

# Using data to improve asthma care: A game changer or just a nice idea?



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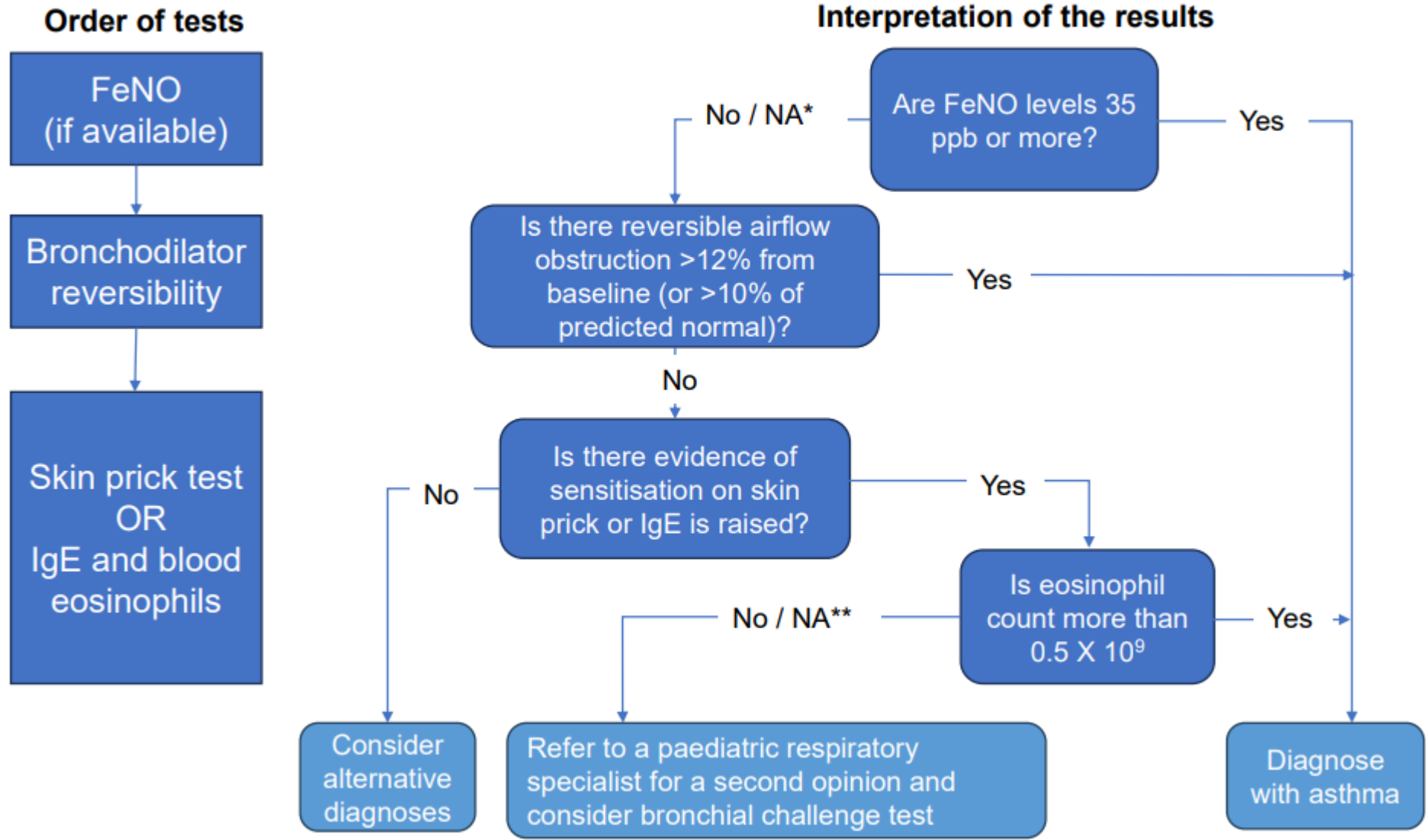
# Plan:

