Severe Asthma Referral- Who Isn't Being Referred?

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ROYAL BROMPTON DIFFICULT ASTHMA SERVICE

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Conflict of interest disclosure

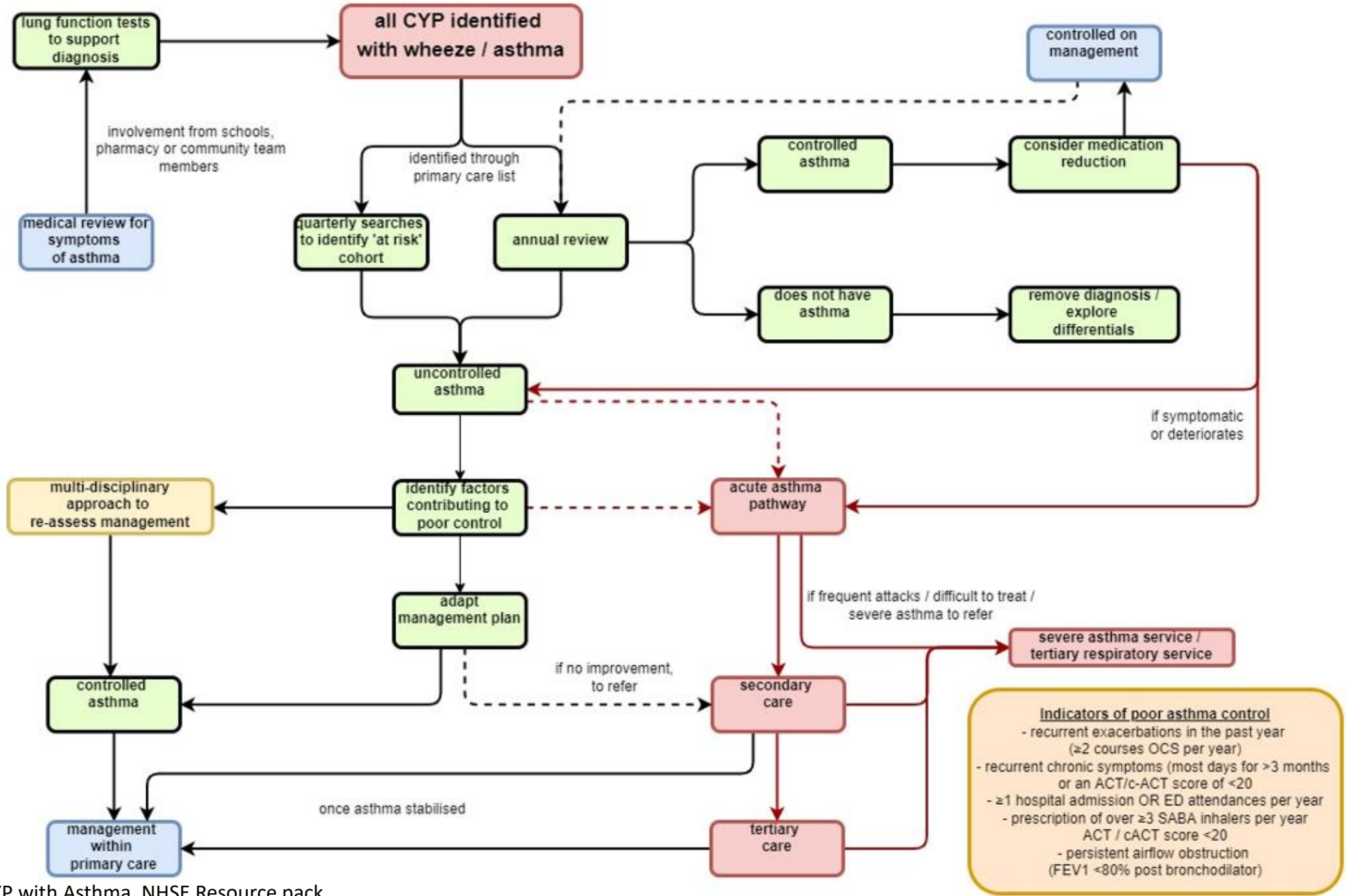
Affiliation / Financial interest	Commercial company
Grants/research support:	
Honoraria or consultation fees:	Novartis, Chiesi, Astra Zeneca, Sanofi, Sanofi,
Participation in a company sponsored bureau:	Astra Zeneca

