



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

July 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.

Meiwald A, Gara-Adams R, Rowlandson A, Ma Y, Watz H, Ichinose M, Scullion J, Wilkinson T, Bhutani M, Weston G, Adams EJ.
Qualitative Validation of COPD Evidenced Care Pathways in Japan, Canada, England, and Germany: Common Barriers to Optimal COPD Care.
Int J Chron Obstruct Pulmon Dis. 2022;17:1507-1521. <https://doi.org/10.2147/COPD.S360983>

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Instructions for use



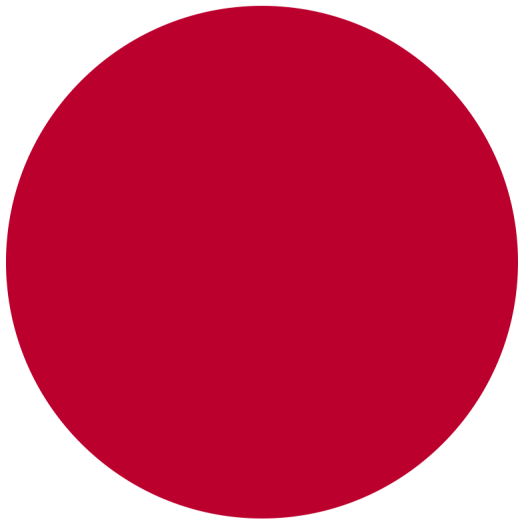
Evidenced Care Pathways for COPD

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



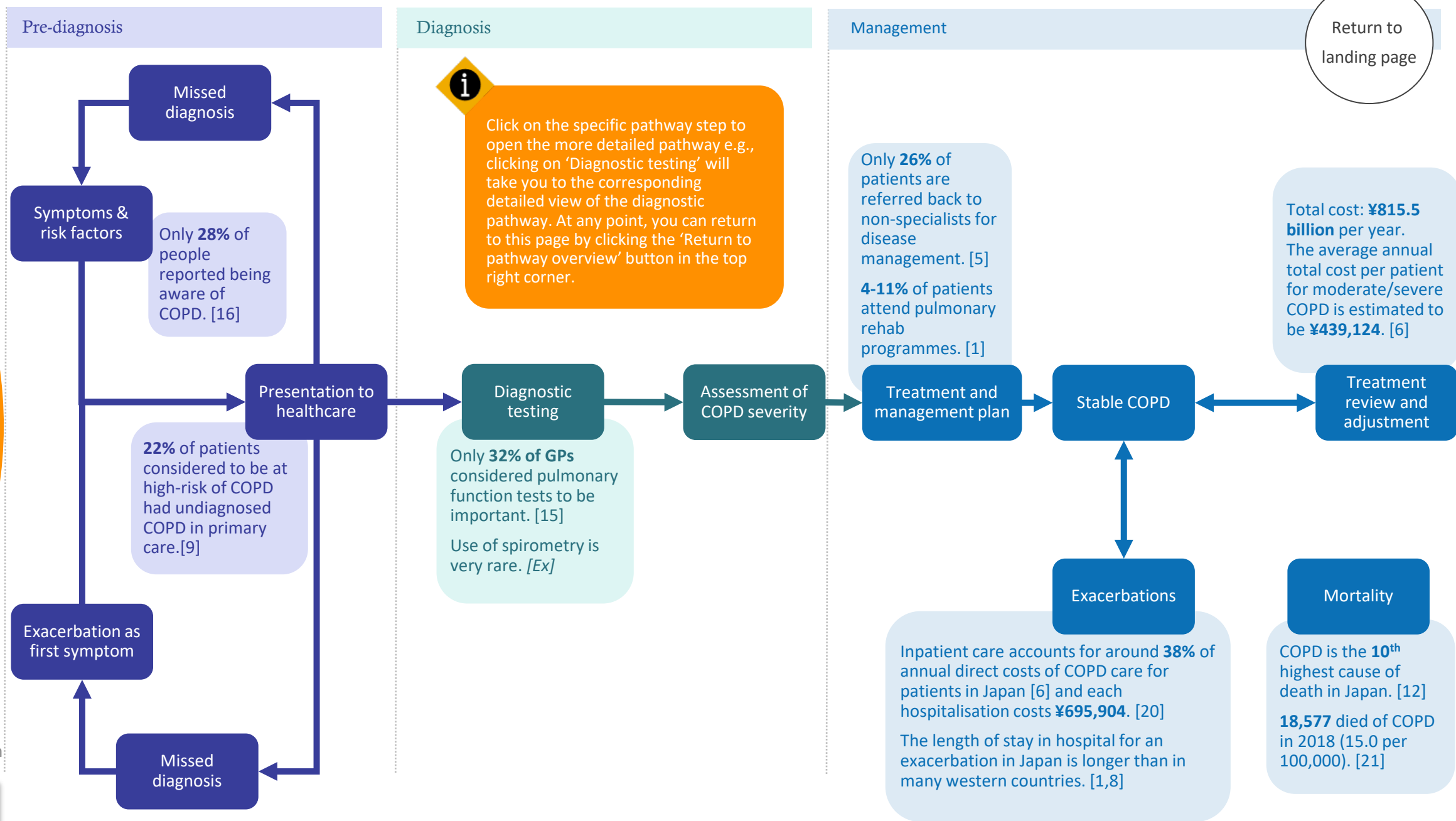
Click on the country
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Japan

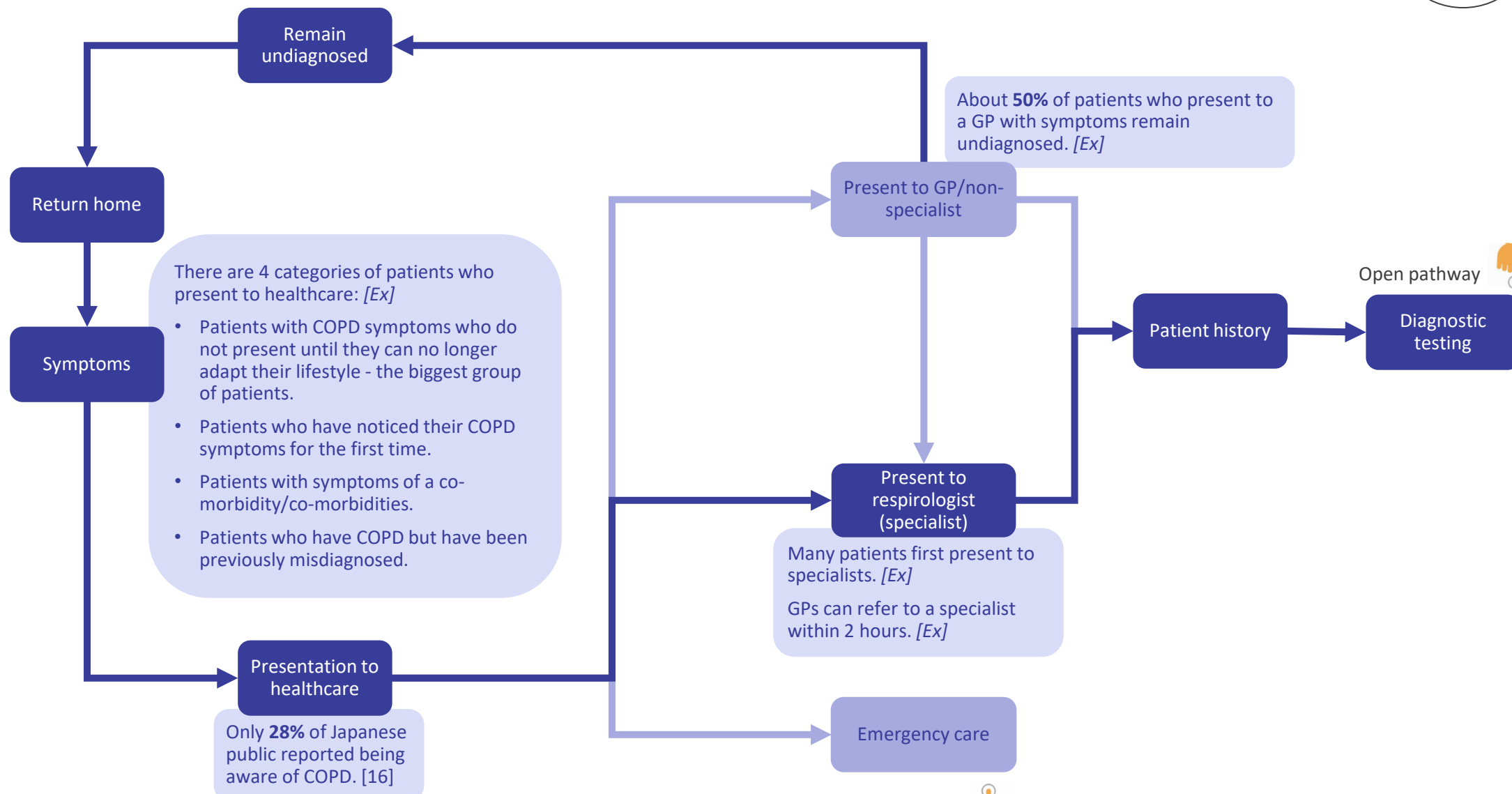
Germany

Pathway overview

Click Flag to open References



Presentation to healthcare

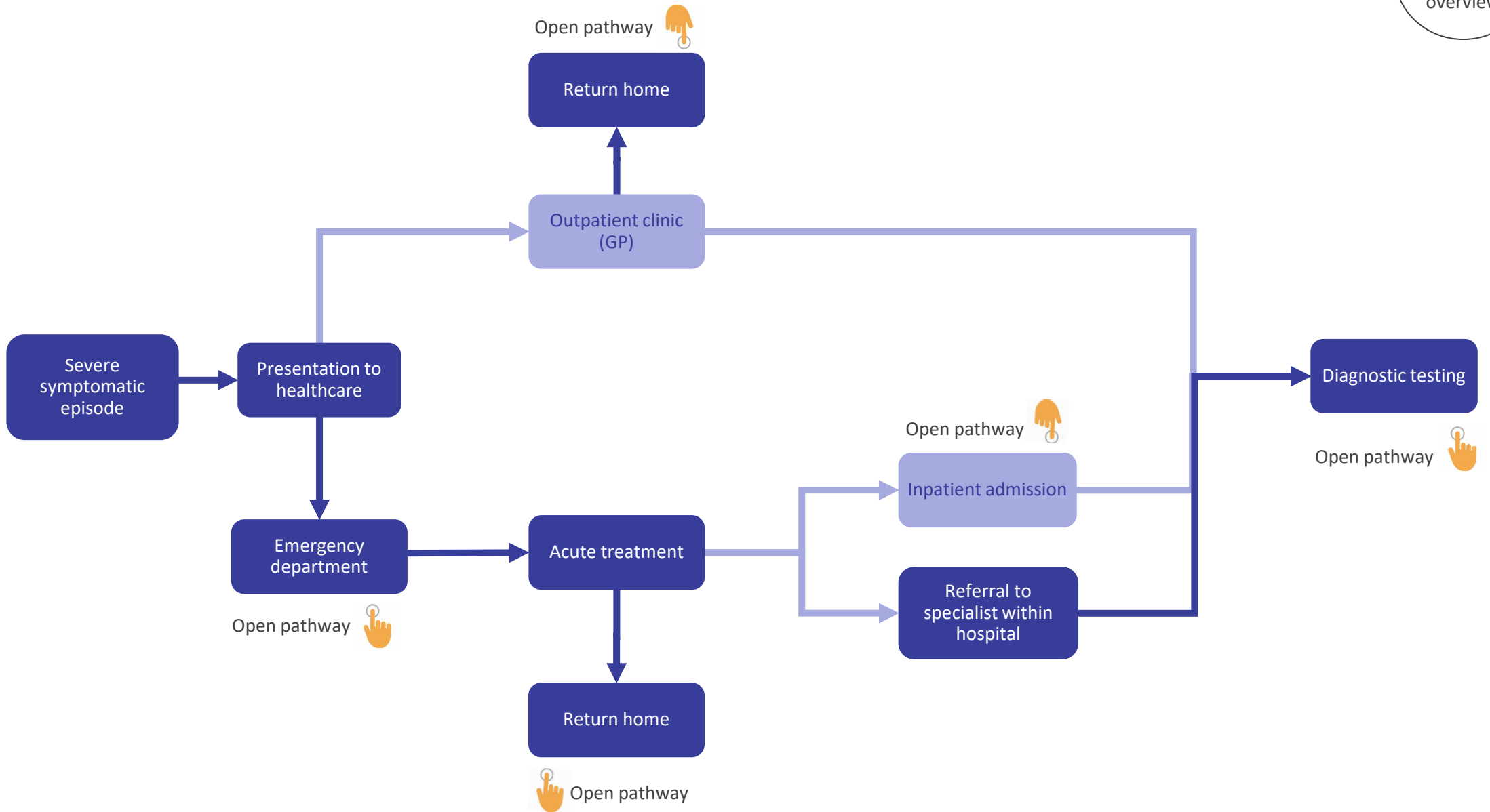


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References





Presentation
to healthcare:
emergency
care



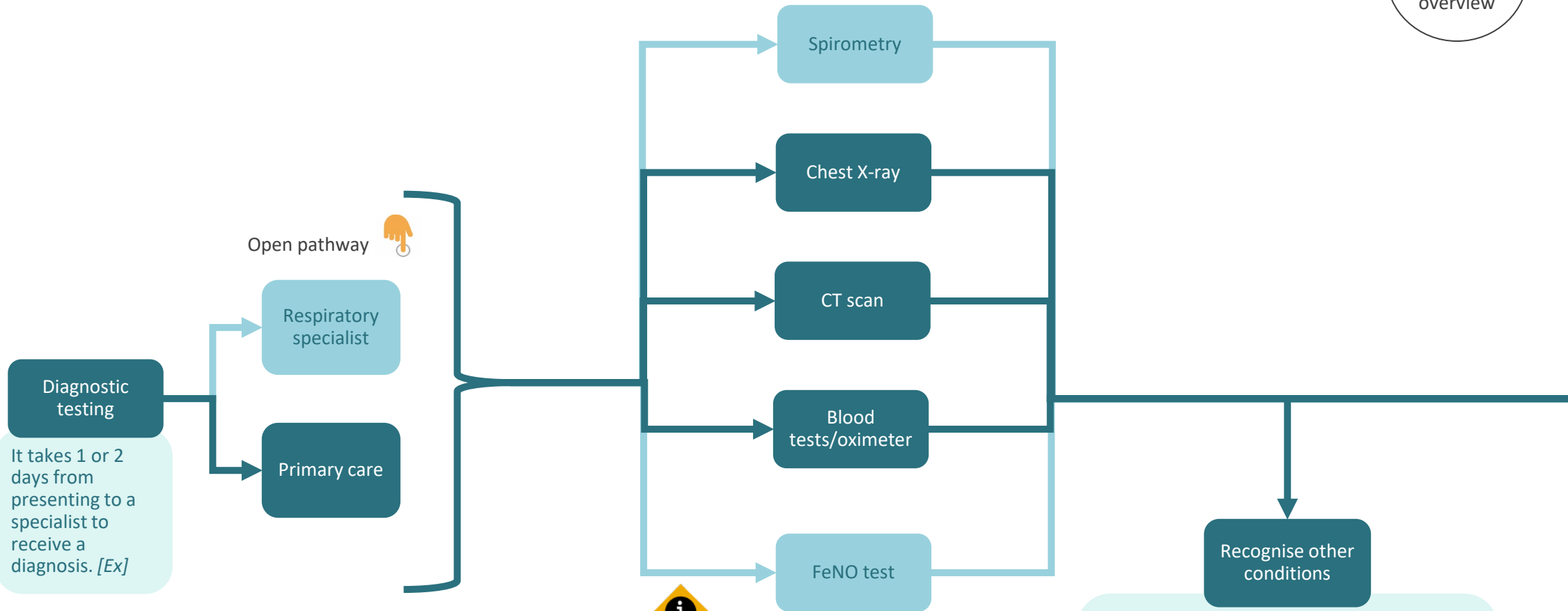
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References





Diagnosis

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:

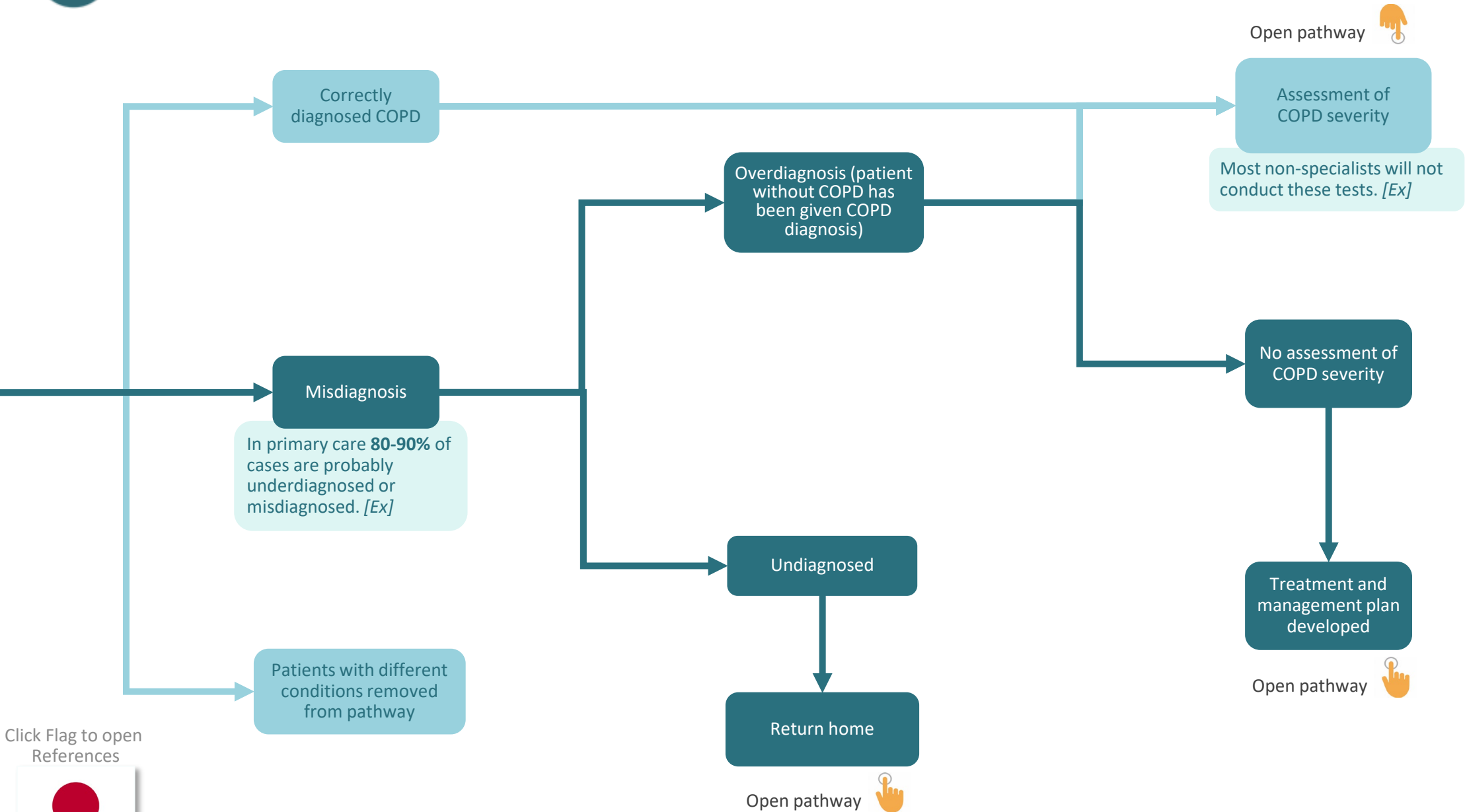
Hypertension: 25-45% [1]
Cardiovascular comorbidities: 16-22% [13]
Osteoporosis (male): 18-39% [13]
Asthma: 15-20% [1]
Diabetes: 4-15% [13]
Lung cancer: 6% [13]

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References





Return
to pathway
overview



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References



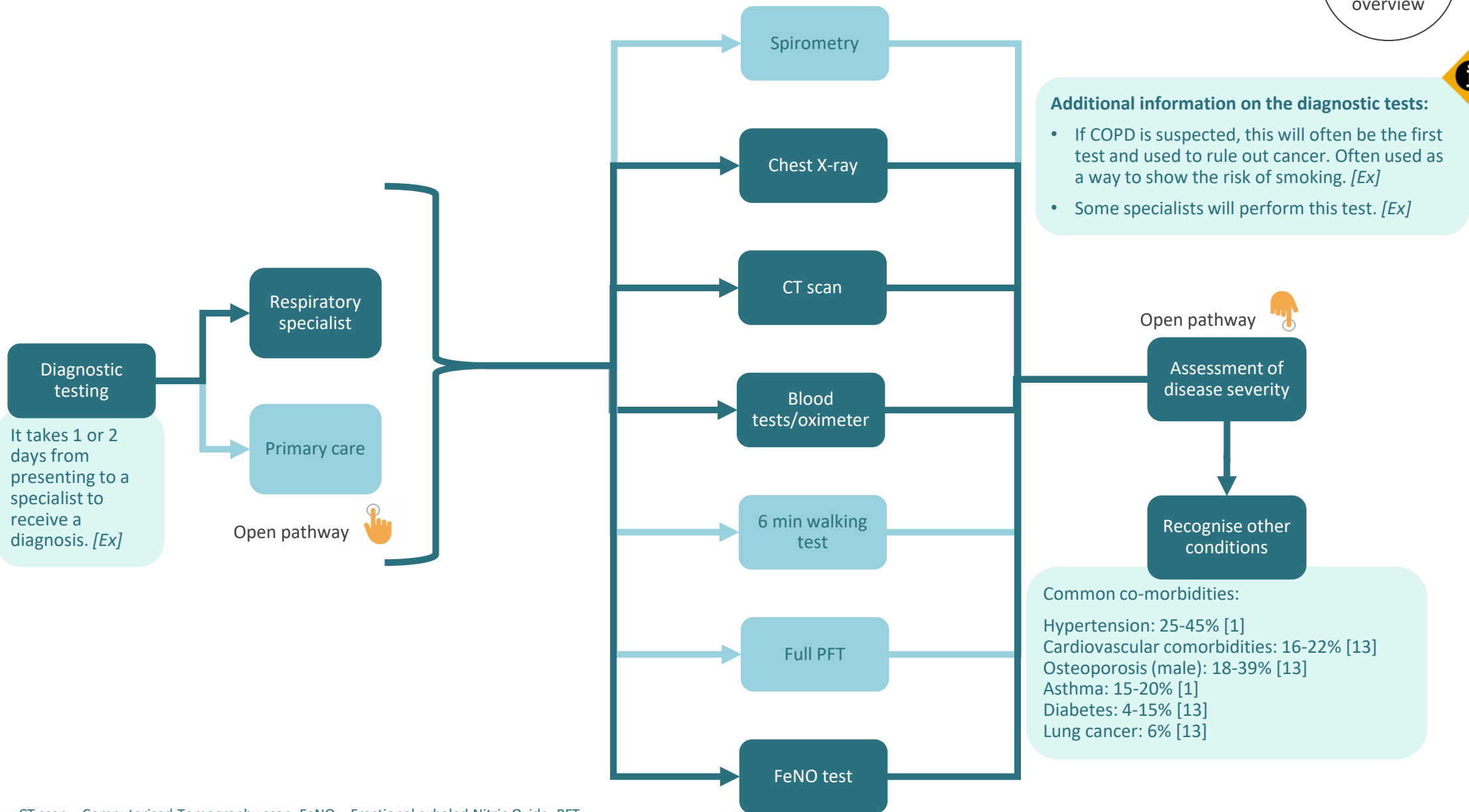
GP =General Practitioner



Return
to pathway
overview



Diagnostic testing: specialist



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References



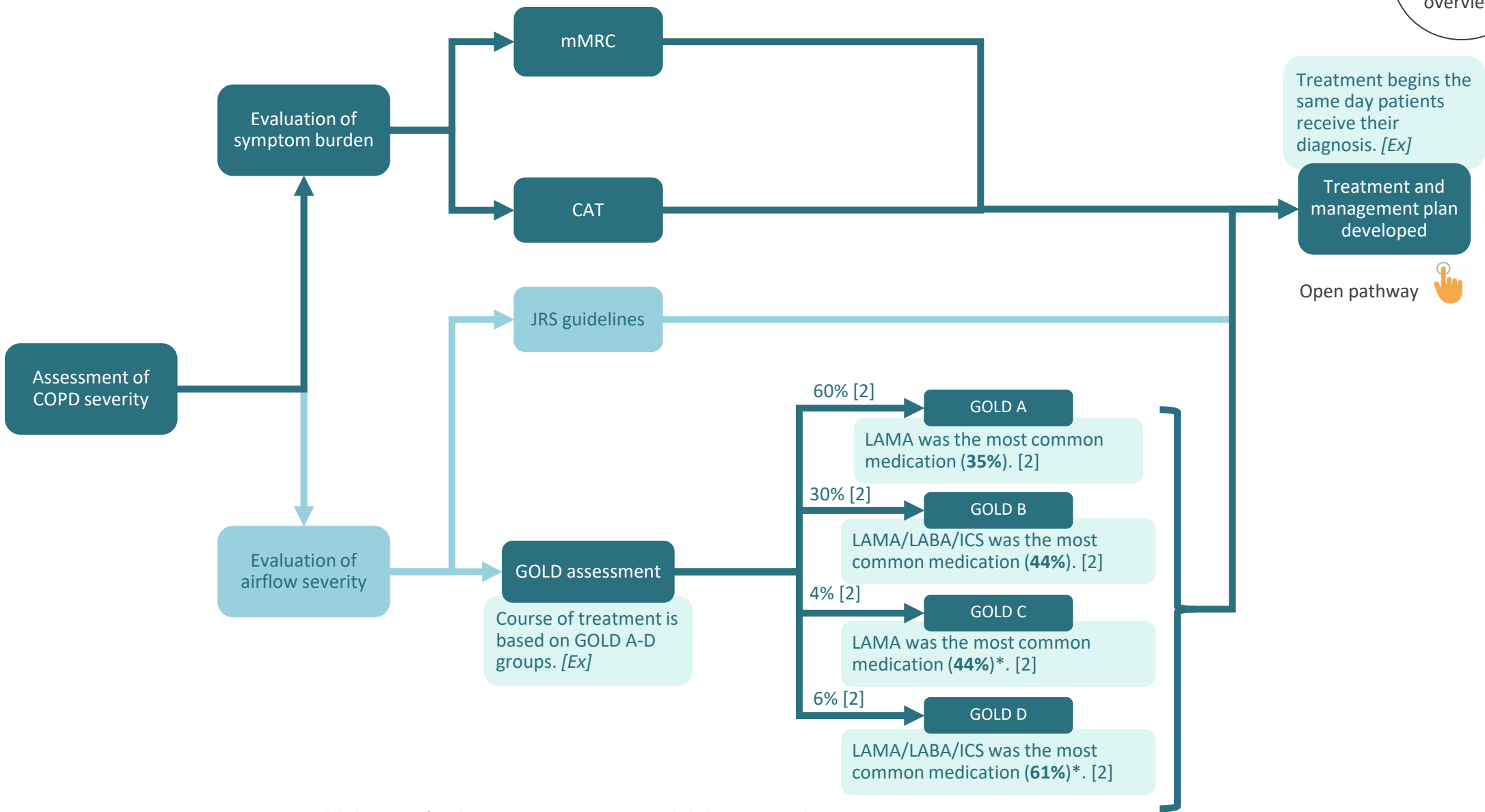
CT scan = Computerised Tomography scan; FeNO = Fractional exhaled Nitric Oxide; PFT = Pulmonary Function Test



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

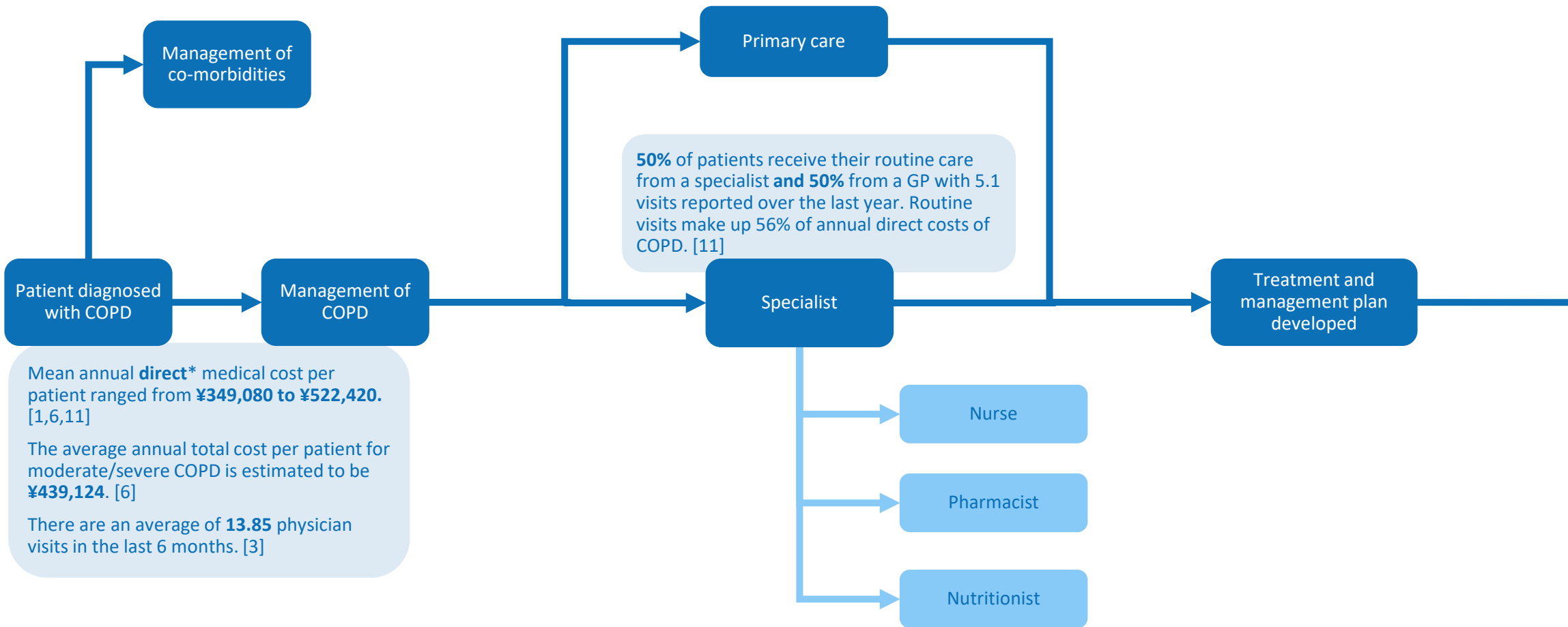
*Sample size was small for GOLD groups C (N=16) and D (N=23)