- Asthma diagnosis in children and young people
  - New guidance
  - Planning for a new approach in NHS Lothian
- Management
  - Some recent changes
- Asthma monitoring
  - Some priorities
  - Innovation activity in NHS Lothian

# Diagnosing asthma in children

- In the past...
  - Asthma diagnosed based on symptoms – wheeze, cough, atopy, triggers
  - Trial of treatment
- More recently – e.g. SIGN guideline 2016
  - Symptoms +/- tests – e.g. variable peak flow or FEV1
- Currently –  
NICE/BTS/SIGN 2024 (out for consultation)
  - Obtain a history
  - Don't confirm asthma without a supporting objective test
  - FeNO, then bronchodilator reversibility, then other tests (e.g. SPT, blood eosinophils)
- GINA 2024
  - If symptoms and signs confirm only asthma, and situation is urgent, treat
  - If lung function is available, look for reversible airflow obstruction – treat if confirmed

This is a summary of objective tests for diagnosing asthma in children aged 5 to 16 from the draft guideline on asthma produced by BTS, NICE and SIGN. See the [draft guideline](#) for more details.



\* If FeNO not available measure bronchodilator reversibility  
\*\* If skin prick test was administered in the previous step

# Approach to diagnosis in Lothian

## Currently

- Testing currently largely only for those in the hospital clinic
- No community lung function testing
- To avoid ambiguity or delay, “if it looks like asthma, treat as asthma”

## Impact of new guideline

- Need for increased availability of lung function testing for all children in NHS Lothian (1500 new diagnoses per year?)
- What to do while waiting for tests
- This is a “rule in, rule out” approach. What about those with asthma who test negative? Likely referral to specialist clinic.

# How can data help?

Lack of good paediatric data on diagnosis of asthma

- Need for better studies
  - E.g. registry based or large prospective trials or treatment

What about your own patients?

- Take a good history and examine to rule out other conditions
- Ask about triggers – pets, smoking, vaping, mould, pollen, pollution etc.
- Consider bronchiectasis, CF, upper airway disease, cough
- Prioritise safety over “confirming the diagnosis”.
- Consider referring for lung function if in doubt but still treat (treatment can be stopped before testing)

# New treatment approaches in NHS Lothian

## AIR and MART therapy

- AIR – Anti-Inflammatory Reliever Therapy

Method: Use combined ICS with fast and long acting bronchodilator as needed for symptoms

Rationale: whenever relief of symptoms is needed, ICS is also given

Outcome: should resolve the issue of over-use of SABA to relieve symptoms when adherence to ICS is poor

- MART – Maintenance and Reliever Therapy

Method: take regular ICS/Formoterol plus extra doses if needed

Rationale: one-inhaler approach for those who are not controlled with AIR alone.

Outcome: better symptom control with reduced need for reliever doses where ICS requirement is higher

# AIR and MART are now recommended as 1<sup>st</sup> line therapy in people >12yrs old

DRAFT information sheet:

## Note:

Symbicort turbohaler is the only licenced formulation for this regime in children >12

Not everyone can activate a turbohaler, esp. if symptoms are severe

NICE/BTS have recommended this for 6-11yrs without a clear appropriate licenced regime

## AIR – Symbicort® turbohaler 200/6 – Licensed for patients with asthma age 12 years and over



**Dosage** -1 inhalation when required for asthma symptoms.

Another inhalation can be taken after a few minutes if symptoms persist.

No more than 6 inhalations at a single time.

Usual maximum daily dose is 8 inhalations.

## MART - 12 to 17 years

Symbicort turbohaler 100/6 and 200/6



### Dosage:

One inhalation twice a day or two inhalations once a day and an extra dose if required for symptoms. If symptoms persist after a few minutes then patients can take additional doses.

Not more than 6 inhalations on a single occasion or 8 in a day.

