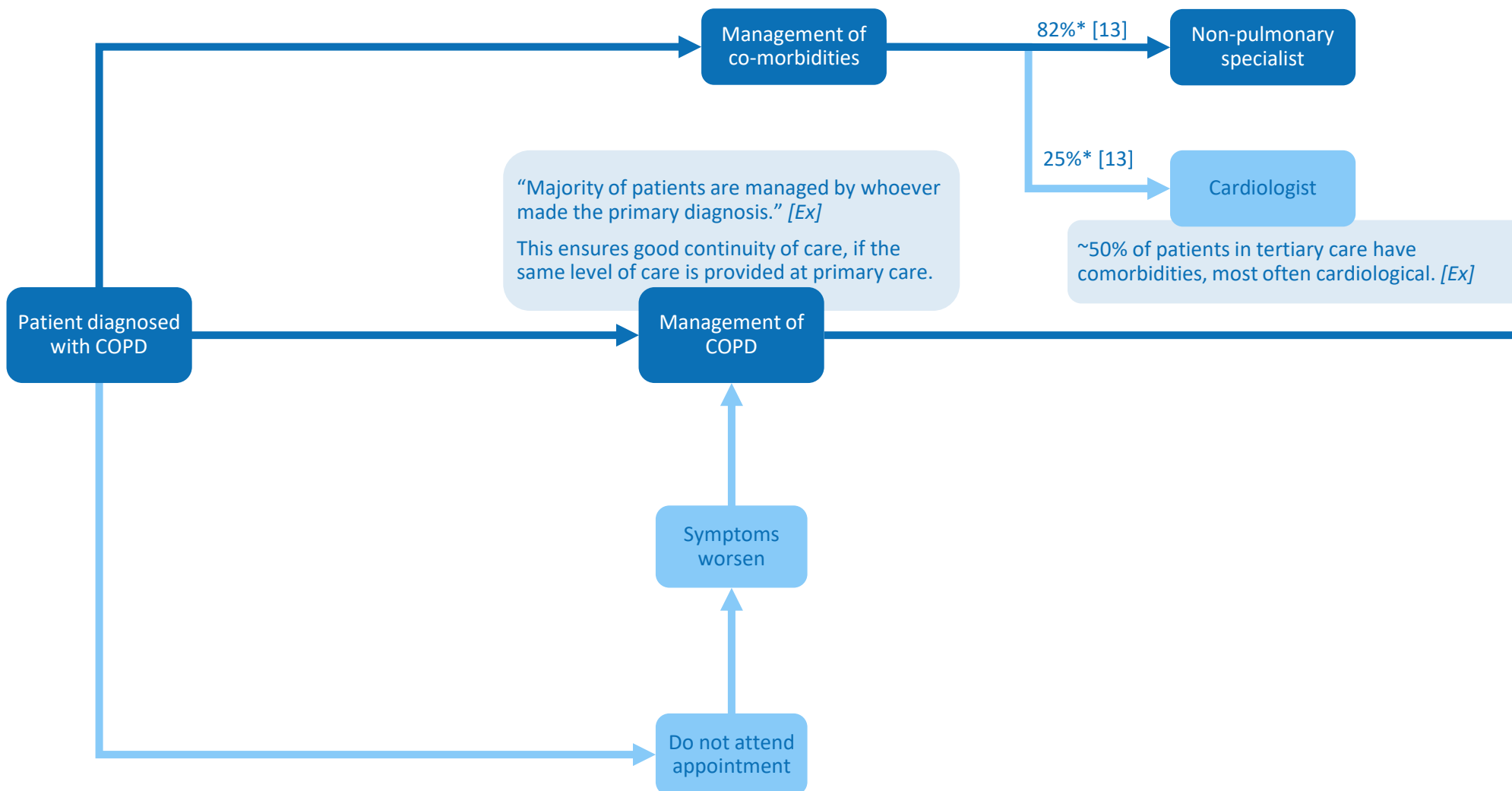
Diagnostic
testing:
specialist

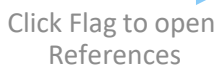
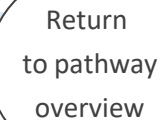


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References



PFT = Pulmonary function test



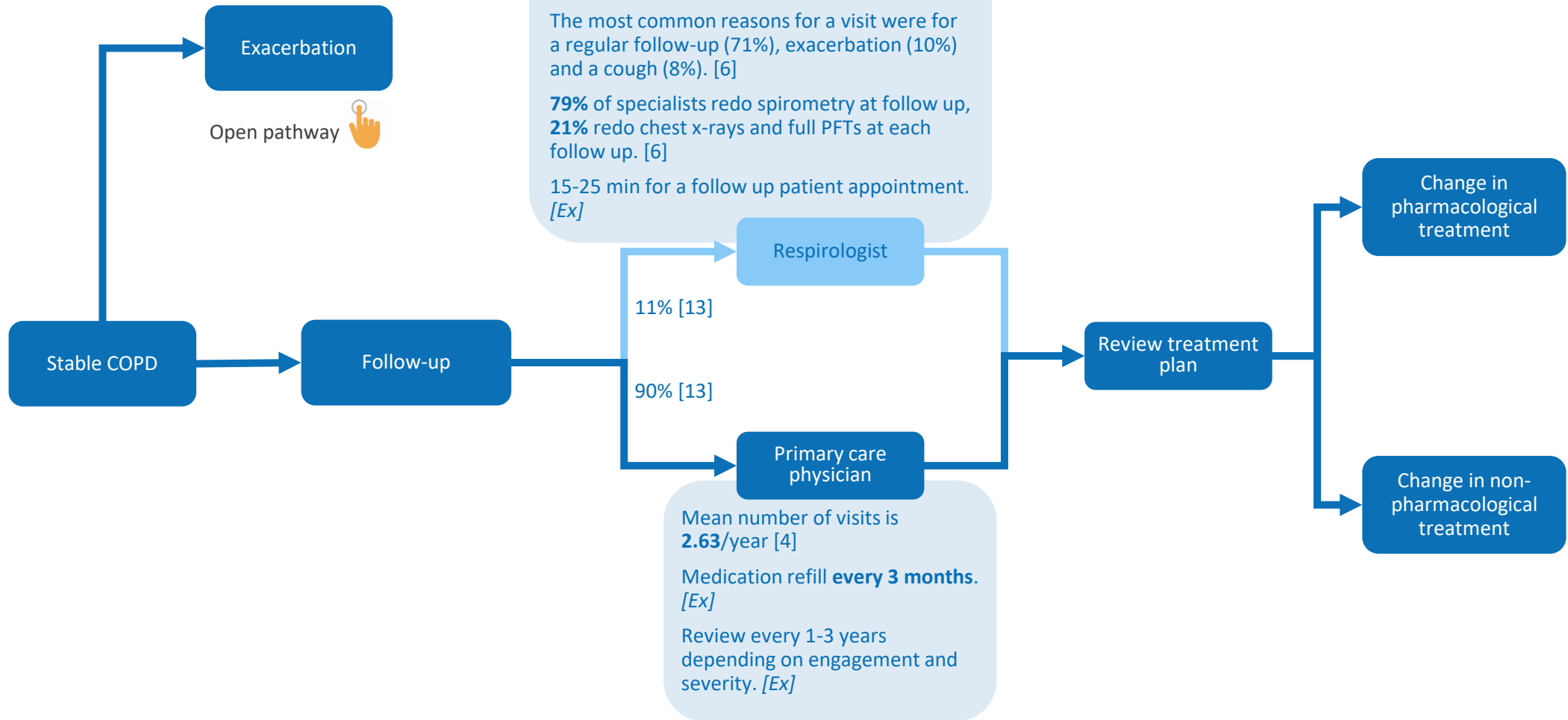




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Management

Stable COPD



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References



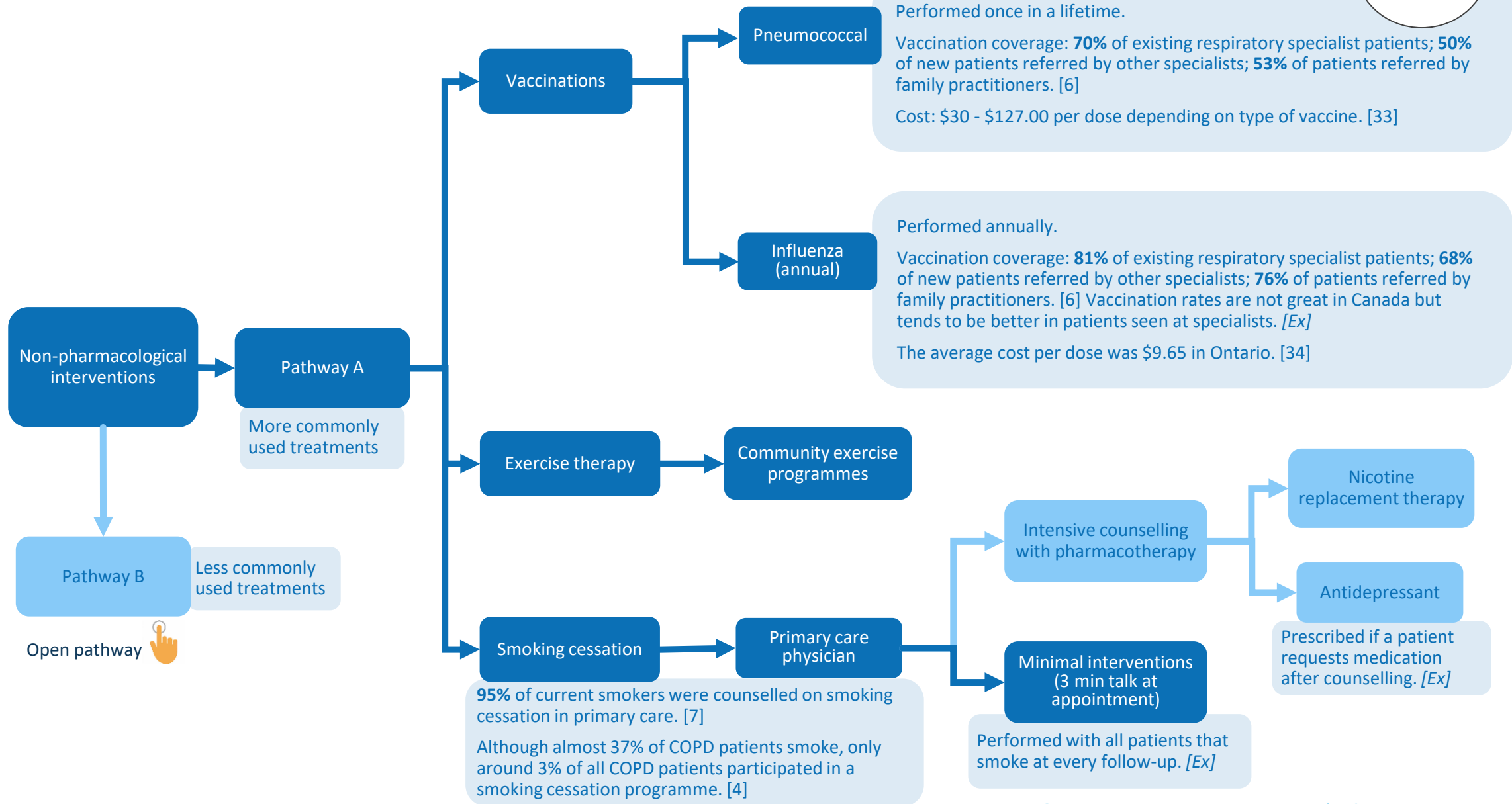
PFT = Pulmonary function test



Return
to pathway
overview

Management

Treatment
and
management
plan: non-
pharma-
cological
treatment



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References

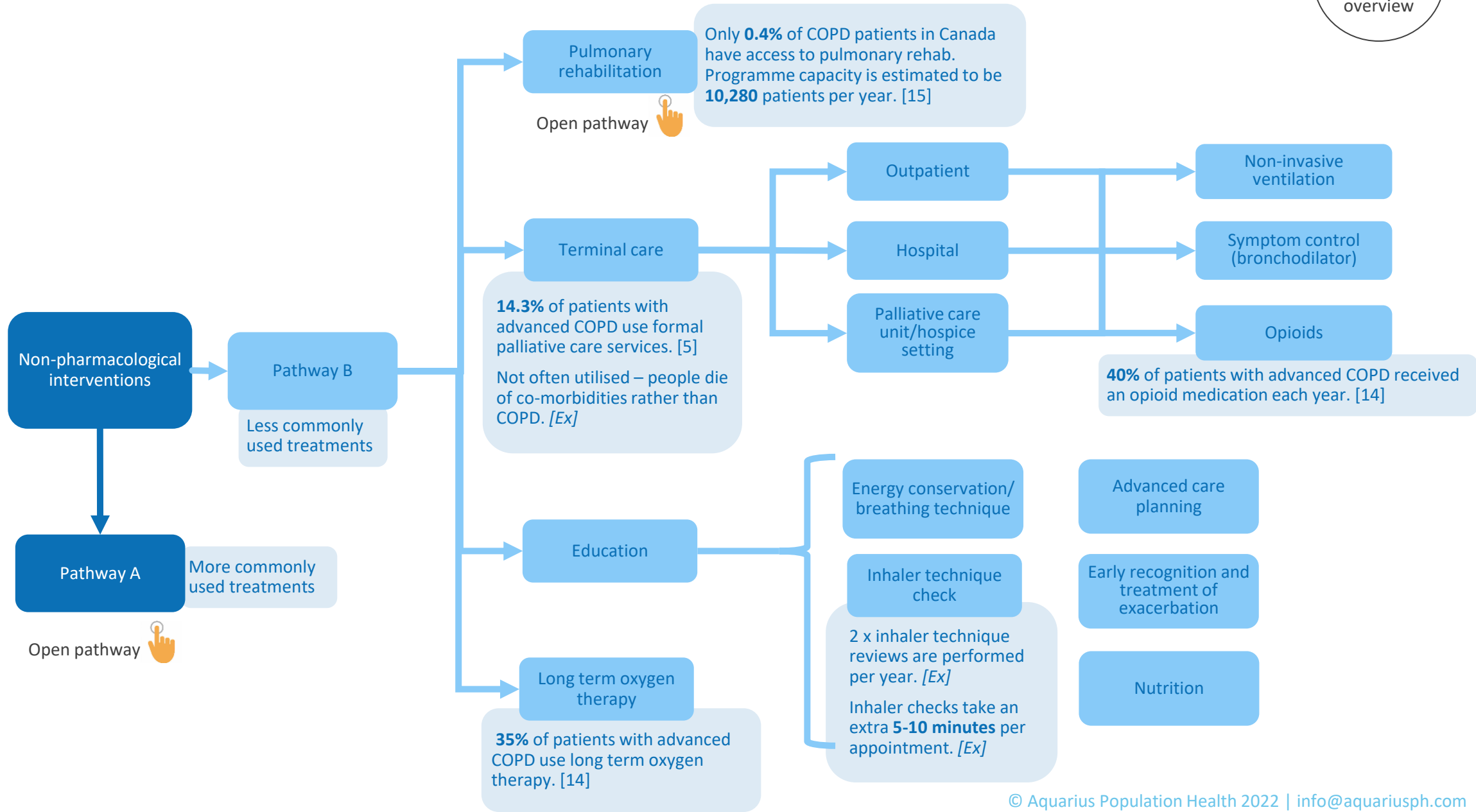




Return
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Management

Treatment
and
management
plan: non-
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References





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Treatment
and
management
plan:
pulmonary
rehab-
ilitation

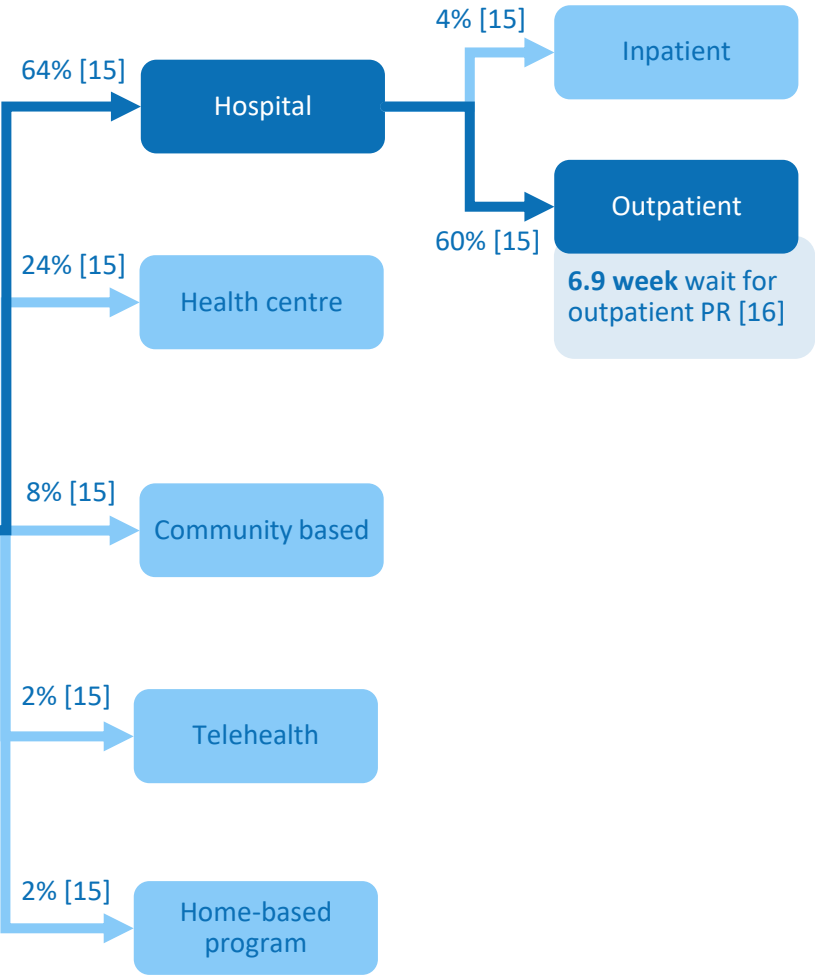
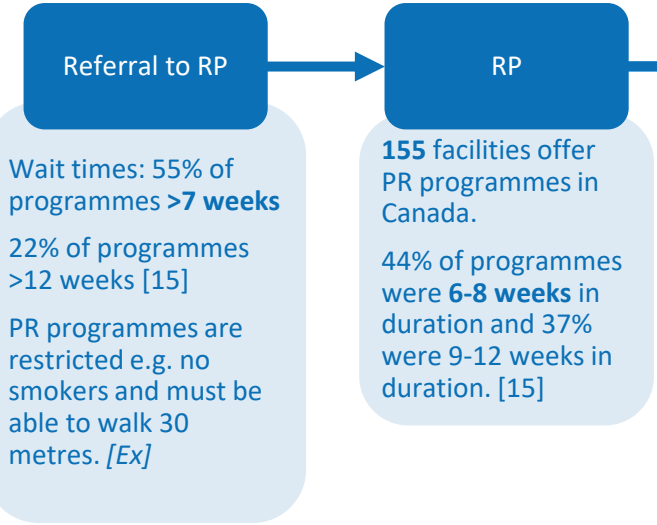
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References



PR = Pulmonary Rehabilitation

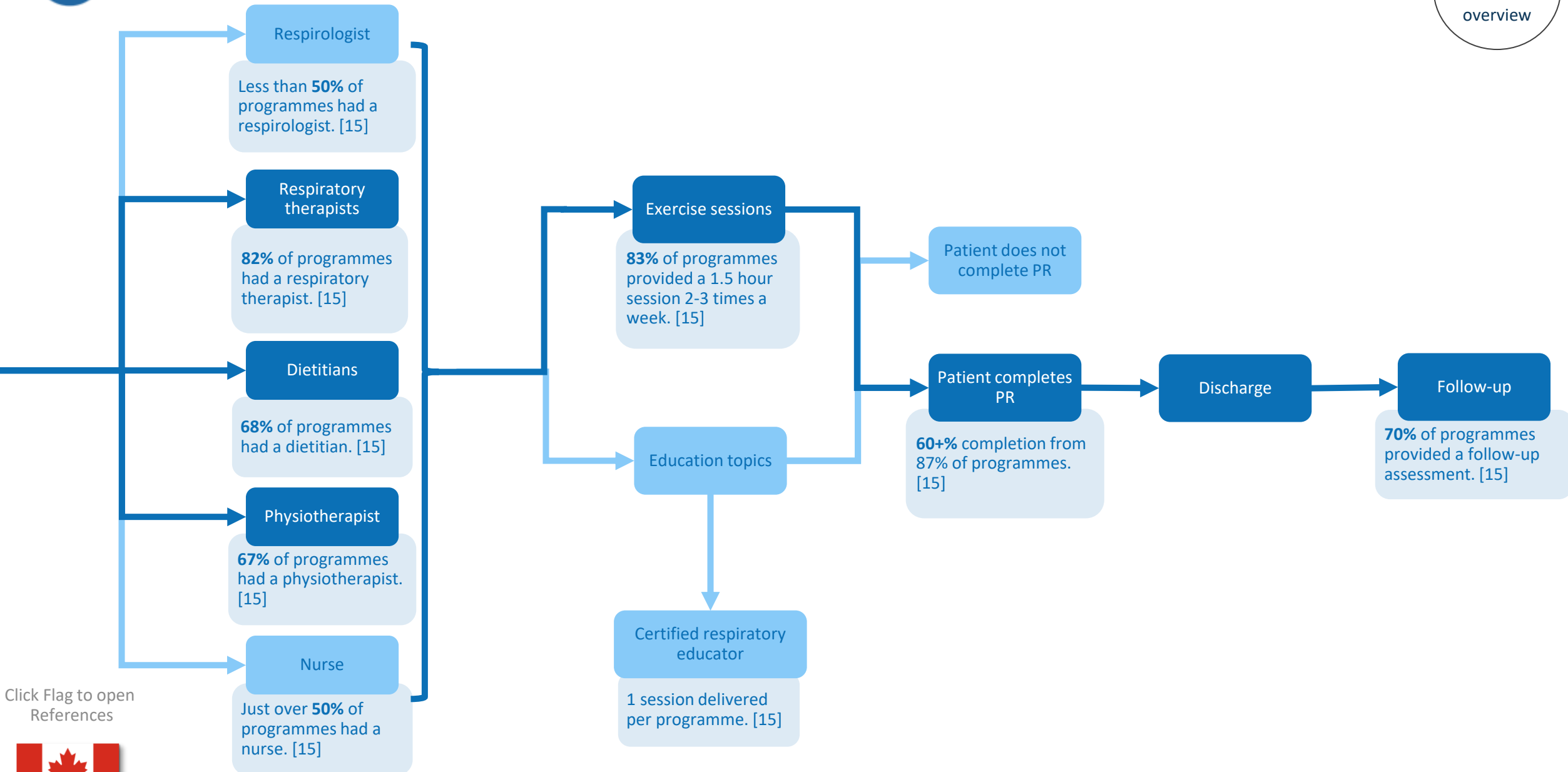
Management

Nurses	Referred 5% of PR patients [6]
Respiratory therapists	Referred 11% of PR patients [6] 52% of programmes had referrals from respiratory therapists. [15]
Primary care physicians	Referred 20% of PR patients [6]
Respirologist	Referred 68% of PR patients [6] 85% of programmes had referrals from respirologists or family physicians. [15]
Physiotherapists	26% of programmes had referrals from physiotherapists. [15]
Patients (self-referral)	52% of programmes had self-referrals. [15]
Another patient	Referred 1% of PR patients. [6]





