



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**



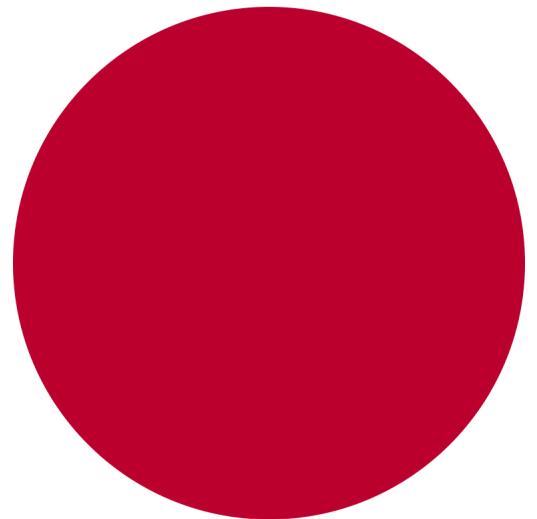
# Evidenced Care Pathways for COPD

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

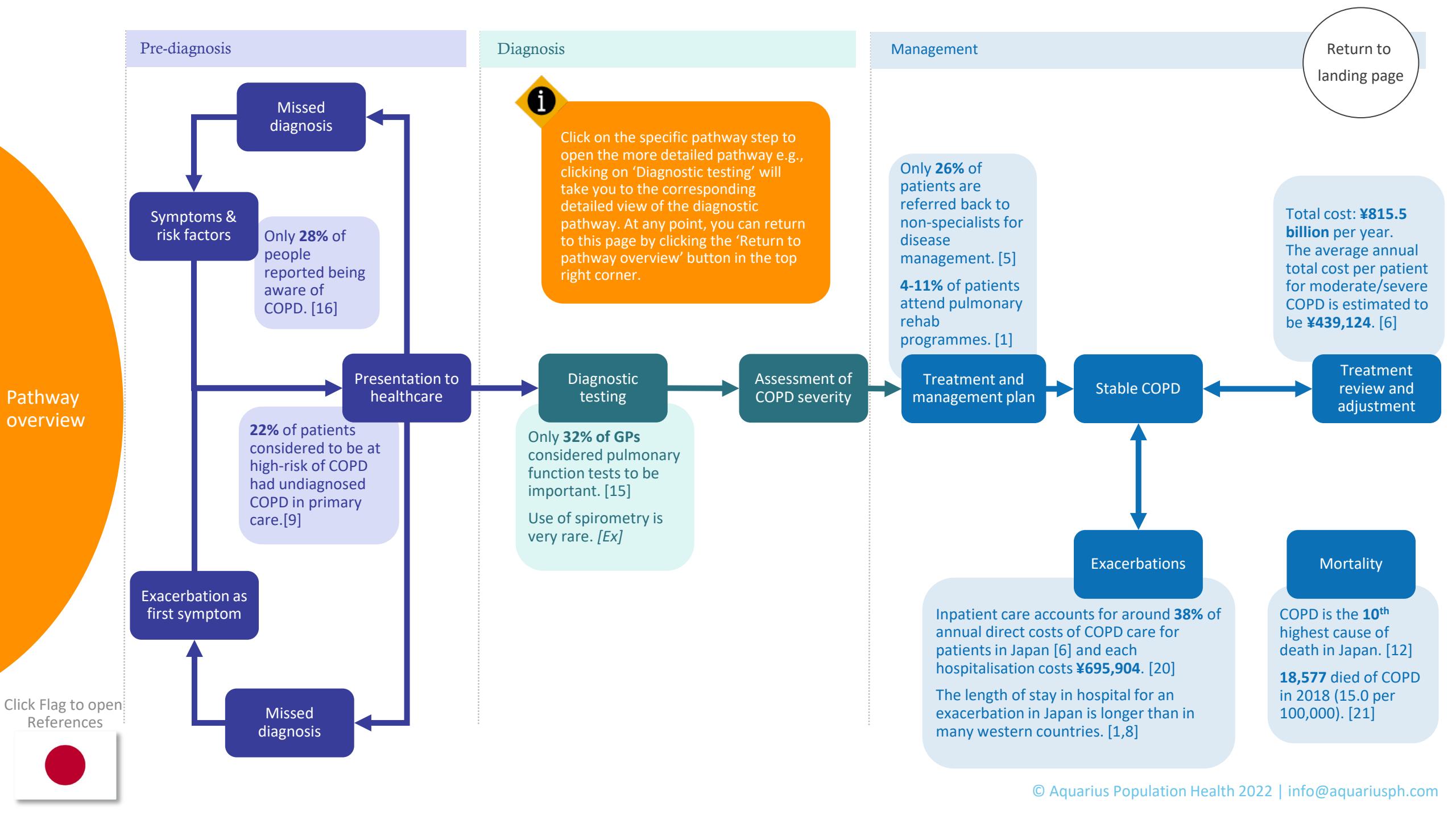
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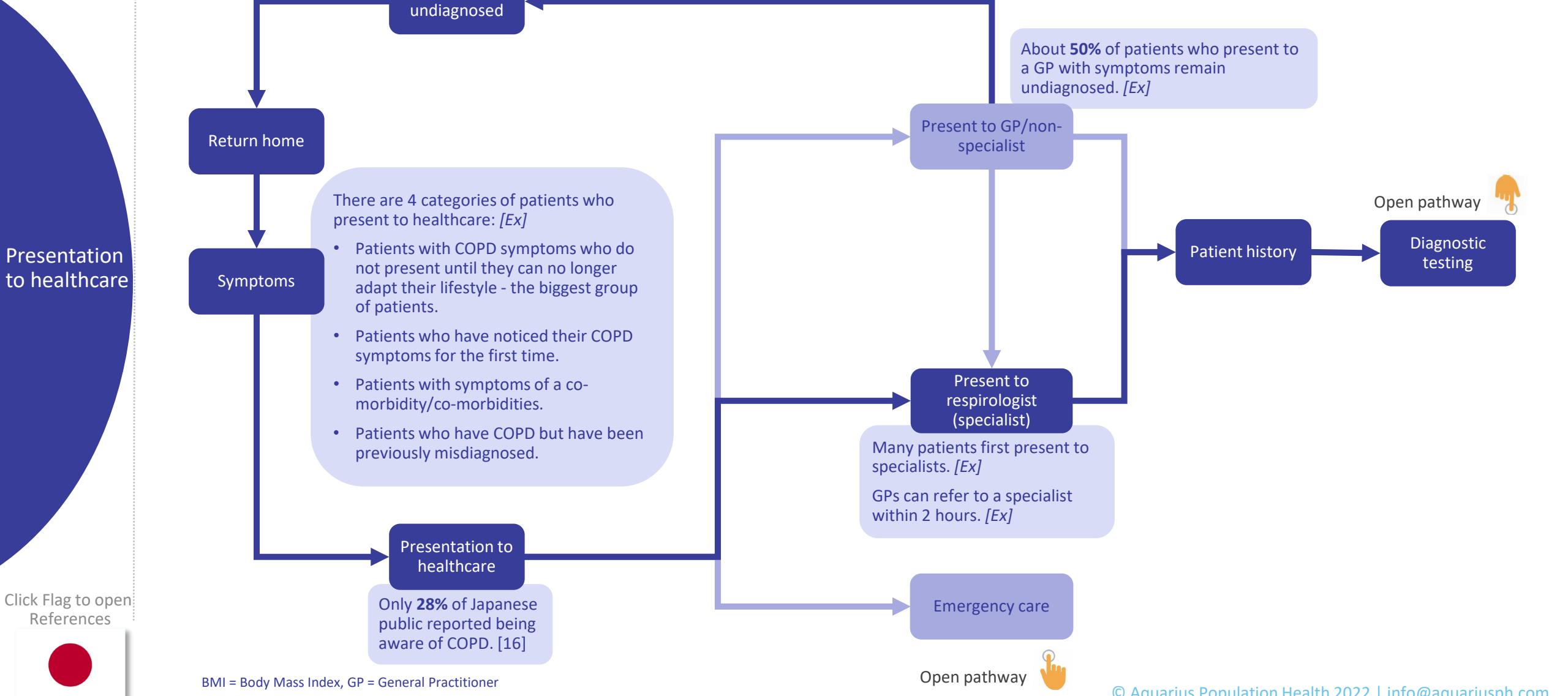
Japan

Germany



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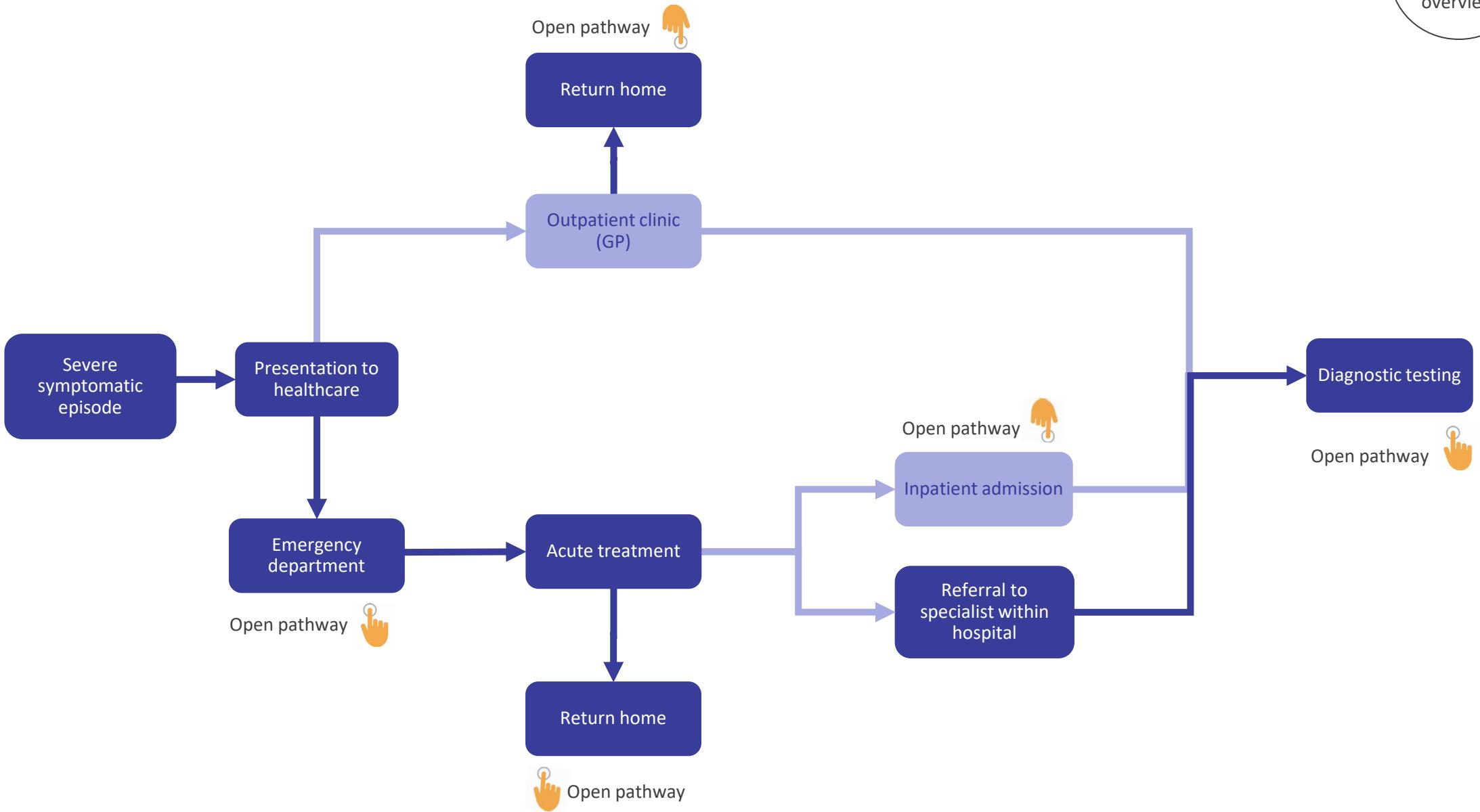






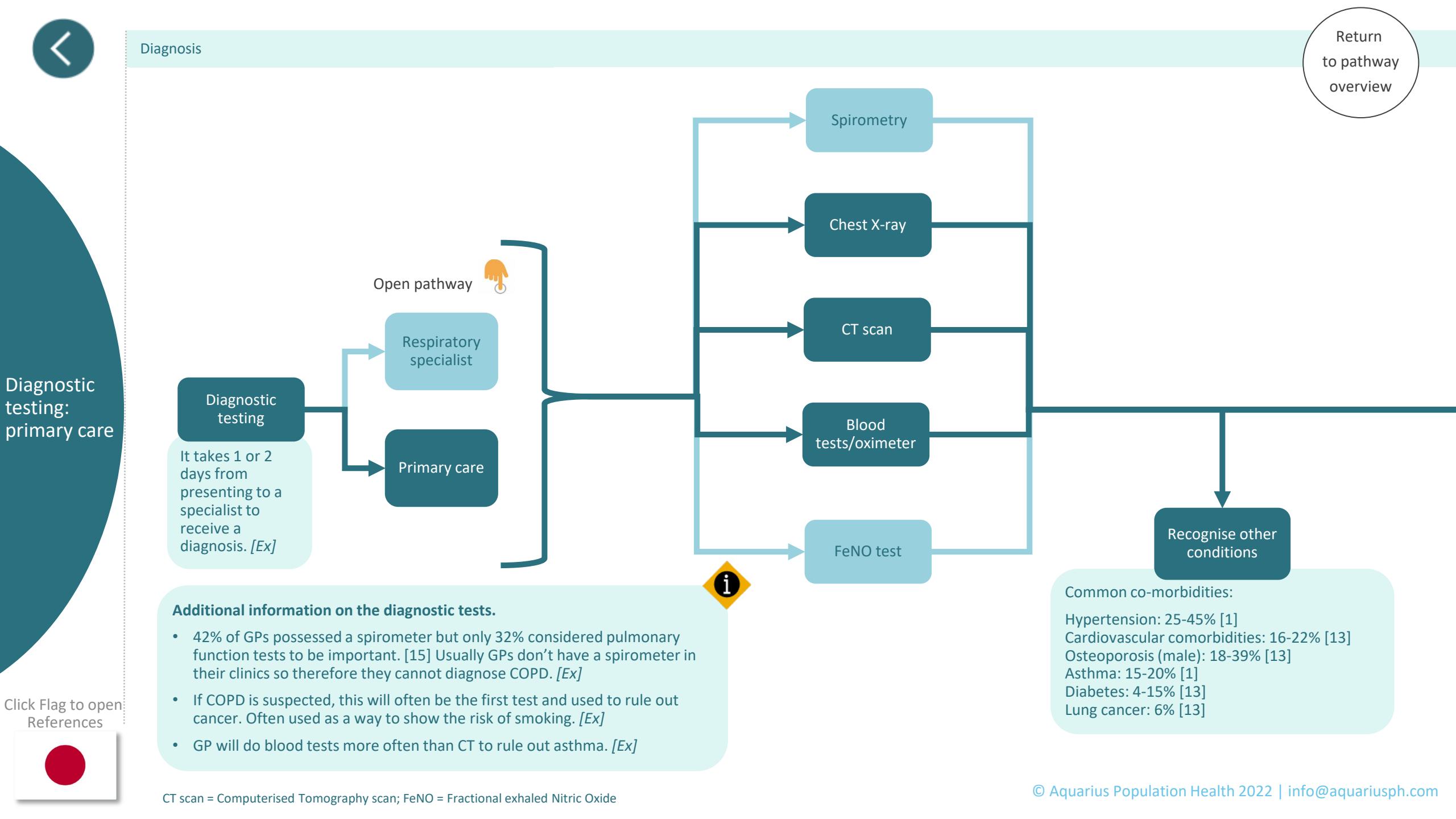
Pre-diagnosis

Return to pathway overview



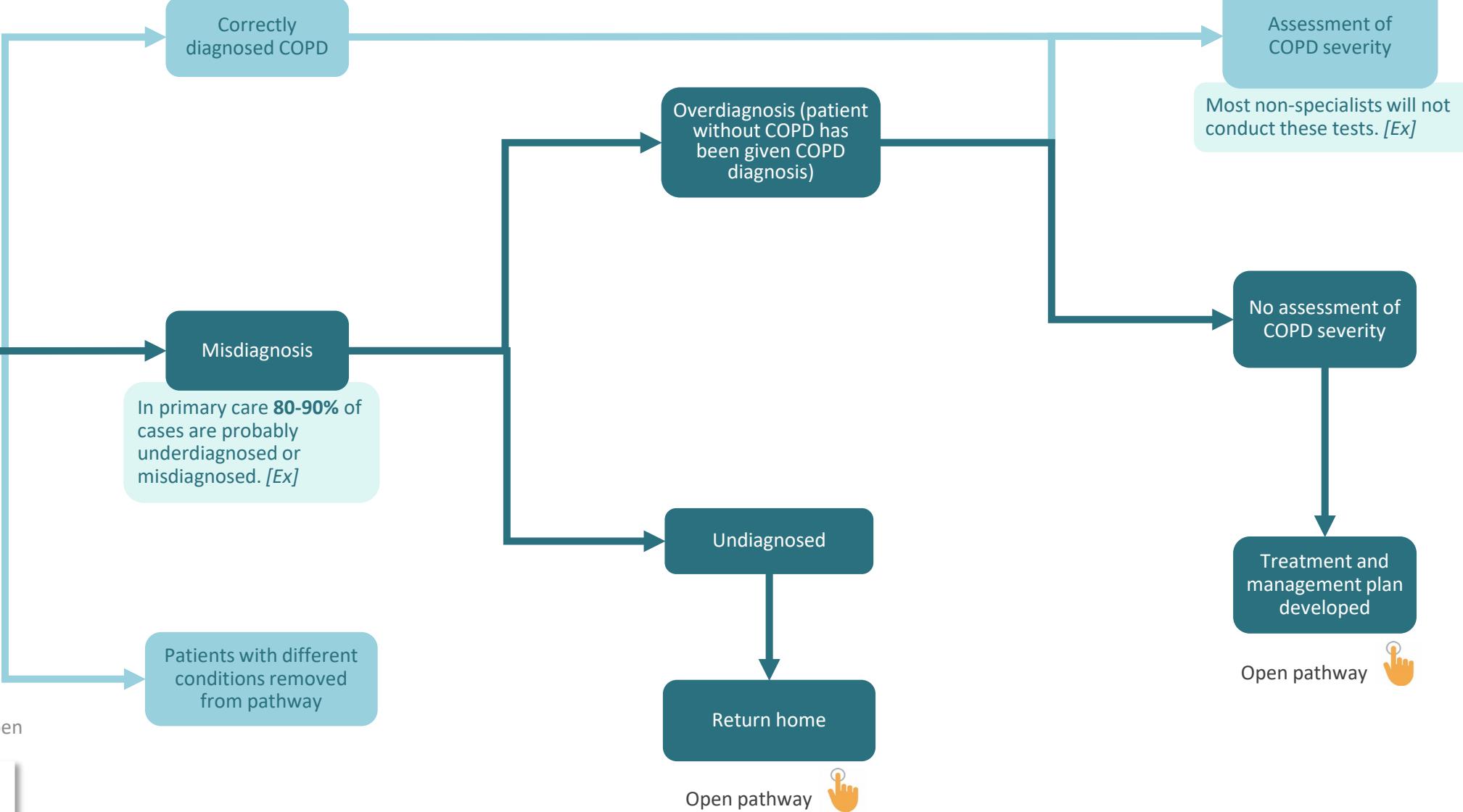
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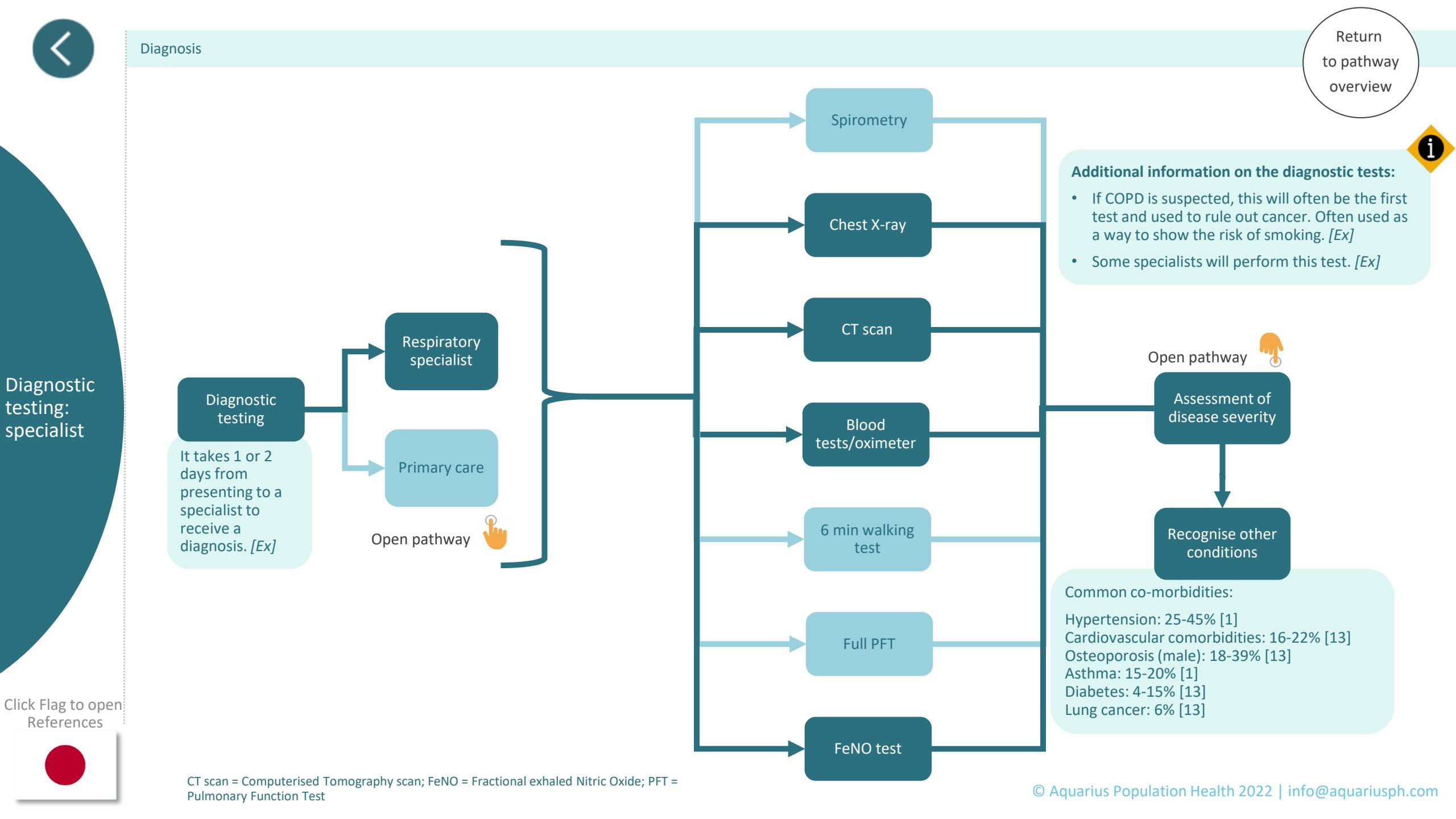
Return  
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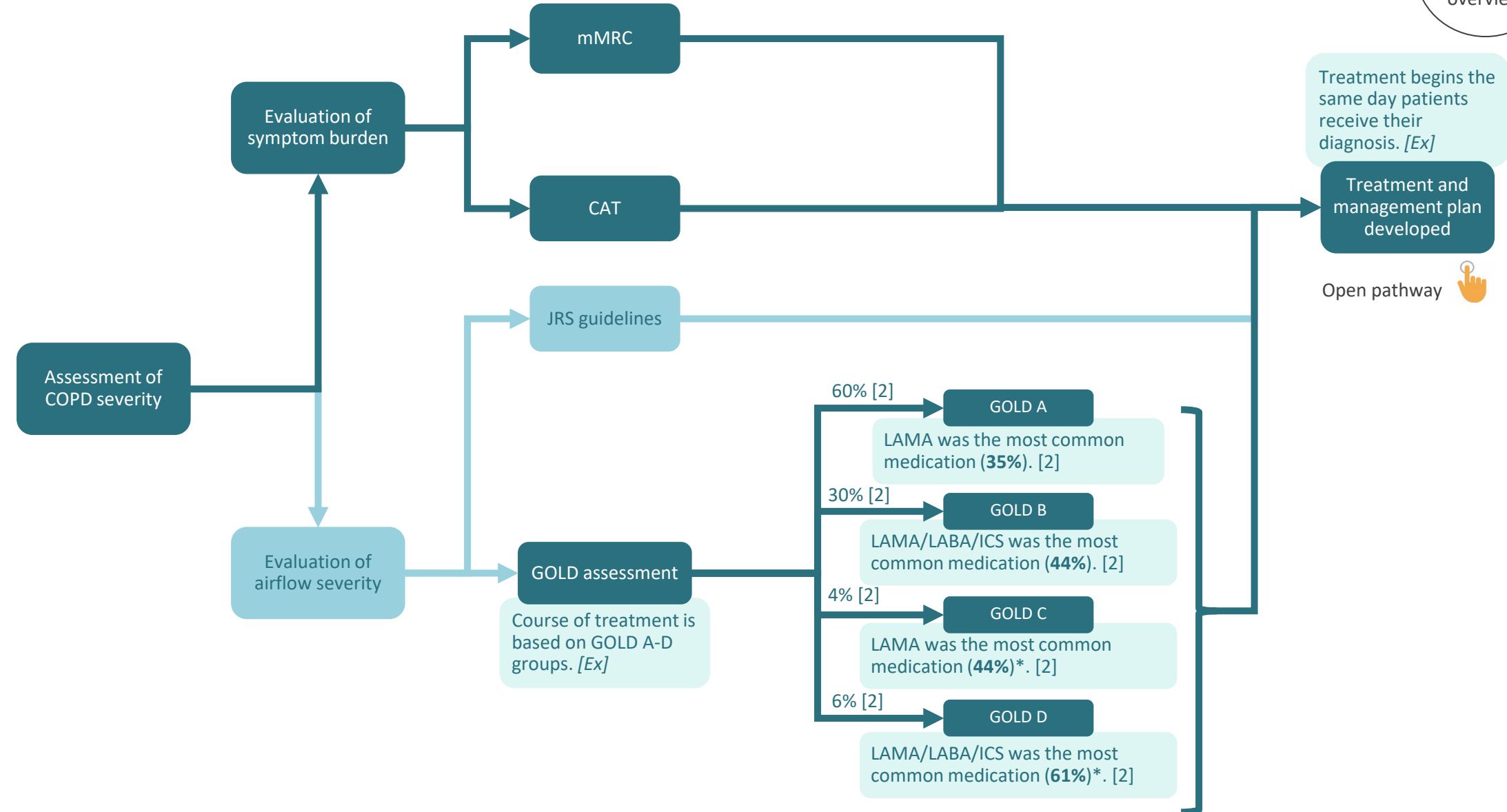
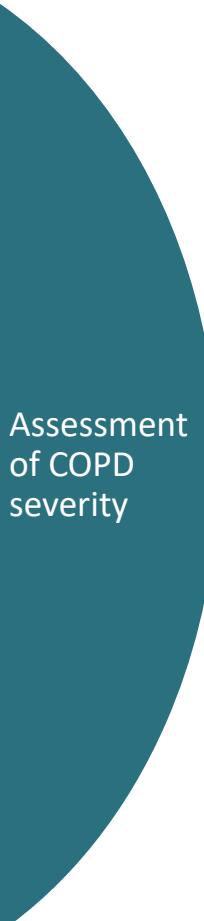


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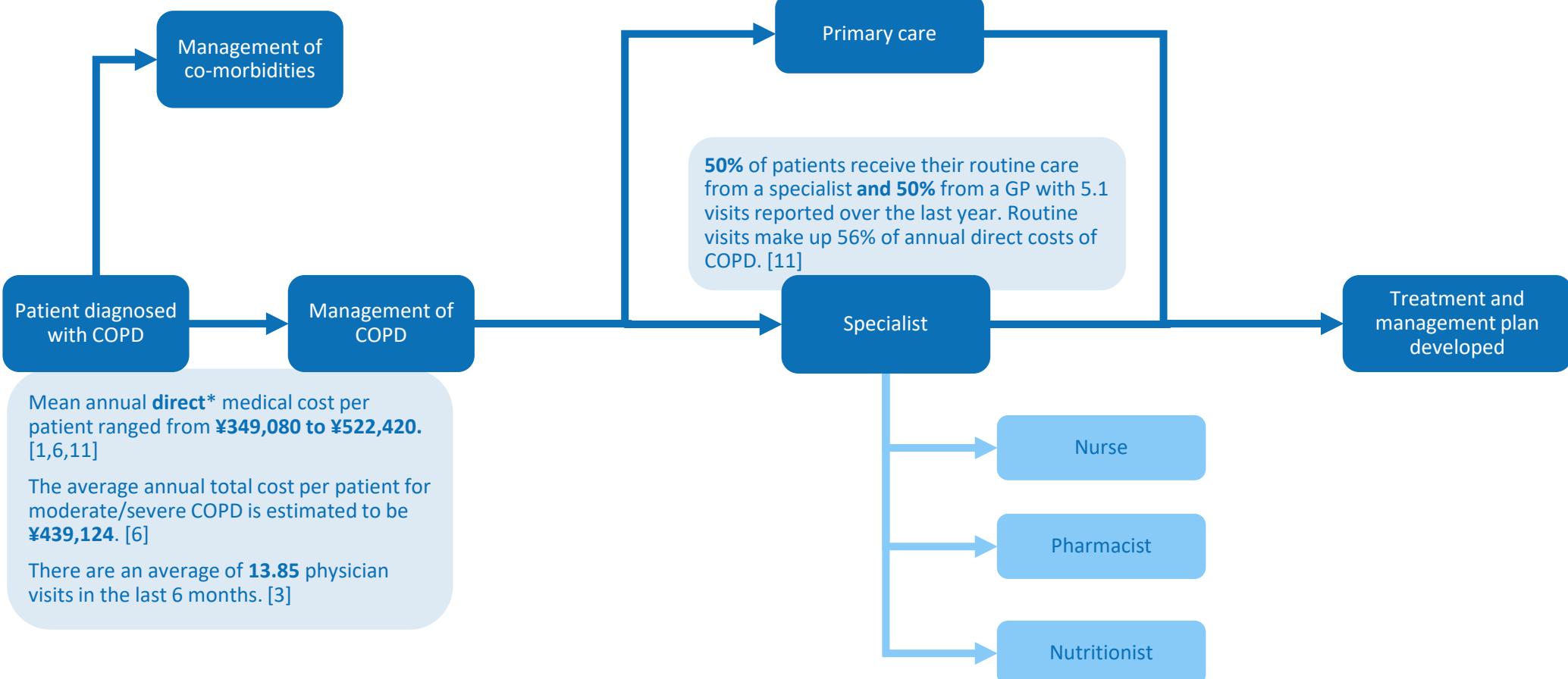
GP =General Practitioner





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)



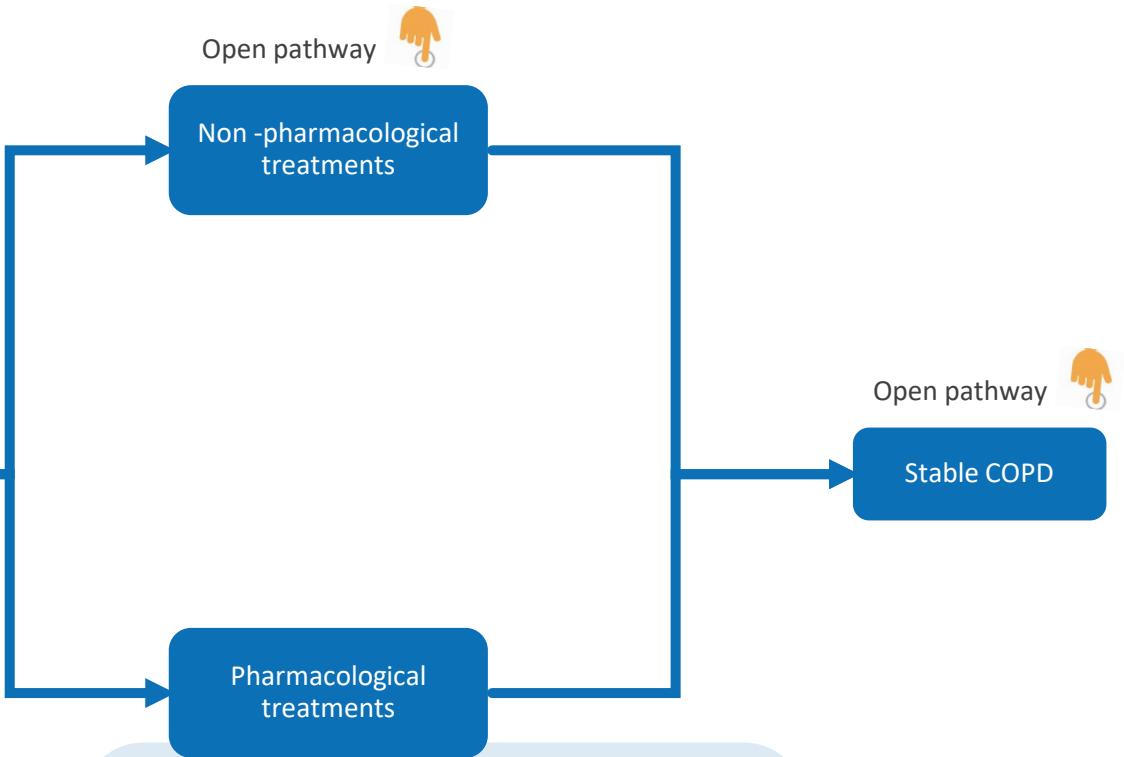
\*Direct costs includes pharmacological treatment, consultations with healthcare professionals, hospitalisation episodes, emergency room visits, pulmonary rehabilitation programs and oxygen therapy [1]; inpatient care, outpatient care and home oxygen therapy [6]; moderate and severe COPD exacerbations,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

GP = General Practitioner





Return  
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overview



Most important part of the management plan. [Ex]

31% of patients with moderate and severe COPD are undertreated in primary care. [9]

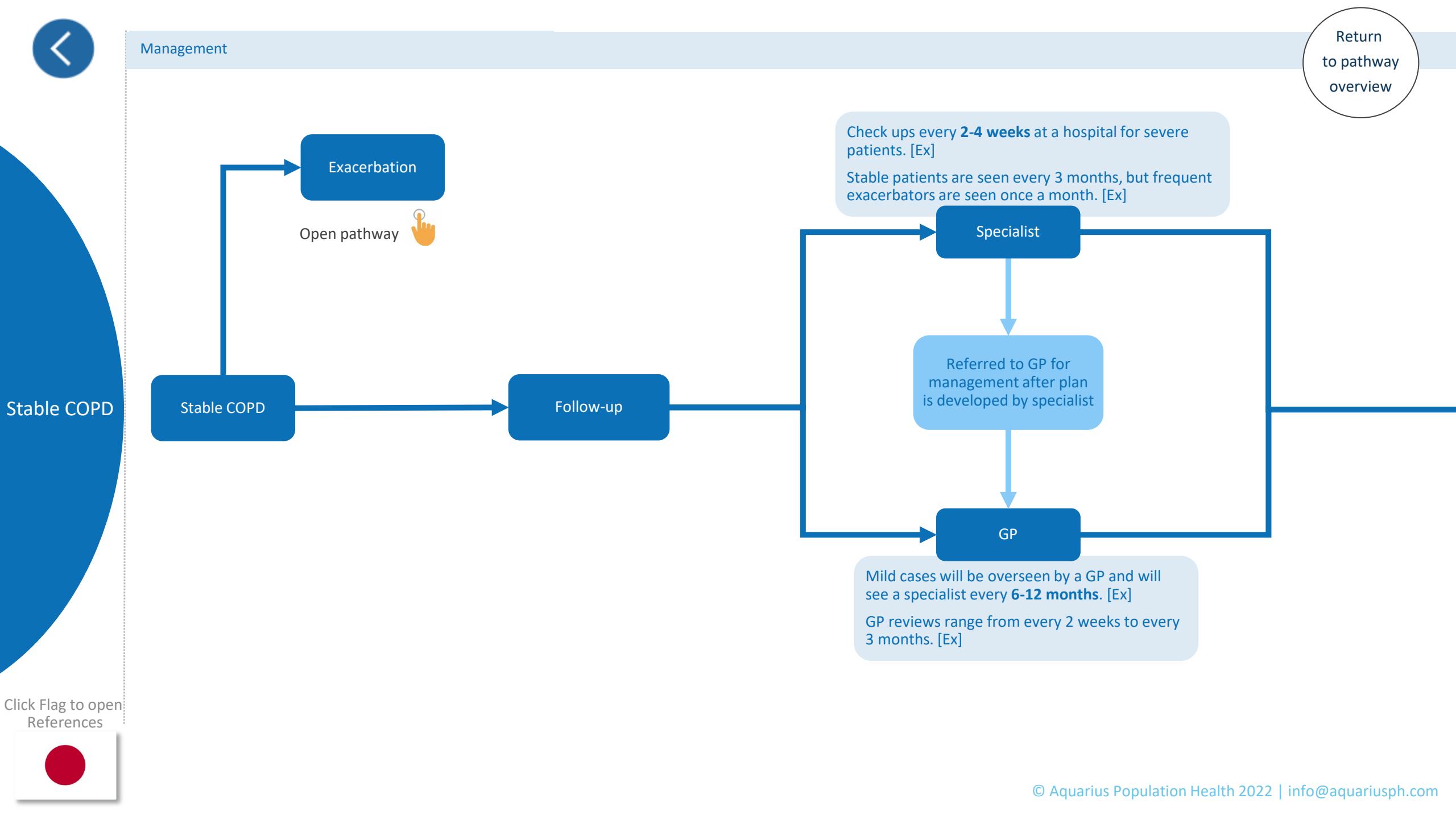
There is conflicting evidence on how much pharmacological treatment accounts for in the annual direct\* medical cost. One study found it to be the main cost driver (77-84%), [1] versus a second where treatments only made up 9% of the annual direct\* costs. [11]

