



England

# #AskAboutAsthma conference

Chaired by:

**Dr Oliver Anglin**

GP, Hampstead Group Practice

Clinical Director CYP Transformation, NHS England - London

# Housekeeping



Attendees are automatically muted for Teams Live.



Please include your questions or comments in the moderated box. The chair will then pose questions to the speakers.



This conference is being recorded. Sharing options for the slides and conference will be circulated.



Mentimeter will be used in the session. Please have your phone nearby, ready to scan a QR code



Please complete the evaluation to help us improve our content for you in the future.

# Agenda

## Session 1

Time	Topic	Speaker/(s)
9:10 – 9:30	Introduction and welcome	<b>Dr Oliver Anglin</b> GP, Hampstead Group Practice Clinical Director CYP Transformation, NHS England - London
9:30 – 9:50	CYP asthma: Young people's view	<b>Dr Oliver Anglin</b> <b>Shelby Davies</b> Youth Participation and Engagement Officer, Partnership for Young London <b>Sara Khanom</b> NHS Youth Steering Group Advisor
9:50 – 10:20	NHS England CYP asthma national update: The Wider Determinants of Asthma Outcomes in Children and Young People	<b>Mursheda Nessa</b> Senior Policy Manager - CYP Transformation Programme, NHS England
10:20 – 10:40	Q & A	All
10:40 – 10:55	<b>Break</b> A video from Moving on Asthma will be played	

# Agenda

## Session 2: Widening our view

Time	Topic	Speaker/(s)
10:55 – 11.20	Vaping – risks to children and young people with asthma	<b>Professor Andrew Bush</b> Professor of Paediatrics and Paediatric Respiriology, Imperial College London Consultant Paediatric Chest Physician, Royal Brompton Harefield NHS Foundation Trust.
11:20 – 11.45	Damp and mould in the home and the risks to health	<b>Julie Billett</b> Deputy Regional Director, Office for Health Improvement and Disparities - London Region
11.45 – 12:10	Population health, health inequalities and children's asthma: Widening our View	<b>Dr Jacqueline Lindo</b> Consultant in Public Health Medicine, NHS England - London
12:10 – 12:30	Q & A	All
12:30 – 13:00	Lunch Slides showing priorities and achievements of ICBs, Trusts and paediatric asthma networks to be displayed	



# Agenda

## Session 3: Patient focus

Time	Topic	Speaker/(s)
13:00 – 13:25	Asthma + Lung UK's work on children and asthma	<b>Sarah Woolnough</b> Chief Executive Officer, Asthma + Lung UK
13:25 – 13:50	Health inequalities and poverty proofing in asthma	<b>Professor Ian Sinha</b> Consultant Respiratory Paediatrician, Alder Hey Children's Hospital
13:50 – 14:05	Assisting Children to Excel: A health and housing proof of concept	<b>Connie Jennings</b> Director Stronger Communities, Walsall Housing Group
14:05 – 14:25	Q & A	All
14:25 – 14:35	<b>Break</b> A short stretching/yoga session by Betsy Weaver will be played	

# Agenda

## Session 4: Improving clinical practice

Time	Topic	Speaker/(s)
14:35 – 14:50	Severe asthma event – a case study	<b>Dr Oliver Anglin</b> GP, Hampstead Group Practice Clinical Director CYP Transformation, NHS England - London <b>Vasif</b> Young person with asthma <b>Sukeshi Makhecha</b> Paediatric Respiratory Pharmacist, Royal Brompton and Evelina Hospitals
14:50 – 15:40	Clinical update and Q&A	<b>Dr Louise Fleming</b> Consultant Respiratory Paediatrician, Royal Brompton Hospital
15:40 – 16:00	Next steps, mentimeter and close	<b>Dr Oliver Anglin</b> GP, Hampstead Group Practice Clinical Director CYP Transformation, NHS England - London

## What is #AskAboutAsthma?

- Seventh year of London's awareness raising campaign and third year involving colleagues from across the country
- #AskAboutAsthma highlights the simple changes to children and young people's care that will make a big difference to how they experience their asthma.