Return
to pathway
overview

Management

Treatment
and
management
plan

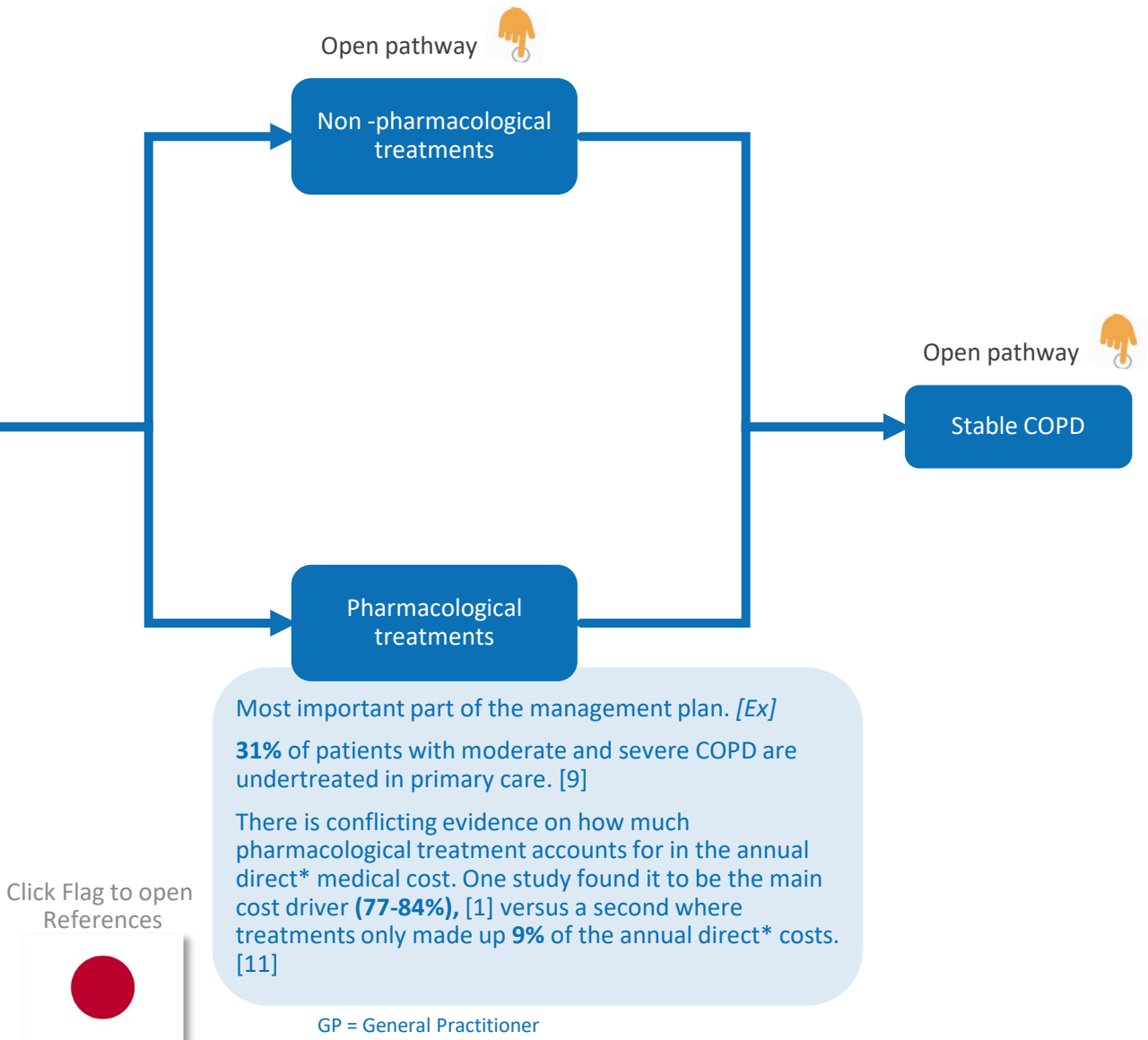


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References



*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

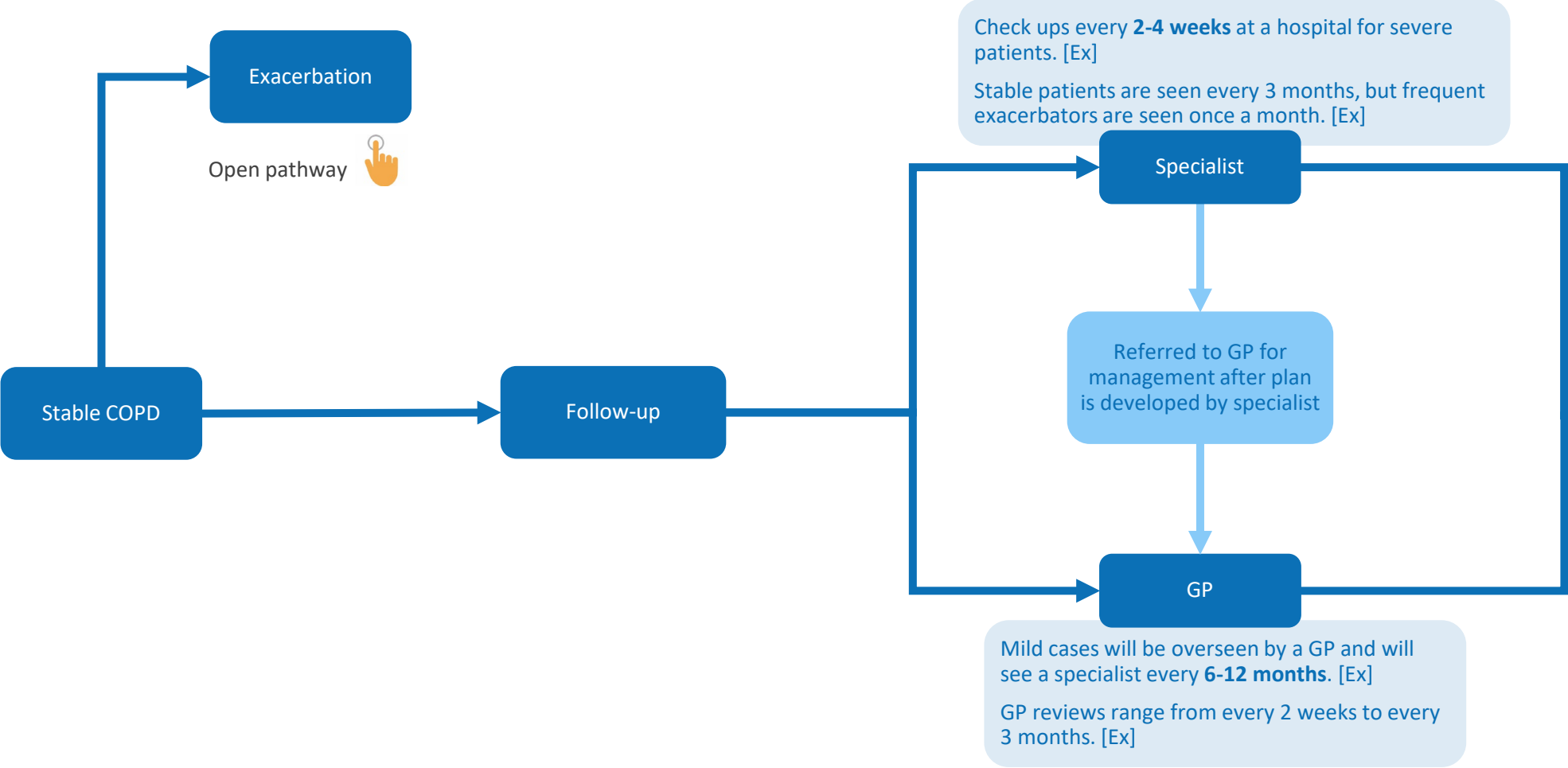




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to pathway
overview

Management

Stable COPD



Exacerbation

Open pathway



Stable COPD

Follow-up

Specialist

Referred to GP for
management after plan
is developed by specialist

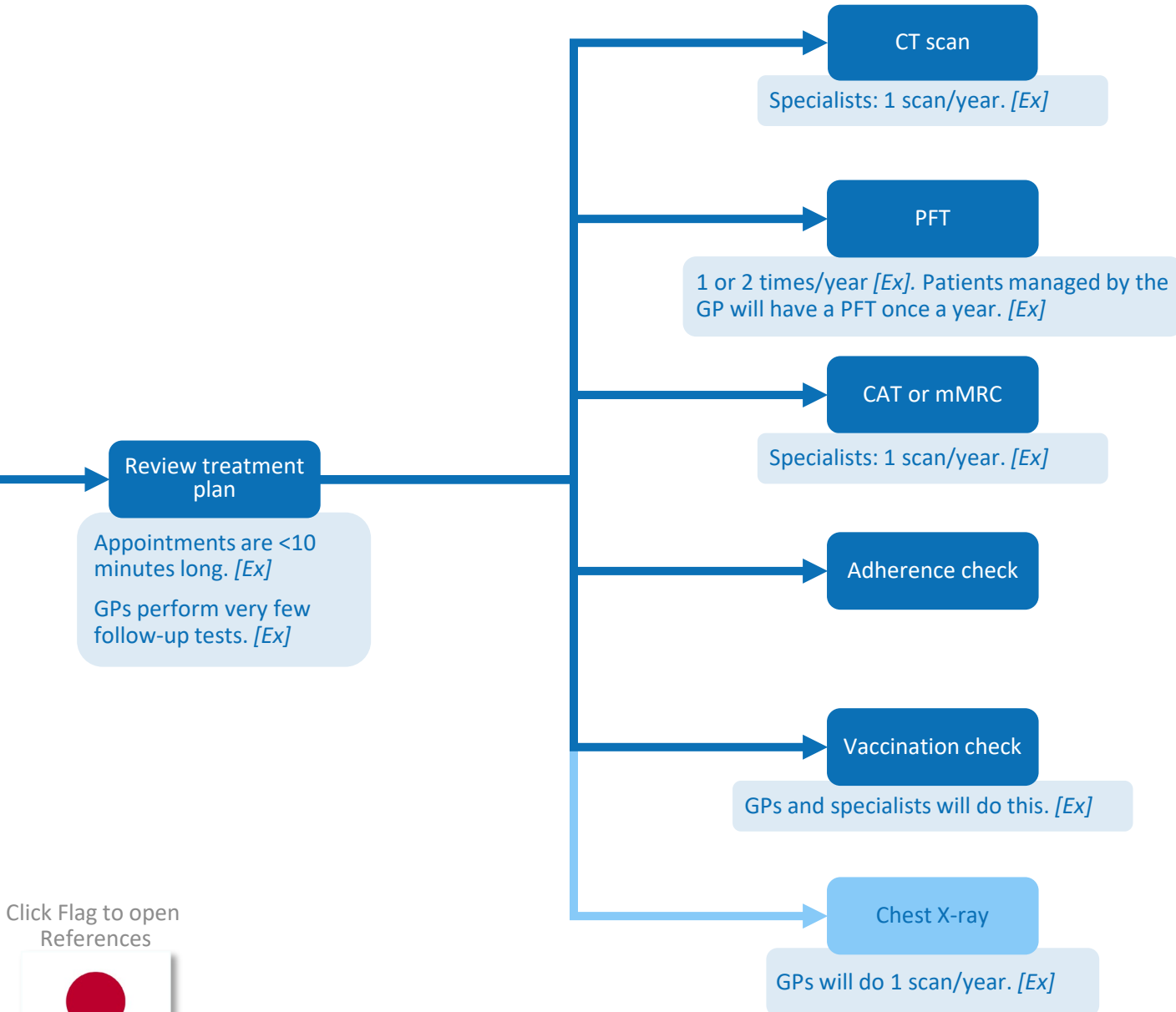
GP

Check ups every **2-4 weeks** at a hospital for severe patients. [Ex]
Stable patients are seen every 3 months, but frequent exacerbators are seen once a month. [Ex]

Mild cases will be overseen by a GP and will see a specialist every **6-12 months**. [Ex]
GP reviews range from every 2 weeks to every 3 months. [Ex]

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References



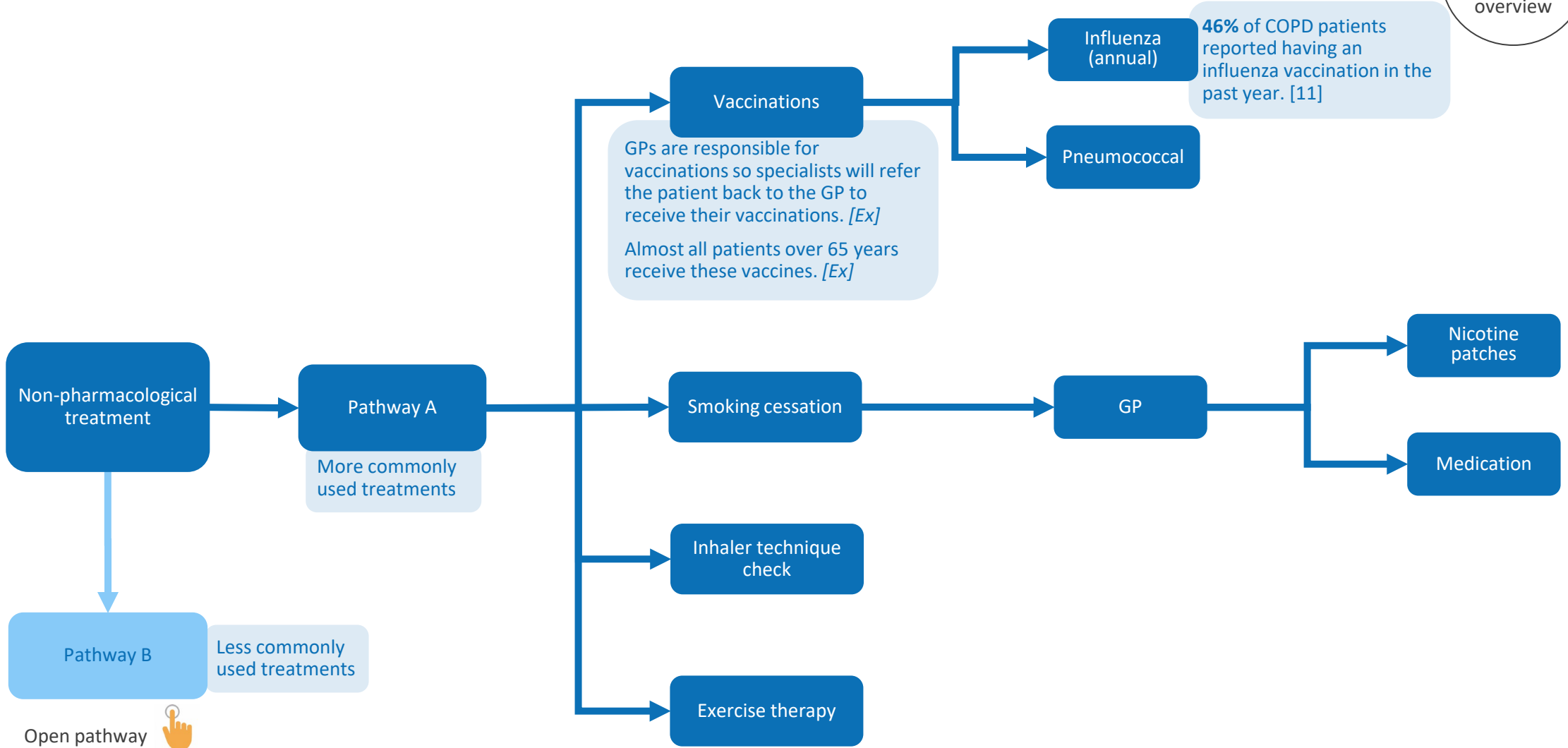


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References





Treatment
and
management
plan: non-
pharma-
cological
treatment



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References



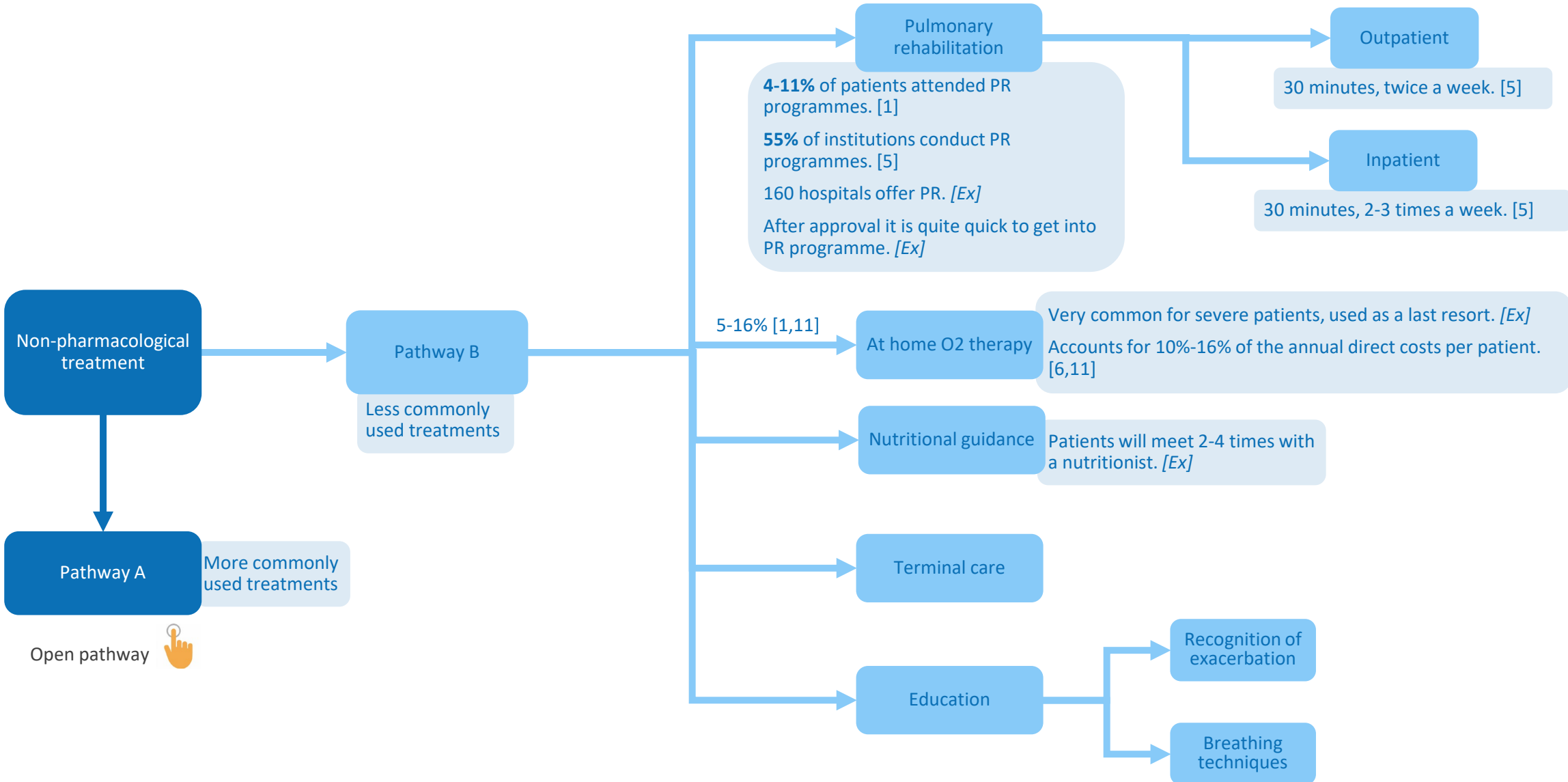
GP = General Practitioner



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Management

Treatment
and
management
plan: non-
pharma-
cological
treatment



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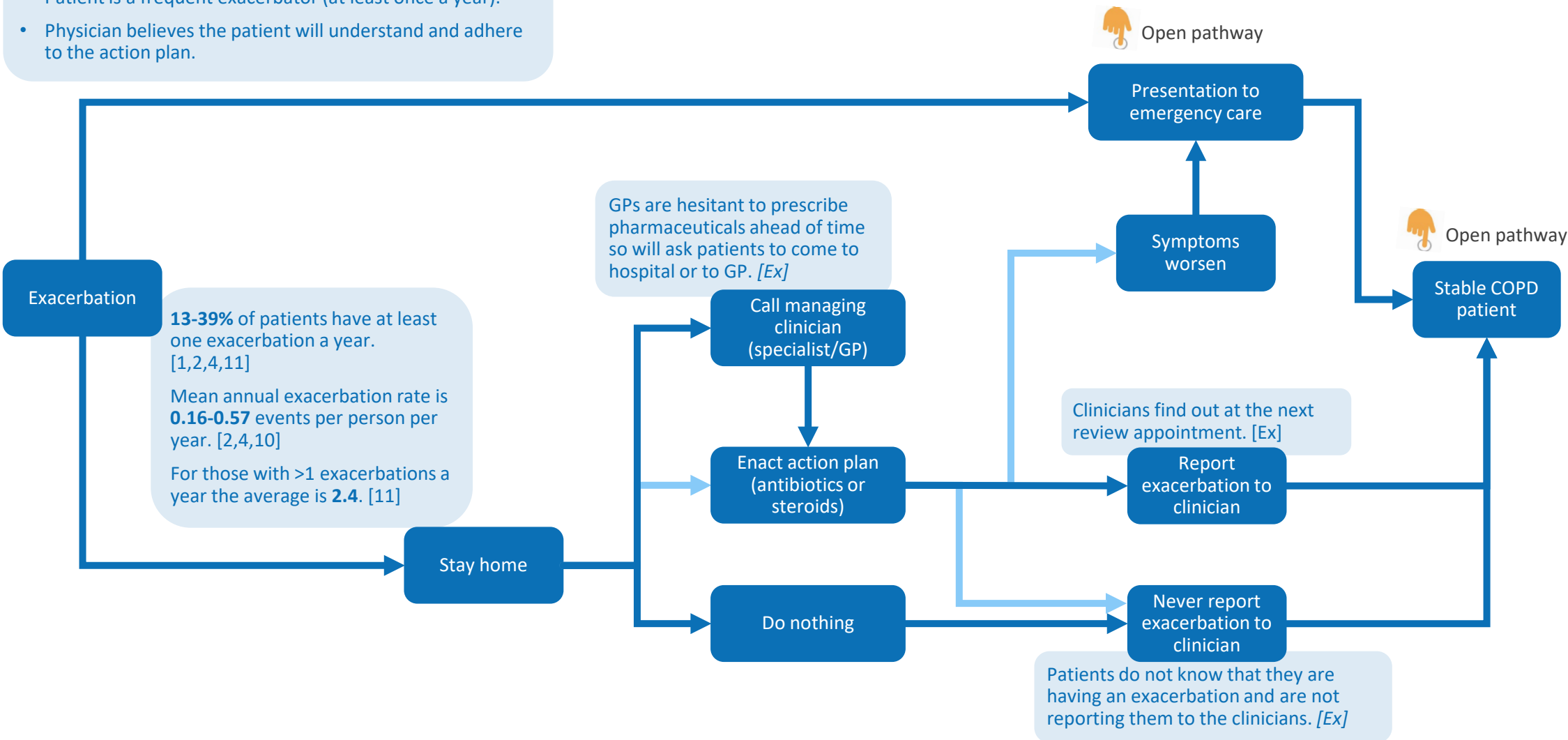
Action plans

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



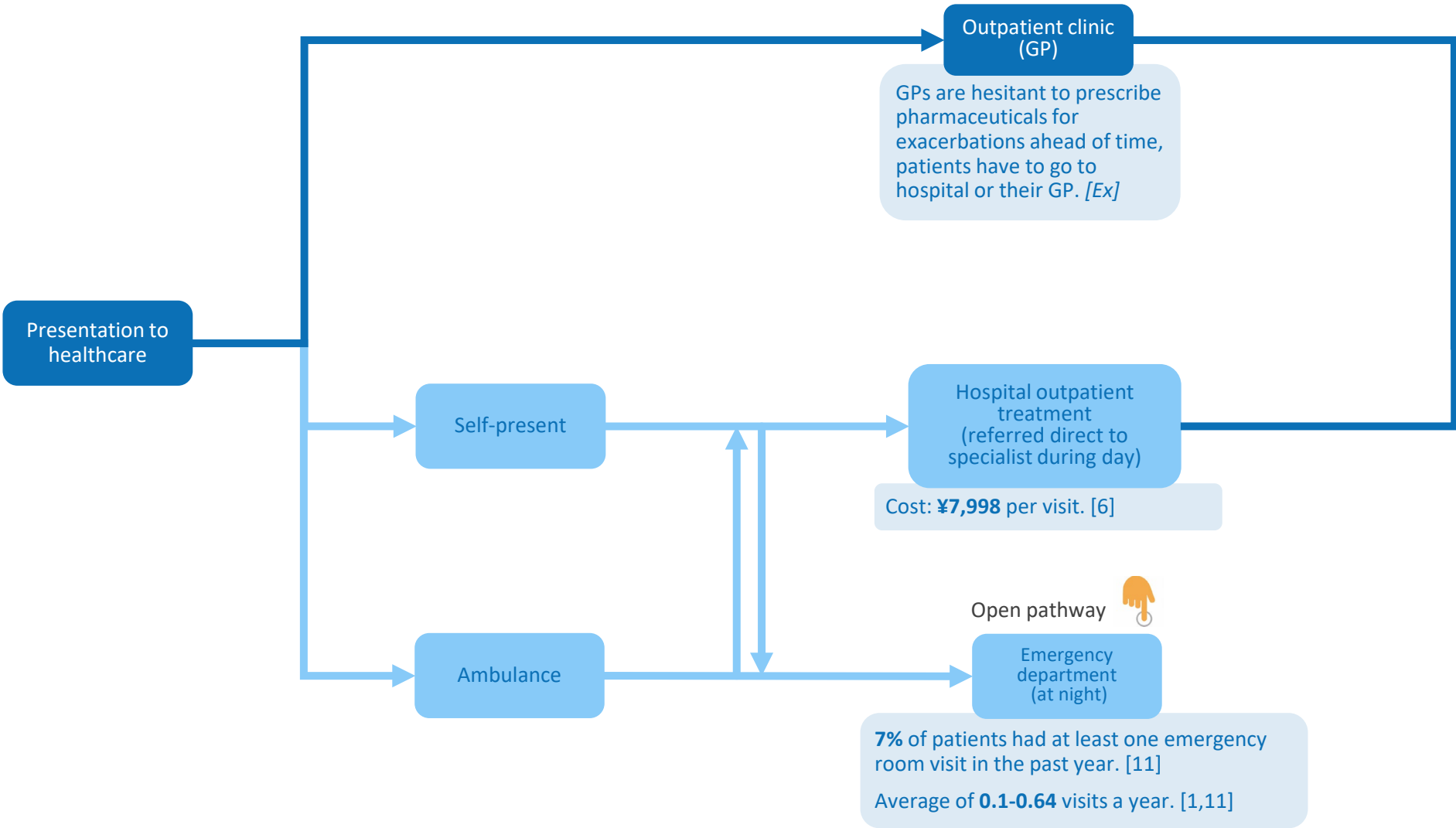
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References





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overview

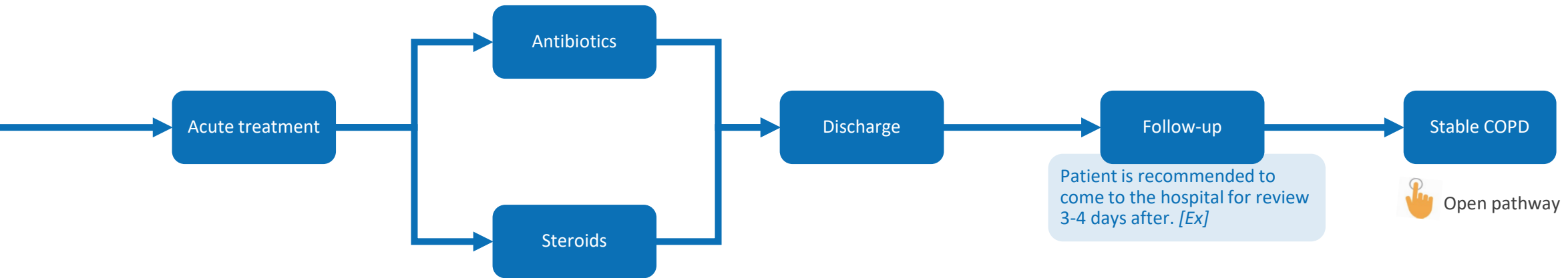
Exacerbations:
presentation to
healthcare



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References



GP = General Practitioner



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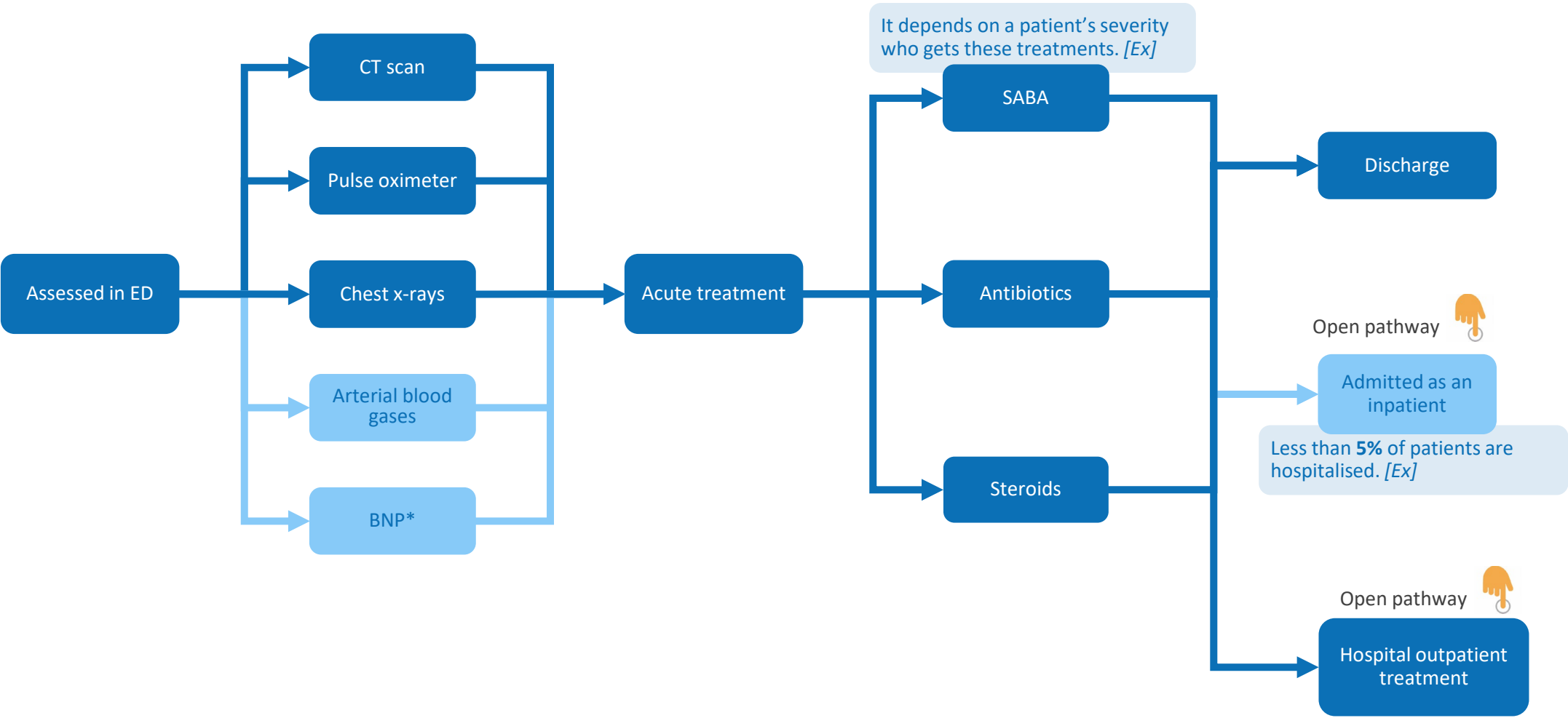




Return
to pathway
overview

Management

Exacerbations:
emergency
department



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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

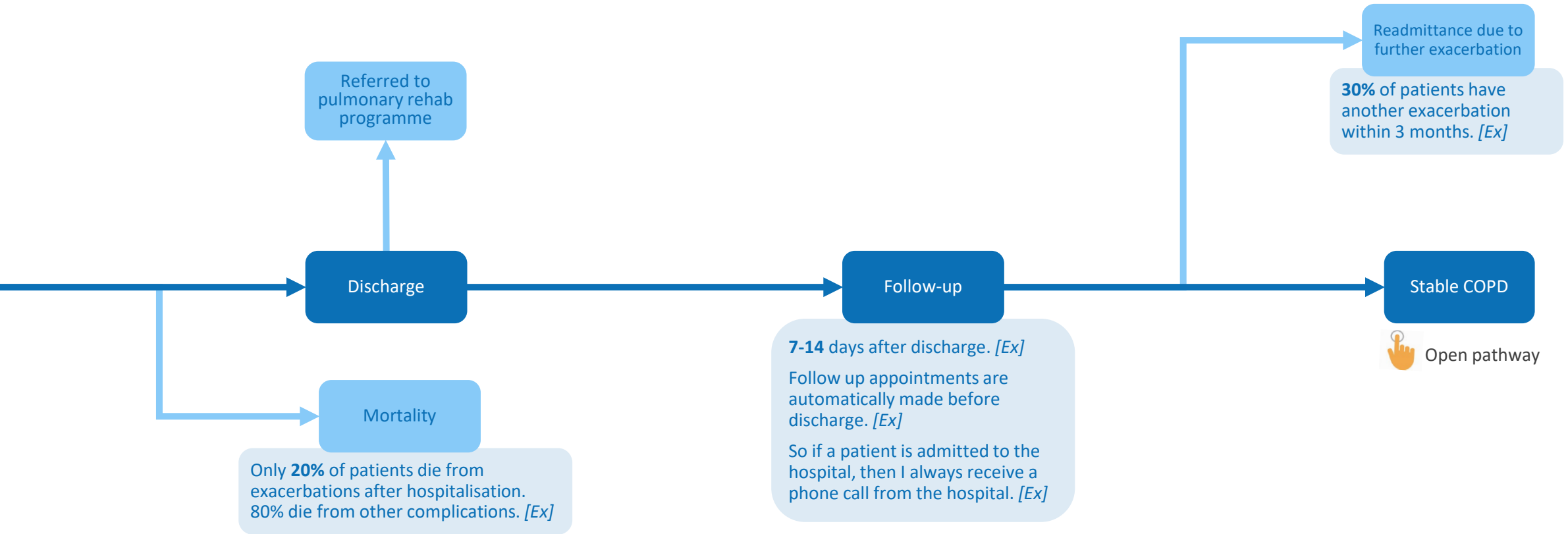
Respiratory
management
(NPPV*)

NPPV dependent on abnormal
arterial blood gas. [Ex]

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References

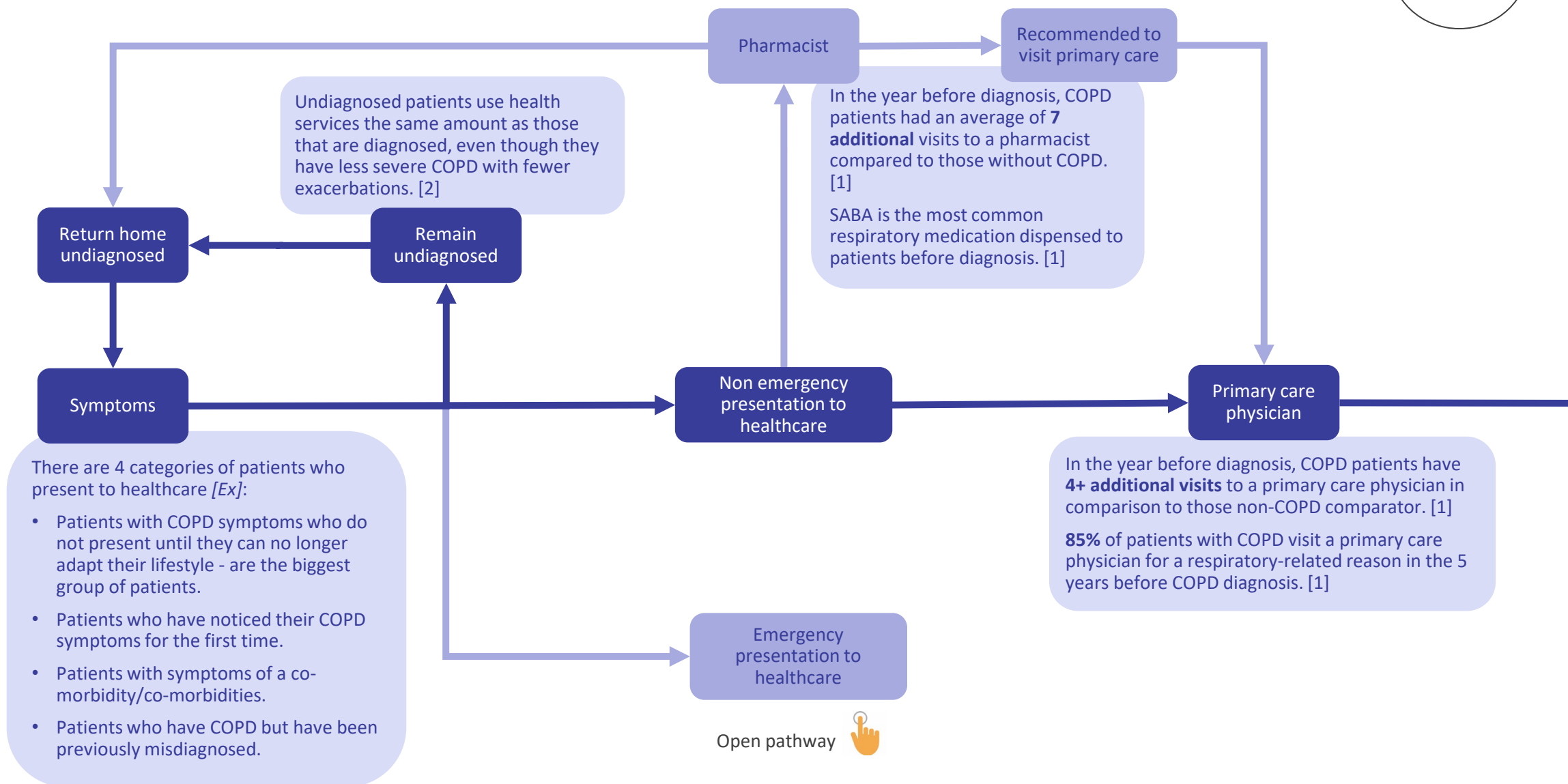


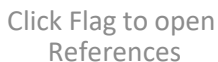
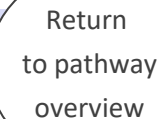
EKG = Electrocardiogram; NPPV = Non-invasive Positive Pressure Ventilation