All fees paid directly to my institution

Overview

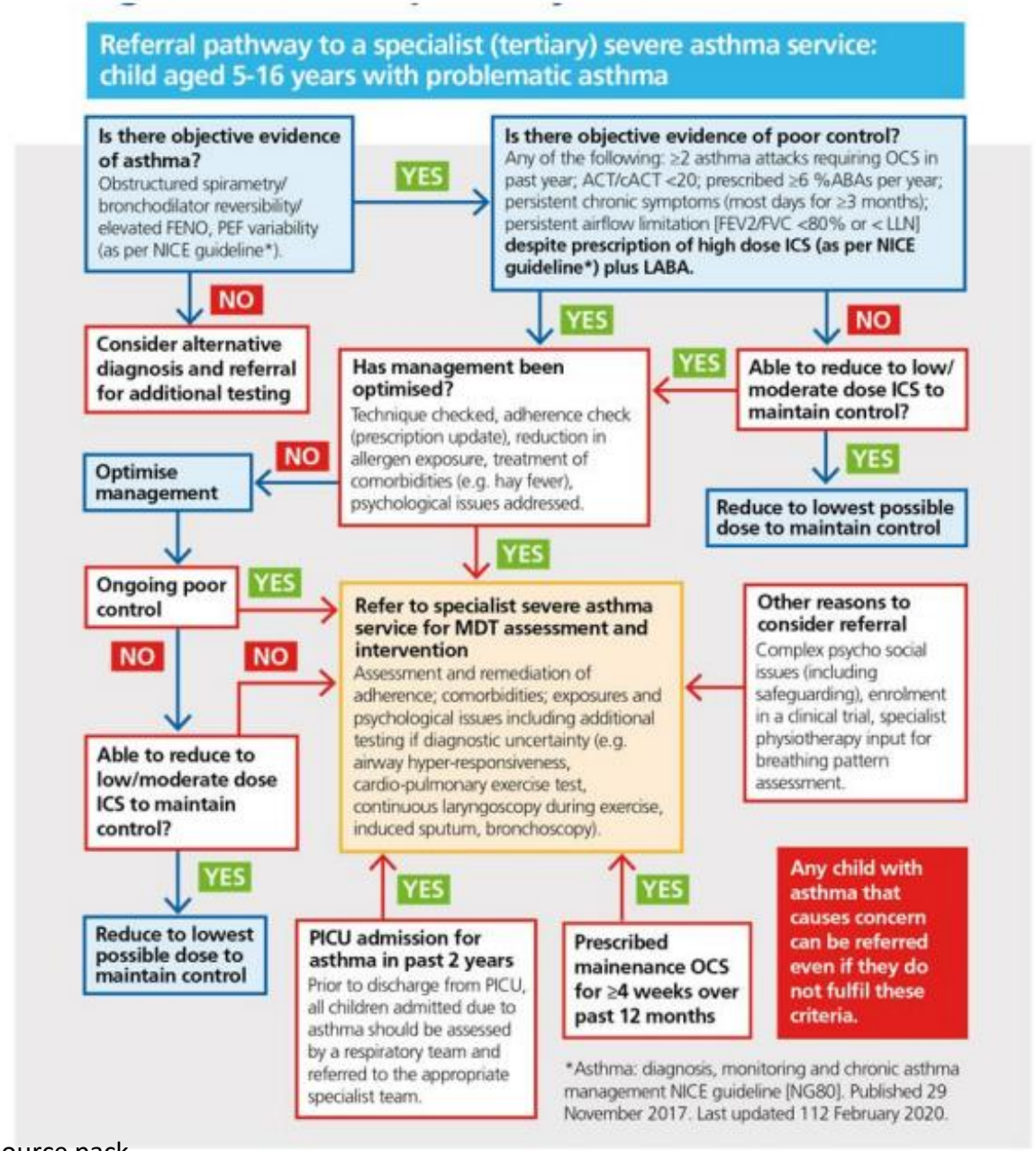
- Who should be referred?
  - Current guidelines and referral pathways
- Are the right children being referred?
- What does a severe asthma service offer?
- Referral data from CPRD (Clinical Practice Research Datalink)
  - Who is and isn’t being referred