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References



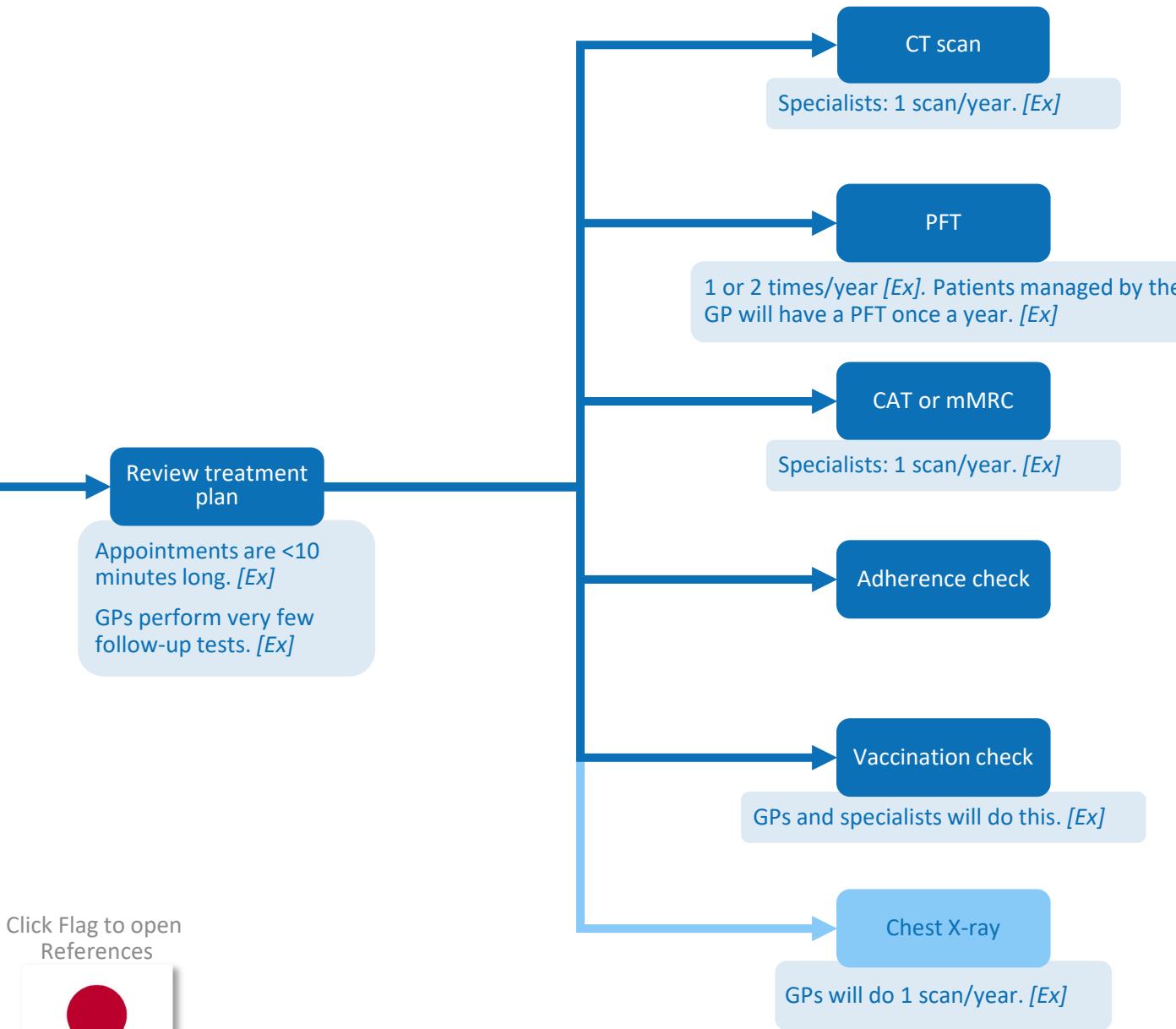
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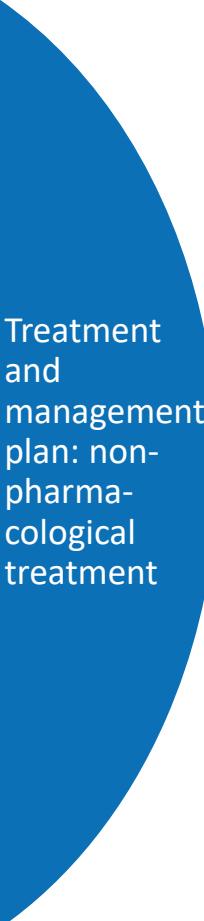
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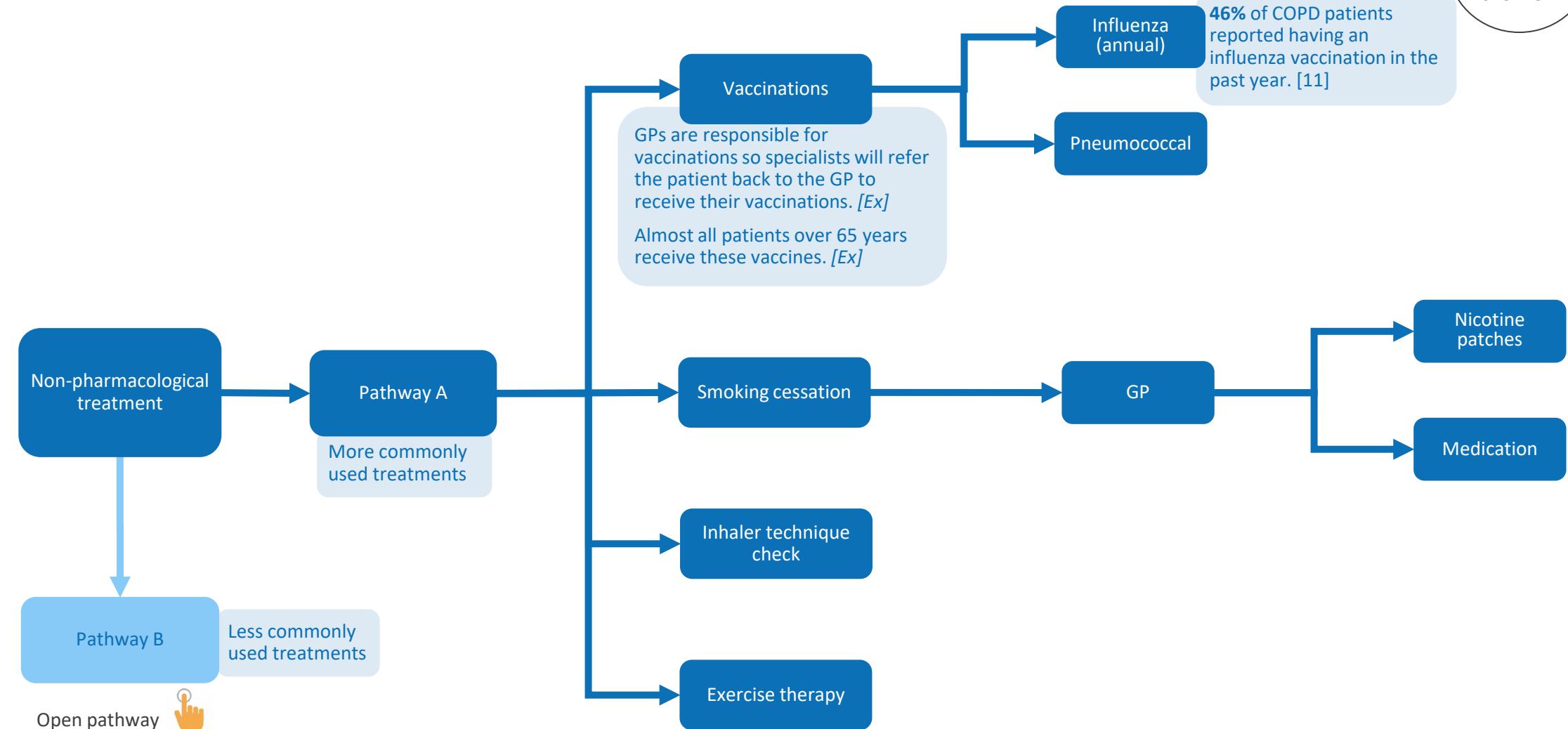


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## Management



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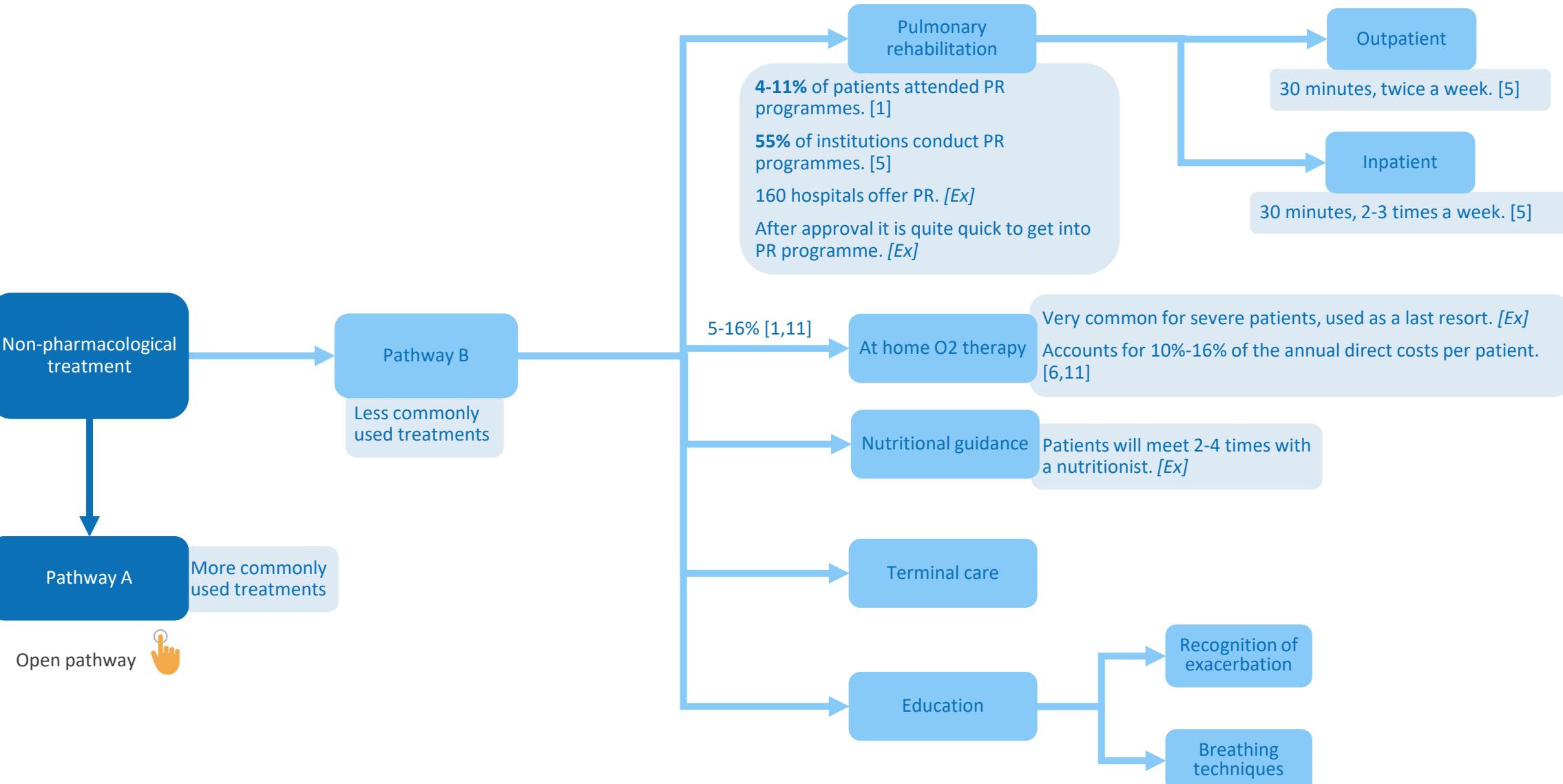
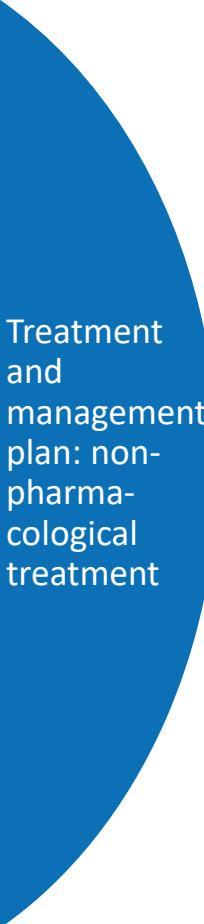
Open pathway

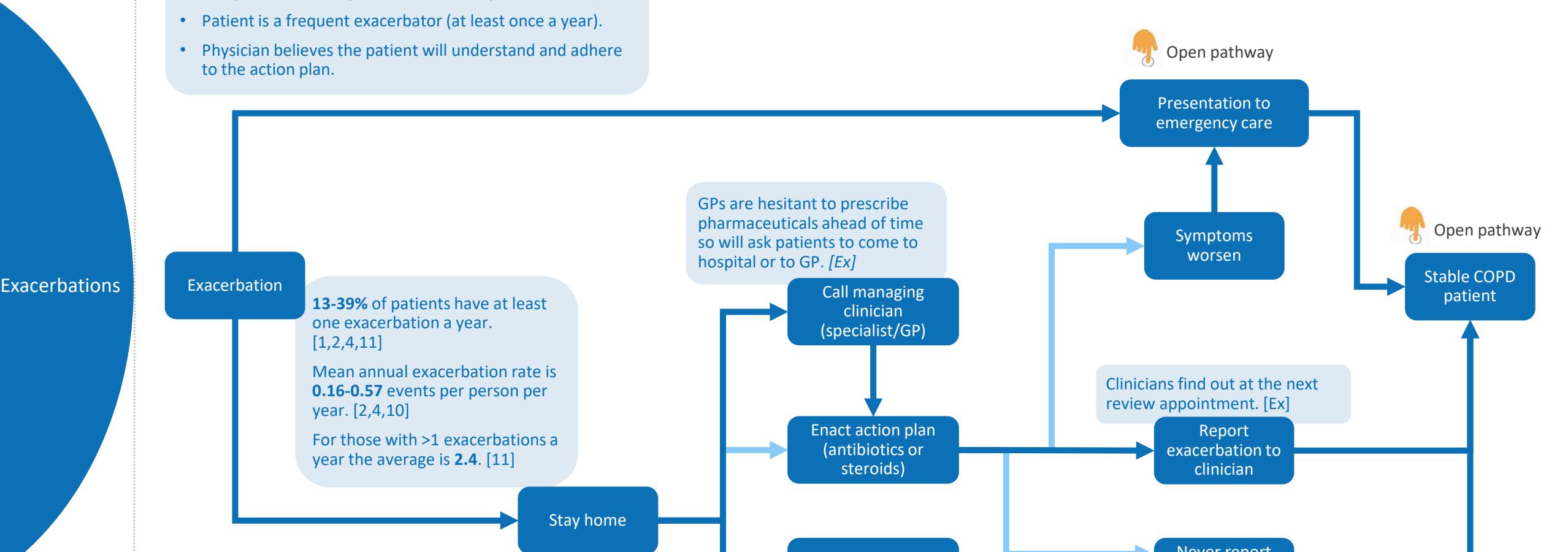


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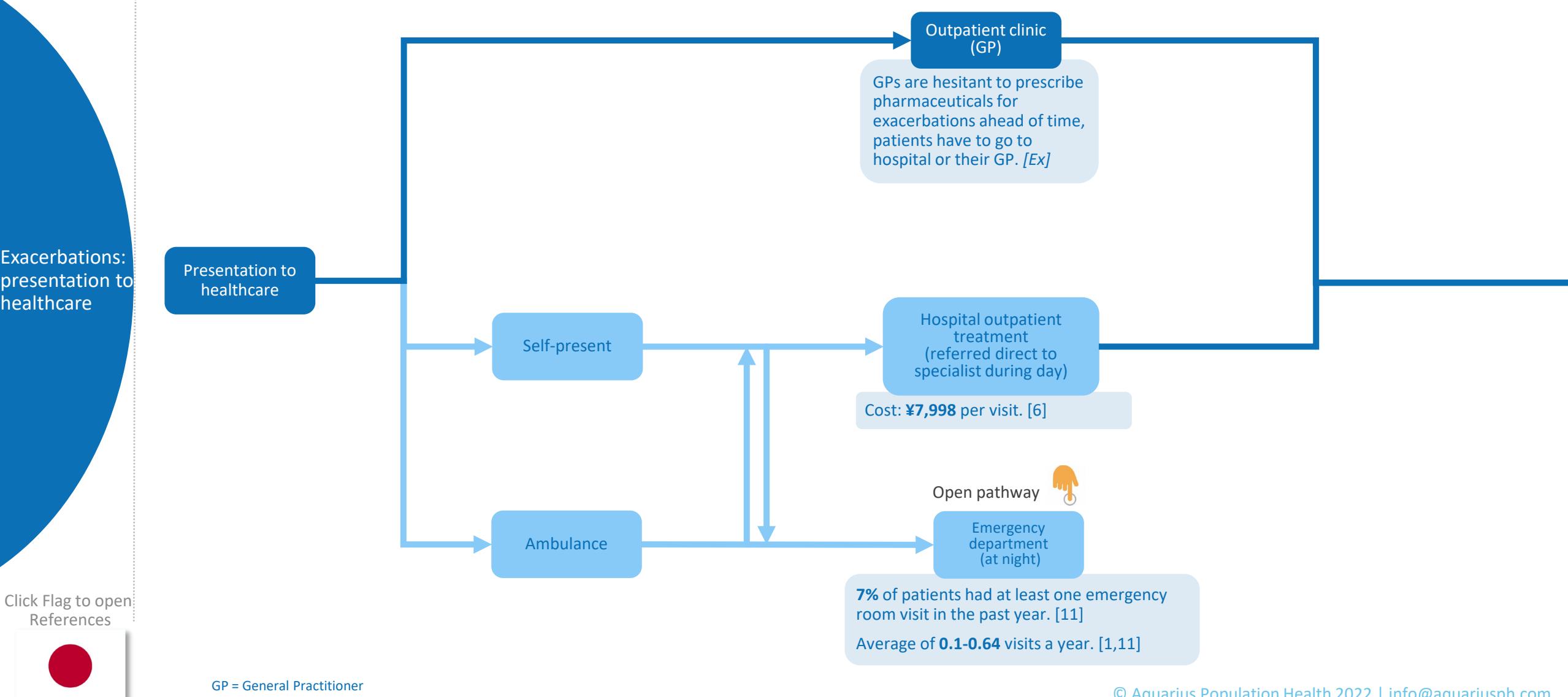
GP = General Practitioner





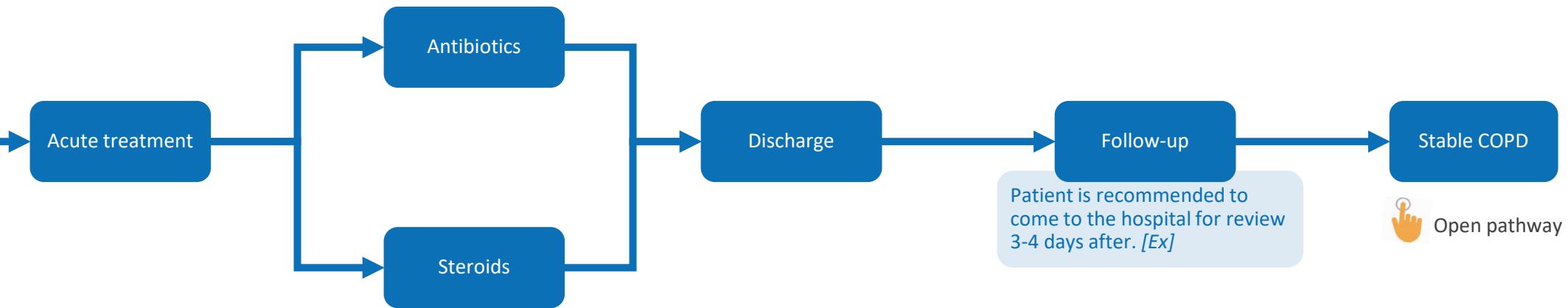
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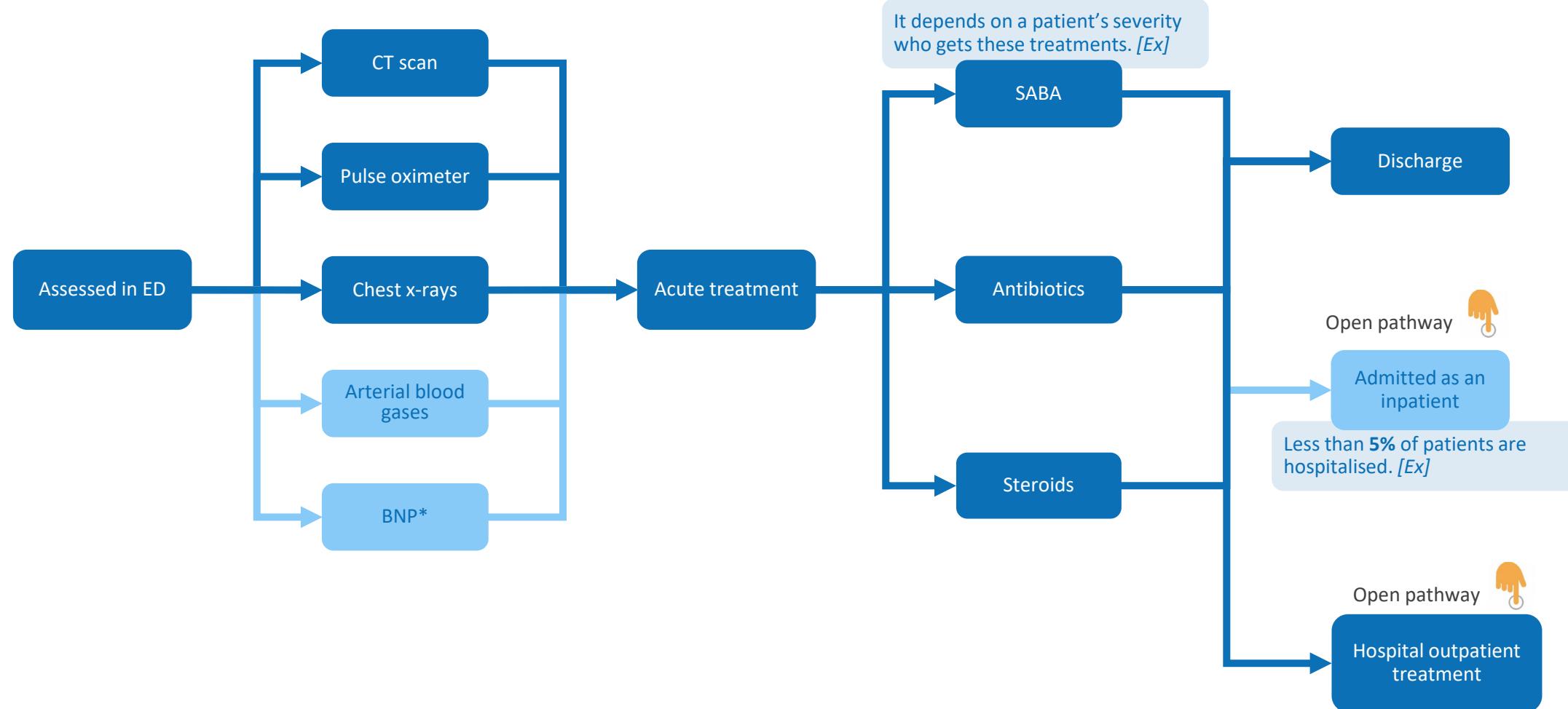
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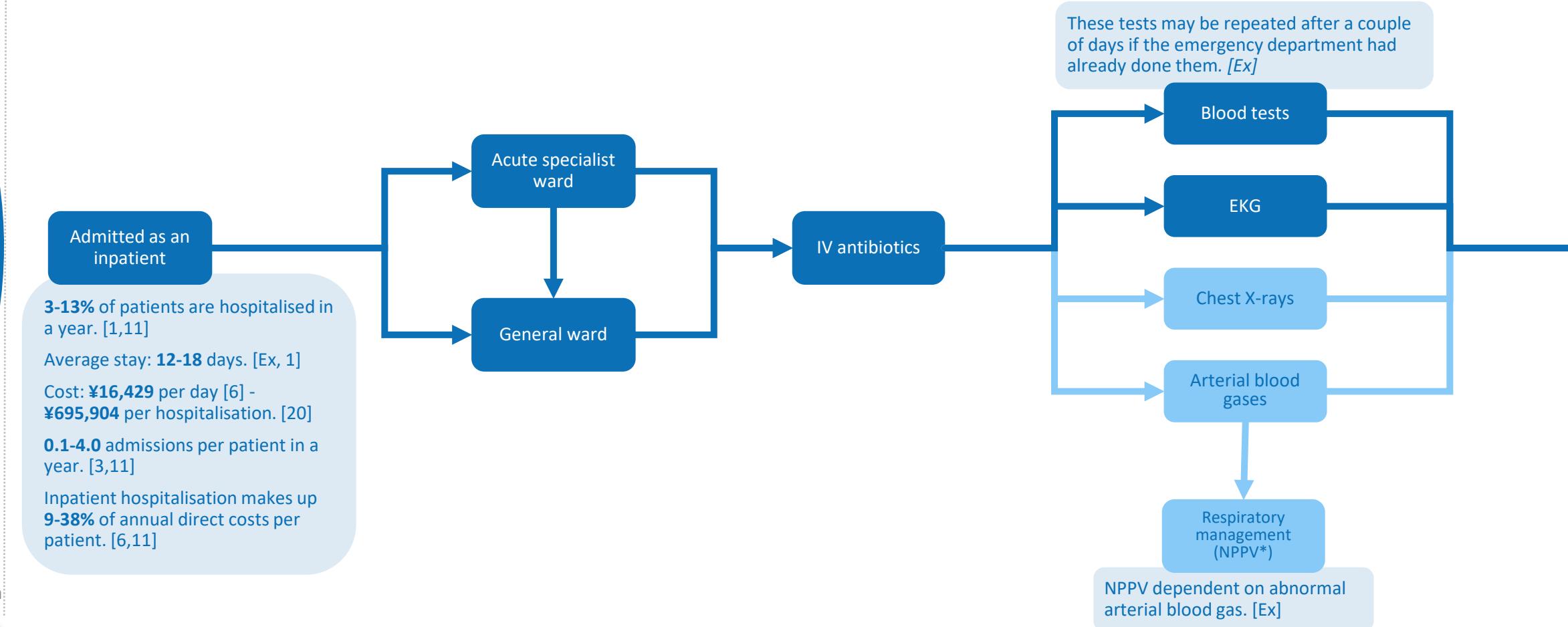


 Open pathway

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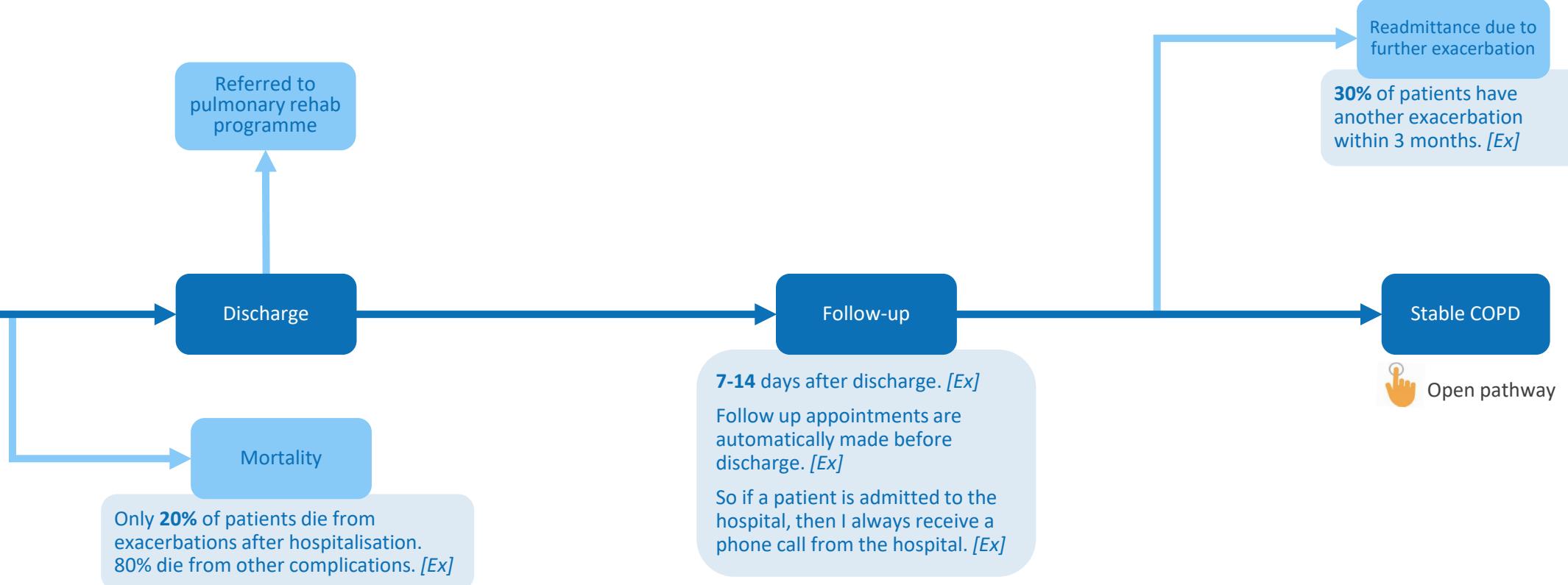


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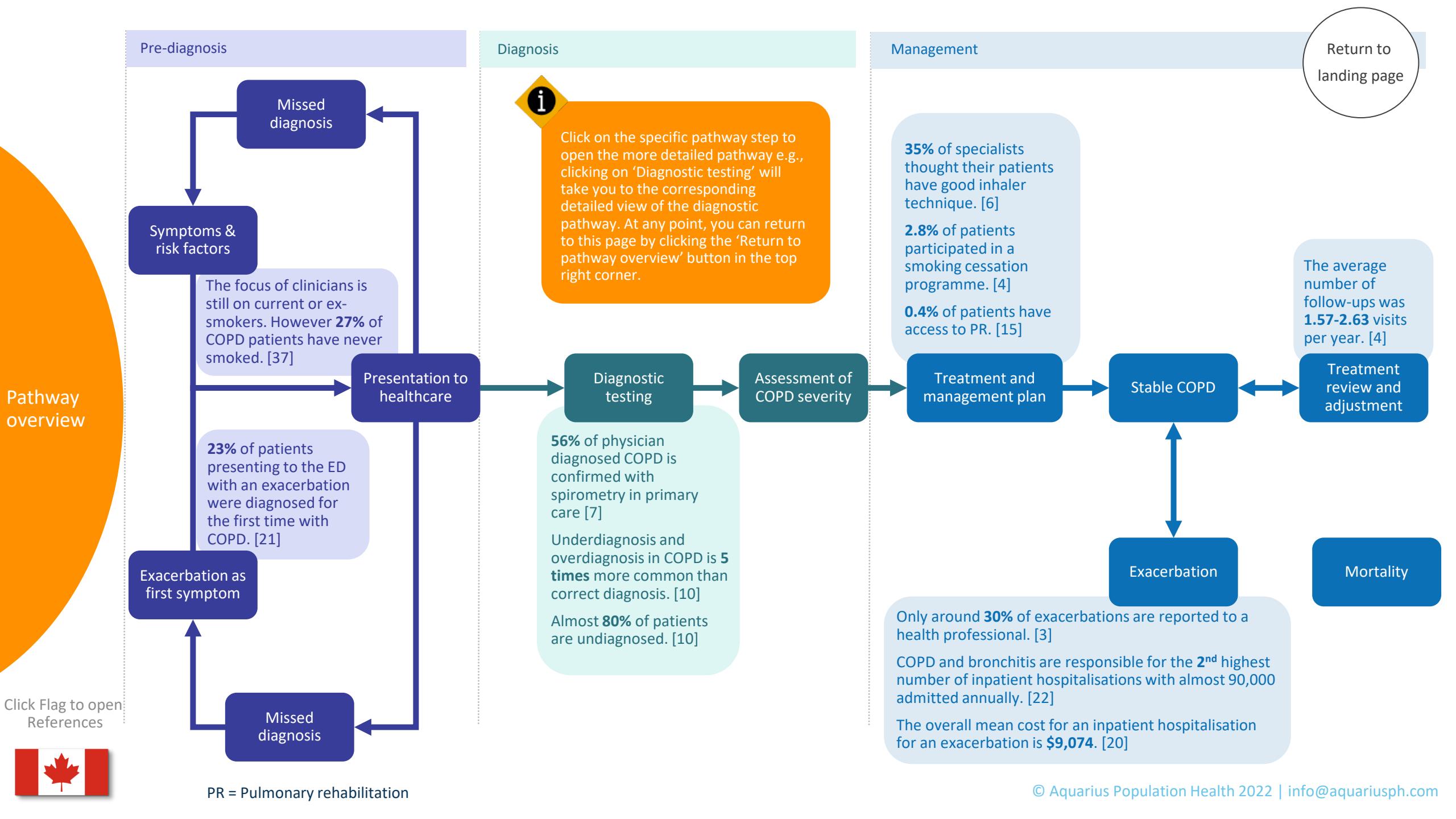


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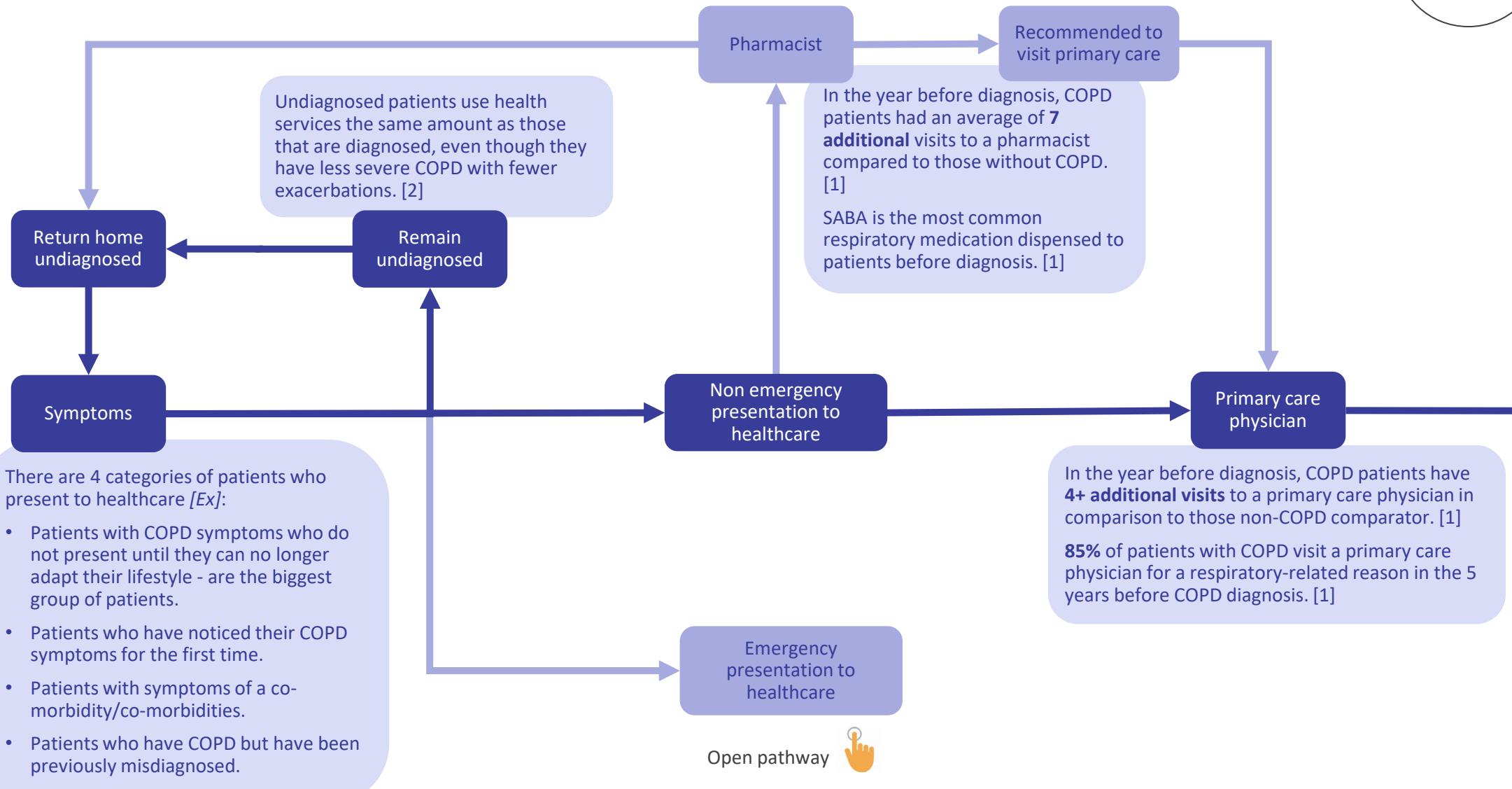