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References





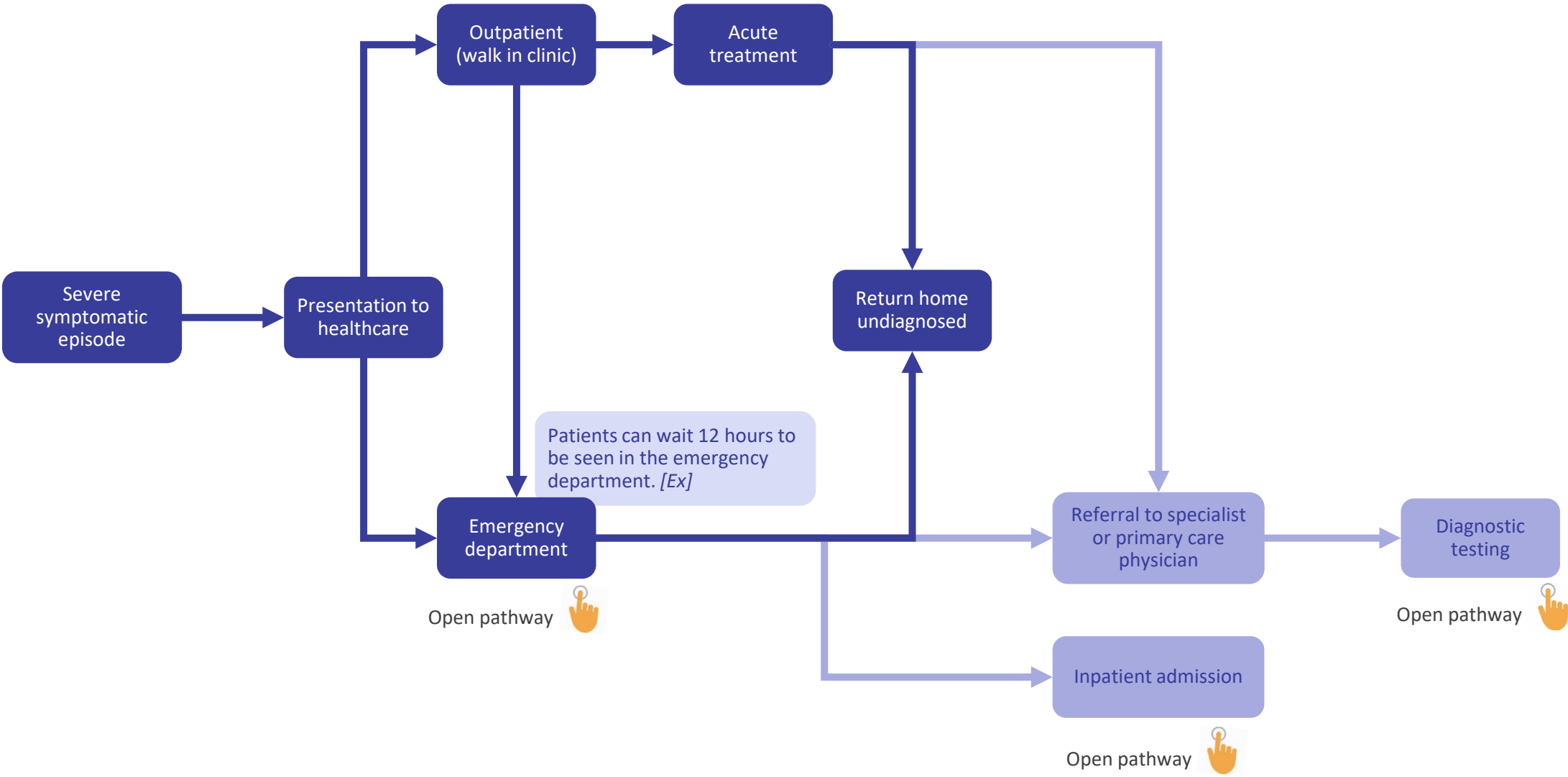




Return
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Pre-diagnosis

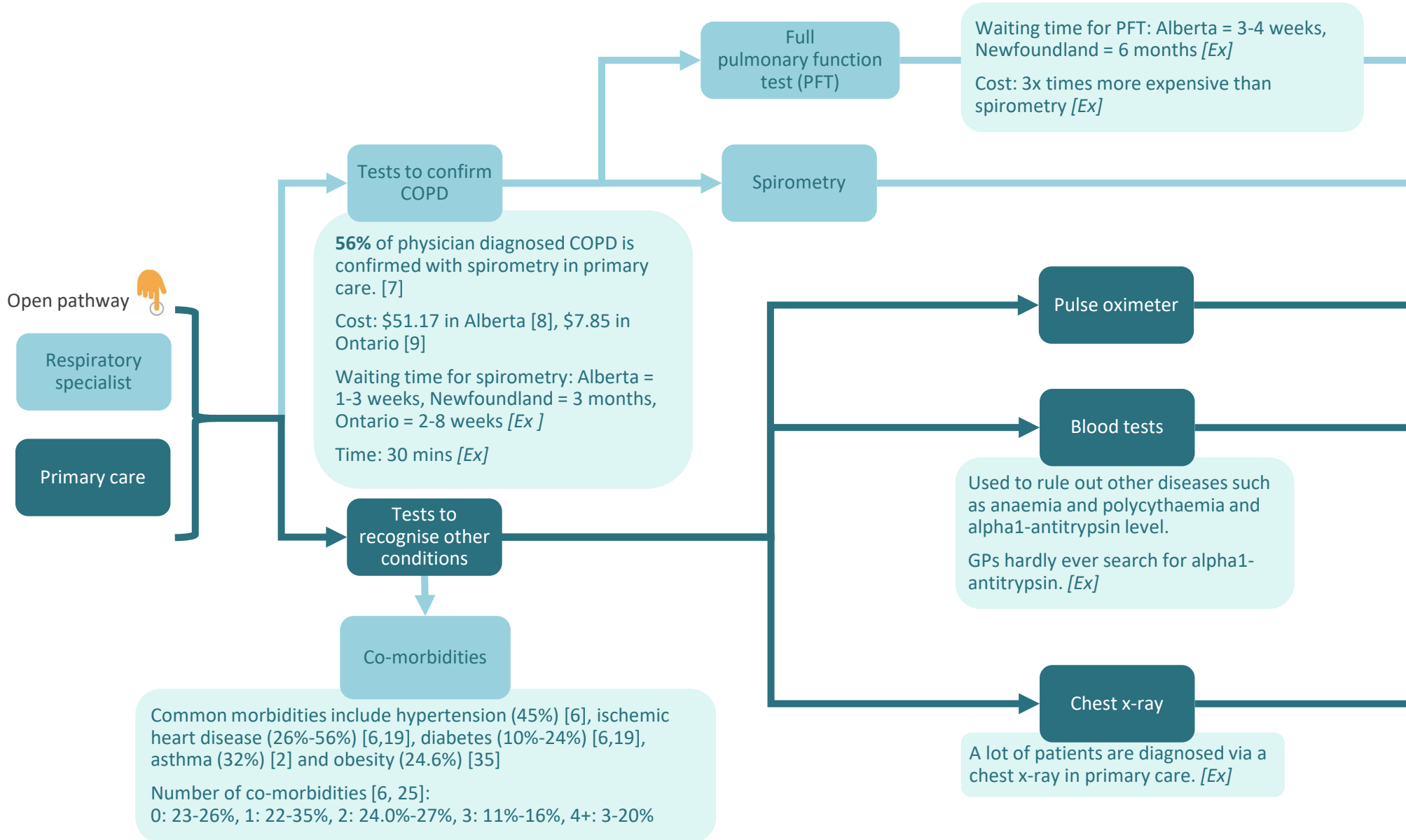
Presentation
to healthcare:
emergency
care



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References



Diagnosis



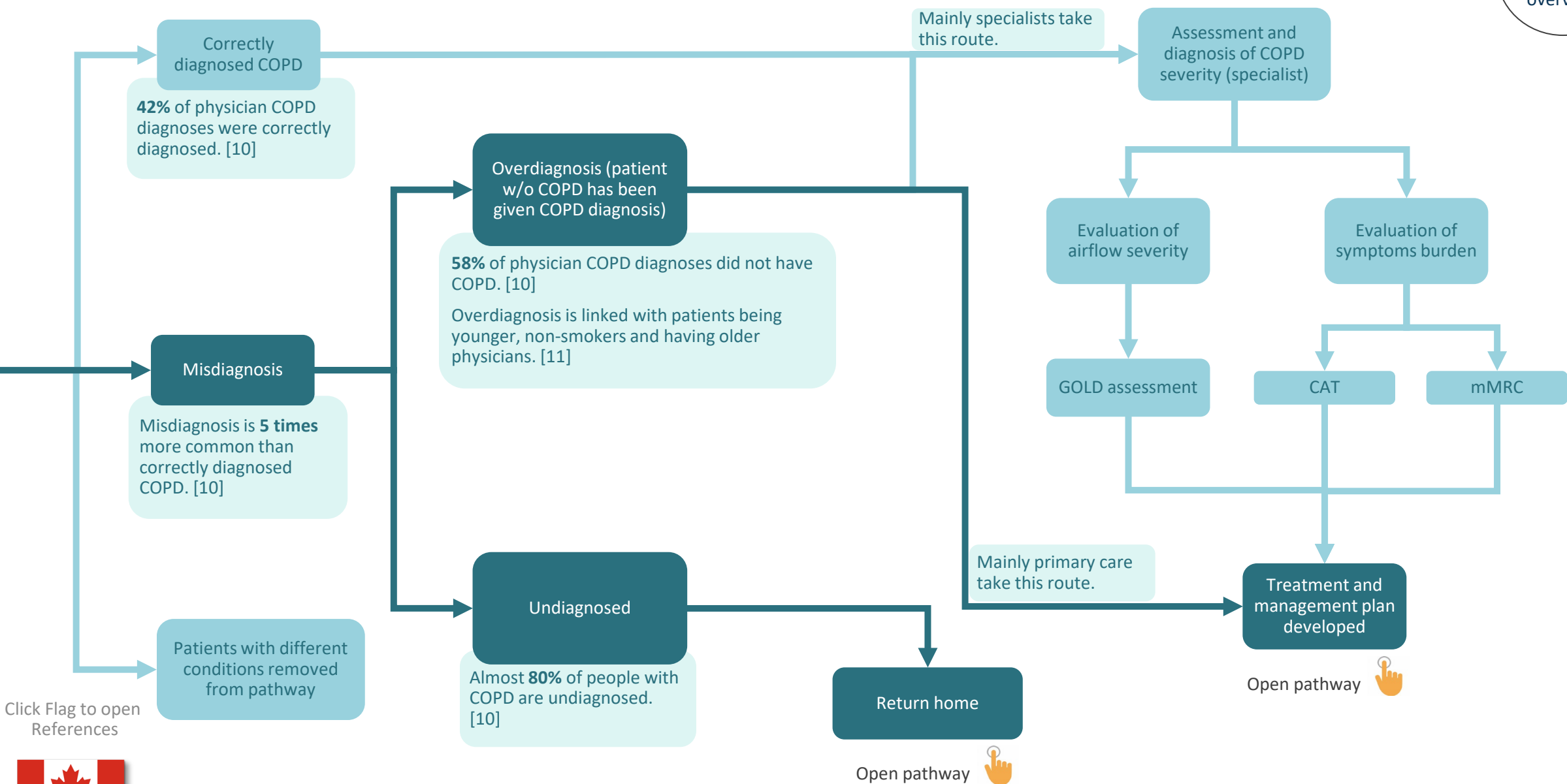
Diagnostic
testing:
primary
care

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References





Return
to pathway
overview



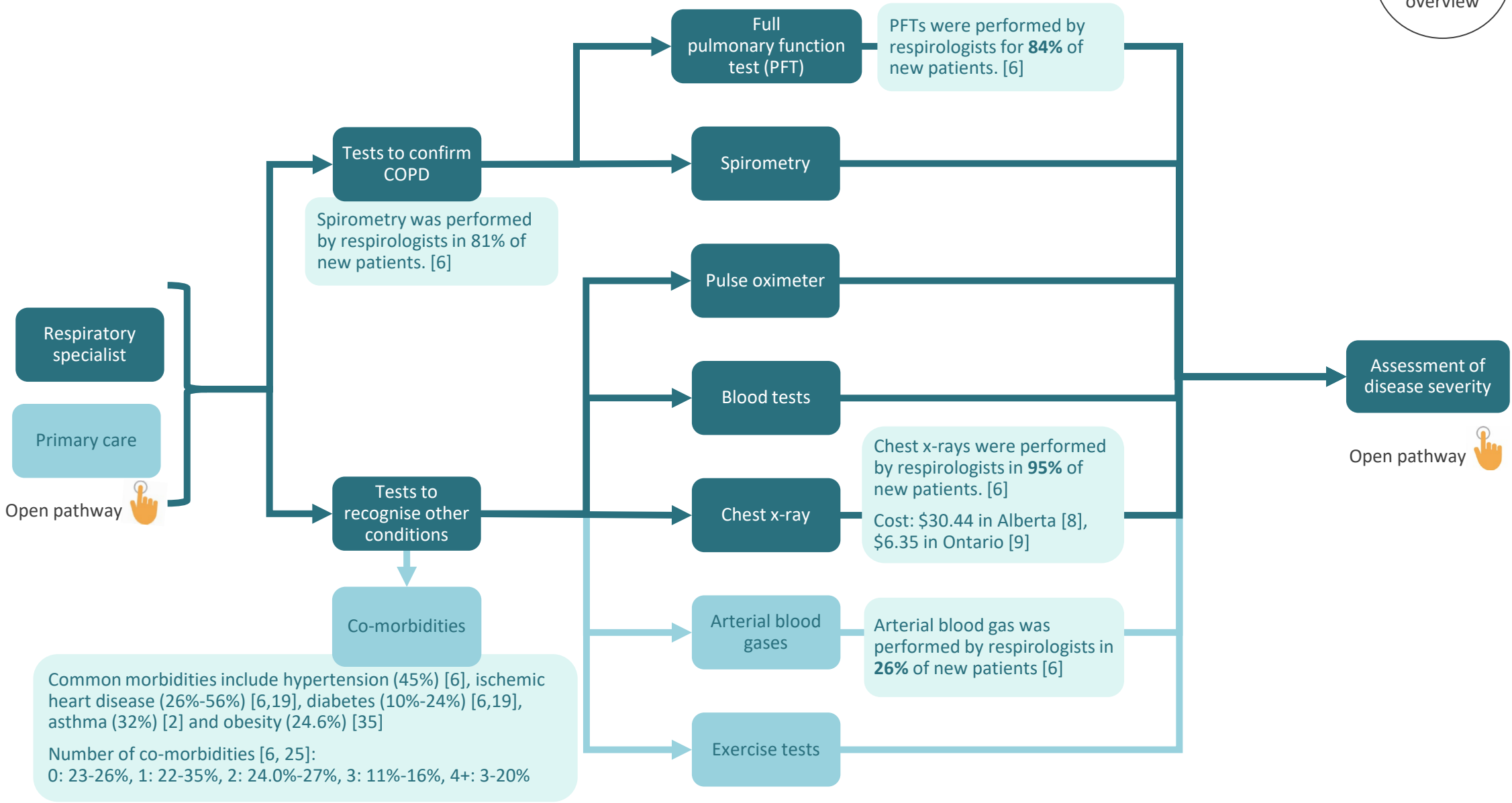
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References



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



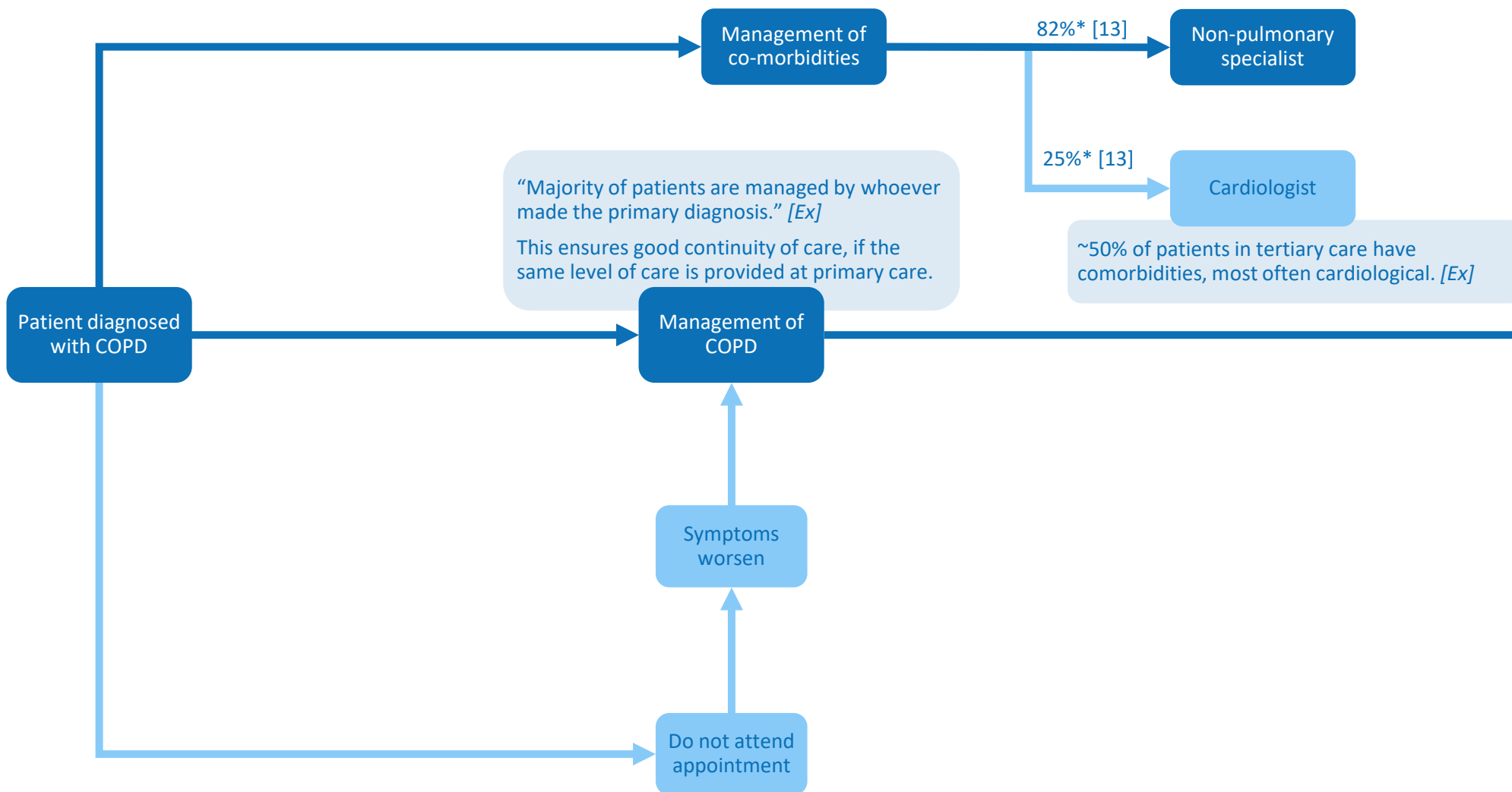
Diagnostic
testing:
specialist



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References

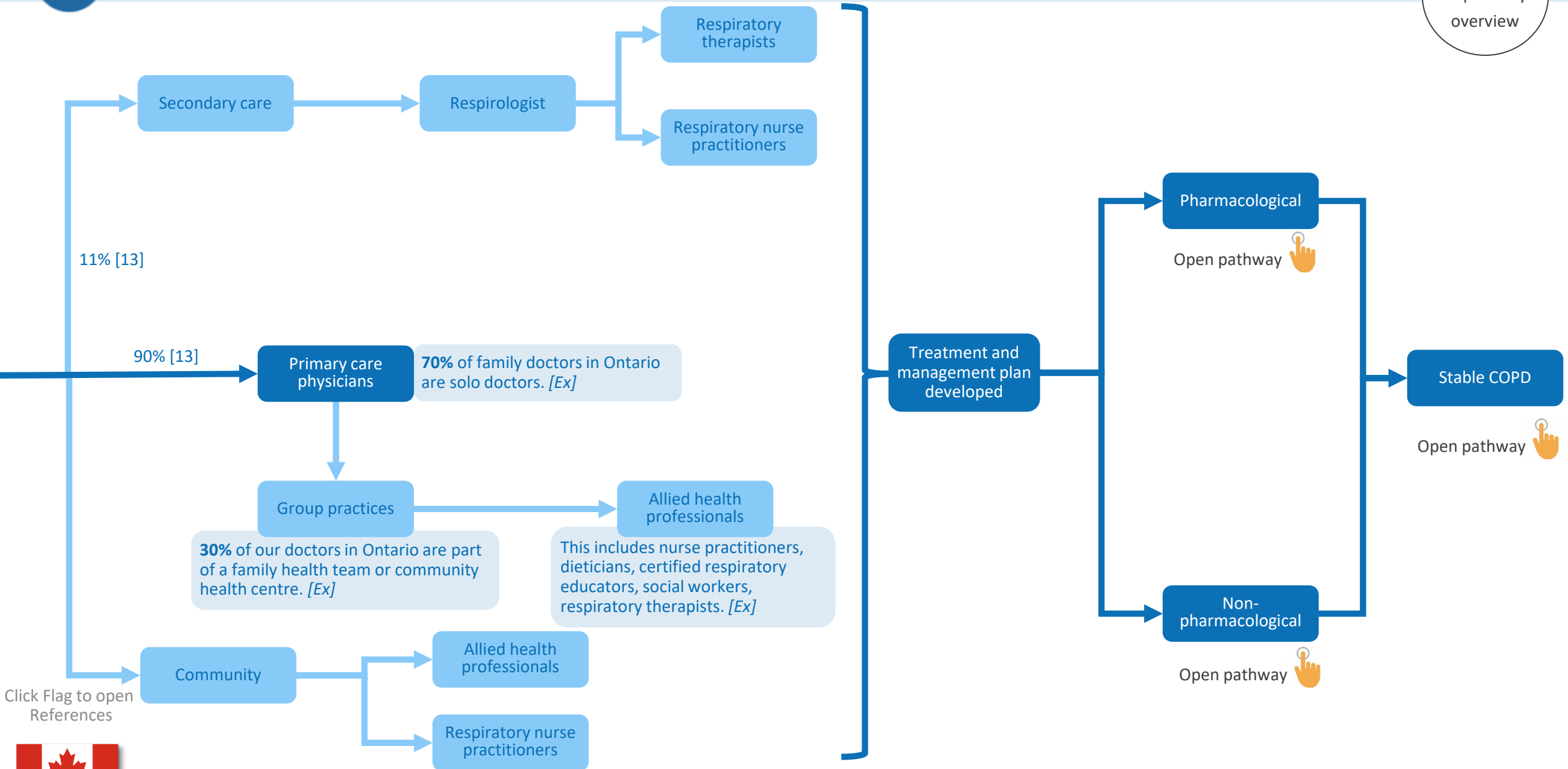


PFT = Pulmonary function test





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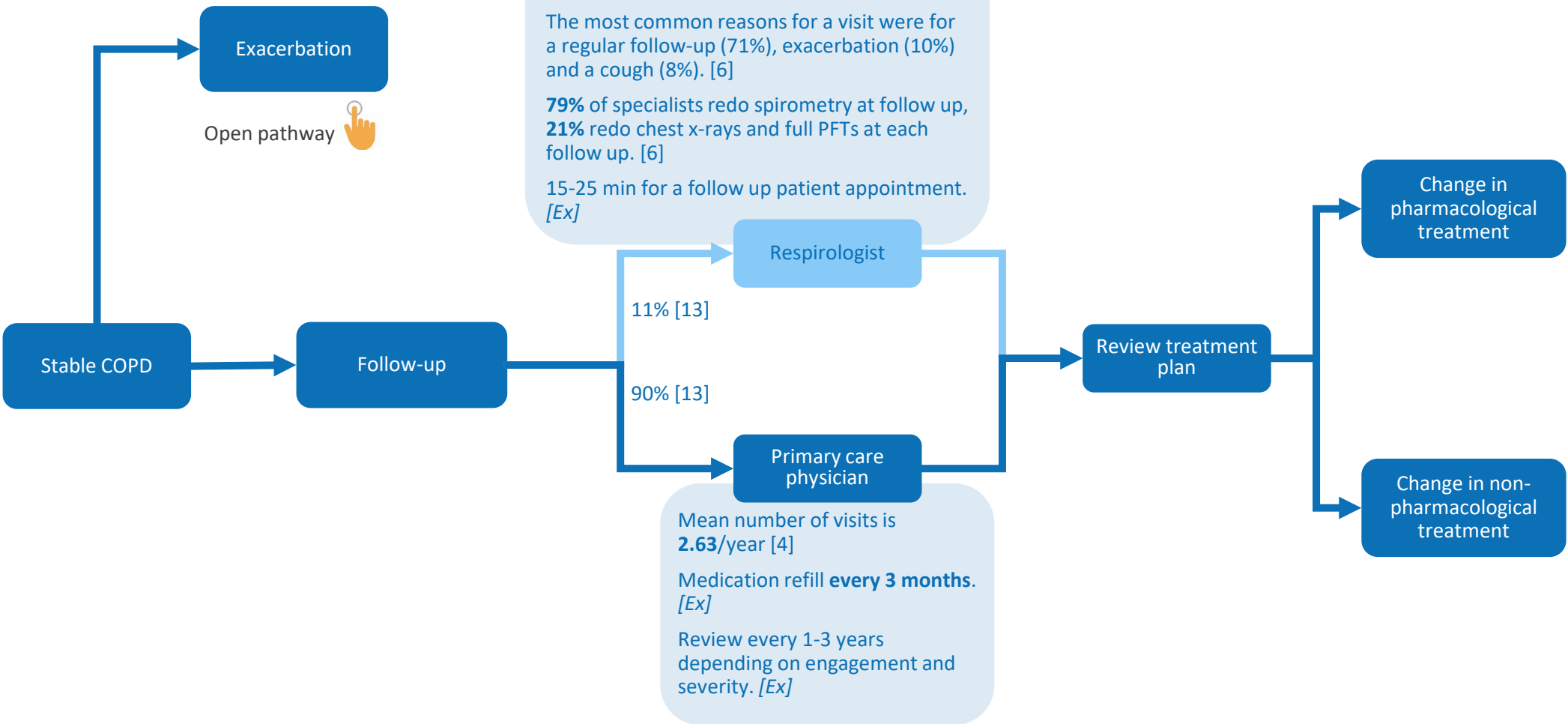




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Management

Stable COPD



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References



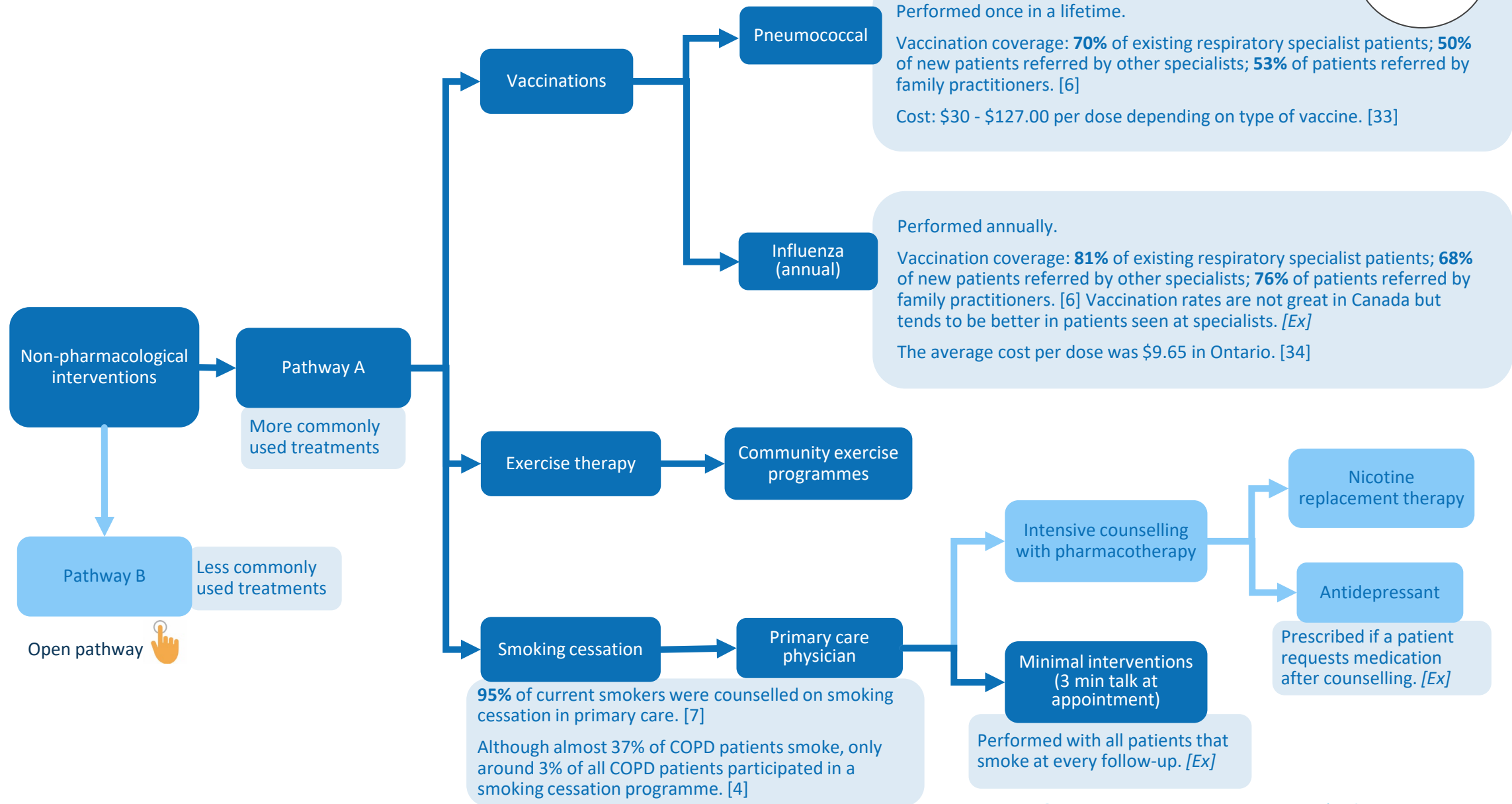
PFT = Pulmonary function test



Return
to pathway
overview

Management

Treatment
and
management
plan: non-
pharma-
cological
treatment



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References

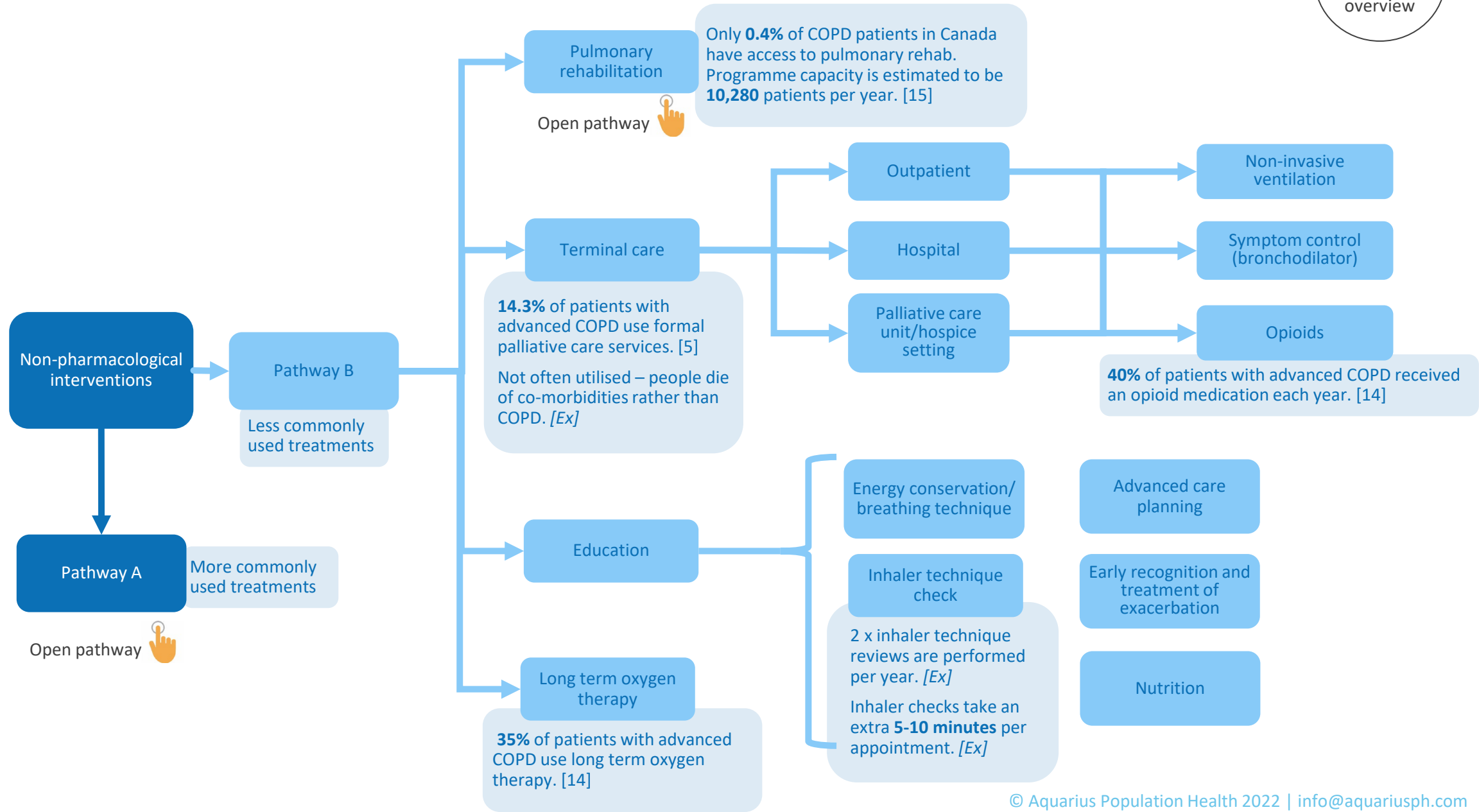




Return
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overview

Management

Treatment
and
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plan: non-
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cological
treatment



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References





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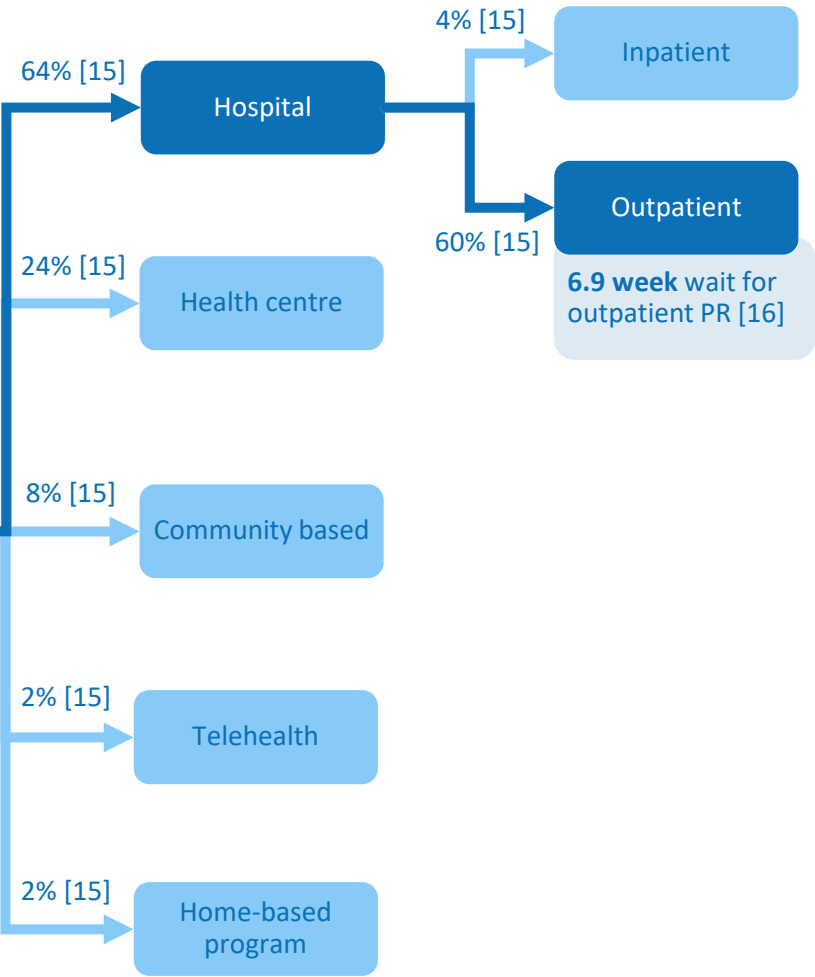
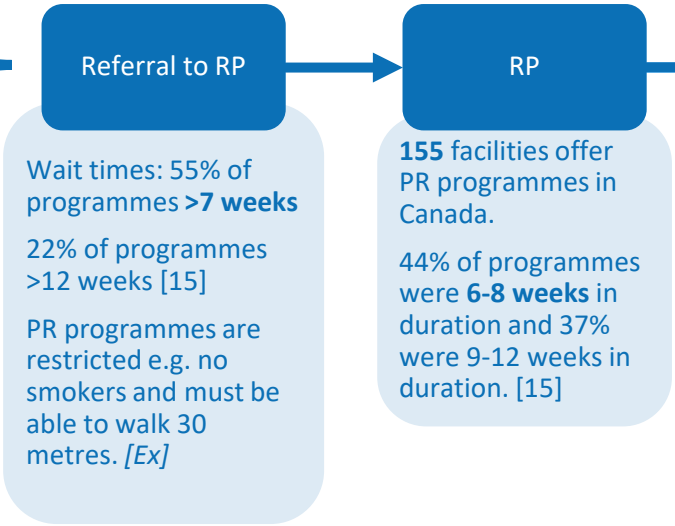
Treatment
and management
plan:
pulmonary
rehab-
ilitation