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overview



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References



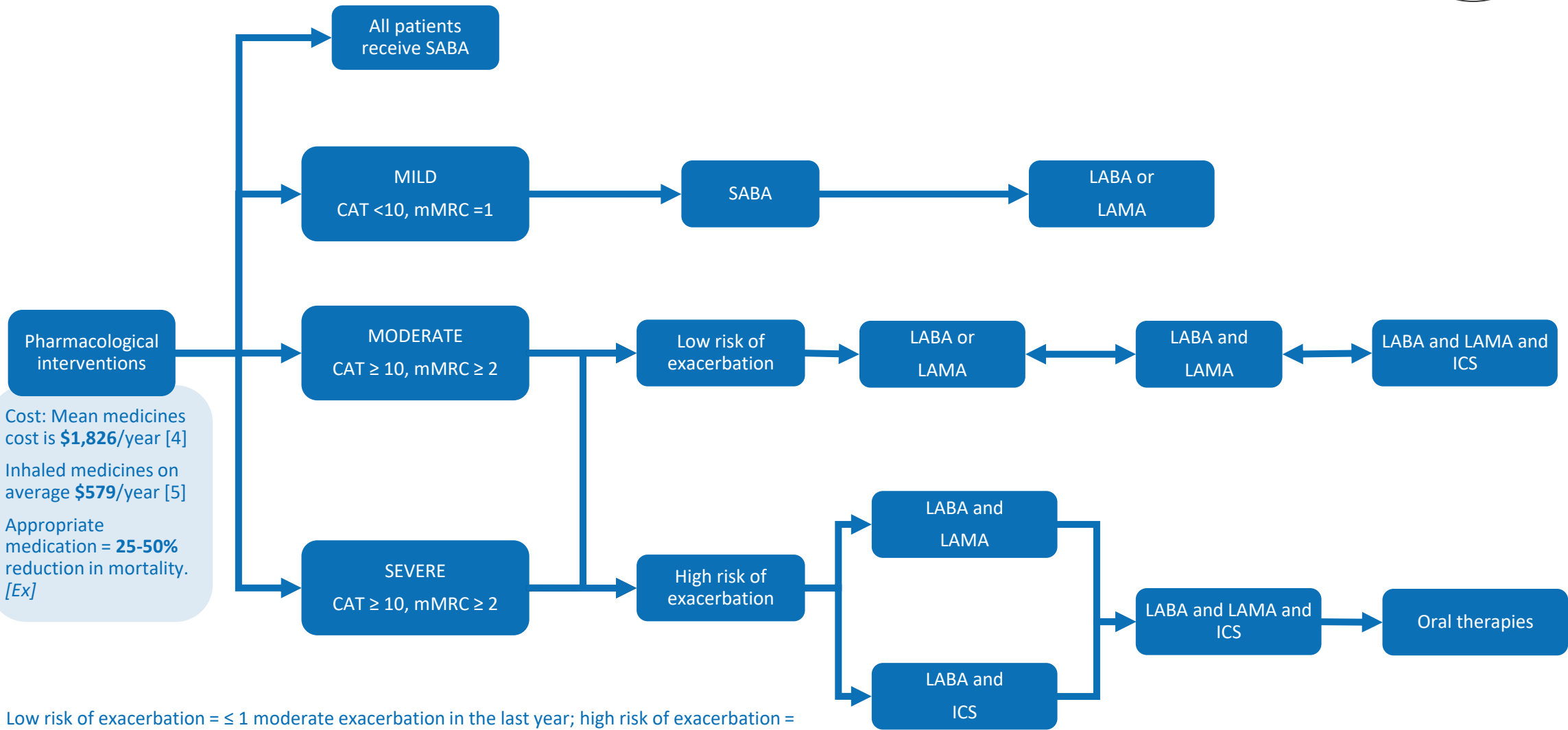
PR = Pulmonary Rehabilitation



Return
to pathway
overview

Management

Treatment
and management
plan:
pharmaceutical
treatment



Low risk of exacerbation = ≤ 1 moderate exacerbation in the last year; high risk of exacerbation = ≥ 2 moderate exacerbation or ≥ 1 severe exacerbation in the last year

CAT = COPD Assessment Test; ICS = Inhaled corticosteroids; LABA = Long-acting beta agonists; LAMA = Long-acting muscarinic antagonists; mMRC = Modified Medical Research Council dyspnoea Scale; SABA = Short-acting beta agonist; SAMA = Short-acting muscarinic antagonist

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References

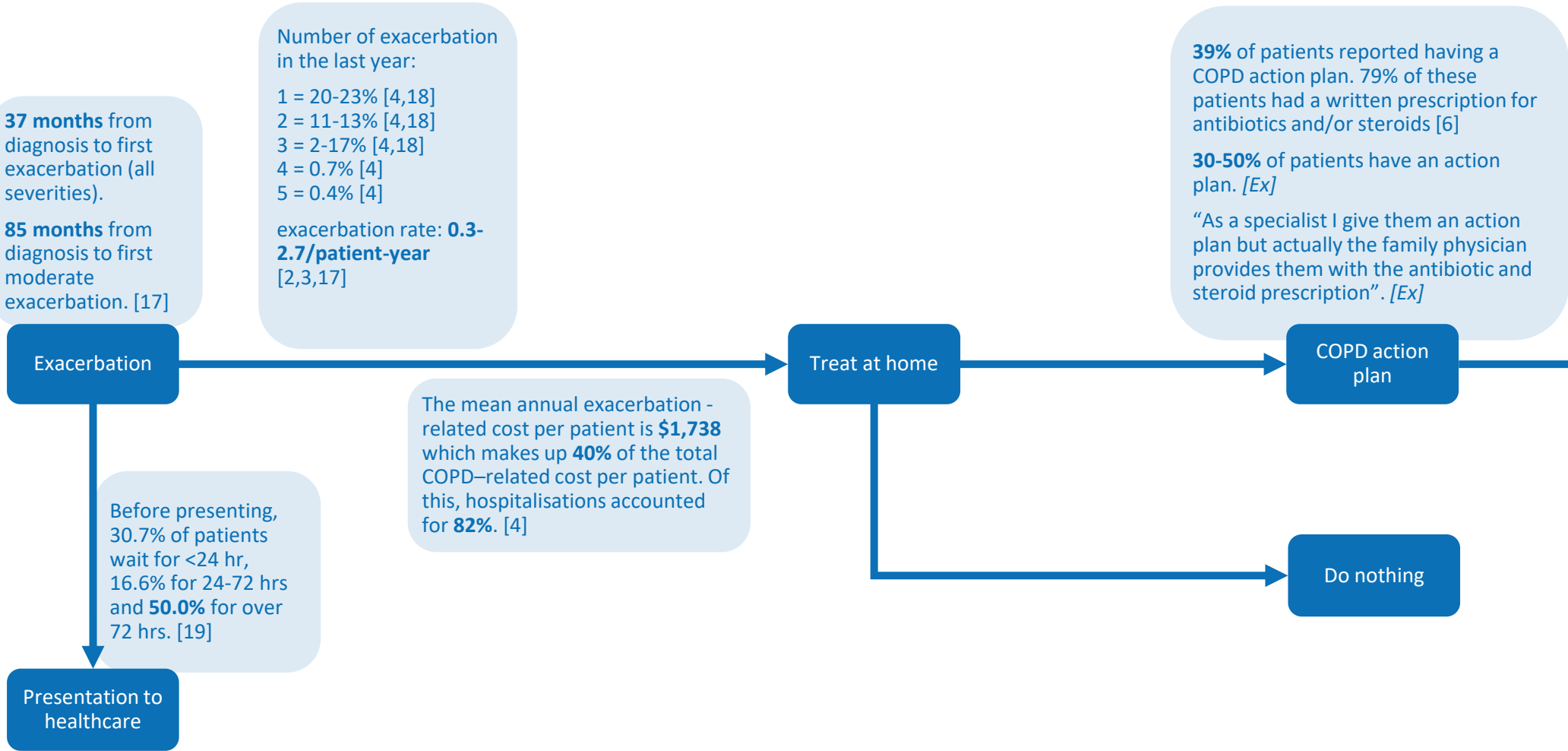




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Management

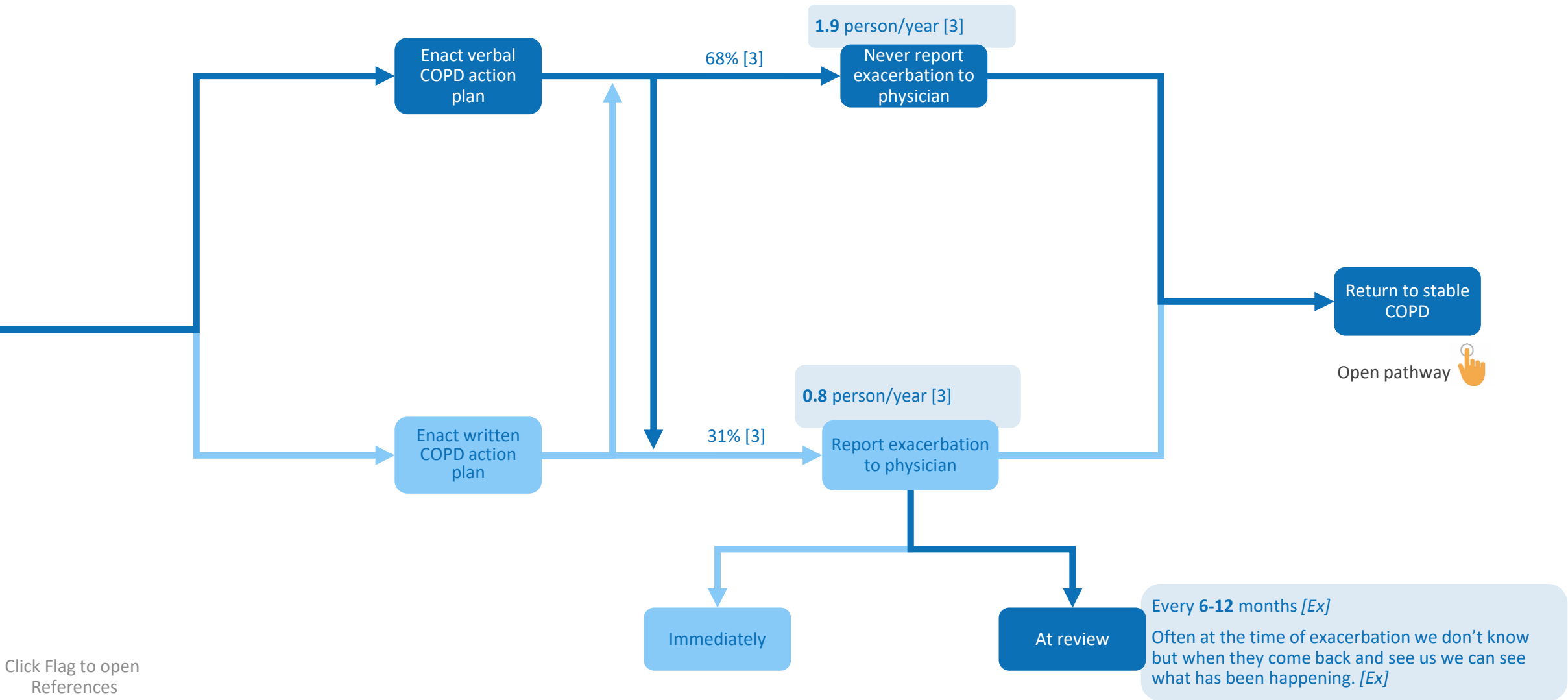
Exacerbations



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References



Open pathway

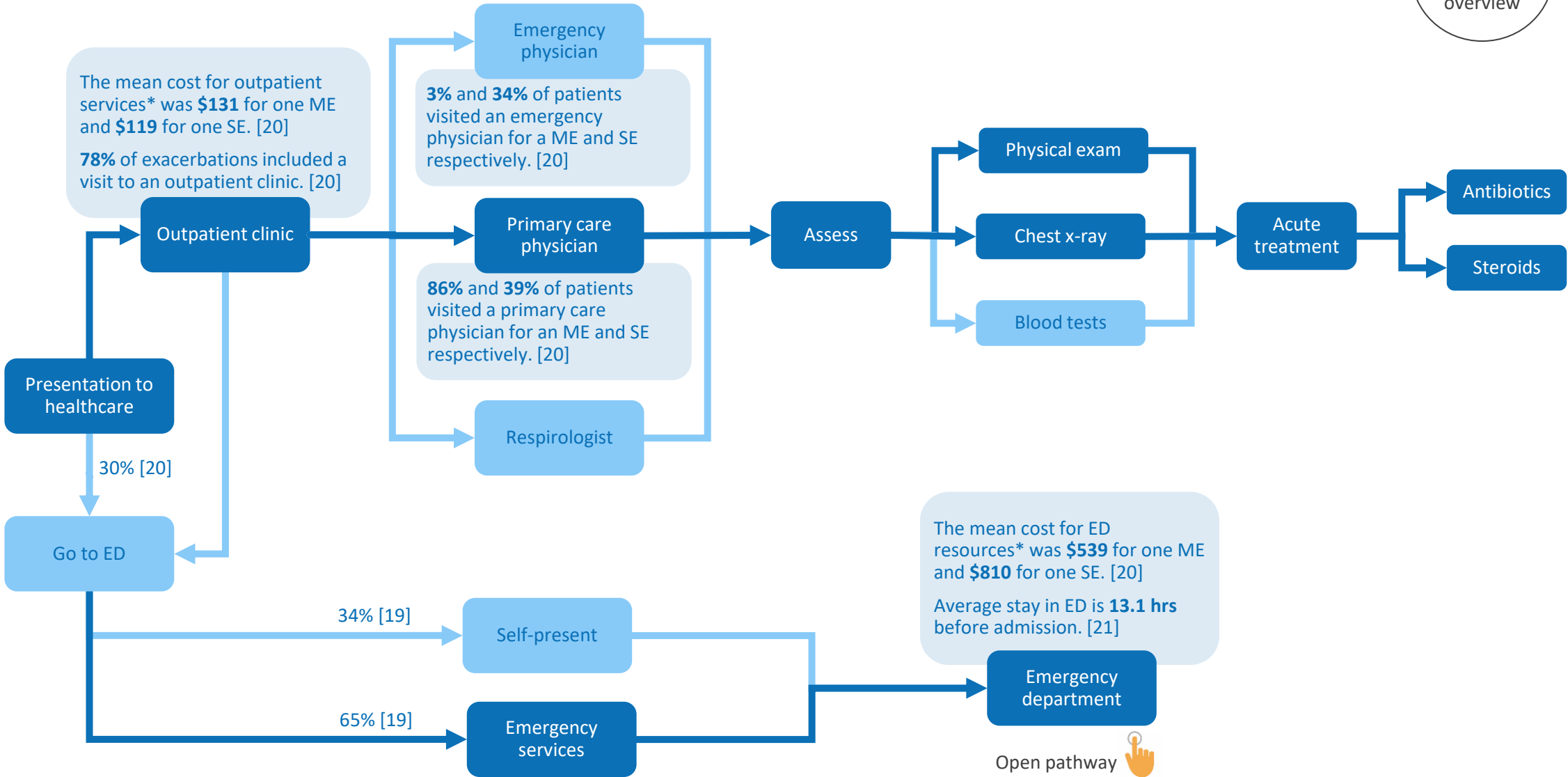




Return
to pathway
overview

Management

Exacerbation:
presentation
to healthcare



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References



*Outpatient resources included physician visits, laboratory and diagnostic testing, mode of transportation to visit and change in medication. ED resources included ED visit (physician cost and visit cost), mode of transportation and change in medication.

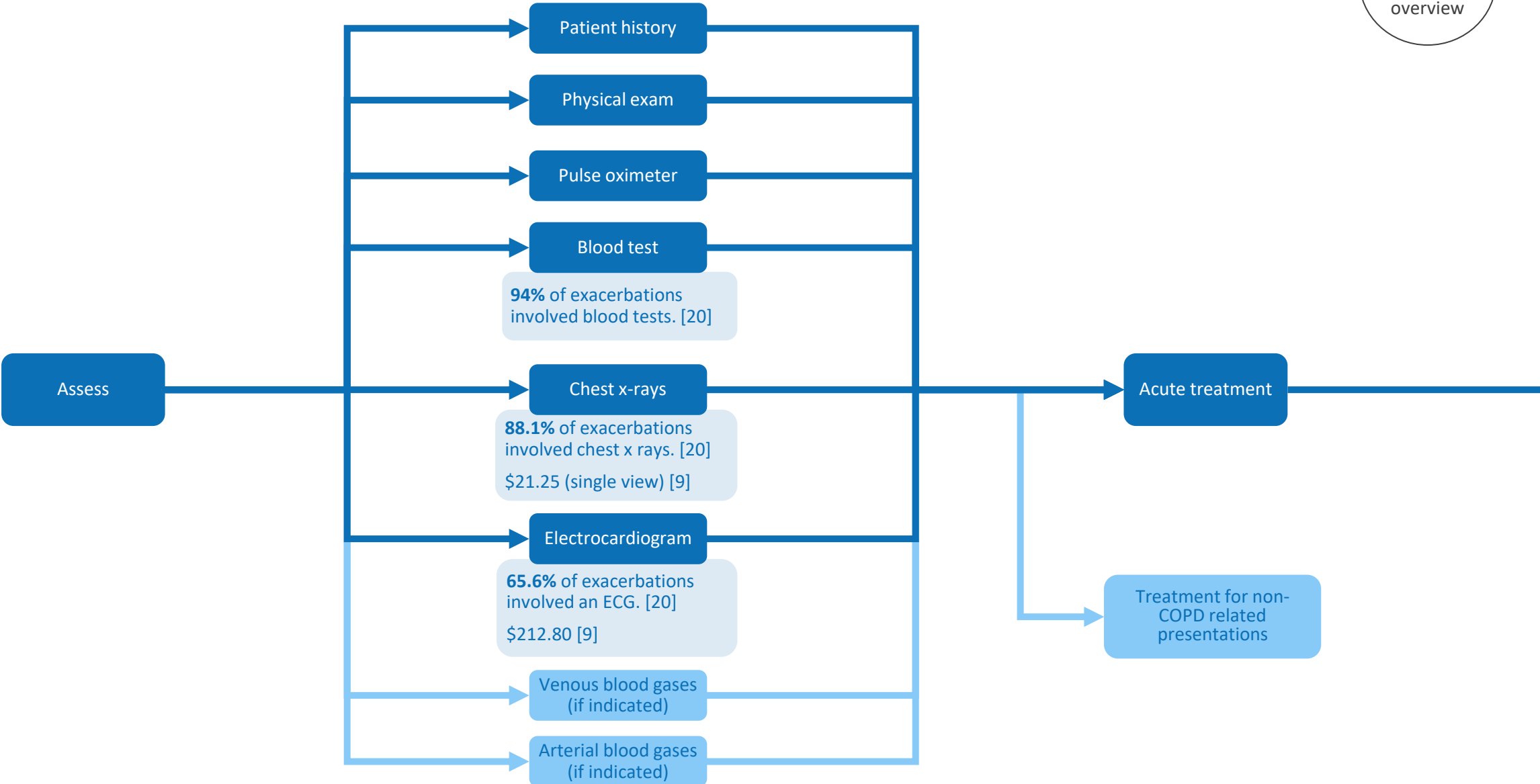
ED = Emergency department; ME = Moderate exacerbation; SE = Severe exacerbation



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overview

Management

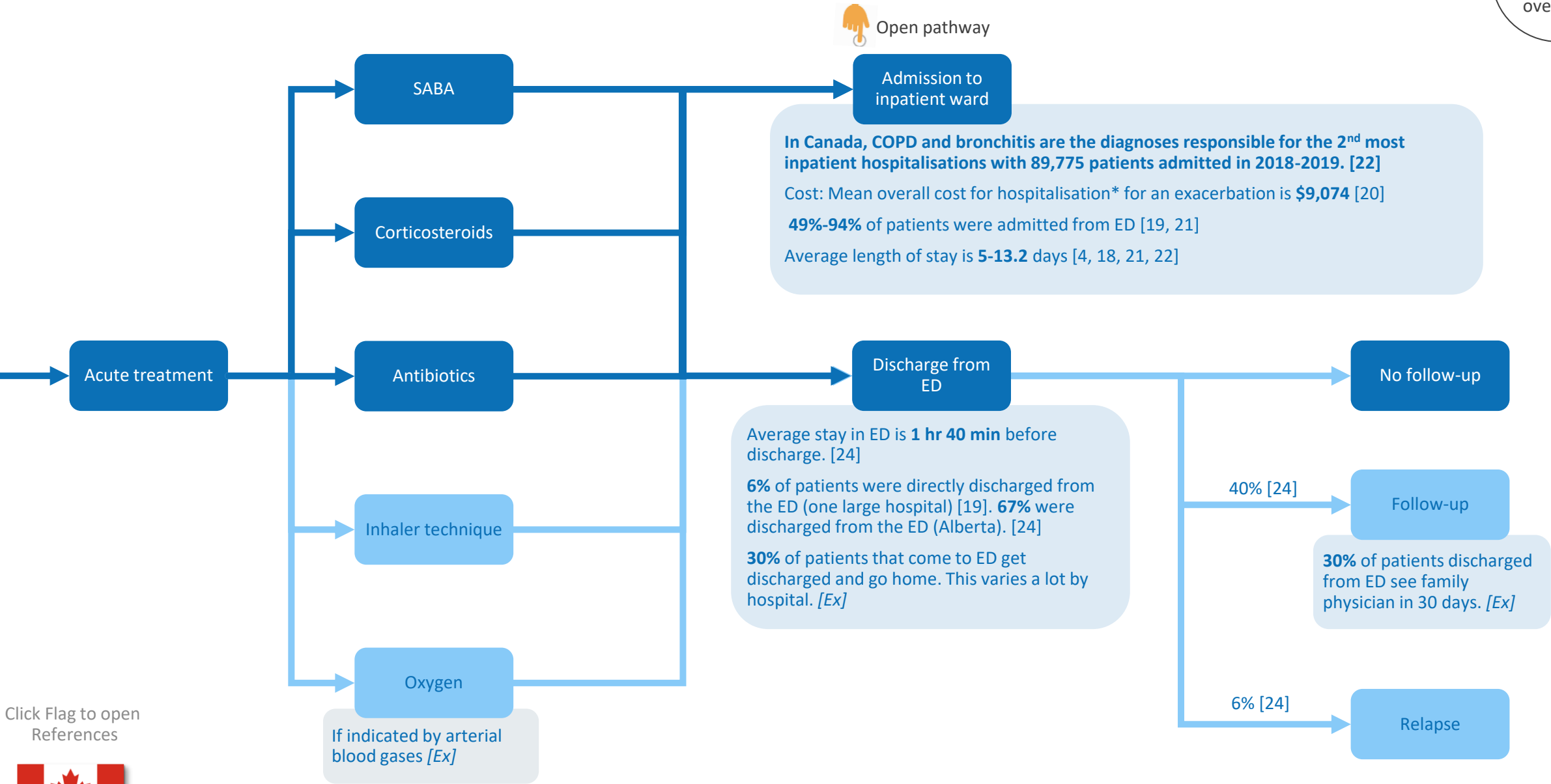
Exacerbations:
emergency
department



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References



*Hospital resources consisted of physician visits, length of stay, type of bed (ward/ICU), mode of transportation, change in medication and laboratory/diagnostic testing.
ECG = Electrocardiogram; ICU = Intensive care unit; ME = Moderate exacerbation; SE = Severe exacerbation



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References



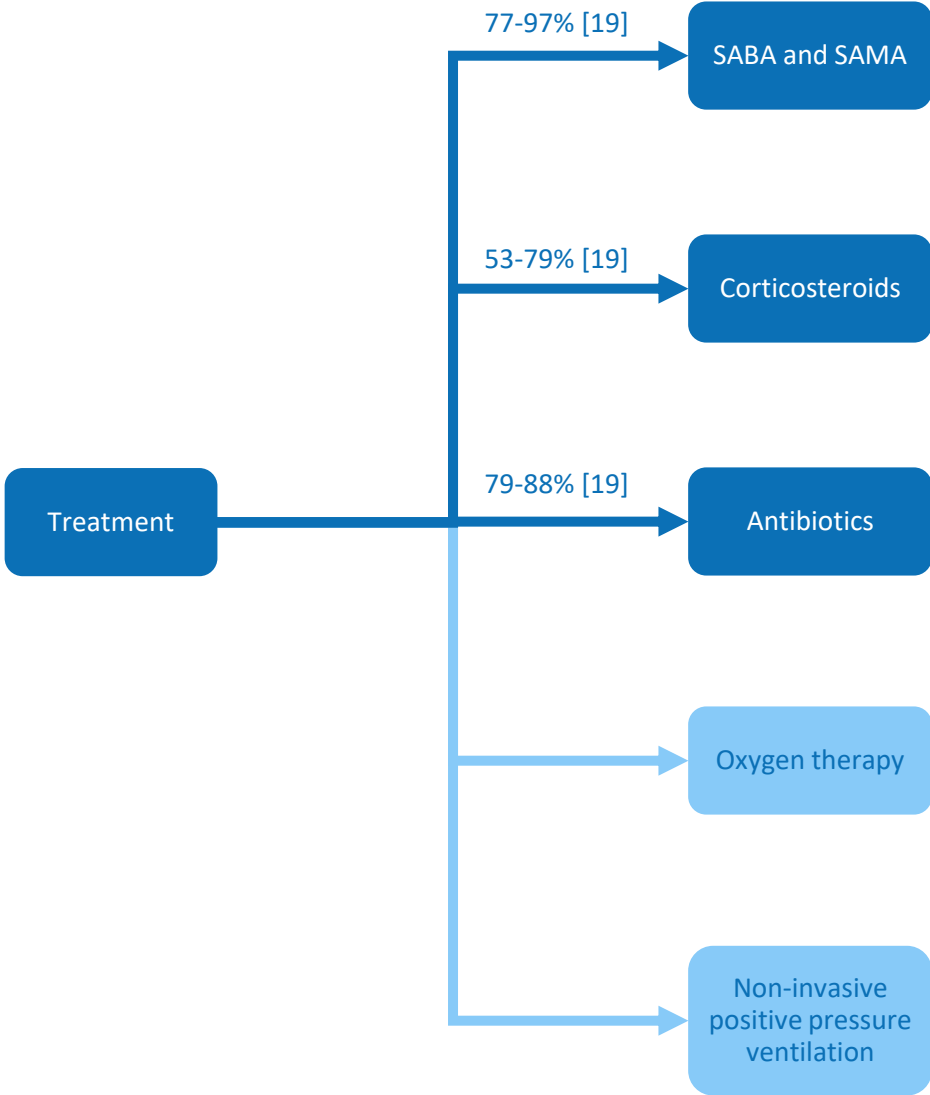
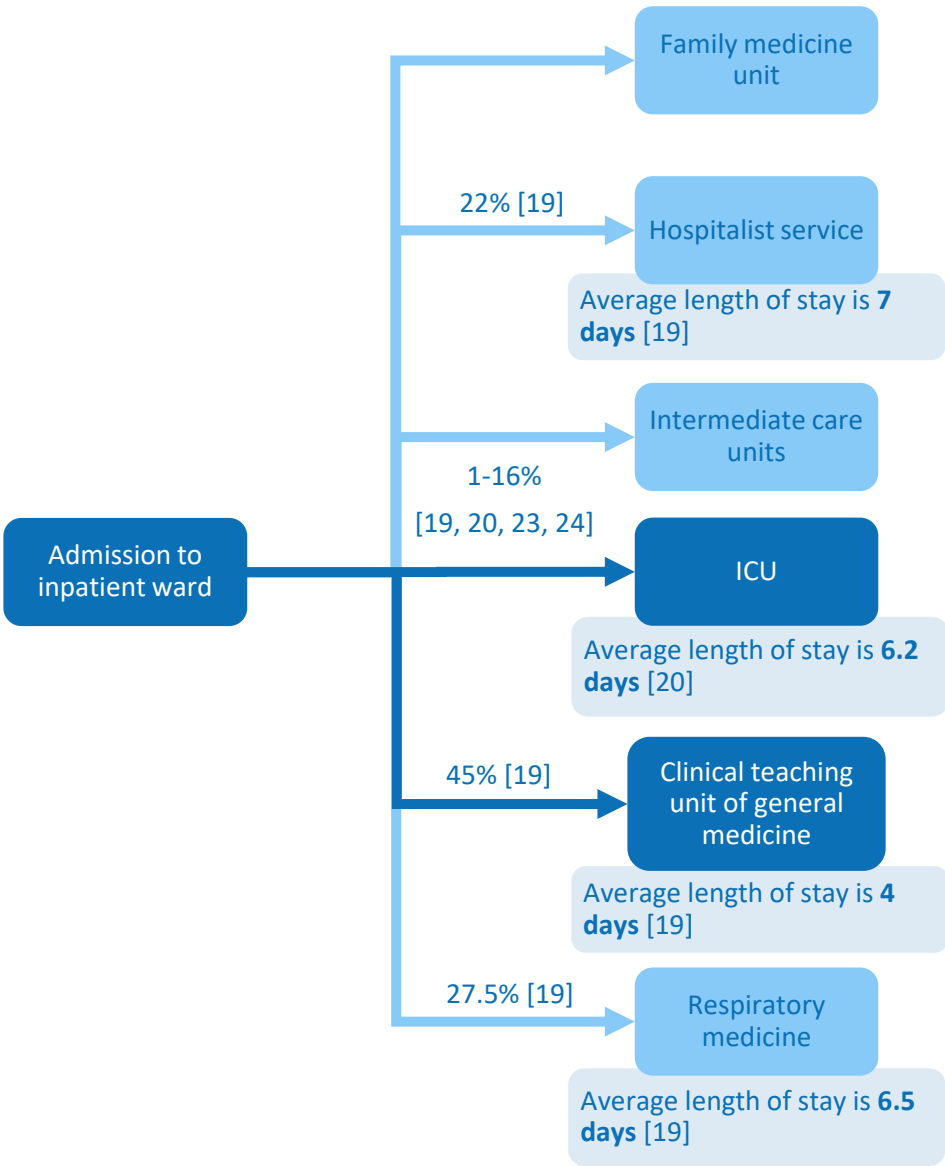
ED = Emergency department; SABA = short-acting beta agonist