Figure 1: non acute asthma care pathway (Long term)



National Bundle of Care CYP with Asthma, NHSE Resource pack

Figure 2: Referral Pathway



National Bundle of Care CYP with Asthma, NHSE Resource pack

Children with Problematic Severe Asthma

Poor control at GINA Step 3
Requiring GINA Step 4 or 5 to maintain control

Indicators of poor asthma control

- Asthma attack
- Hospital admission / ED attendance
- ≥6 SABA inhalers per year
- ACT / cACT score <20

GINA 2024 – Children 6–11 years

Personalized asthma management:
Assess, Adjust, Review

Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (see Box 2-2)
Comorbidities
Inhaler technique & adherence
Child and parent/caregiver preferences and goals

Symptoms
Exacerbations
Side-effects
Lung function
Comorbidities
Child and parent/ caregiver satisfaction

Treatment of modifiable risk factors & comorbidities
Non-pharmacological strategies
Asthma medications including ICS
Education & skills training

Asthma medication options:
Adjust treatment up and down for individual child's needs

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
PREFERRED CONTROLLER to prevent exacerbations and control symptoms	Low dose ICS taken whenever SABA taken*	Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)	Low dose ICS-LABA, OR medium dose ICS, OR very low dose ICS-formoterol maintenance and reliever therapy (MART)	Refer for expert advice, OR medium dose ICS-LABA, OR low dose ICS-formoterol maintenance and reliever therapy (MART)	Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy, e.g. anti-IgE, anti-IL4Rα, anti-IL5
Other controller options (limited indications, or less evidence for efficacy or safety)		*Daily leukotriene receptor antagonist (LTRA†), or low dose ICS taken whenever SABA taken**	*Low dose ICS + LTRA†*	*Add tiotropium or add LTRA†*	*As last resort, consider add-on low dose OCS, but consider side-effects*
RELIEVER	As-needed SABA (or ICS-formoterol reliever* in MART in Steps 3 and 4)				

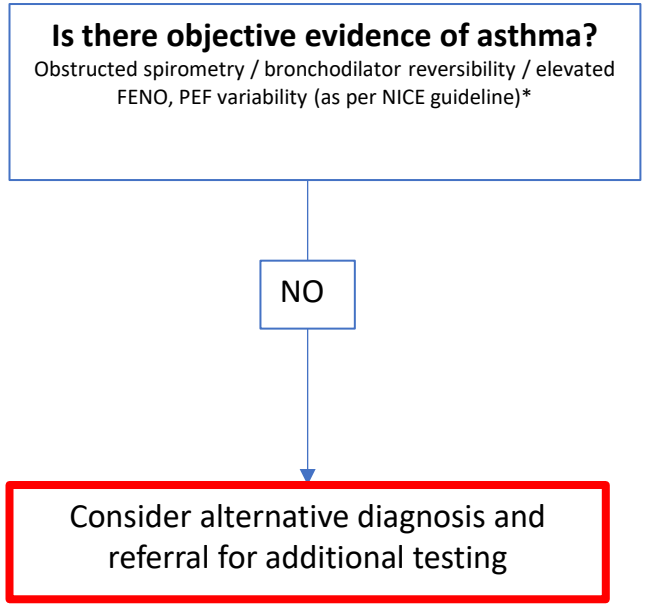
*Anti-inflammatory reliever; †advise about risk of neuropsychiatric adverse effects

Step 3 and 4

	6 to 11 years	Over 12 years
STEP 3		
Low dose ICS-LABA	100-200	200-500
Medium dose ICS	>200-400	>500-1000
Very low dose ICS-formoterol MART	100	
Low dose ICS-formoterol MART	N/A	200-400
STEP 4		
Medium dose ICS-LABA	>200-400	>500-1000
Low dose ICS-formoterol MART	200	N/A
Medium dose ICS-formoterol MART	N/A	800