The image displays four NHS posters arranged in a 2x2 grid, each with a blue background and white text. Each poster features a large white circle with a blue number inside, and a small icon related to the topic. The NHS logo is in the top right corner of each poster.

**1**  **Make sure your child has an asthma action plan**  
Children with an asthma action plan are four times less likely to have to go to hospital for their asthma.

**2**  **Make sure you know how to use an inhaler**  
Getting the inhaler technique right with a spacer or facemask is one of the most important things you can do to help your child stay well.

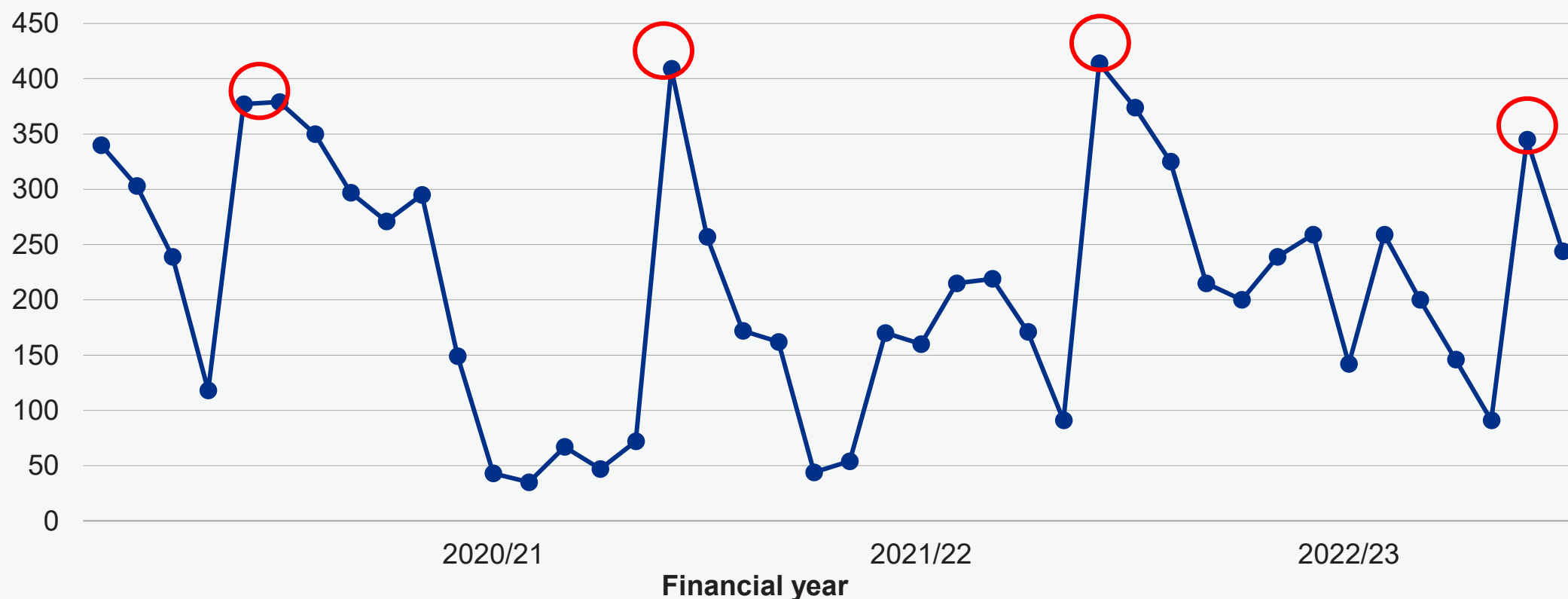
**3**  **Attend your child's asthma review**  
Scheduling an asthma review once a year (and after every attack) can help children and young people to manage their symptoms.

**4**  **Consider air pollution and its impact**  
Air pollution can trigger asthma, but knowing the triggers can help children and young people to manage their condition.