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Management

Exacerbations:
inpatient admission



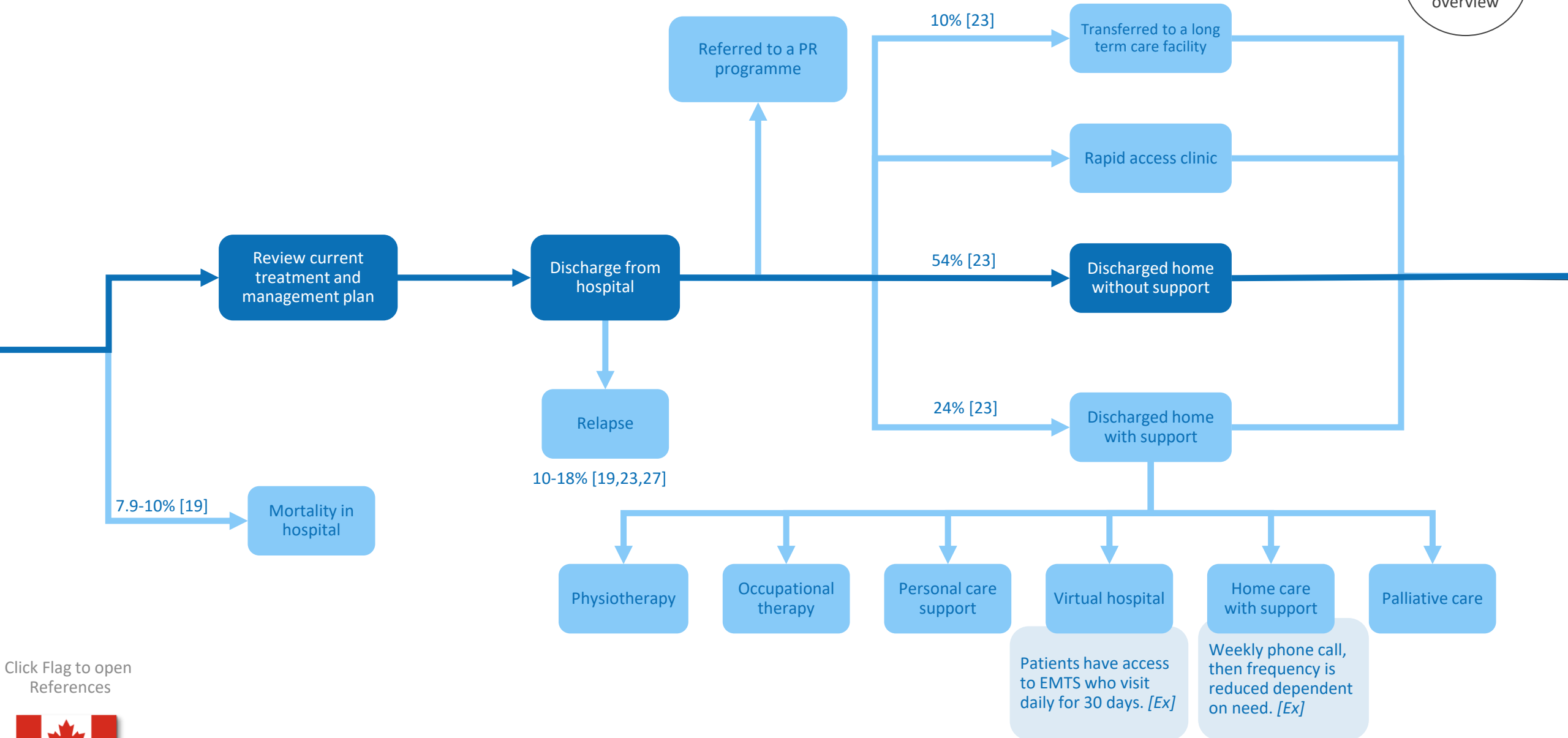
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References



ICU = Intensive care unit; SABA = Short-acting beta agonist; SAMA = Short-acting muscarinic antagonist



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to pathway
overview

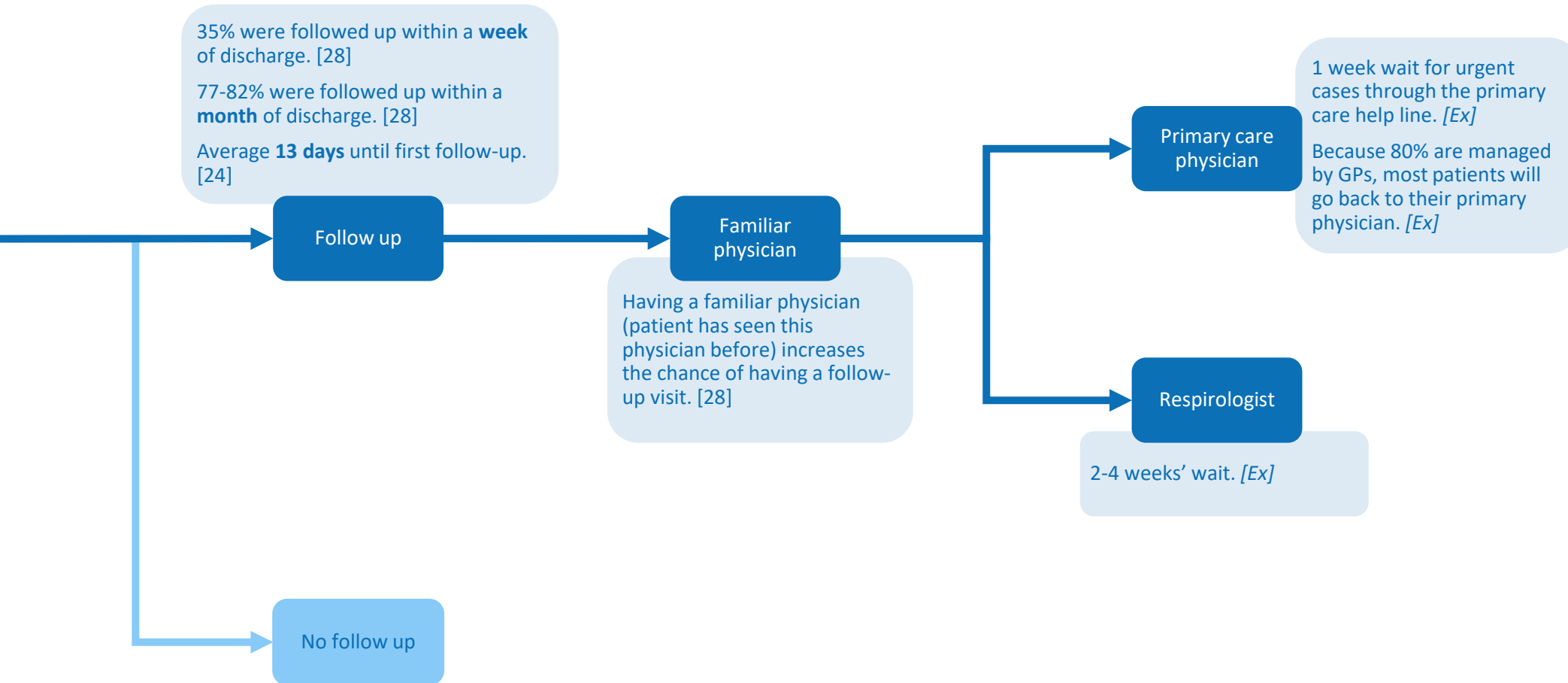


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References



PR = Pulmonary Rehabilitation; EMTS = Emergency Medical Technicians

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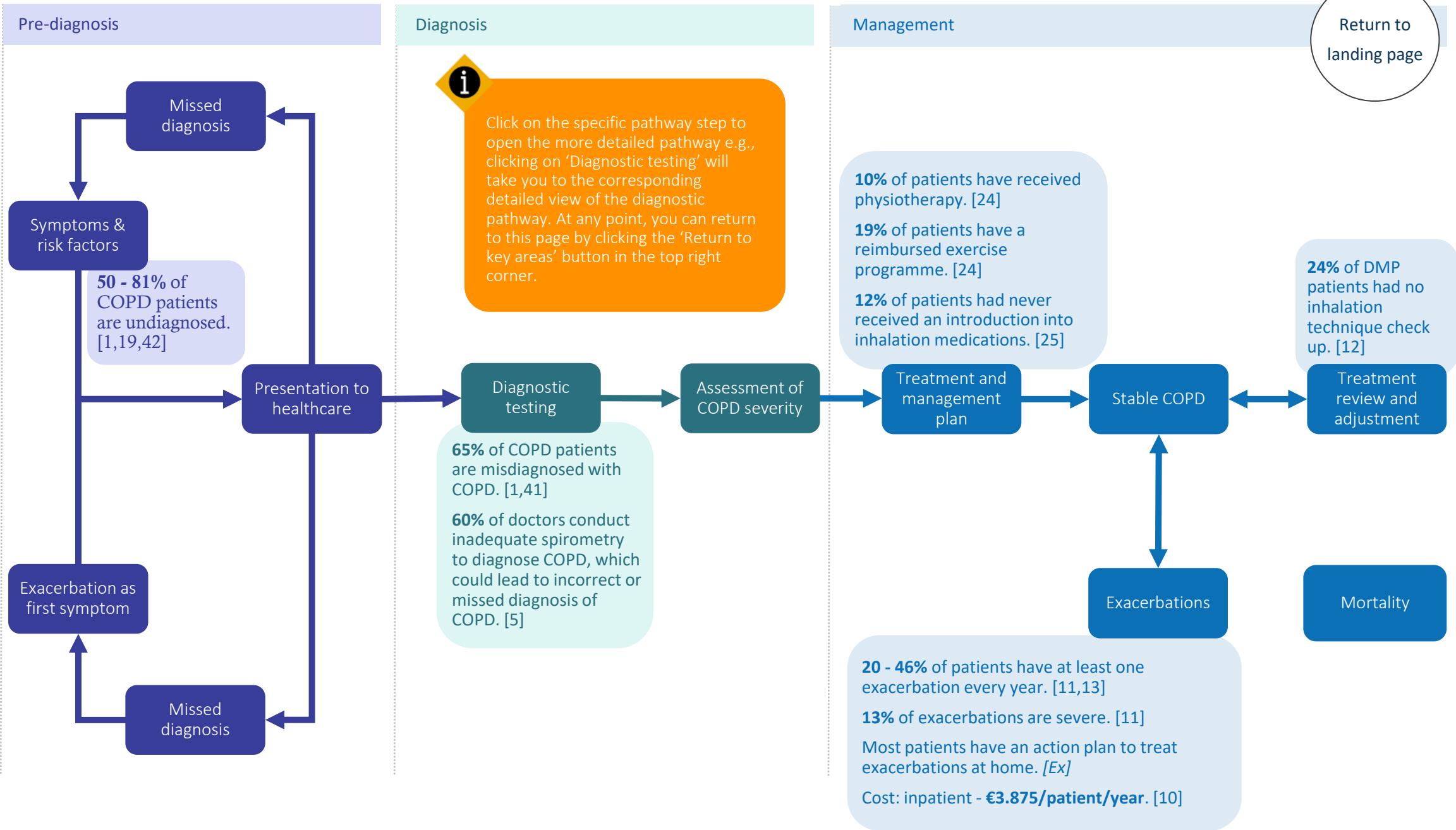
GP = General Practitioner

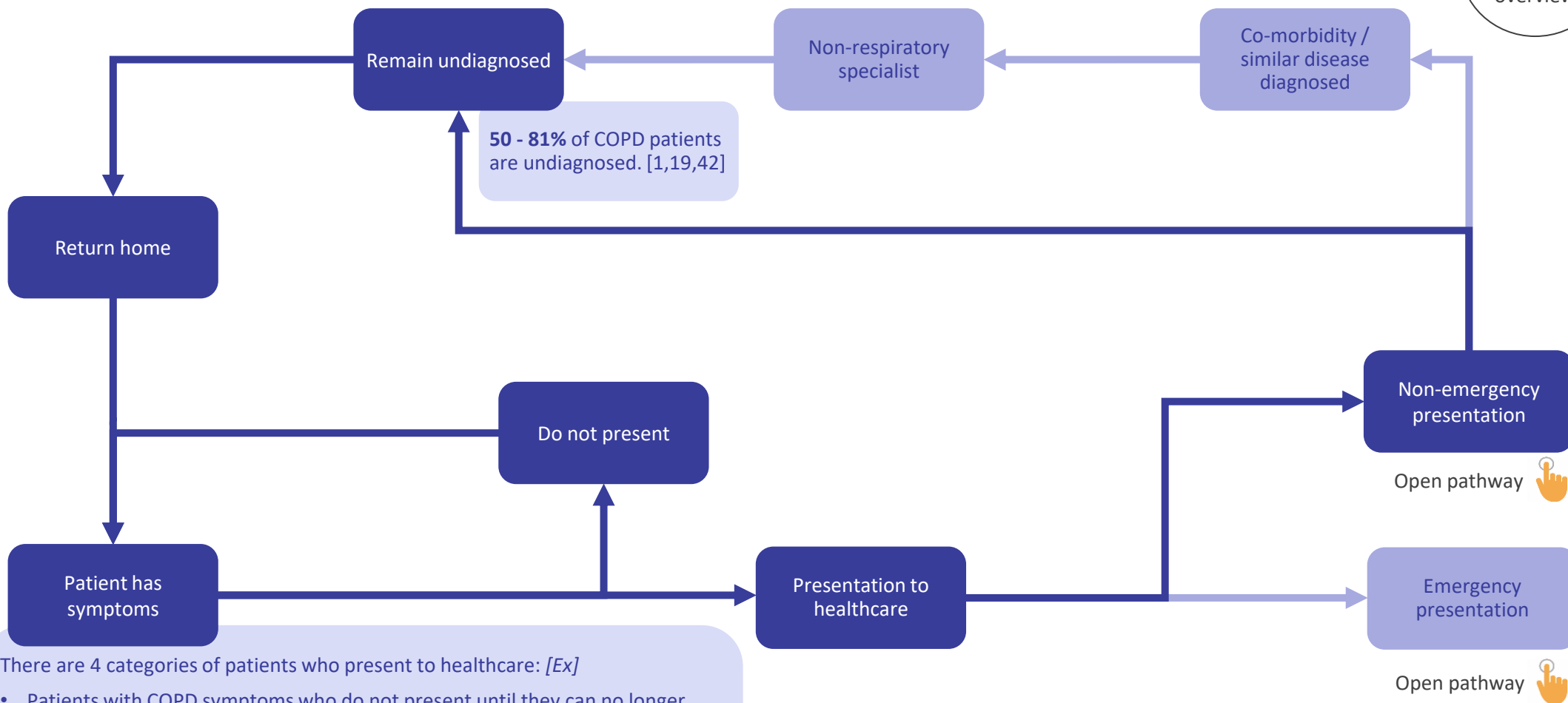
Pathway overview

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References



Return to
landing page





There are 4 categories of patients who present to healthcare: [Ex]

- Patients with COPD symptoms who do not present until they can no longer adapt their lifestyle - the biggest group of patients.
- Patients who have noticed their COPD symptoms for the first time.
- Patients with symptoms of a co-morbidity/co-morbidities.
- Patients who have COPD but have been previously misdiagnosed.

Presentation
to healthcare

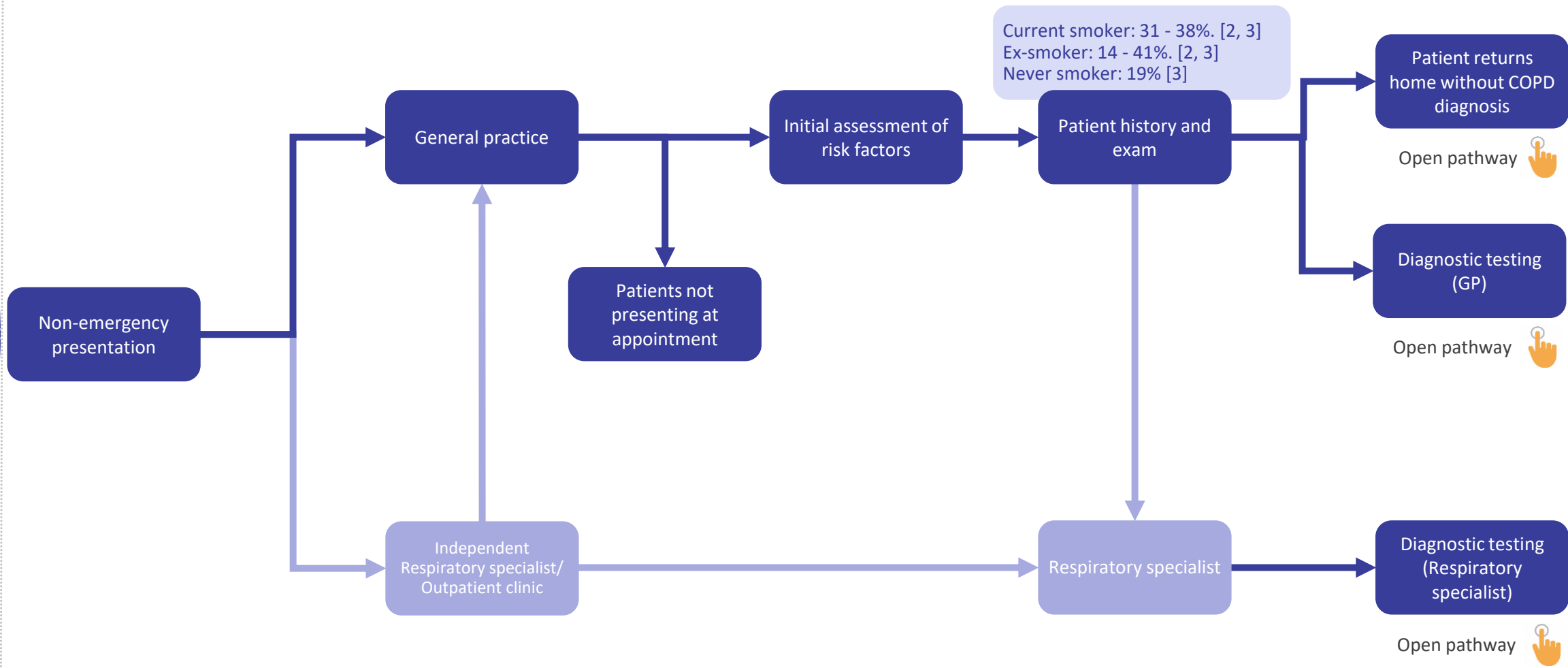
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References





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overview

Presentation
to healthcare:
non-
emergency
care

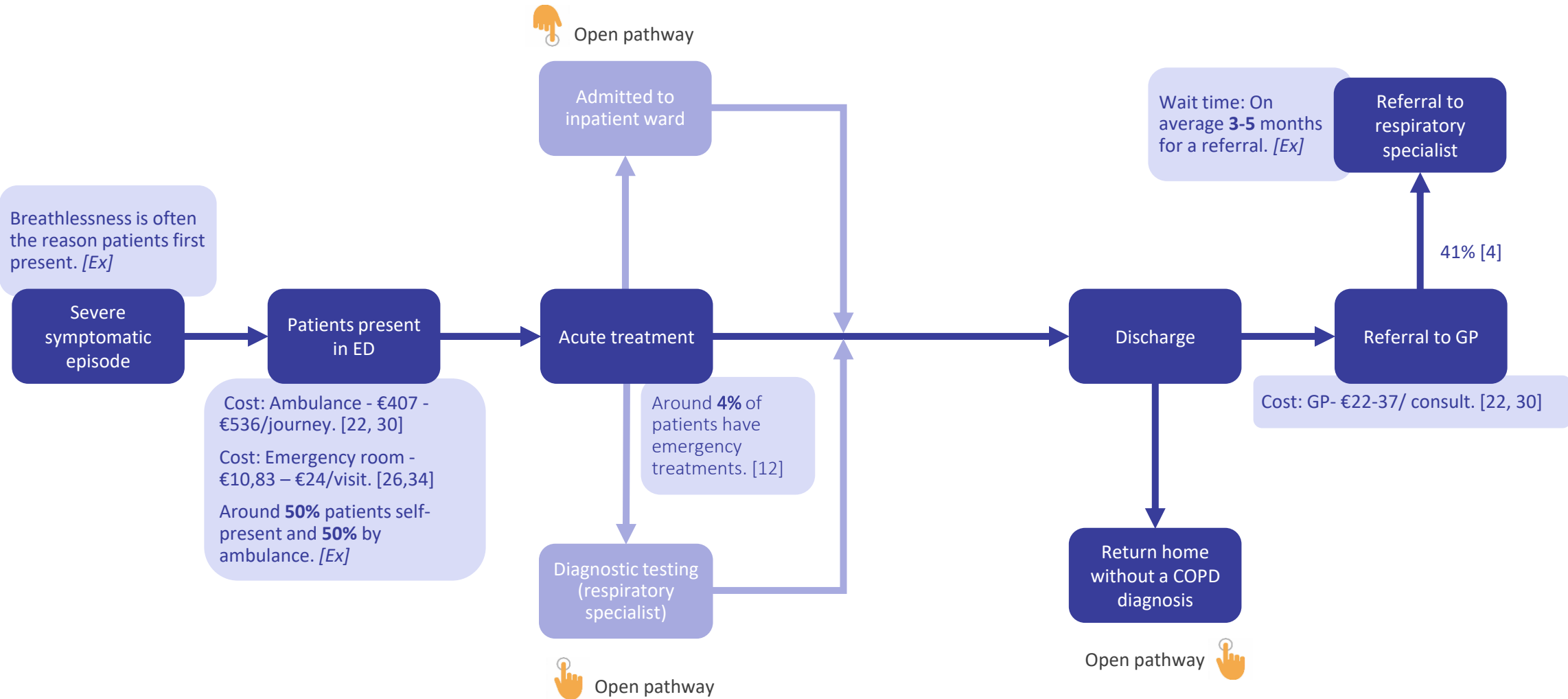


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References

GP = General Practitioner



Presentation
to healthcare:
emergency
care



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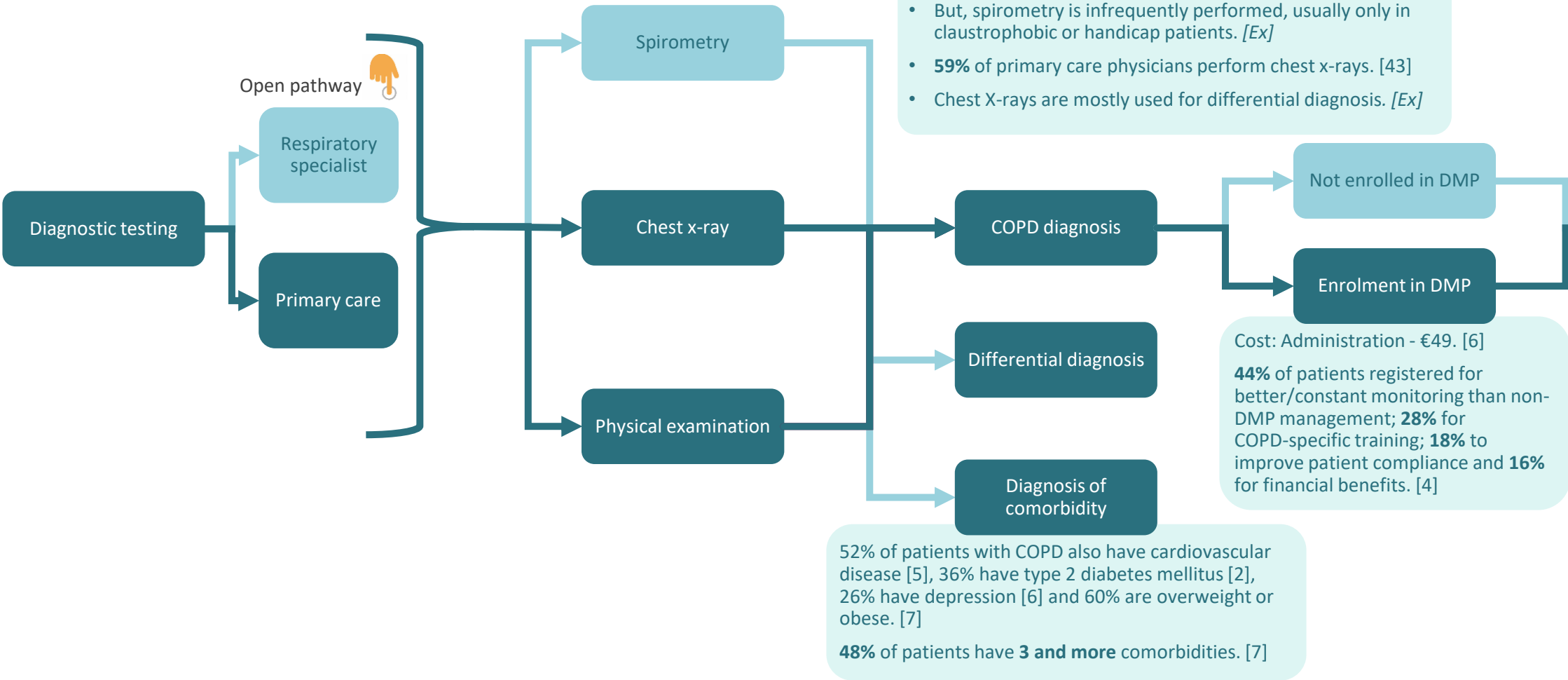