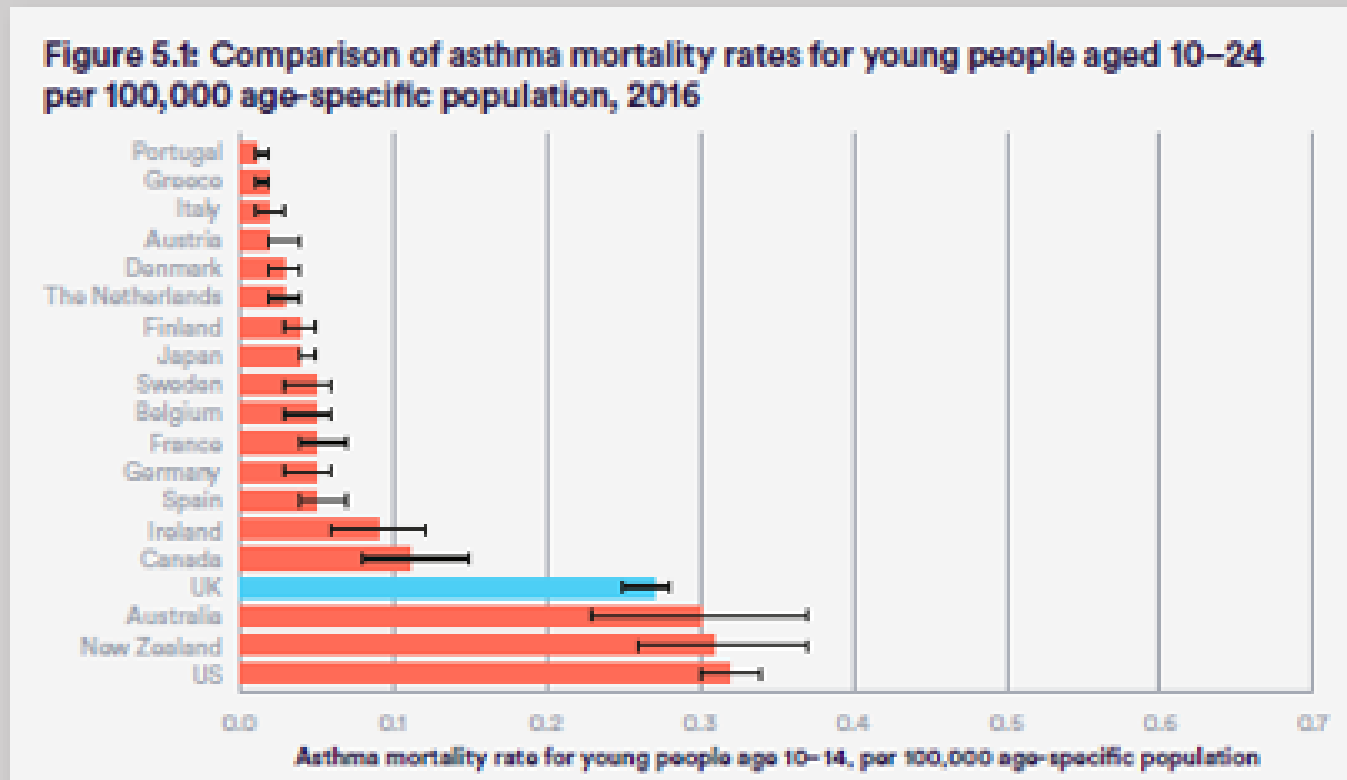
Dose may be increased to moderate - 2 inhalations twice a day.