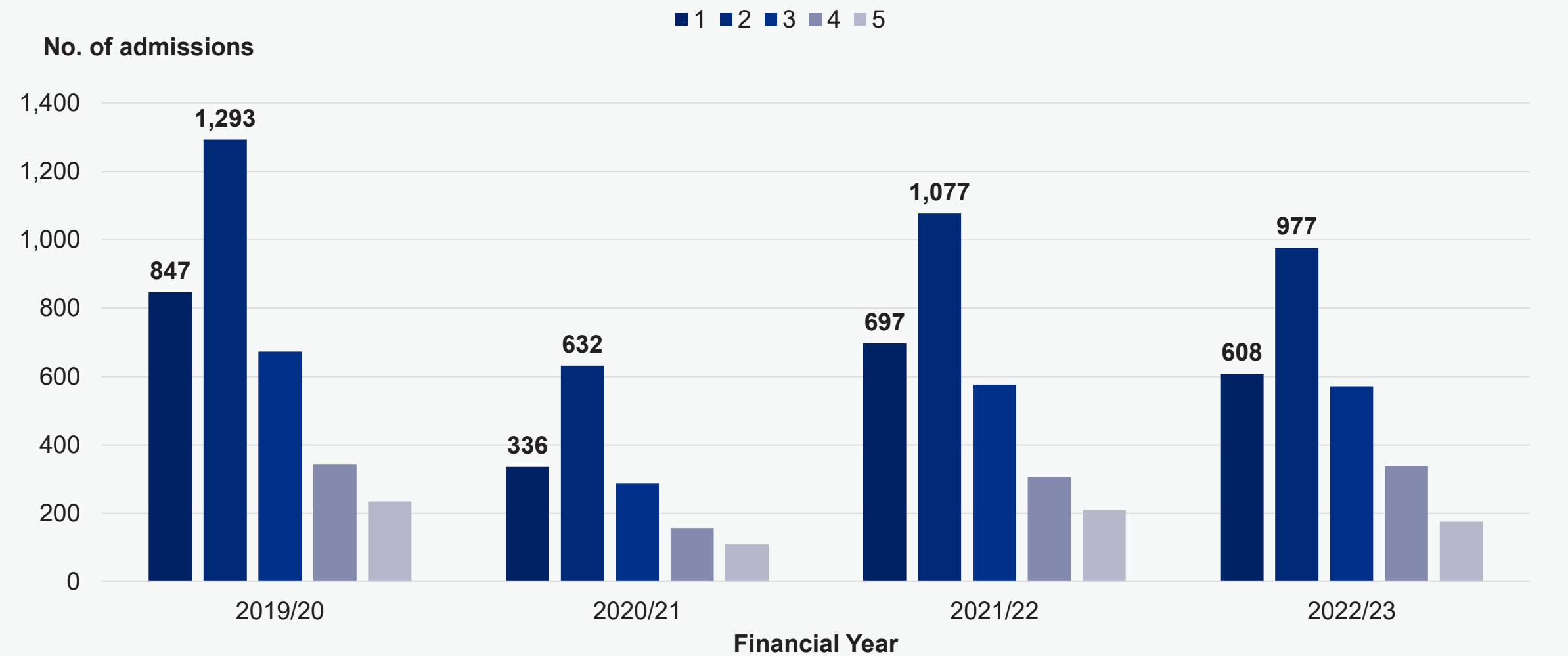
# Paediatric asthma admissions (London)

#AskAboutAsthma coincides with start of the new school year in England and directly precedes the annual spike in hospital admission rates for asthma (week 38).