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References

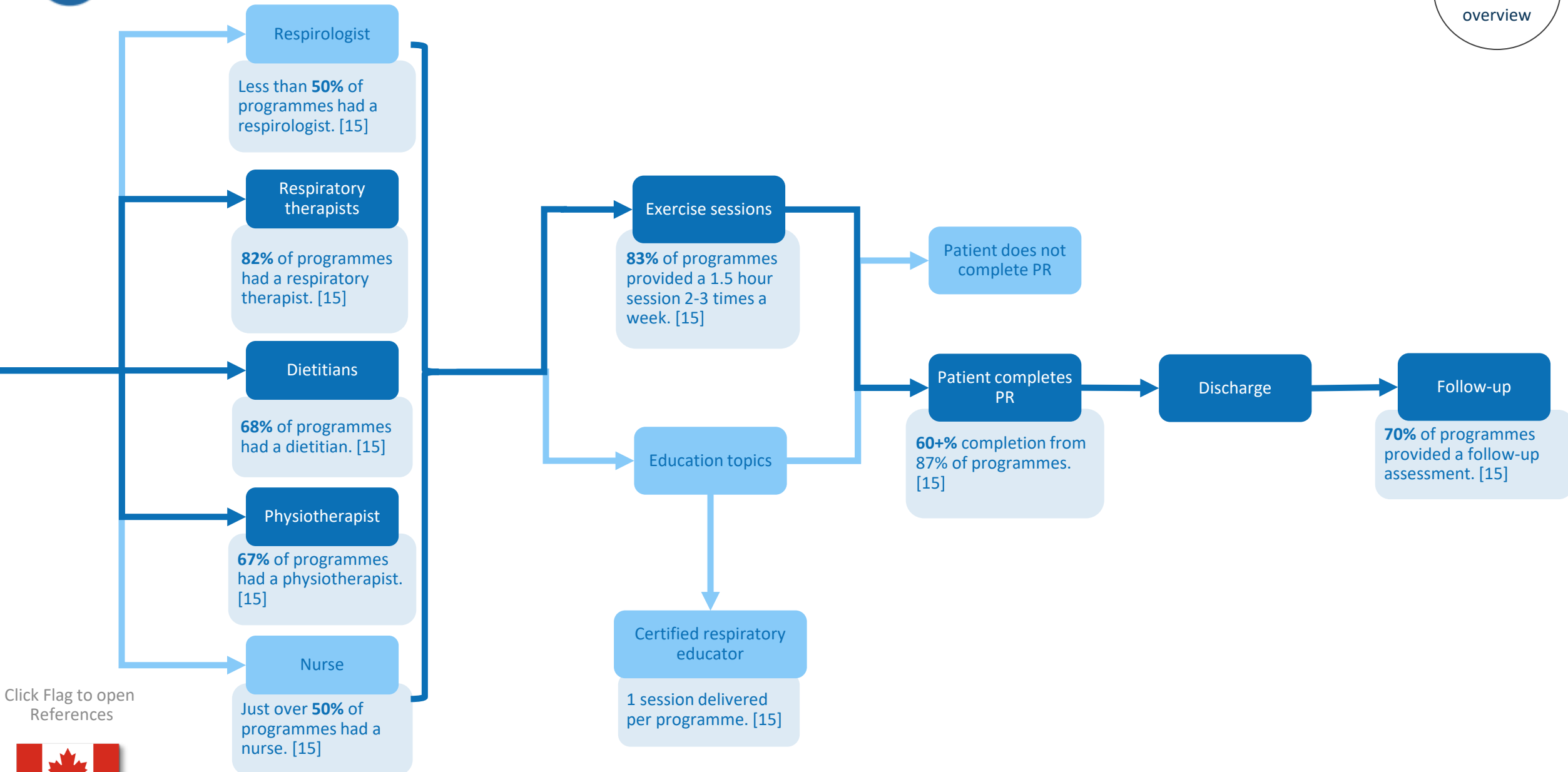


Management

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]



PR = Pulmonary Rehabilitation



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References



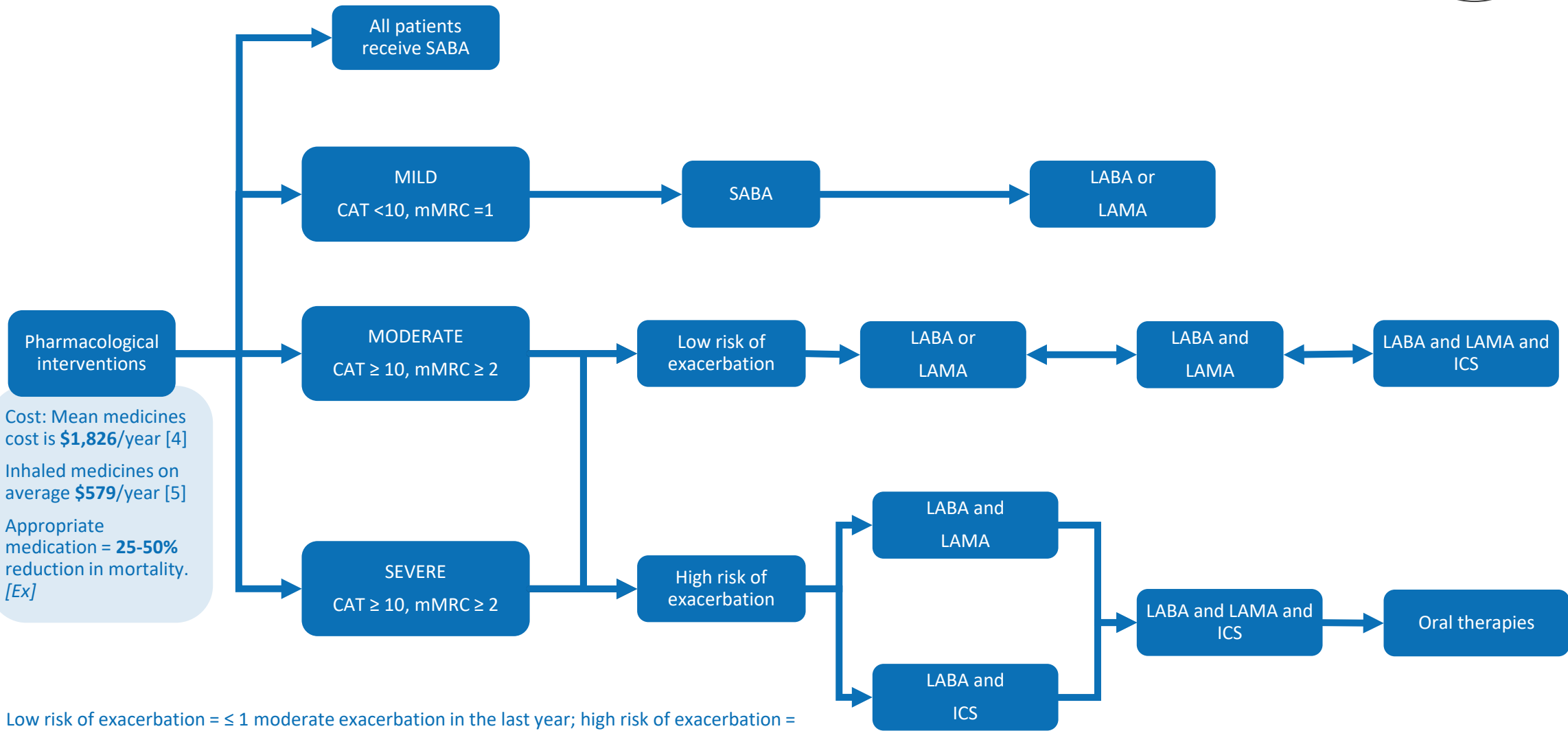
PR = Pulmonary Rehabilitation



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

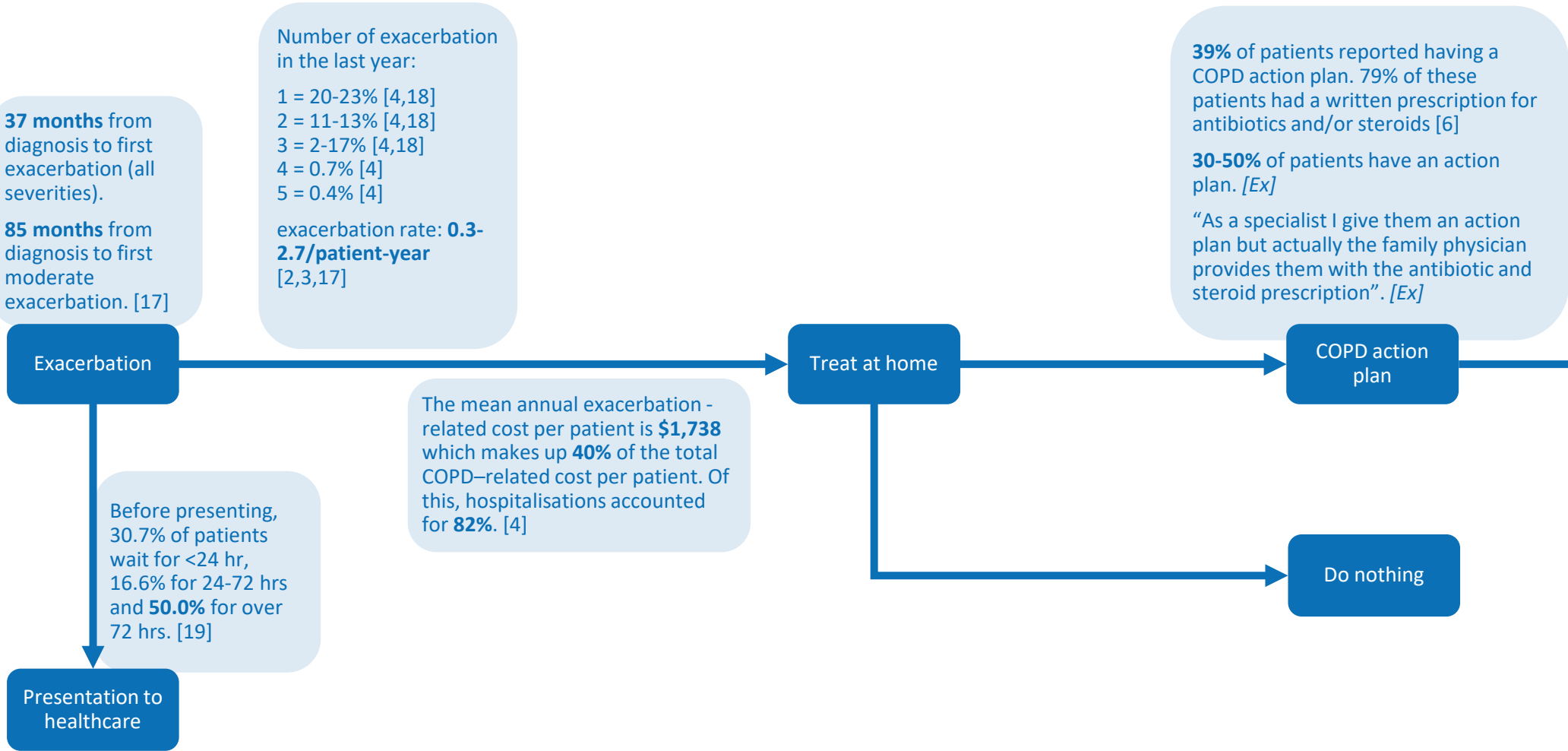




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Management

Exacerbations



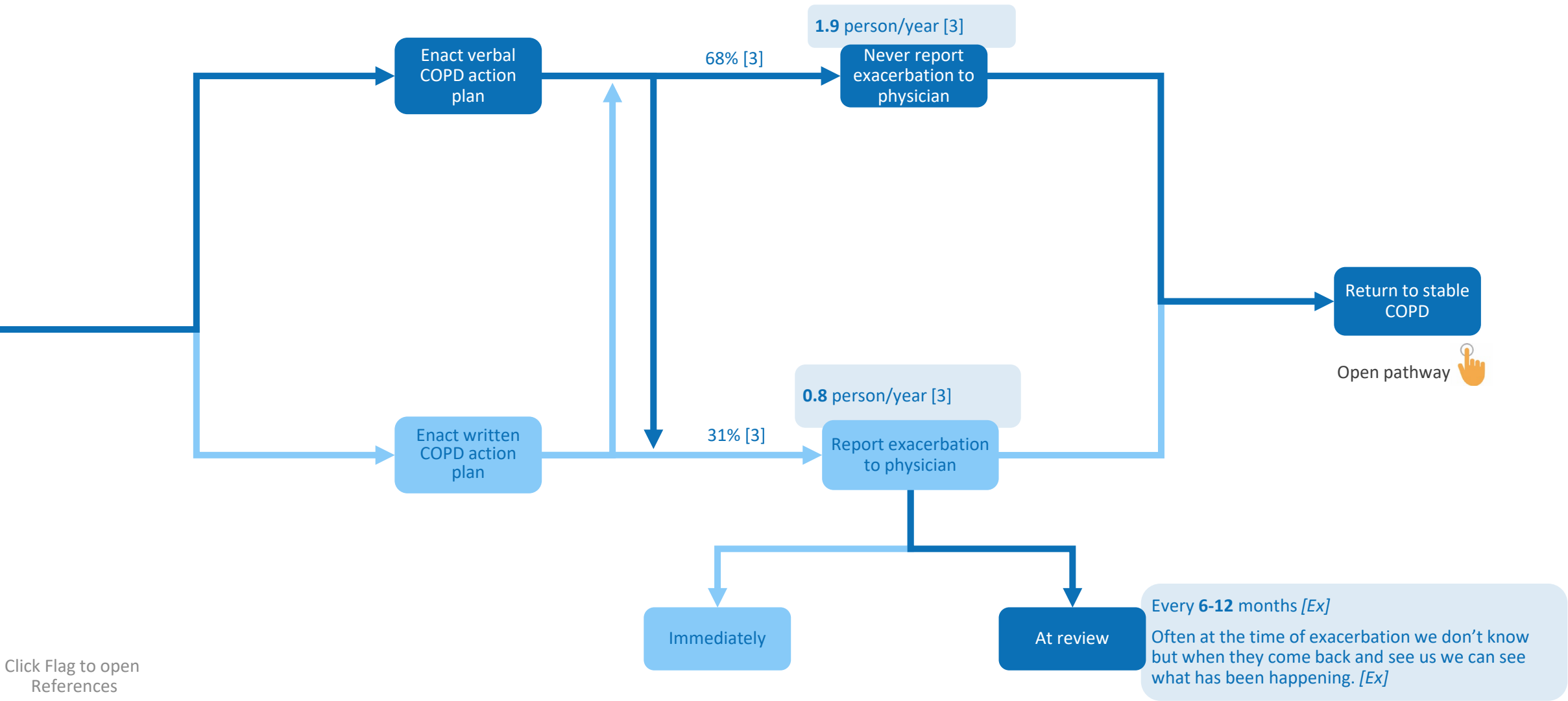
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References



Open pathway



Return
to pathway
overview



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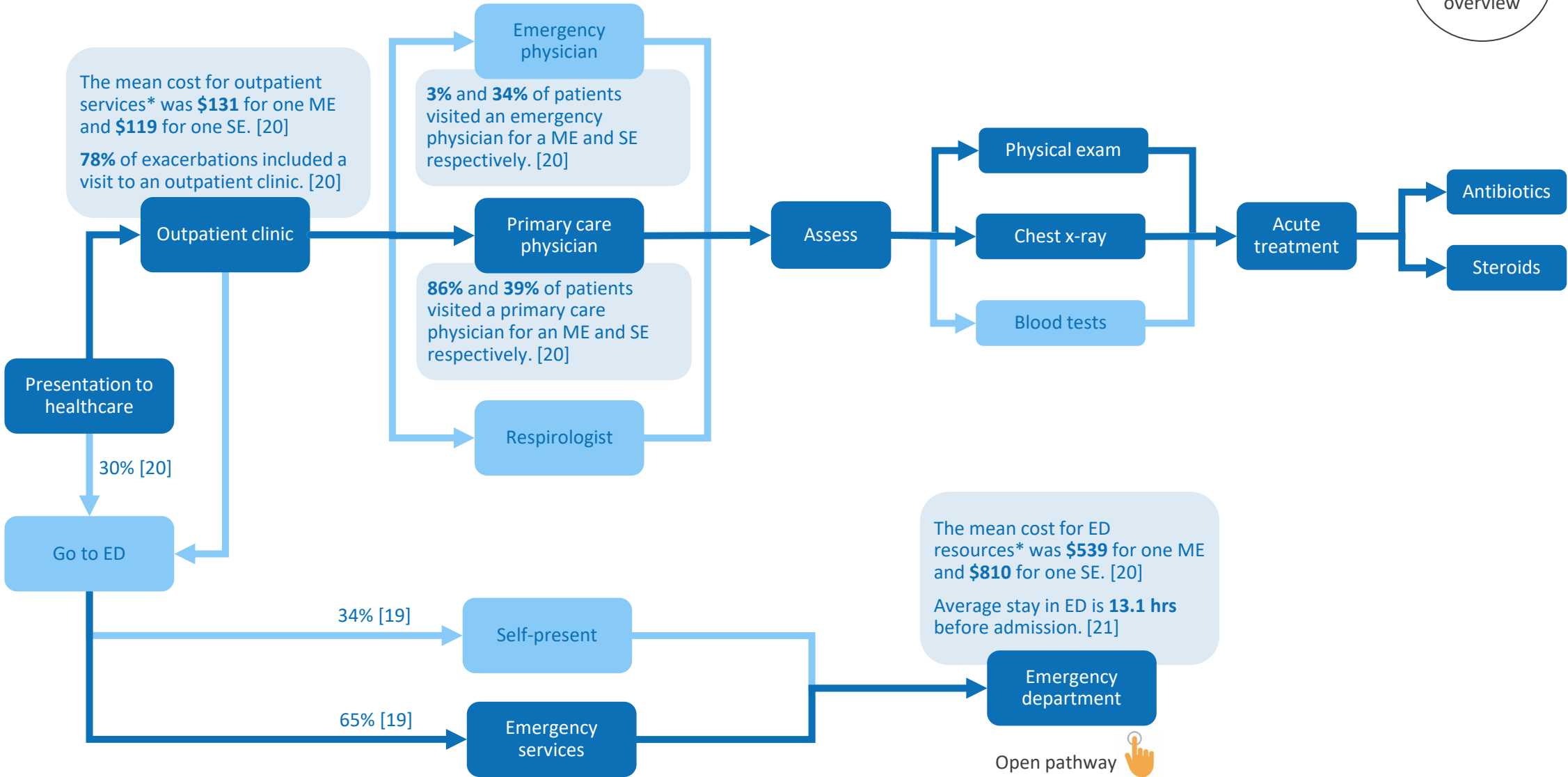




Return
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overview

Management

Exacerbation:
presentation
to healthcare



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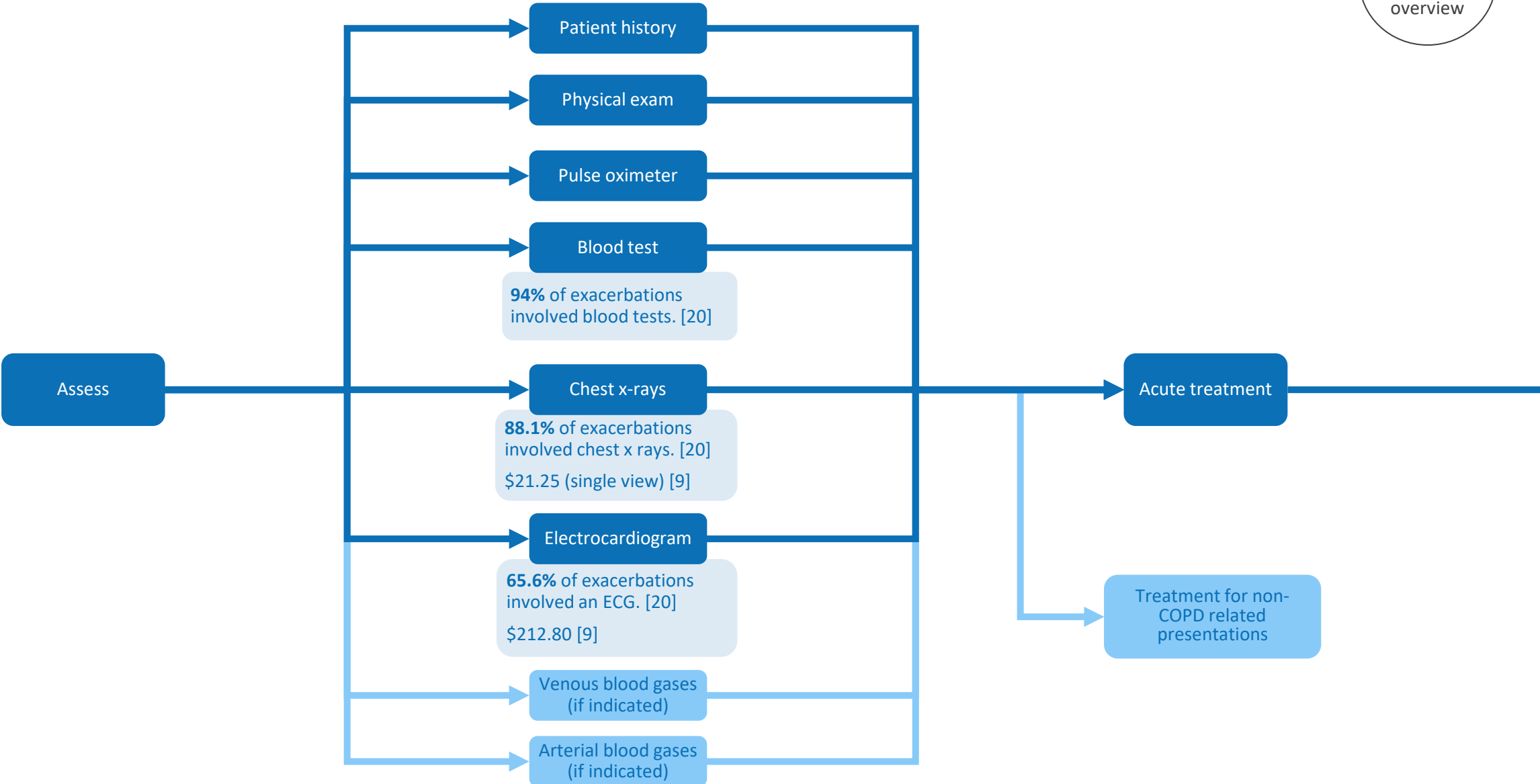




Return
to pathway
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Management

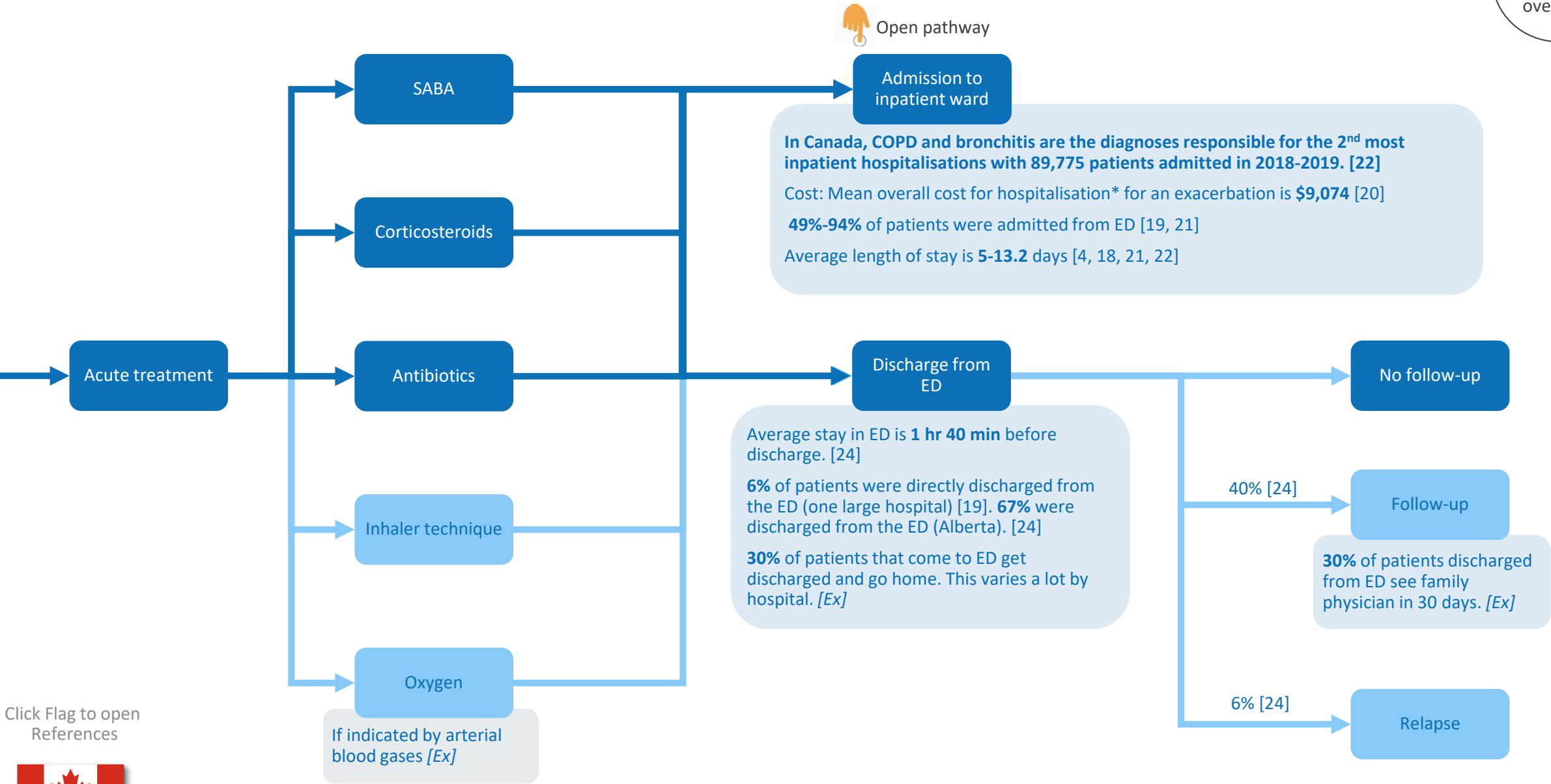
Exacerbations:
emergency
department



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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



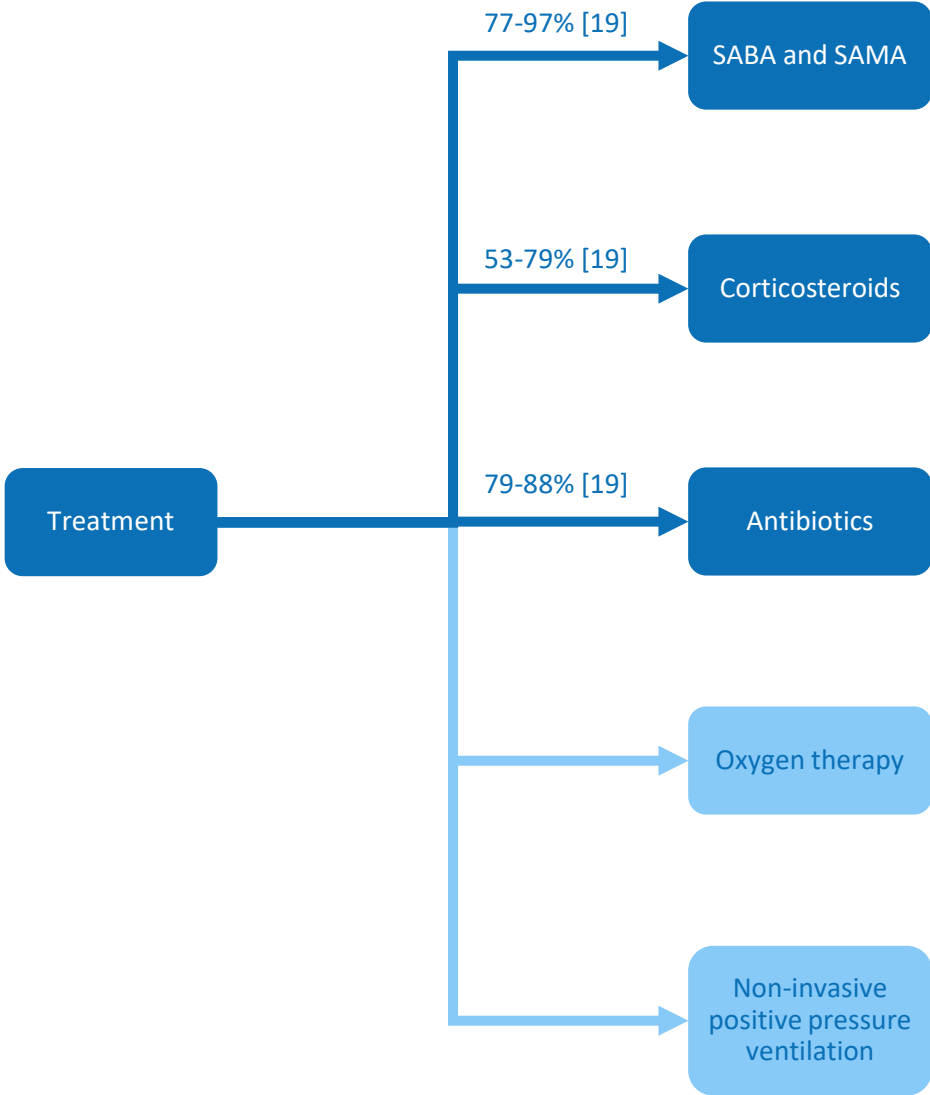
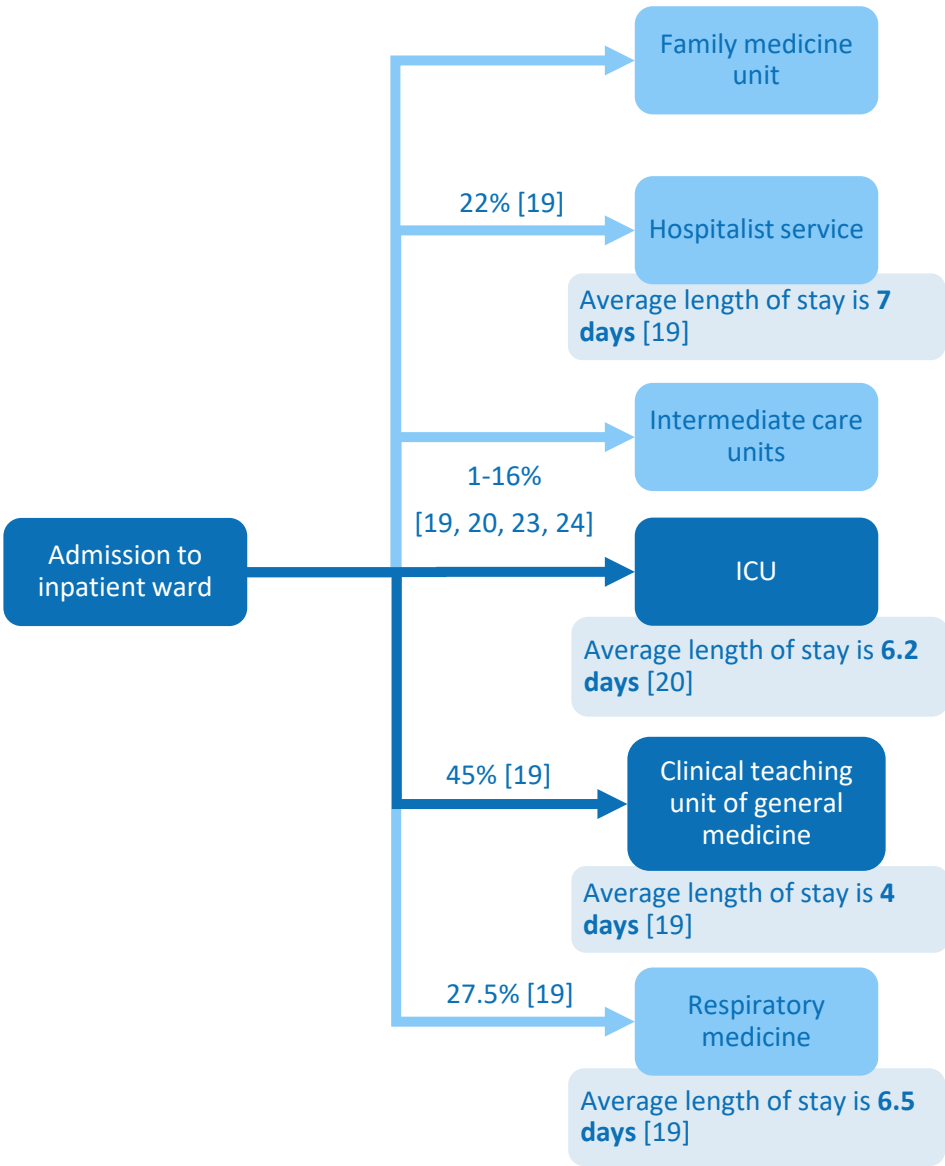
ED = Emergency department; SABA = short-acting beta agonist