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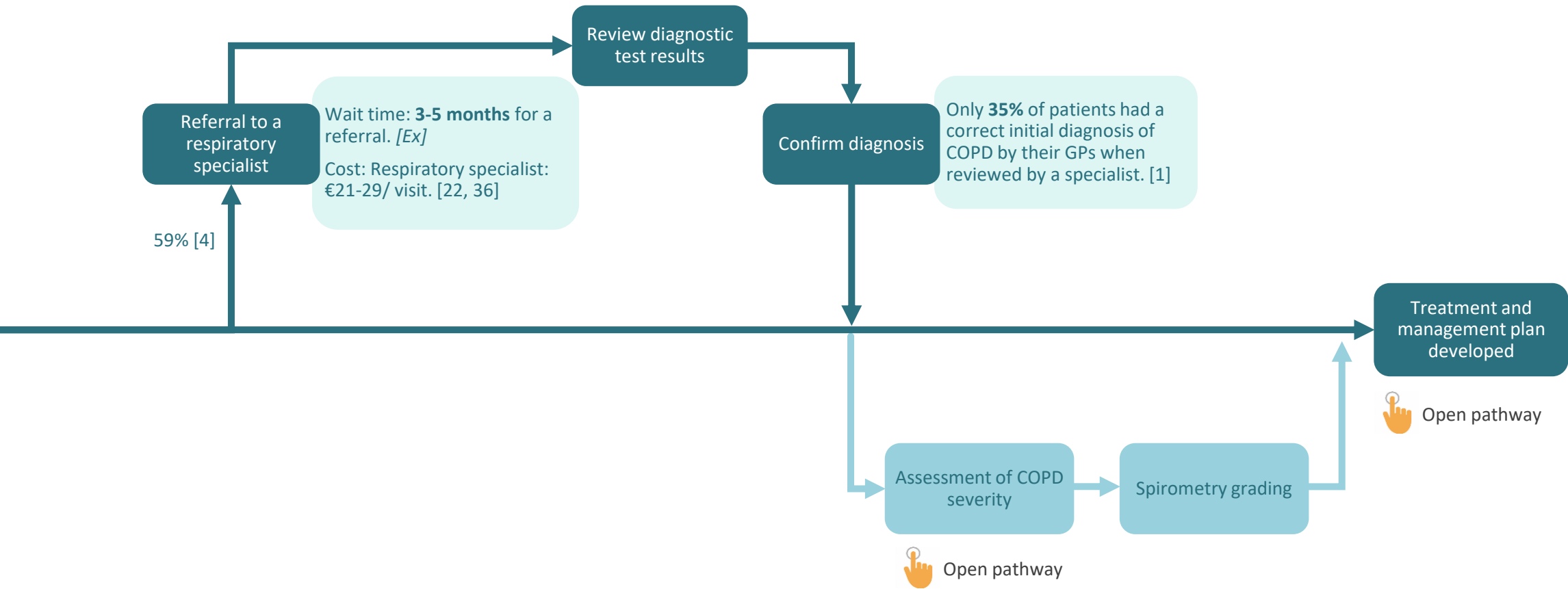
Diagnosis

Diagnostic testing:
primary care



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References



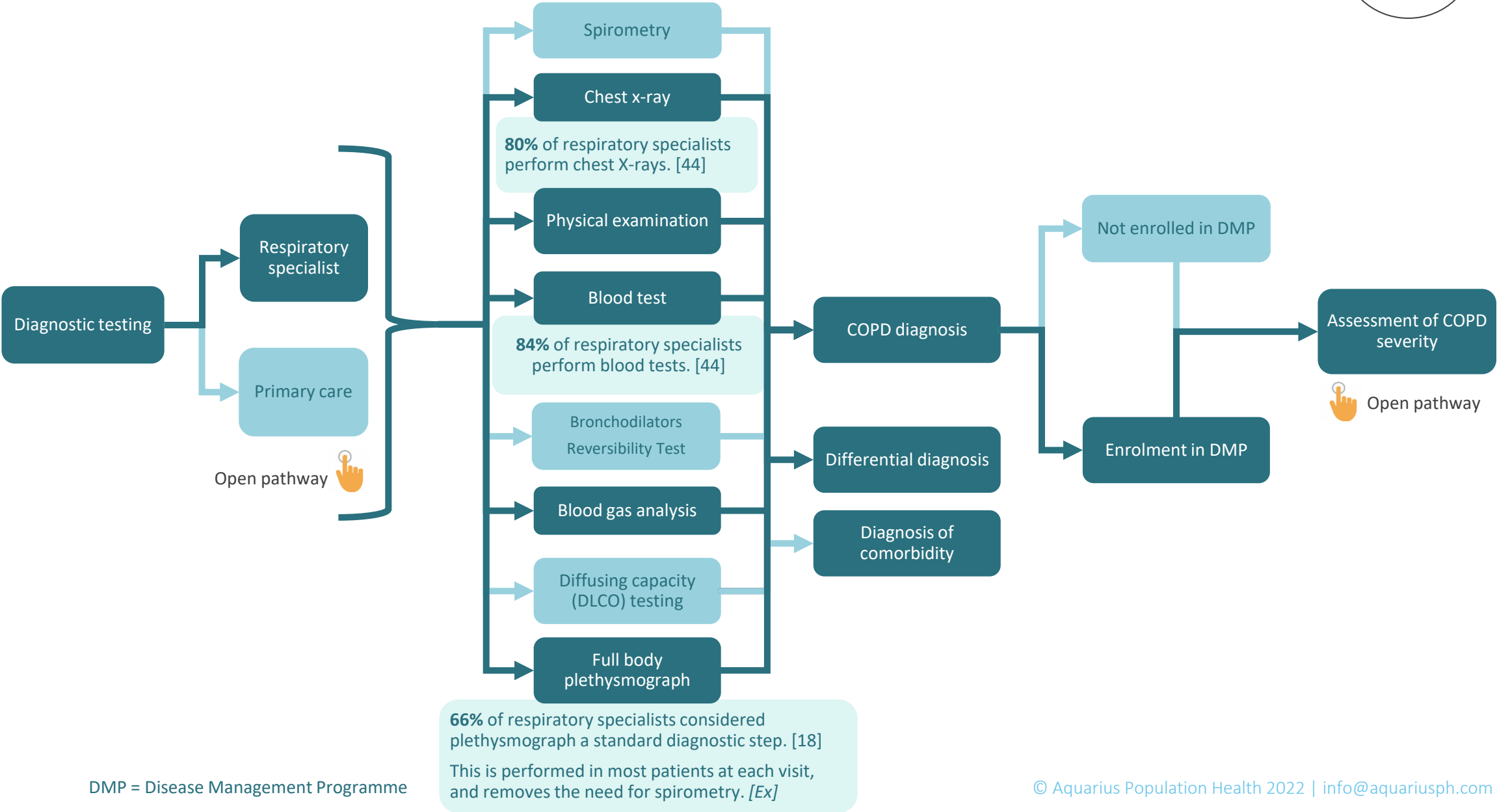




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Diagnosis

Diagnostic testing:
specialists



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References



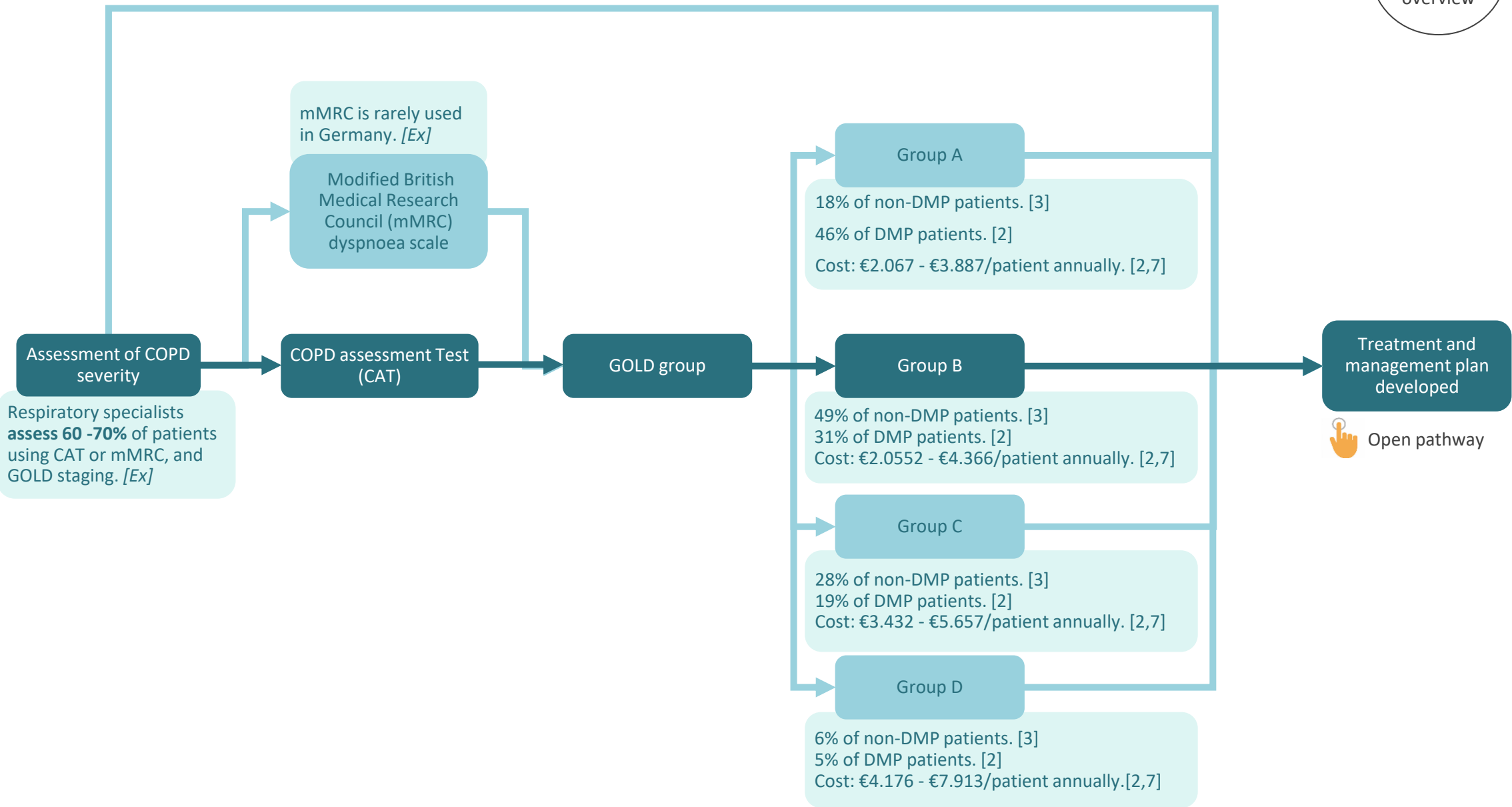
DMP = Disease Management Programme



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to pathway
overview

Diagnosis

Assessment of COPD severity



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References

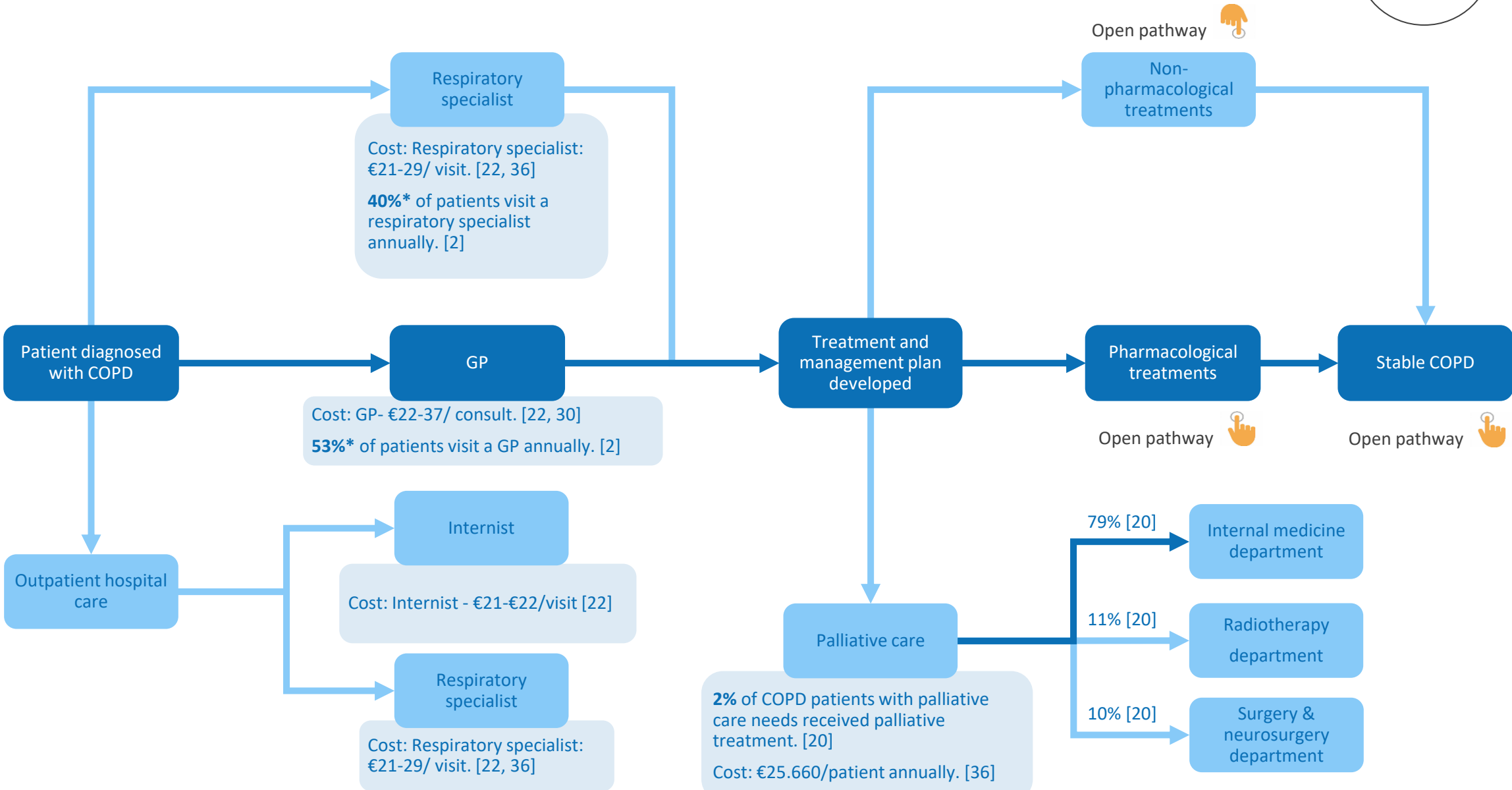




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overview

Management

Treatment
and
management
plan



Click Flag to open
References

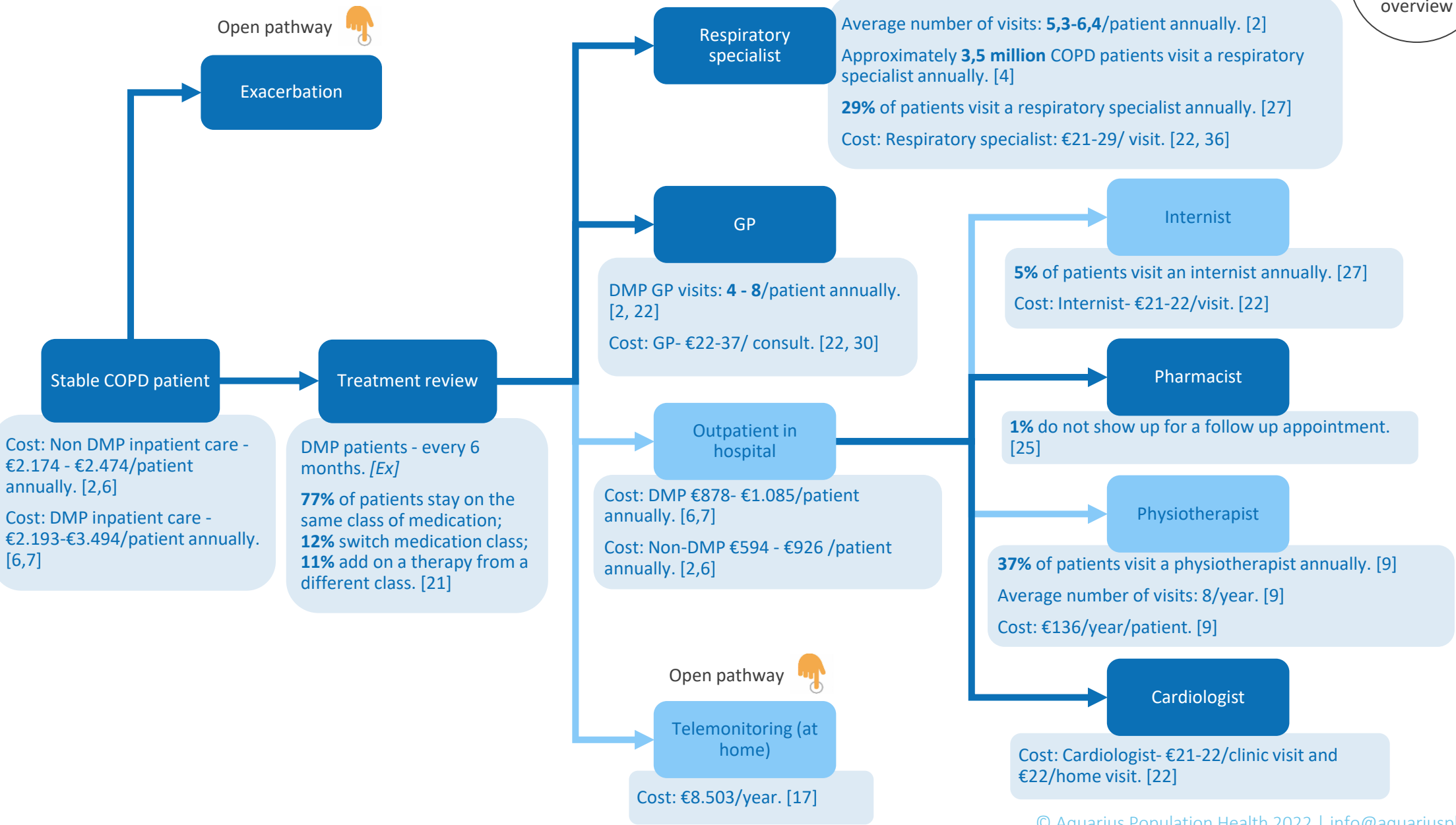




Return
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Management

Stable COPD



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References



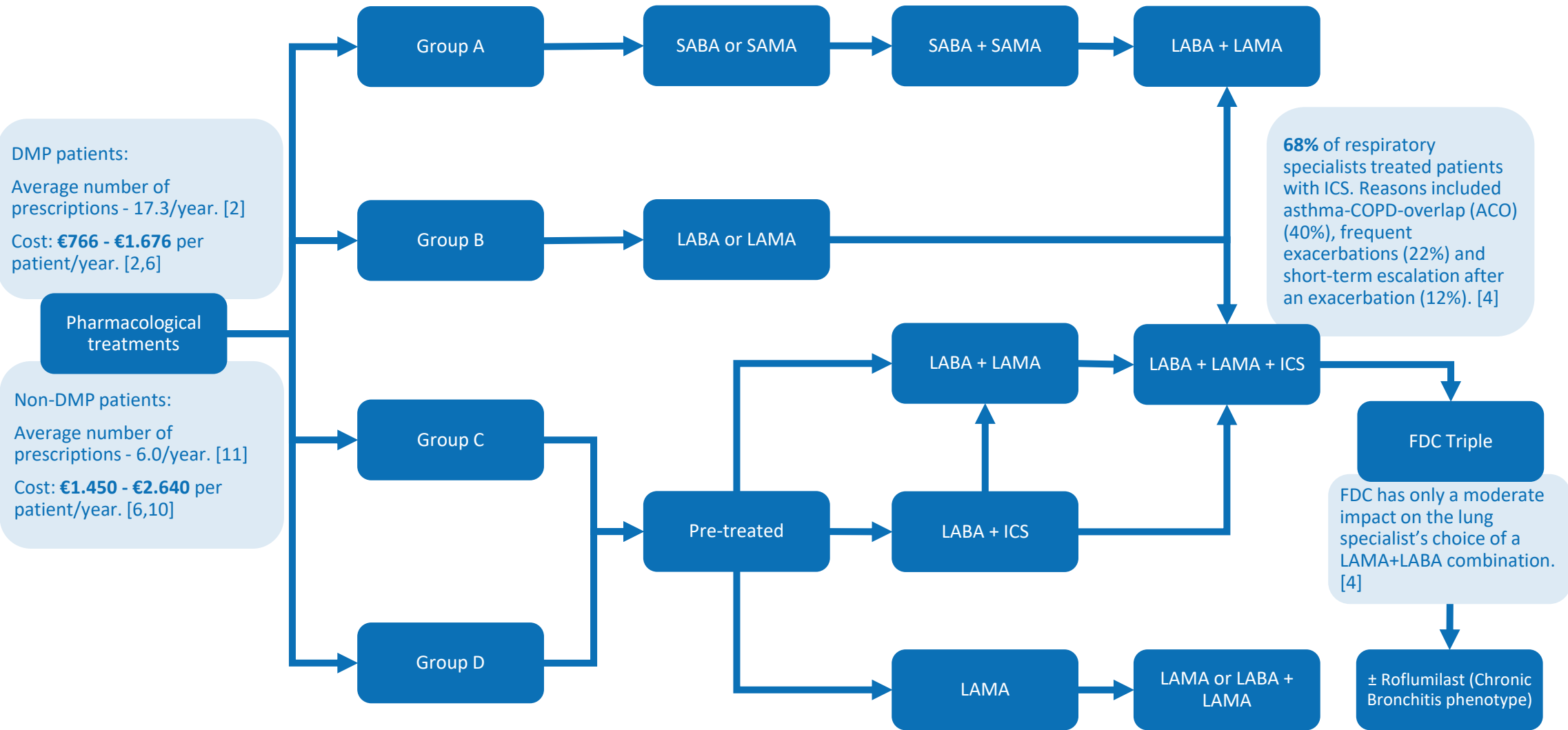
GP = General Practitioner; DMP = Disease Management Programme