No. of admissions



# Asthma related admissions: Deprivation (London)



# This year's theme

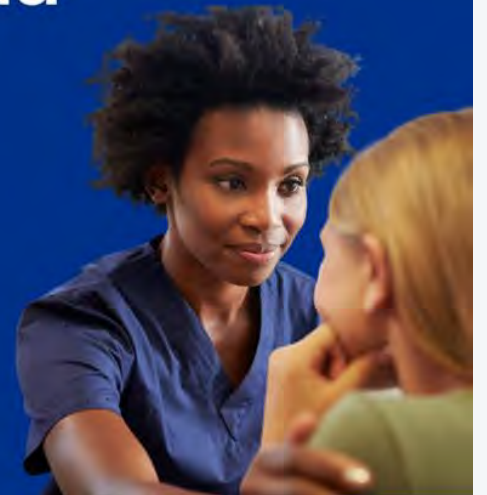
*We are shining a light on the wider factors of children and young people's asthma care including housing, mould and vaping.*

*Widening our view also helps us to raise the profile of asthma; reaching out to everyone who has asthma, their friends, families and the whole system that cares for them.*



For #AskAboutAsthma  
2023, we are **widening  
our view** of young  
people's asthma

#AskAboutAsthma  
**11-17 September 2023**



# Housing, mould and vaping



- Condensation and damp in homes can lead to mould growth.
- Inhaling mould spores can cause allergic type reactions, the development or worsening of asthma, respiratory infections, coughs, wheezing and shortness of breath.
- Children and young people growing up in homes with mould and damp are between one and a half and three times more prone to coughing and wheezing.



- Current vaping prevalence in 11–18-year-olds is 8.6%.
- Use of disposable vaping products has increased substantially, with 52.8% of current vapers using them.
- Fruit flavours are the most popular vapes in 11-18 year olds.
- 34.2% of 11–18-year-olds always use vaping products that contain nicotine.



# Social media

Join the conversation and share what you learn from today's conference using the hashtag **#AskAboutAsthma**:

- **Twitter:** @BCYP\_NHSLDN
- **Instagram:** @BCYP\_NHSLDN

To view all the content from the week so far including short videos, blogs and podcasts please visit our website: [#AskAboutAsthma 2023 - Transformation Partners in Health and Care](#)

There is also still time to register for tomorrow's air pollution webinar.



# CYP asthma: Young people's view

Dr Oliver Anglin, Shelby Davies  
and Sara Khanom



# Widening our view

## The Wider Determinants of Asthma Outcomes in Children and Young People

Mursheda Nessa

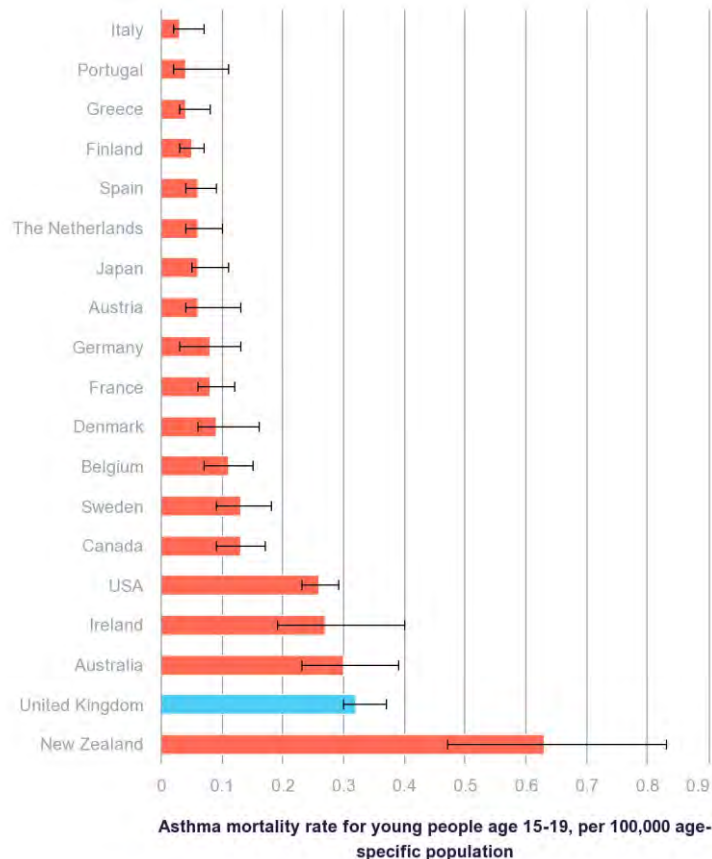
Children and Young People Transformation Programme, NHS England