## Pre-diagnosis

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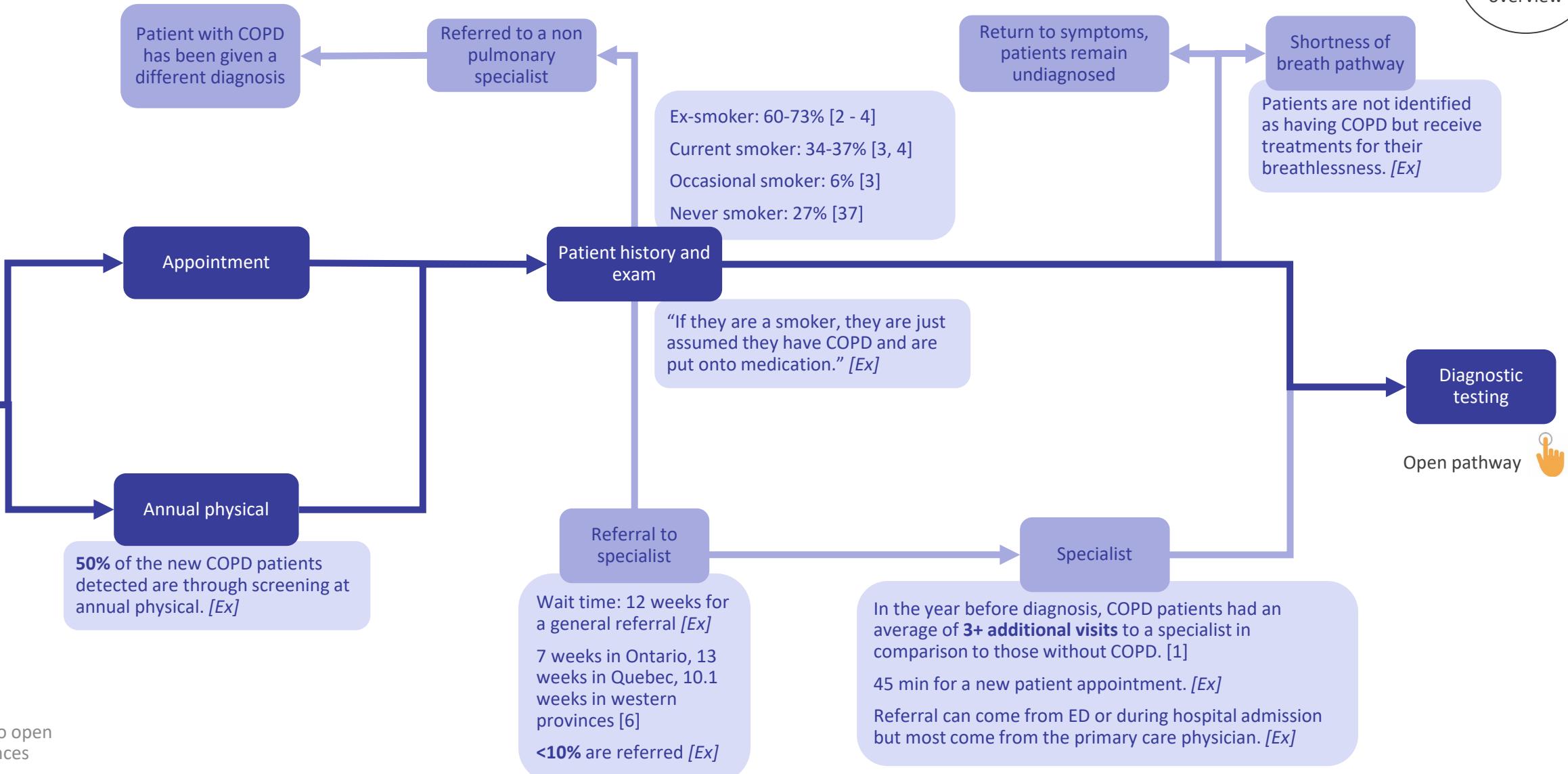


SABA = Short-acting beta agonist

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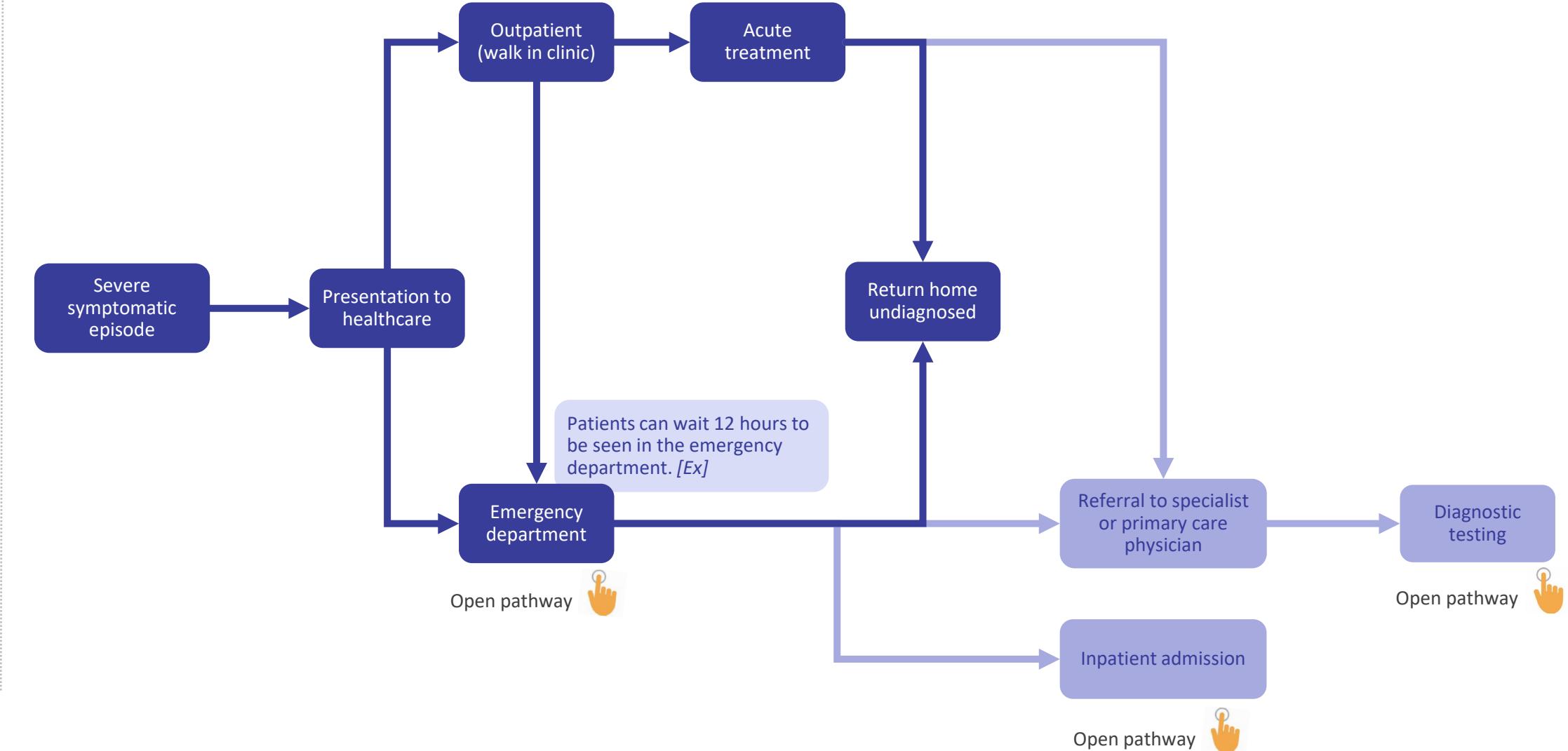
ED = Emergency department

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Pre-diagnosis

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## Diagnosis

Open pathway 

- Respiratory specialist
- Primary care

Common morbidities include hypertension (45%) [6], ischemic heart disease (26%-56%) [6,19], diabetes (10%-24%) [6,19], asthma (32%) [2] and obesity (24.6%) [35]

Number of co-morbidities [6, 25]:  
0: 23-26%, 1: 22-35%, 2: 24.0%-27%, 3: 11%-16%, 4+: 3-20%

Tests to confirm COPD

56% of physician diagnosed COPD is confirmed with spirometry in primary care. [7]  
Cost: \$51.17 in Alberta [8], \$7.85 in Ontario [9]  
Waiting time for spirometry: Alberta = 1-3 weeks, Newfoundland = 3 months, Ontario = 2-8 weeks [Ex]  
Time: 30 mins [Ex]

Tests to recognise other conditions

Co-morbidities

Full pulmonary function test (PFT)

Spirometry

Waiting time for PFT: Alberta = 3-4 weeks, Newfoundland = 6 months [Ex]

Cost: 3x times more expensive than spirometry [Ex]

Pulse oximeter

Blood tests

Used to rule out other diseases such as anaemia and polycythaemia and alpha1-antitrypsin level.

GPs hardly ever search for alpha1-antitrypsin. [Ex]

Chest x-ray

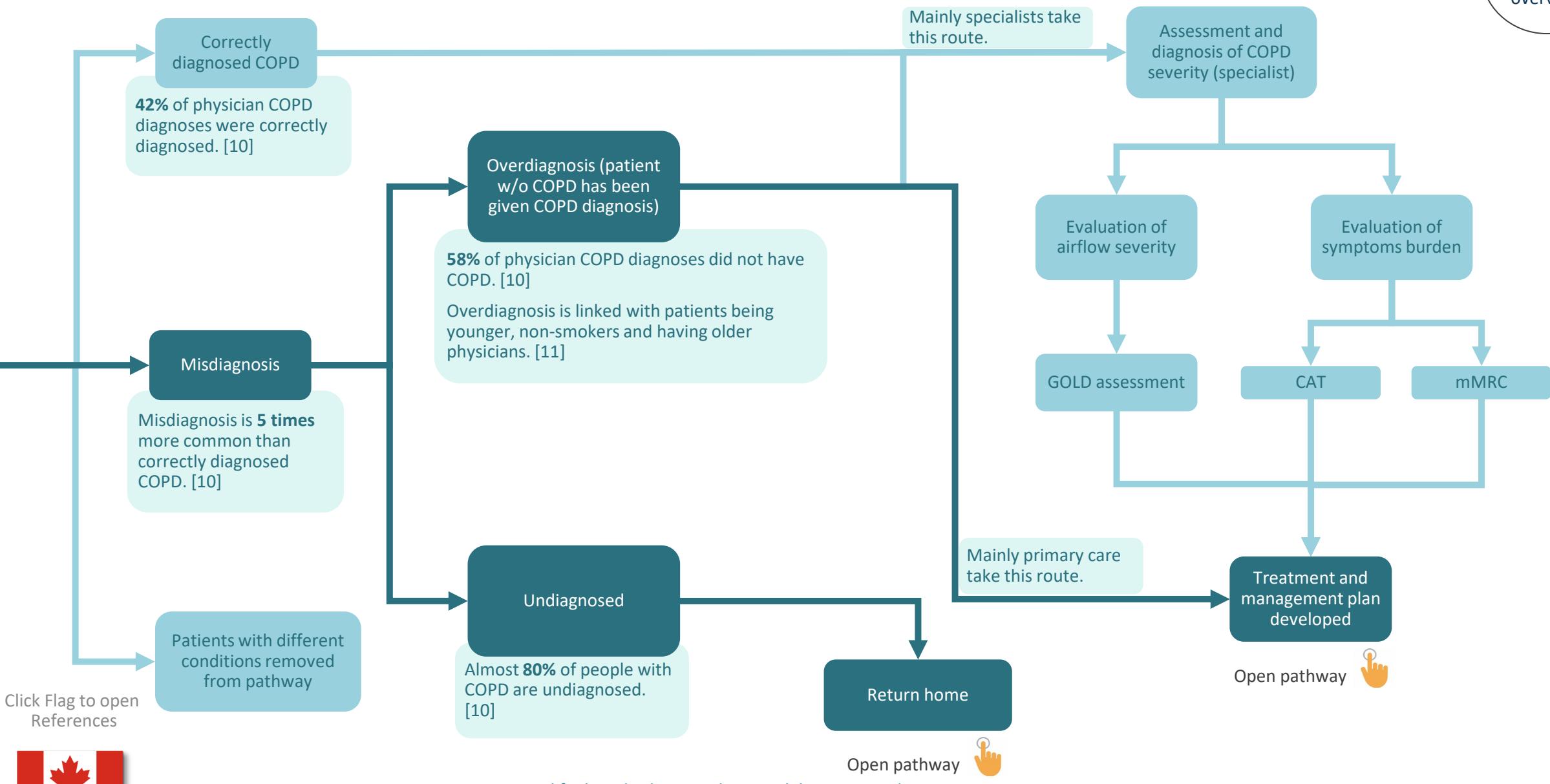
A lot of patients are diagnosed via a chest x-ray in primary care. [Ex]

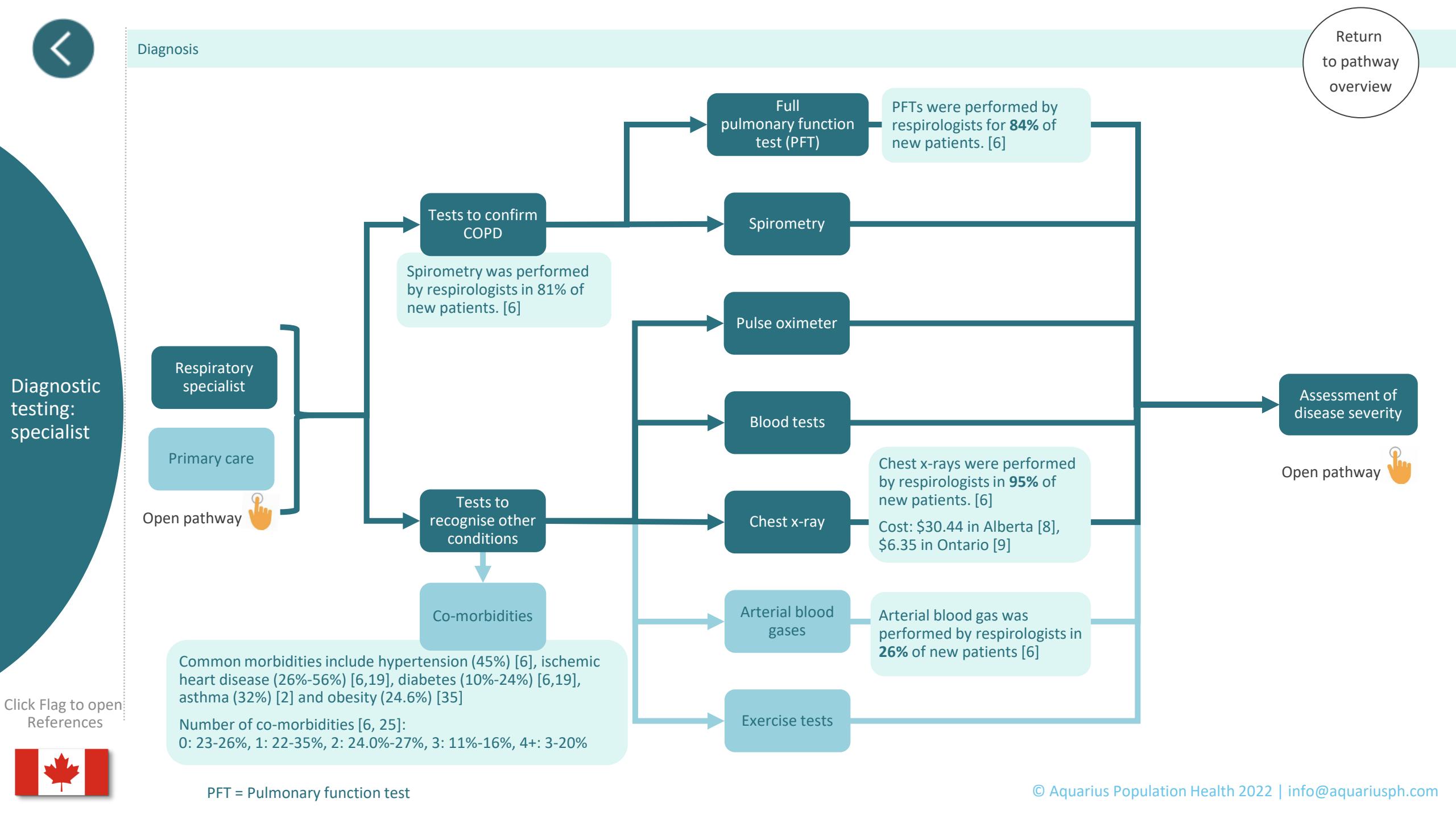
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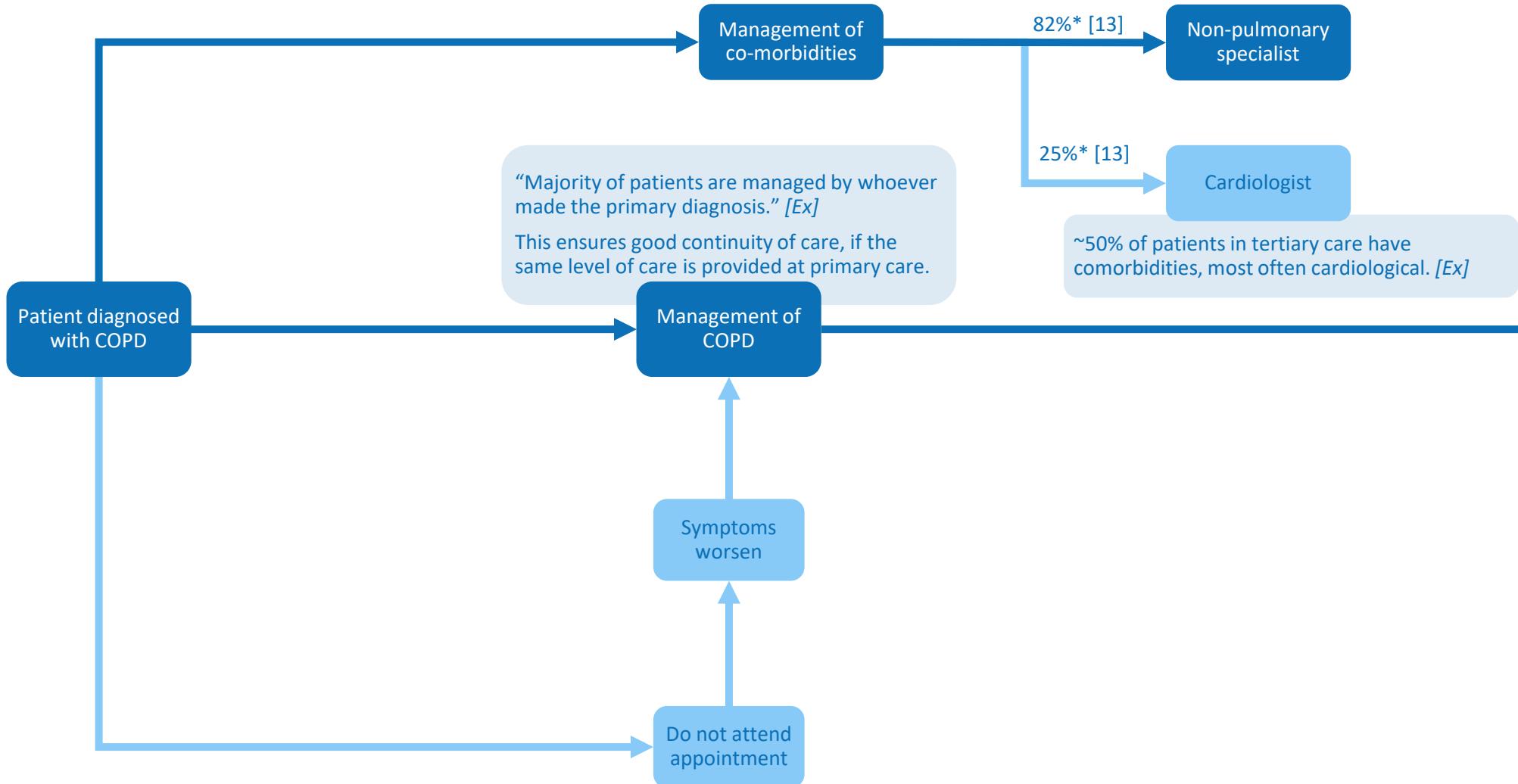






## Management

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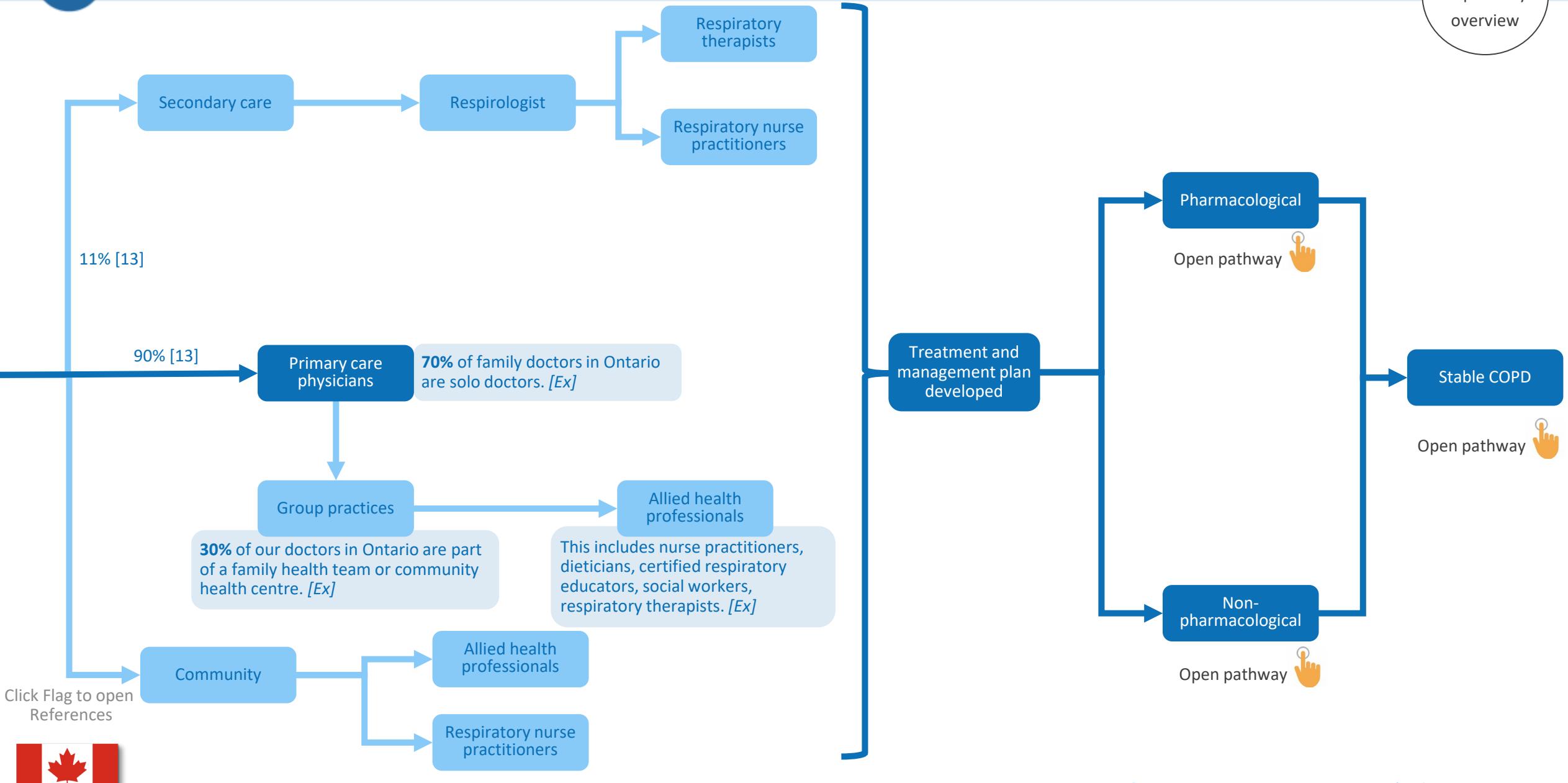


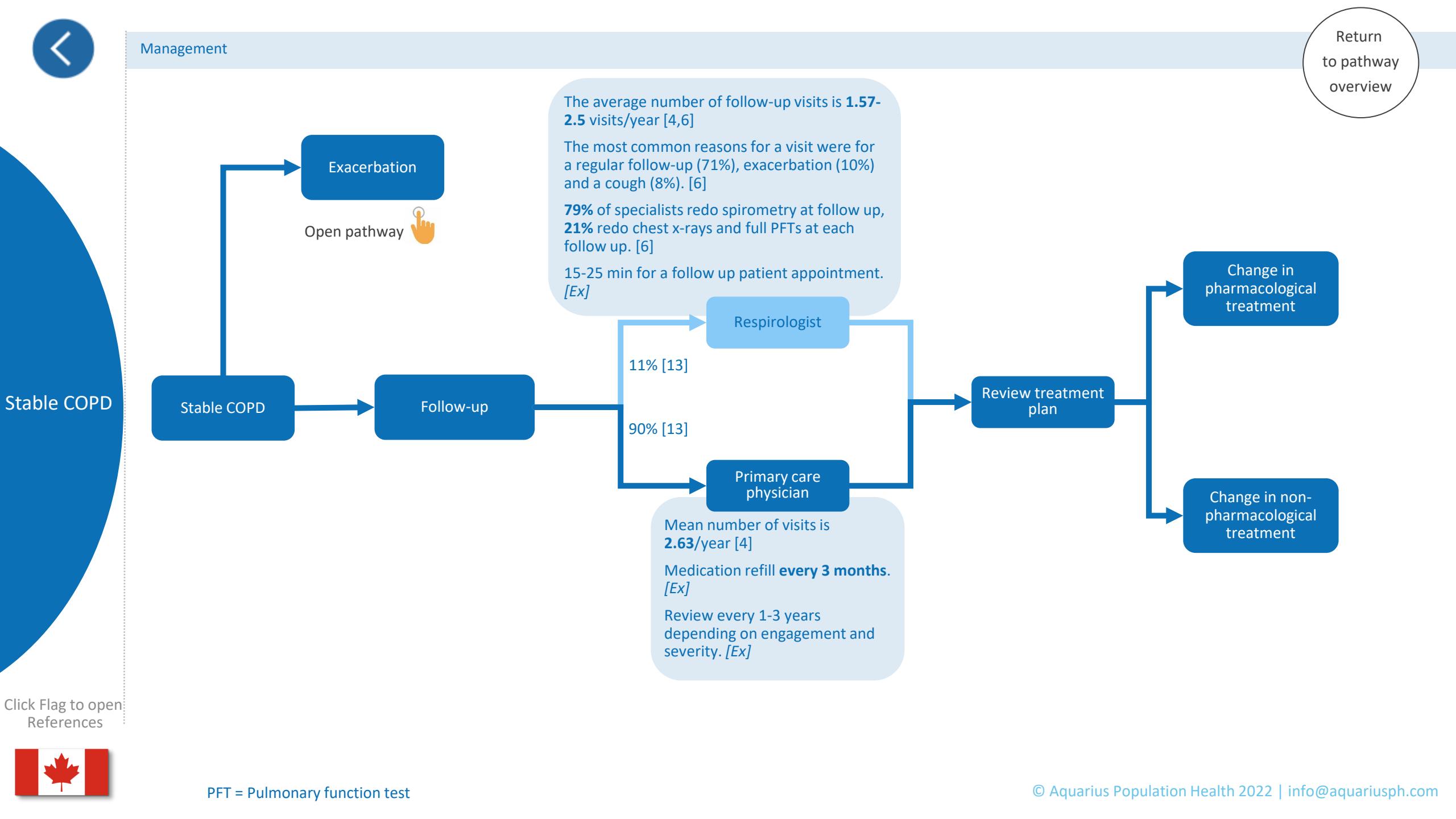
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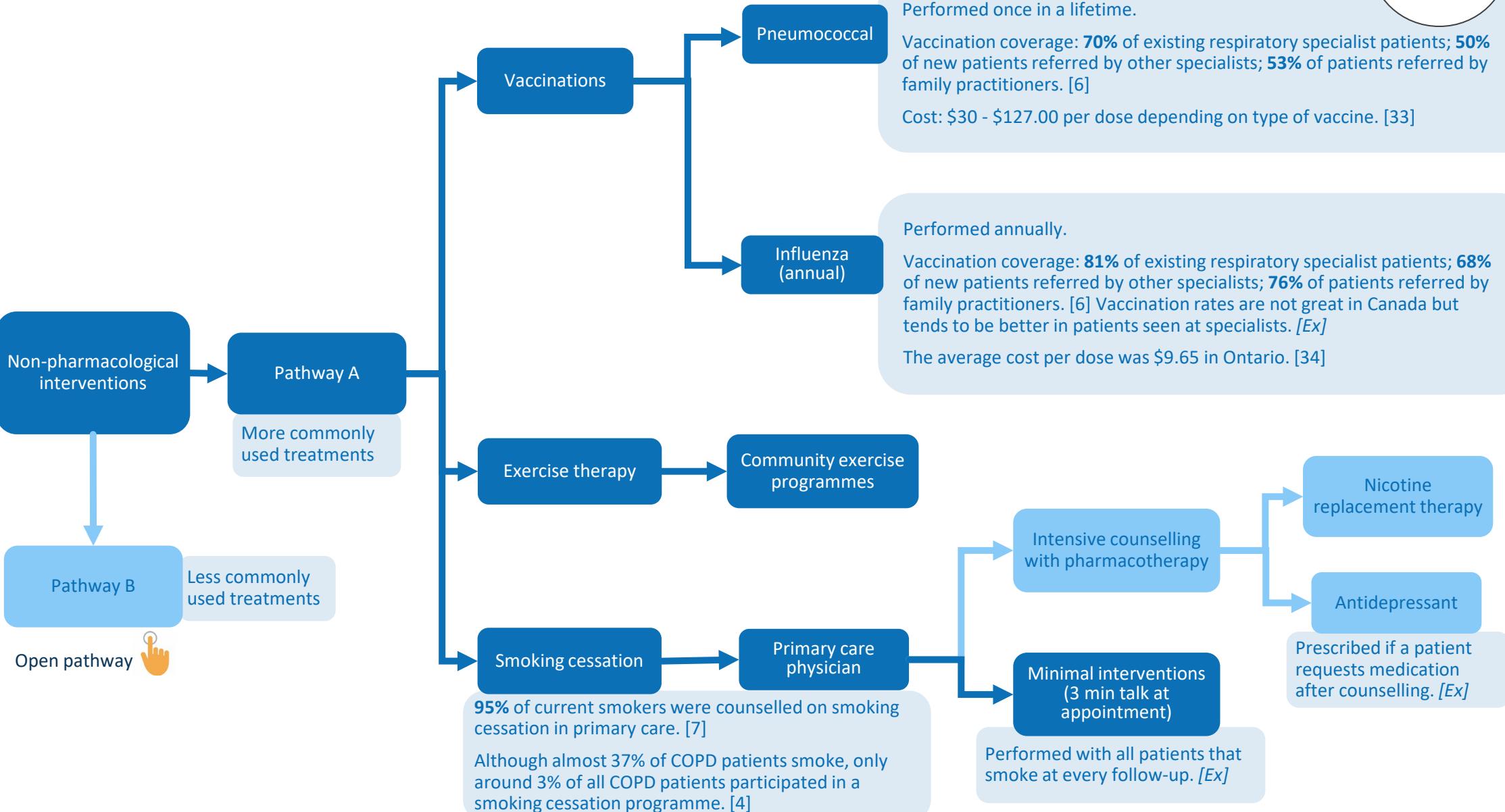
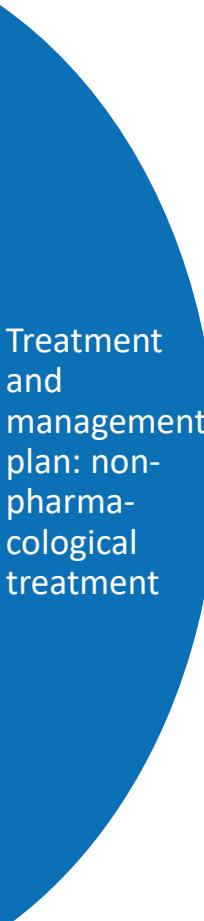


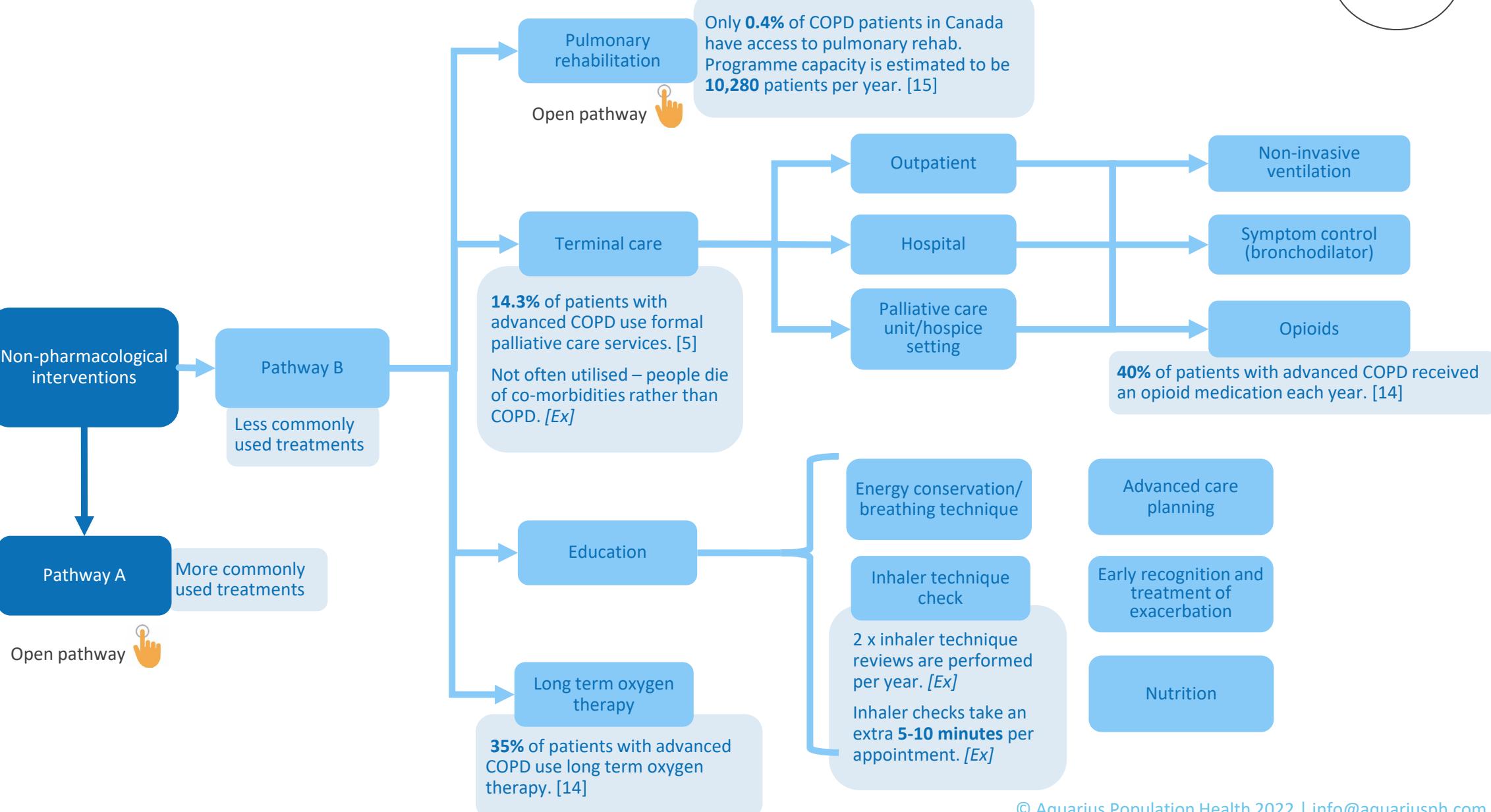
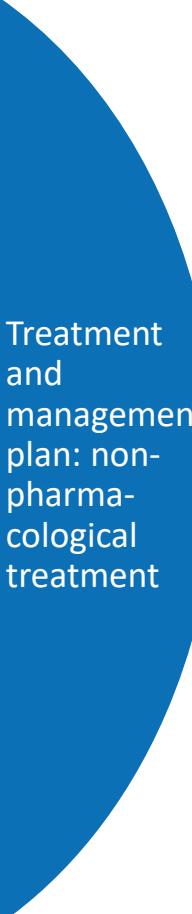