Return
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overview

Management

Treatment
and
management
plan: pharma
cological
treatment

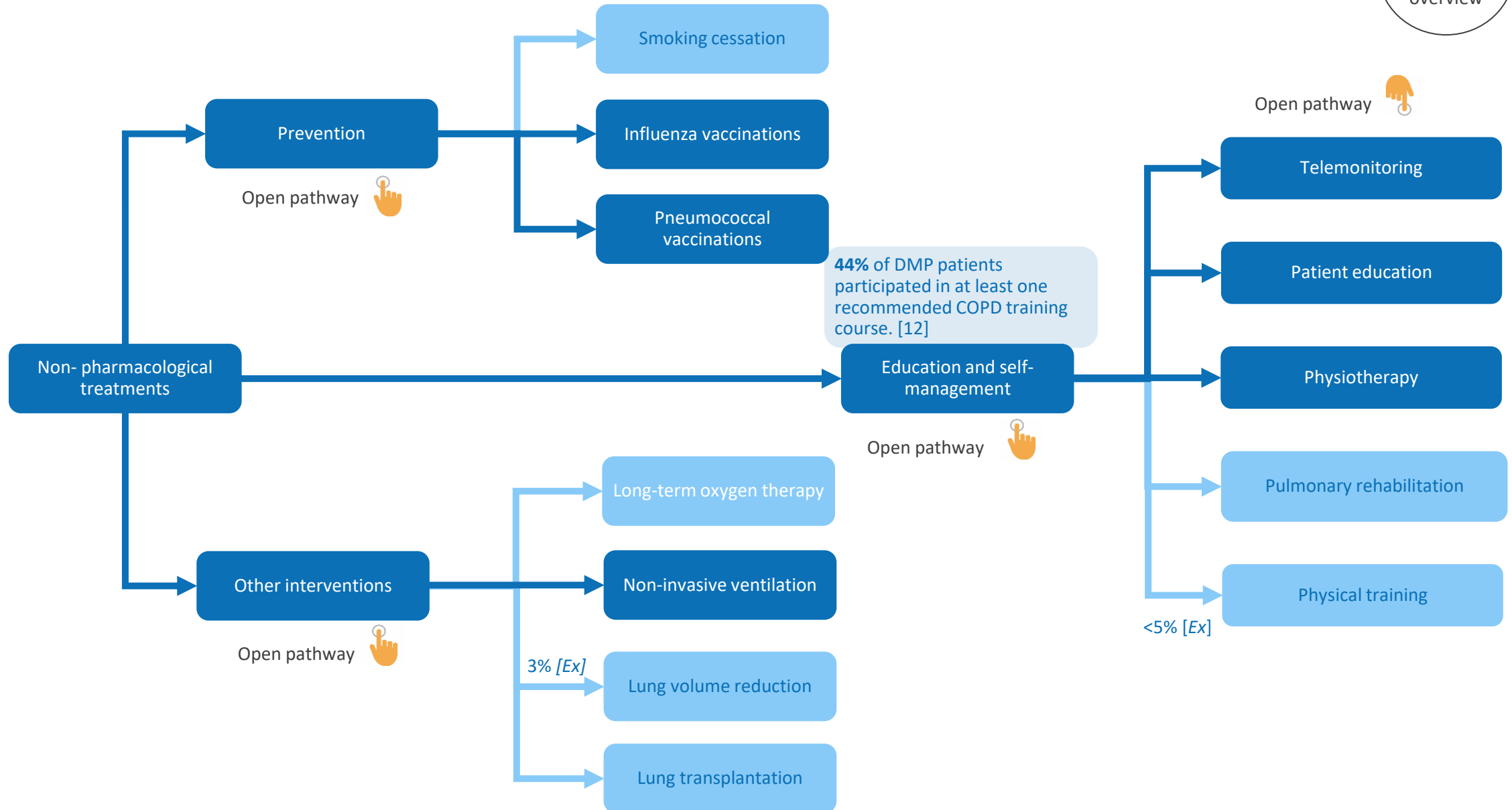


ICS =Inhaled corticosteroids; LABA = Long-acting beta agonists; LAMA = Long-acting muscarinic antagonists; SABA = Short-acting beta agonist; SAMA = Short-acting muscarinic antagonist; FDC triple = Fixed-dose combination triple therapy



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Management

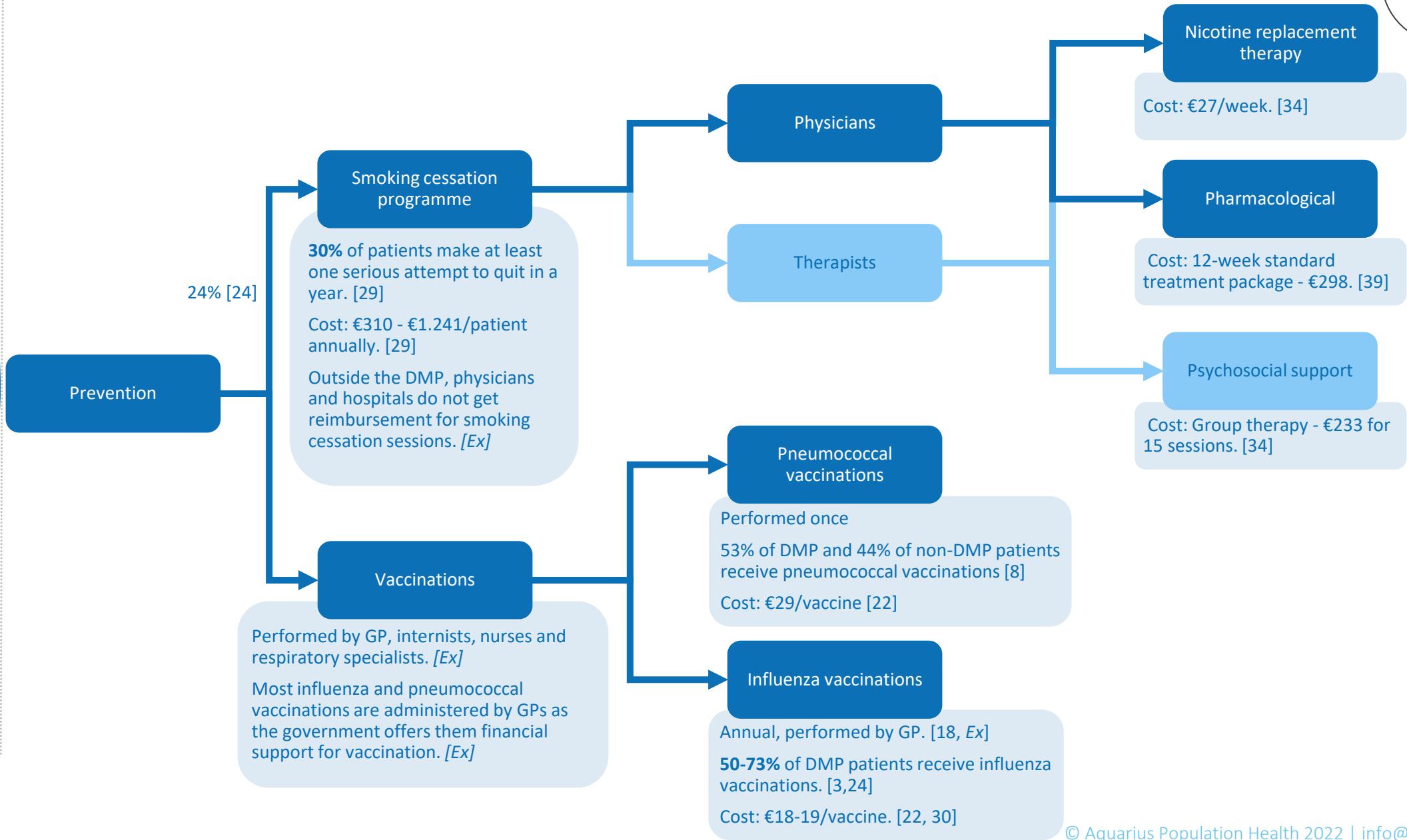


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Non-pharmaco-
logical
treatment:
prevention

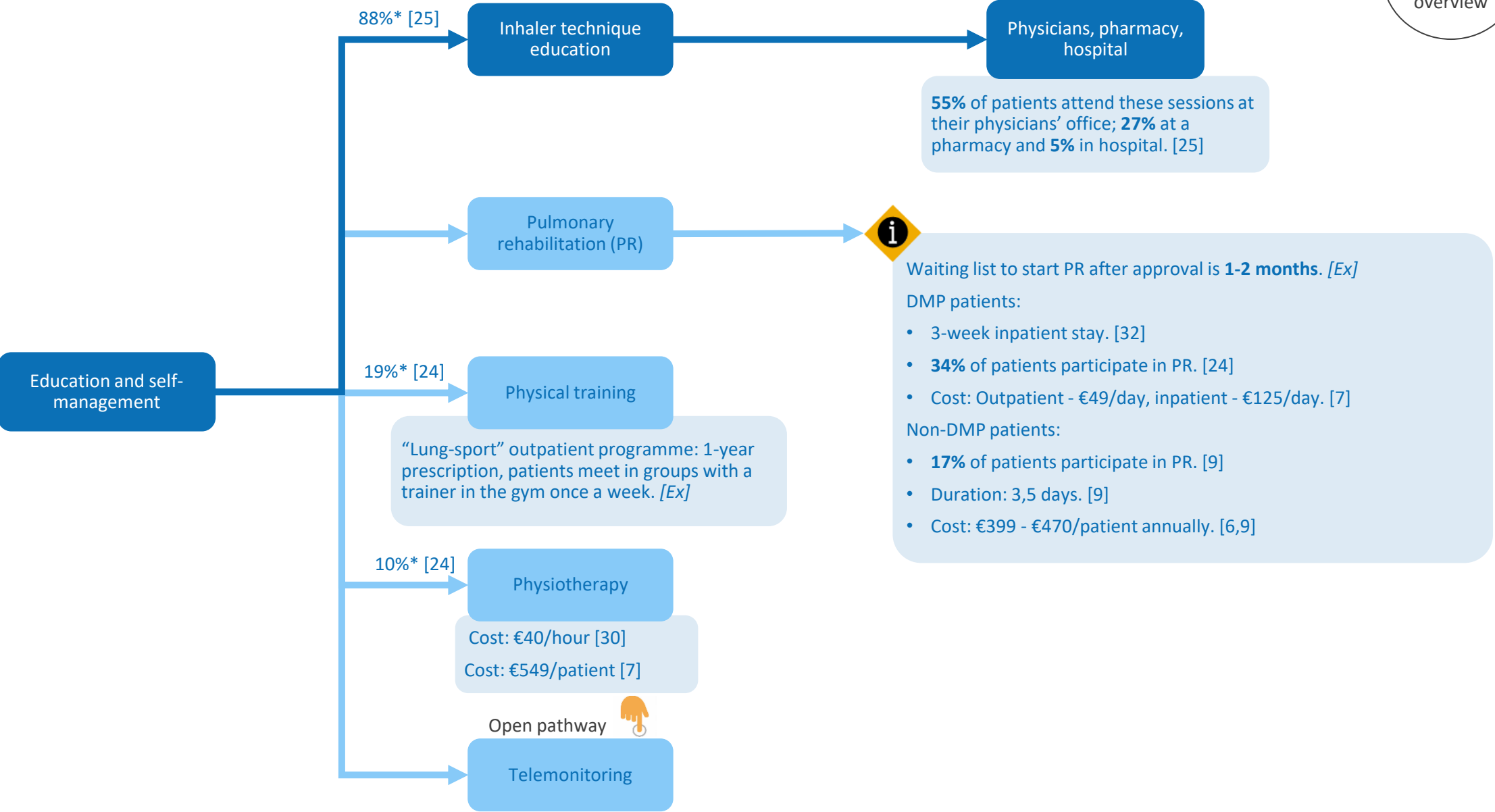


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Non-pharmacological
treatment:
education and
self-management



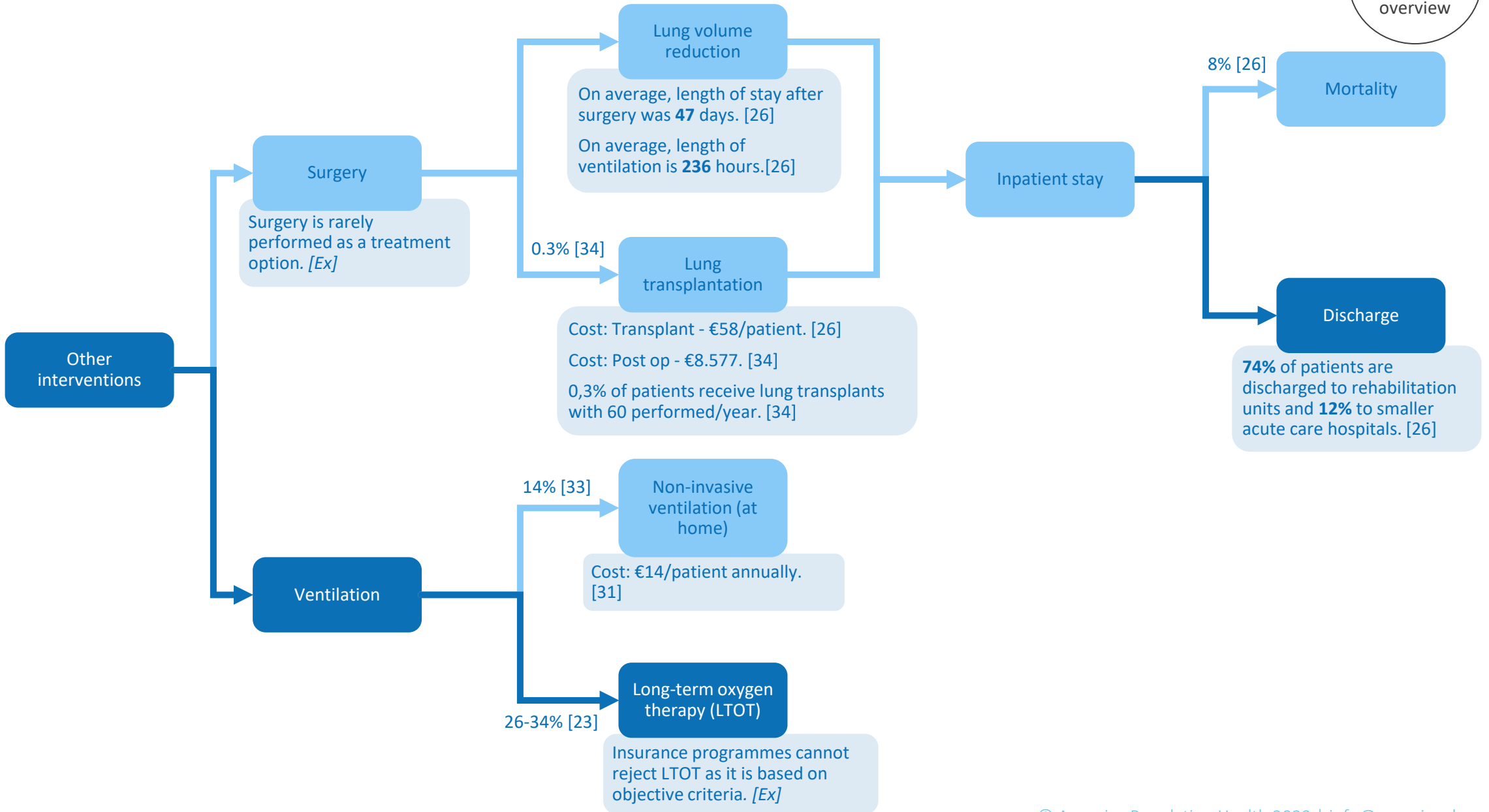
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*Patients may receive more than one type of support



Non-pharmacological treatments:
other interventions



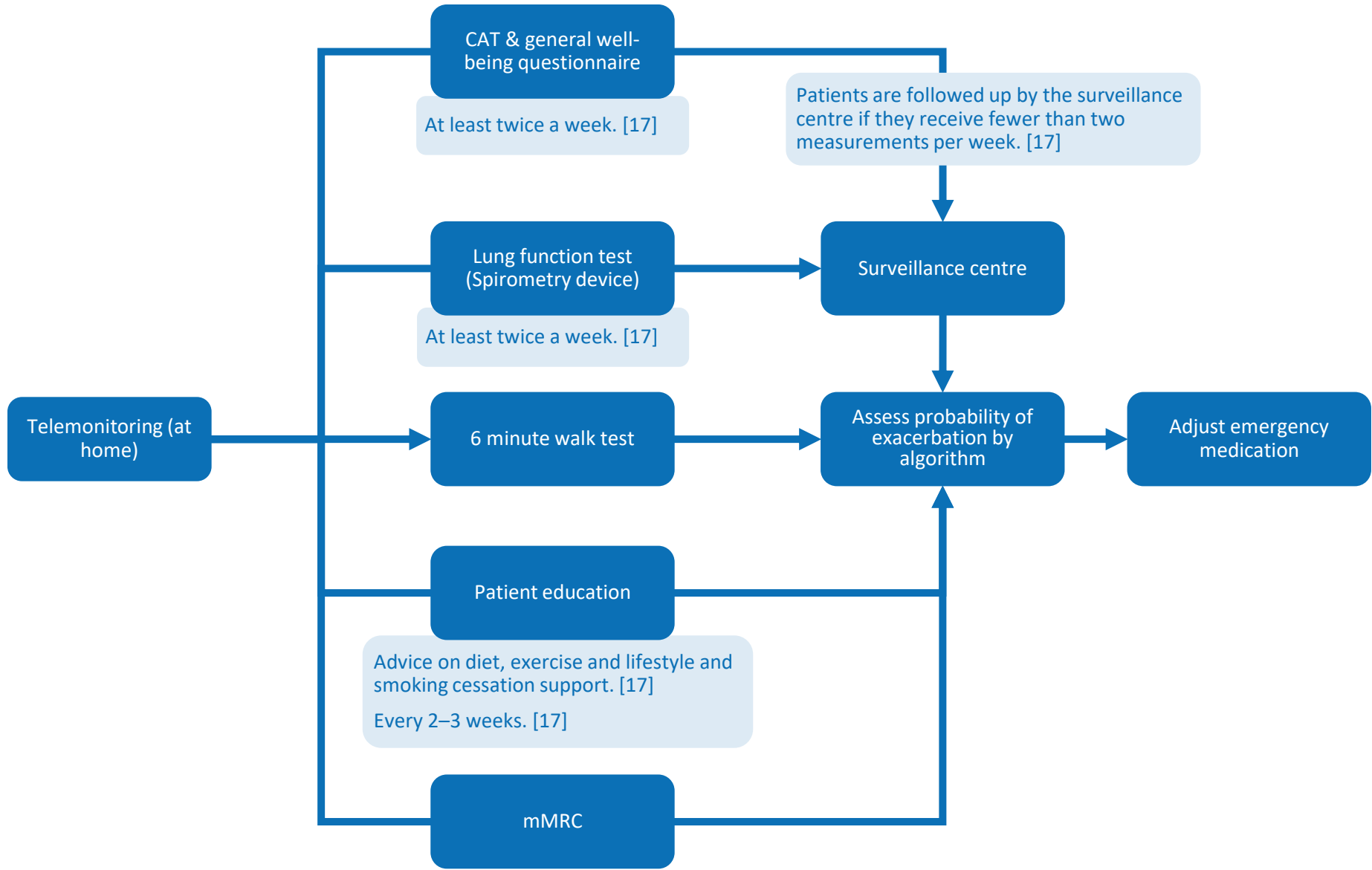
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Management



Non-pharmaco-
logical
treatment:
telemonitor-
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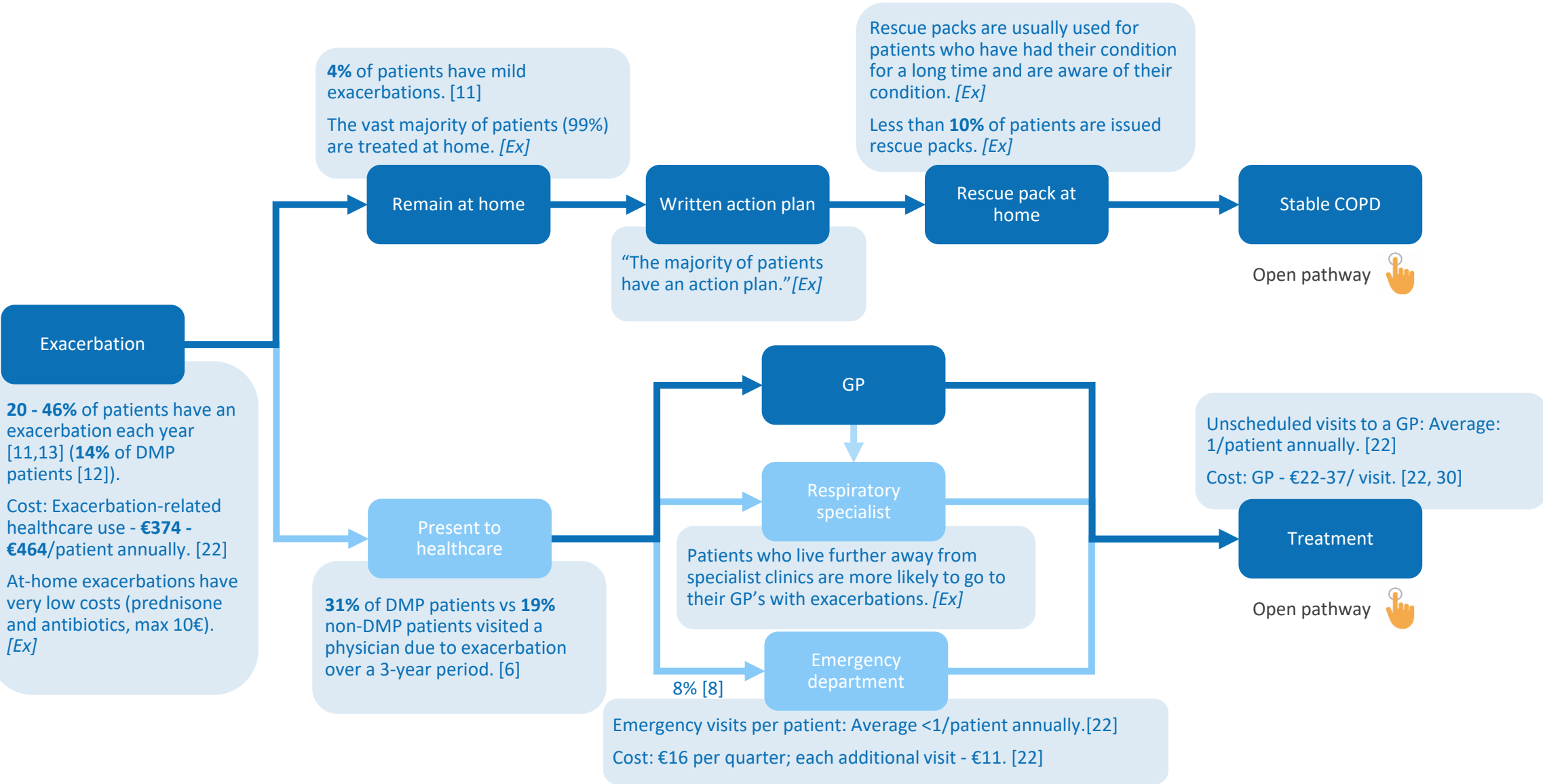