Dr Jen Townshend

National Clinical Lead CYP Asthma, NHS England

General and Respiratory Paediatrician, Newcastle Upon Tyne

# Why we are here



Source: International comparisons of health and wellbeing in adolescence and early adulthood, Nuffield Trust, 2019



ORIGINAL ARTICLE  
ASTHMA AND PAEDIATRICS

## Educational and health outcomes of children treated for asthma: Scotland-wide record linkage study of 683 716 children

Michael Fleming<sup>1</sup>, Catherine A. Fitton<sup>2</sup>, Markus F.C. Steiner<sup>2</sup>, James S. McLay<sup>2</sup>, David Clark<sup>3</sup>, Albert King<sup>4</sup>, Daniel F. Mackay<sup>1</sup> and Jill P. Pell<sup>1</sup>

## Childhood asthma is a risk factor for the development of chronic obstructive pulmonary disease

Michael J McGeachie, PhD

Channing Division of Network Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA



PEDIATRIC PULMONOLOGY

ORIGINAL ARTICLE: ASTHMA

## Anxiety in youth with asthma: A meta-analysis

Joanne Dudeney PhD, Louise Sharpe PhD, Adam Jaffe MD, Emma B. Jones BPsych, Caroline Hunt PhD

First published: 27 July 2017 | <https://doi.org/10.1002/ppul.23689> | Citations: 62

Joanne Dudeney was supported by an Australian Post-Graduate Award scholarship.

# Getting the basics right



Asthma action plan



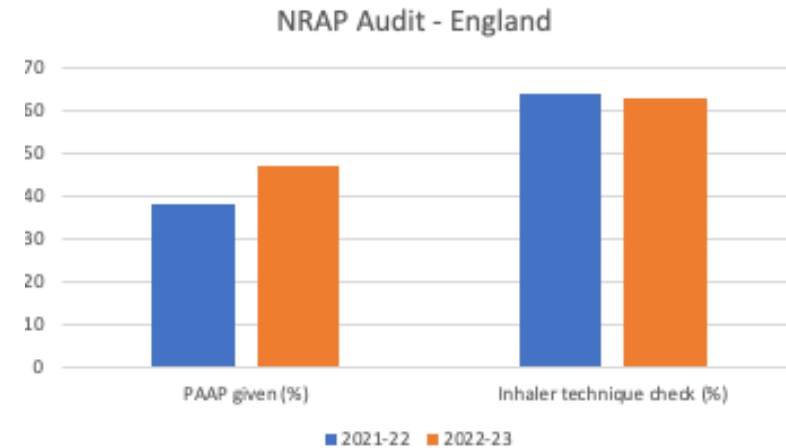
Inhaler technique check



Asthma review



Air pollution



# Digging deeper



# Meet Amari...

- Lots of wheeze episodes in preschool years
- Diagnosis 'asthma' aged 8 years
- Mould and damp
- Neighbours smoke, near a busy road
- Working 2 jobs to try and save money to move:
  - Often not there on an evening to manage meds
  - Offered annual reviews– can't get there
- 'Overweight' but can't afford the healthier options
- Struggling at school