Return
to pathway
overview

Management

Exacerbations:
inpatient admission



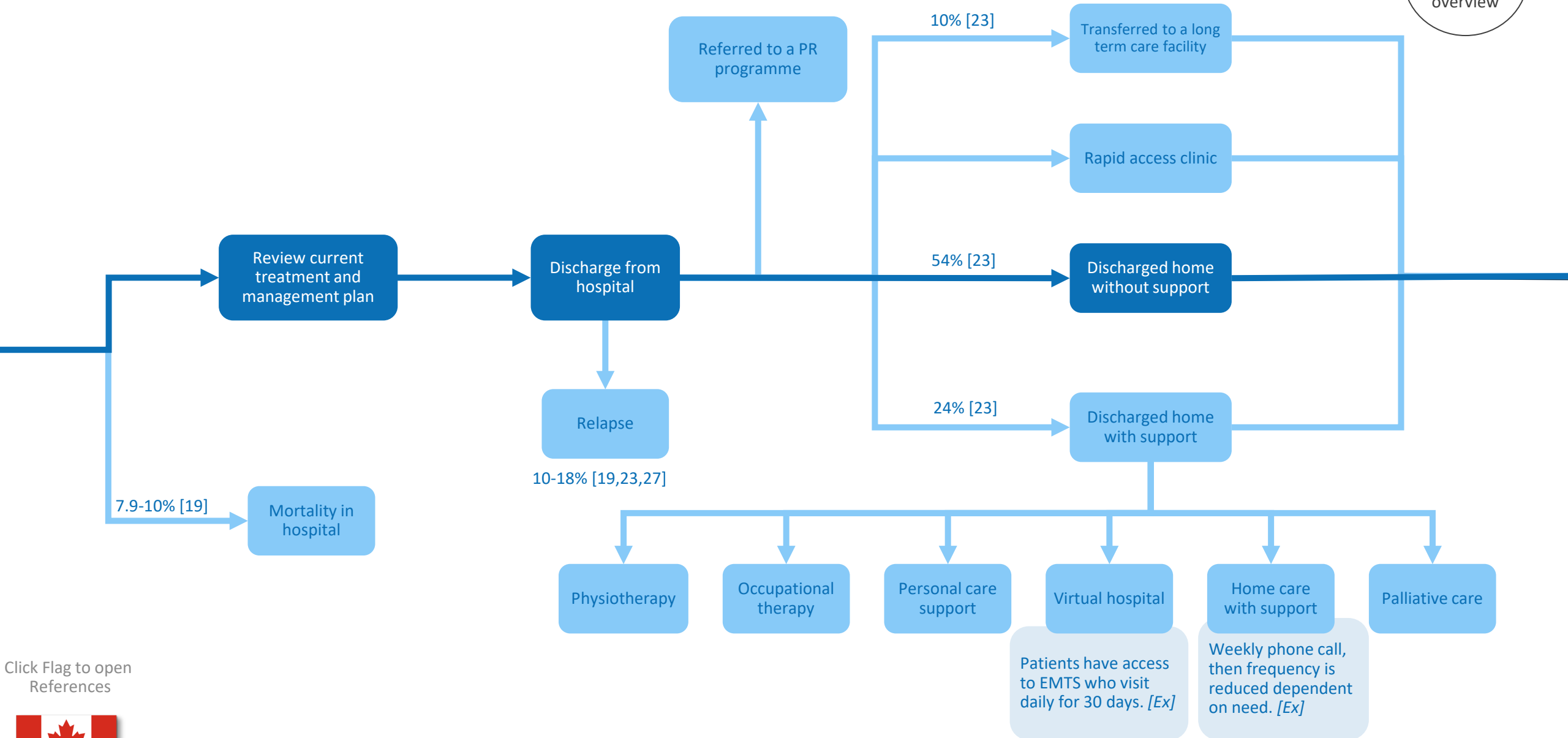
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References



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

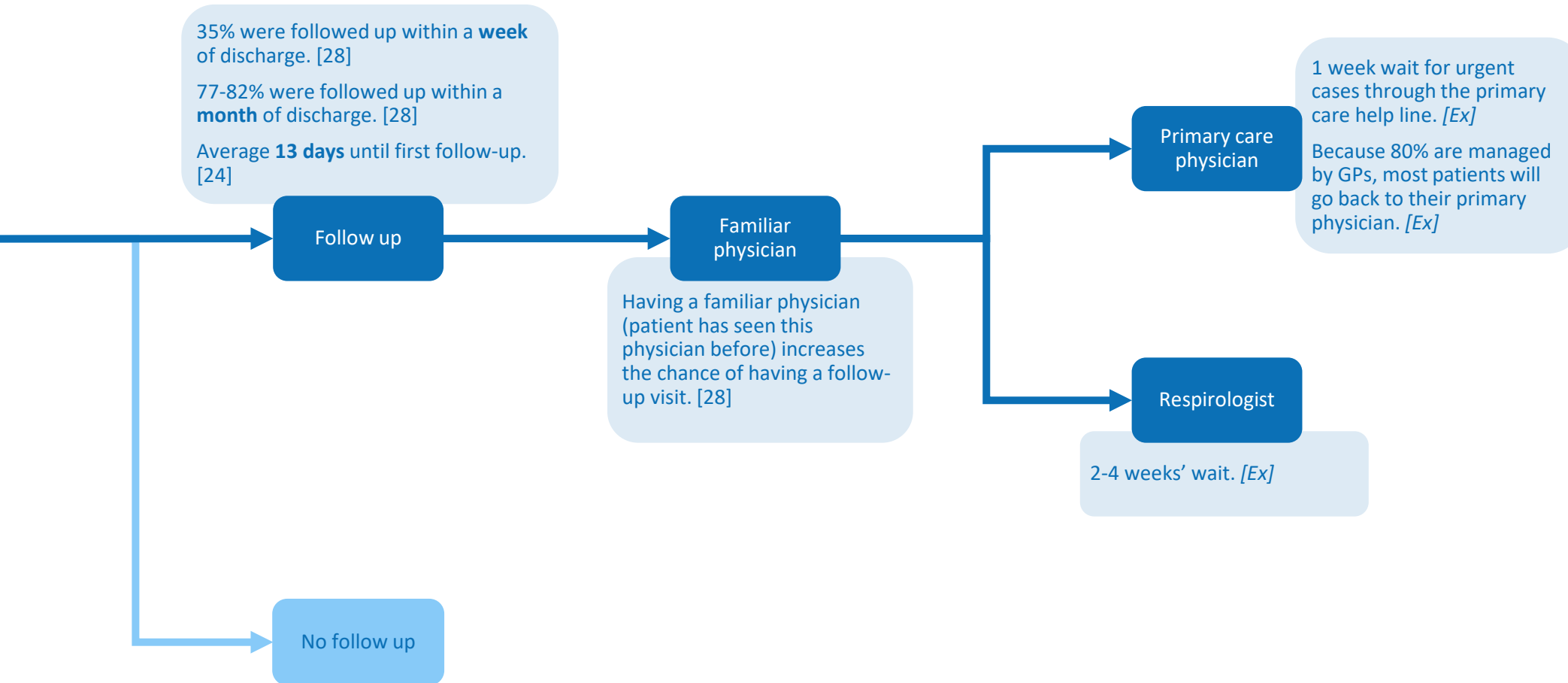


Return
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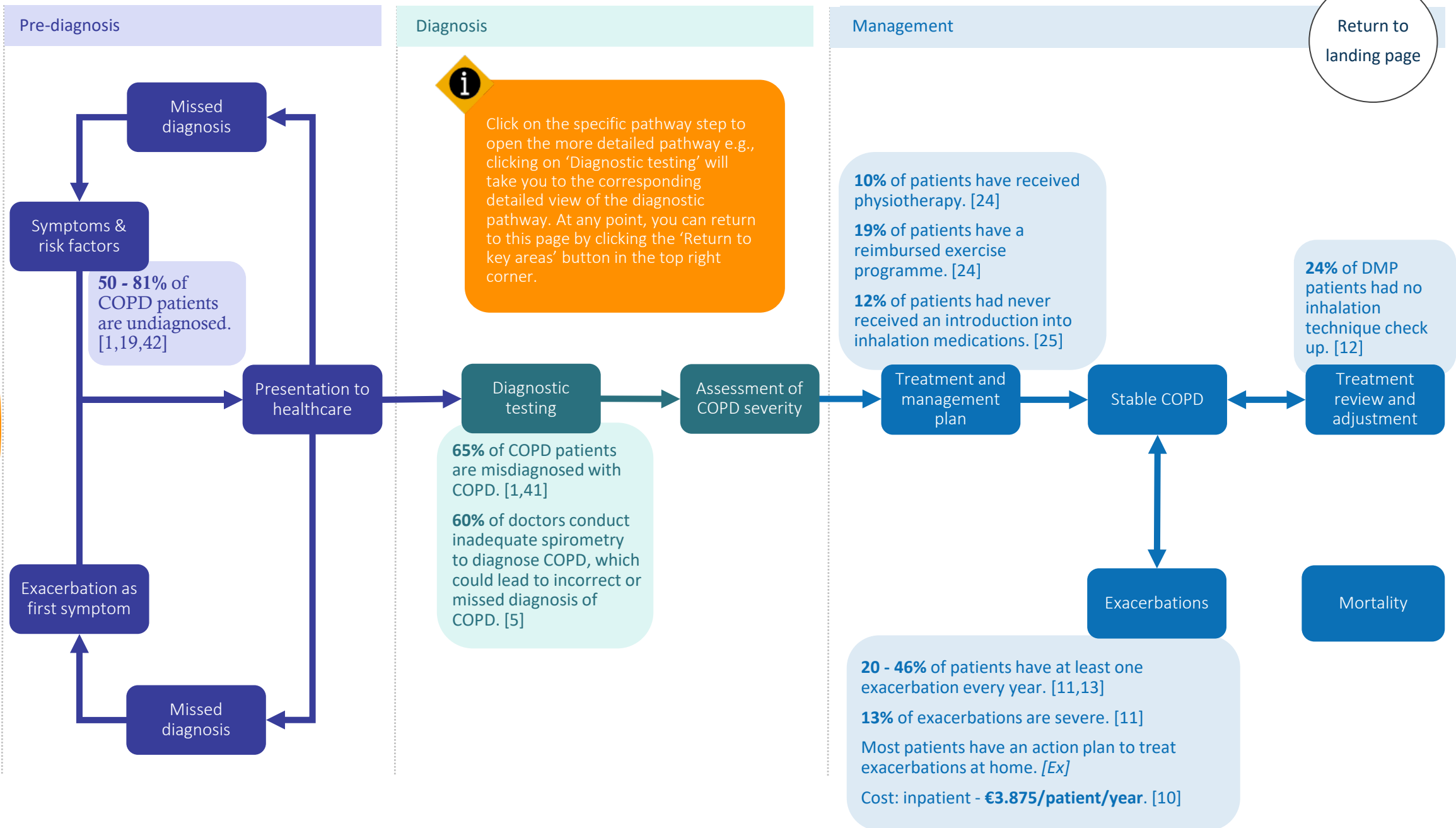
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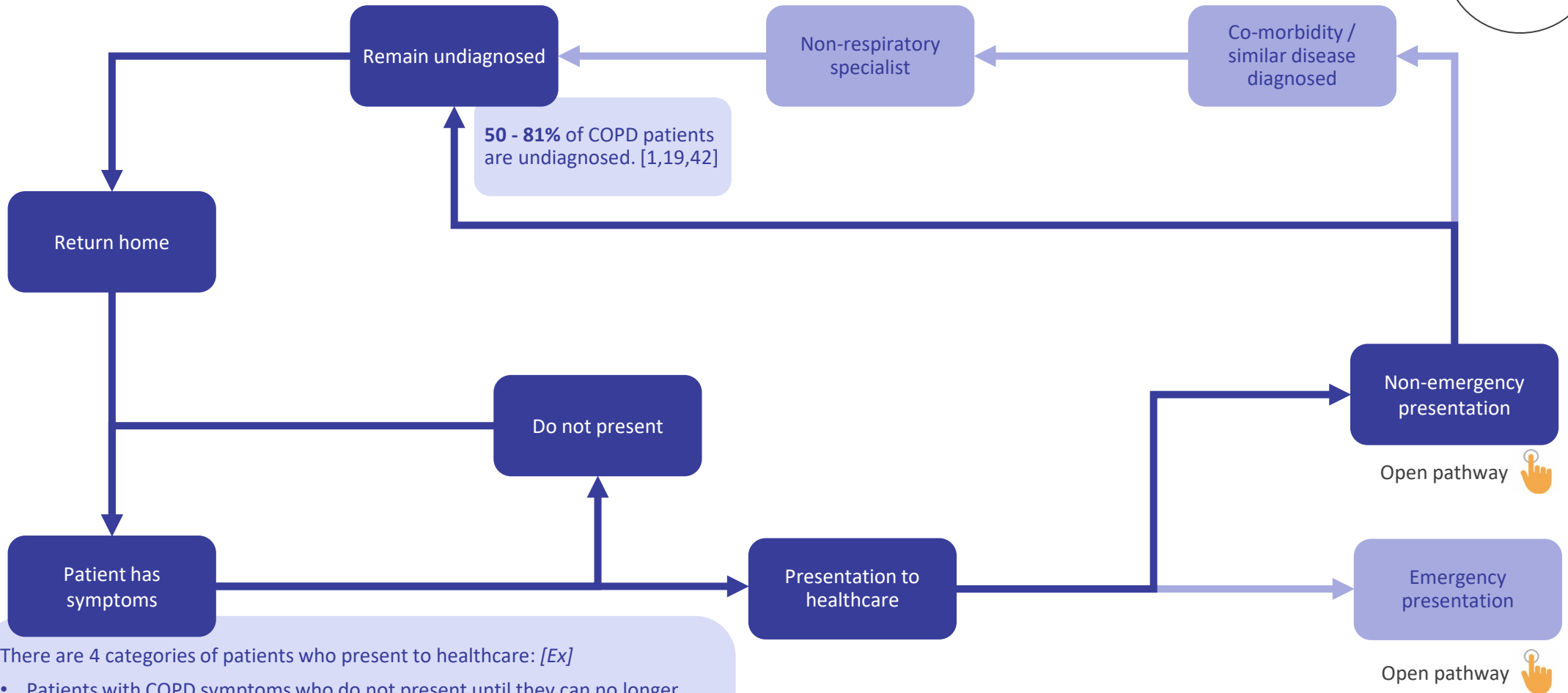


GP = General Practitioner

Pathway overview

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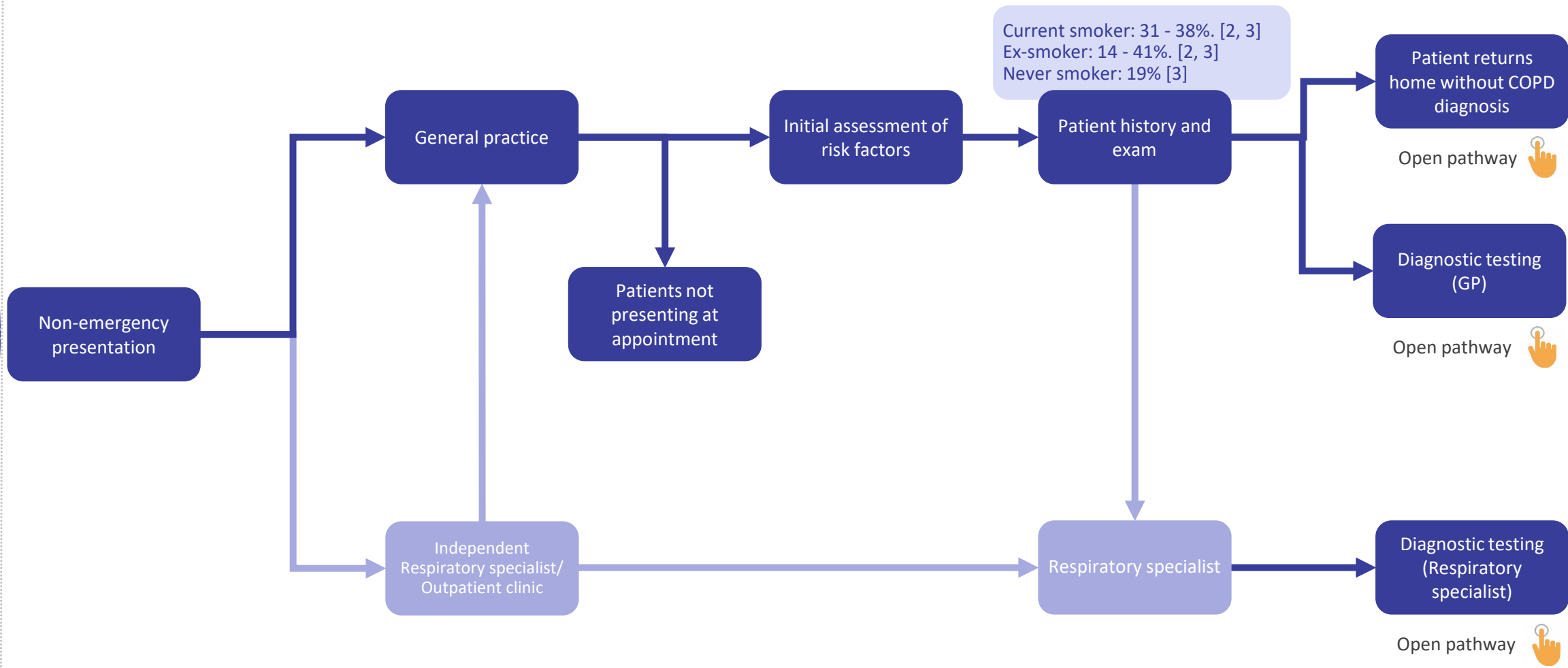


Presentation
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References



Return
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Presentation
to healthcare:
non-
emergency
care

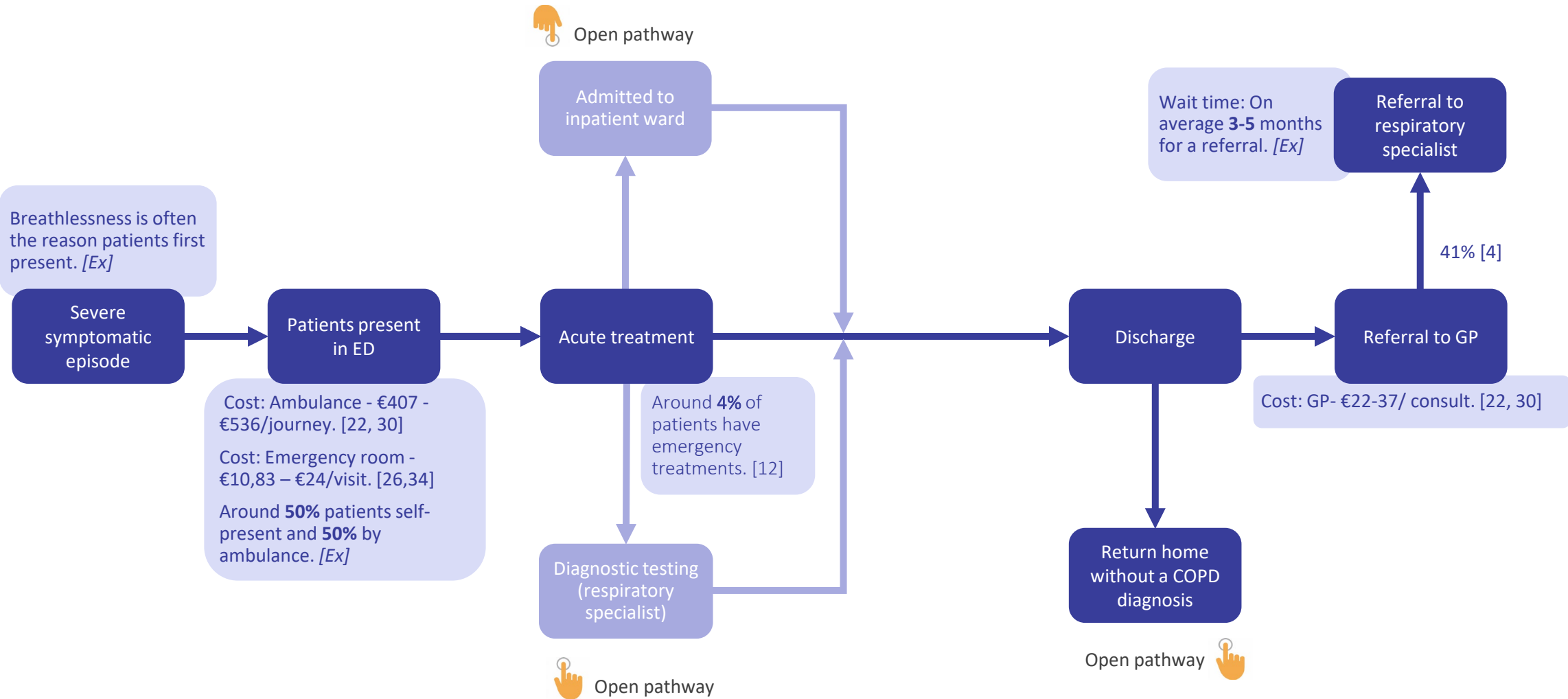


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References

GP = General Practitioner



Presentation to healthcare: emergency care



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References

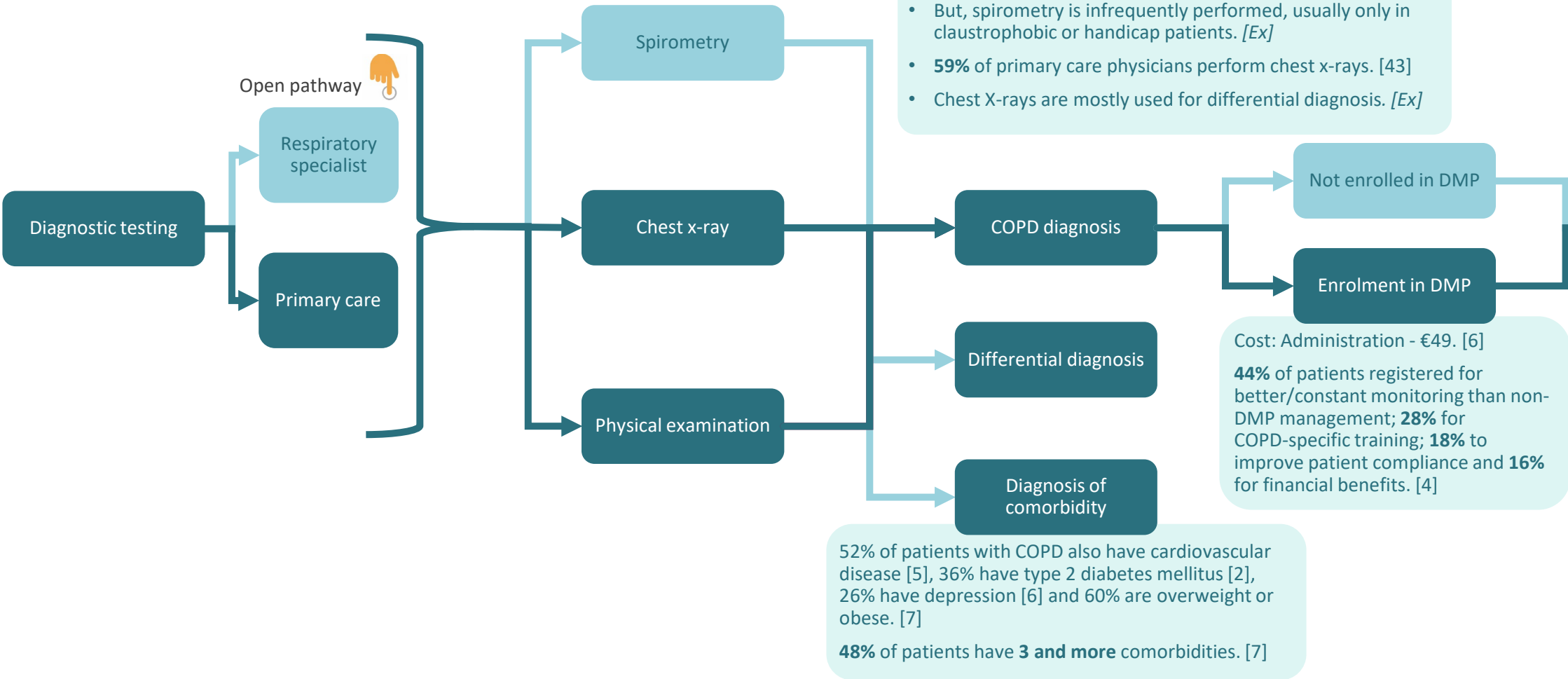




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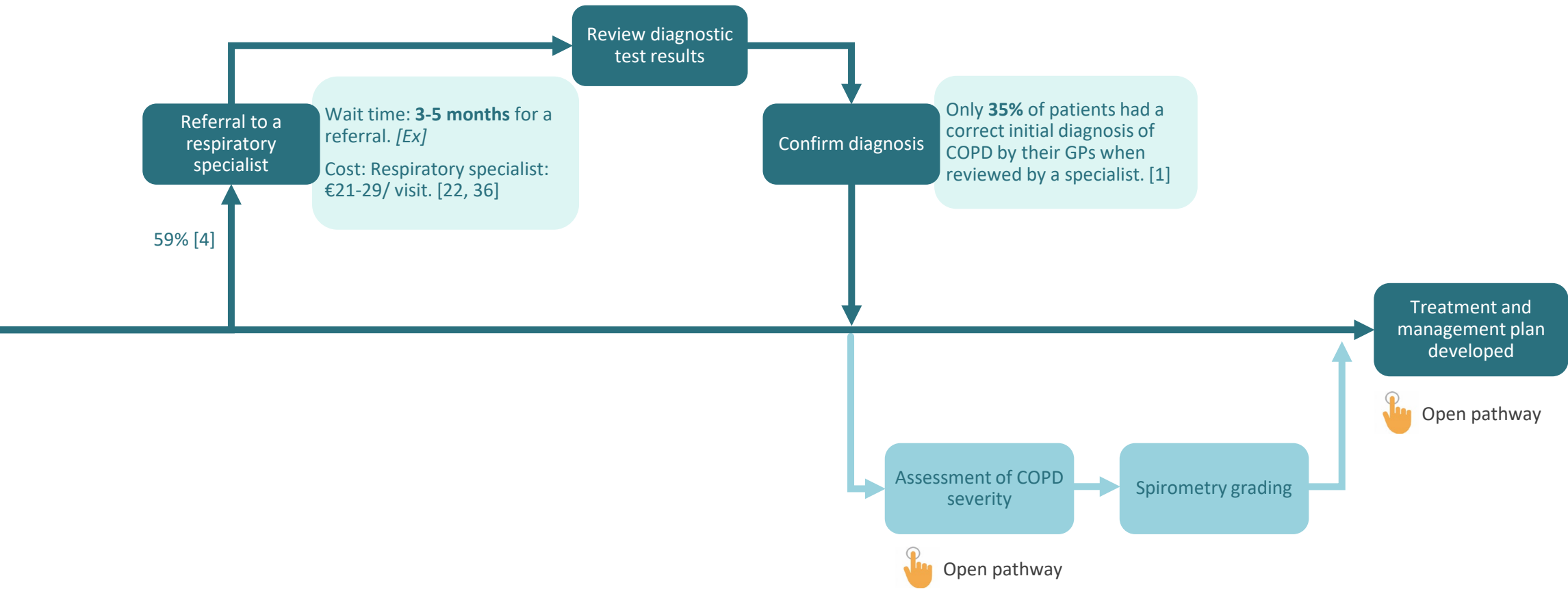
Diagnosis