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Management

Exacerbations



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References

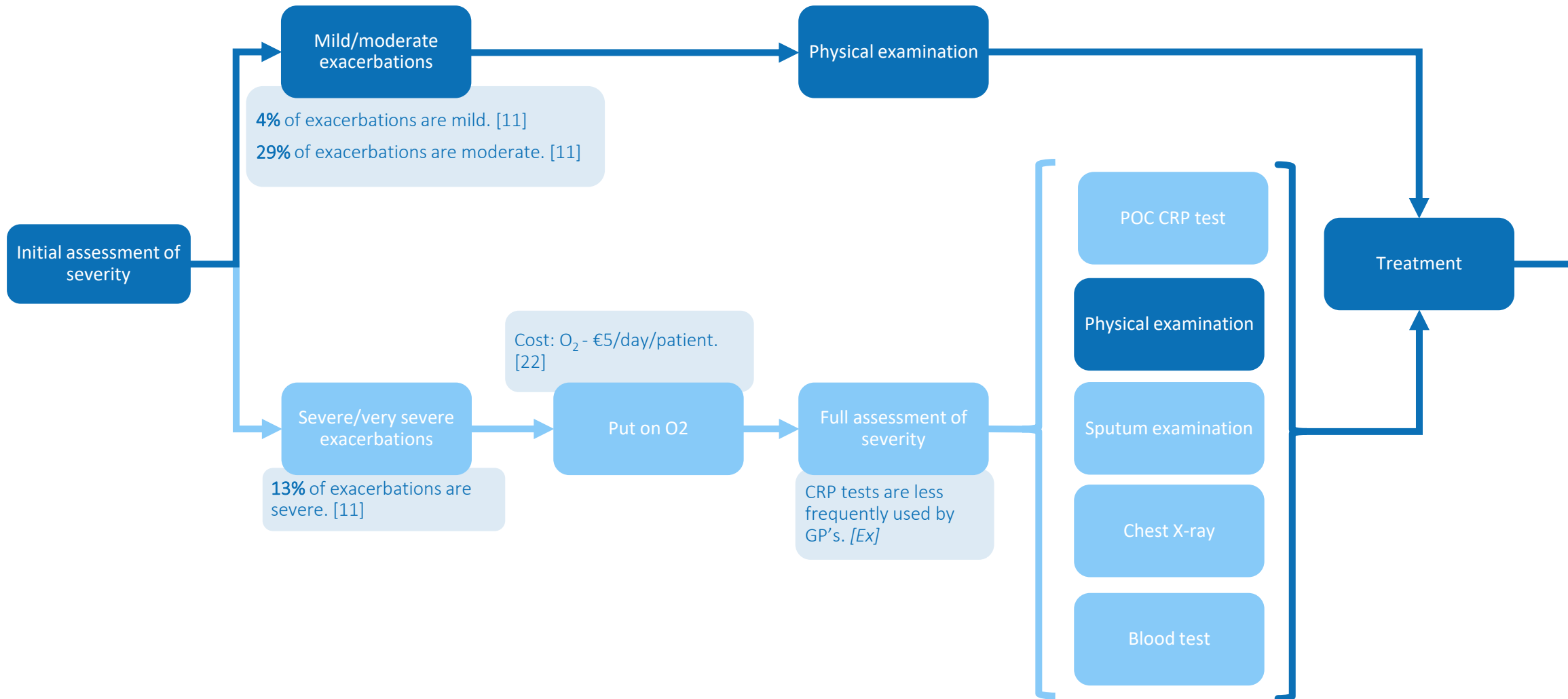




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Management

Exacerbation:
presentation
to healthcare

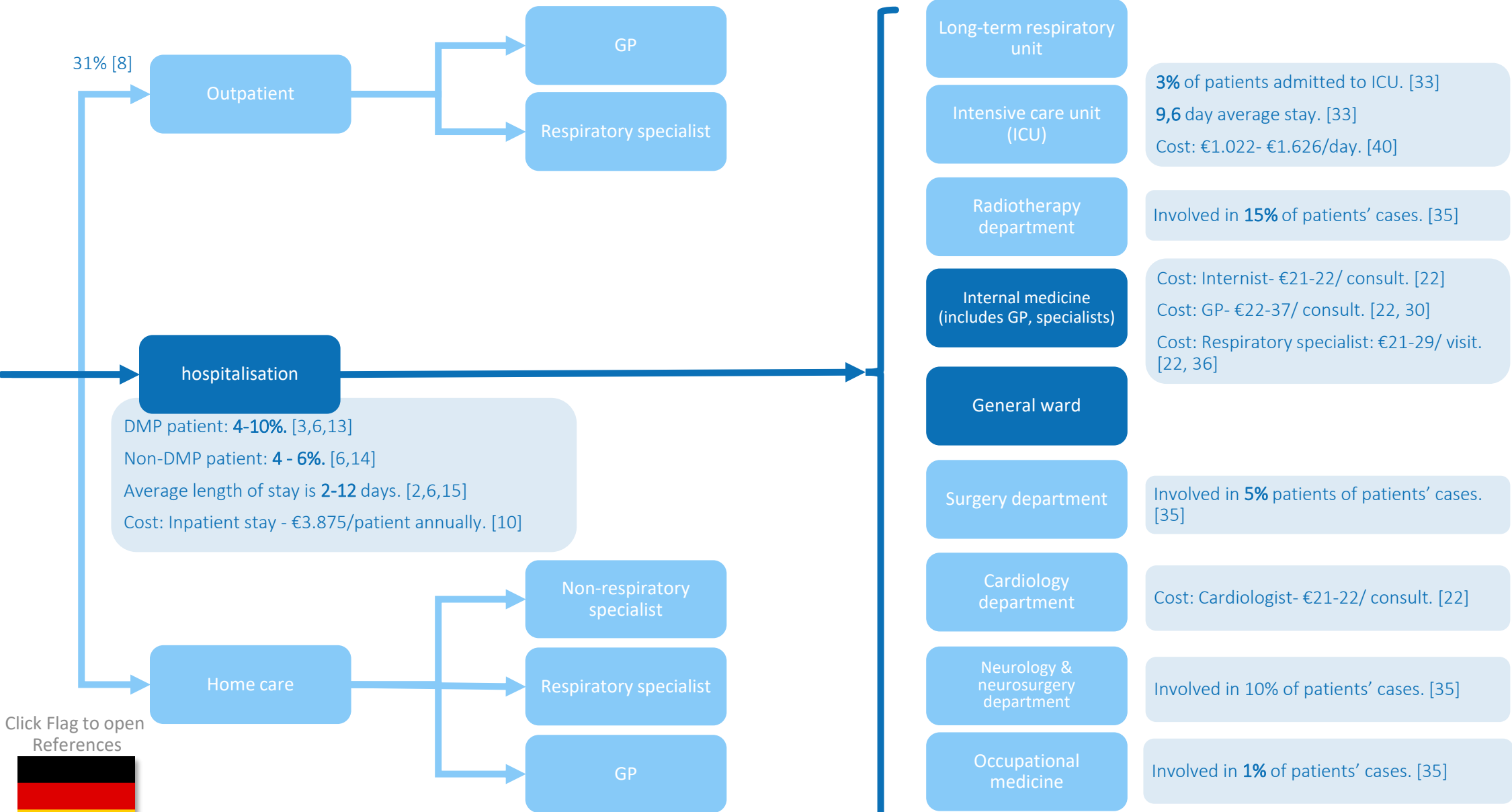


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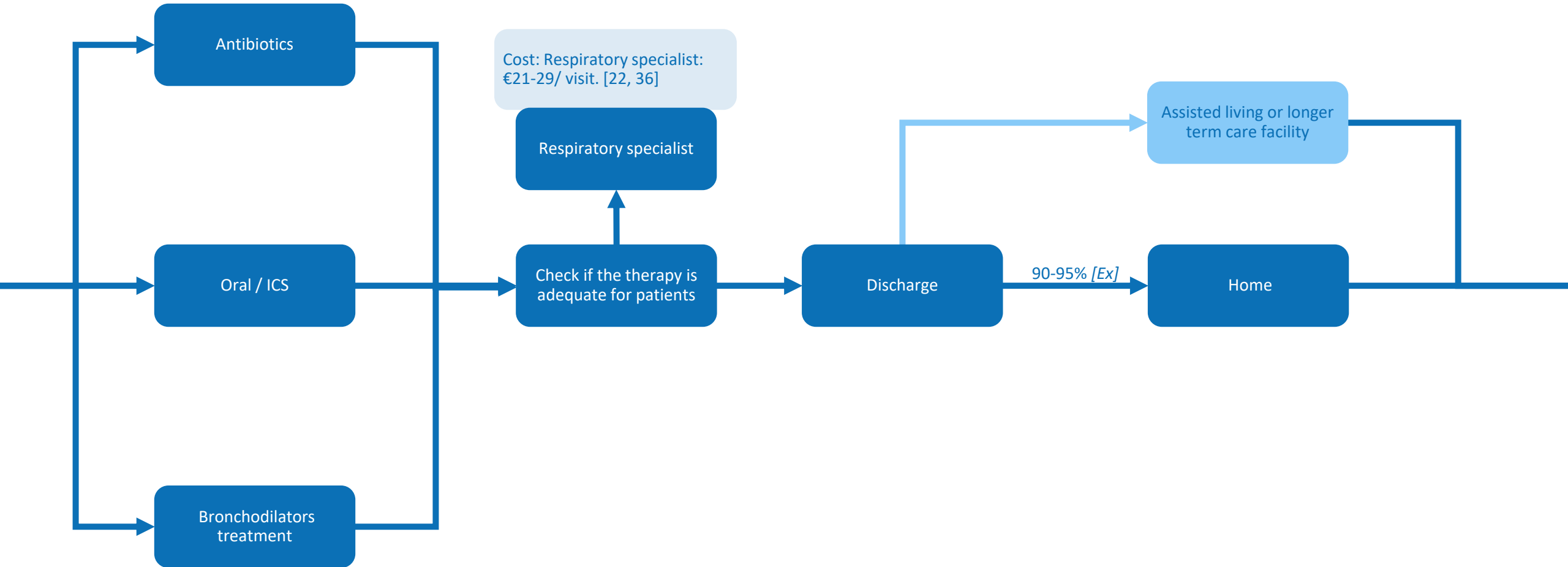


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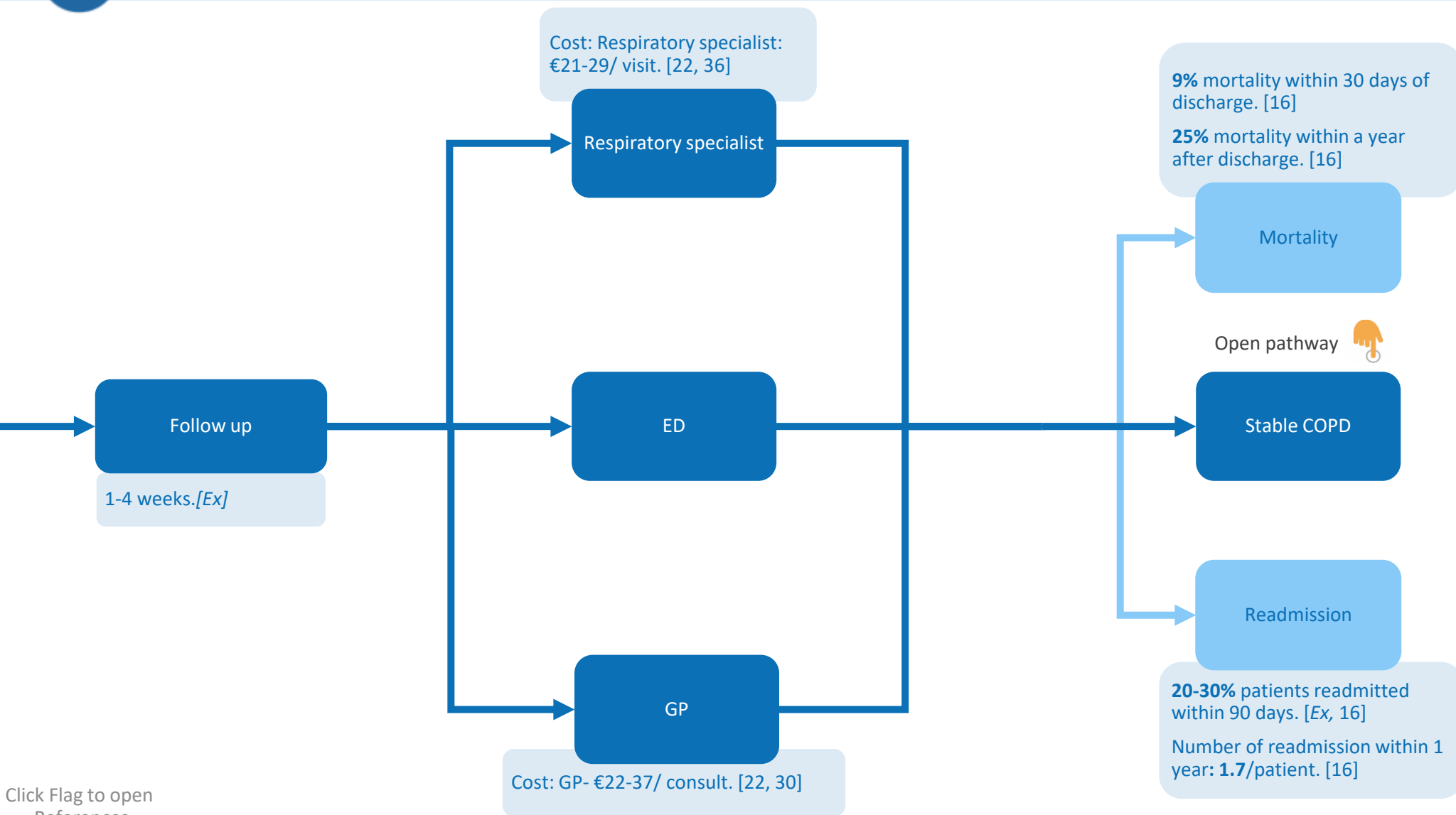
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ICS = Inhaled Corticosteroids



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overview



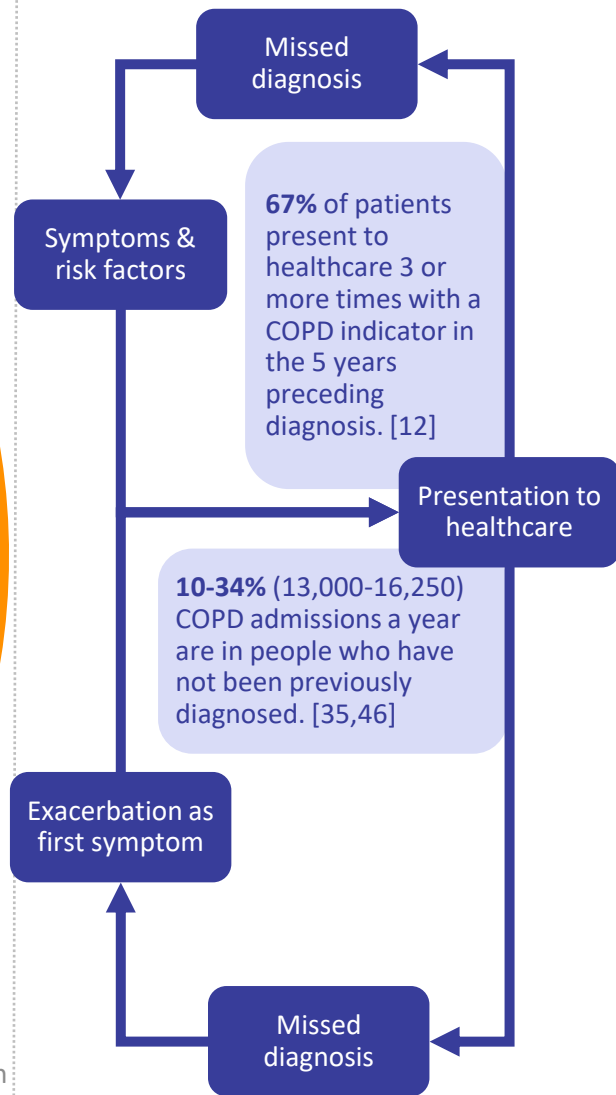
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Pathway overview

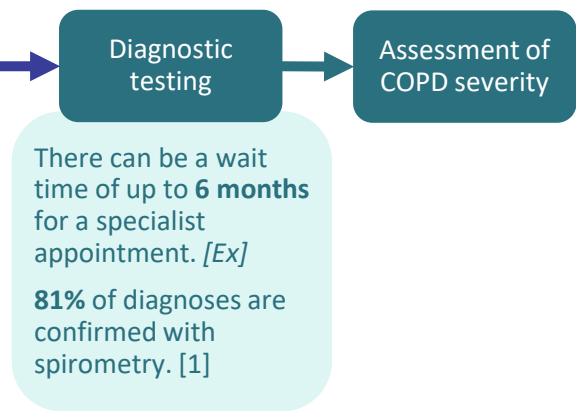
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Pre-diagnosis

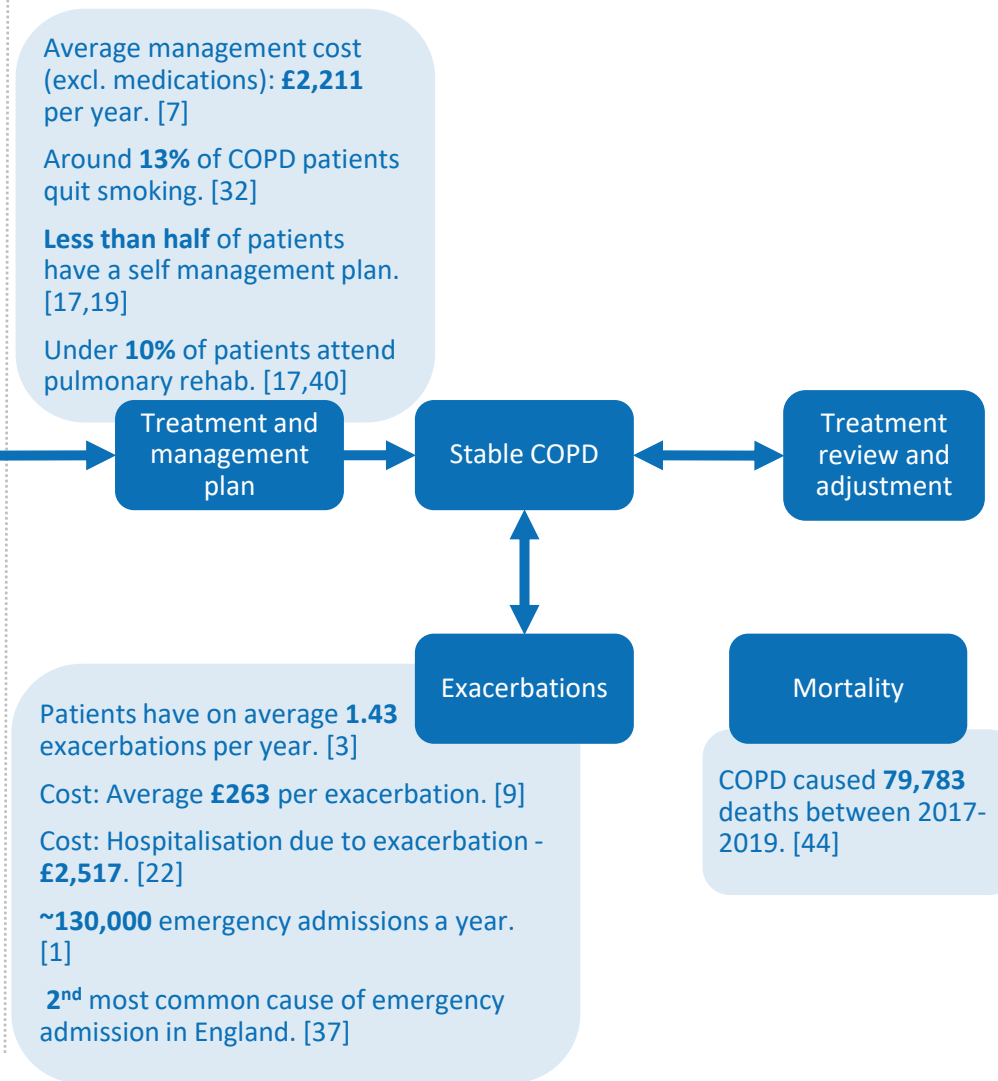


Diagnosis

i Click on the specific pathway step to open the more detailed pathway e.g., clicking on 'Diagnostic testing' will take you to the corresponding detailed view of the diagnostic pathway. At any point, you can return to this page by clicking the 'Return to pathway overview' button in the top right corner.



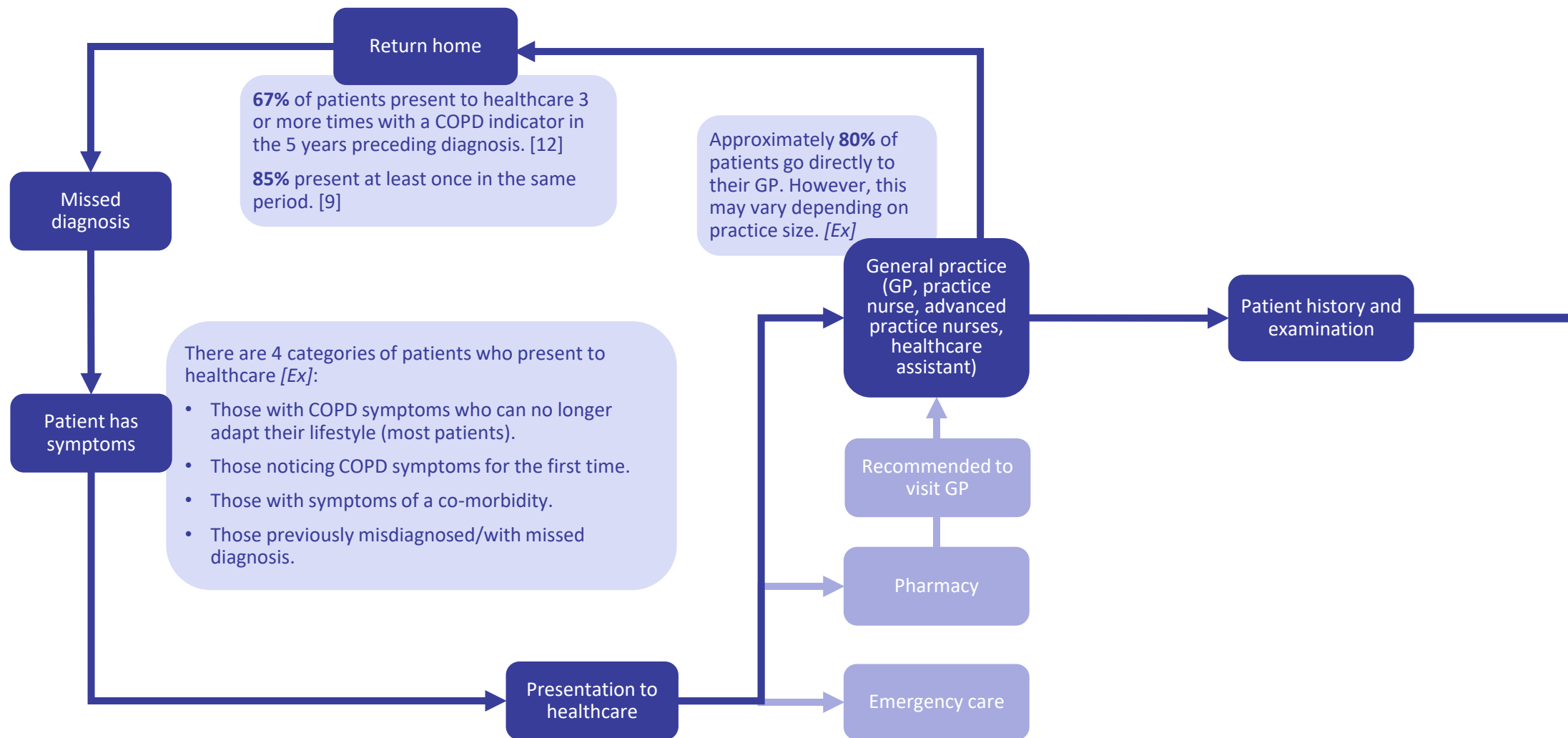
Management



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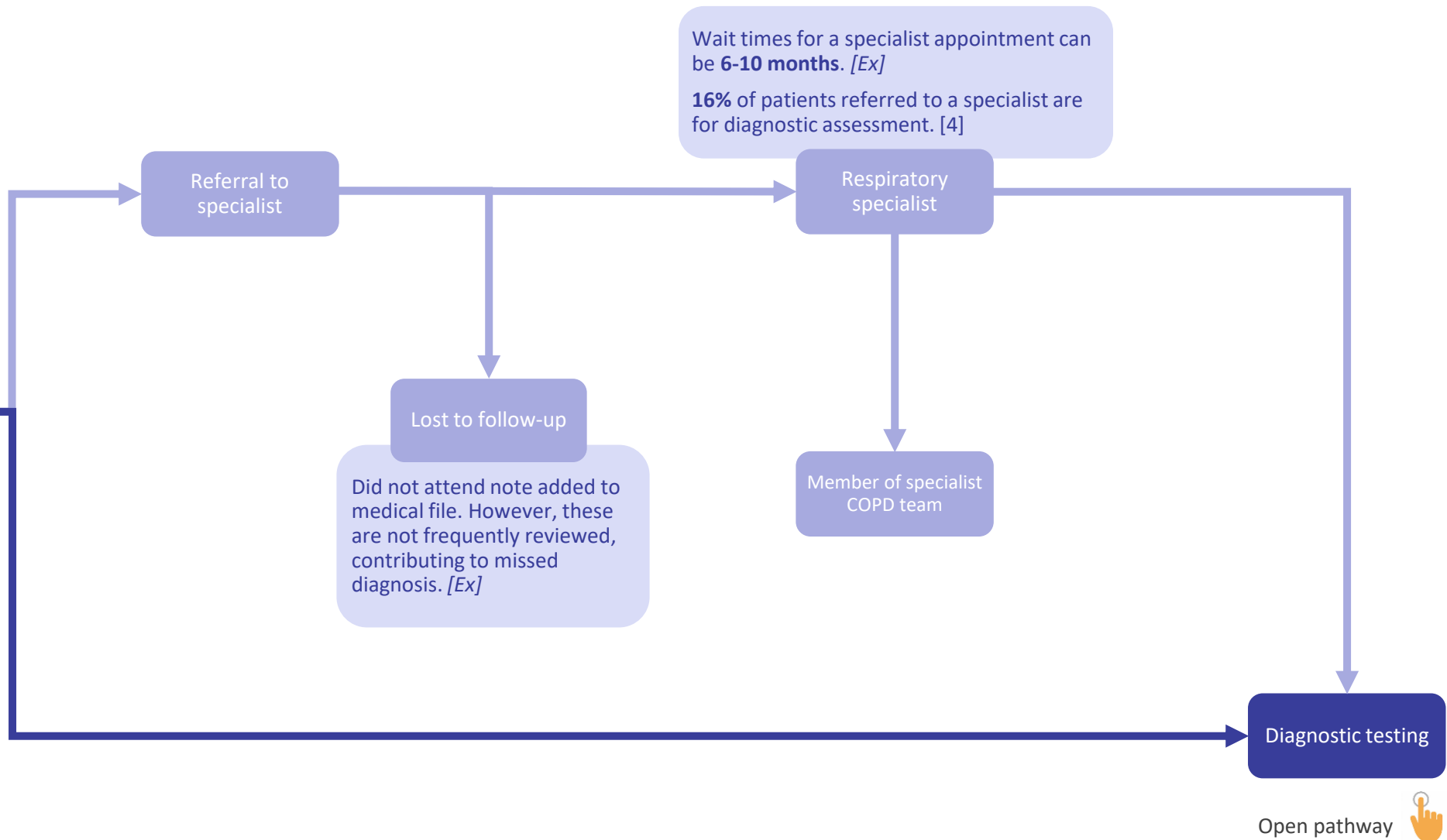
GP = General Practitioner