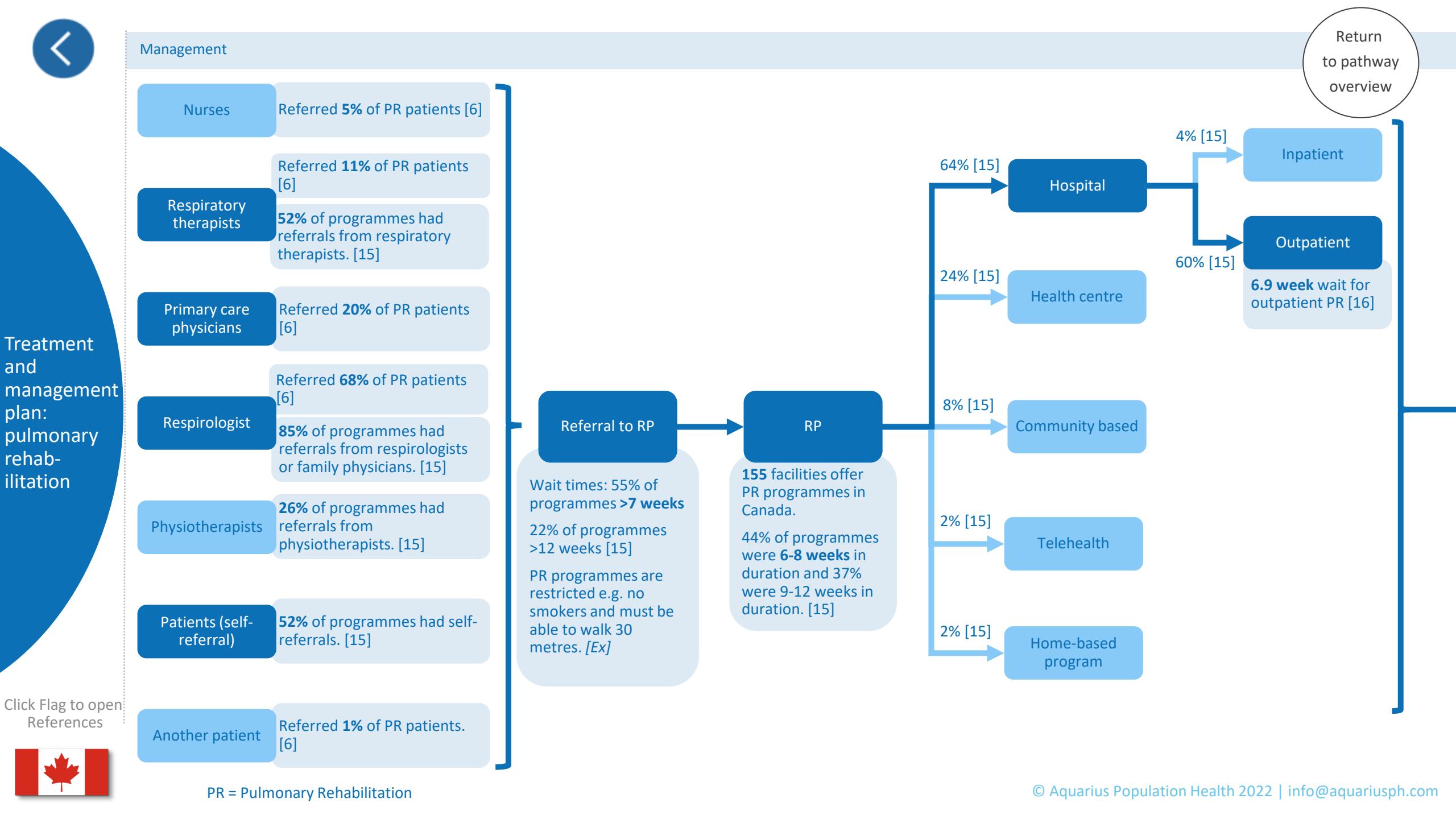
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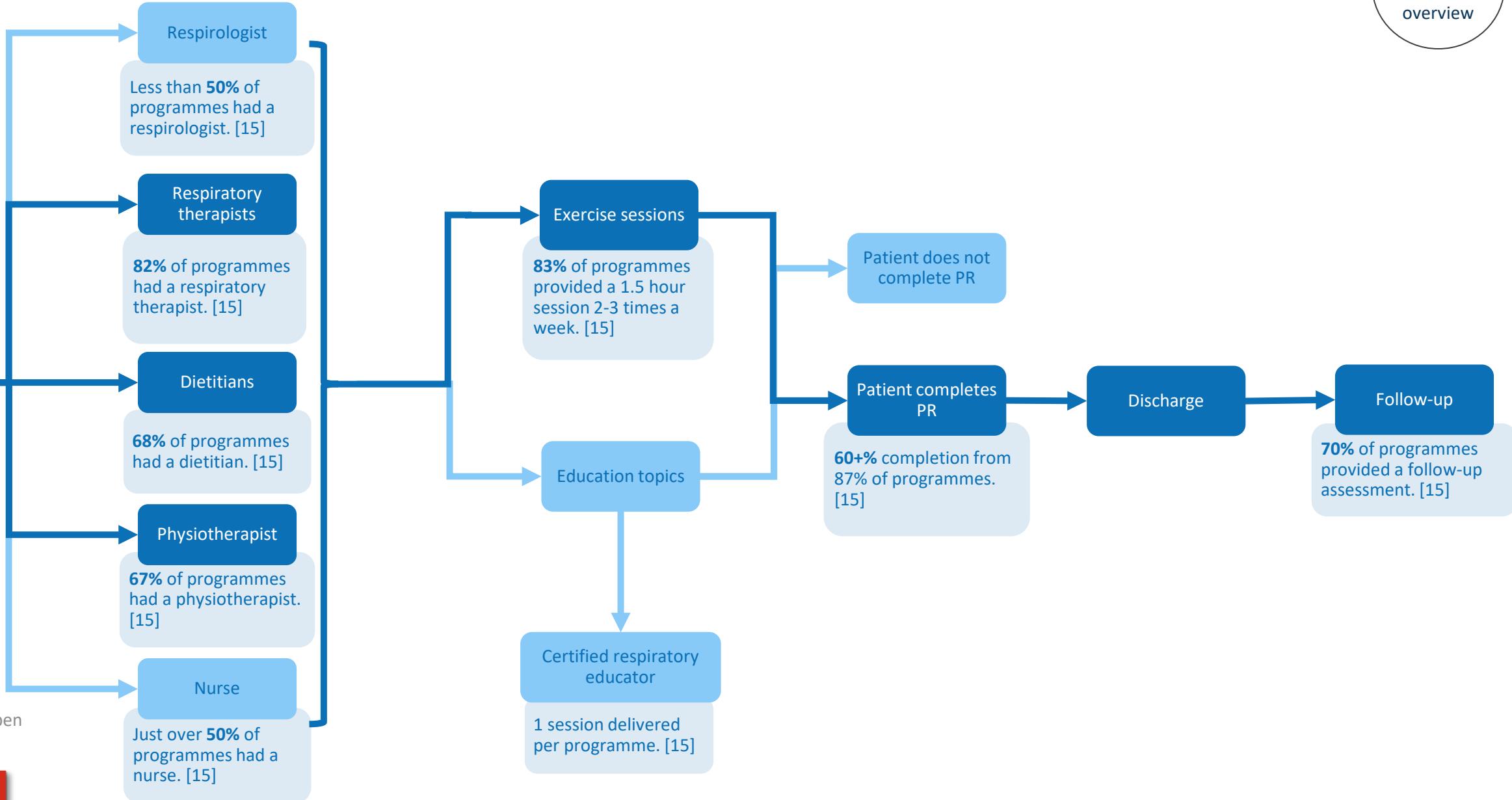








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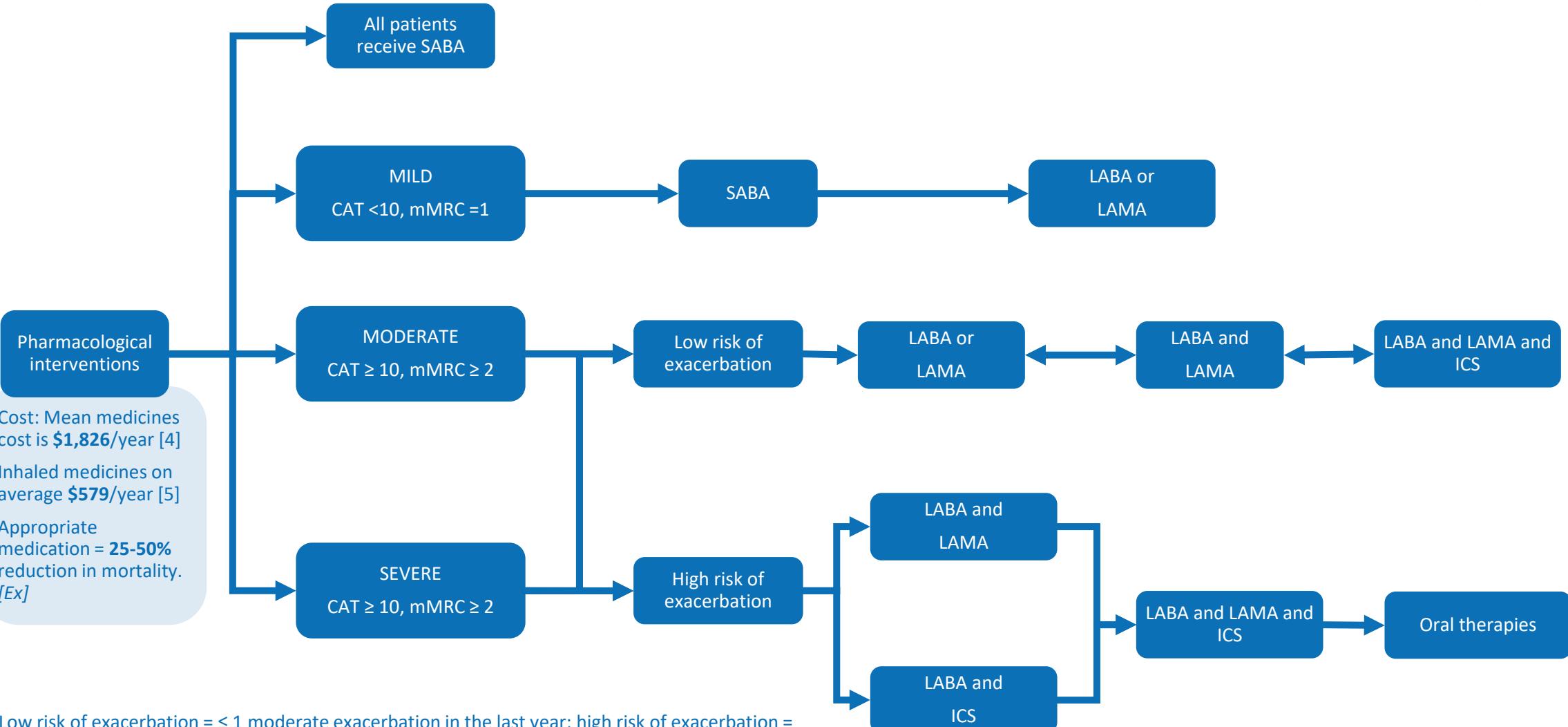
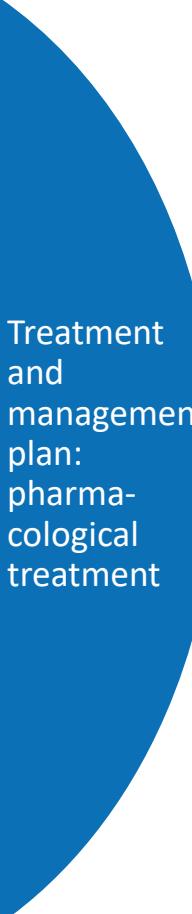


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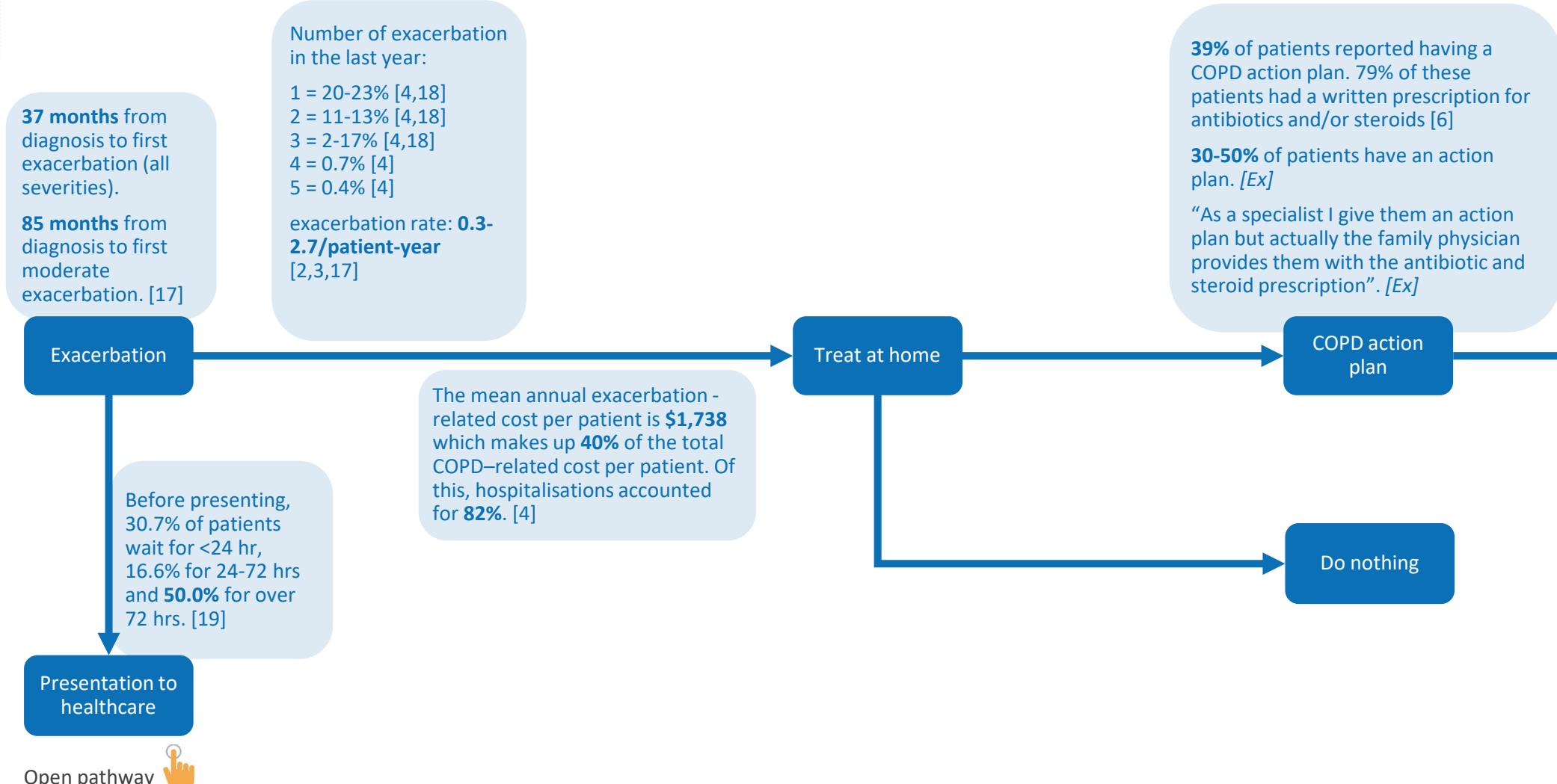
PR = Pulmonary Rehabilitation

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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





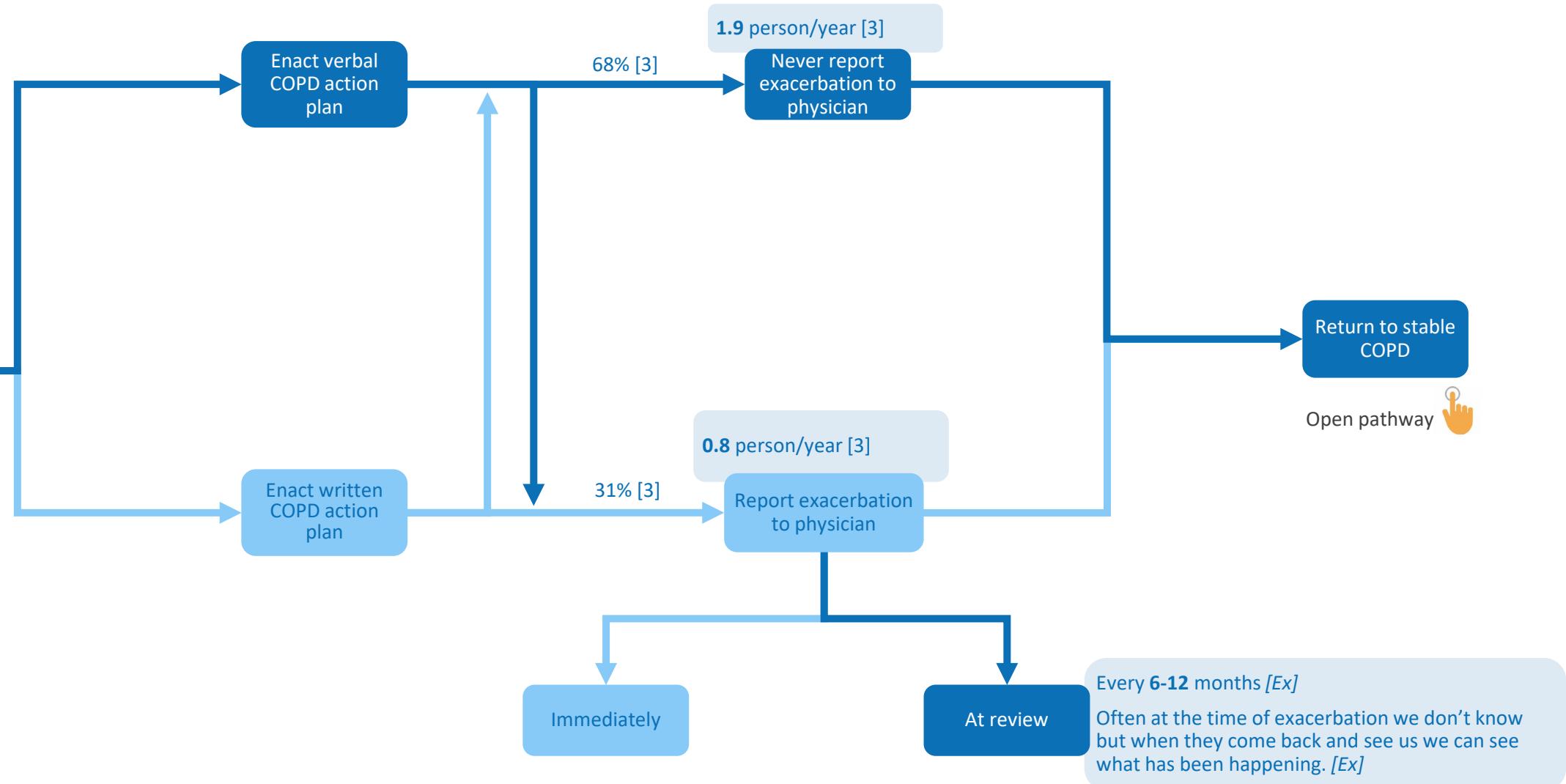
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Open pathway



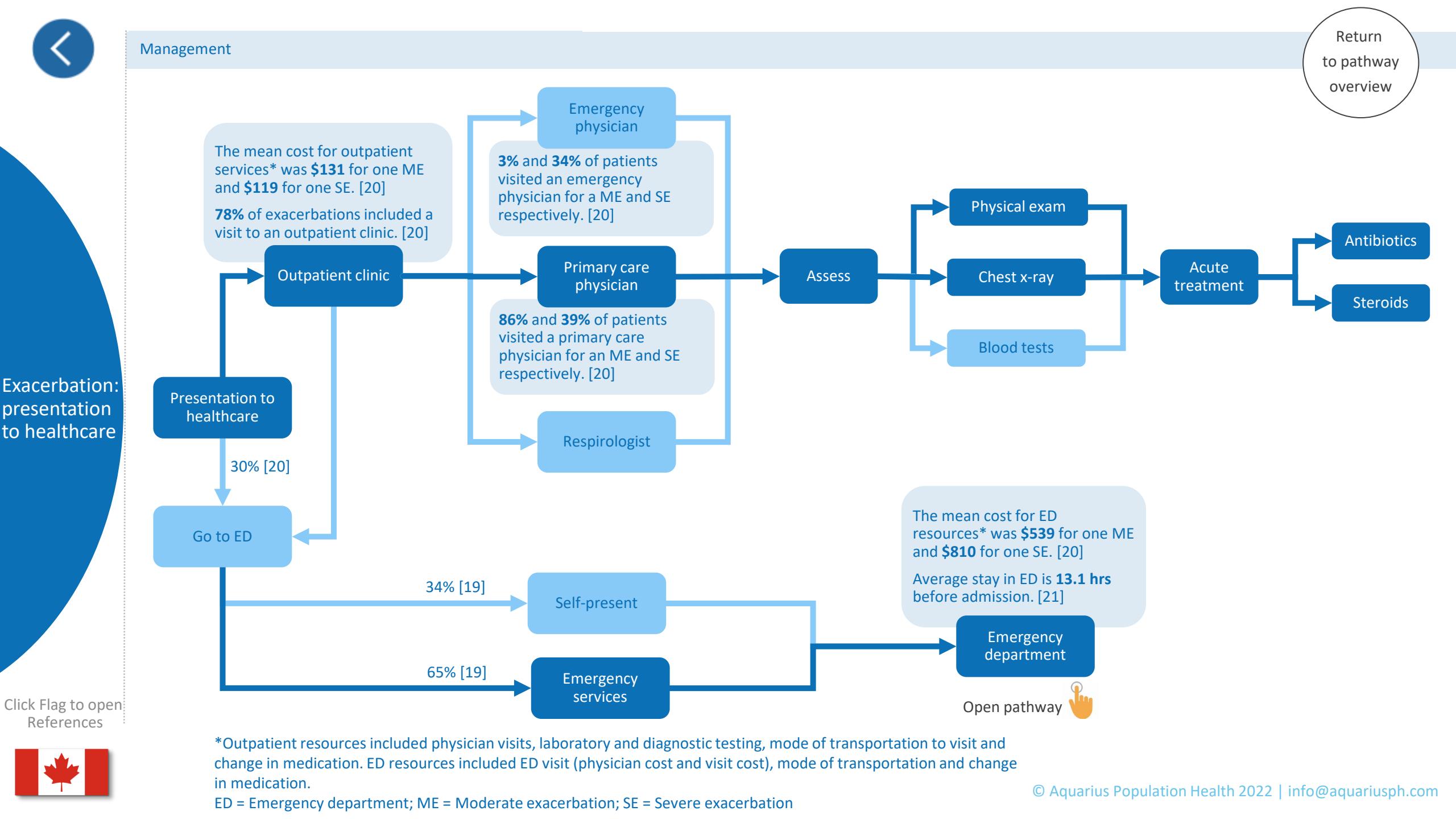


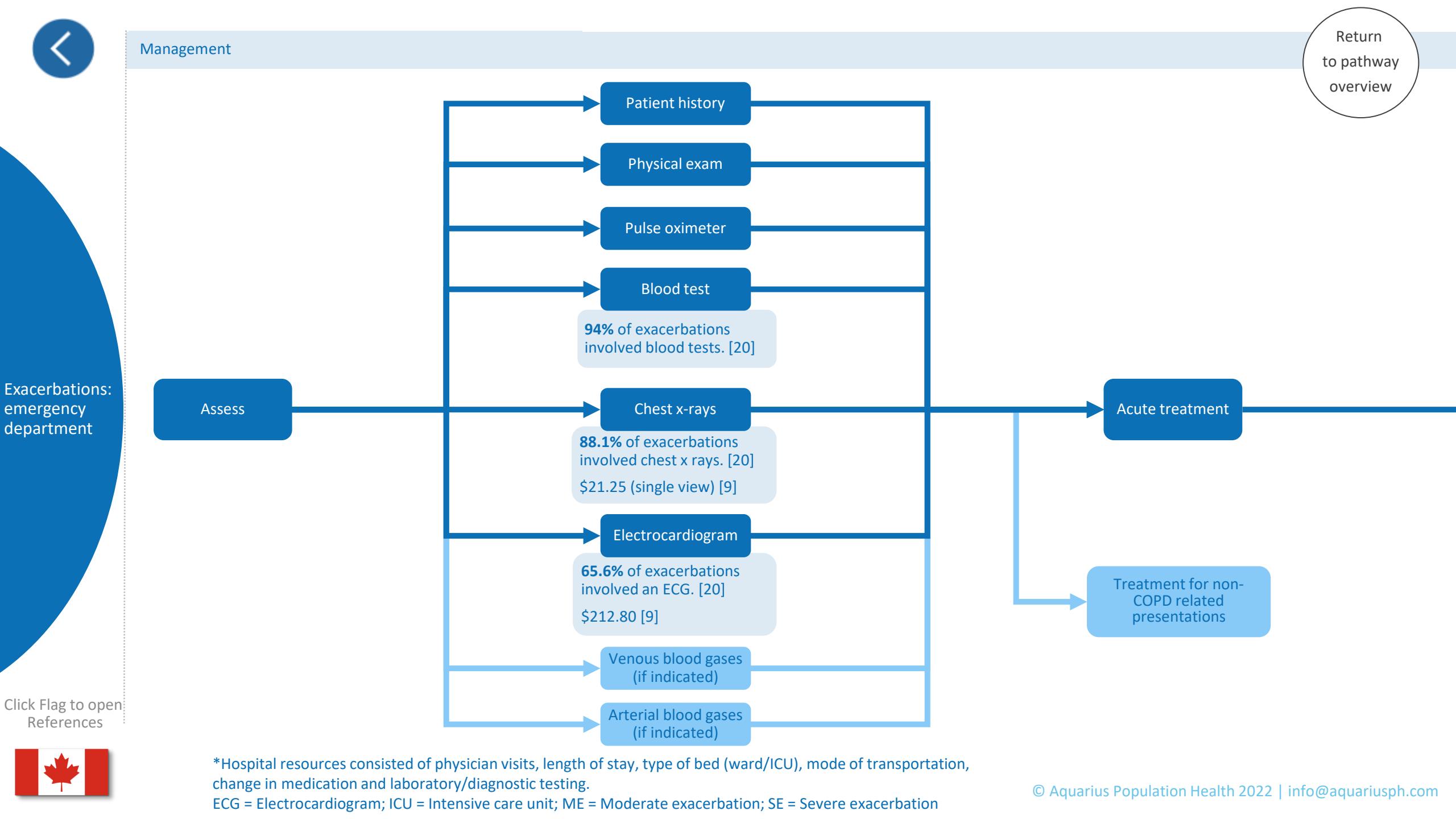
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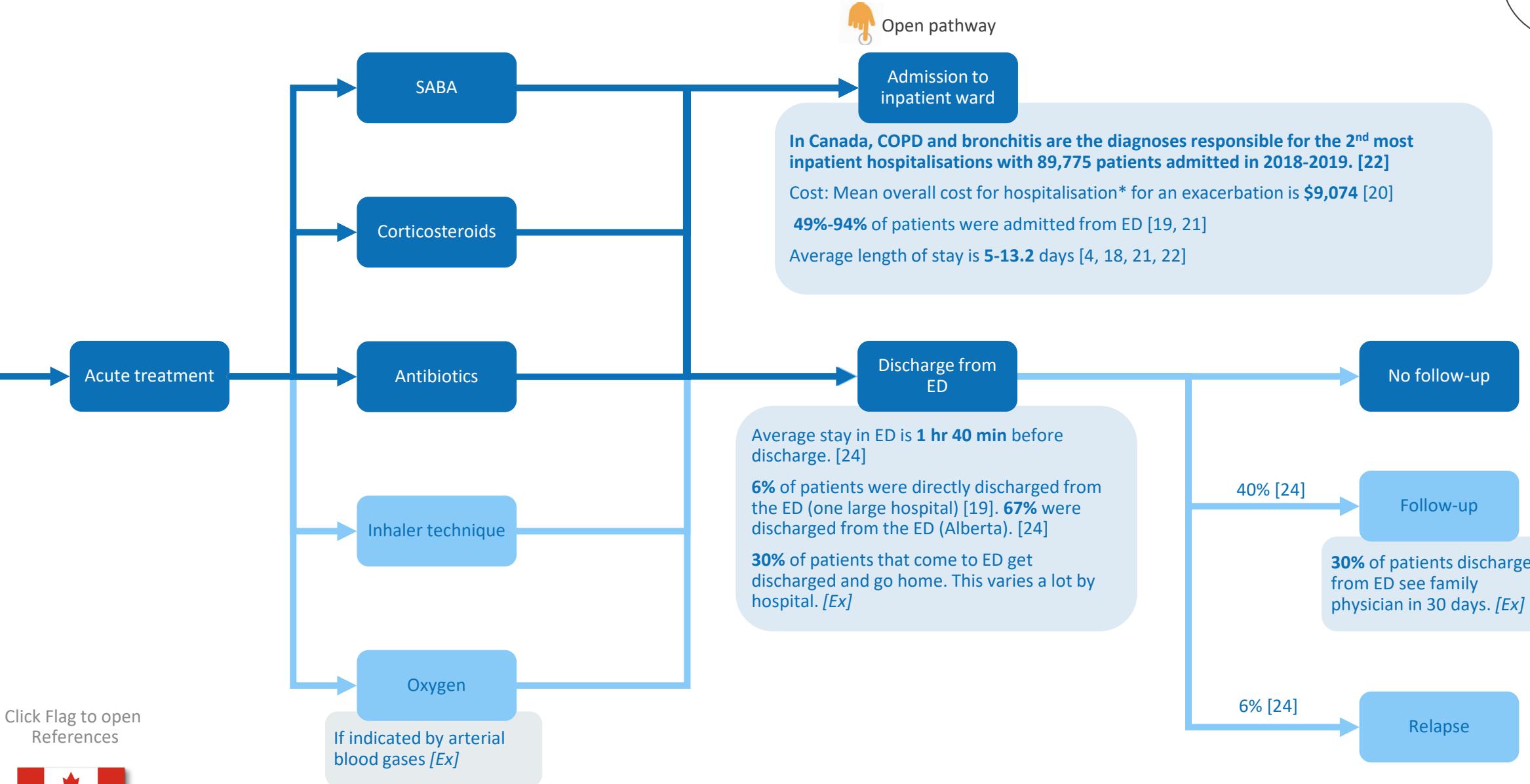








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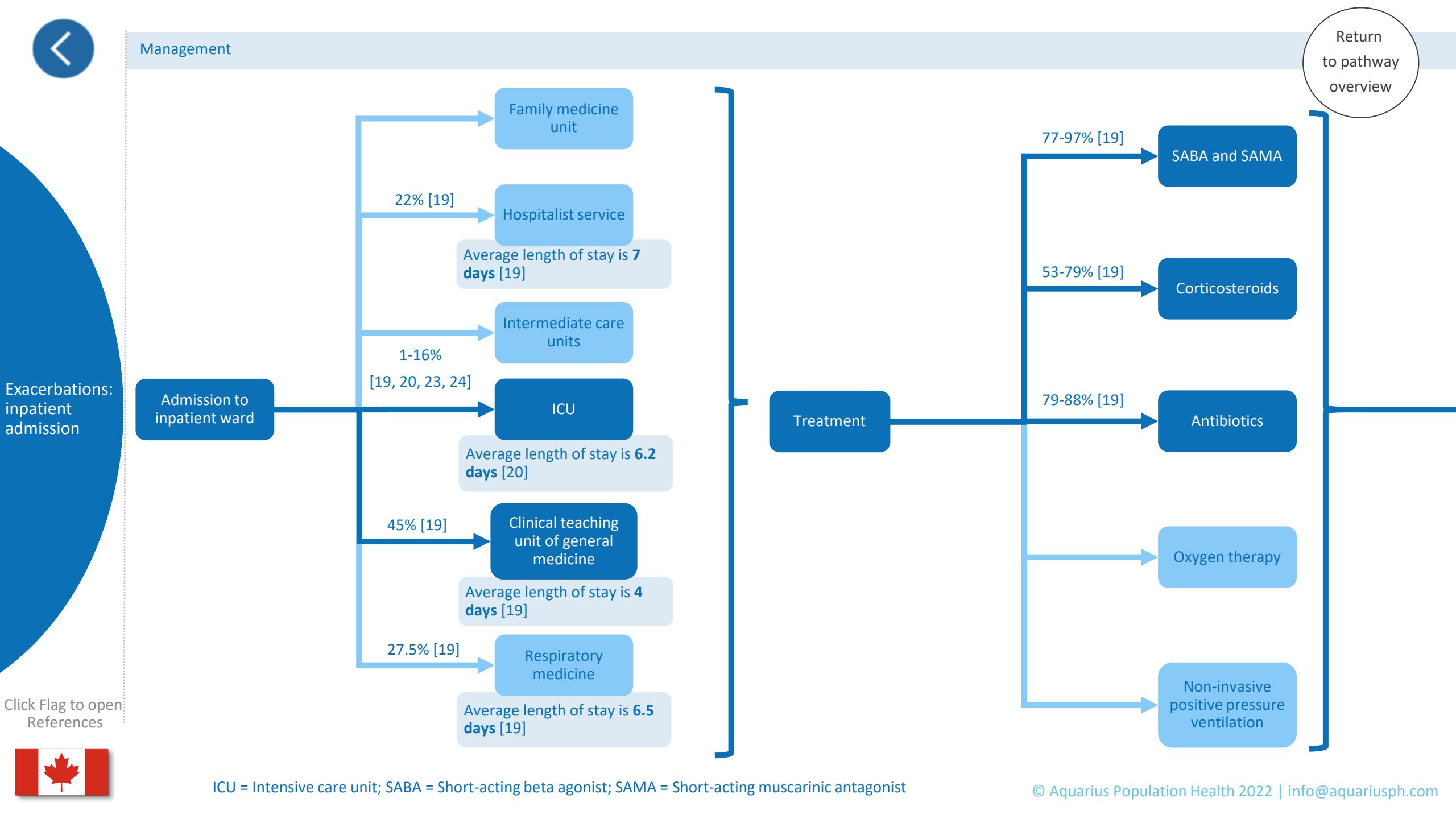


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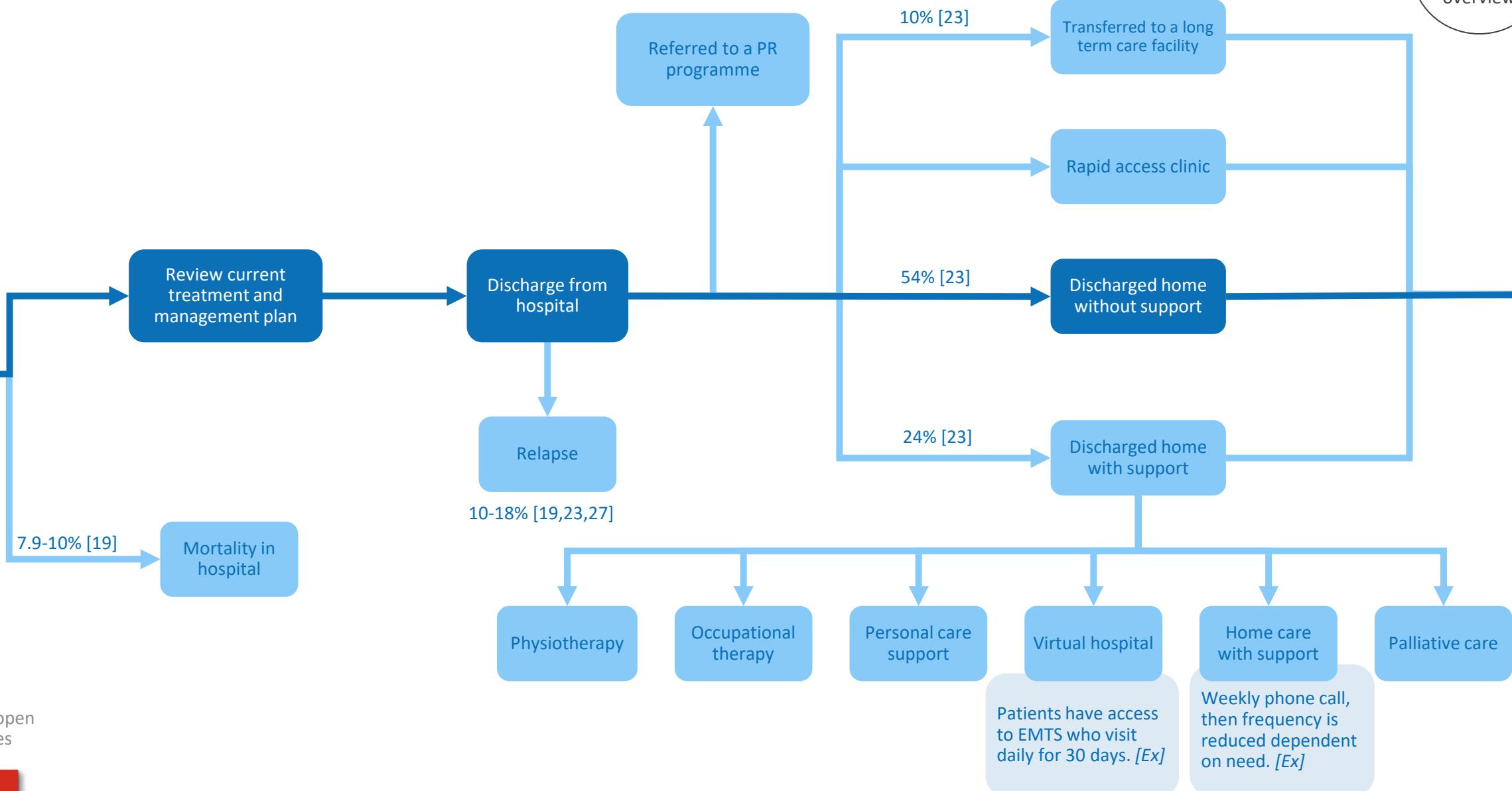
ED = Emergency department; SABA = short-acting beta agonist