Diagnostic testing: primary care



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References





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References



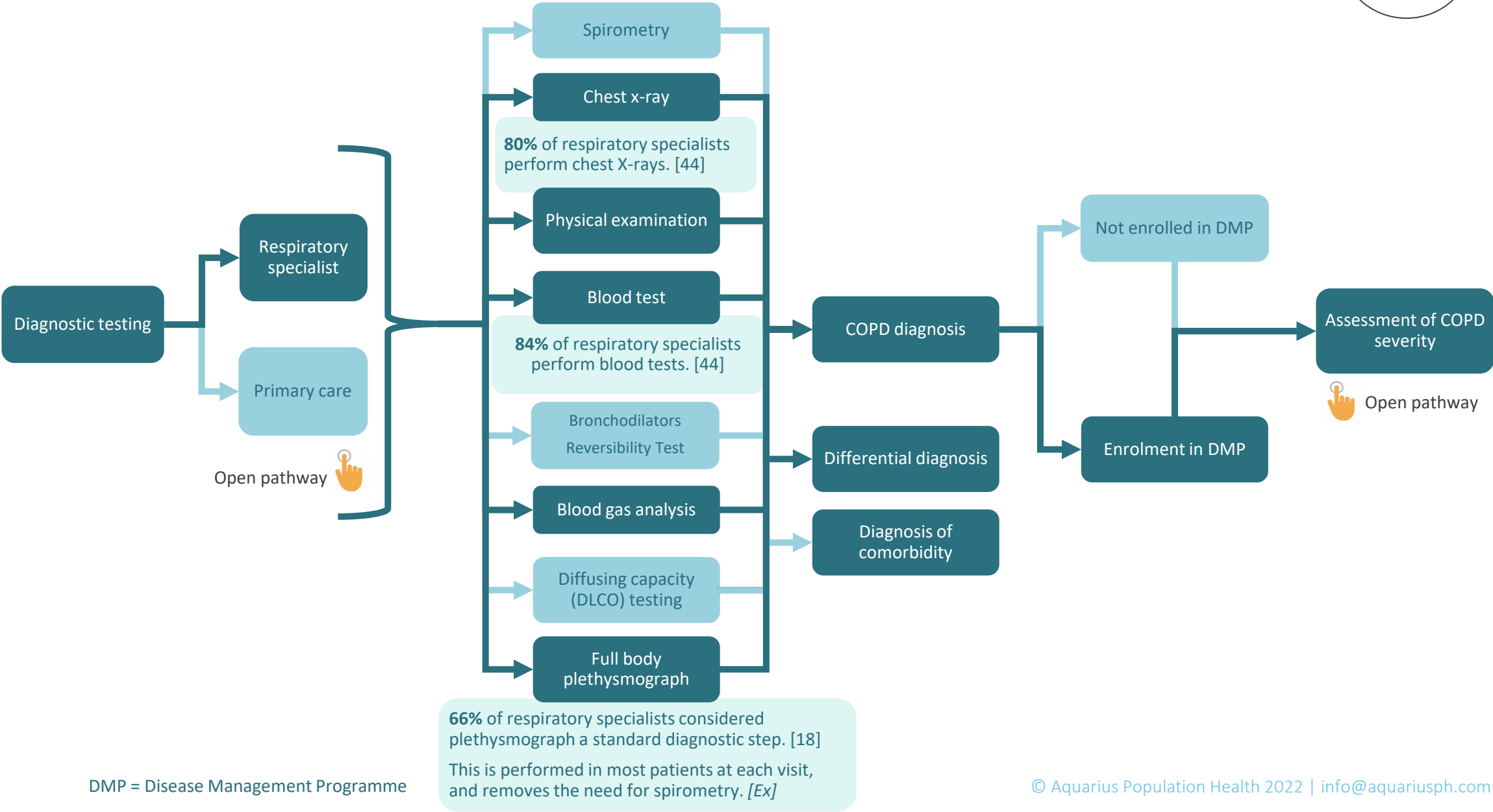
GP = General Practitioner



Return
to pathway
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Diagnosis

Diagnostic testing:
specialists



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References



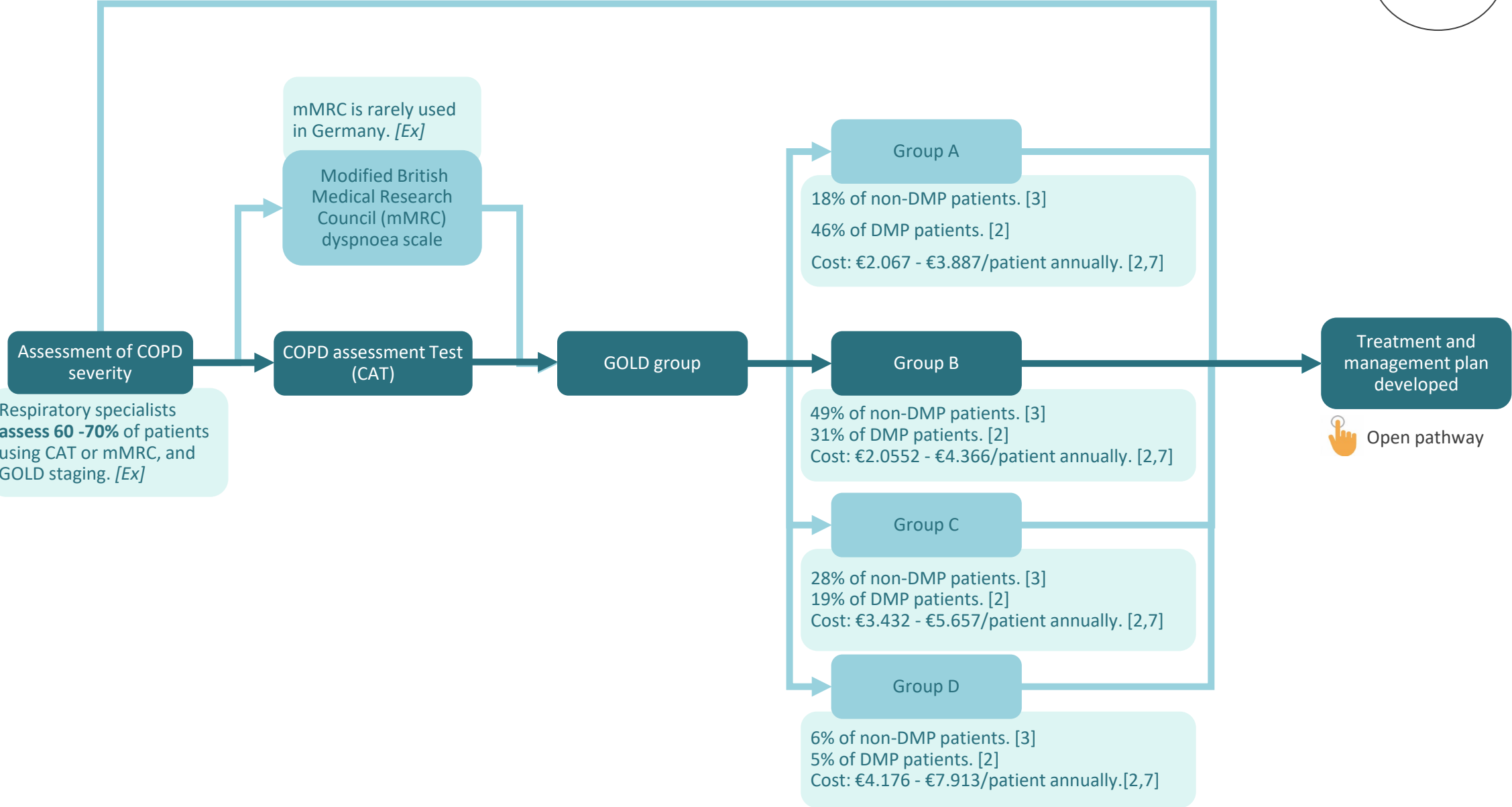
DMP = Disease Management Programme



Return
to pathway
overview

Diagnosis

Assessment
of COPD
severity



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References

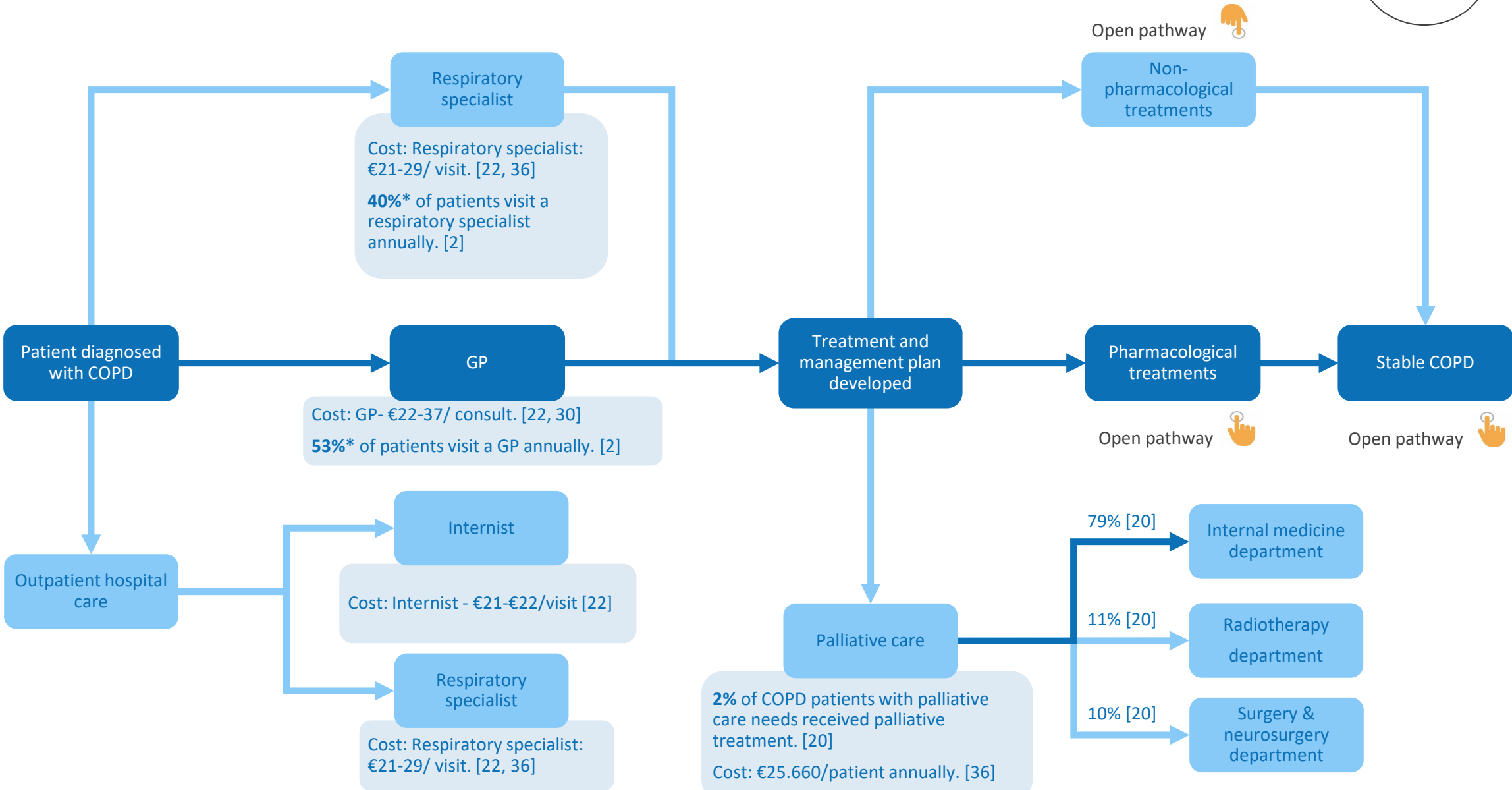




Return
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Management

Treatment
and
management
plan



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References

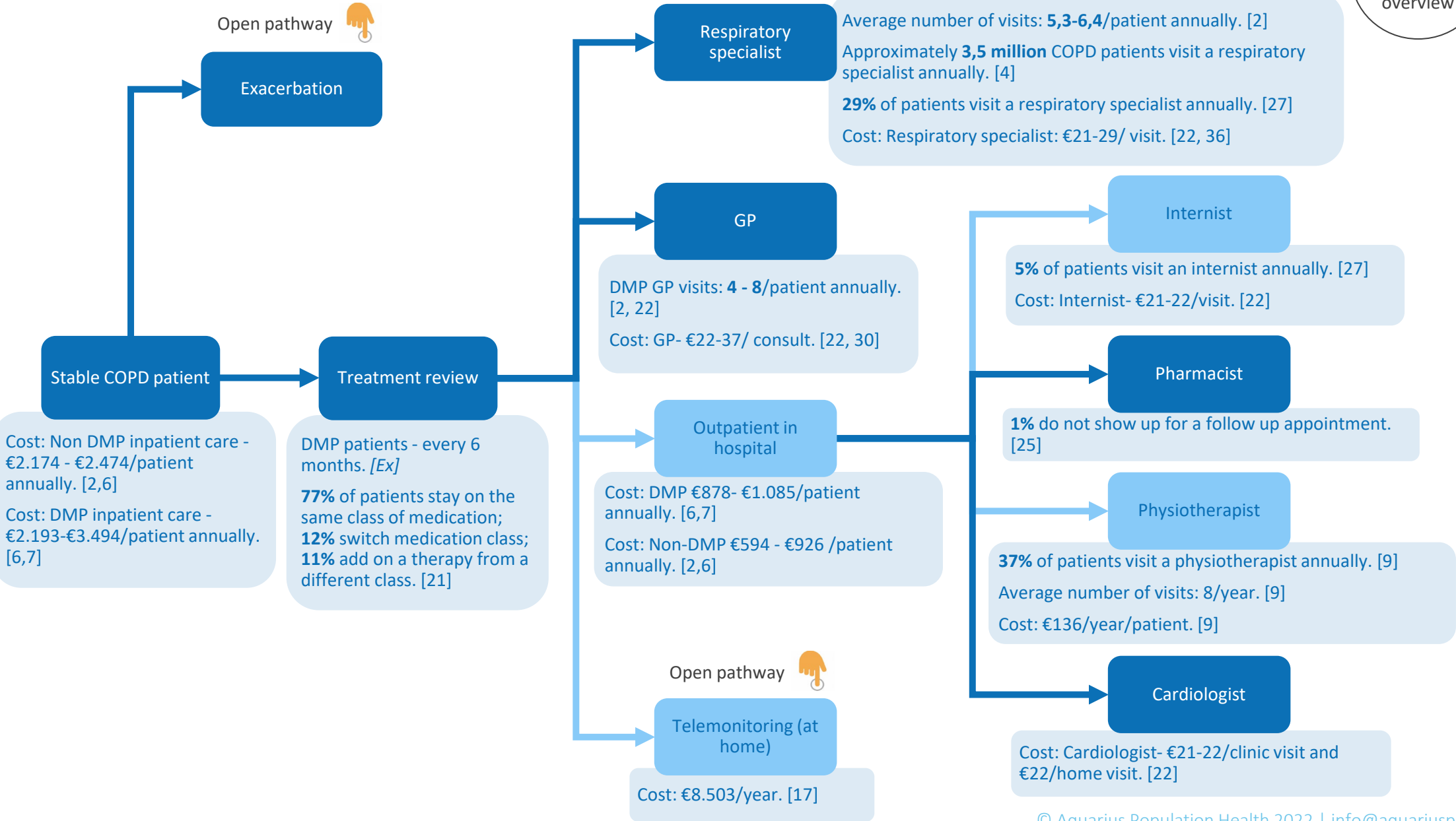




Return
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Management

Stable COPD



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References



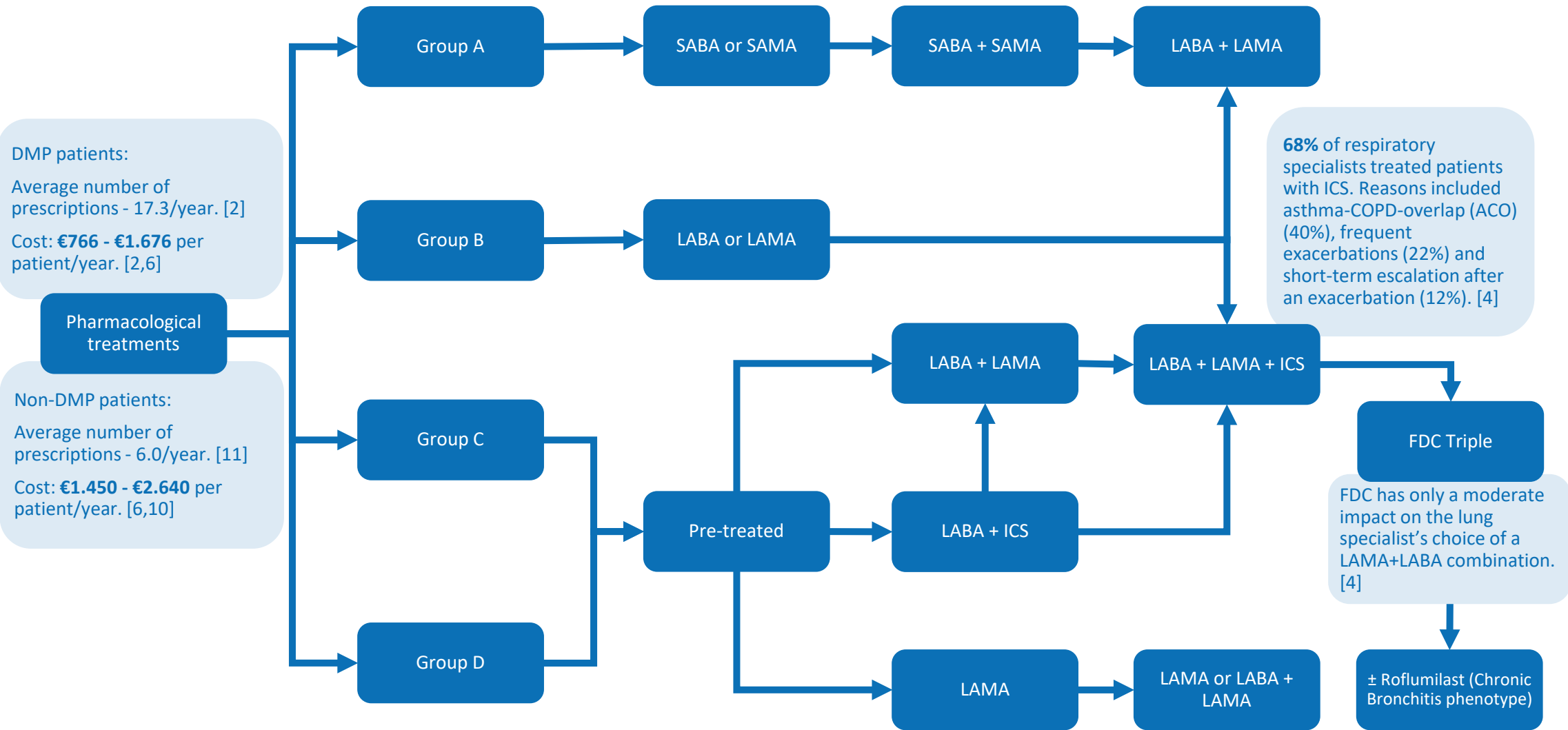
GP = General Practitioner; DMP = Disease Management Programme



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Management

Treatment
and
management
plan: pharma
cological
treatment



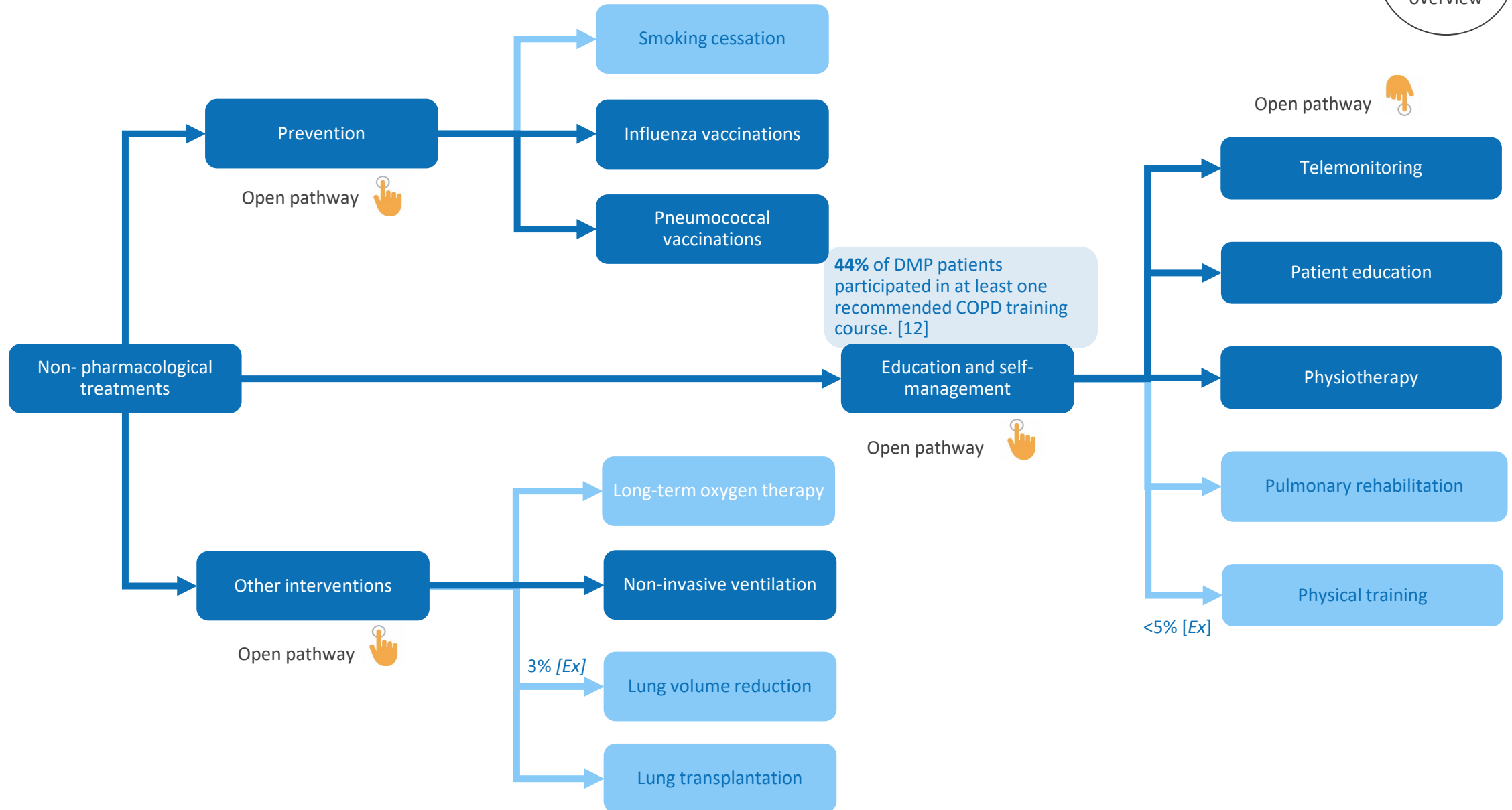
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Management

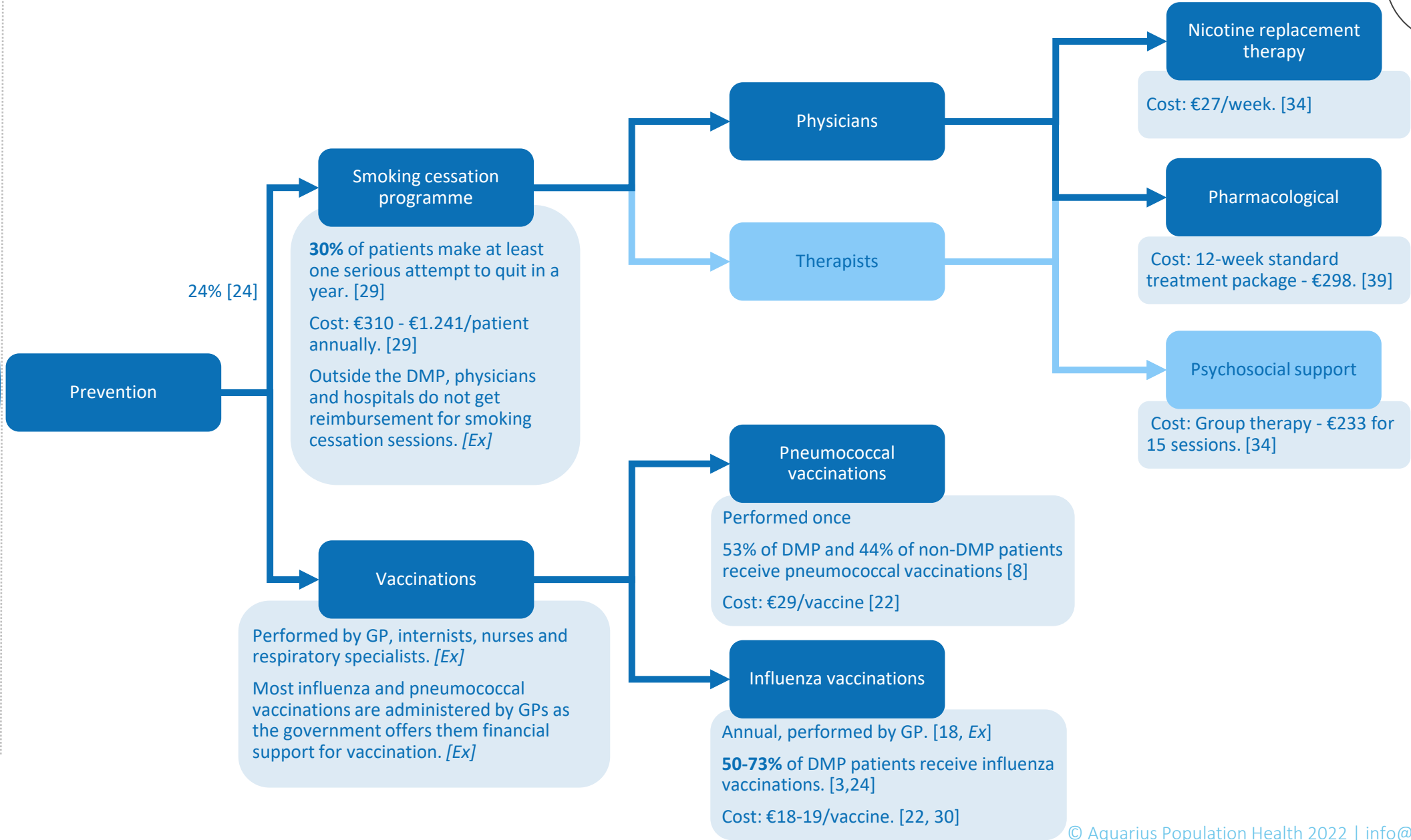


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References





Non-pharmacological treatment: prevention



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References

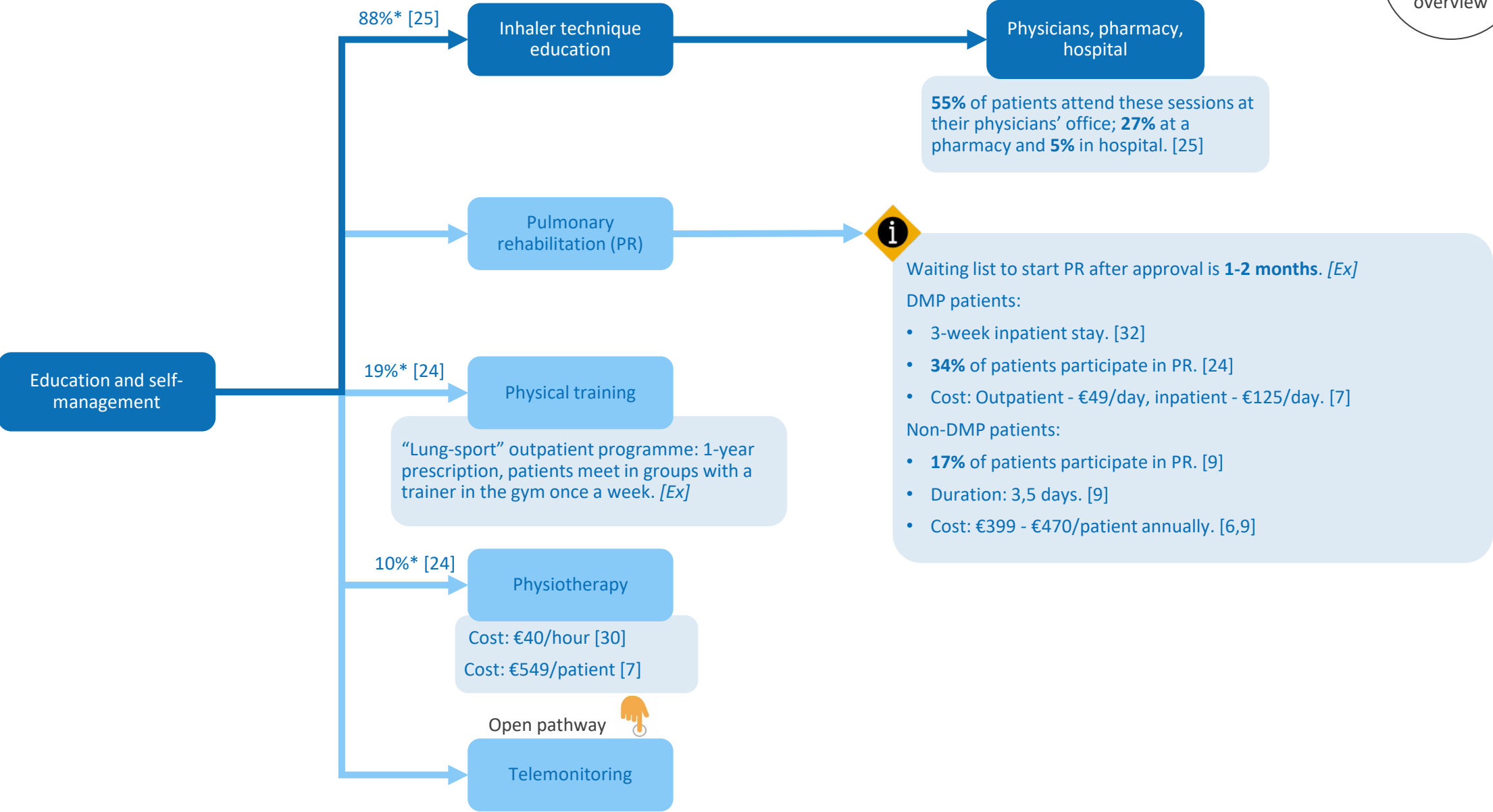




Return
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overview

Management

Non-pharmacological
treatment:
education and
self-management



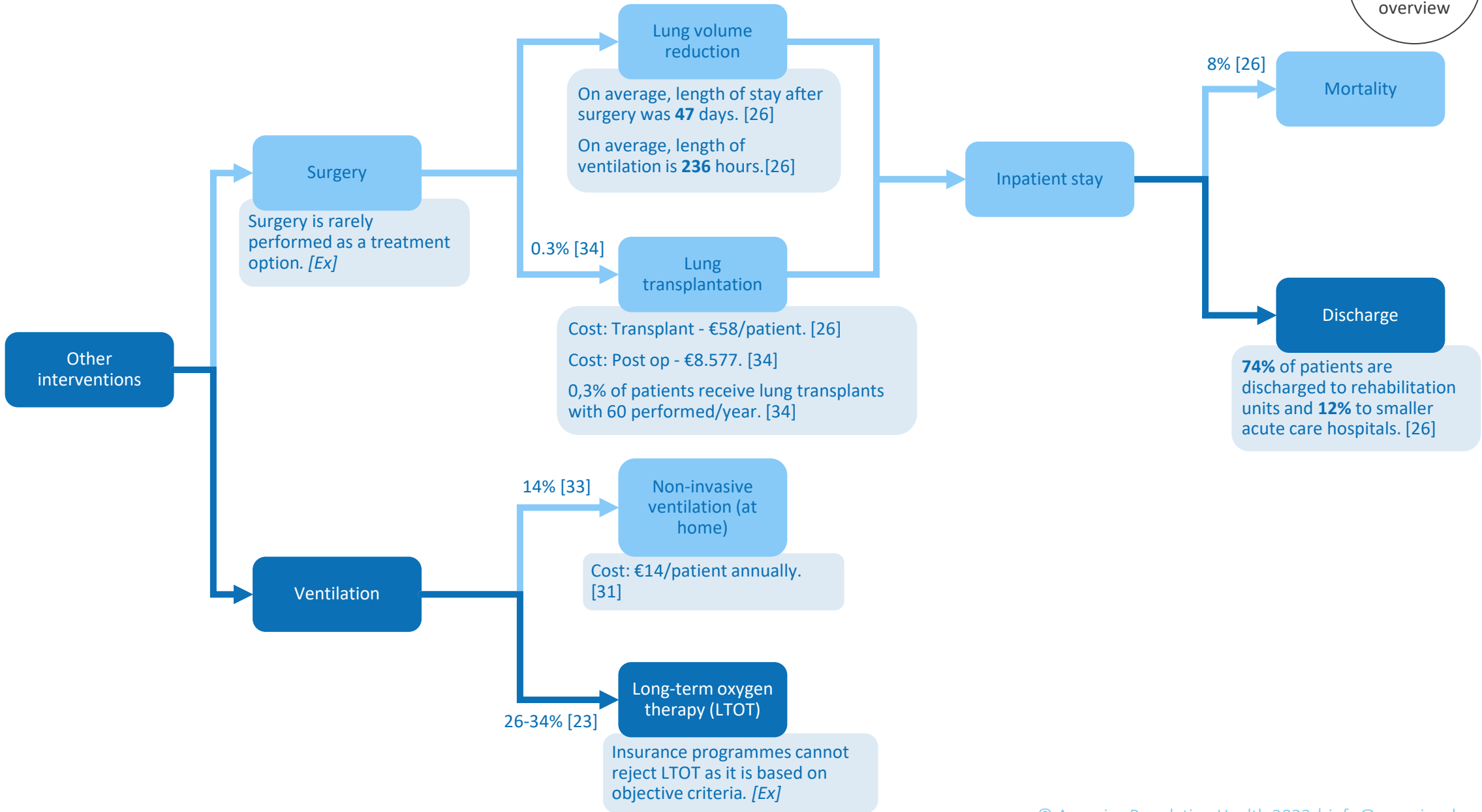
*Patients may receive more than one type of support

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References





Non-pharmacological treatments:
other interventions



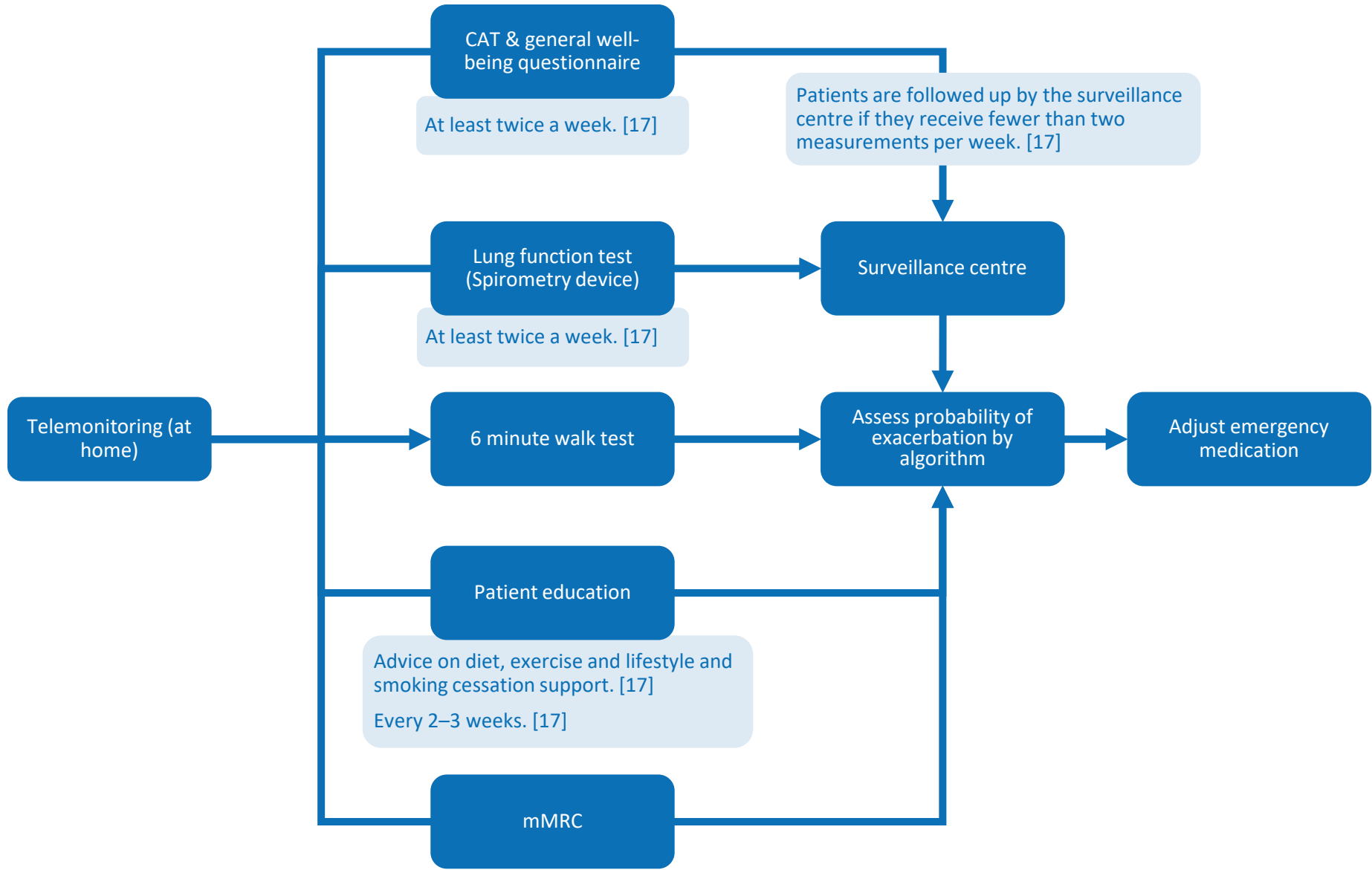
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Management



Non-pharmaco-
logical
treatment:
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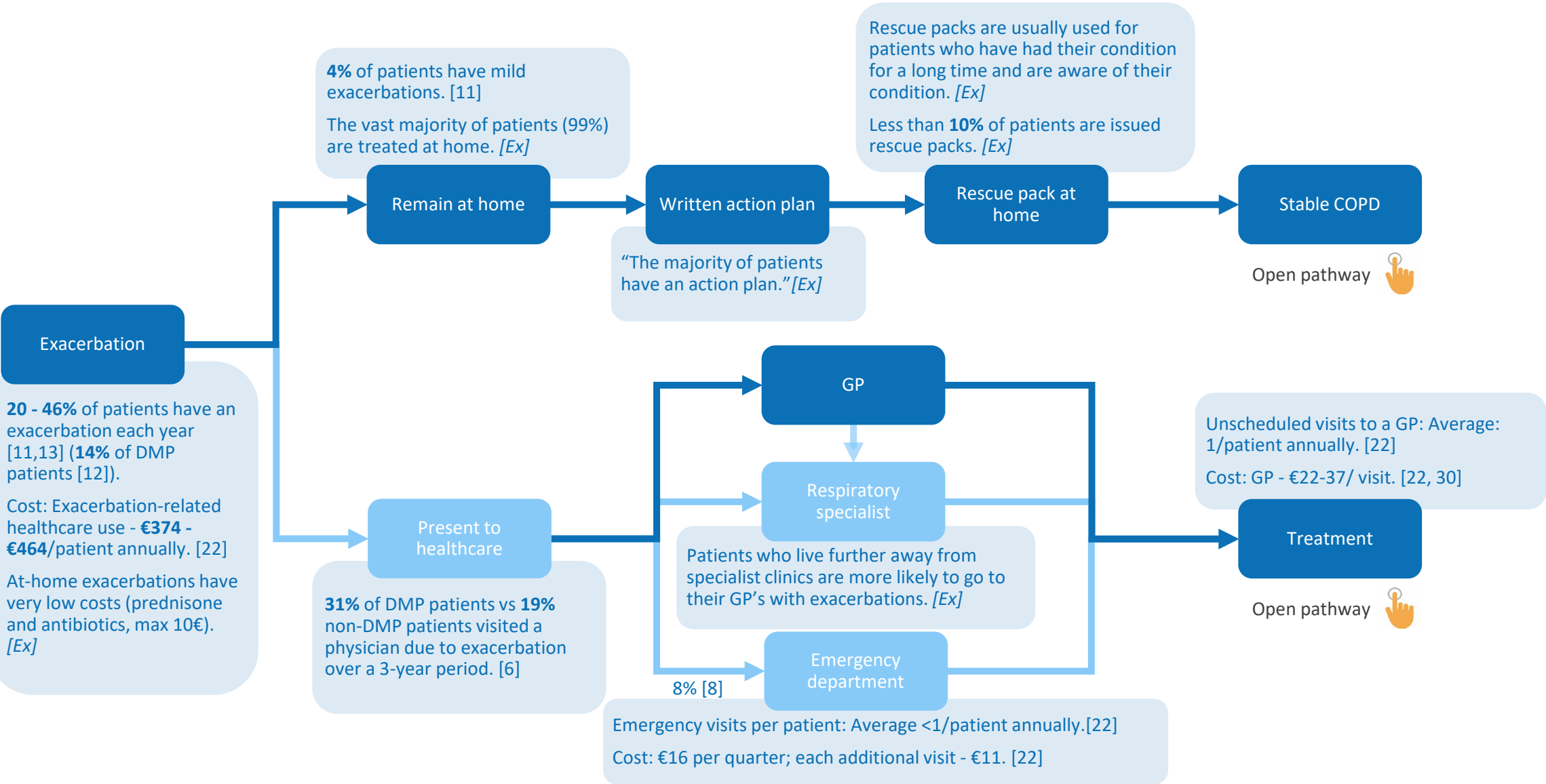




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Management

Exacerbations



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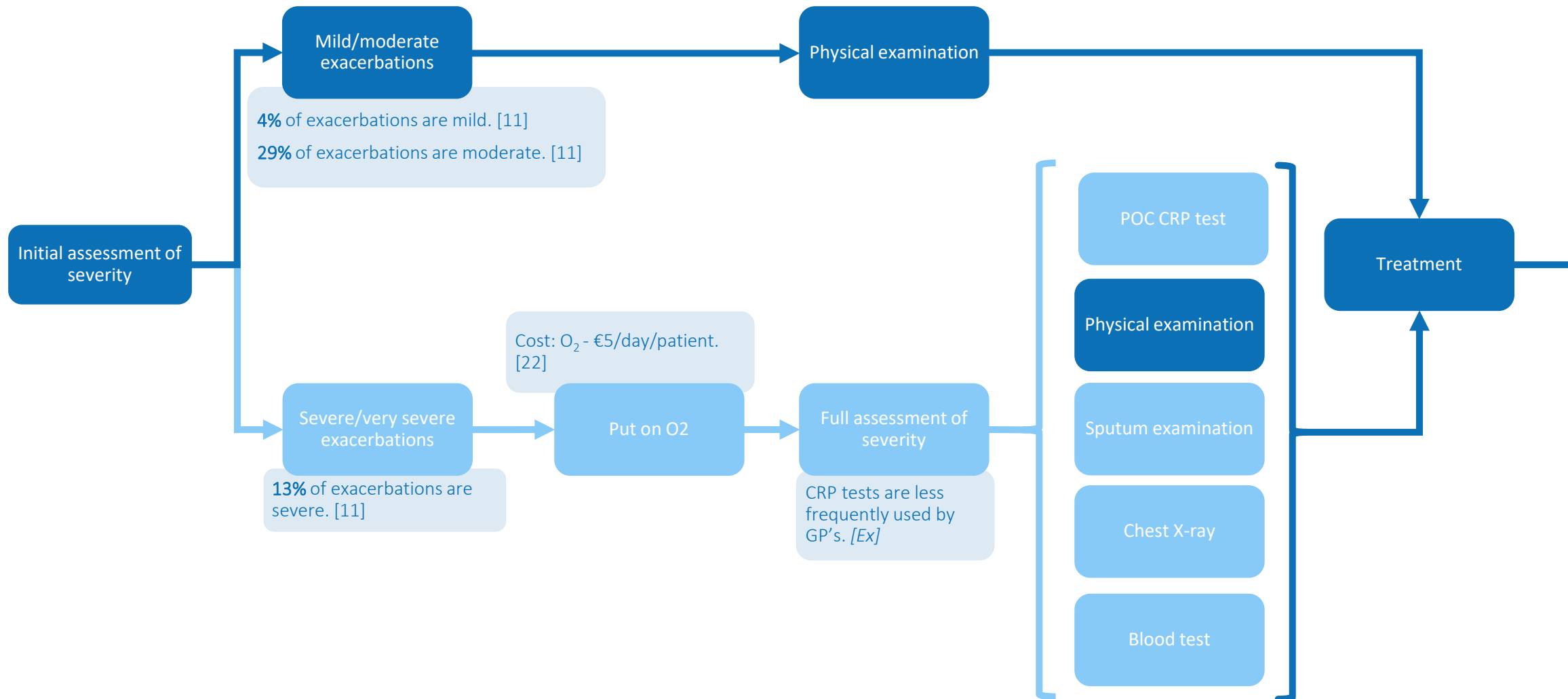