*'It's just asthma, we just have to get on with it'*





# Contributing factors

✓

## Deprivation

## Environment

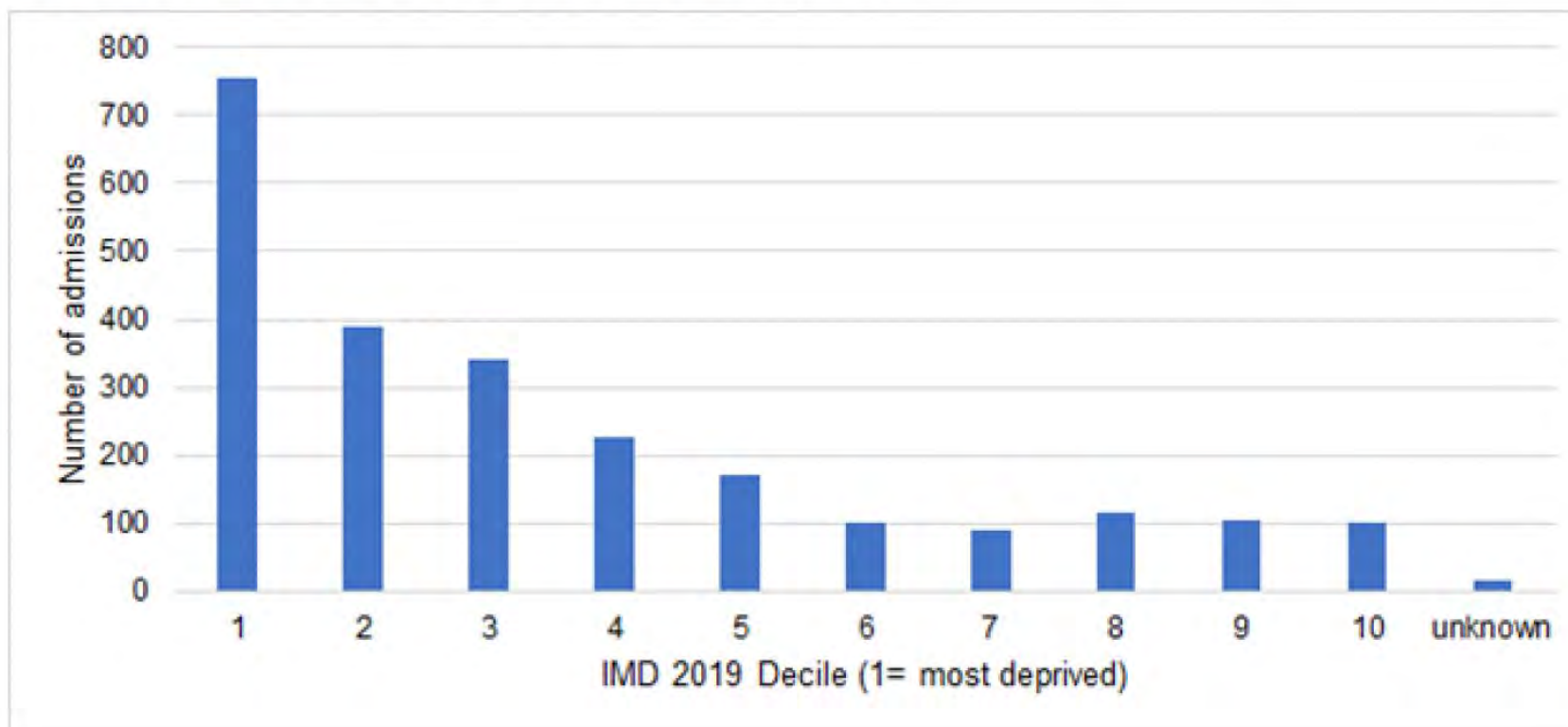
- Housing
- Outdoor air pollution

## NHS

- Diagnosis
- Preschool wheeze
- Awareness
- Outdated care delivery model?