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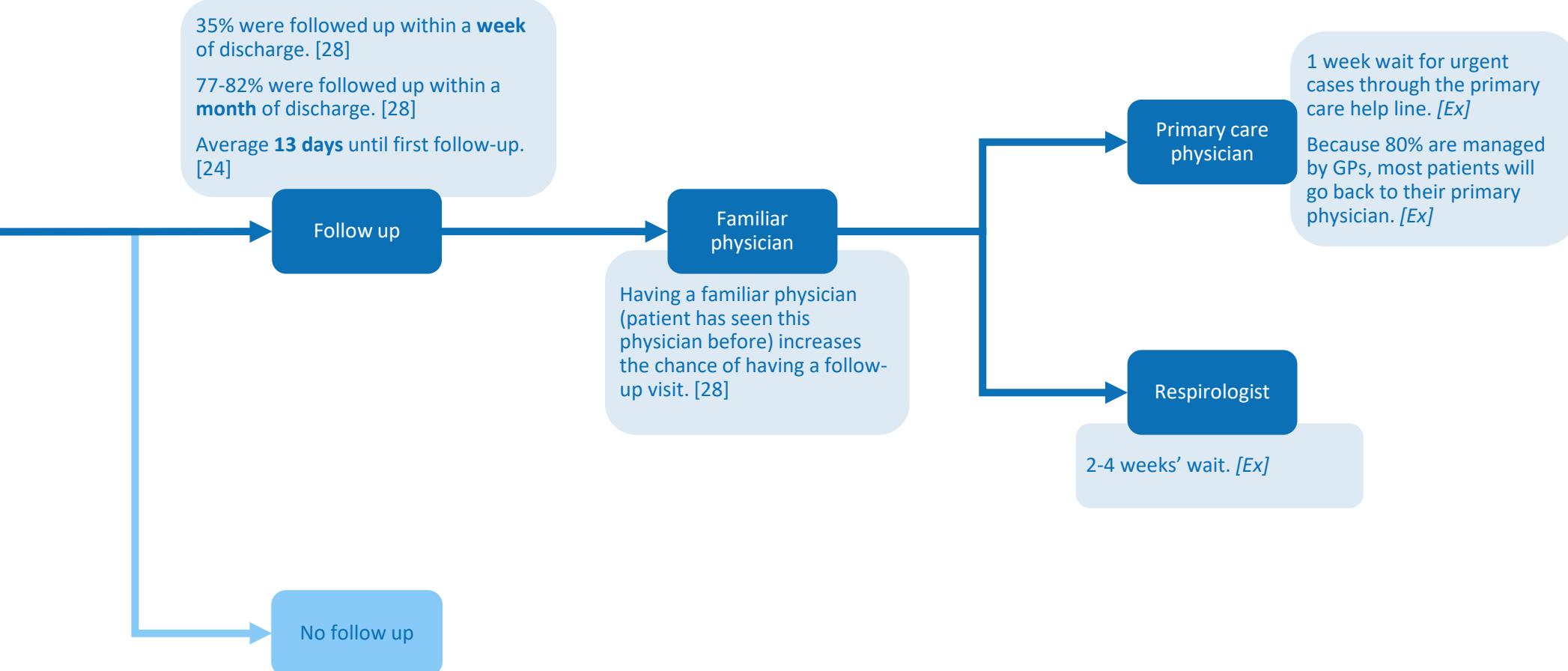


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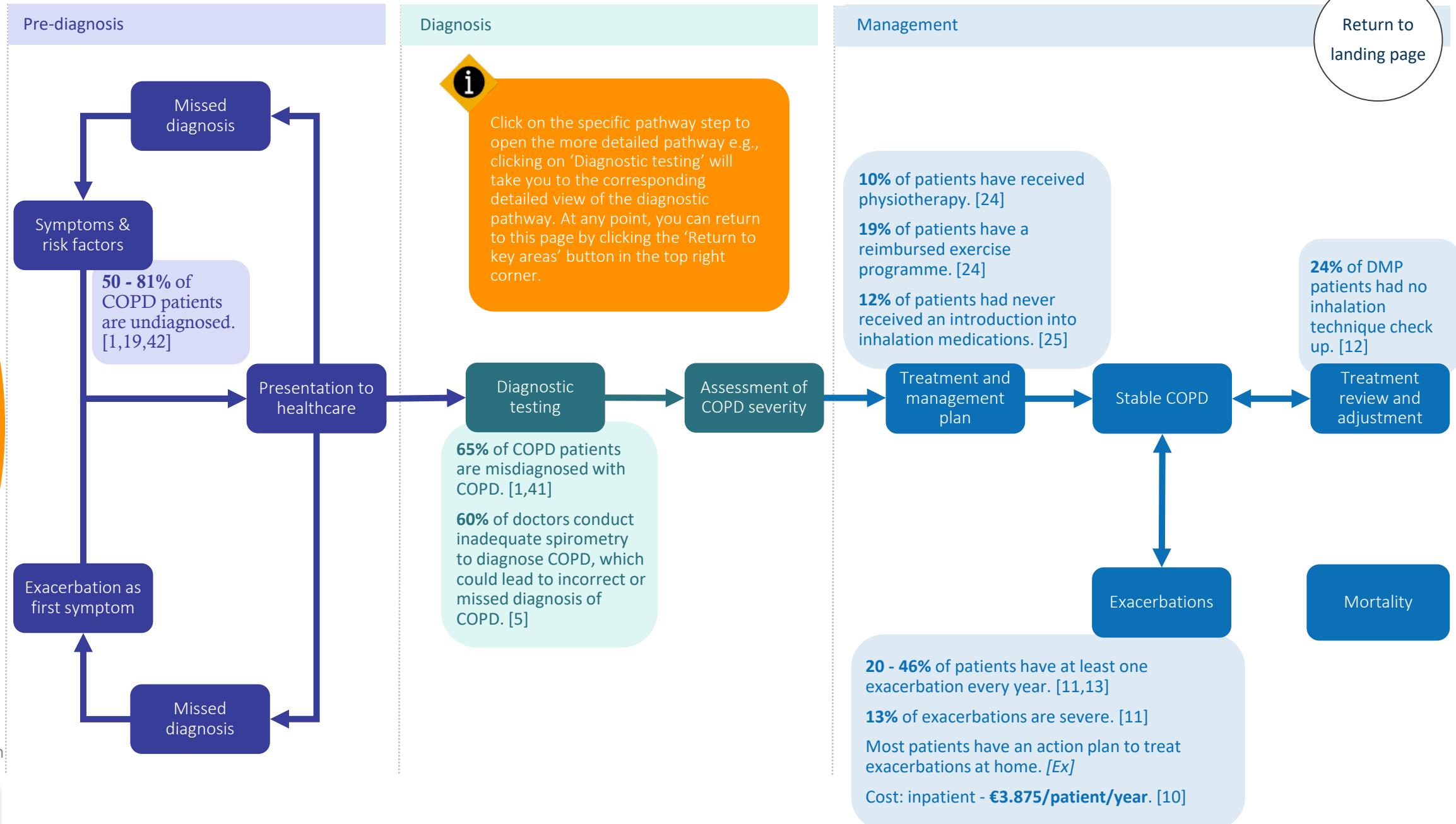


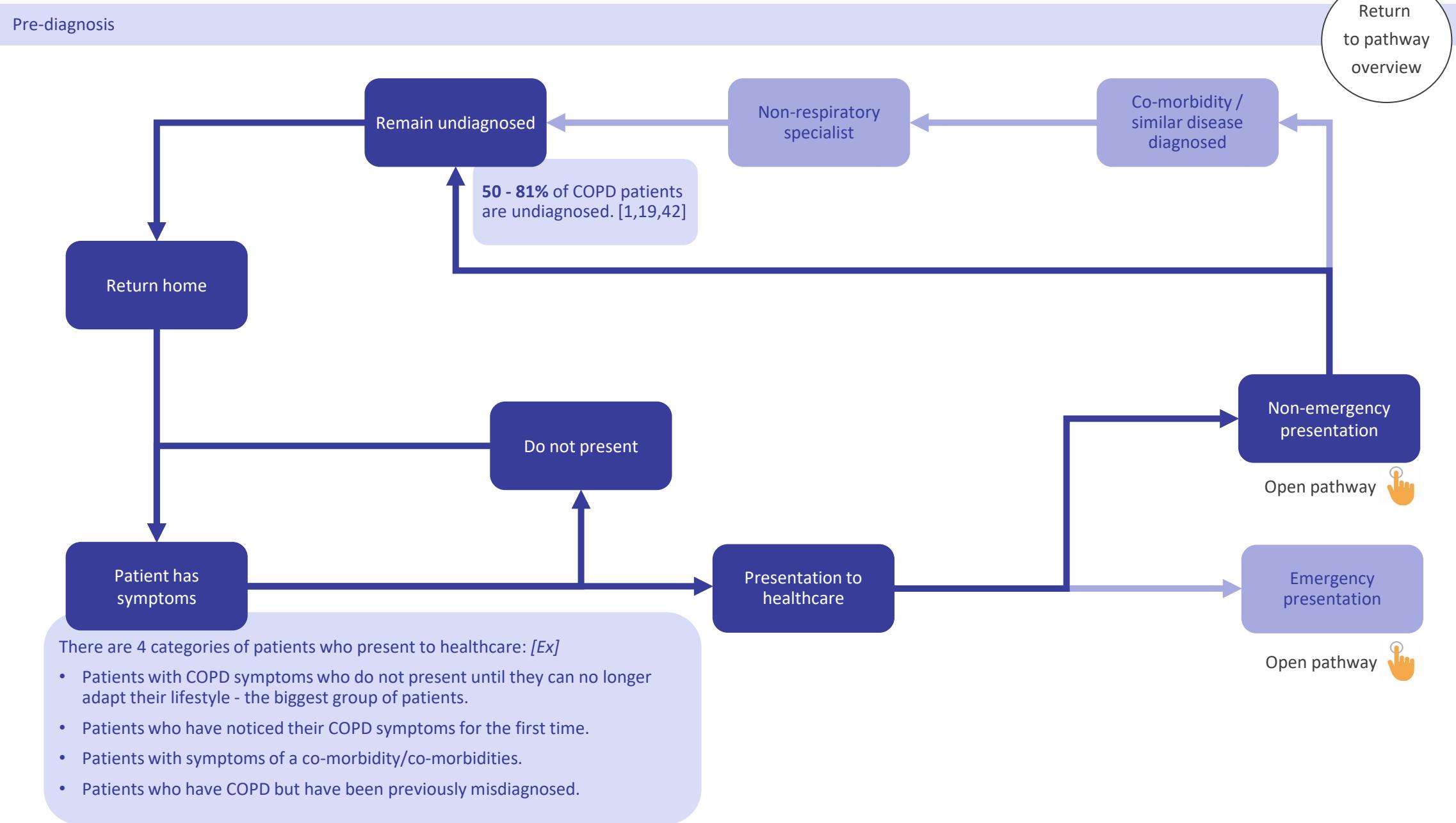
GP = General Practitioner

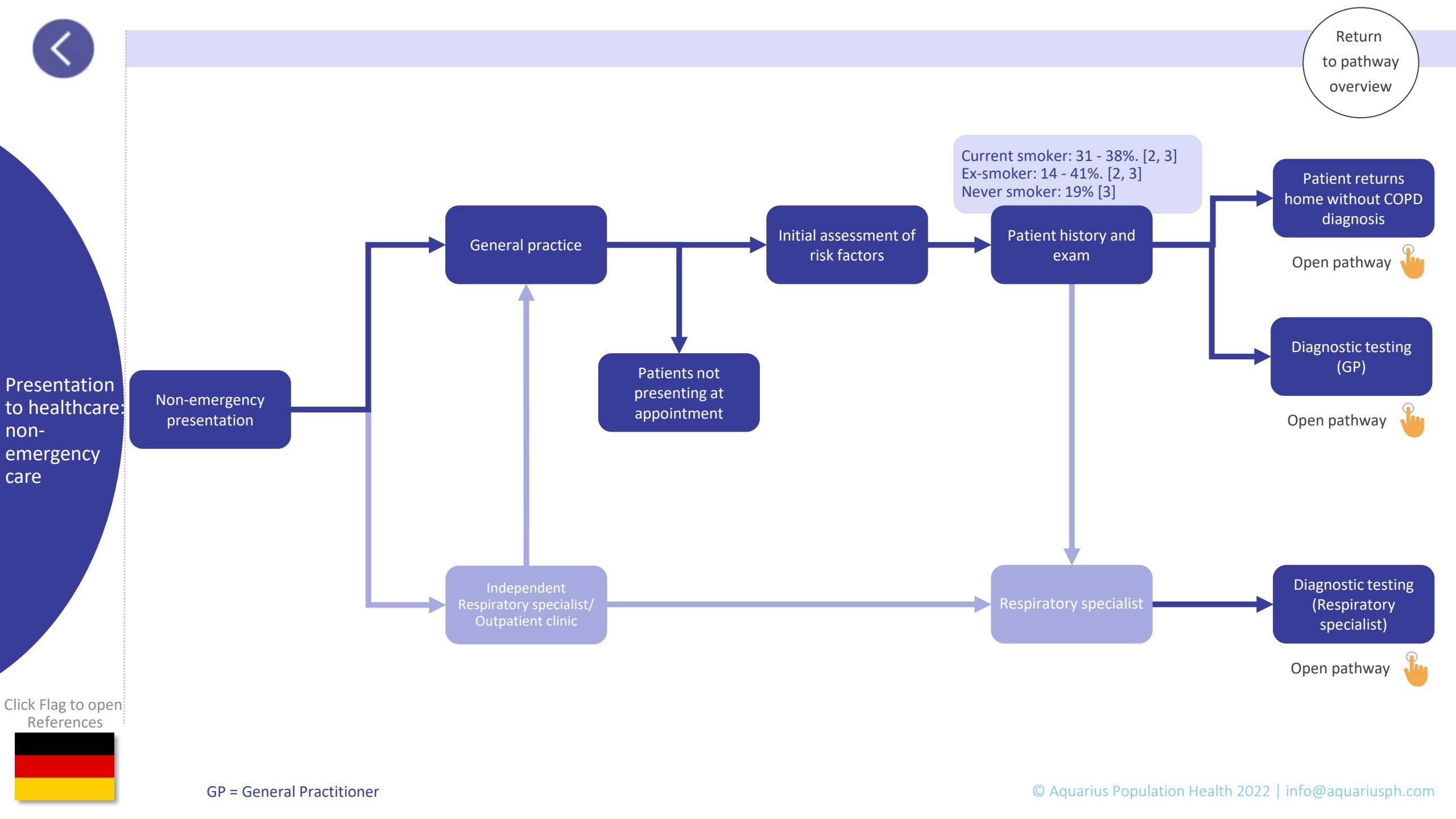
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# Pathway overview

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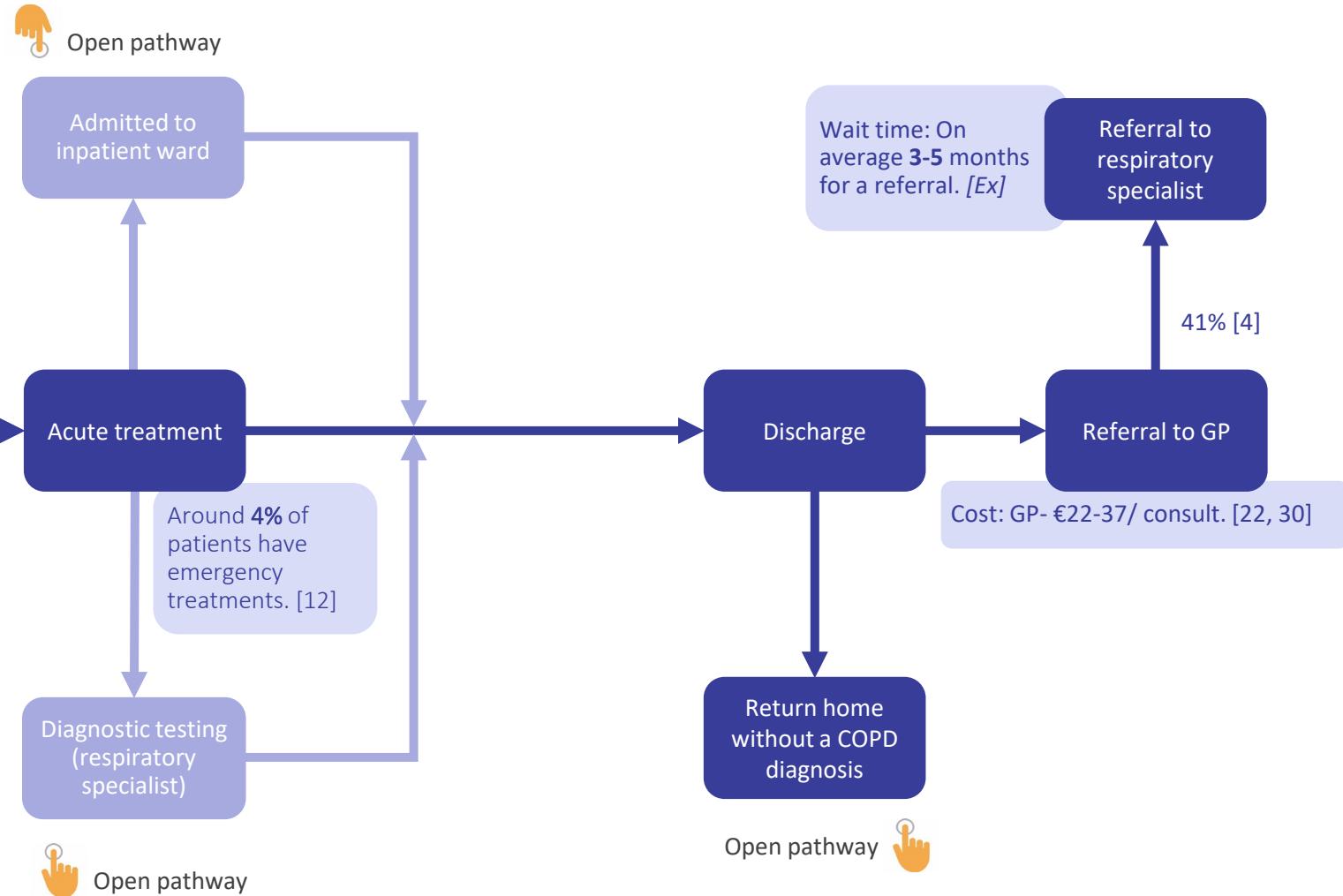






Pre-diagnosis

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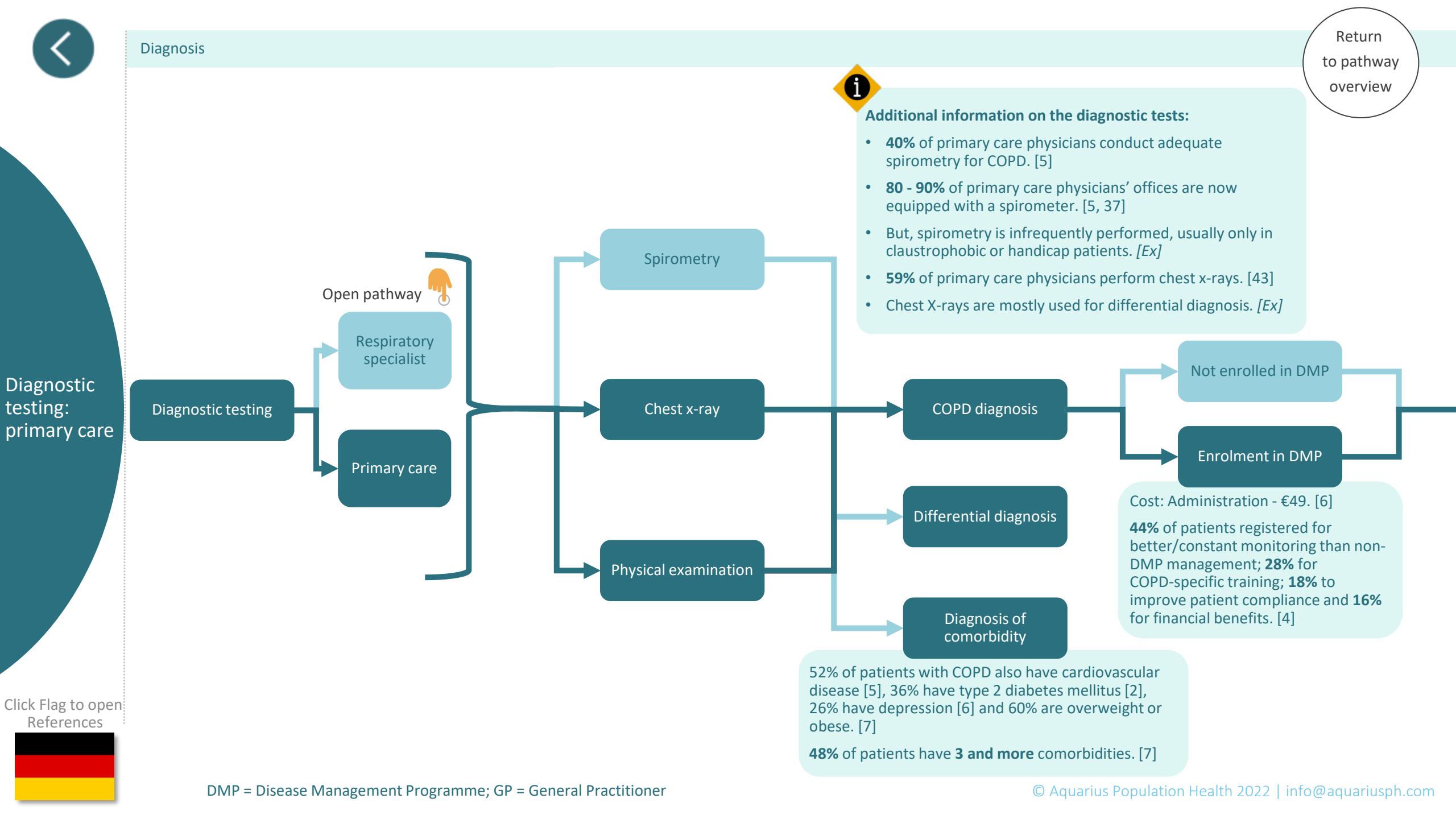


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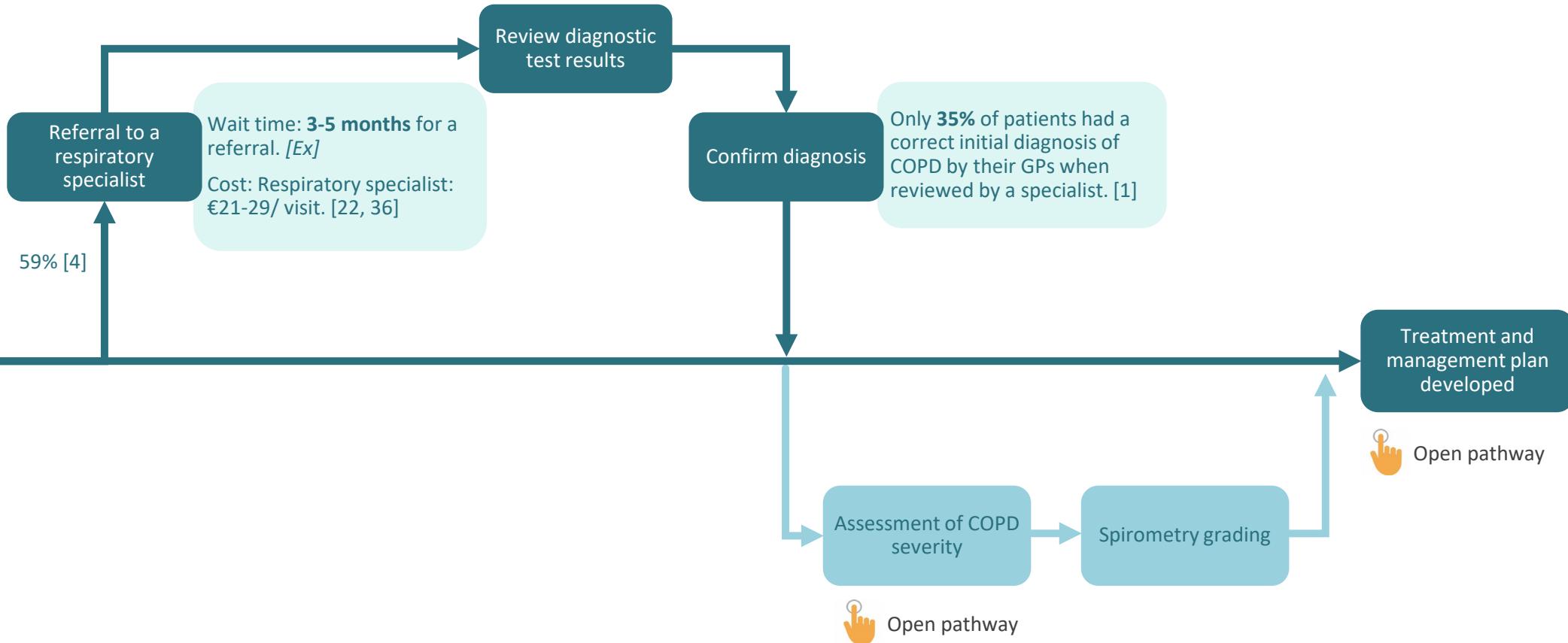
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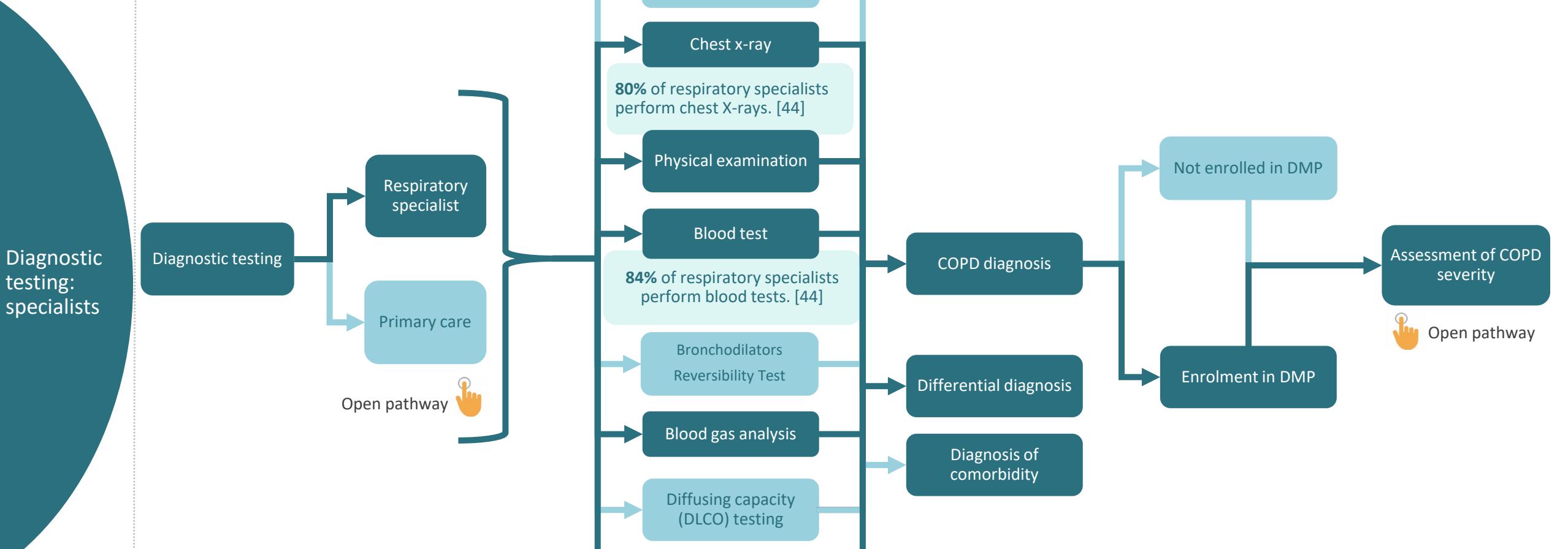


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GP = General Practitioner

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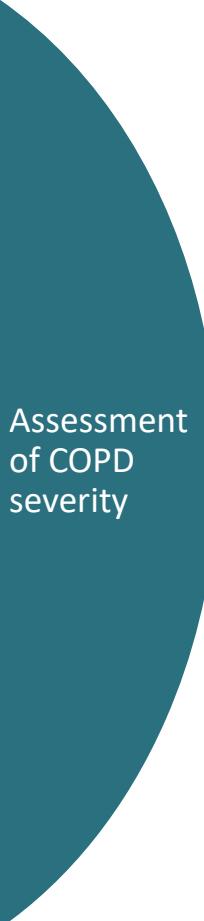


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References



DMP = Disease Management Programme

66% of respiratory specialists considered plethysmograph a standard diagnostic step. [18]  
This is performed in most patients at each visit, and removes the need for spirometry. [Ex]



## Assessment of COPD severity

## Assessment of COPD severity

Respiratory specialists **assess 60 -70%** of patients using CAT or mMRC, and GOLD staging. [Ex]

mMRC is rarely used in Germany. [Ex]

Modified British Medical Research Council (mMRC) dyspnoea scale

## COPD assessment Test (CAT)

## GOLD group

## Group A

18% of non-DMP patients. [3]  
46% of DMP patients. [2]  
Cost: €2.067 - €3.887/patient annually. [2,7]

## Group B

49% of non-DMP patients. [3]  
31% of DMP patients. [2]  
Cost: €2.0552 - €4.366/patient annually. [2,7]

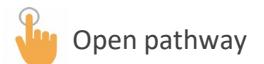
## Group C

28% of non-DMP patients. [3]  
19% of DMP patients. [2]  
Cost: €3.432 - €5.657/patient annually. [2,7]

## Group D

6% of non-DMP patients. [3]  
5% of DMP patients. [2]  
Cost: €4.176 - €7.913/patient annually. [2,7]

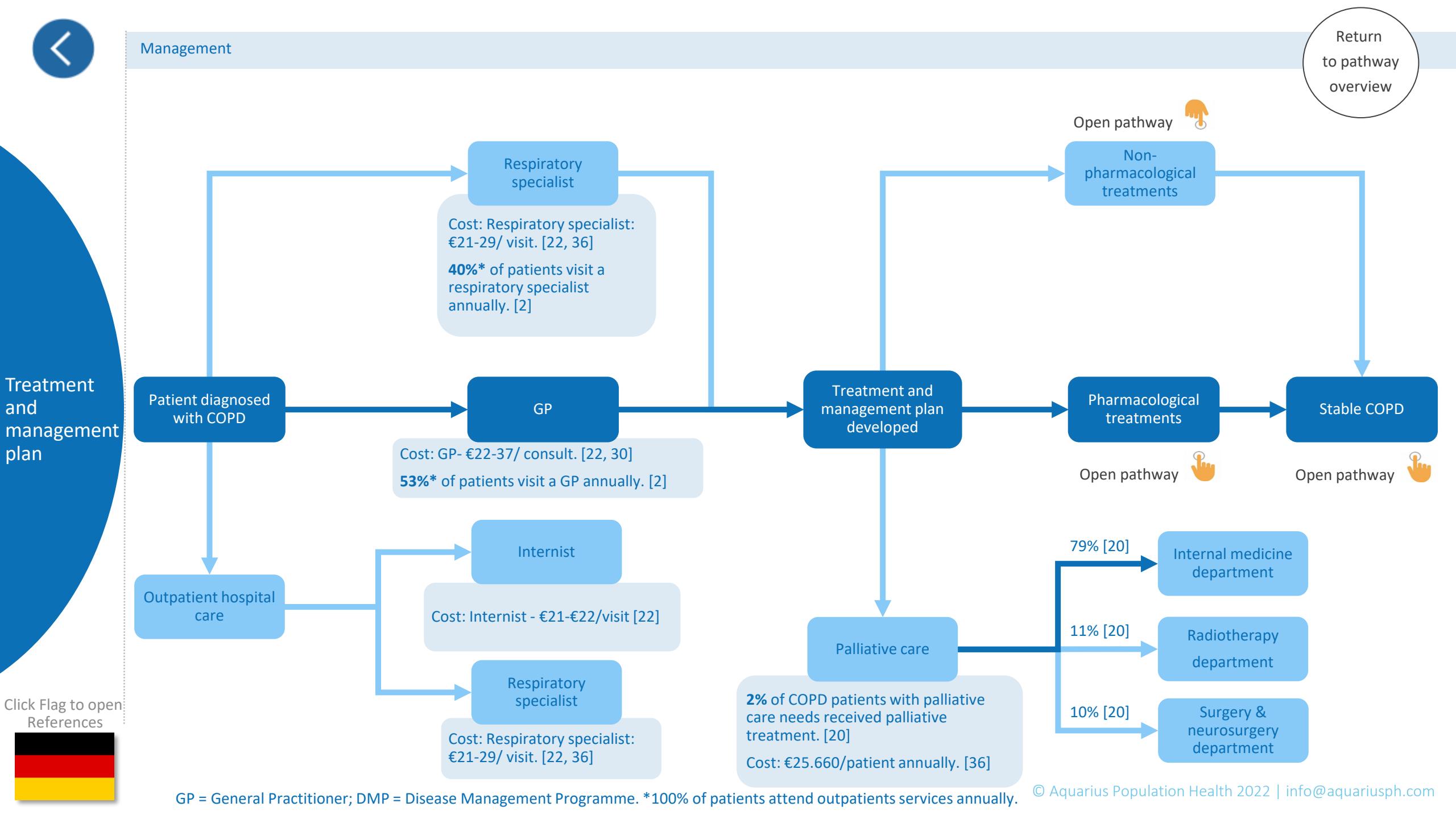
## Treatment and management plan developed



Open pathway

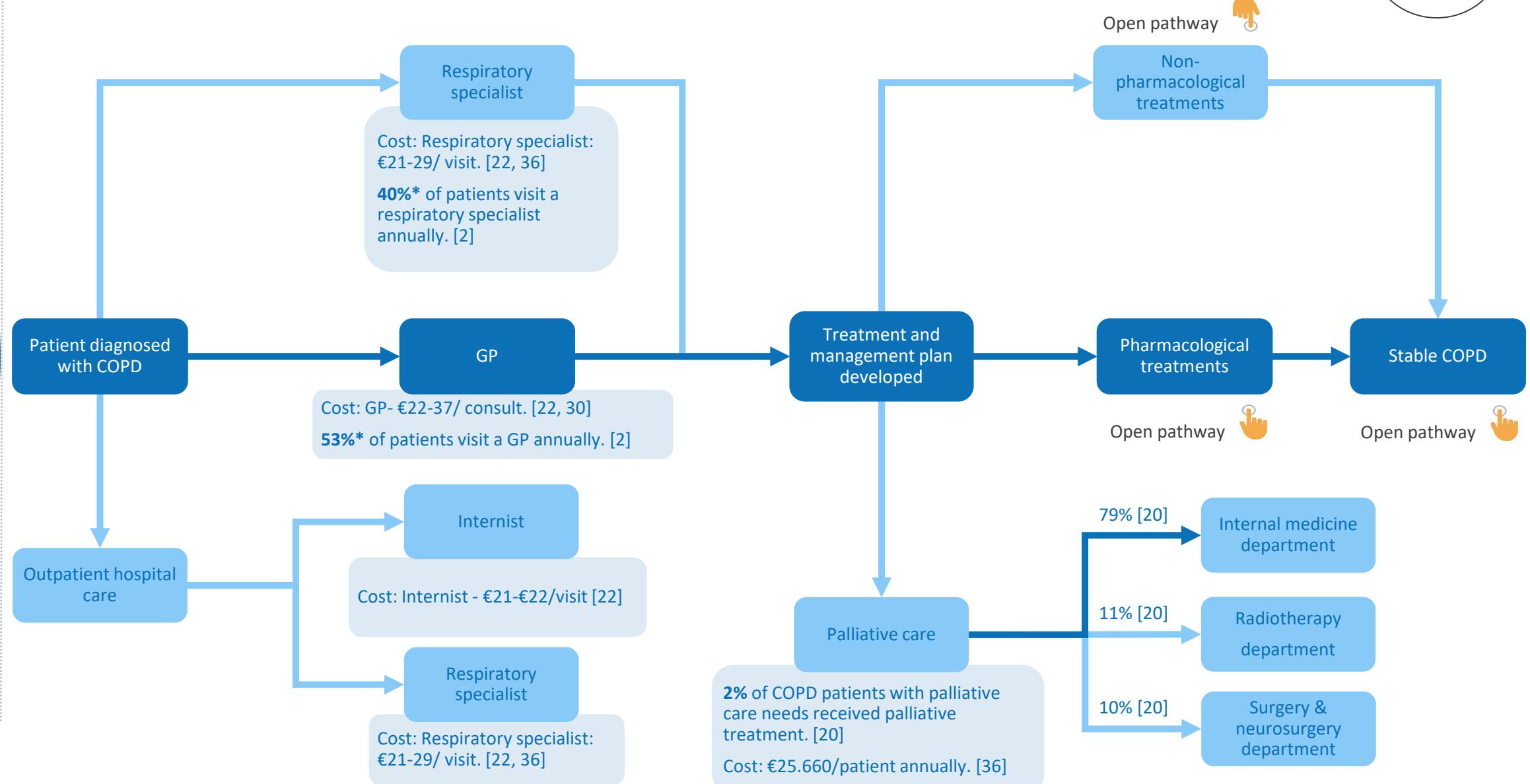
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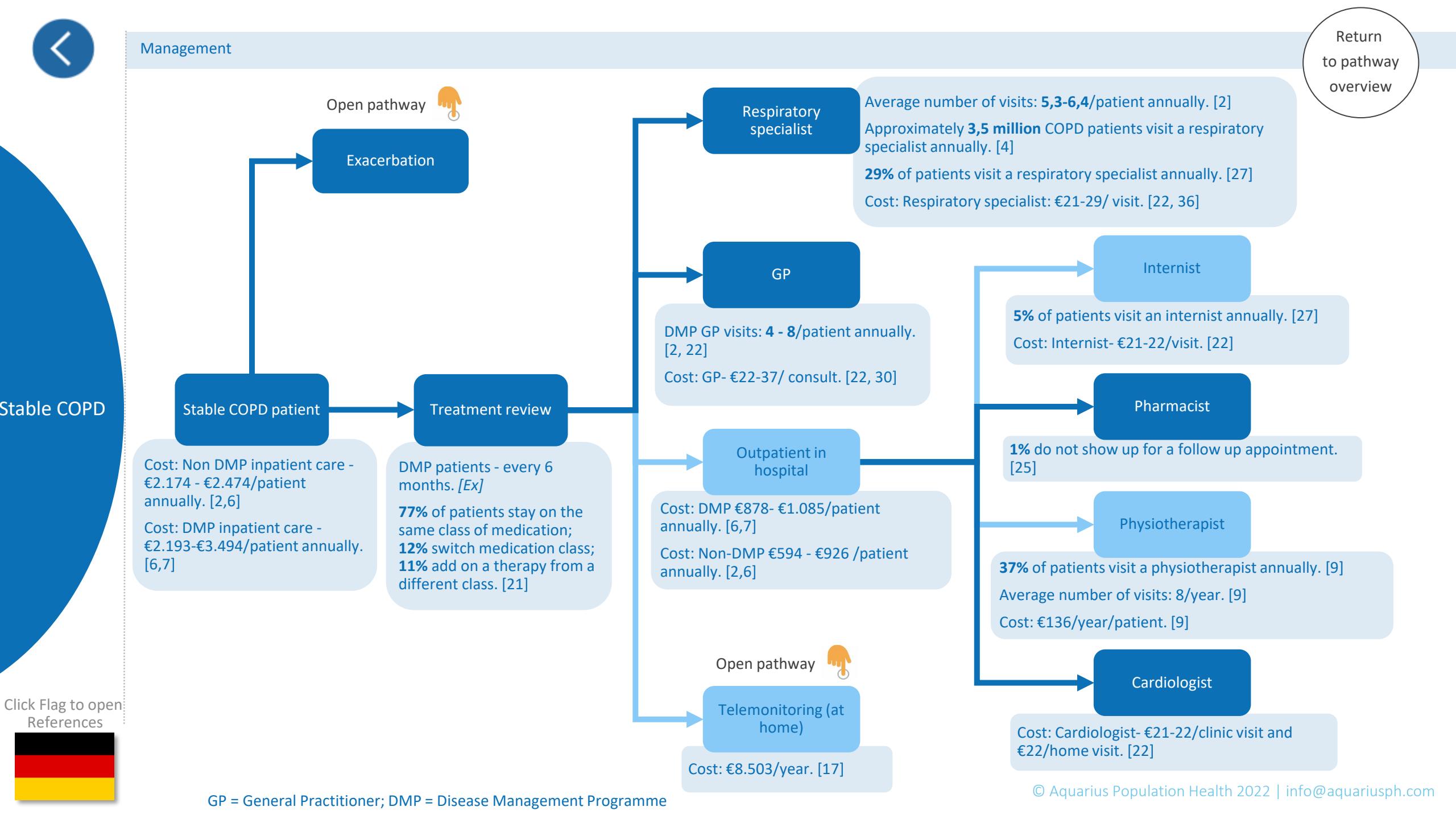
## Management

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GP = General Practitioner; DMP = Disease Management Programme. \*100% of patients attend outpatients services annually.