Doses for beclomethasone / budesonide mcg/day

Diagnosis



Specialist Severe Asthma Service

- Spirometry
- FeNO
- Tests of airway hyper-responsiveness
- Other lung function tests
  - Forced oscillation technique
  - Multiple breath washout
- Induced sputum
- Cardio-pulmonary exercise tests
- CT chest
- Bronchoscopy
- Continuous laryngoscopy during exercise

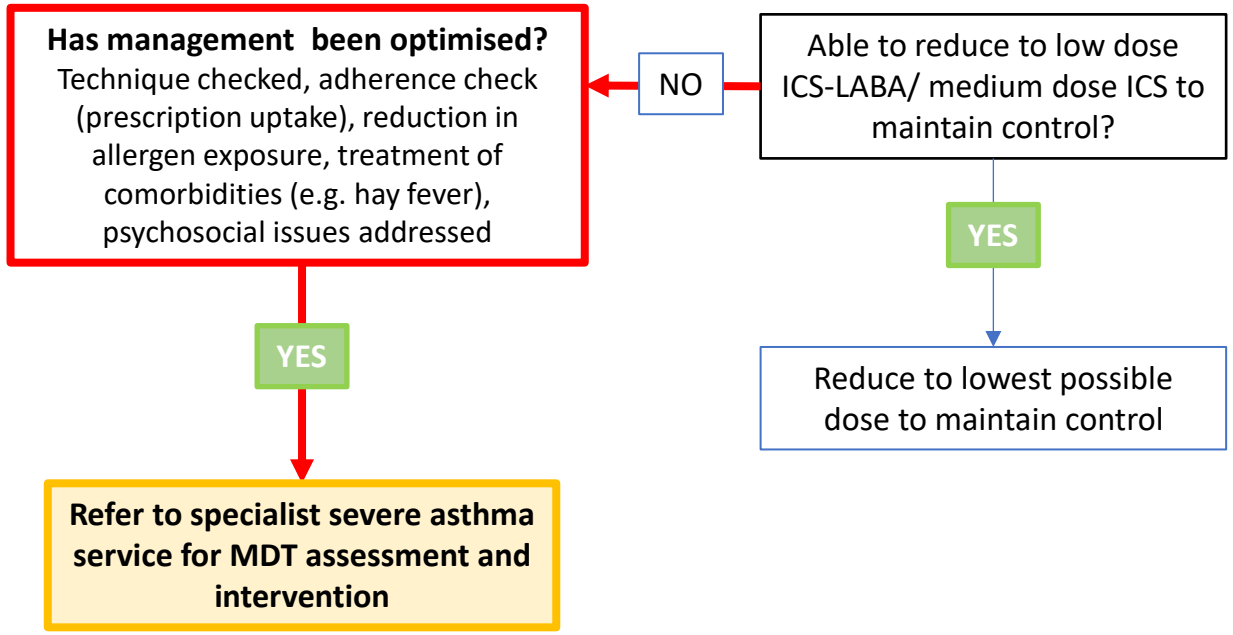
Some children are being referred due to a lack of availability of objective tests in primary and secondary care