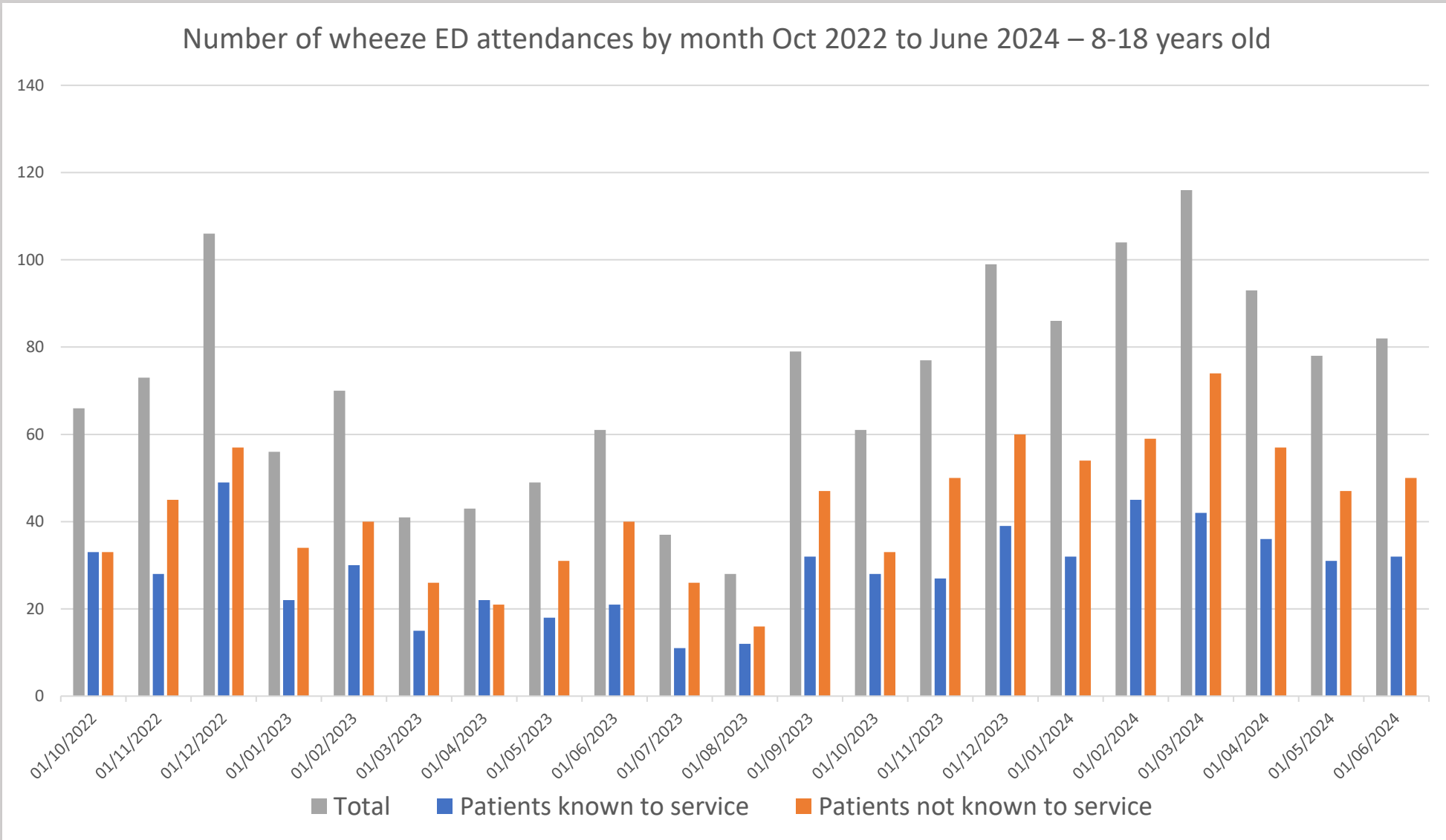
# Asthma monitoring

## Priorities

- Asthma affects approximately 1 in 11 young people in the UK
- Overall cost to the NHS is greater than £1 billion
- Our current track record isn't very good
- National Review of Asthma Deaths – 2014
- Nuffield Health report 2019
- An asthma attack is the end point of a period of poor control
- Asthma fluctuates over time
- Patients can be stable, then enter periods of poor control



# Some local data...



# Why is the mortality rate so high and what should we do?

There are various theories as to why the UK is performing so poorly in preventing asthma deaths; however, a lack of provision of basic care and a poor understanding of symptoms by both young people and health care providers are likely to be playing a part (Asthma UK, 2014; 2019).