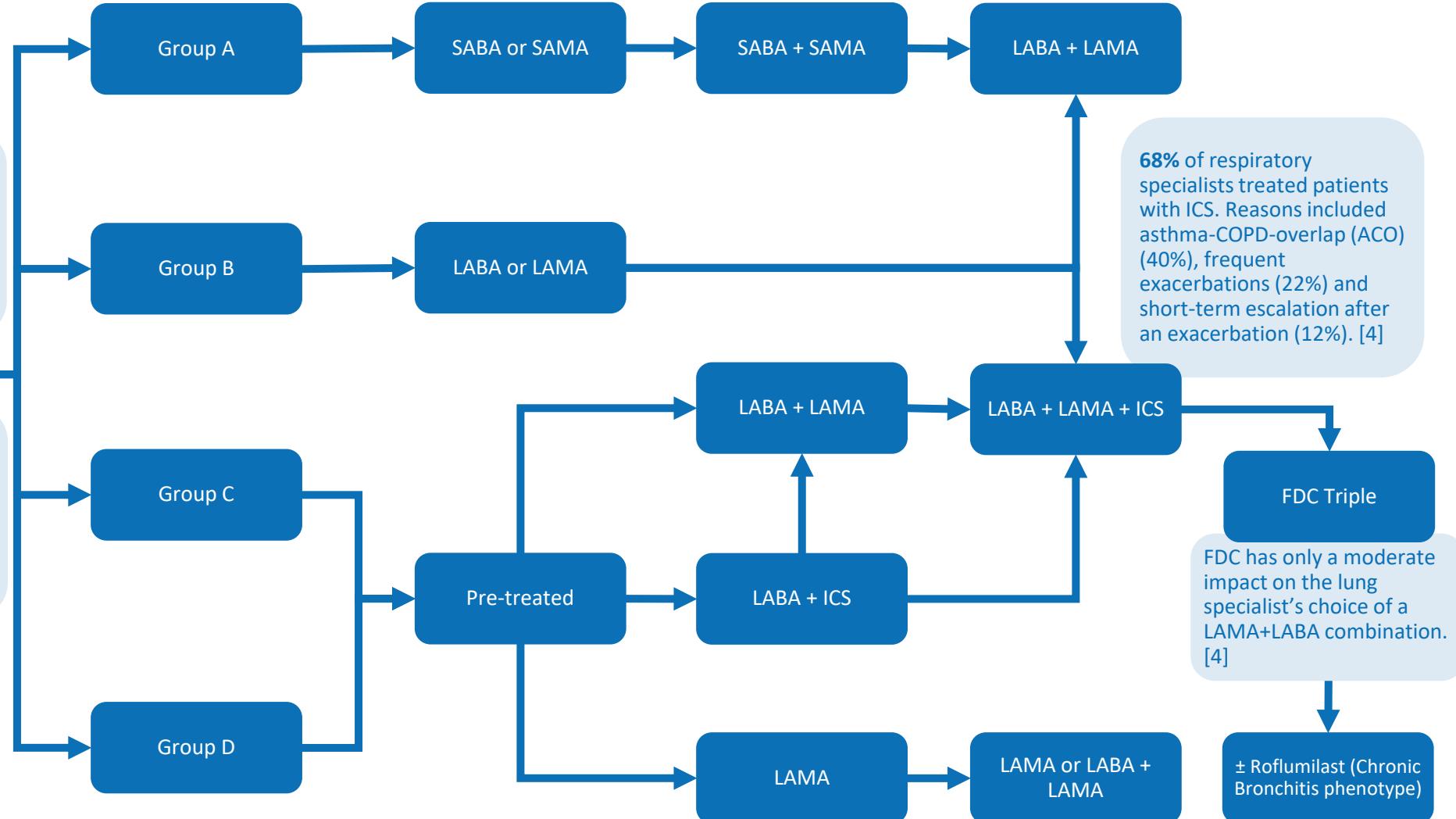
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# Treatment and management plan: pharmacological treatment

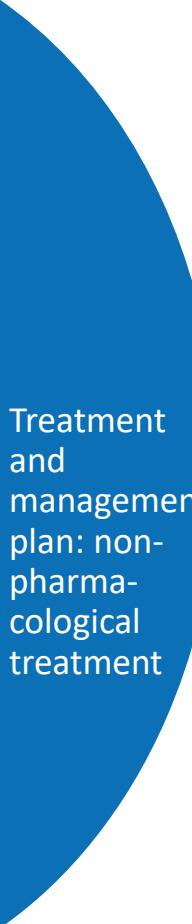
## Management

Return to pathway overview



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



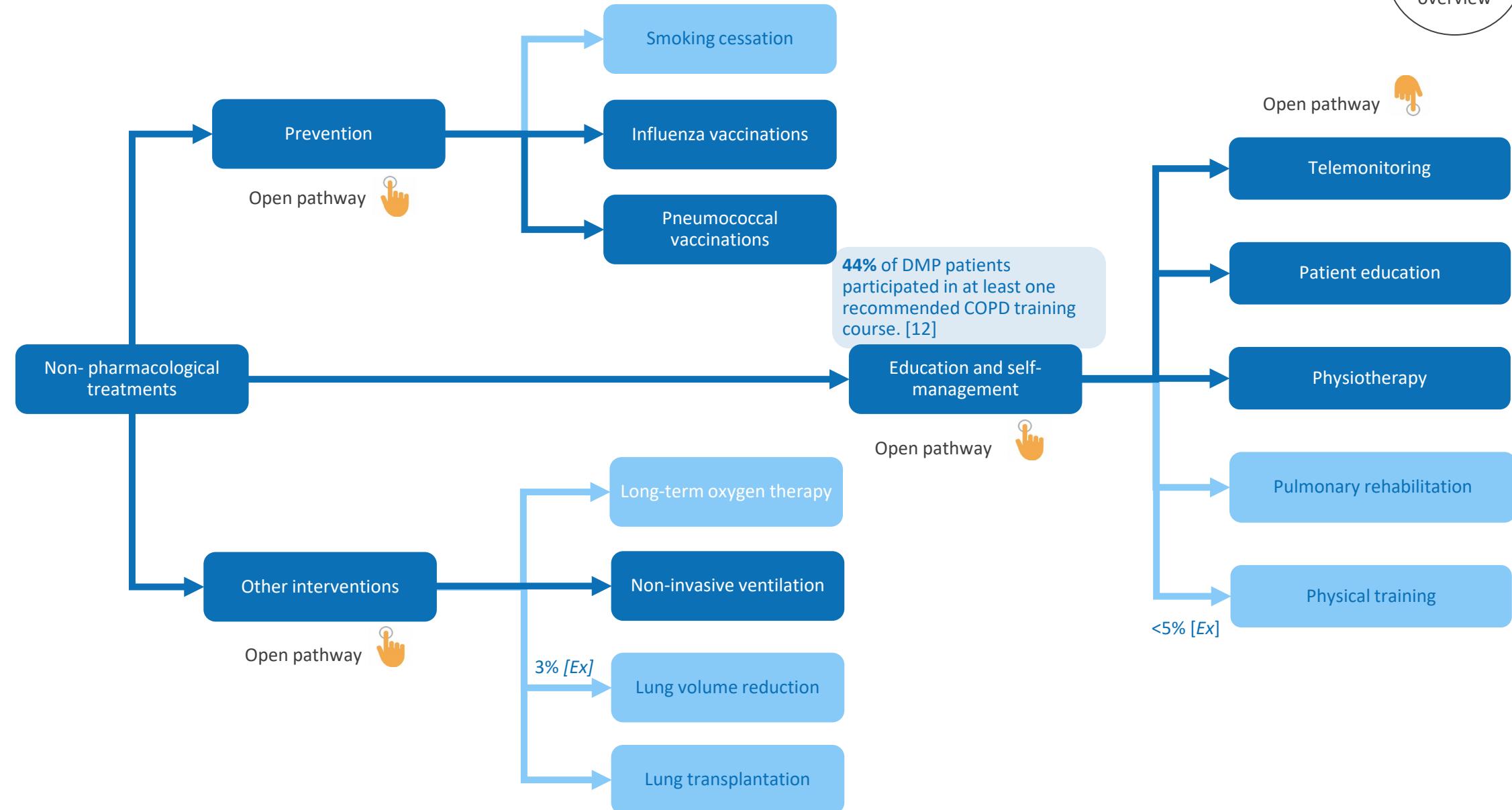


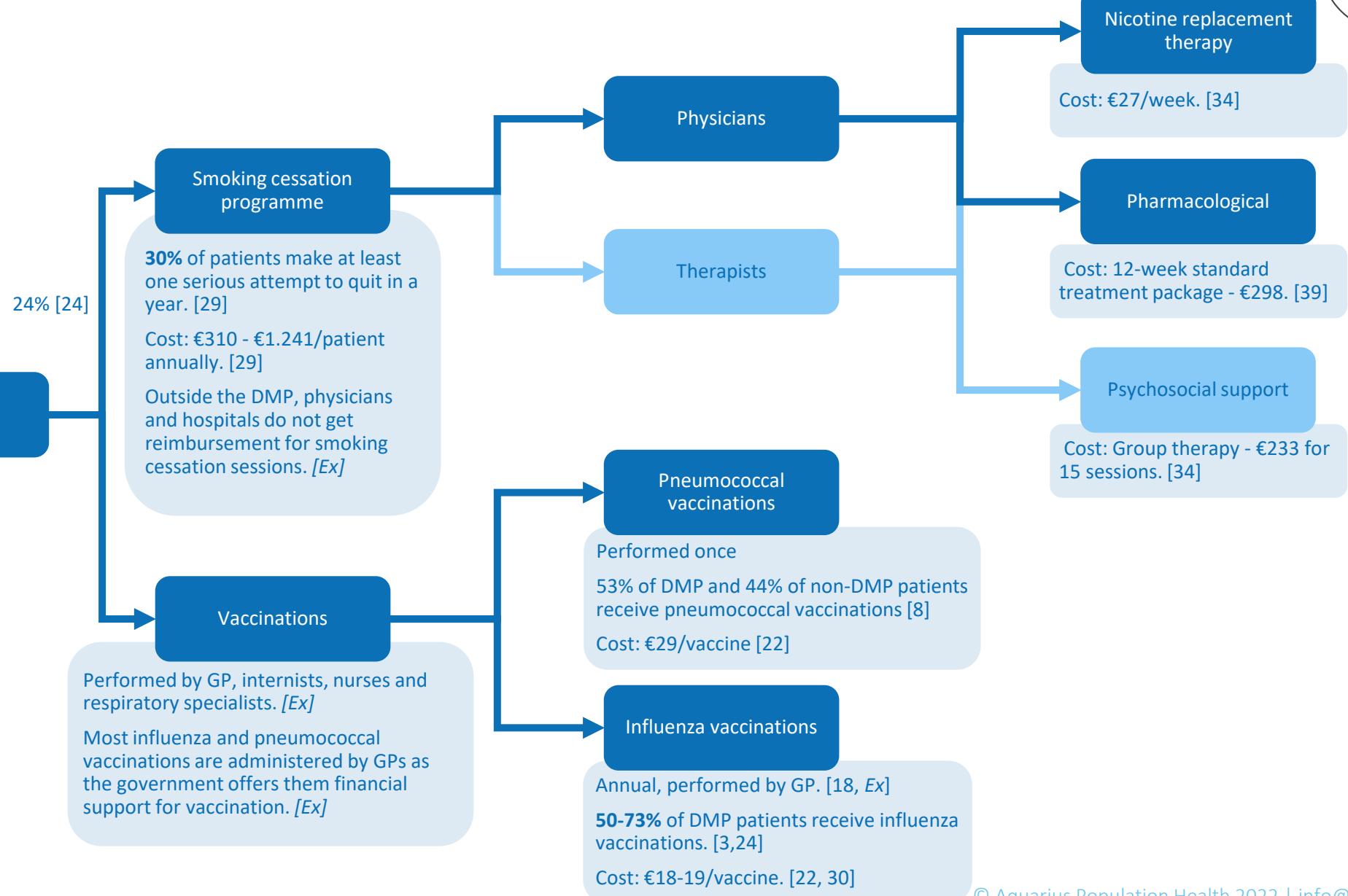
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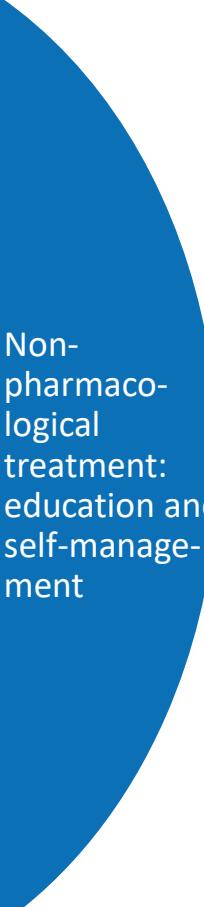


## Management

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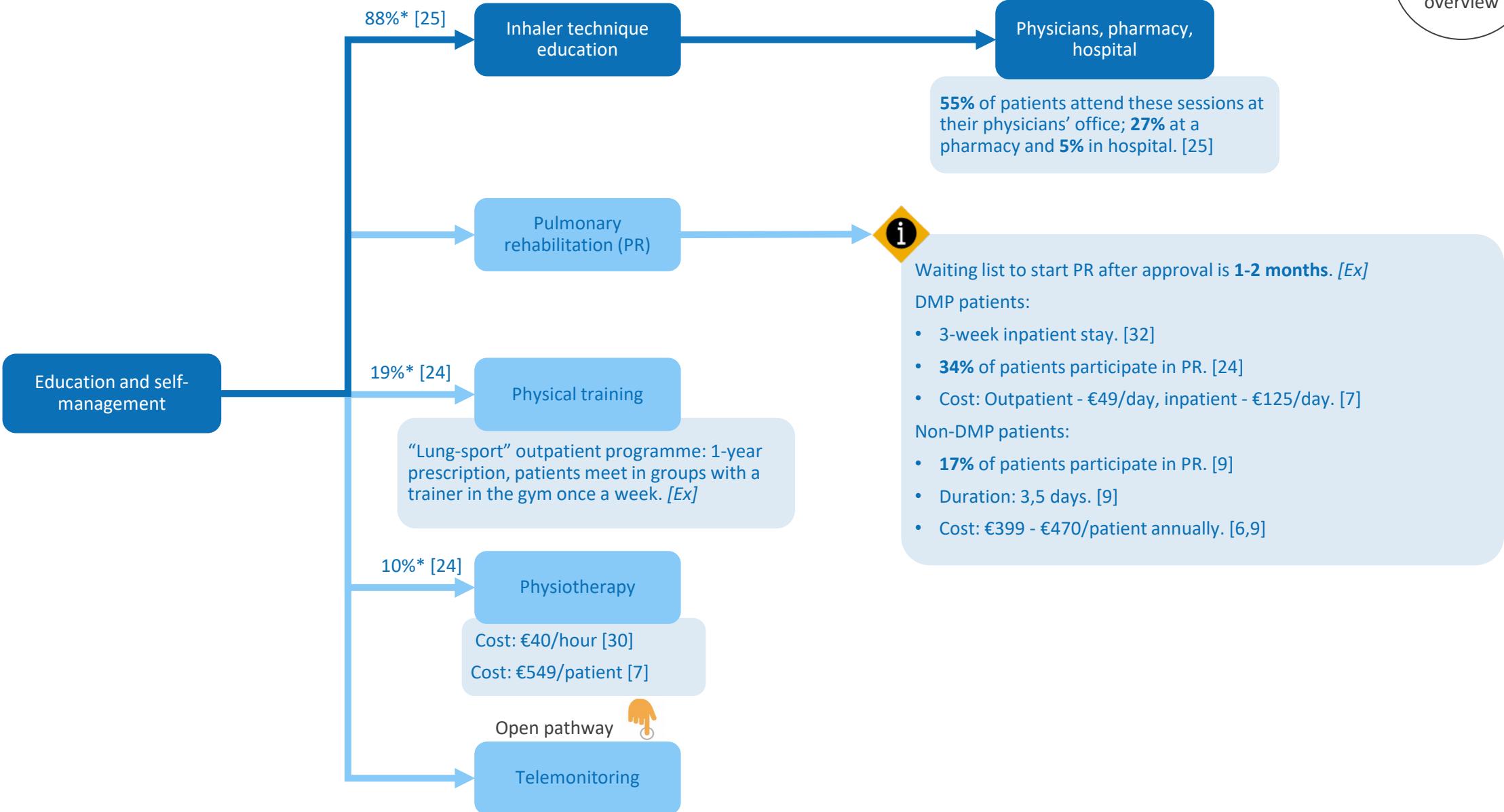






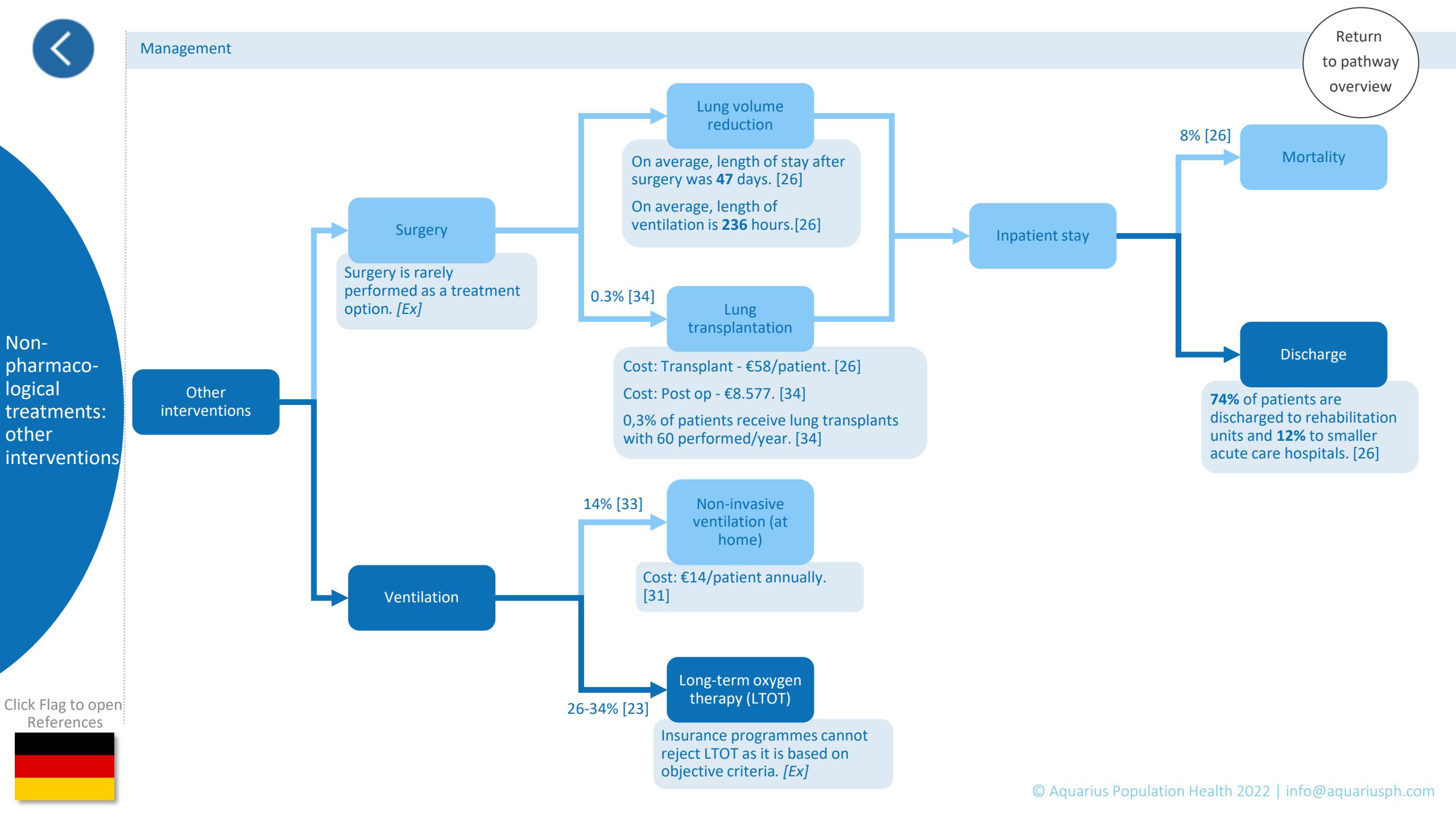
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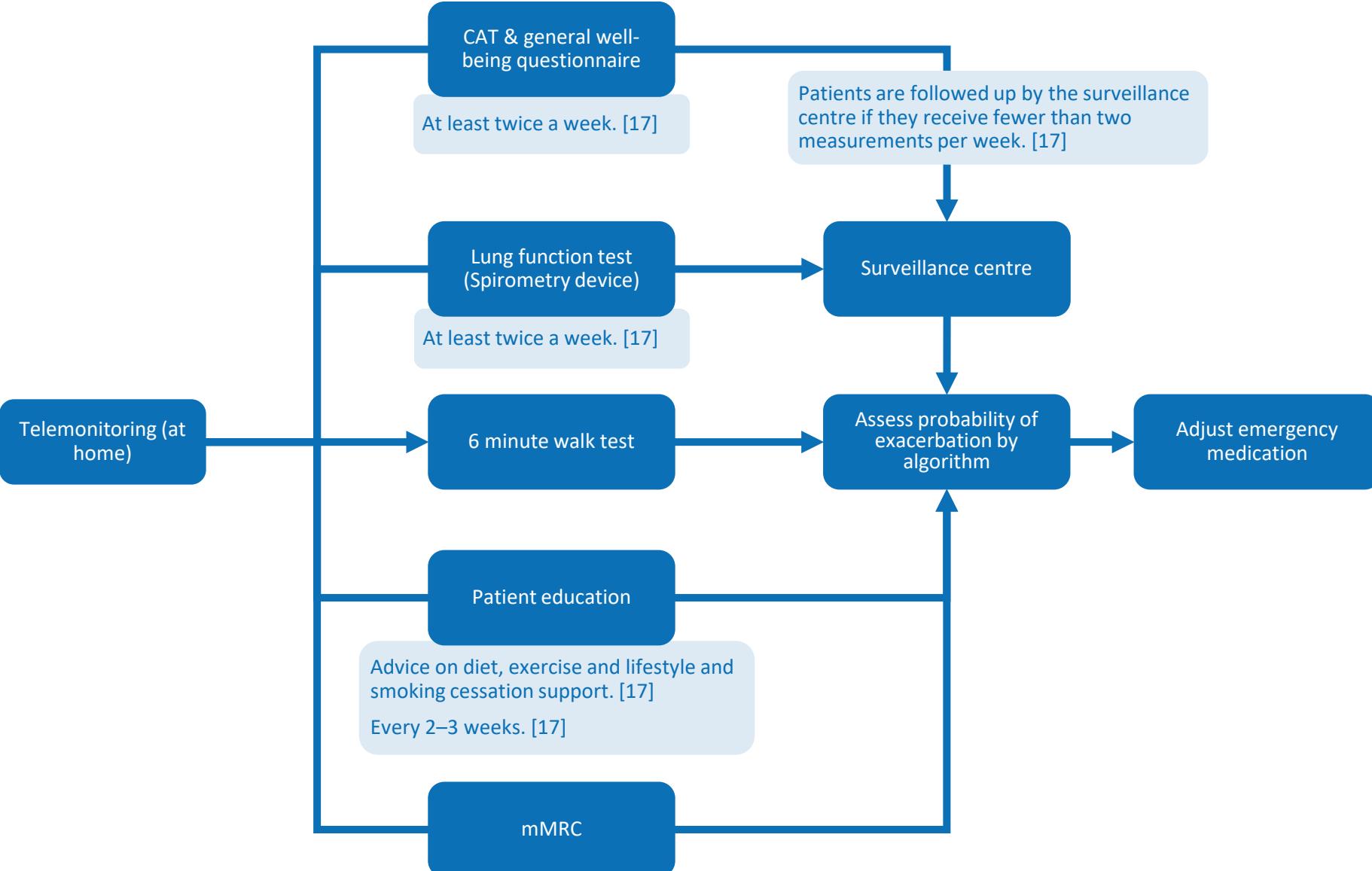






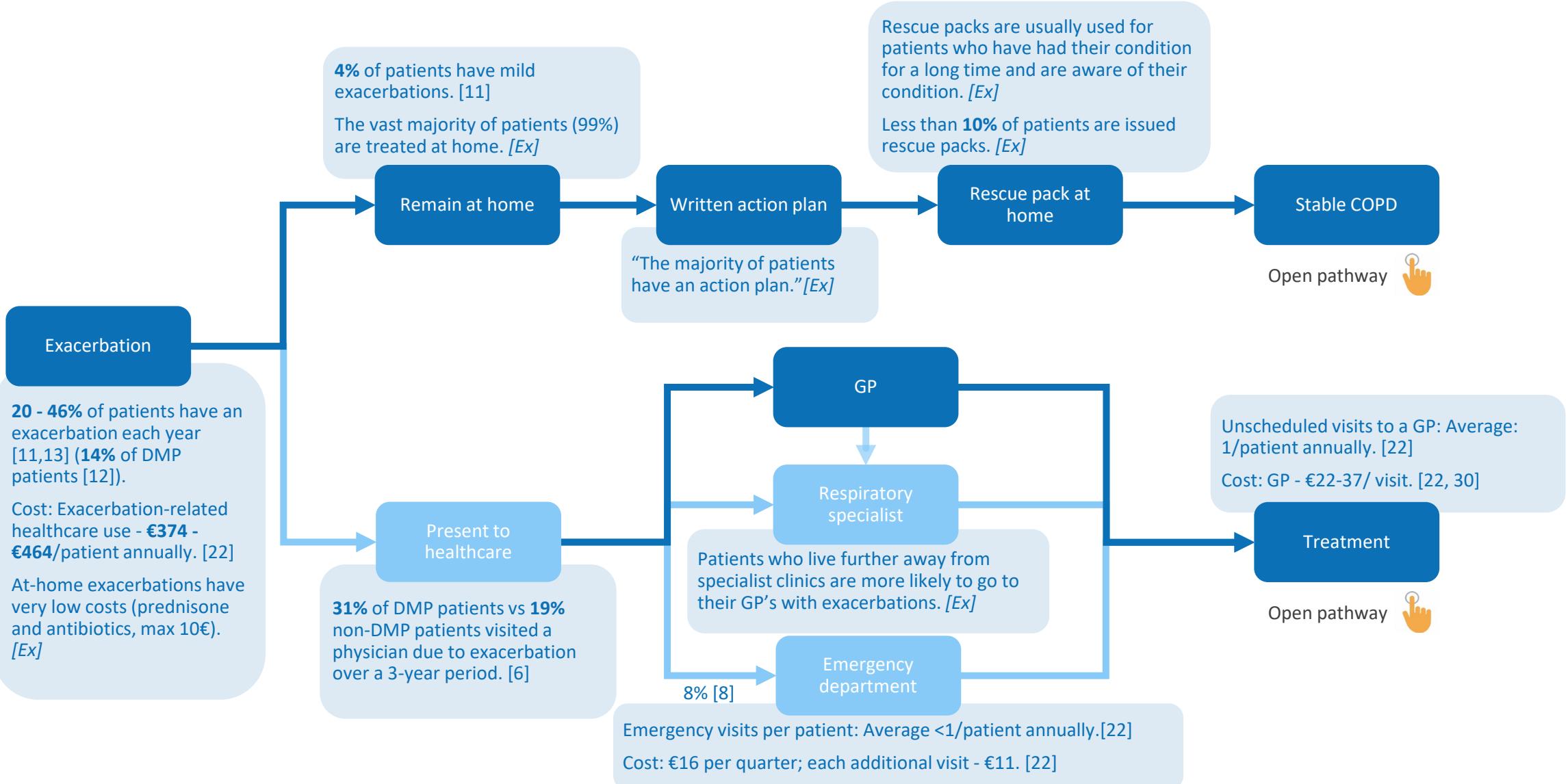
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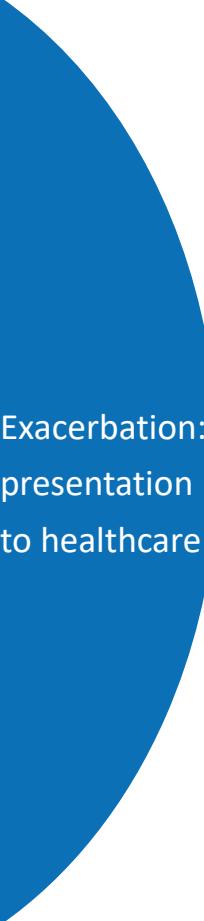
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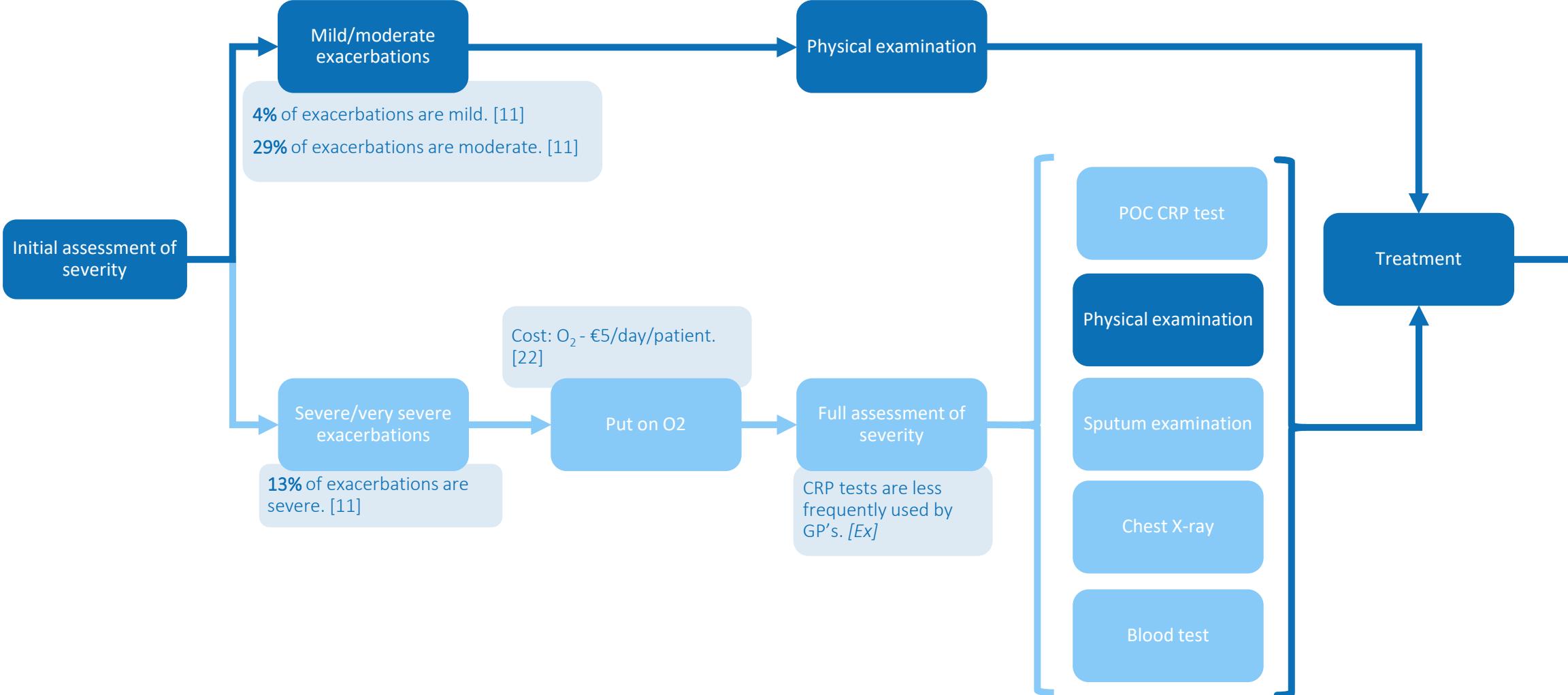