Asthma Control and Diagnosis

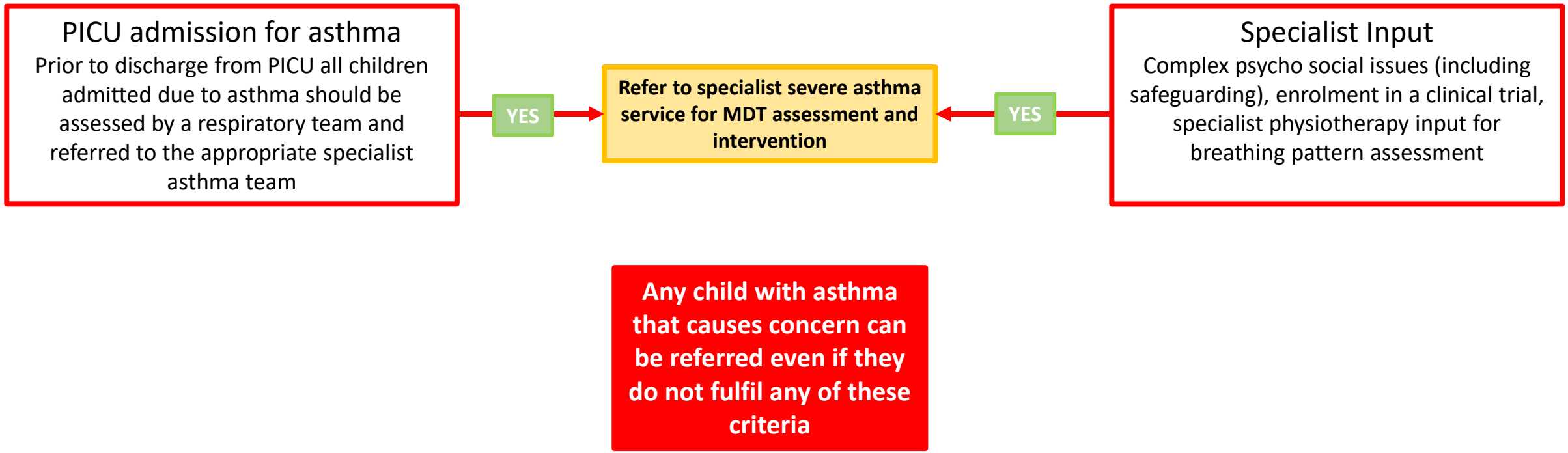
- Pilot scheme in Leicester
- Children referred to a hub for rapid review and diagnostic testing post admission for an asthma attack or if found to be poorly controlled
- Asthma confirmed in 27.4% (37% of those referred from primary care)
- Asthma diagnosis <20% in unselected primary care population

Hakizimana, Arch Dis Child *in press*

Poor Control Despite Optimised Management



Other Reasons for Referral



Any child with asthma that causes concern can be referred even if they do not fulfil any of these criteria

MDT Assessment: Factors are Contributing to Poor Control

Adherence	Inhaler technique Prescription check Electronic adherence monitoring
Allergens	History (pets, hay fever) Assessment and treatment of rhinitis Allergy testing Immunotherapy
Environmental Exposures	Home environment (indoor and outdoor air quality) History (secondary exposure, active smoking inc e-cigarettes) Smoking cessation advice Urinary cotinine . CO monitoring
Psychosocial	Family circumstances Safeguarding Home visit Psychology assessment / support
Co-Morbidities / Asthma mimics	Rhinits / hayfever Dysfunctional Breathing Obesity Sleep disordered breathing