- Contributing factors:
  - Socioeconomic factors
  - Smoke exposure
  - Air pollution
  - Lack of awareness
  - Etc. etc.

## Zero tolerance for attacks

- Replace the inadequate terms exacerbation or flare-up with attack
- Precision medicine rather than a one-size-fits-all approach to treatment and secondary prevention of attacks
- Development of a risk score and incorporation into every day clinical practice



The Lancet Commissions

After asthma: redefining airways diseases

Lancet 2018; 391: 350–400

# Example case

- 7 year old girl with asthma
  - Attends clinic every 3 months, relatively stable  
FEV1 95%, minimal symptoms, doesn't recall much fluctuation
  - Clinical review shows how she is today  
Difficult to know what has happened in-between
  - Sees a variety of people at different times between appointments  
GP, practice nurse, A&E, pharmacist
  - Has a paper asthma action plan

At some point in time she may have an attack.

Is the current clinic model of routine reviews the best way to prevent this?

# Asthma attacks are the end point

- A full blown attack is probably preceded by various events, e.g.
  - Change in life circumstances/behaviour
  - Drop in adherence
  - Increase in triggers
  - Change in activities – e.g. school, work, sports
  - Increased symptoms – e.g. decreased activity, lower lung function, increased cough, disturbed sleep etc.
  - Change in underlying disease

Can we use data to predict which patients have changed before they have an attack?

Can we tackle poor adherence without asking patients to do more tasks?

# Factors that predict asthma attacks

- Buelo et al (2018)