Presentation
to healthcareClick Flag to open
References

GP = General Practitioner

Open pathway

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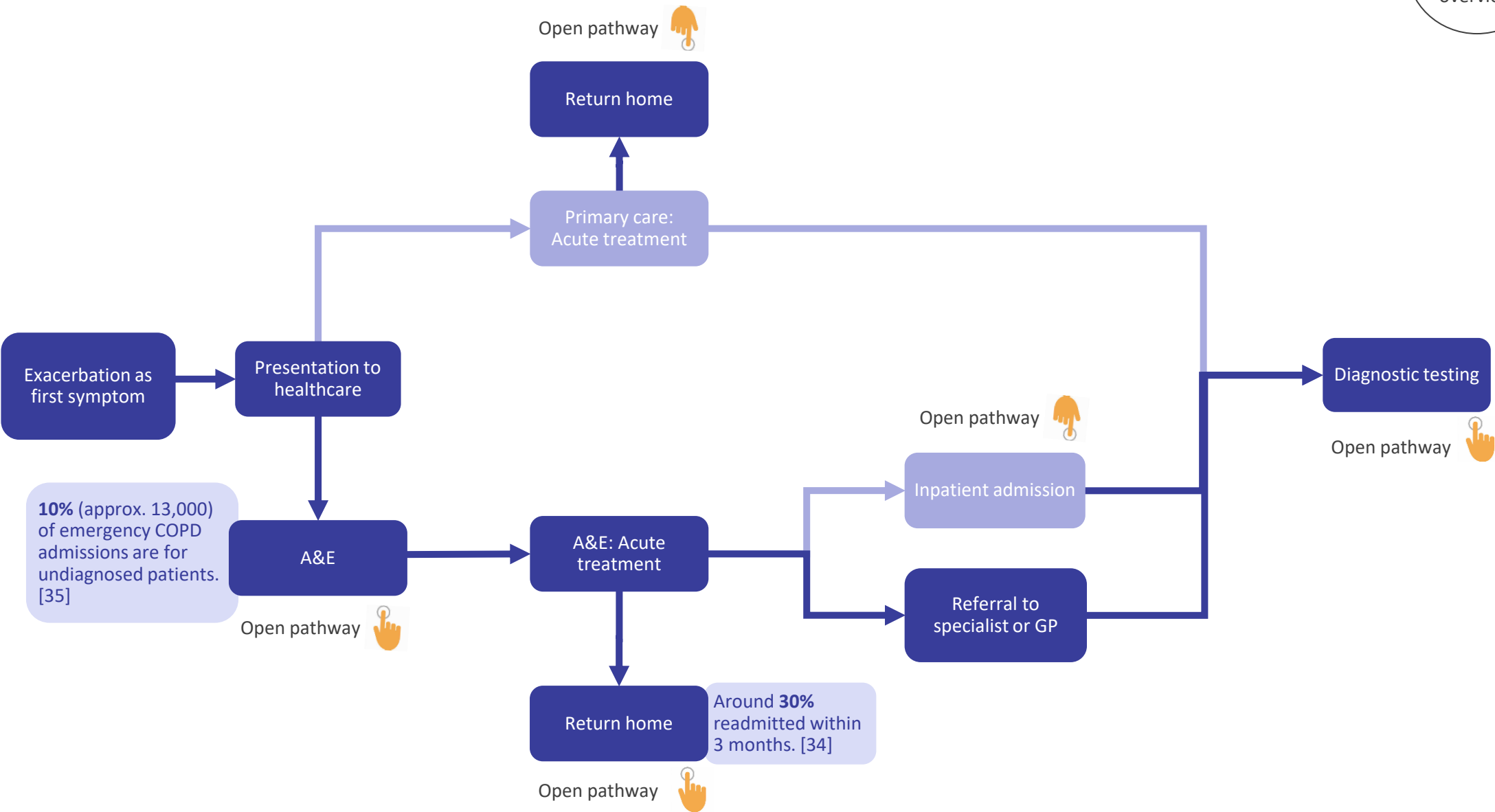
GP = General Practitioner



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Pre-diagnosis

Presentation
to healthcare
emergency
care



10% (approx. 13,000) of emergency COPD admissions are for undiagnosed patients. [35]

Around 30% readmitted within 3 months. [34]

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A&E = Accident and Emergency department; GP = General Practitioner

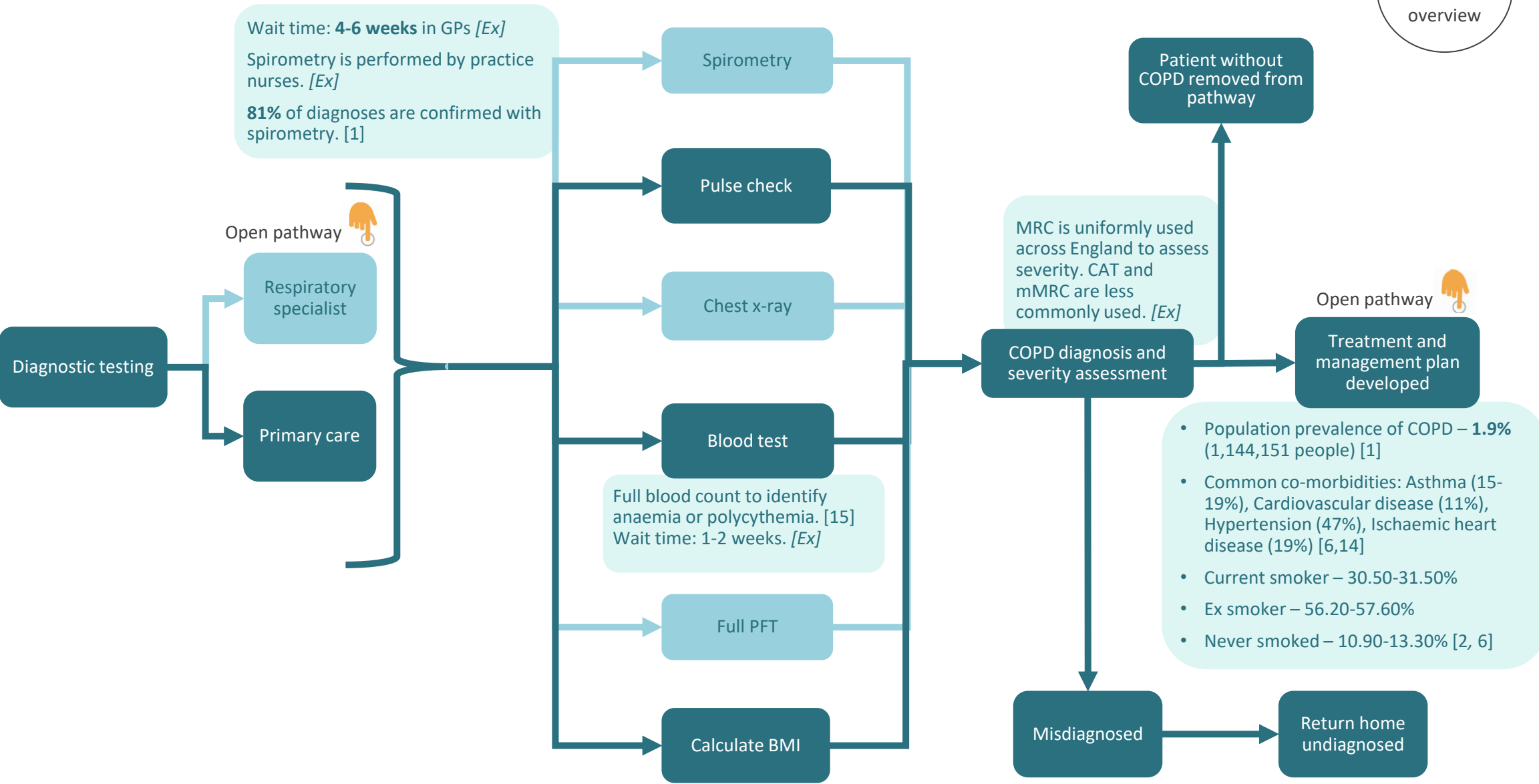
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Diagnosis

Diagnostic testing:
primary care



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References



BMI = Body Mass Index; PFT = Pulmonary Function Test; MRC = Medical Research Council Dyspnoea Scale; mMRC = Modified Medical Research Council Dyspnoea Scale; CAT =COPD Assessment Test

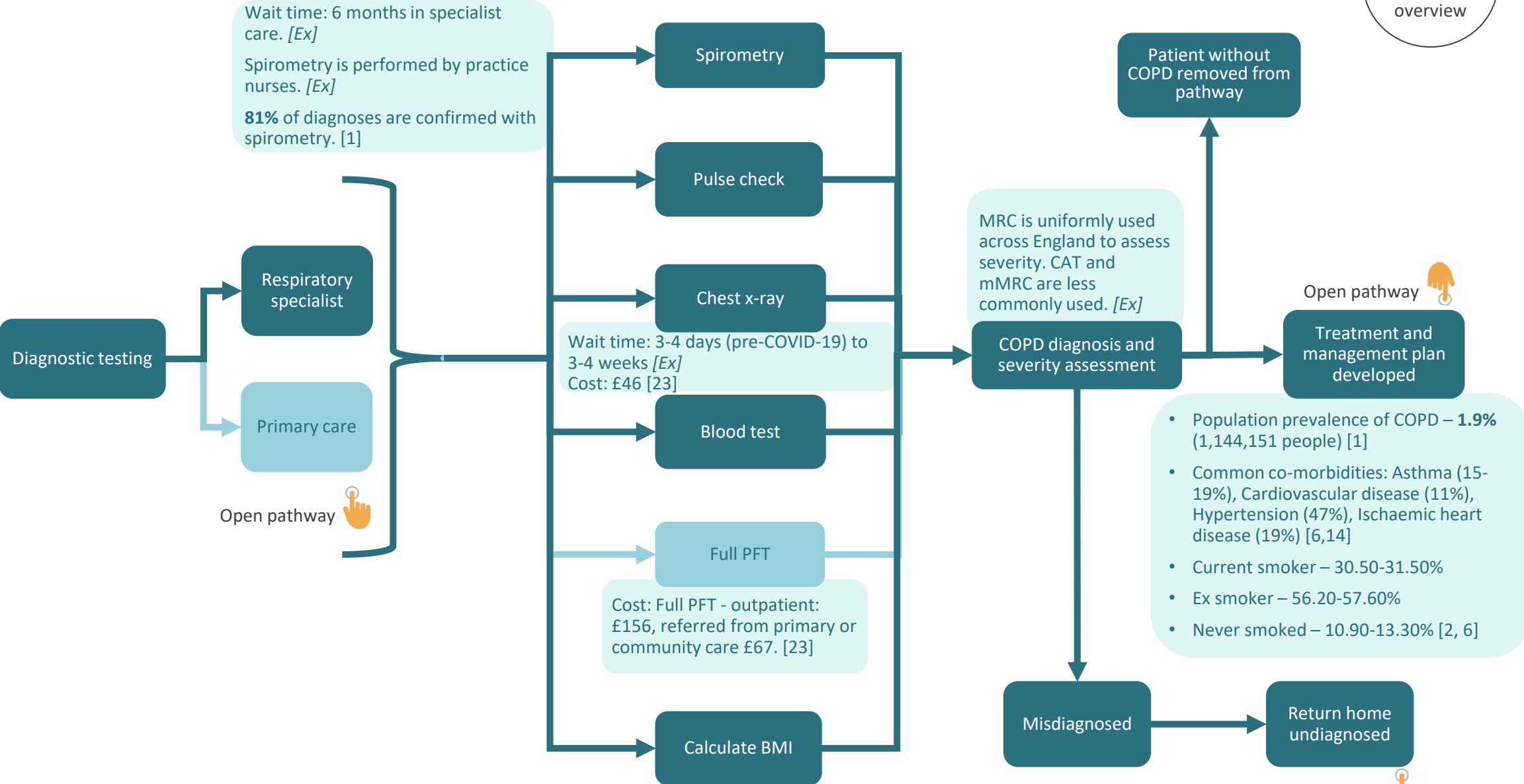
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Diagnosis

Diagnostic testing:
specialist



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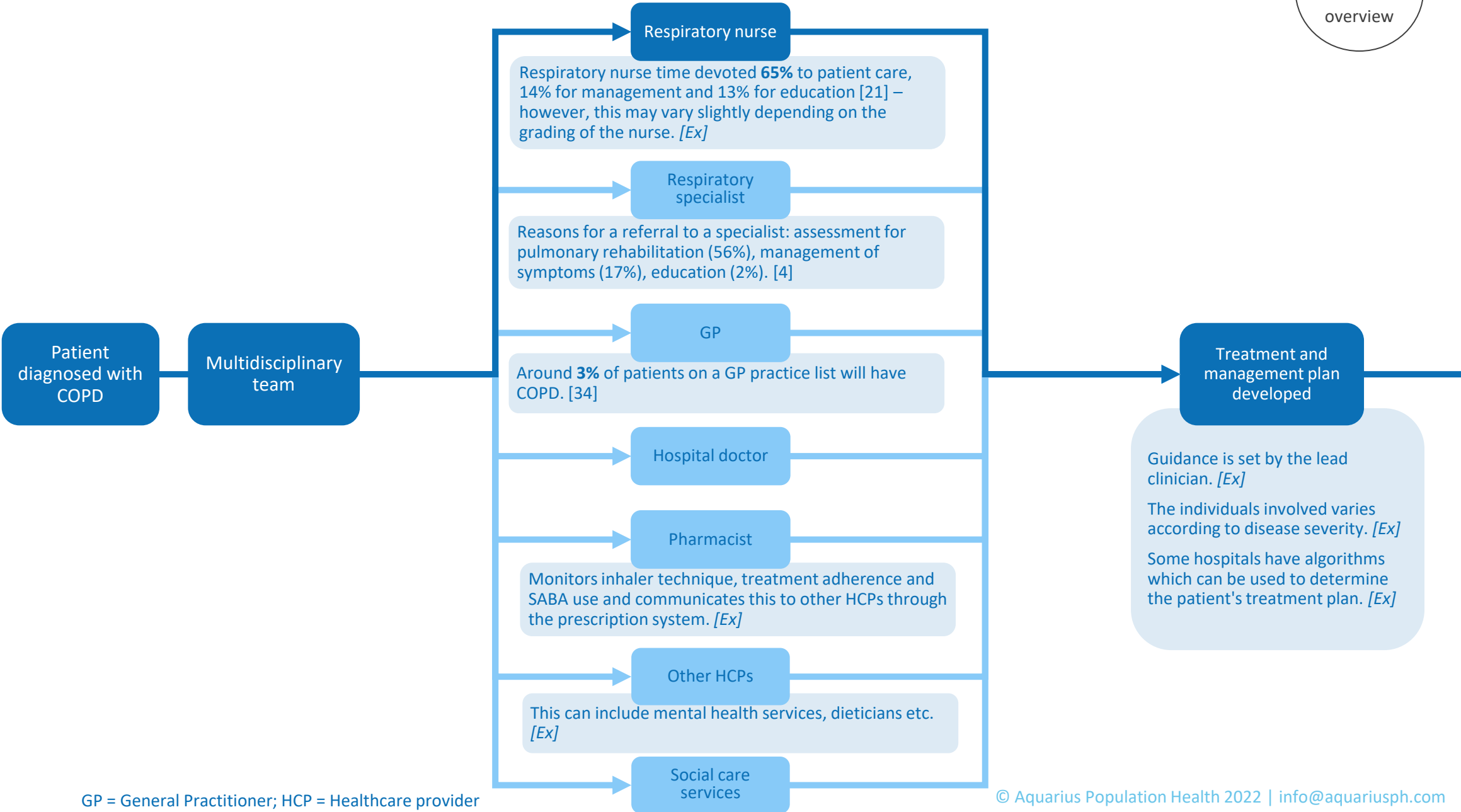
BMI = Body Mass Index; PFT = Pulmonary Function Test; MRC = Medical Research Council Dyspnoea Scale; mMRC = Modified Medical Research Council Dyspnoea Scale; CAT = COPD Assessment Test



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overview

Management

Treatment
and
management
plan



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References





Open pathway

Non-pharmacological
treatment

There is a low awareness of available treatments among non-respiratory physicians, which leads to pharmacological treatments being favored. There is also a lack of time to analyse the health status further. [Ex]

Pharmacological
treatment

Pharmacological treatments are most common as they are quicker. [Ex]

GOLD Group A
44% [6]

GOLD Group B
26% [6]

GOLD Group C
14% [6]

GOLD Group D
16% [6]

Stable COPD

Open pathway

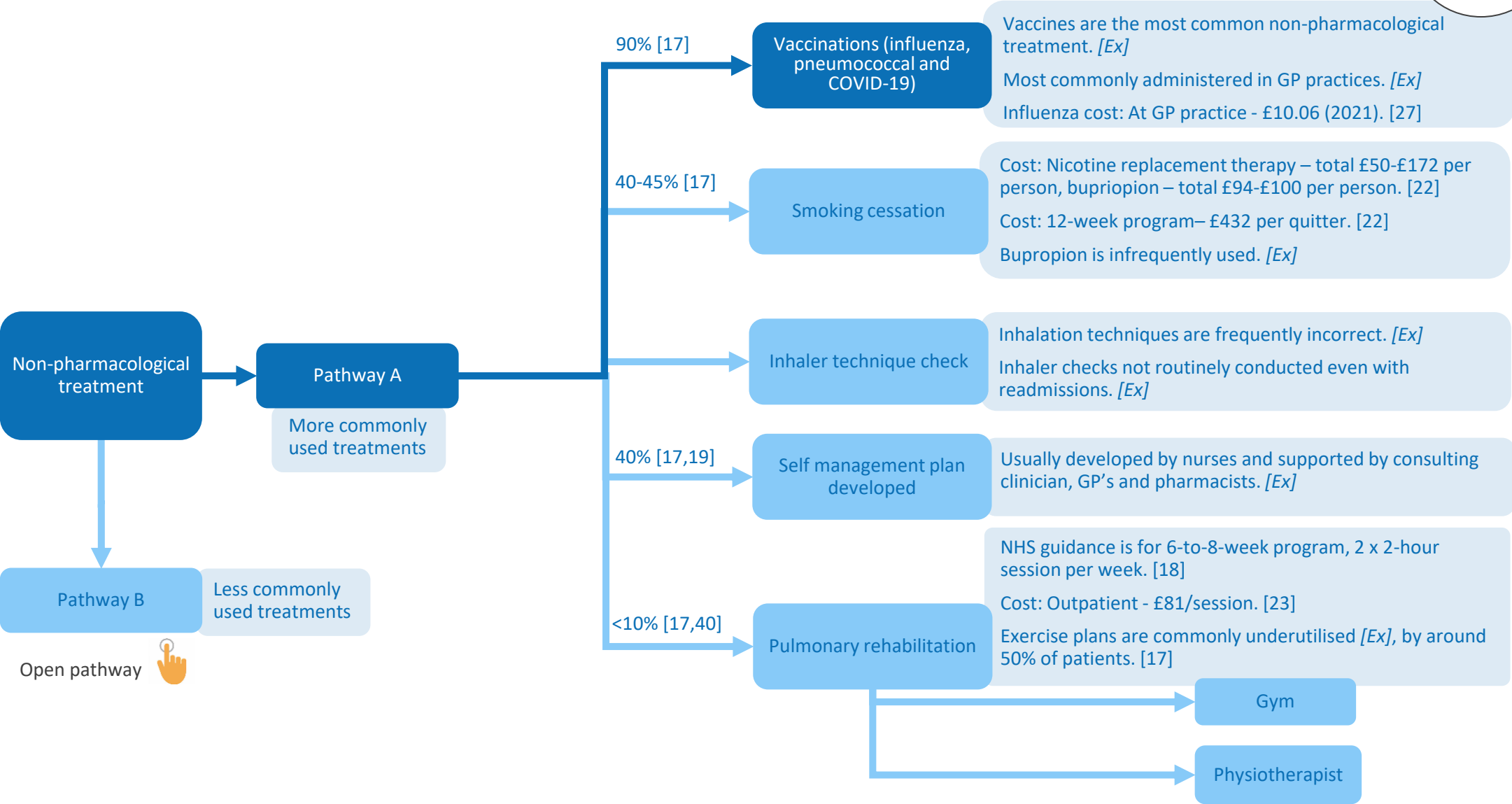
Both GOLD and NICE guidelines are widely used to assess severity and determine treatment choices. [Ex]
Whilst GOLD guidelines are more academically robust, the NICE guidelines have been identified as being easier to follow in clinical practice. [Ex]
Regional guidelines are also available in most parts of England. [Ex]





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Treatment
and
management
plan: non-
pharma-
cological
treatment



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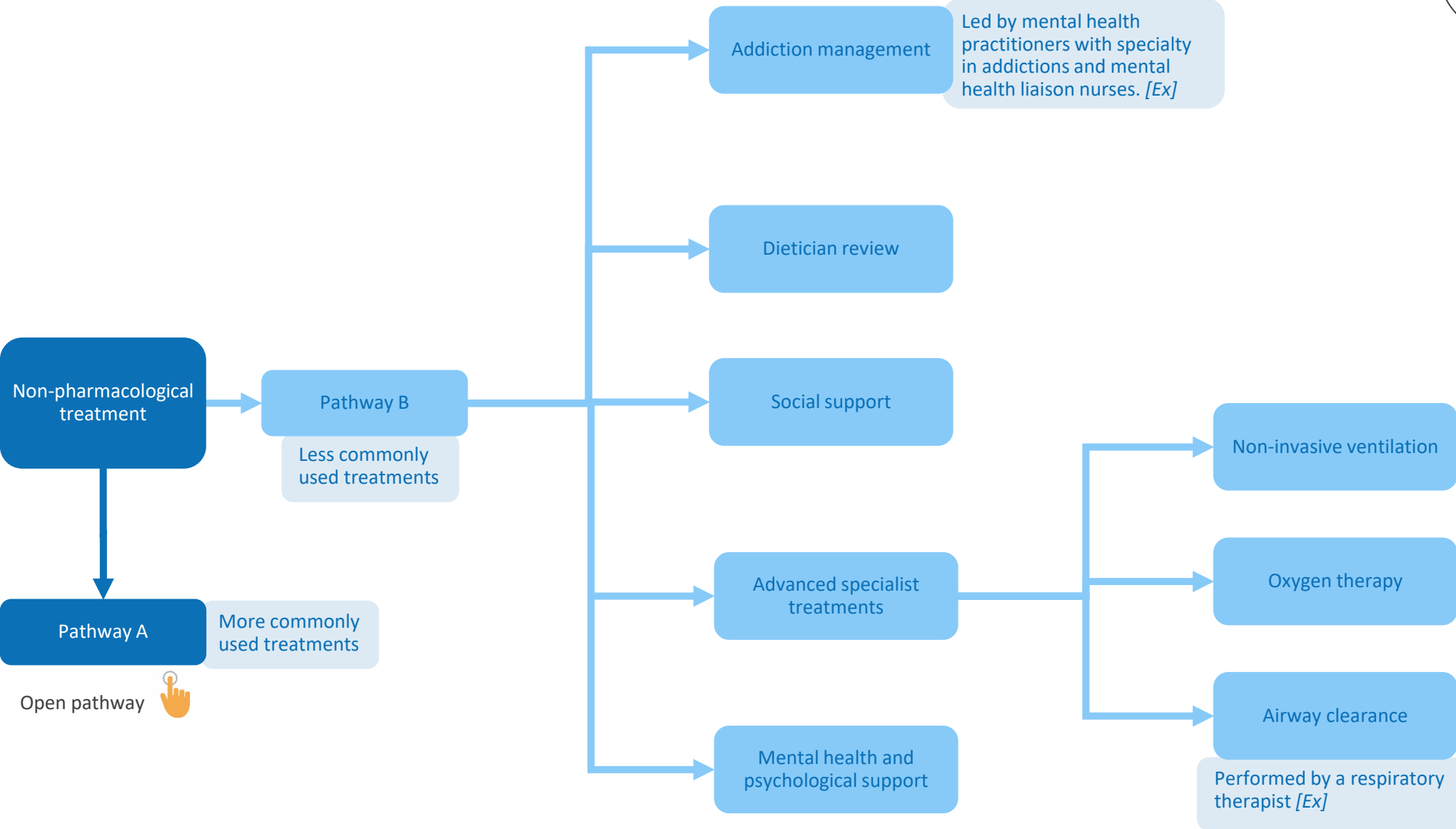