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Management

Exacerbation:
presentation
to healthcare

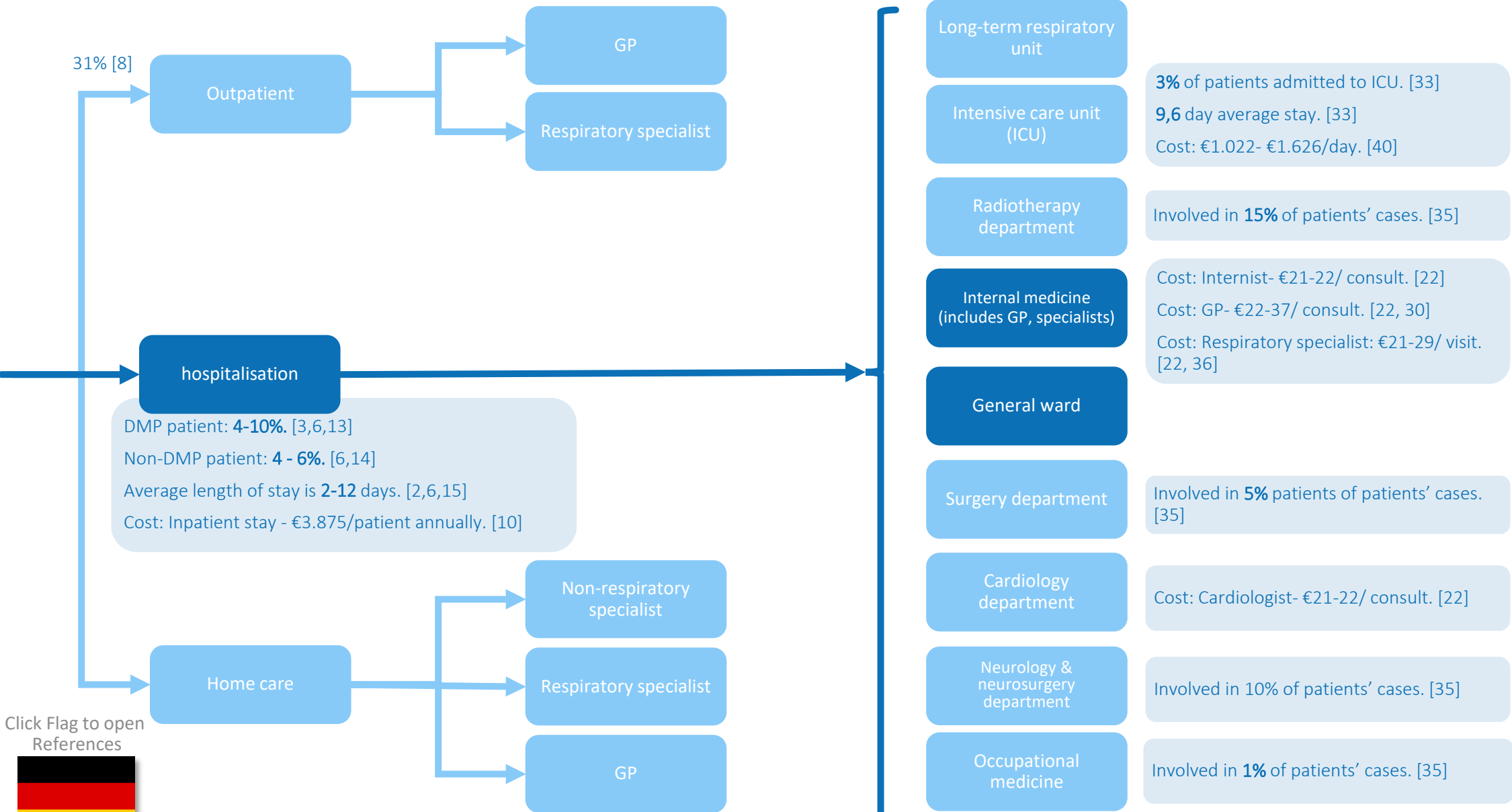


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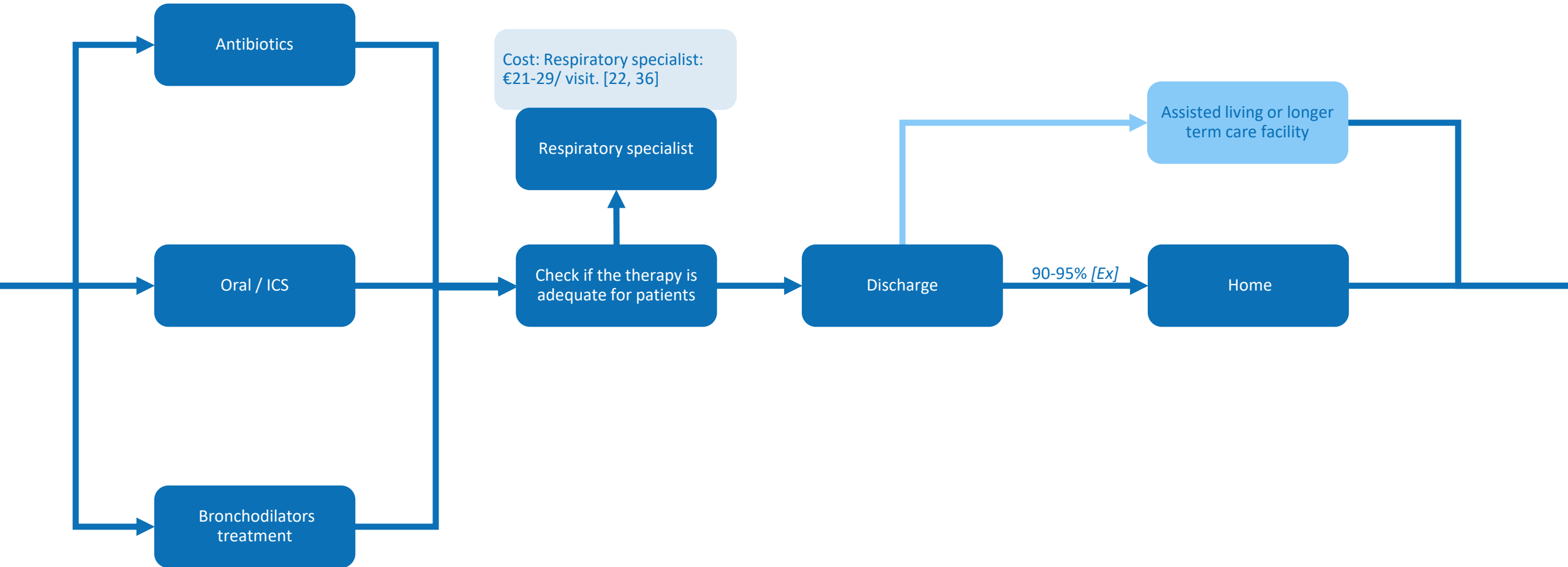


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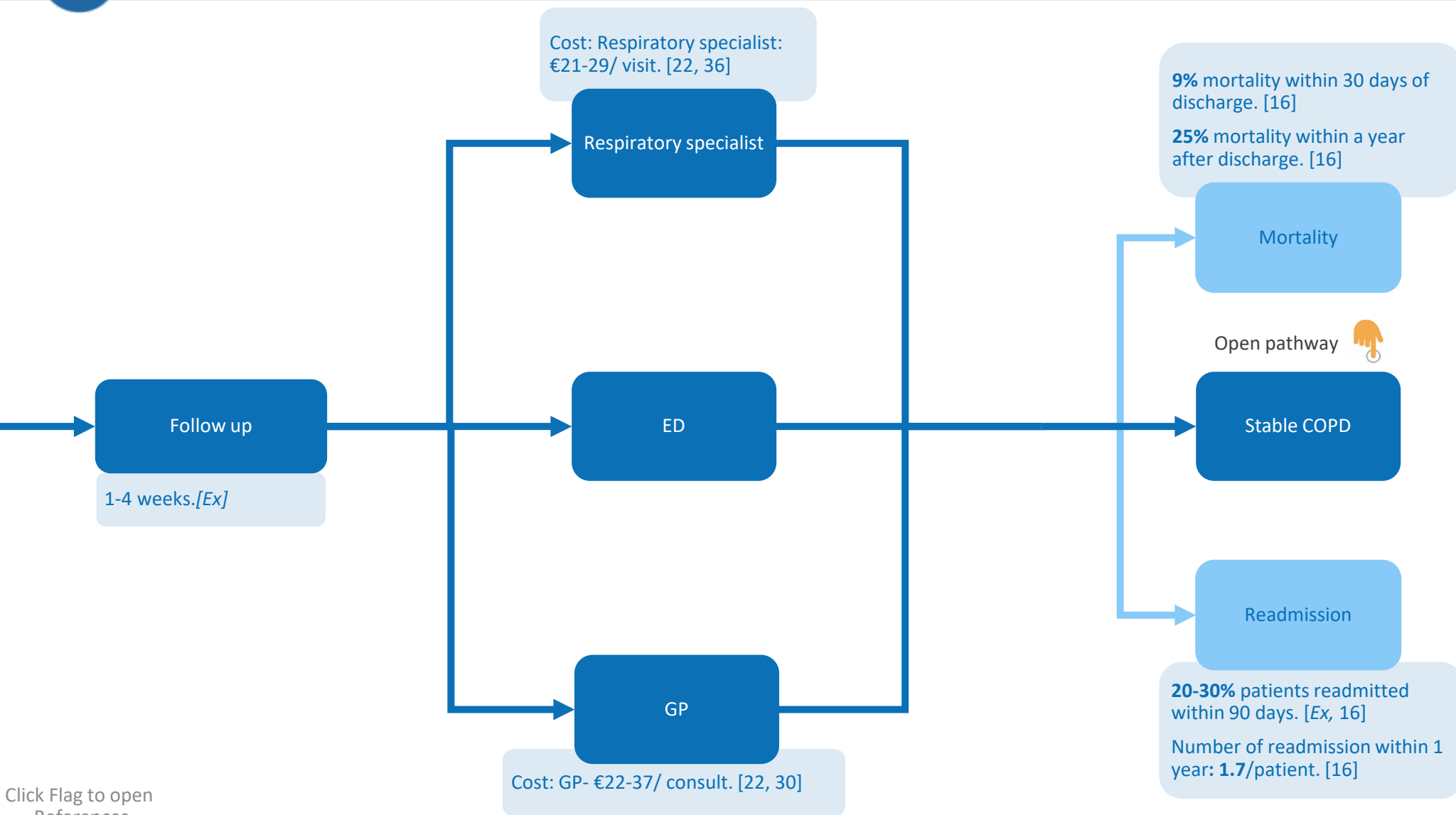
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ICS = Inhaled Corticosteroids



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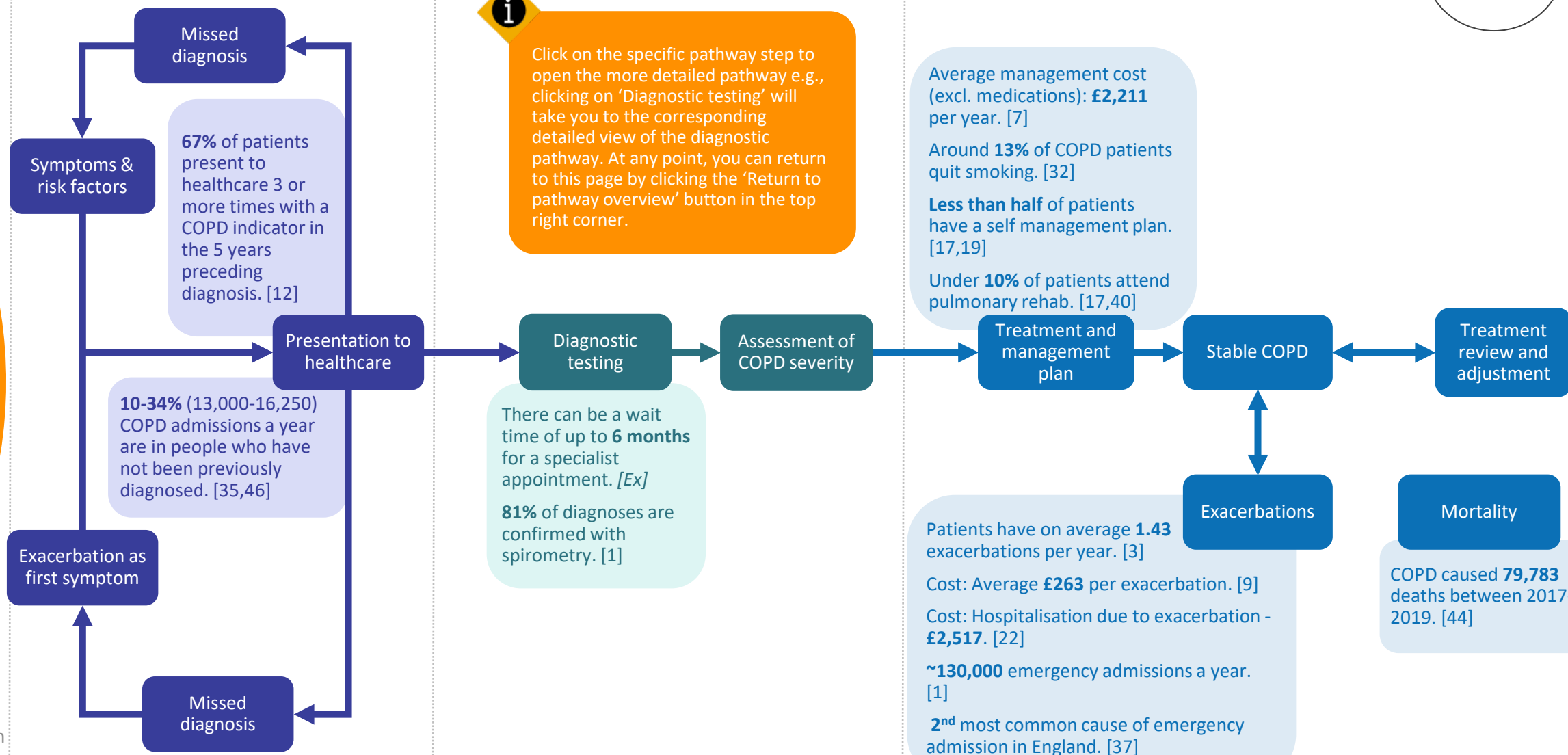
Pathway overview

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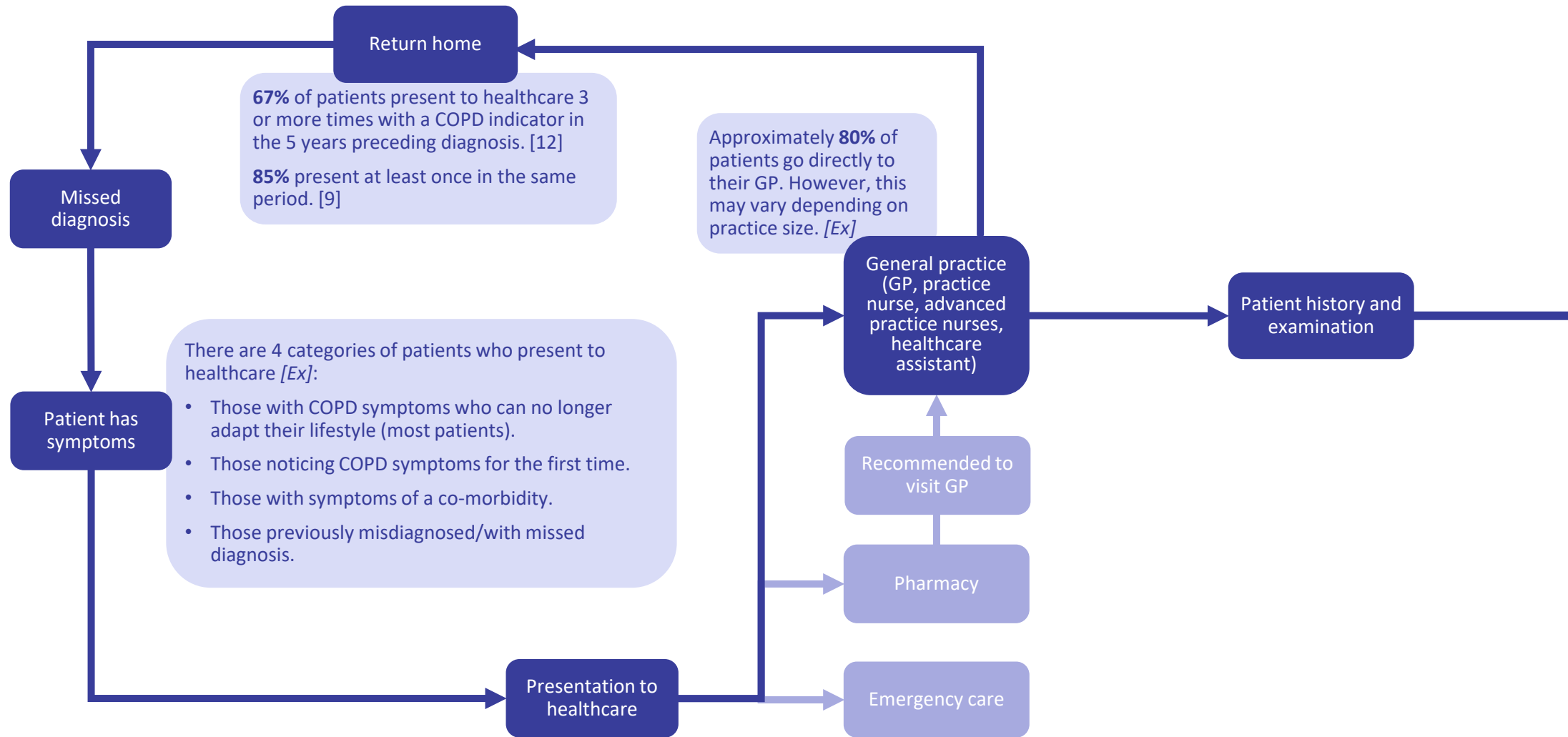
Pre-diagnosis

Diagnosis

Management



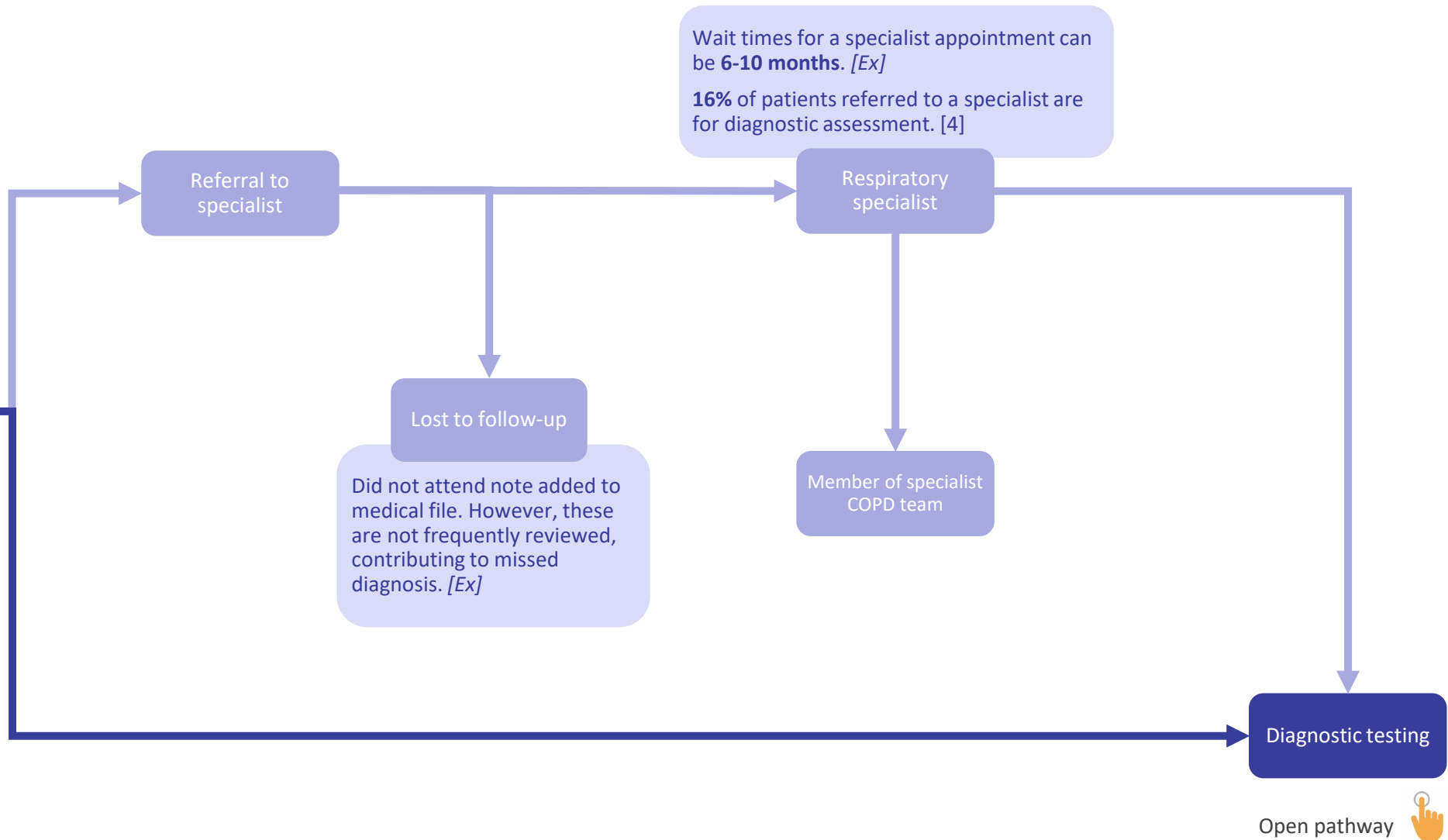
GP = General Practitioner

Presentation
to healthcareClick Flag to open
References

GP = General Practitioner

Open pathway

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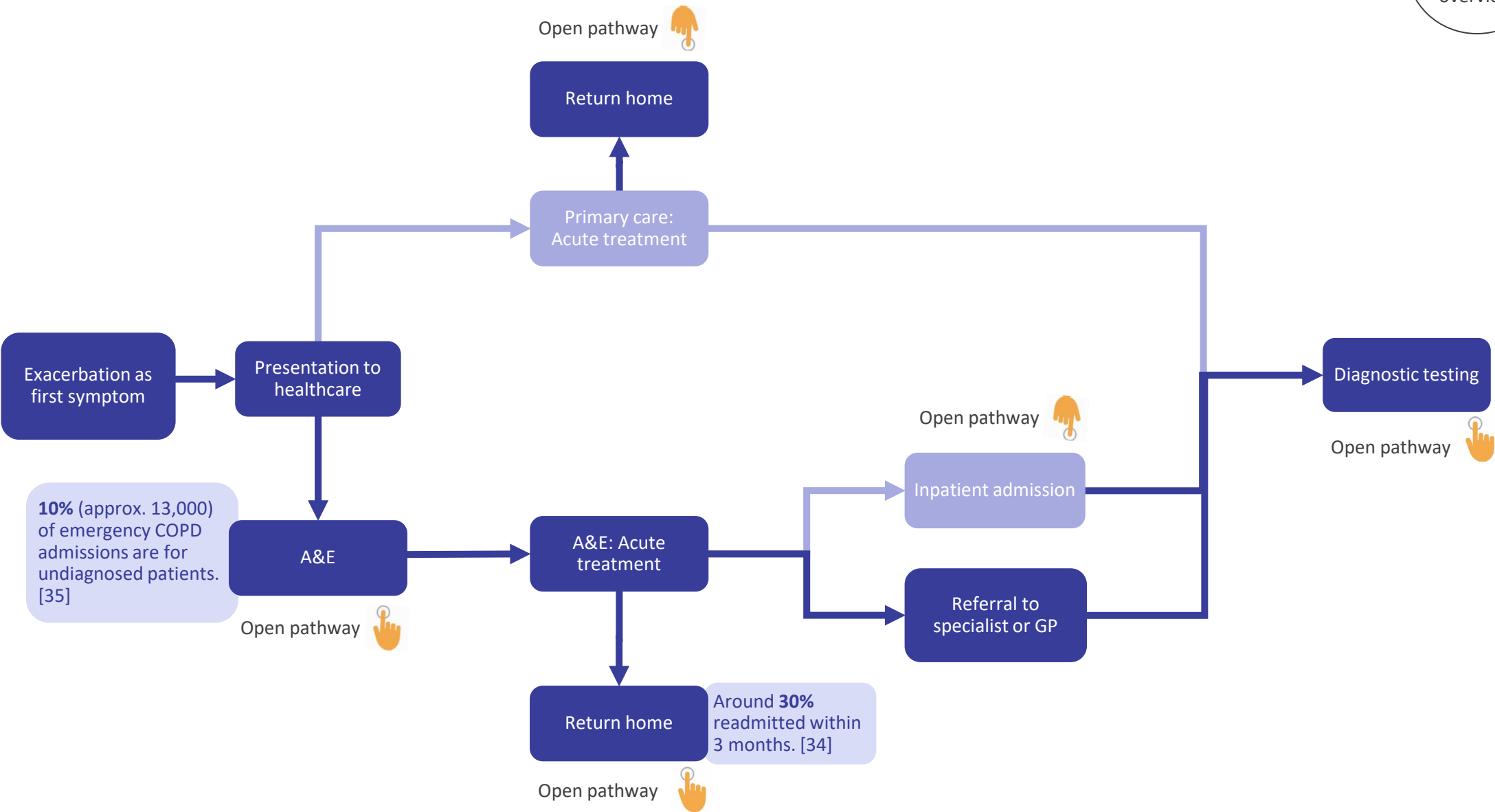
GP = General Practitioner



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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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References



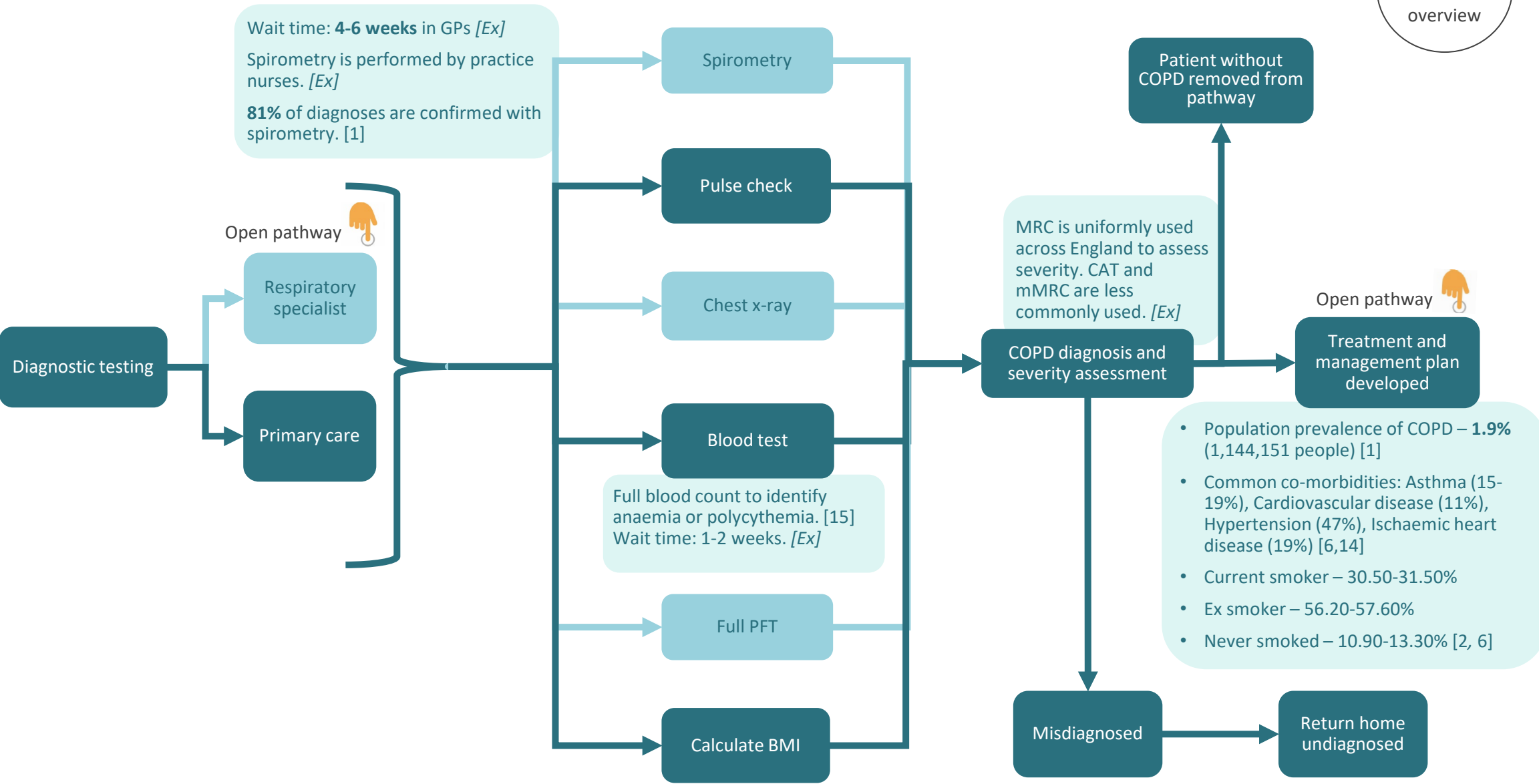
A&E = Accident and Emergency department; GP = General Practitioner



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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

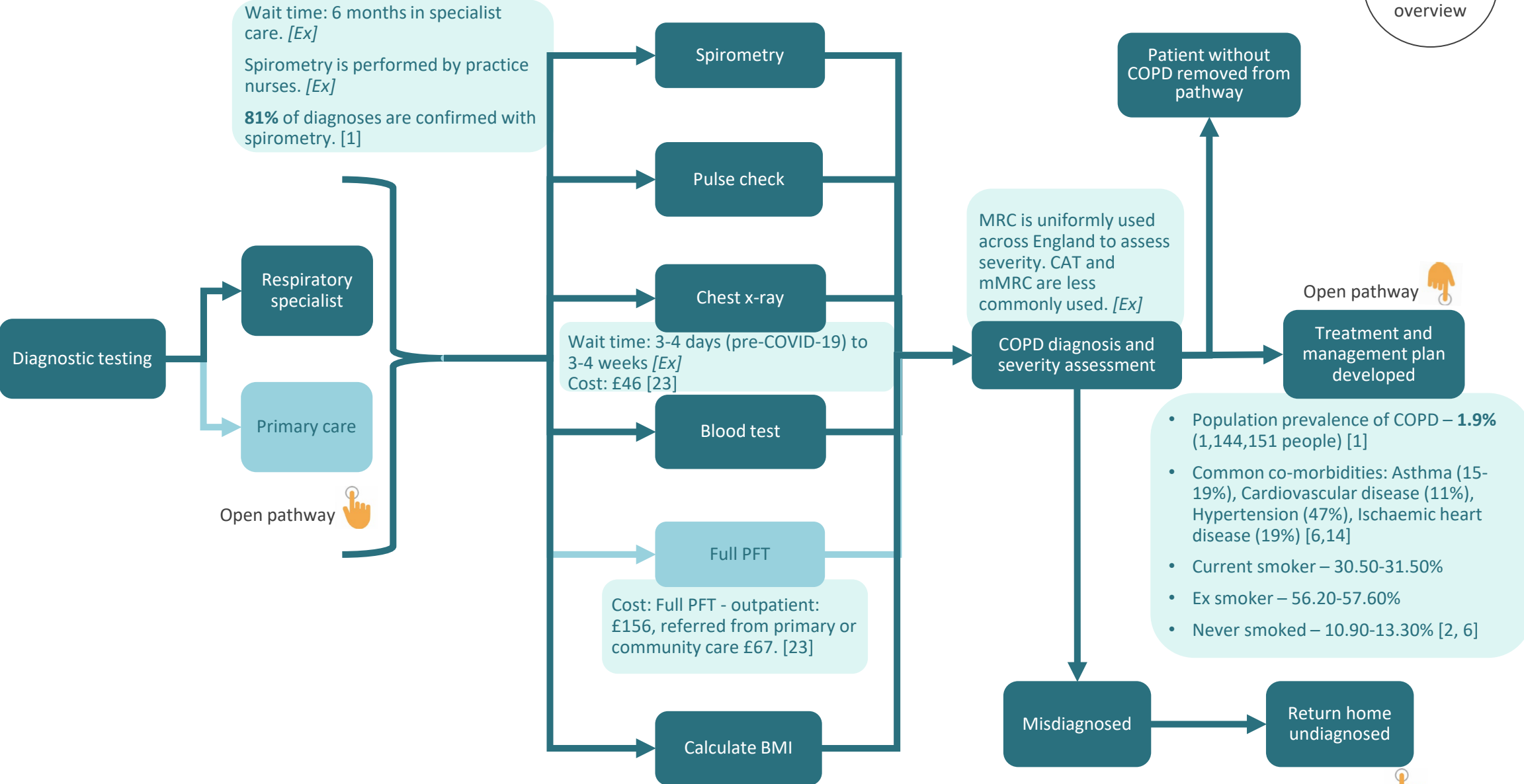
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Diagnosis