Children 5-12 years

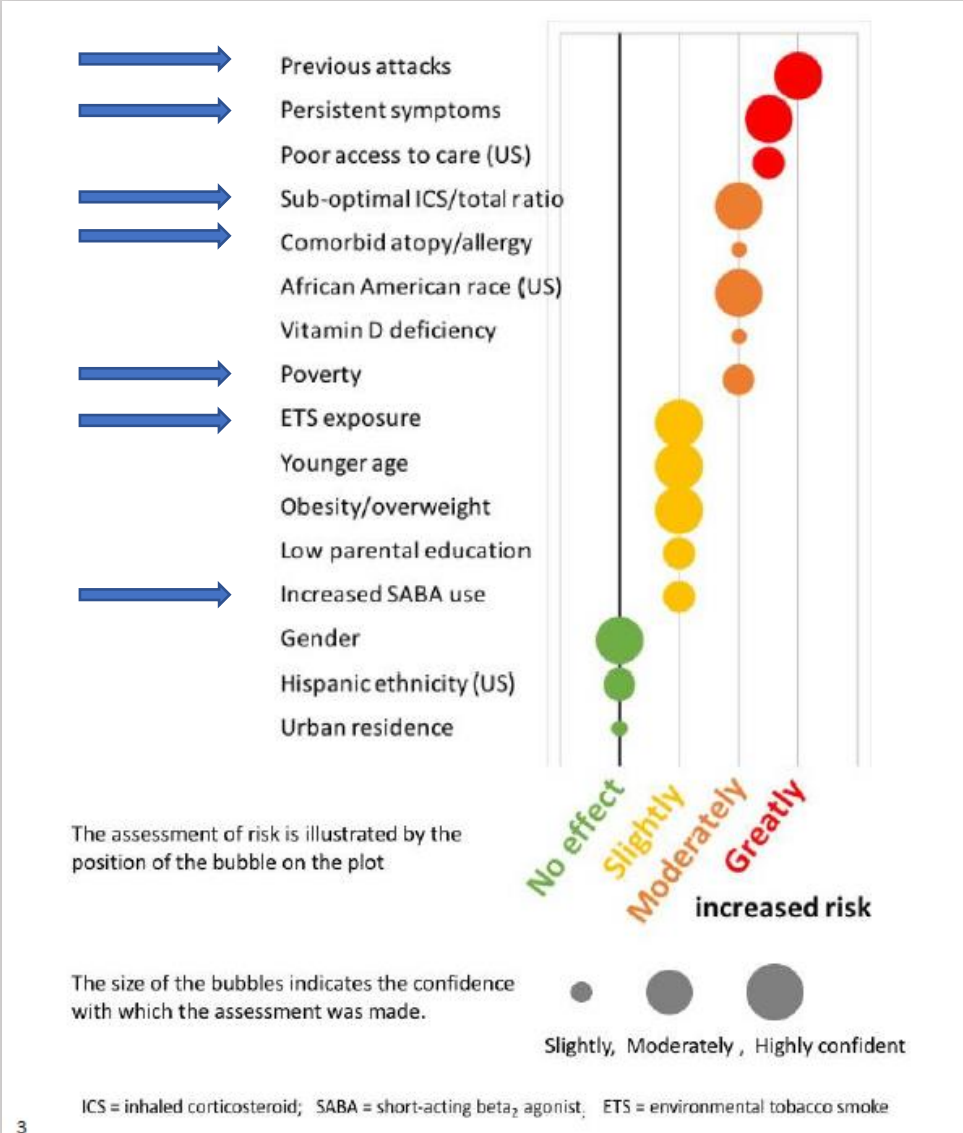
Systematic review and meta-analysis

68 studies from 10 countries (including UK)

Buelo A et al

At-risk children with asthma (ARC): a systematic review

Thorax 2018;73:813-824.



# Current situation

- High asthma attack and death rates
- Impact of poverty
- Fluctuating symptoms
- Current model doesn't anticipate attacks
- Disconnected electronic records
- Patchy application of digital technology






BMJ Journals

Thorax

Original research

Association between socioeconomic deprivation, ethnicity and health outcomes in preschool children with recurrent wheeze in England: a retrospective cohort study

David Lo ,<sup>1,2</sup> Claire Lawson,<sup>3</sup> Clare Gillies,<sup>4</sup> Sharmin Shabnam,<sup>4</sup> Erol A Gaillard ,<sup>1,2</sup> Hilary Pinnock,<sup>5</sup> Jennifer K Quint <sup>6</sup>

# Where do we want to get to?

- Utilising key clinical data to prevent asthma attacks
- A data-driven, risk-based, machine-learning algorithm
- Patient-centred response to increased risk
- Patient-centred communication and clinical reviews
- Incorporation of useful digital technology to modify risk
- Ongoing education of patients and families
- Digital asthma action plan with ongoing clinical input when needed