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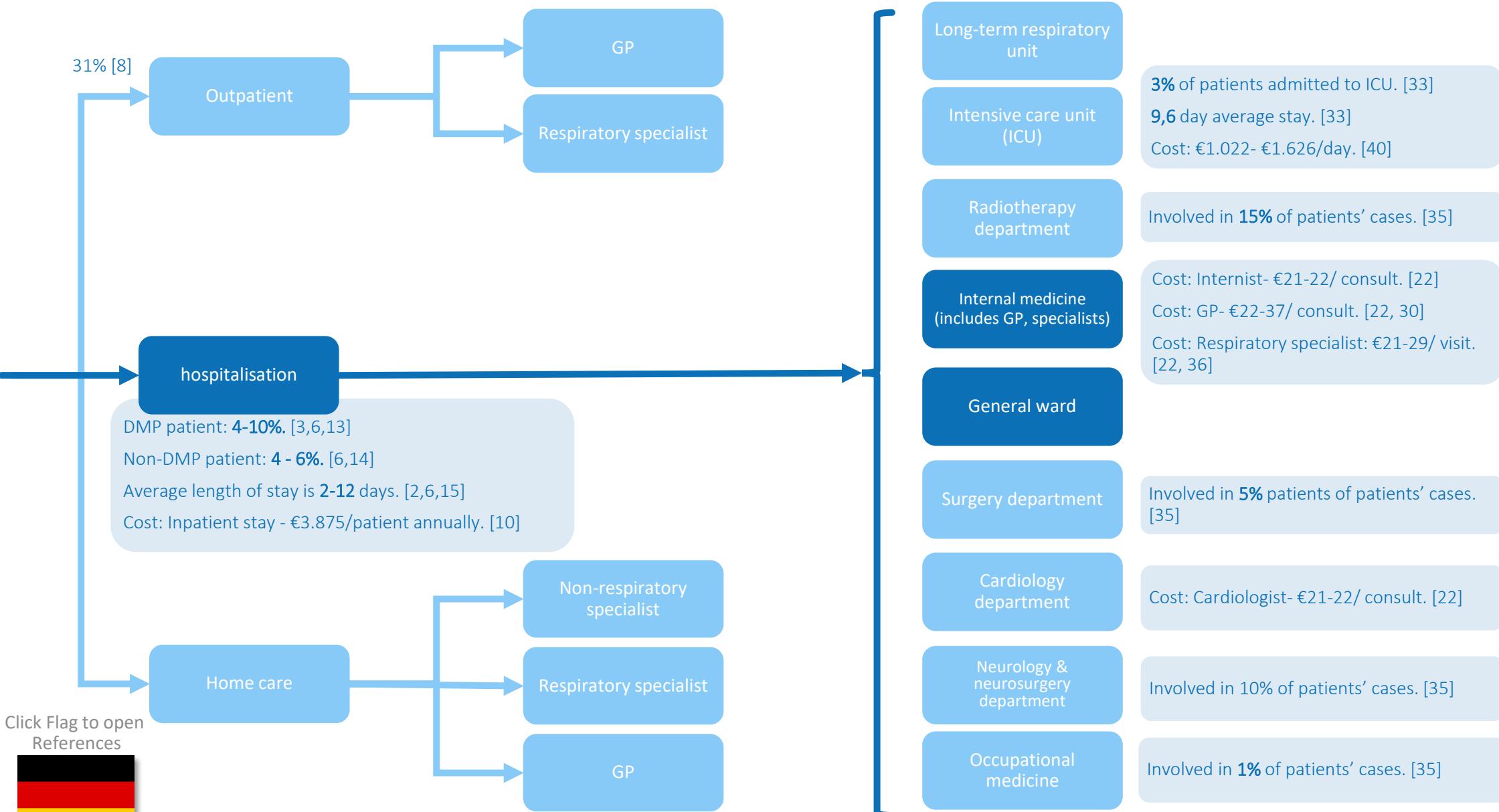


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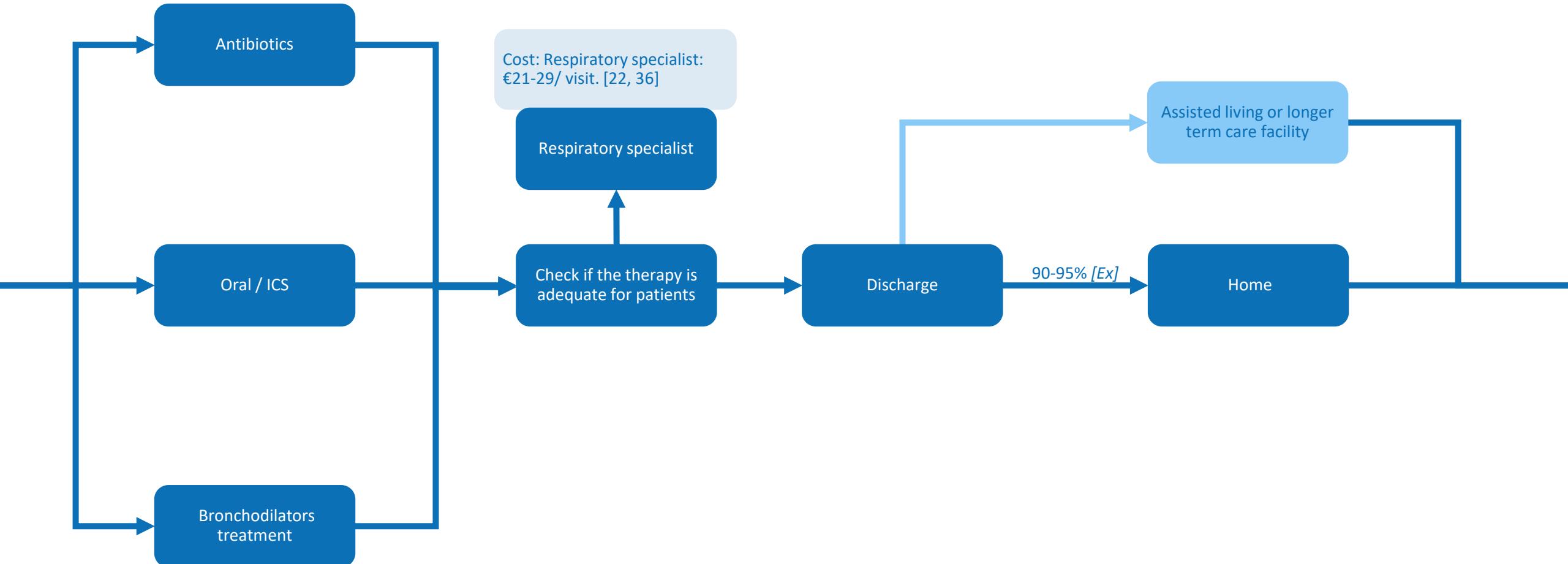


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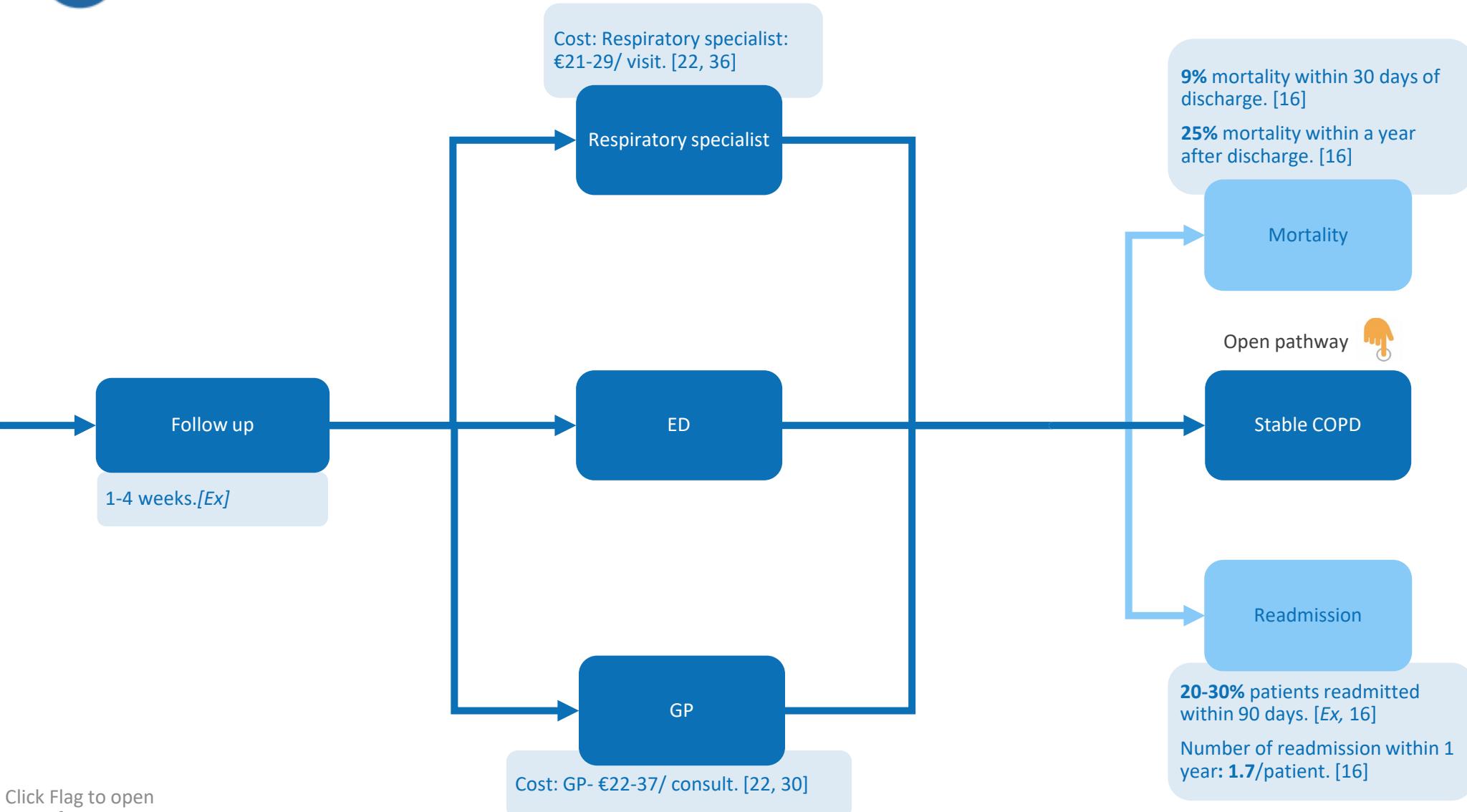
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ICS = Inhaled Corticosteroids



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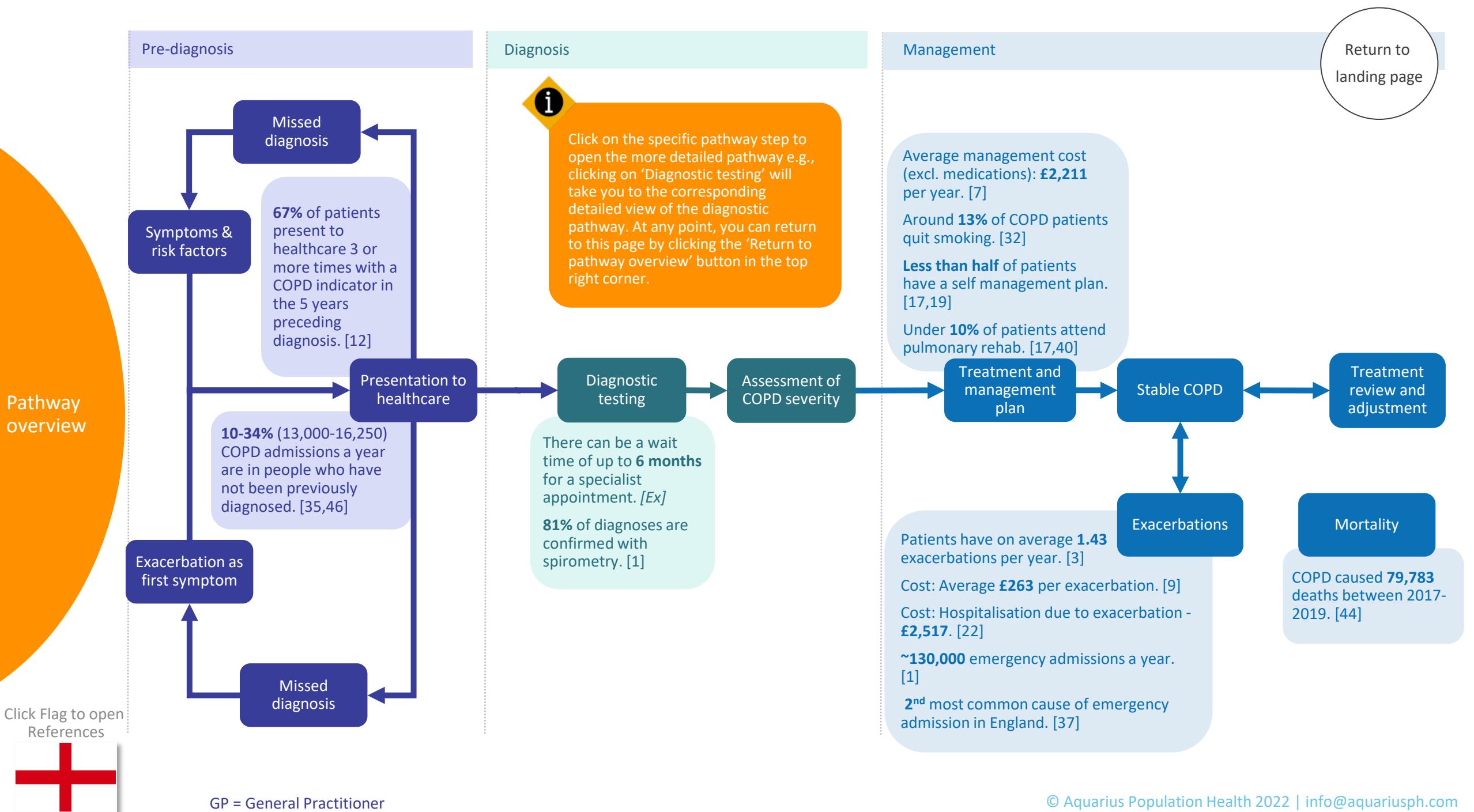


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ED = Emergency Department; DMP = Disease Management Programme

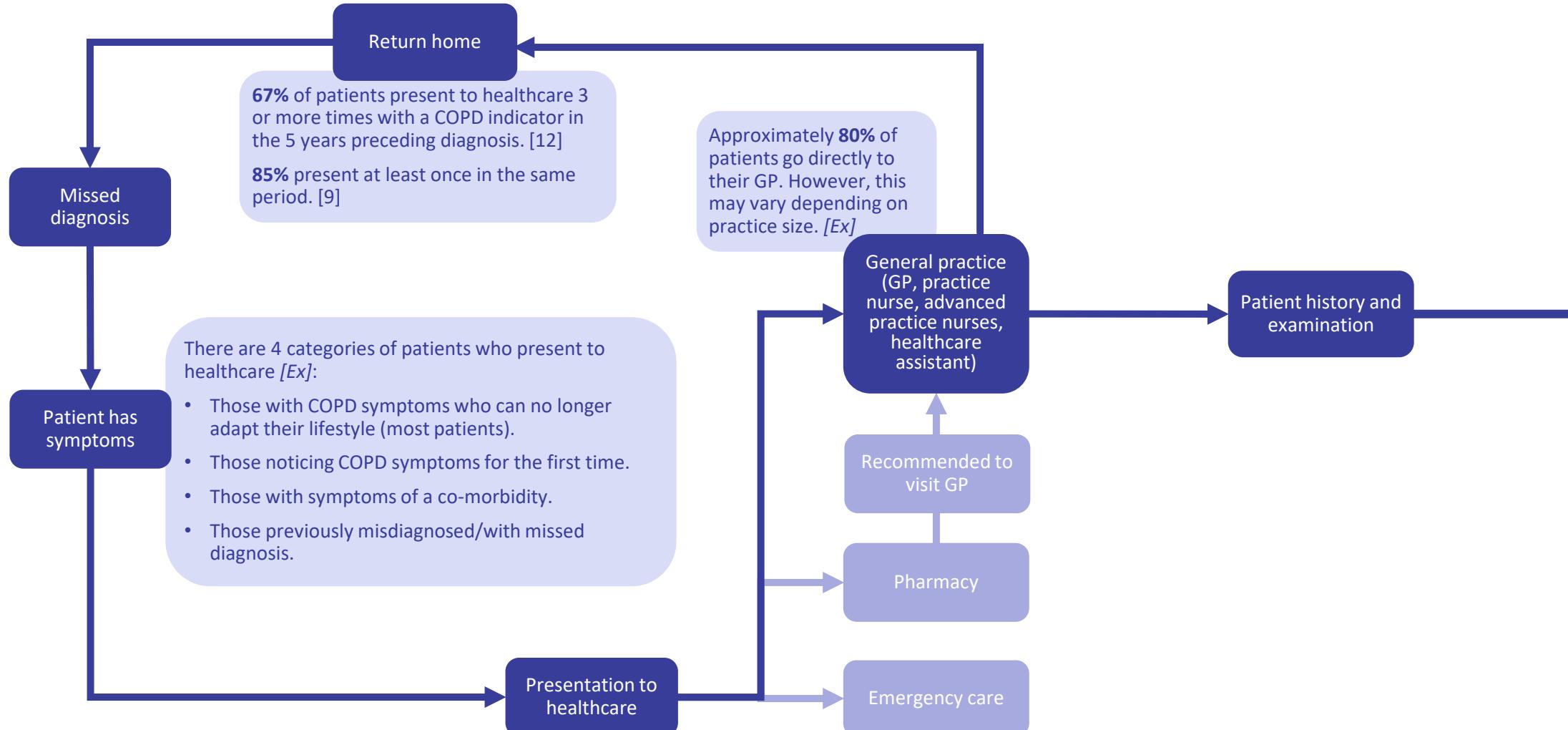
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Pre-diagnosis

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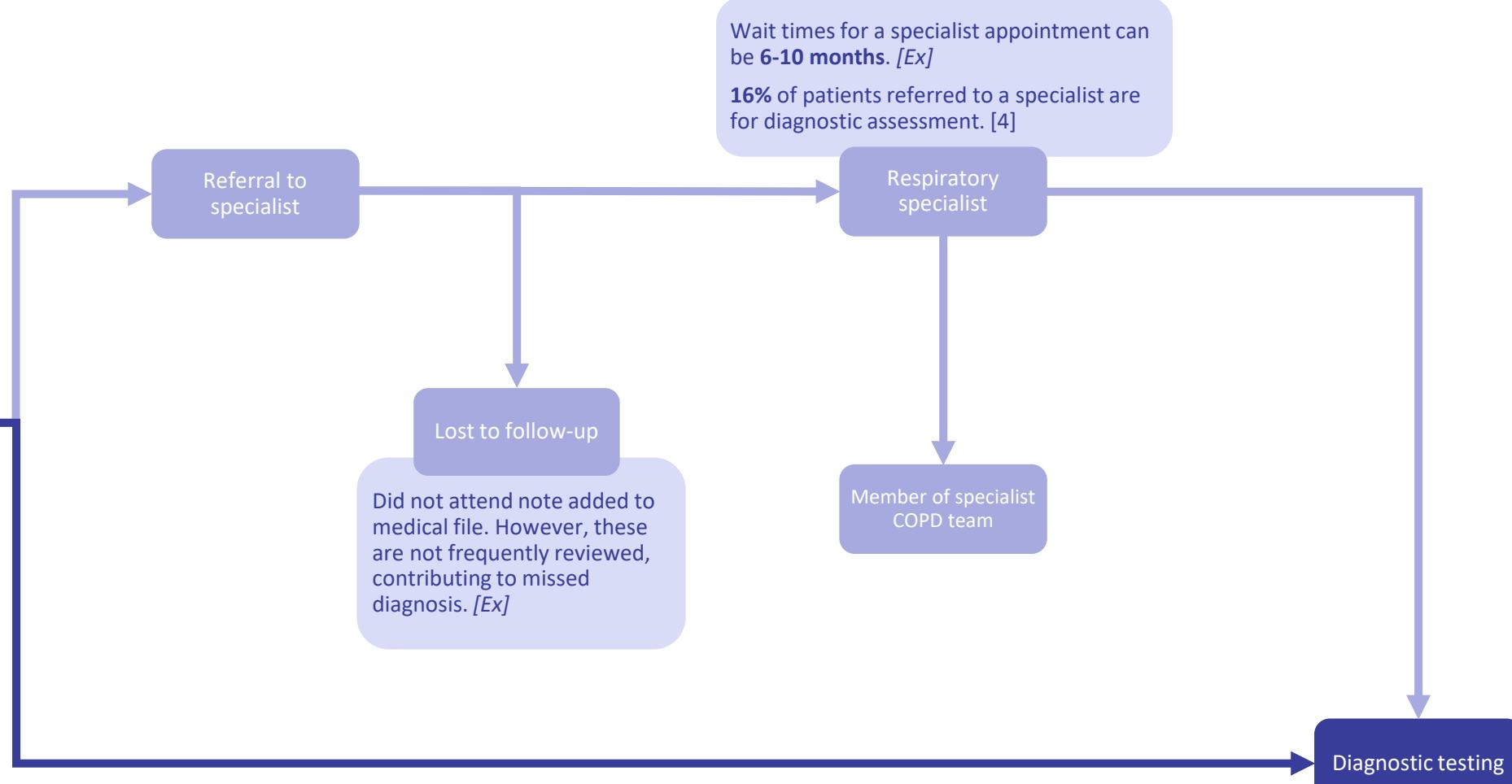
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GP = General Practitioner



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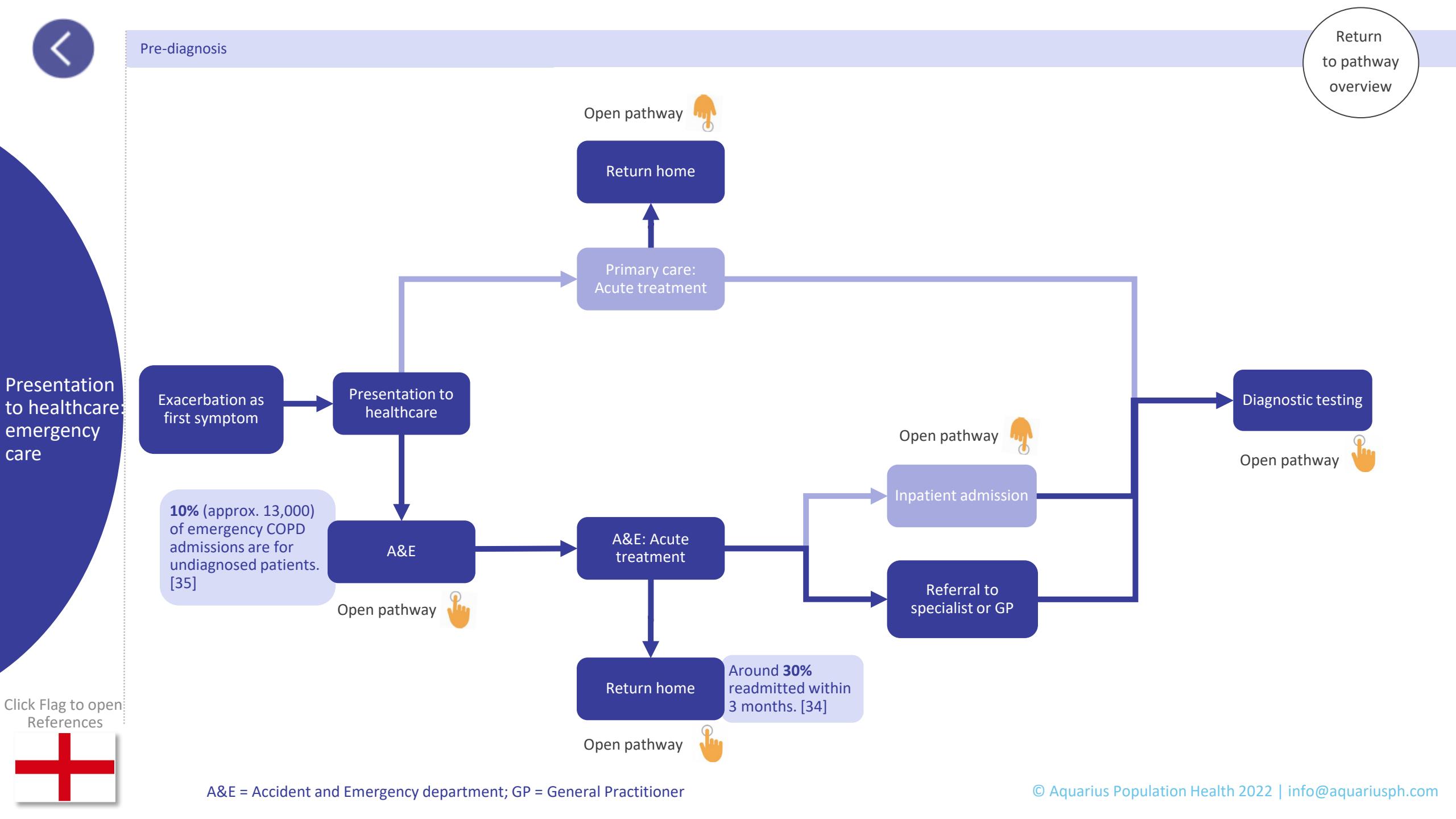


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GP = General Practitioner

Open pathway



# Presentation to healthcare: emergency care

## Exacerbation as first symptom

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

A&

Open pathway 

## Open pathway



[Return home](#)

## Primary care: Acute treatment

## A&E: Acute treatment

[Return home](#)

## Open pathway



## Inpatient admission

## Referral to specialist or GP

## ► Diagnostic testing

## Open pathway

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References

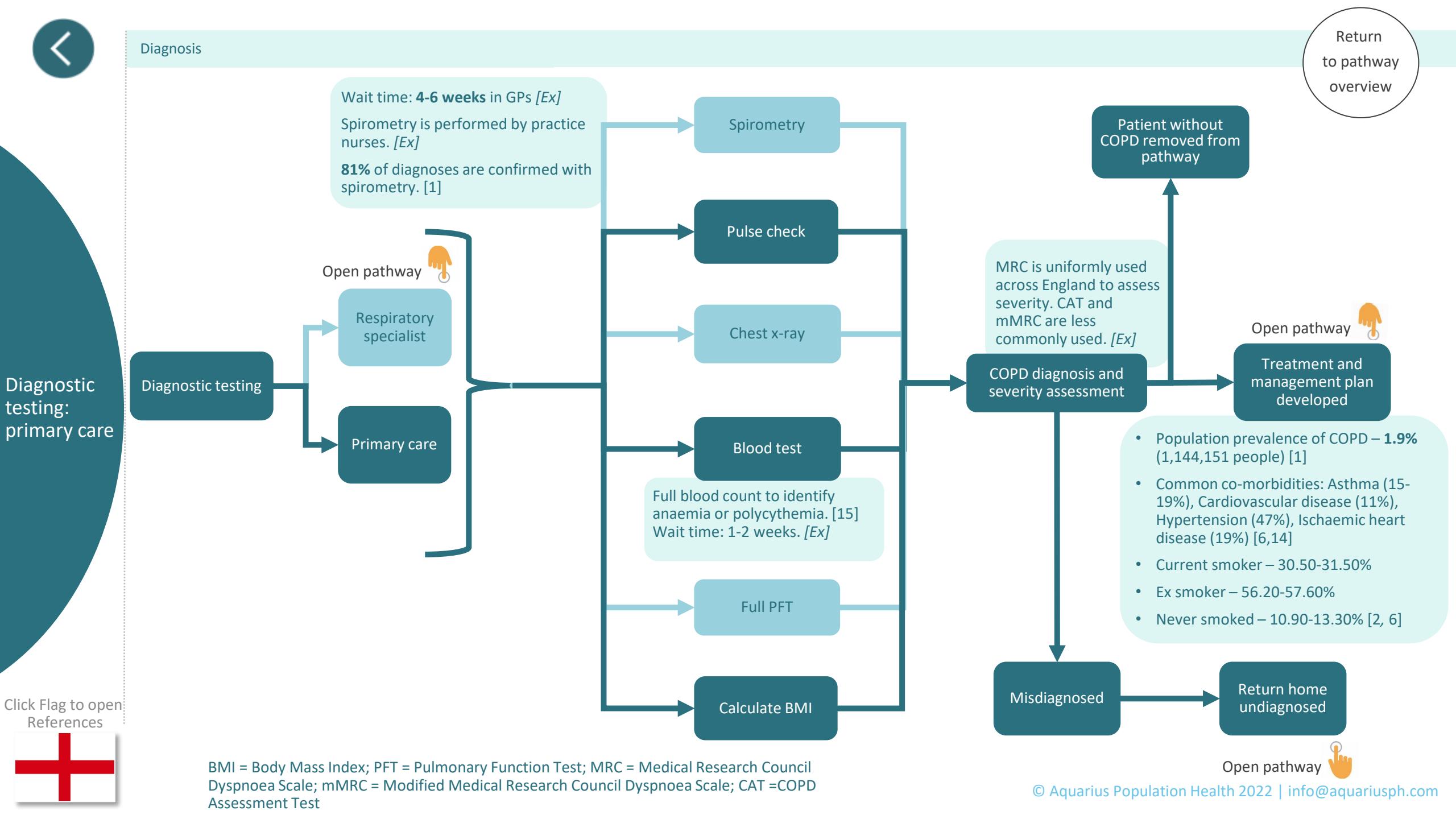


## Pre-diagnosis

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

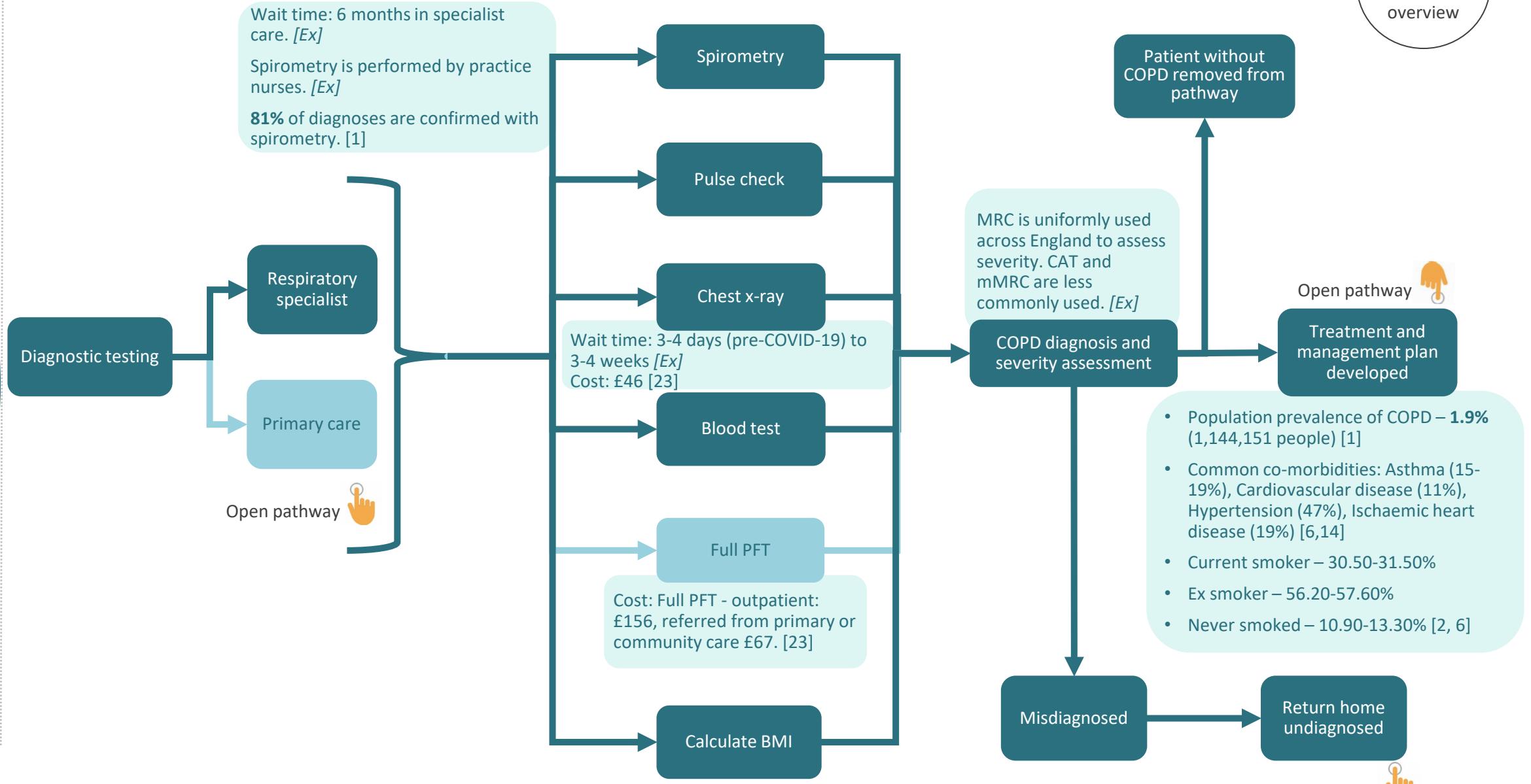
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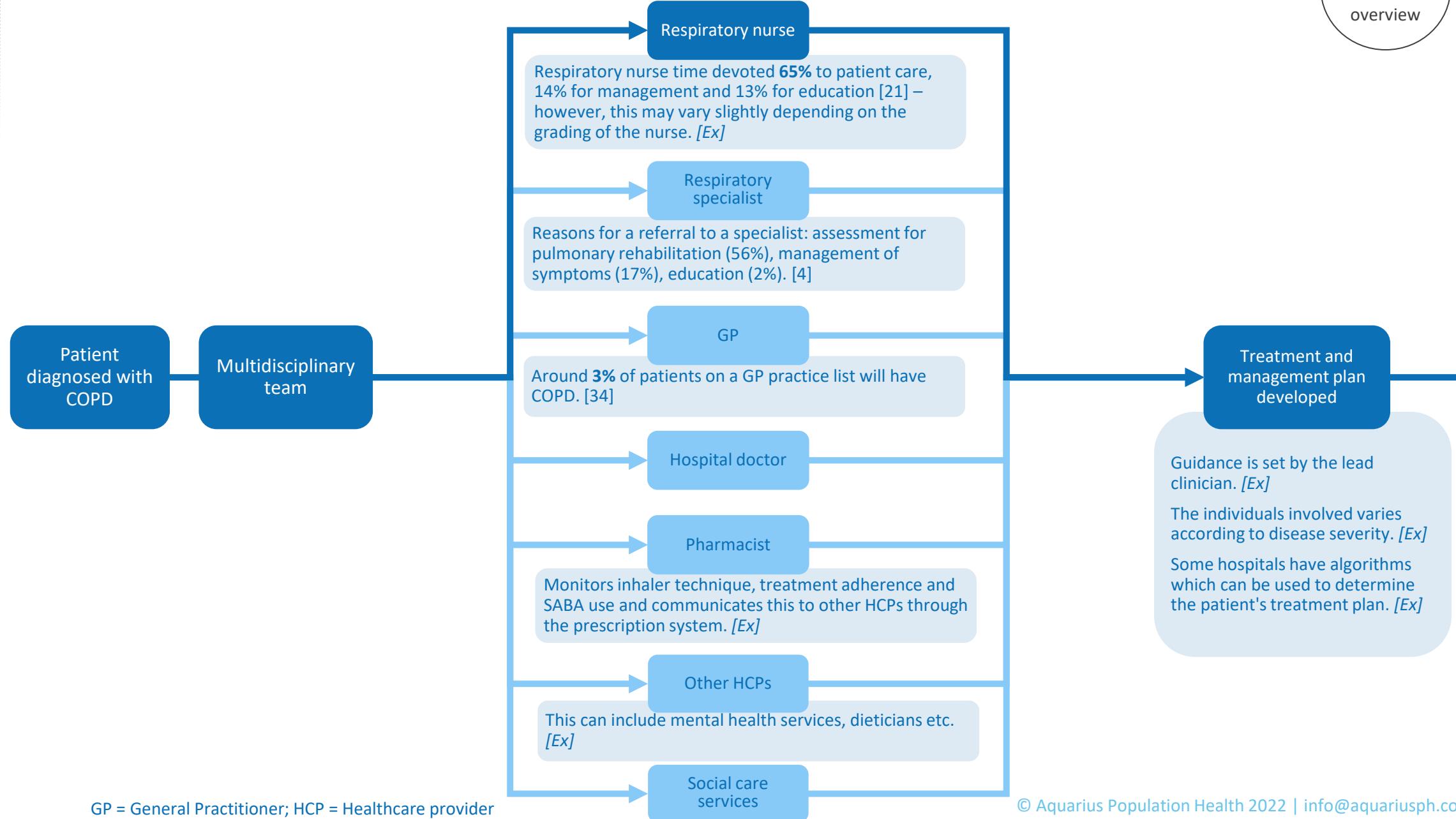
## Diagnosis