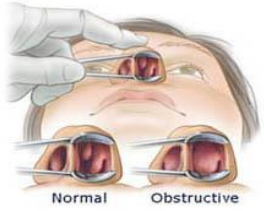
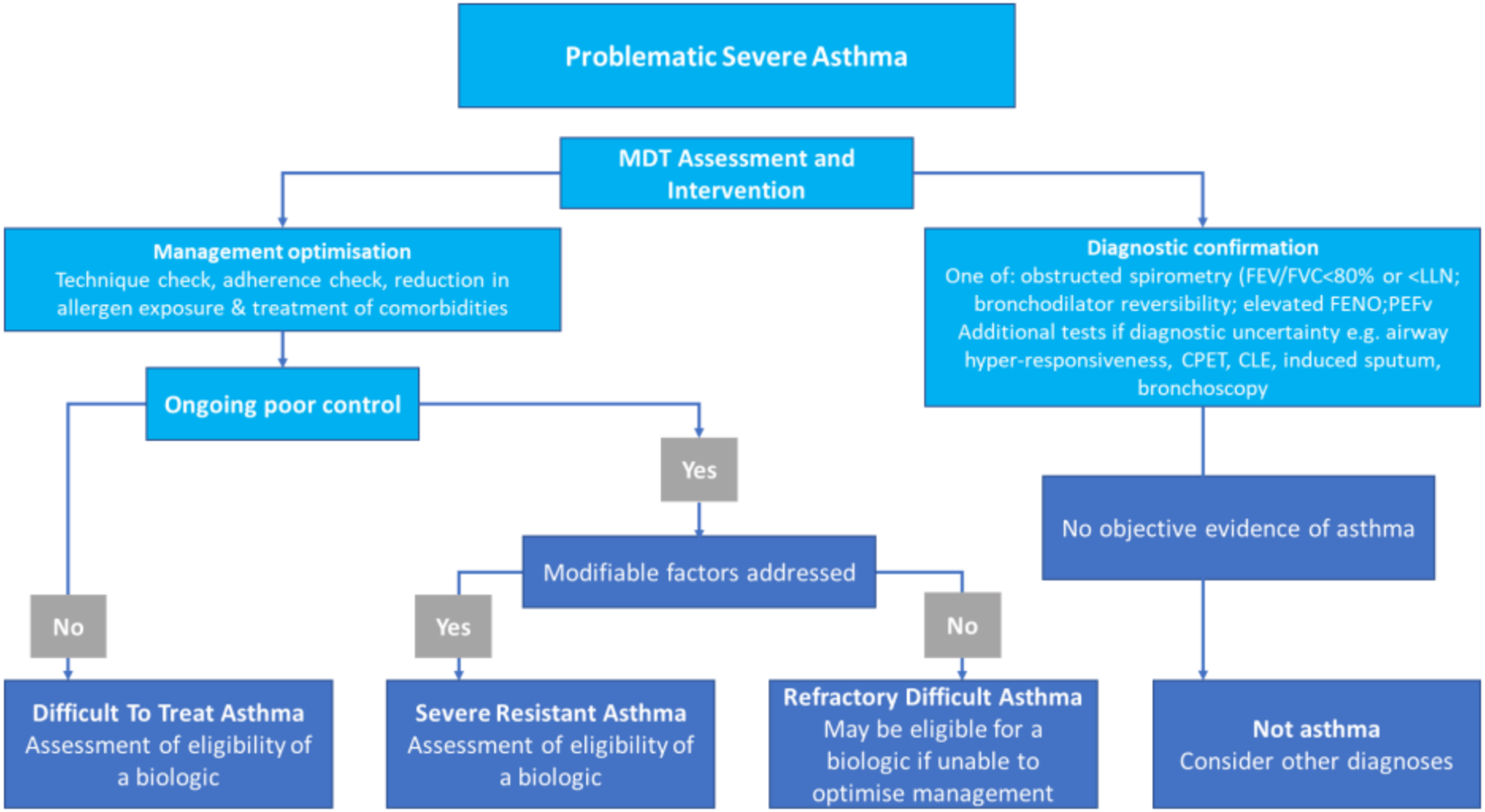


Figure 3: Summary of outcomes



Adapted from Pjinenburg, Fleming
Lancet Resp Med, 2020

Indicators of poor asthma control
- ≥2 courses OCS per year
- ≥1 hospital admission / ED attendance per years
- ≥6 SABA inhalers per year
- ACT / cACT score <20

	Primary Care	Secondary Care asthma clinic	Specialist Severe Asthma Service
Patient Groups	• Children presenting with symptoms suggestive of asthma (wheeze, breathlessness, cough) • Treatment at Step 1 -2 GINA • Shared care with primary or secondary care for children on higher treatment steps • 48 hour review post asthma attack	• Follow up of all children post ED attendance / admission for acute asthma attack • Referrals from primary care or school / community nursing • Treatment at GINA Step 2-4 • Diagnostic confirmation • Shared care with tertiary care for children with problematic severe asthma	• Follow up of all children post PICU admission for acute asthma attack • Referrals from primary care secondary care or school / community nursing • Treatment at GINA Step 3-5 (including children prescribed maintenance OCS for ≥4 weeks over past year) • Diagnostic uncertainty (including dysfunctional breathing) • Enrolment in a clinical trial
Interventions	• Diagnostic evaluation (access to diagnostic hub for spirometry and FeNO; PEFv) • Adherence check (prescription records) • Treatment of comorbidities (e.g. allergic rhinitis)	• Diagnostic evaluation(spirometry and FeNO; PEFv) • Adherence check (prescription records) • Allergy testing and avoidance advice (skin prick tests, spIgEs) • Treatment of comorbidities (e.g. allergic rhinitis, dysfunctional breathing)	• Spirometry and FENO for diagnostic evaluation and monitoring • Other diagnostic tests (AHR,CT chest, bronchoscopy, cardio-pulmonary exercise test, PSG, pH study, induced sputum) as clinically indicated • Monitoring side effects of treatment (SST, DEXA) • Biomarker tests (total IgE, FBC (blood eosinophils), SPTs, spIgEs) • Adherence check (electronic monitoring) • Investigation and treatment of comorbidities (allergic rhinitis, OSA; dysfunctional breathing) • Initiation of biologics following MDT discussion