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Management

Treatment and management plan: non-pharmacological treatment



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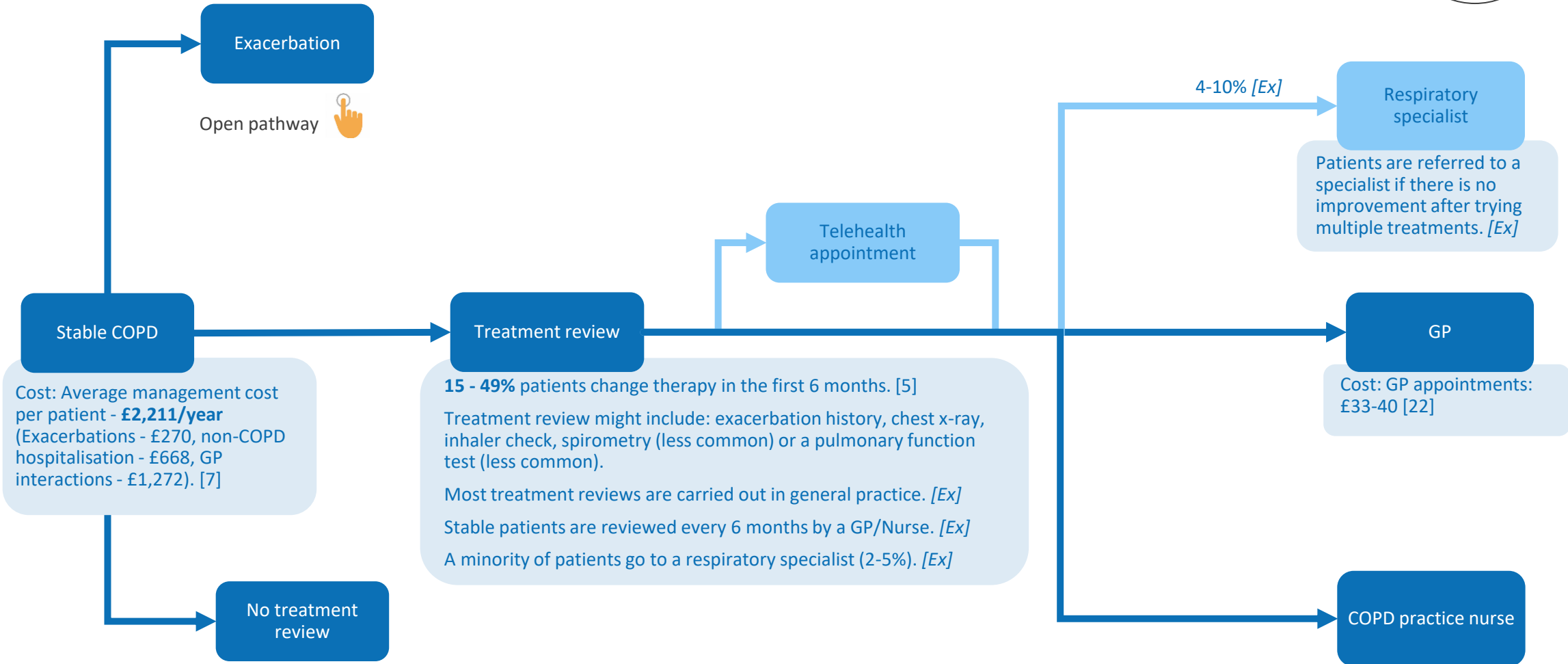




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Management

Stable COPD



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References



GP = General Practitioner



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Exacerbations

Exacerbation

1.43 exacerbations/year per person [3] (No exacerbation: 47% of patients, 2 or more exacerbations/year – 30%) [6]

60% of exacerbations are triggered by viral respiratory infections. [38]

Cost: Average cost of all exacerbations per patient - **£270/year**. [7]

Open pathway 

Presentation to healthcare

Primary care physician

Alternative treatment (e.g., antibiotics)

Stay at home

Rescue Pack

Use report at treatment review

Use unreported

Open pathway 

Stable COPD patient

52% [51]

No treatment

There are incentives for primary care to monitor usage. [Ex]
Nurses usually review patients following ≥ 2 rescue packs. [Ex]
Some patients are aware when they need to start a rescue pack, others need to confirm with a clinician. [Ex]

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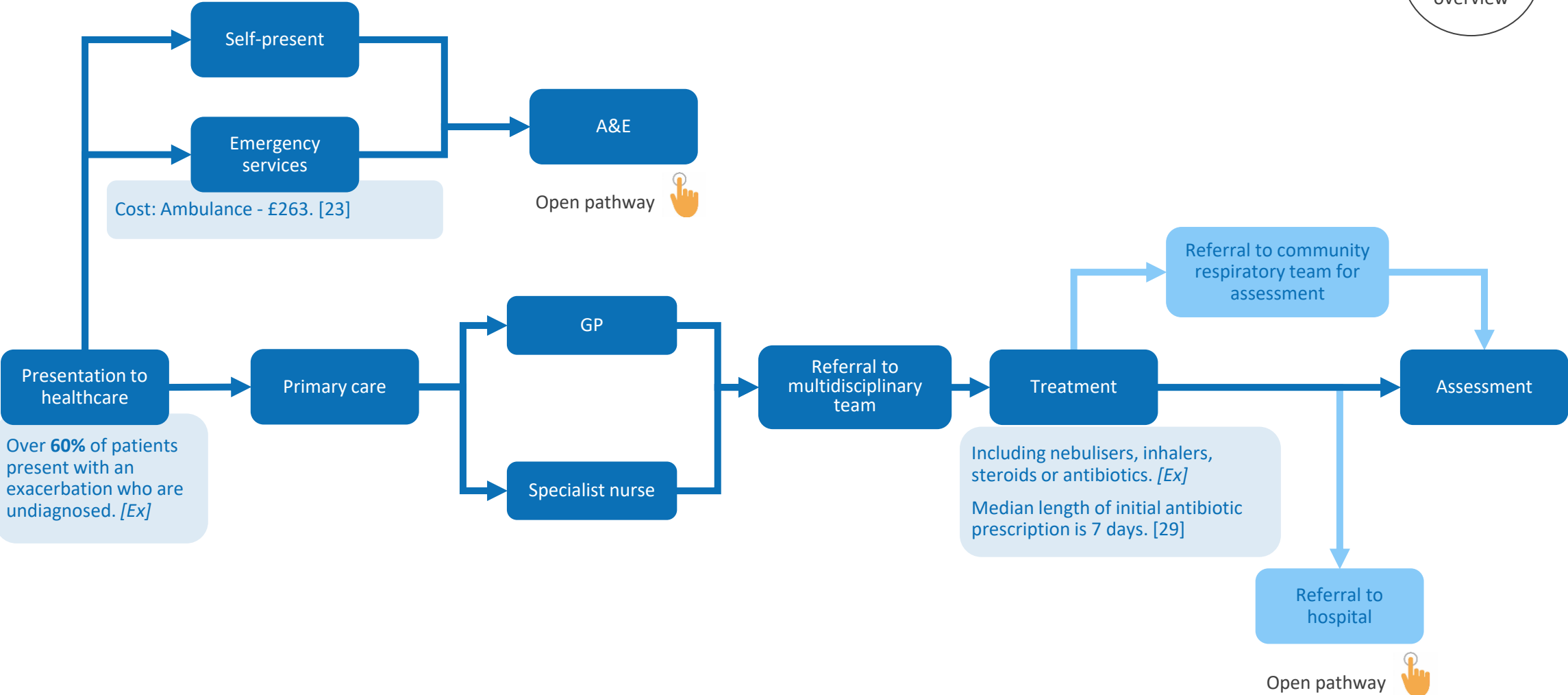




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Management

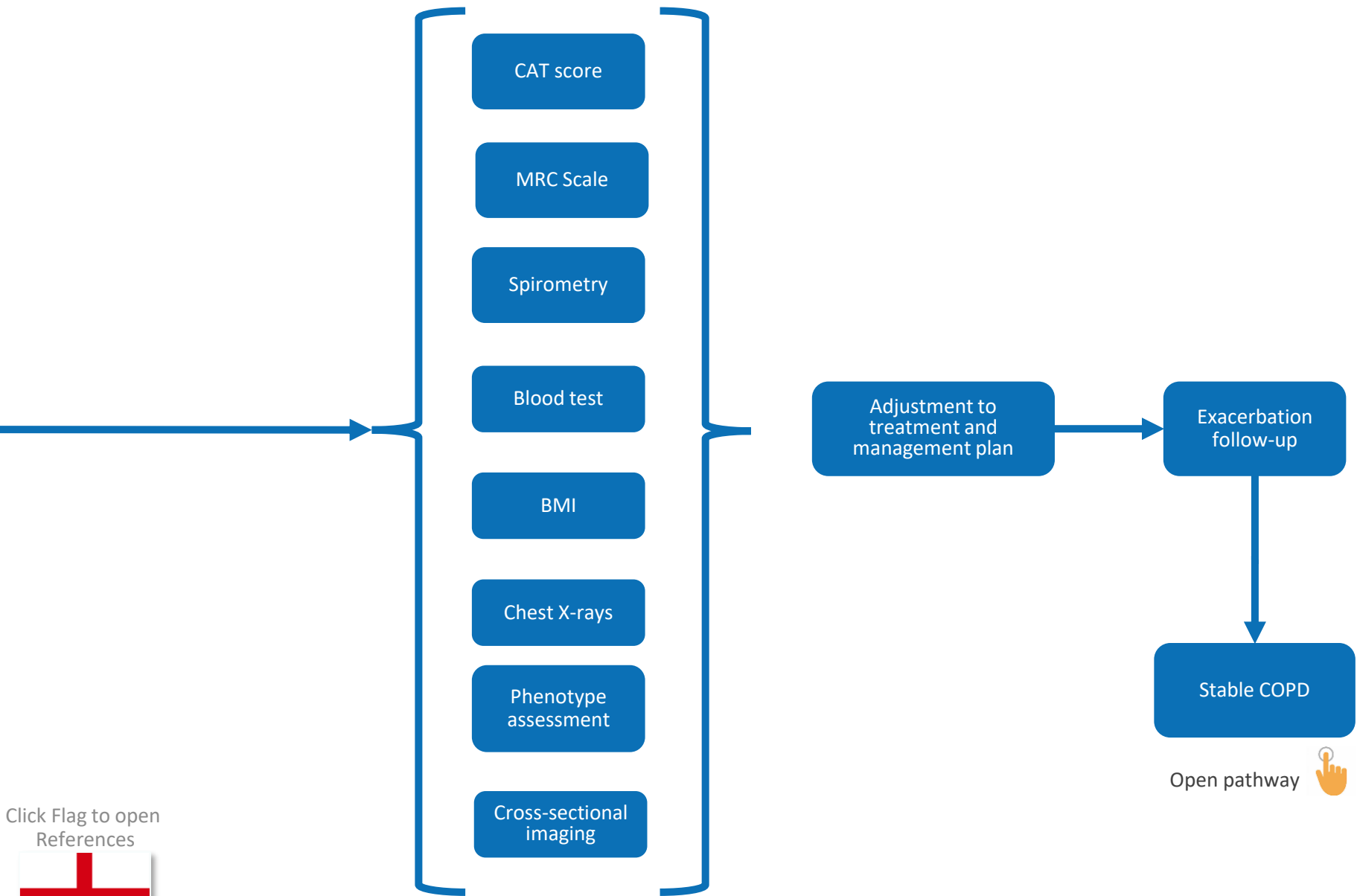
Exacerbations:
presentation to
healthcare



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References



A&E = Accident and Emergency department GP = General Practitioner



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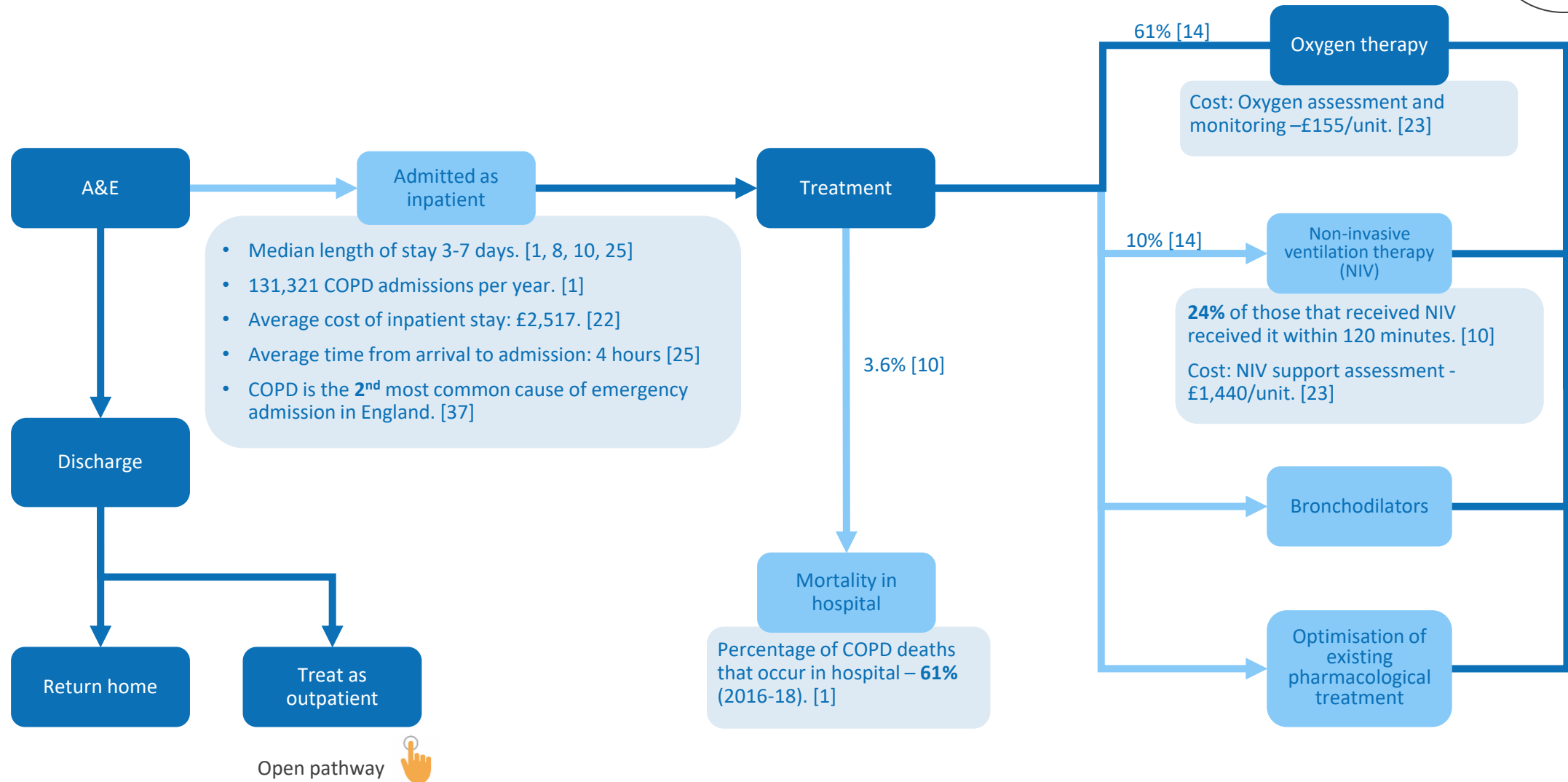




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Management

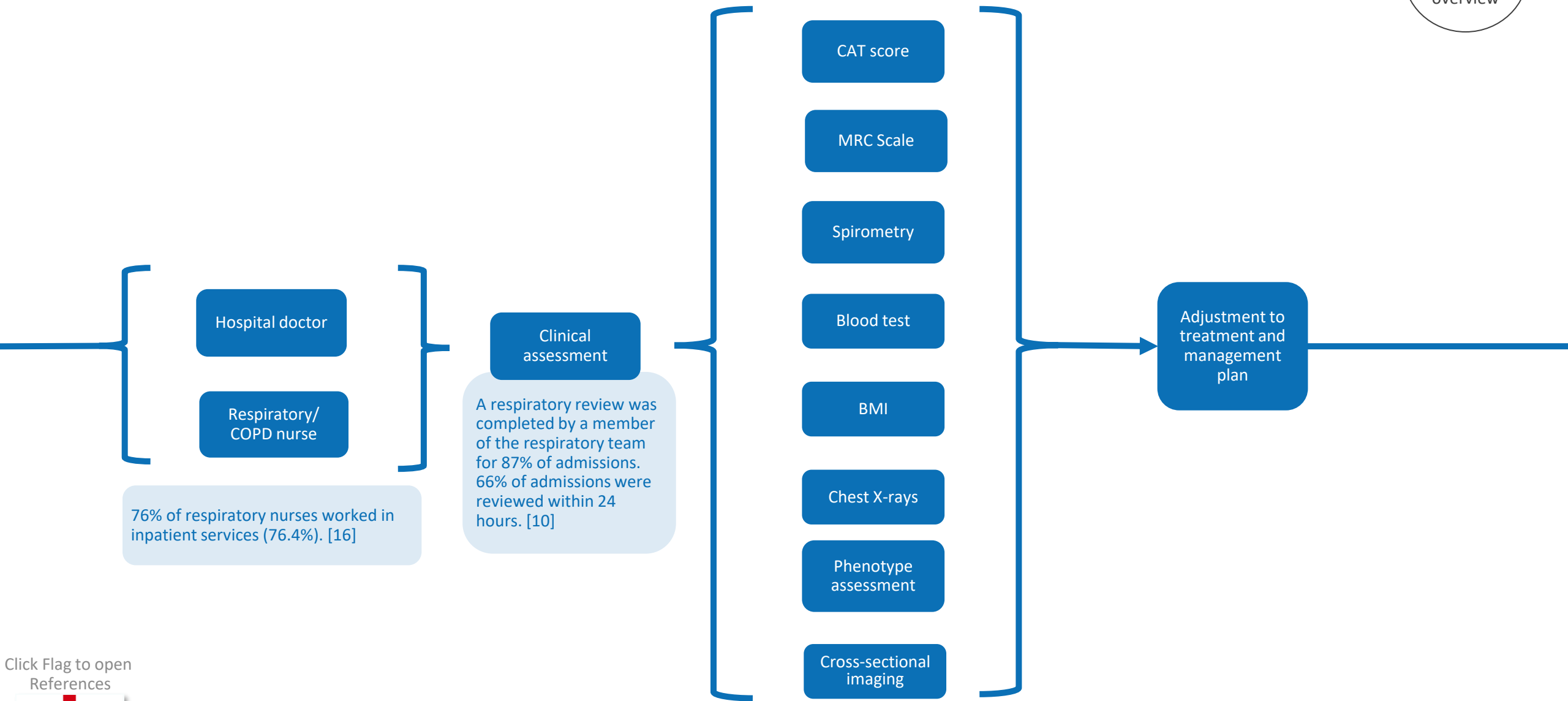
Exacerbations:
A&E and
inpatient
admission



Open pathway

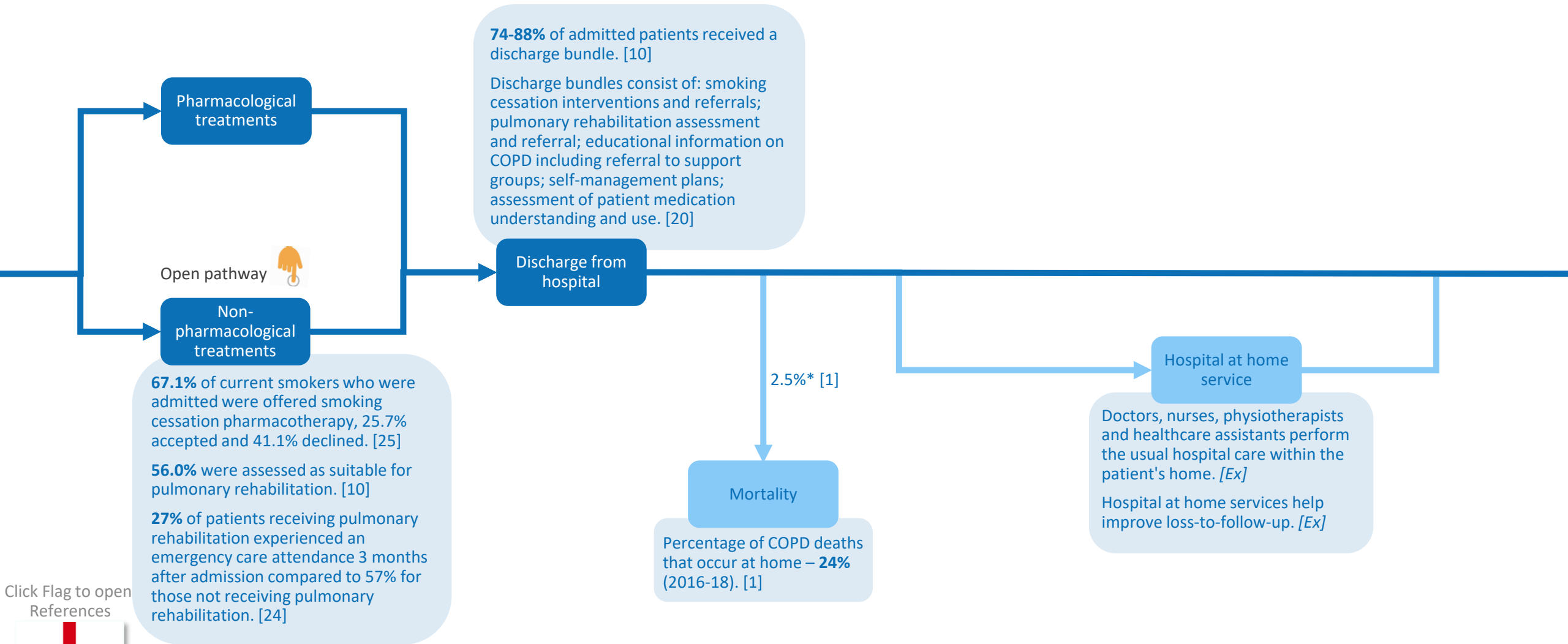
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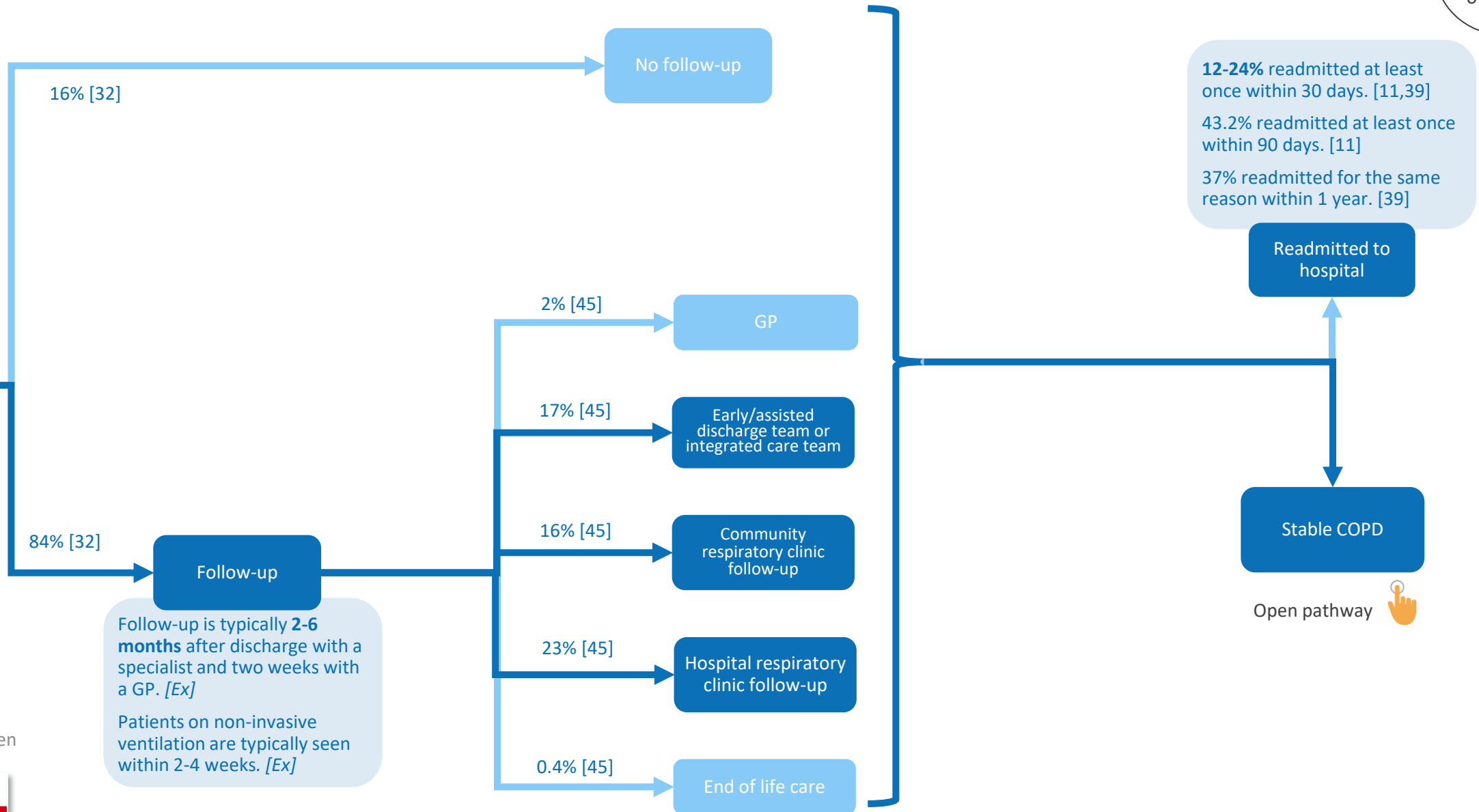




* Within 30 days of emergency hospital admission



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References



GP = General Practitioner

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