Diagnostic
testing:
specialist



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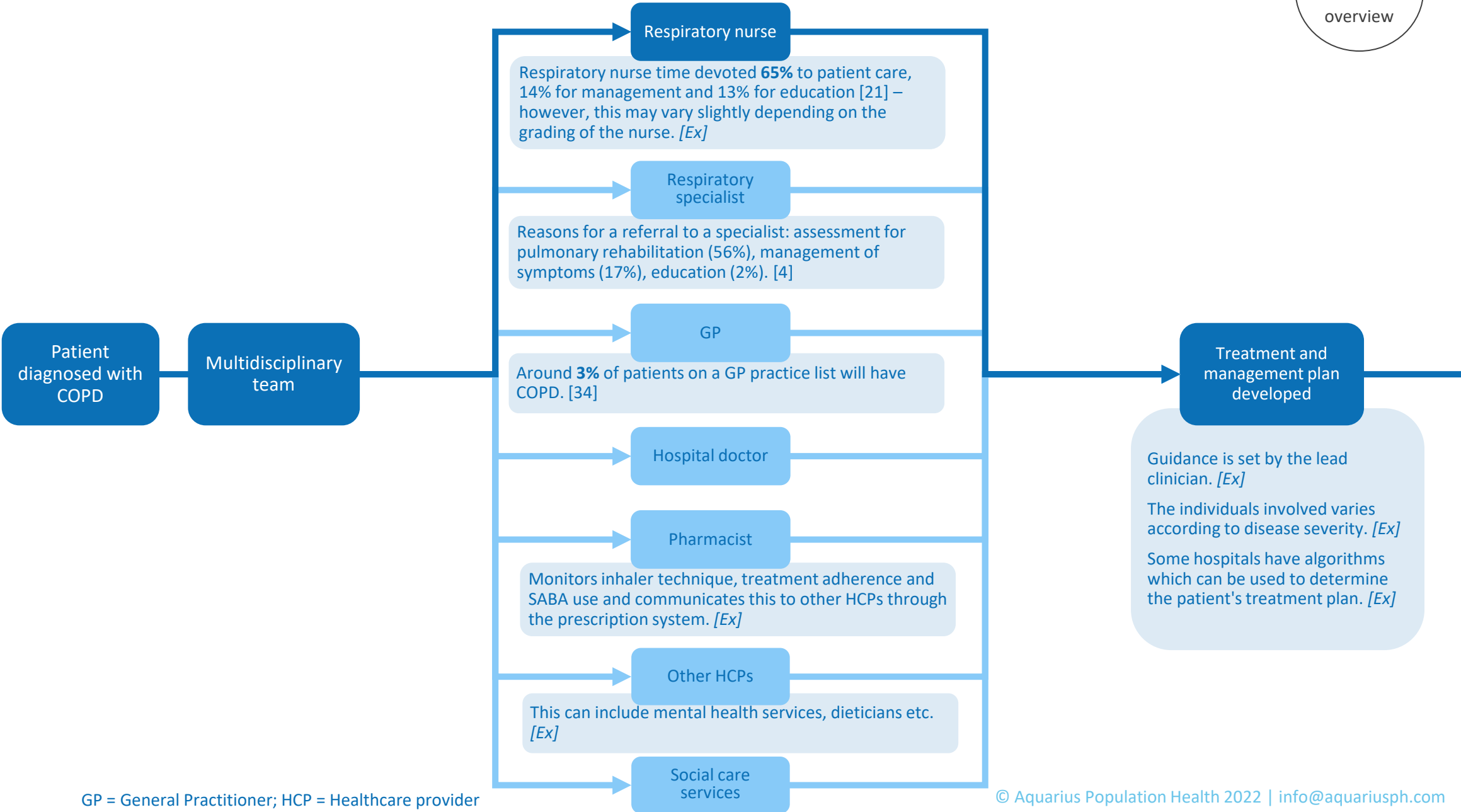
BMI = Body Mass Index; PFT = Pulmonary Function Test; MRC = Medical Research Council Dyspnoea Scale; mMRC = Modified Medical Research Council Dyspnoea Scale; CAT =COPD Assessment Test



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Management

Treatment
and
management
plan



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References





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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]

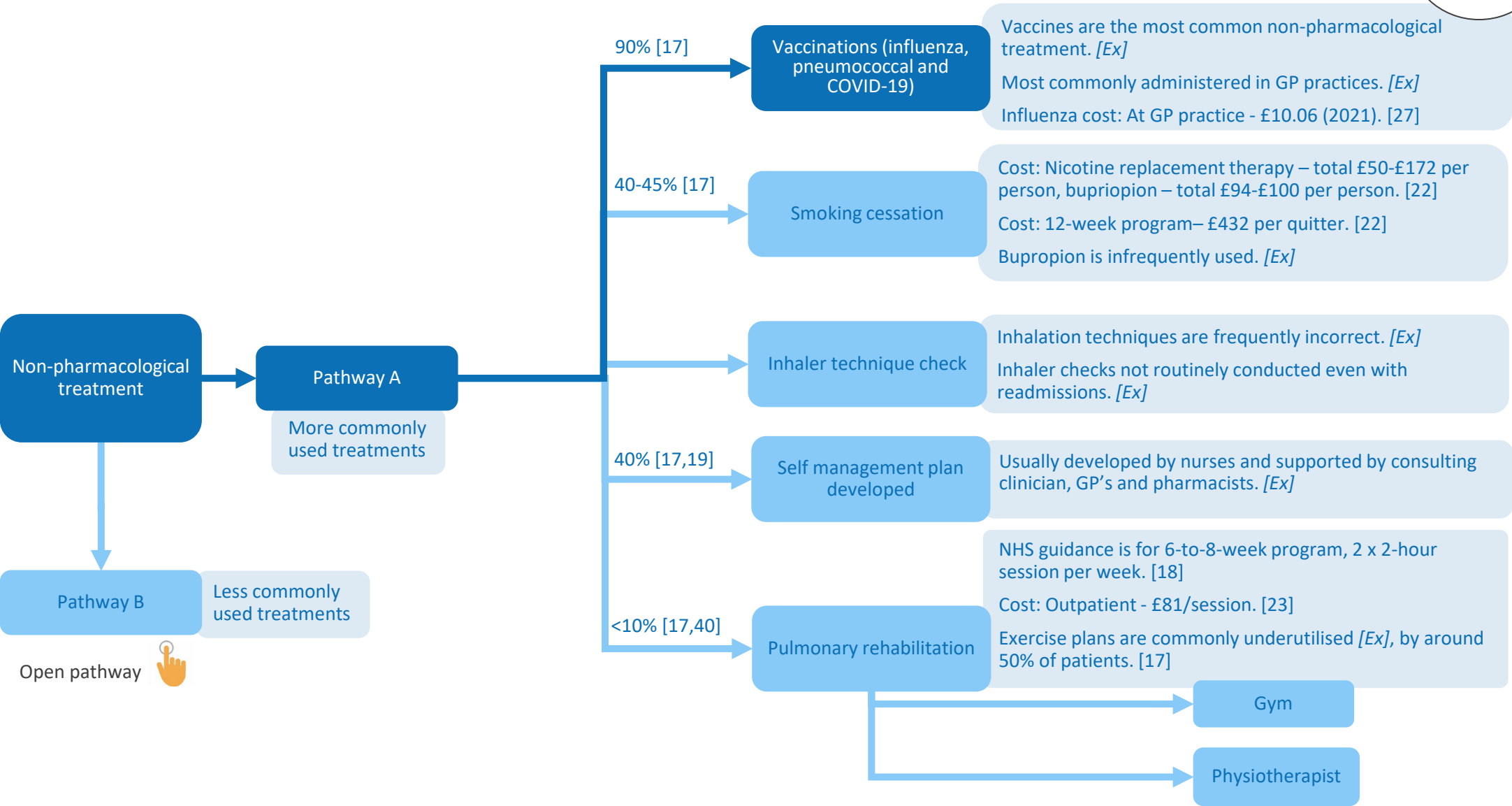
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Treatment
and
management
plan: non-
pharma-
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treatment



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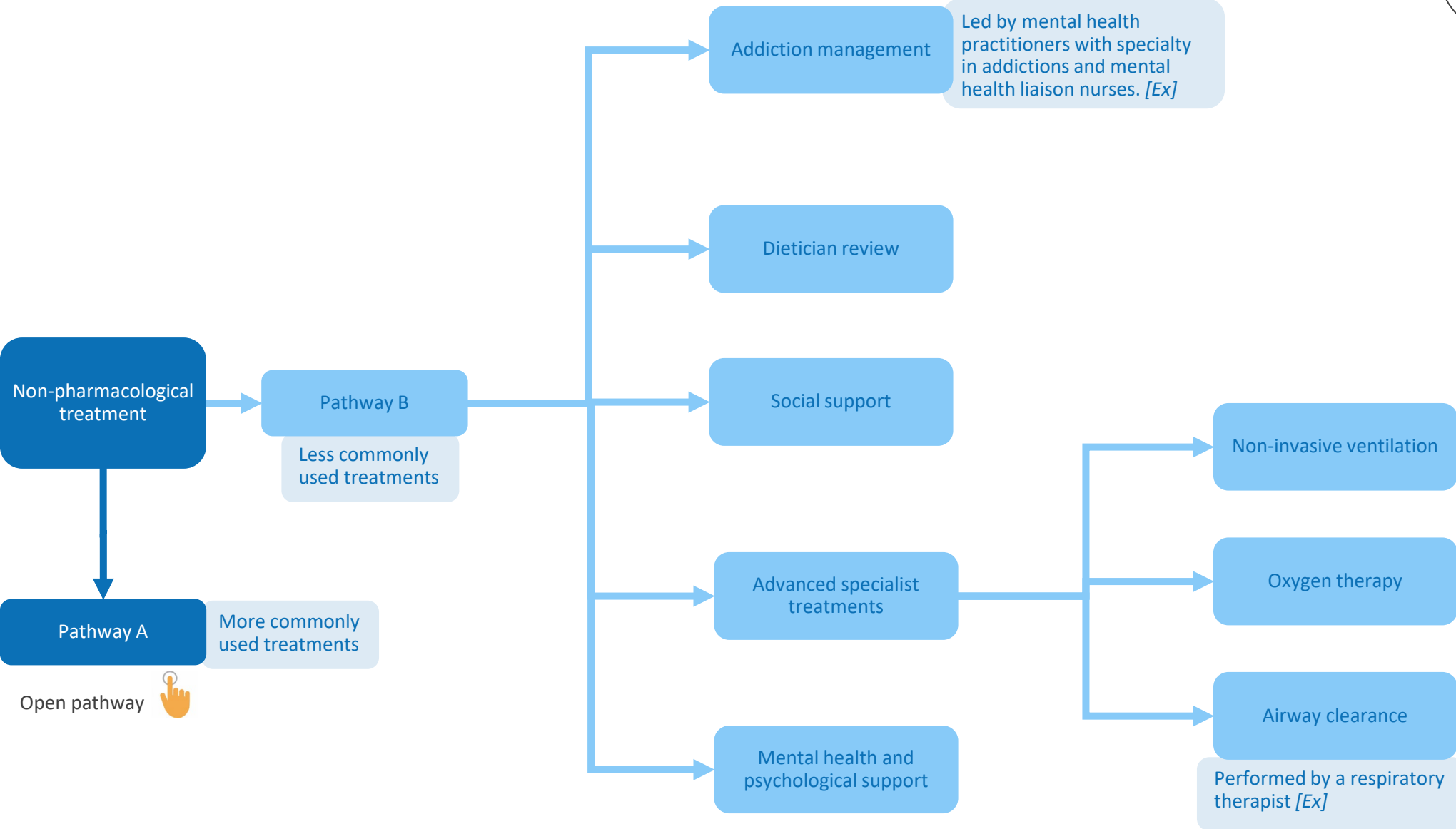




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Management

Treatment
and
management
plan: non-
pharma-
cological
treatment



Open pathway

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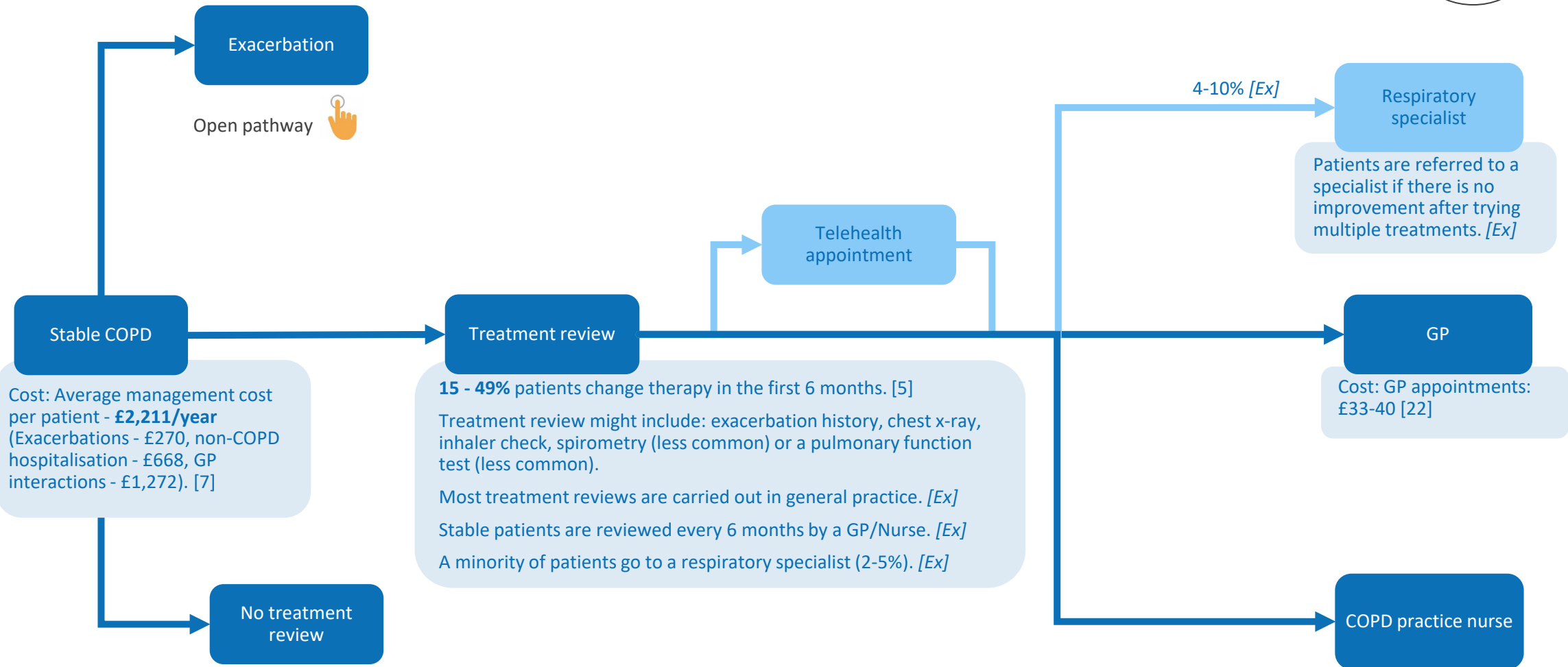




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to pathway
overview

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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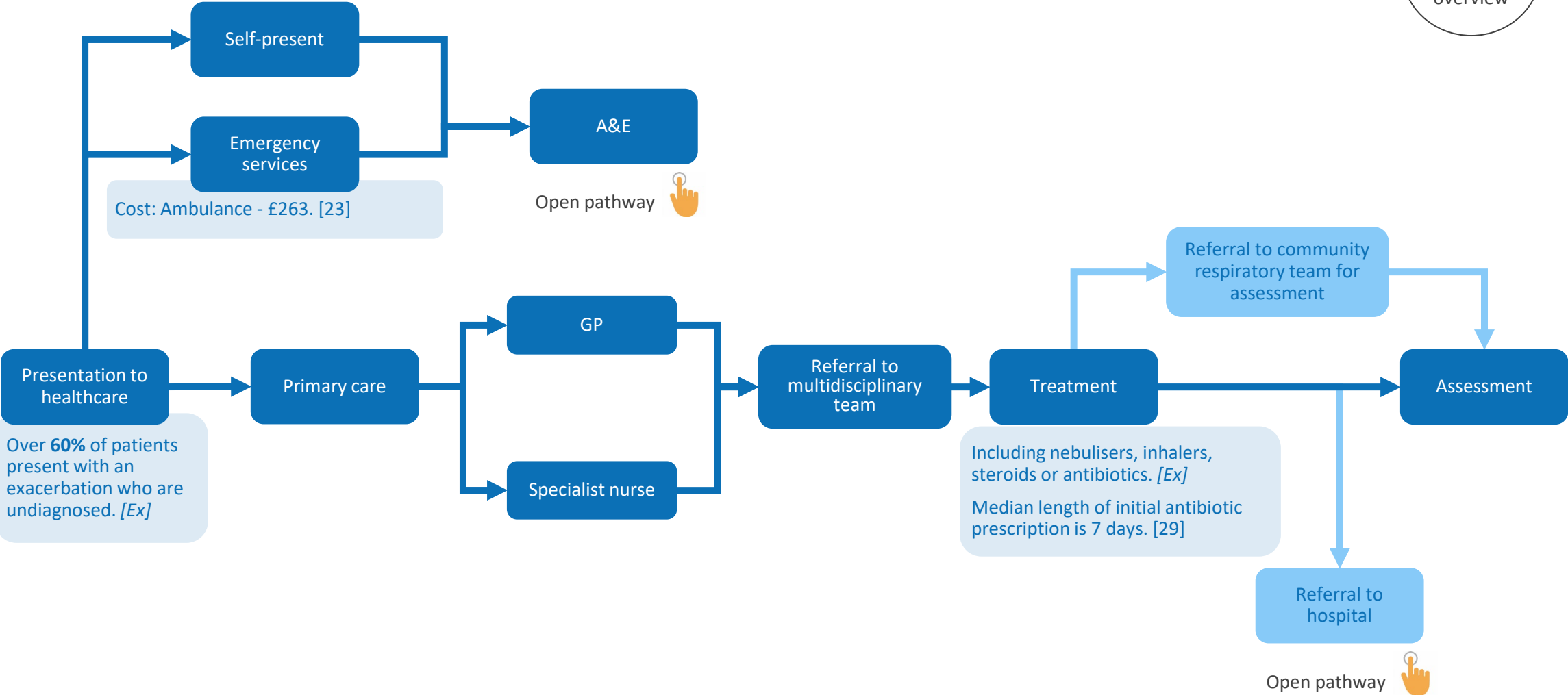




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Management

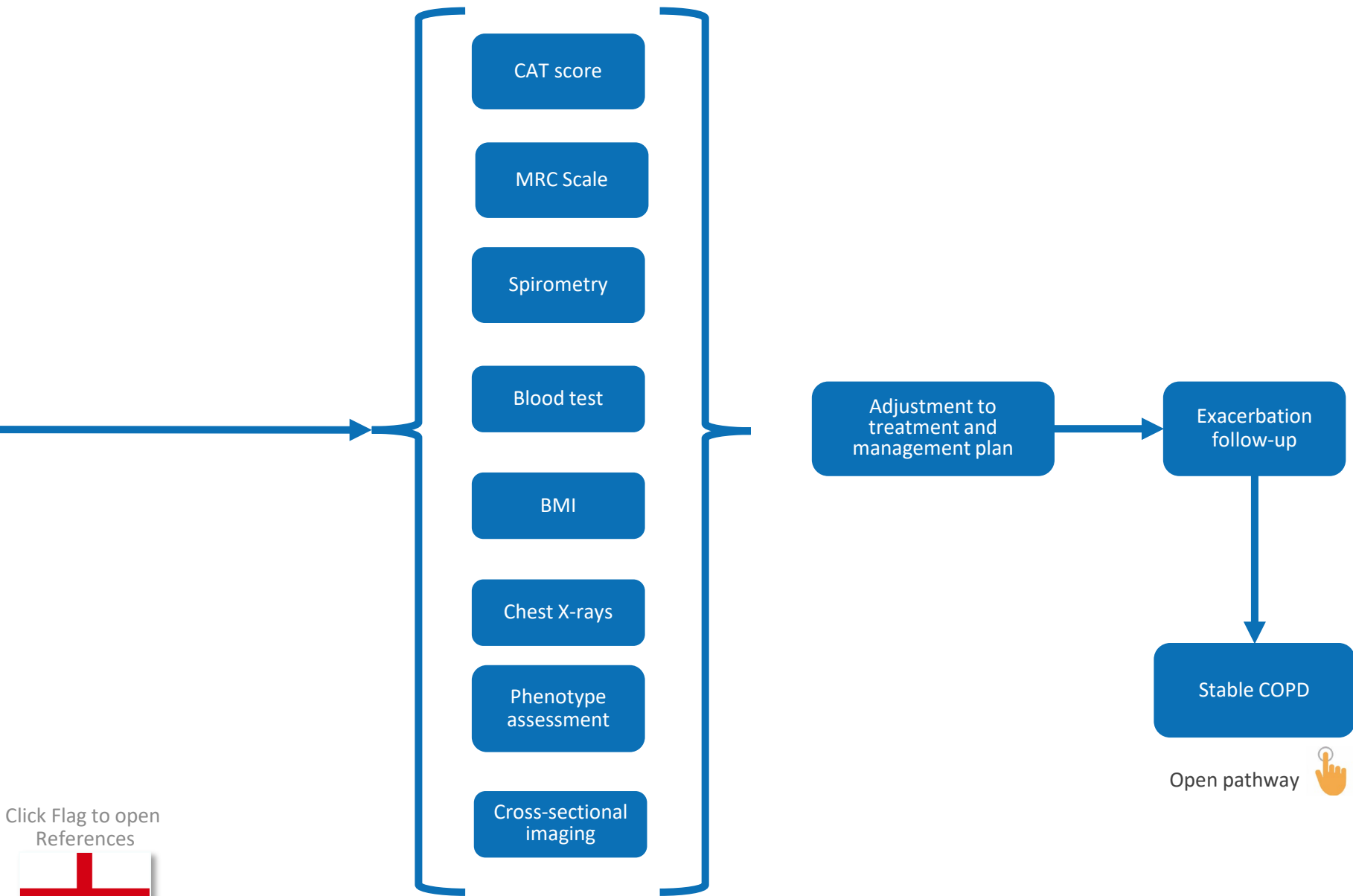
Exacerbations:
presentation to
healthcare



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References



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



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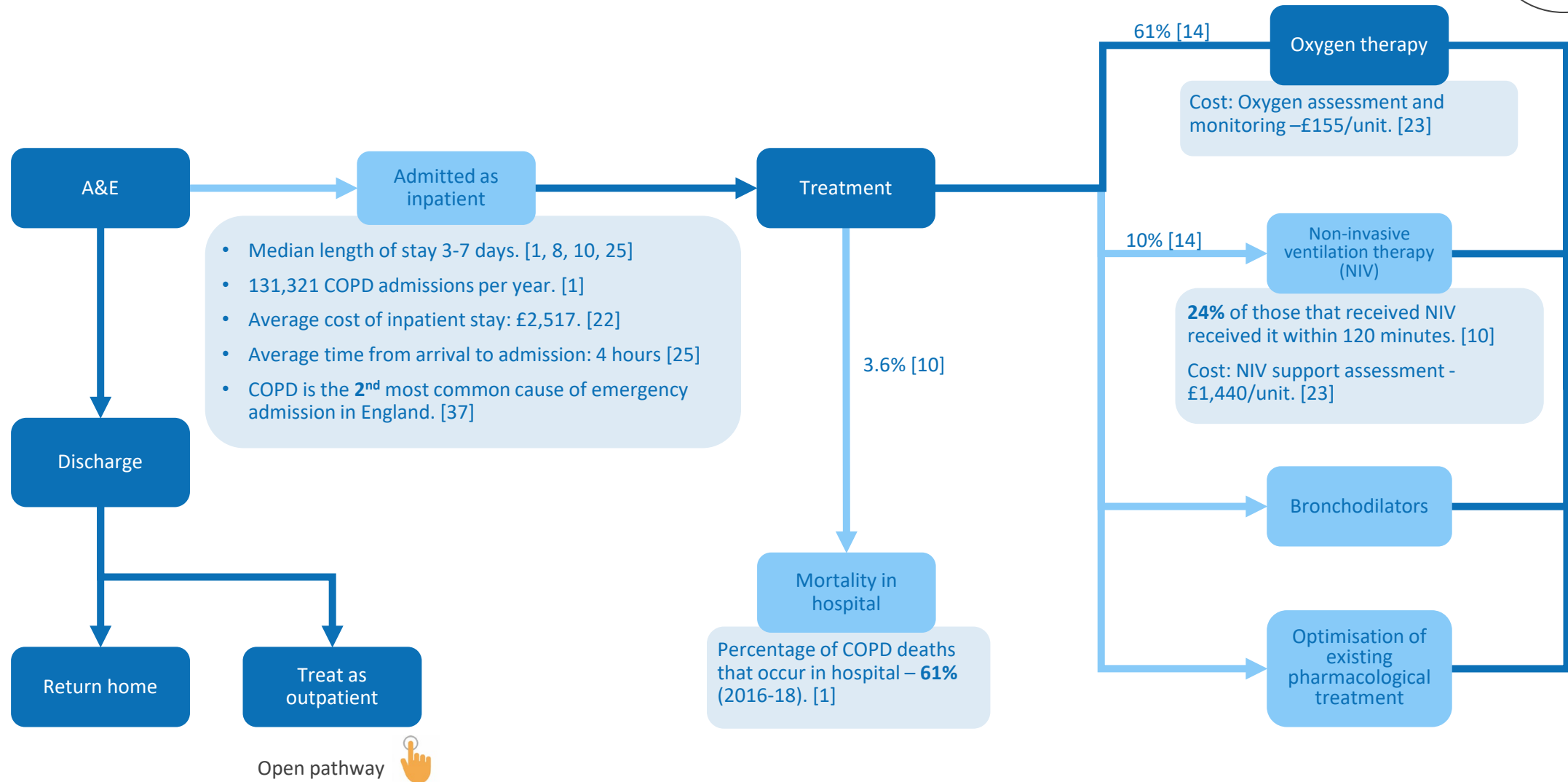




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Management

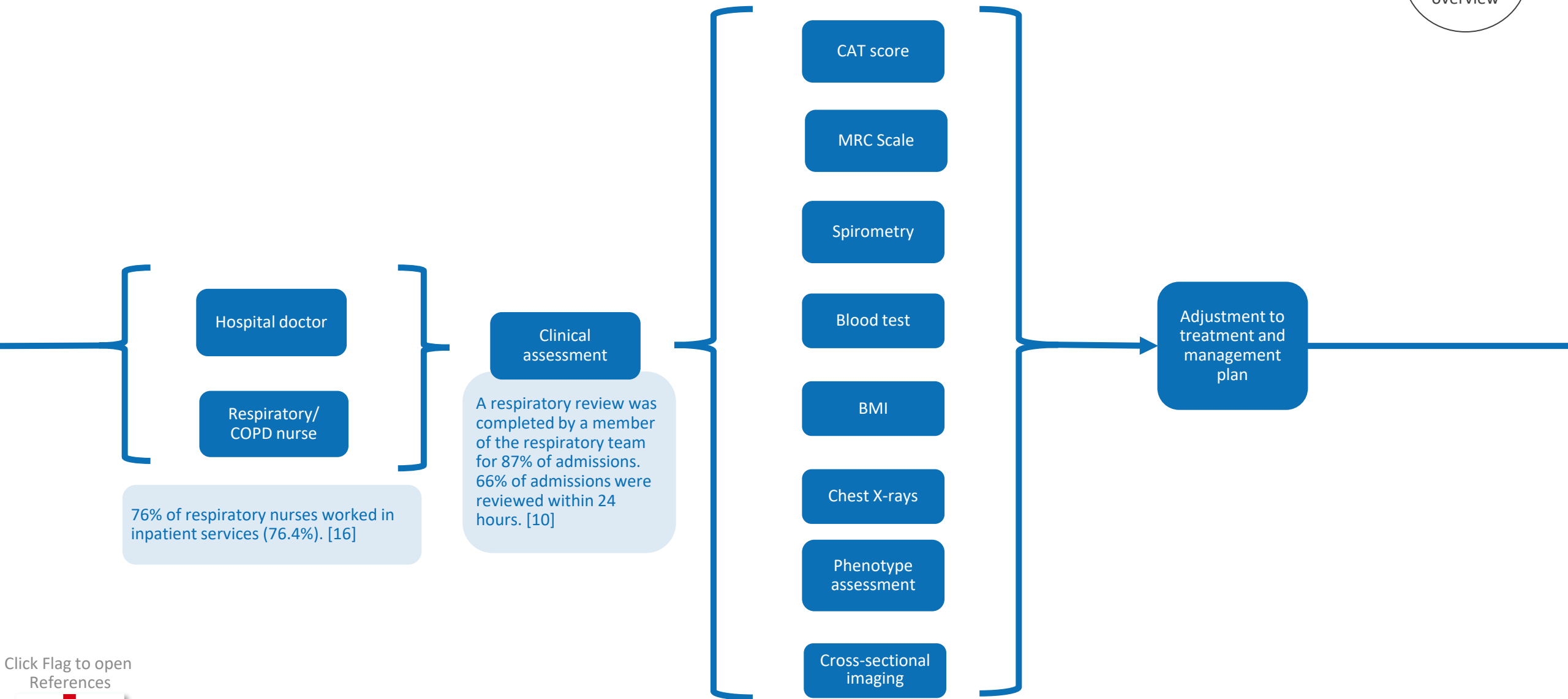
Exacerbations:
A&E and
inpatient
admission



Open pathway

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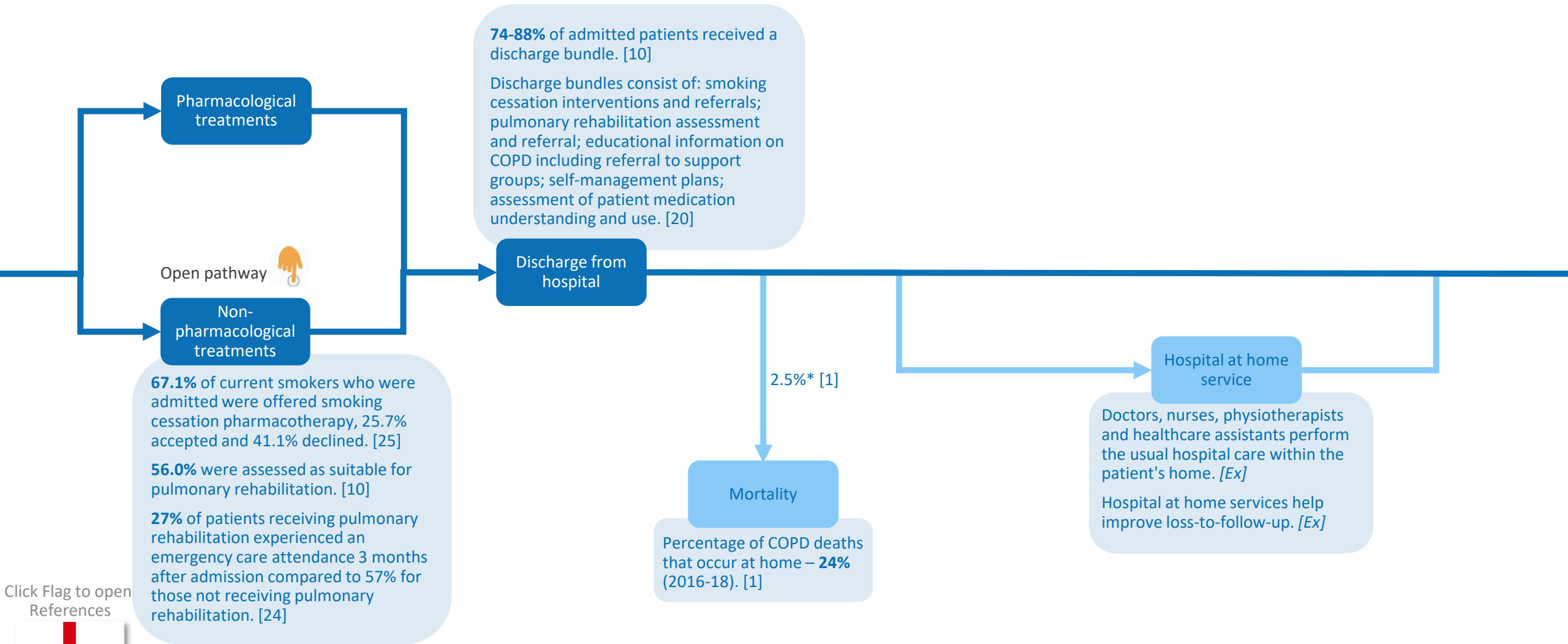




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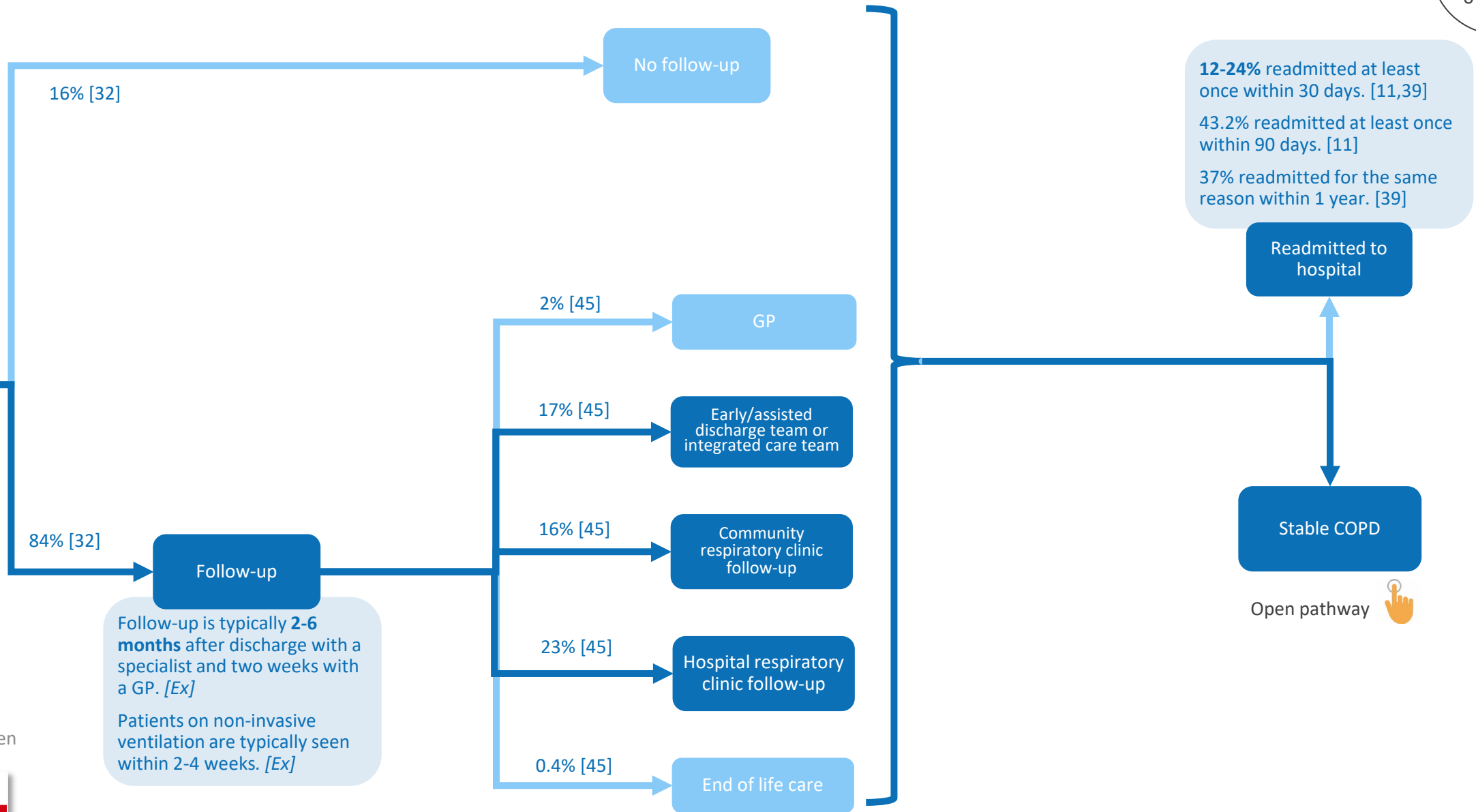
CAT = COPD Assessment Test; BMI = Body Mass Index; MRC = Medical Research Council; NACAP = National Asthma and COPD Audit Programme



* Within 30 days of emergency hospital admission



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GP = General Practitioner

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