At every step:

Inhaler technique
Smoking cessation advice
Adherence and treatment optimisation
Up to date asthma plan issued
Support from community teams (including school nurses, community nurses, community pharmacists)

Team members and training level	• Asthma nurse • Designated ICS primary care lead • Tier 1-3 training	• Named clinical lead for asthma • Children's asthma nurse • Access to specialist physiotherapist? • Tier 3-4 training	• Named clinical lead for asthma • Children's asthma nurse • Specialist physiotherapist • Psychologist • Specialist pharmacist • Physiologist • Access to dietetics, ENT and Allergy services • Tier 5 training

Referral

Referrals can be made direct to secondary or tertiary care from school nurses, community nursing teams, primary care

Poor asthma control despite treatment at GINA Step 2
Diagnostic uncertainty
Psychosocial concerns
Safeguarding

Poor asthma control despite treatment at GINA Step 3-4
PICU admission
Diagnostic uncertainty
Psychosocial concerns
Safeguarding

Specialist Severe Asthma Service

Patient Groups

Follow up of all children post PICU admission for acute asthma attack
Treatment at GINA Step 3-5
Diagnostic uncertainty (including dysfunctional breathing)
Enrolment in a clinical trial

Interventions

Spirometry and FENO for diagnostic evaluation and monitoring
Other diagnostic tests (AHR,CT chest, bronchoscopy, cardio-pulmonary exercise test, PSG, pH study, induced sputum) as clinically indicated
Monitoring side effects of treatment (SST, DEXA)
Biomarker tests (total IgE, FBC (blood eosinophils), SPTs, spIgEs)
Adherence check (electronic monitoring)
Investigation and treatment of comorbidities (allergic rhinitis, OSA; dysfunctional breathing)
Initiation of biologics following MDT discussion

Team members

Named clinical lead for asthma
Children's asthma nurse
Specialist physiotherapist
Psychologist
Specialist pharmacist
Physiologist
Access to dietetics, ENT and Allergy services

Referral

Poor asthma control despite treatment at GINA Step 3-4
PICU admission
Diagnostic uncertainty
Psychosocial concerns
Safeguarding

Referral Data

Journal of Asthma and Allergy

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ORIGINAL RESEARCH

Prevalence of Poorly Controlled Asthma and Factors Associated with Specialist Referral in Those with Poorly Controlled Asthma in a Paediatric Asthma Population

Constantinos Kallis[1,2,*], Ann Morgan[1,2,*], Louise Fleming[1], Jennifer K Quint[1,2]

- CPRD data Jan 2007 – Dec 2019
- Children 6 – 17 years
- Poor control: ≥6 SABA inhalers; ≥2 OCS; ACT or cACT <20, one admission or ED attendance due to asthma

Table 1 Baseline Characteristics of the Study Population, by Age Cohort

Characteristic	6–11 Years			12–17 Years		
	All Subjects N (% of Total)	With Poor Control N (% of Total)	Without Poor Control N (% of Total)	All Subjects N (% of Total)	With Poor Control N (% of Total)	Without Poor Control N (% of Total)
Total	93,961 (100%)	14,817 (15.8%)	79,144 (84.2%)	91,029 (100%)	15,176 (16.7%)	75,853 (83.3%)
Age, years (median, IQR)	7 (6–9)	7 (7–9)	8 (7–9)	13 (12–14)	13 (13–14)	14 (13–15)

Asthma Control

Table 1 (Continued).