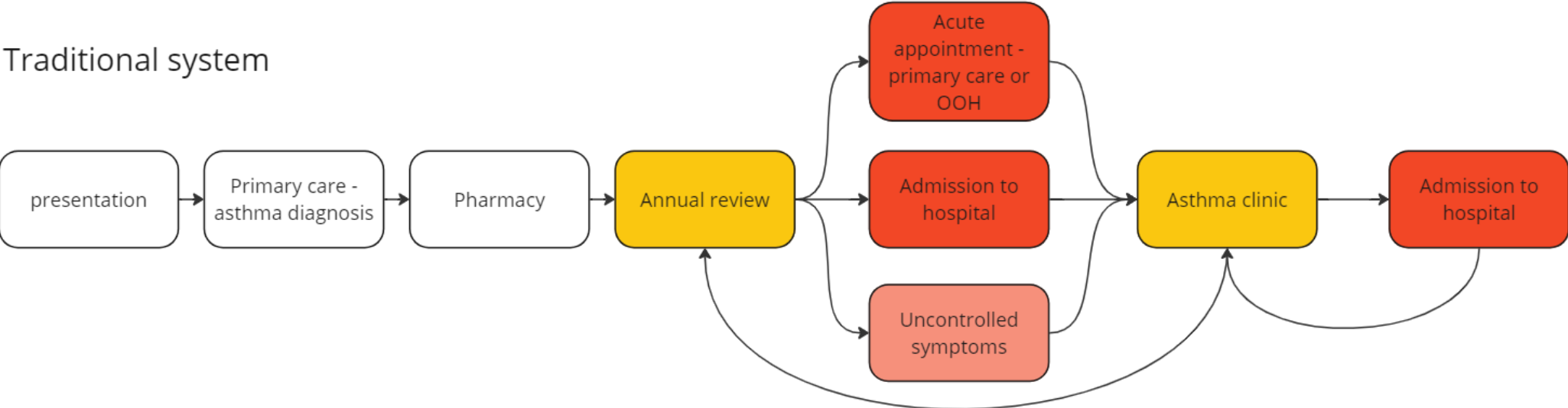


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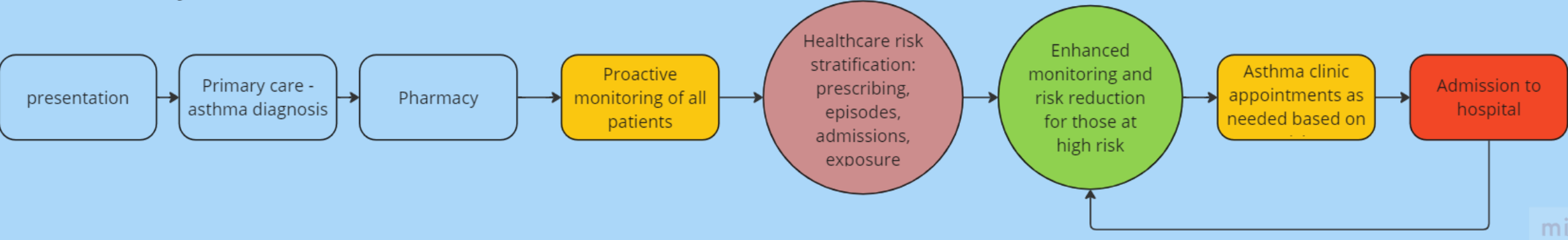


Admissions are expensive, disruptive, dangerous and preventable

Traditional system



Data-based system



## What this could be:

- A truly patient-centred system
- Fewer routine appointments
- Better communication between patients and clinicians
- Focussed appointments when needed rather than at set intervals
- Better monitoring for those at high risk
- Early intervention and reduced hospitalisations
- An opportunity for hospital and primary care to work together

## What this will NOT be:

- Service or research focussed
- An added administration burden
- An attempt to move work from hospital to primary care
- A “me too” project or app

# Where are we now?



- Innovation challenge started May 2024 – Redstar
  - £250k from CSO
  - 3 months initial phase – defining the problem and solutions
  - Currently discussing the details of asthma management
  - Engagement with clinical team and families
- Similar process happening in Glasgow with QIOT
- Subsequent phase 2 with 1 or 2 companies to complete a more detailed project
- Dataloch application completed – data ready
  - large-scale analysis of 15 years of data – primary, secondary, OOH, pharmacy, admissions etc etc.
  - **Can a retrospective analysis of temporal associations generate a predictive algorithm for asthma attack risk in an individual?**



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# Where next?

- Despite pressures in all areas of healthcare, we need engagement from interested clinicians esp. in primary care
  - Providing perspectives from current experiences
  - Piloting a new system within a practice or cluster
  - Troubleshooting and debugging
- A new product will need a significant resource and evidence base
  - Investment
  - Academic backing

# Conclusions

- Getting the right data from patients and families will improve asthma diagnosis
- Using healthcare systems and existing technology could renew the traditional routine review system and reduce pressure in acute and primary care settings

Please contact the asthma team with any clinical queries

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Please contact me if you want to discuss asthma innovation

[kenneth.macleod3@nhs.scot](mailto:kenneth.macleod3@nhs.scot)