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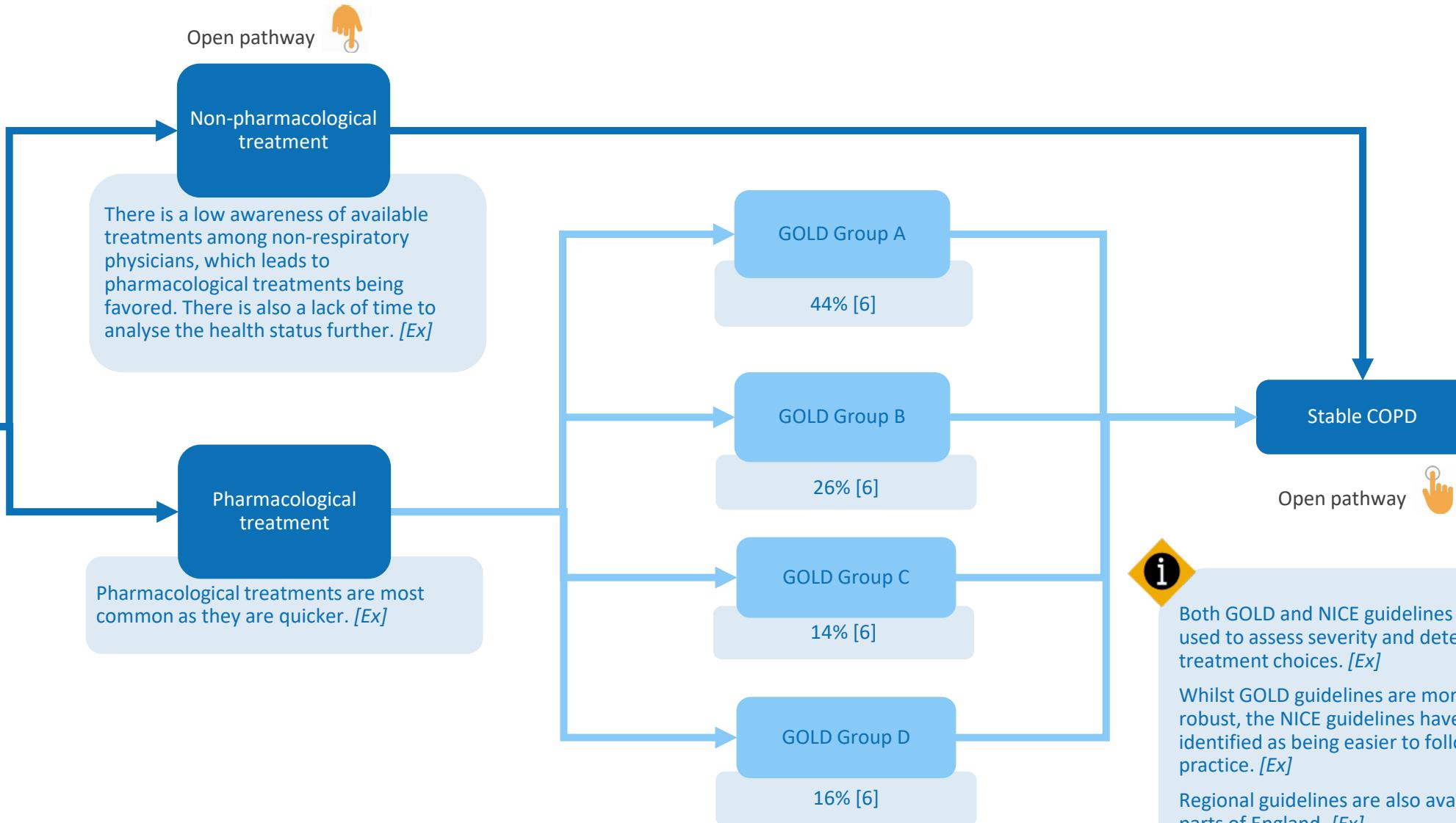
BMI = Body Mass Index; PFT = Pulmonary Function Test; MRC = Medical Research Council Dyspnoea Scale; mMRC = Modified Medical Research Council Dyspnoea Scale; CAT = COPD Assessment Test



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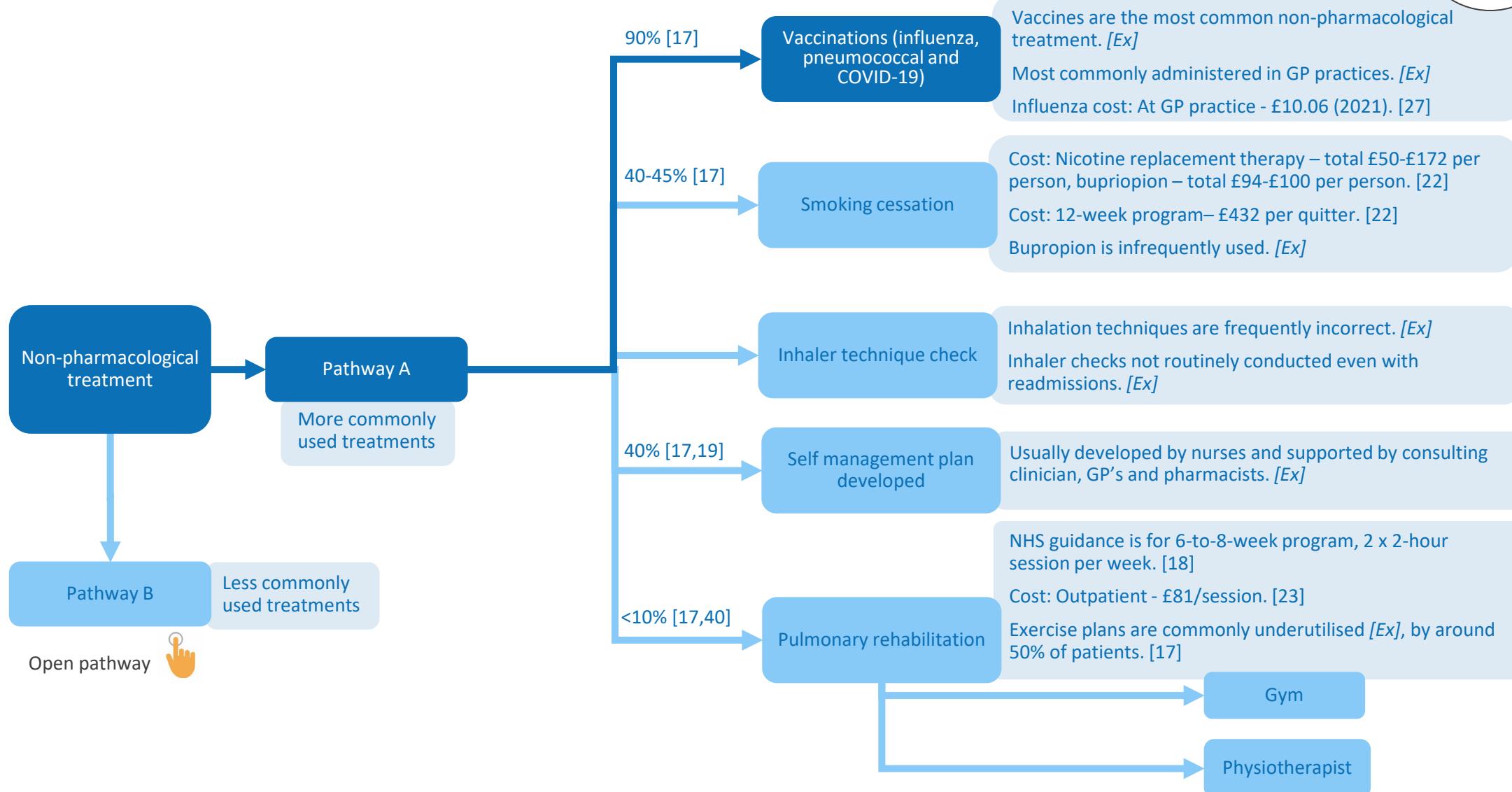
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# Treatment and management plan: non-pharmacological treatment

## Management

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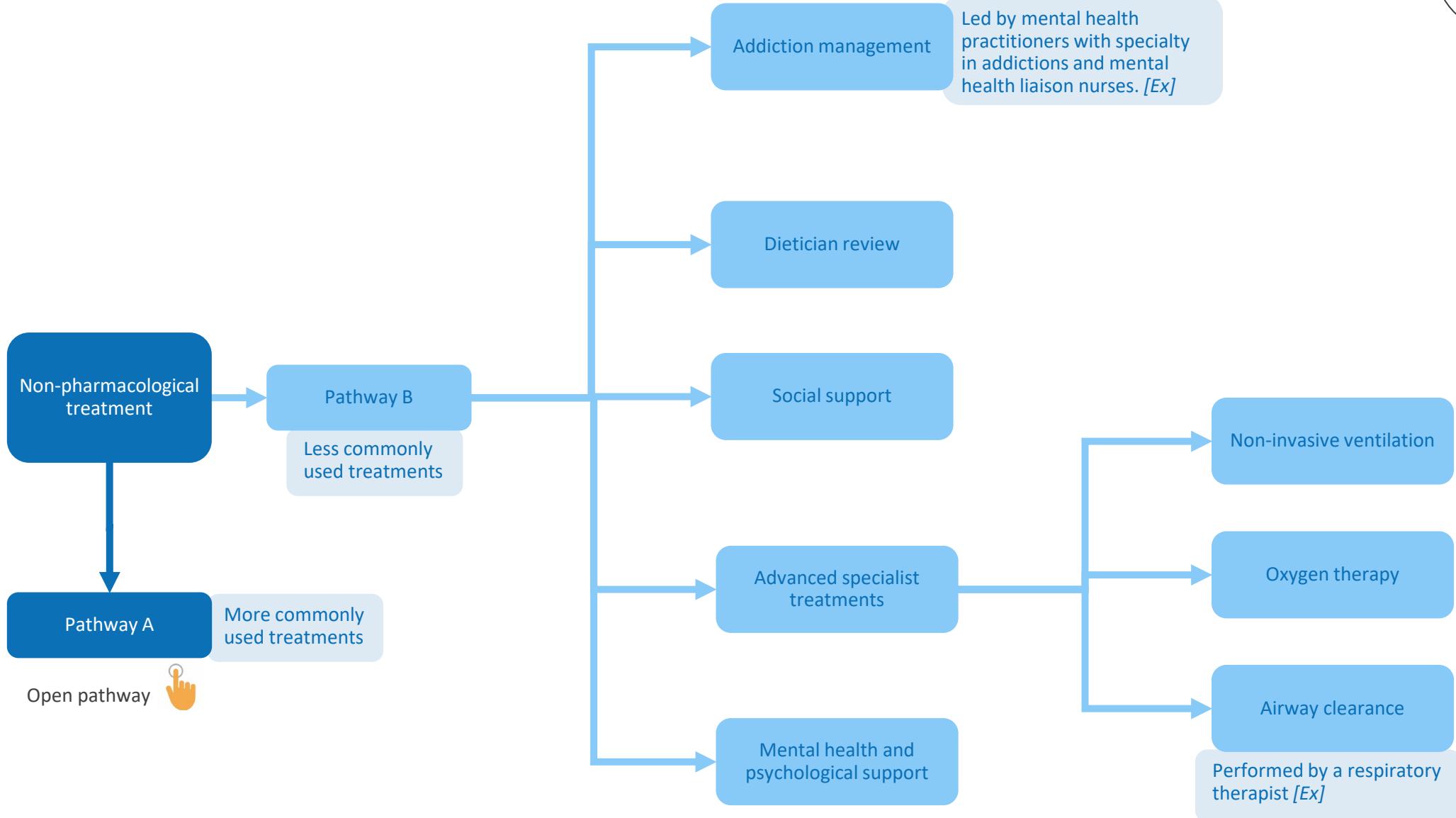
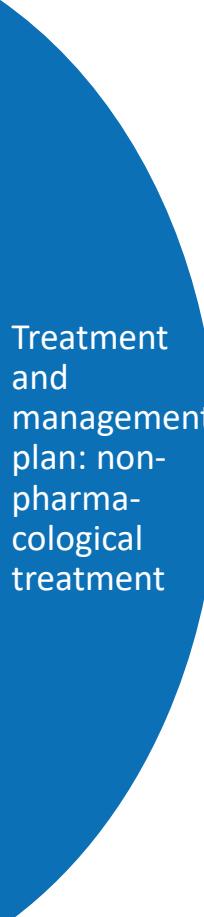


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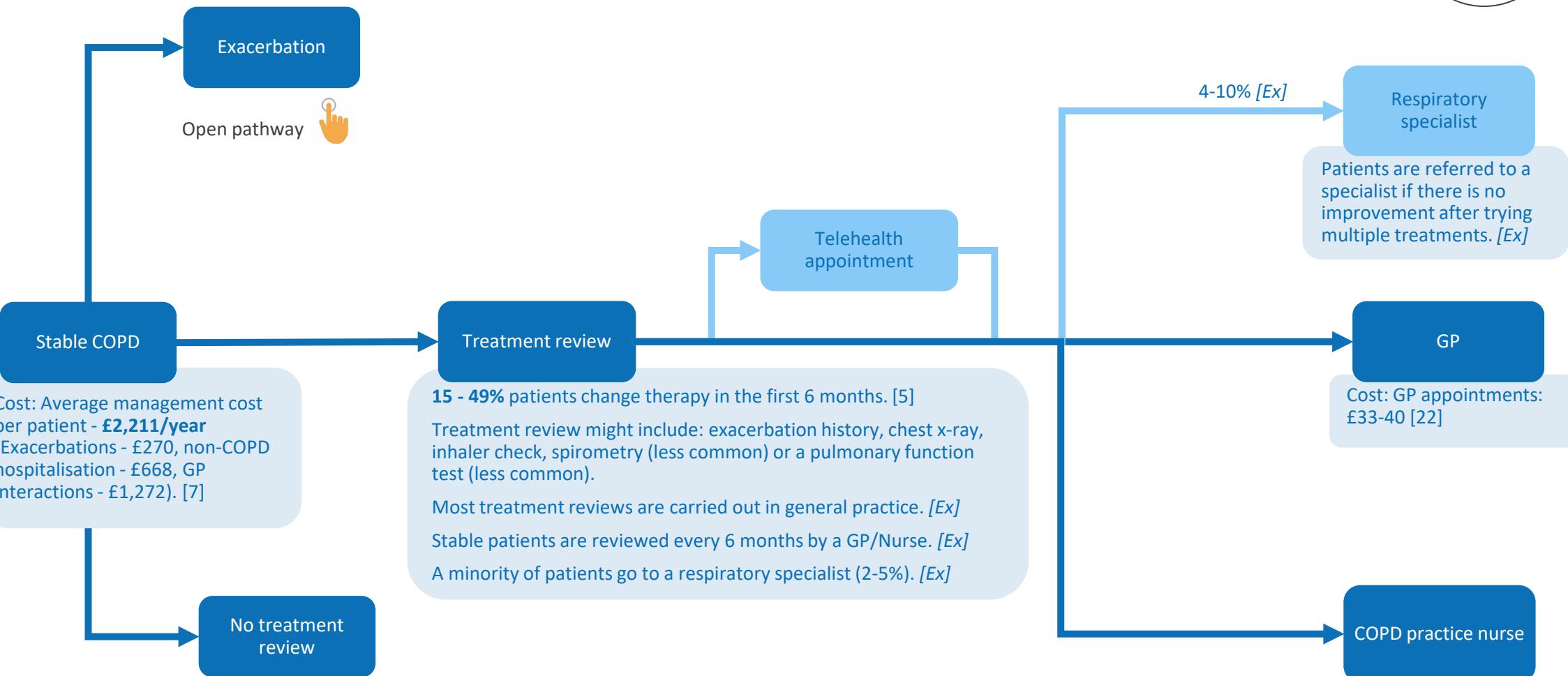
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## Management

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GP = General Practitioner



## 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)

A thick blue arrow pointing to the right, positioned above the text "Stay at home".

## Rescue Pack

52% [51]

### No treatment

There are incentives for primary care to monitor usage. [Ex]

Nurses usually review patients following  $\geq 2$  rescue packs. [Ex]

Some patients are aware when they need to start a rescue pack, others need to confirm with a clinician. [Ex]

Use report at treatment review

### Use unreported

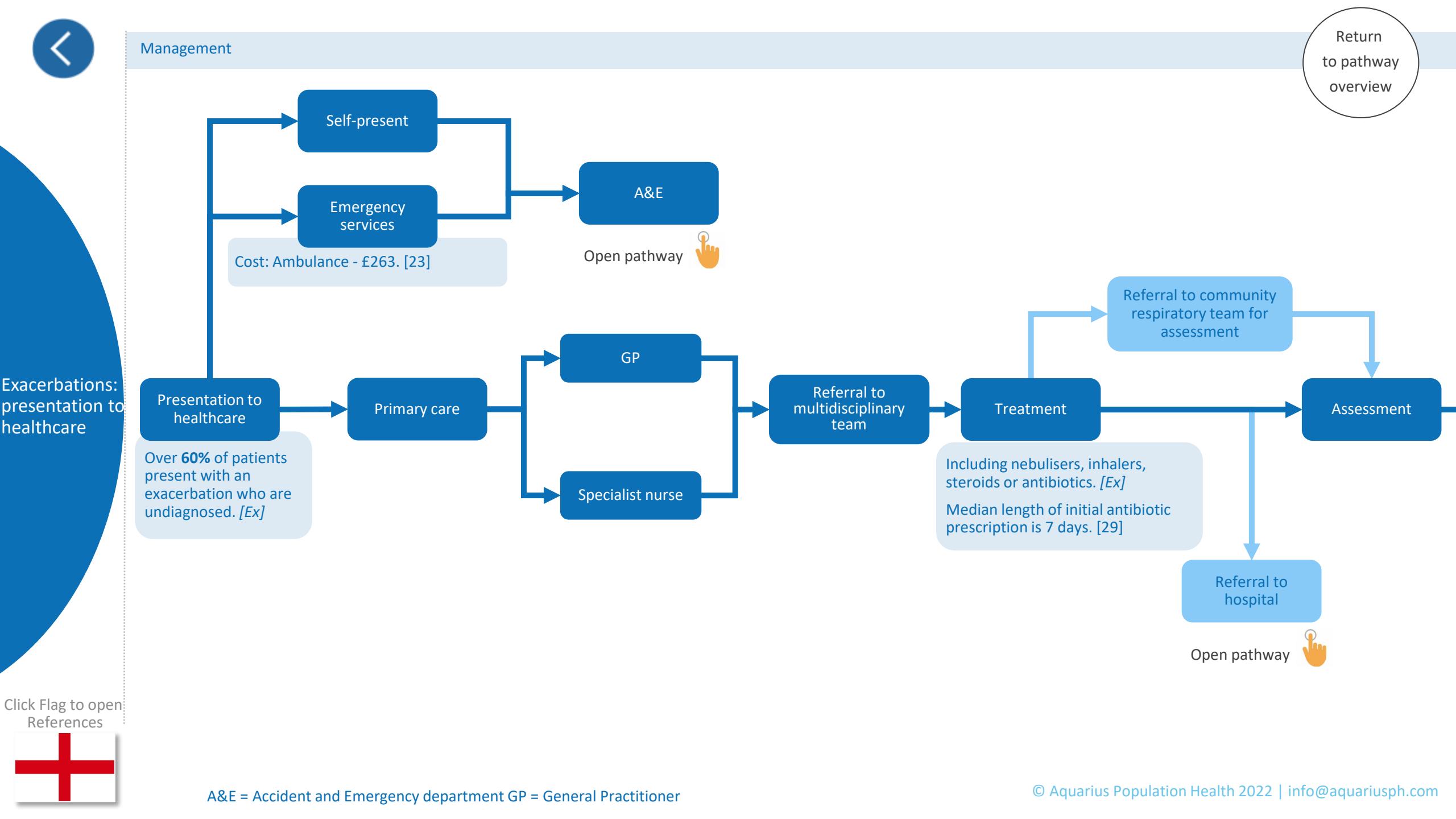
## Open pathway

## Stable COPD patient



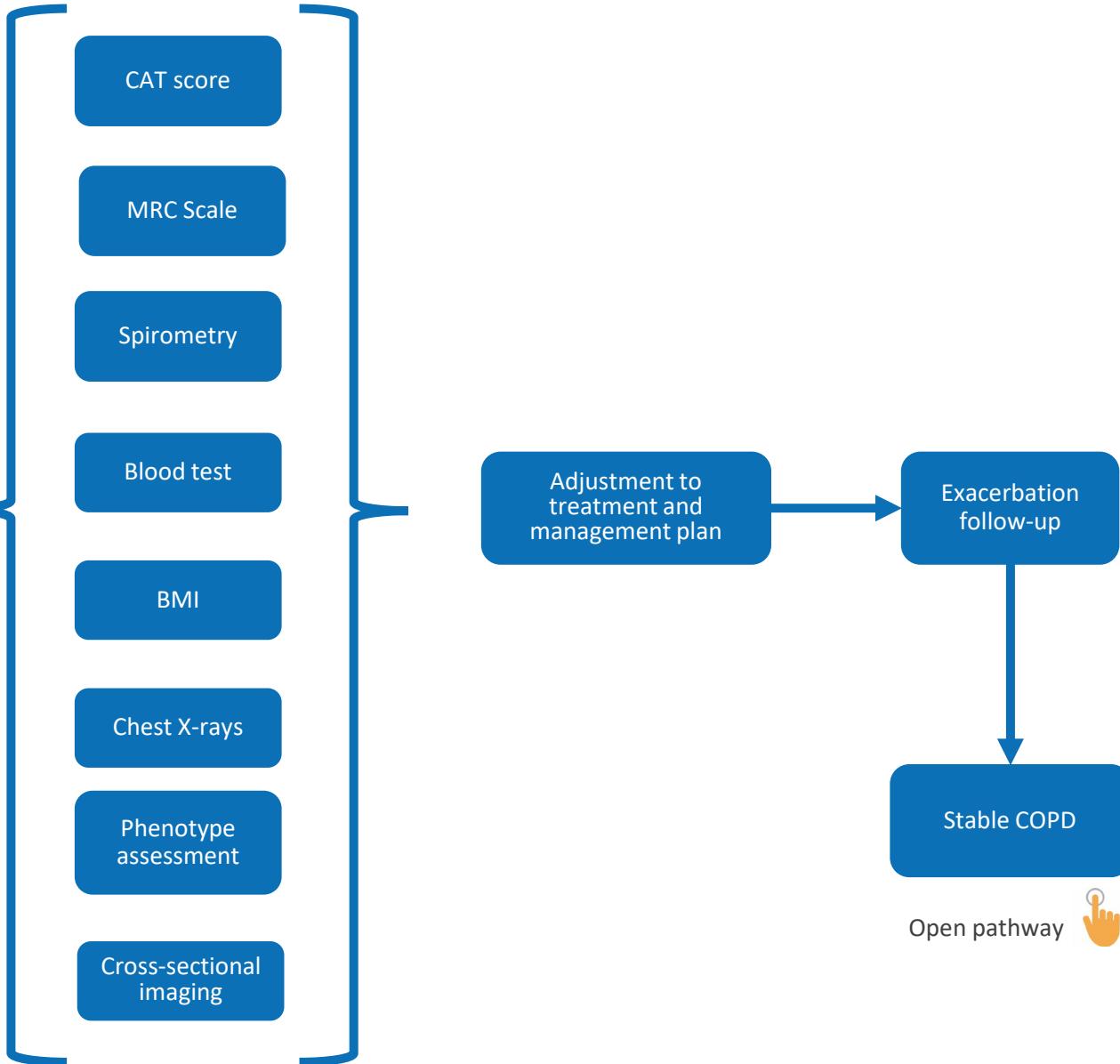
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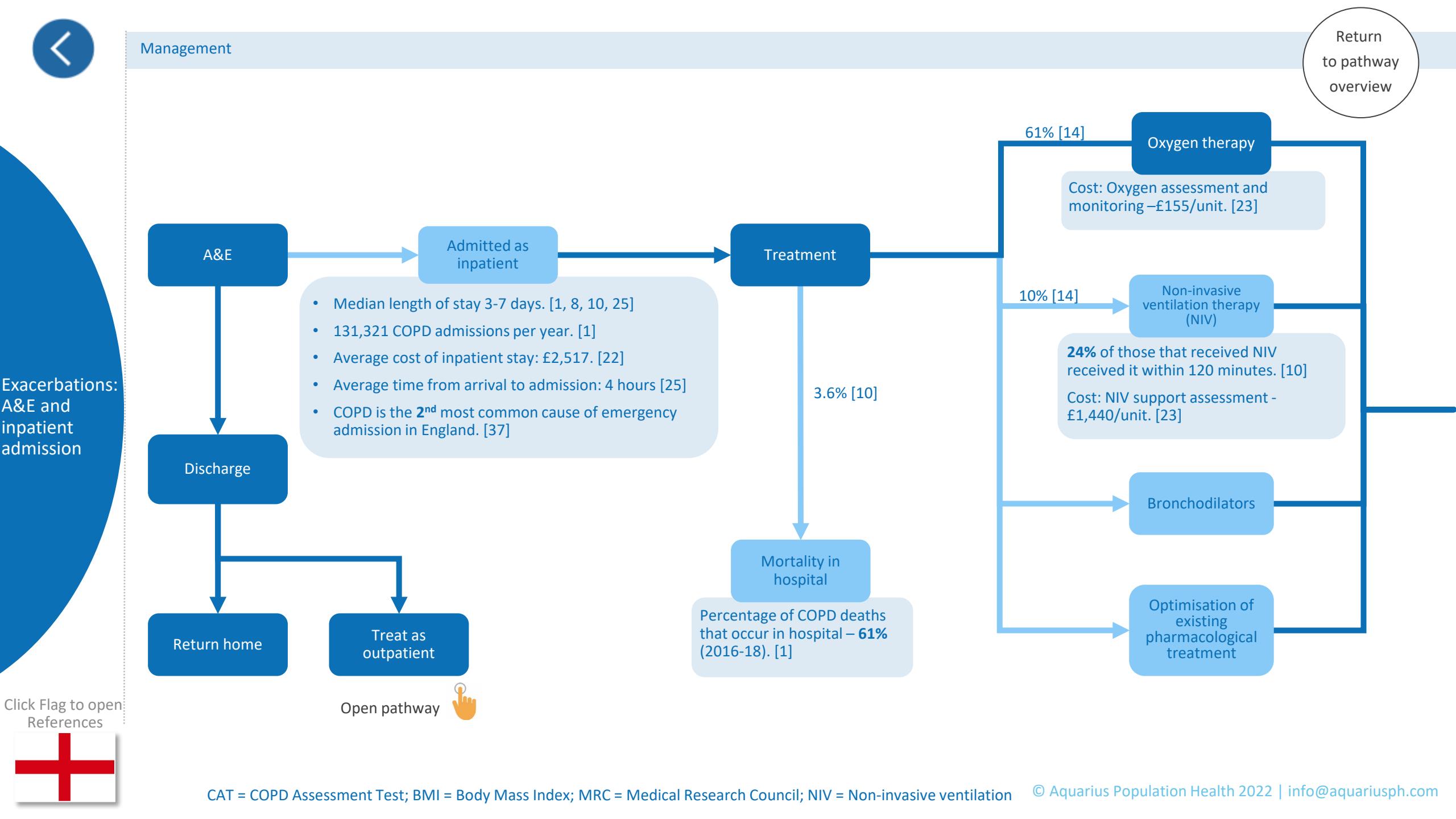


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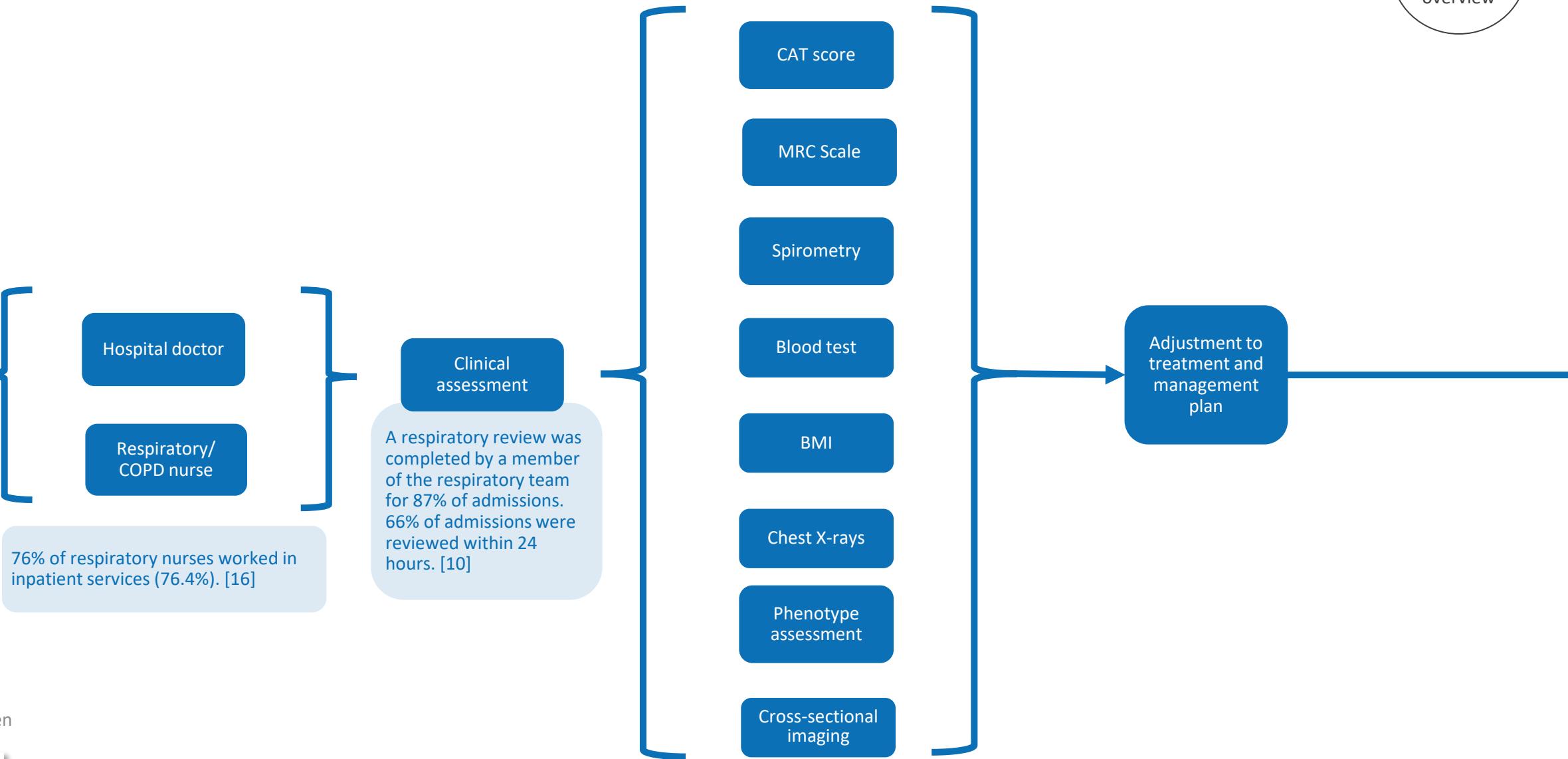
CAT = COPD Assessment Test; BMI = Body Mass Index; MRC = Medical Research Council;

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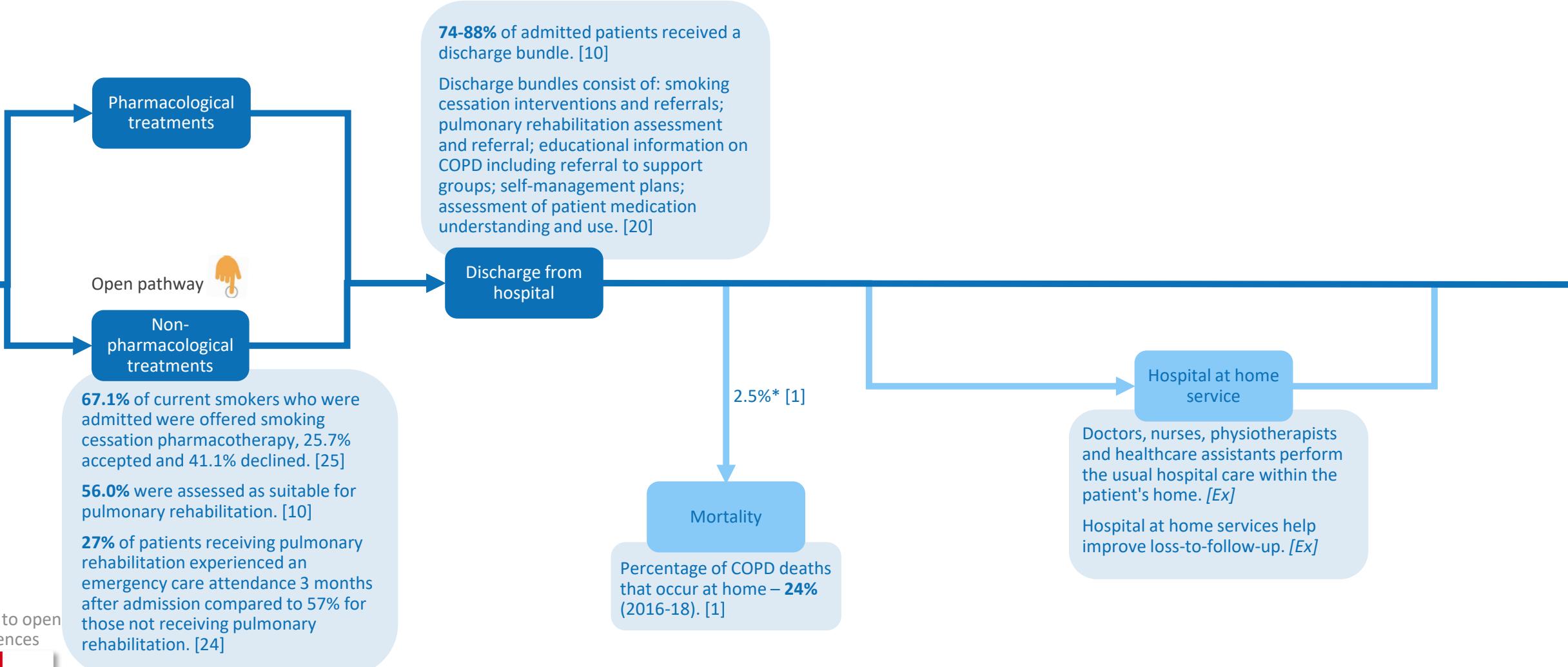


CAT = COPD Assessment Test; BMI = Body Mass Index; MRC = Medical Research Council; NACAP = National Asthma and COPD Audit Programme

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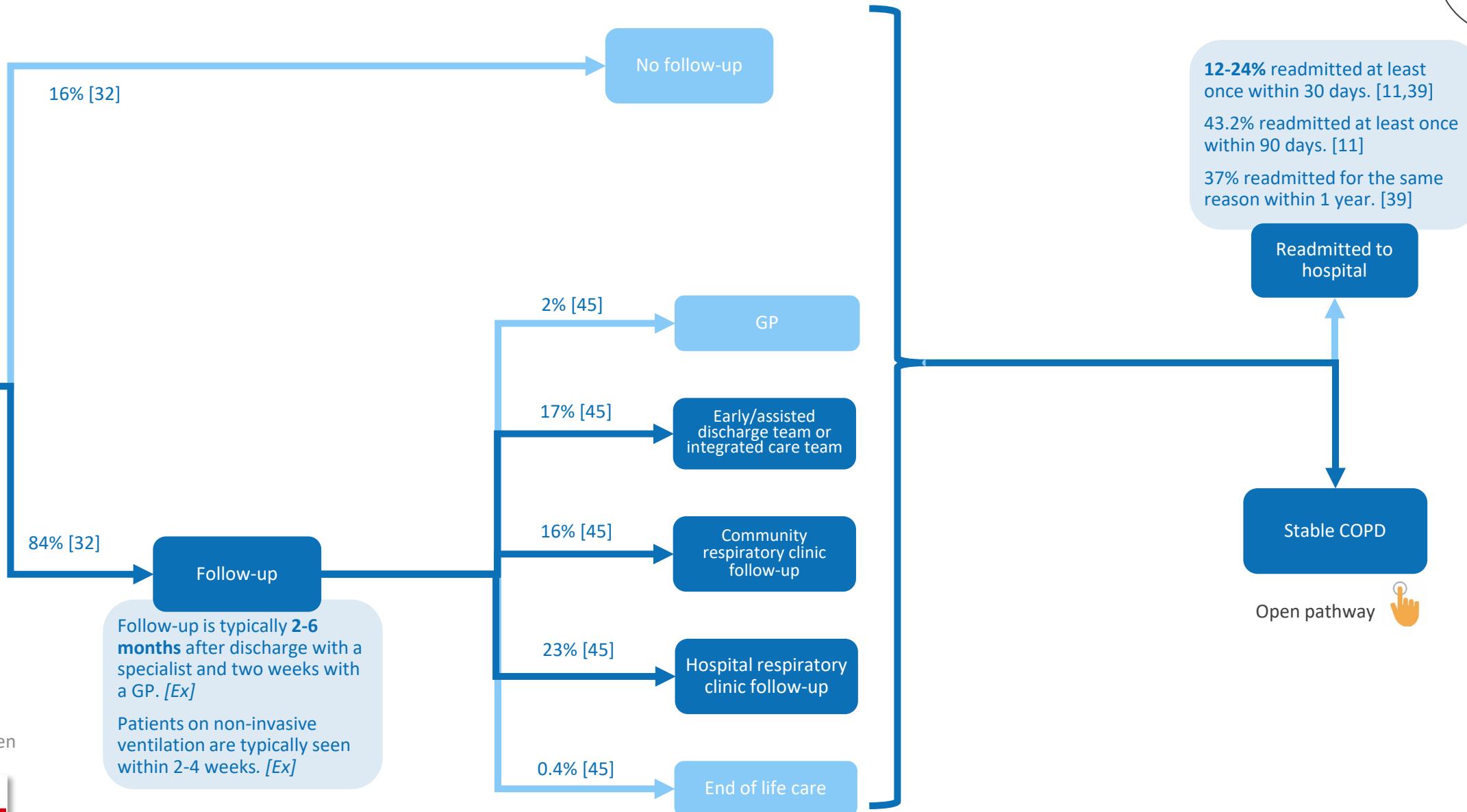


\* Within 30 days of emergency hospital admission

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GP = General Practitioner

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