Characteristic	6–11 Years			12–17 Years		
	All Subjects N (% of Total)	With Poor Control N (% of Total)	Without Poor Control N (% of Total)	All Subjects N (% of Total)	With Poor Control N (% of Total)	Without Poor Control N (% of Total)
Asthma treatment (GINA step)						
GINA step 0–3	91,891 (97.8%)	13,954 (94.2%)	77,937 (98.5%)	85,632 (94.1%)	13,034 (85.9%)	72,598 (95.7%)
GINA step 4+5	2070 (2.2%)	863 (5.8%)	1207 (1.5%)	5397 (5.9%)	2142 (14.1%)	3255 (4.3%)

- 17.6% of study population had poor control
- Poor control was higher in boys than girls
- Higher prevalence of poorly controlled asthma among the most deprived

- 4.2 % of children at GINA step 4/5
- 40% had poor control

Poor Asthma Control and Referral

Referral to a respiratory specialist:

- 6.2% of children at GINA Steps 4 and 5 with poor control
- 1.6% of children at GINA 1 – 3 and poor control

Table 4 Factors Associated with Referral to a Respiratory Specialist Among Children and Adolescents with Poorly Controlled Asthma (6–17 Years)

Risk Factor	Unadjusted HR	95% CI	p-value	Adjusted HR	95% CI	p value
≥ 6 SABA inhalers	1.08	0.90–1.30	0.397	1.84	1.42–2.37	< 0.001
≥ 2 OCS courses	2.48	2.06–2.98	< 0.001	2.18	1.70–2.79	< 0.001
cACT or ACT<20	0.72	0.44–1.17	0.183	1.52	0.90–2.56	0.118
≥ 1 hospital admission	2.16	1.82–2.56	< 0.001	2.51	1.97–3.19	< 0.001
≥ 1 A&E visit	2.45	1.93–3.11	< 0.001	1.77	1.30–1.41	< 0.001

How Many Children Should Be Referred?

- 9 million school aged children in England
- 1 in 11 have asthma

= 810,000

- 4.2% GINA 4/5

= 34,020

- 14.5% GINA 1 – 3 and poor control

= 117,450

London Data

- 1.3million school aged children
- Number with asthma

=118,181

- GINA 4/5

=4,963

- GINA 1 -3 and poor control

=17,136

- Referrals per year to severe asthma centres in London

= 231

- Children currently on biologics

=71

Factors Which Increased the Likelihood of Being Referred?

- Younger age
- Female
- Living in a more deprived area
- Concomitant presence of food allergy

When do Clinicians Refer?

Table 1 Self-reported thresholds for referral onwards of healthcare professionals (all values reported as medians (IQR))

Number in year before referral?	Attacks	Courses or oral steroids	A&E attendances	Hospital admissions	Days off school
Primary care (n=79)	3 (2)	3 (2)	2 (1)	1 (1)	15 (12)
GPs (n=49)	4 (2)	3 (2)	2 (1)	2 (1)	18 (15)
'Not sure'(n (%))	7 (14)	9 (18)	7 (14)	4 (8)	20 (41)
Practice nurses (n=30)	2 (1)	3 (1)	2 (1)	1 (1)	15 (12)
'Not sure'(n (%))	4 (13)	3 (10)	2 (%)	3 (10)	10 (38)
General paediatricians (n=47)	4 (1)	4 (1)	3 (1)	3 (2)	30 (21)
'Not sure'(n (%))	9 (19)	8 (17)	14 (30)	9 (19)	18 (38)

Carroll, Arch Dis Child 2020;105:494-498

Summary

- Poor asthma control is very common
- Referral rates to a specialist service are extremely low
- Recent increase in referrals for diagnostics
- Better tools for risk stratification and identification of children who should be referred
- Once referred – equitable service and access to biologics

Acknowledgements

NIHR | National Institute for Health Research

Asthma UK Centre for Applied Research