# Deprivation

**Figure 6: Emergency admissions for asthma by deprivation profile in patients aged 25 years and under, in NENC (Apr '19 – Mar '21)**

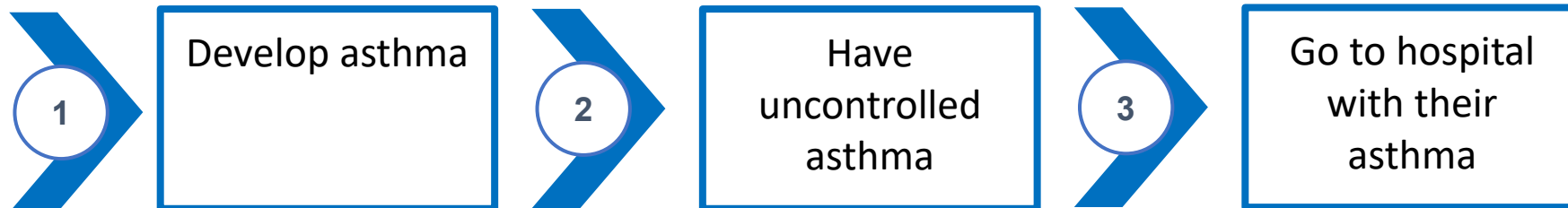




# Deprivation as a driver for inequality in asthma

Children from deprived communities have worse asthma outcomes than those from wealthier communities.

They are more likely to:



## Factors that contribute to deprivation as a risk factor for asthma and poor asthma outcomes

Air pollution

Poor quality  
housing

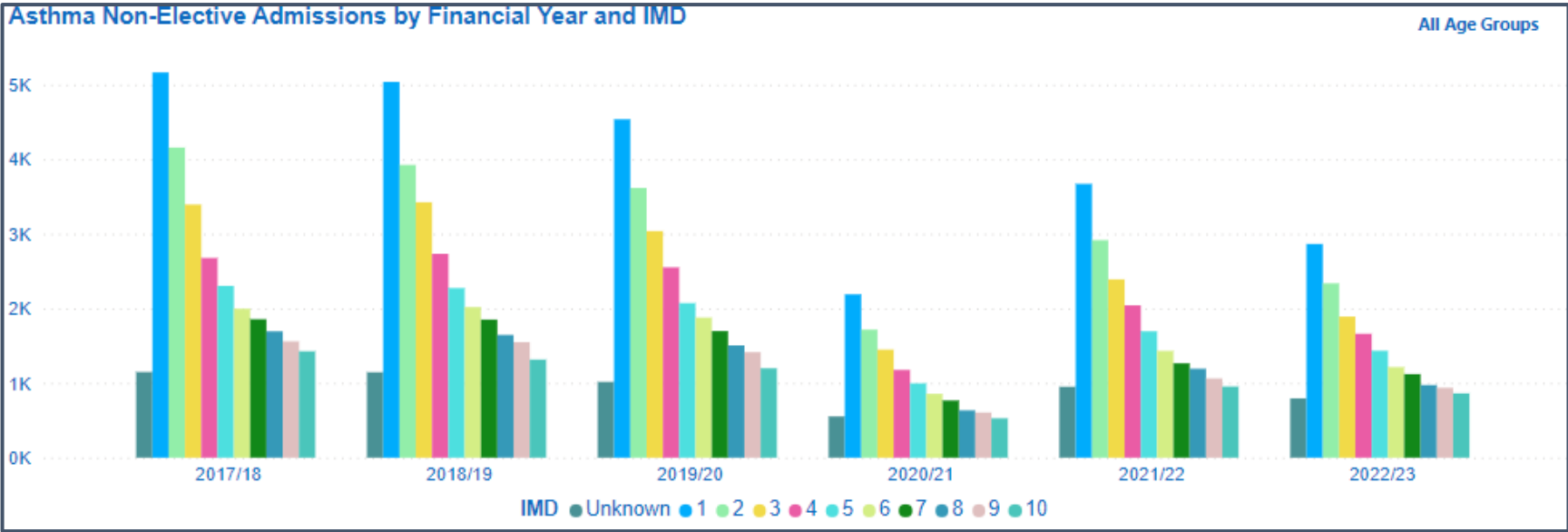
Second hand  
smoke  
exposure

Diet & obesity

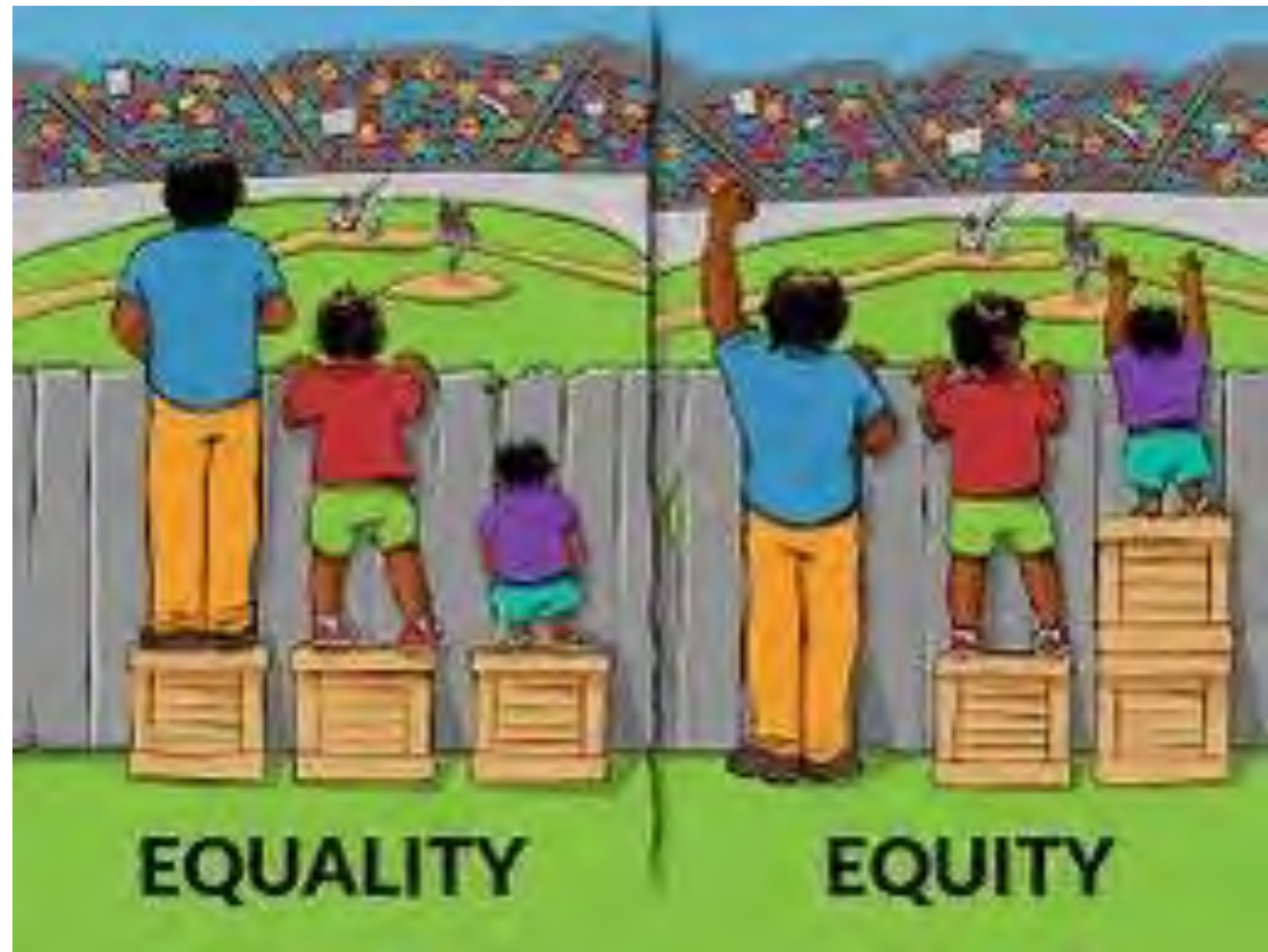
Family chaos  
and maternal  
stress

Lower health  
literacy

Reduction in non-elective admissions across all deciles of deprivation equally



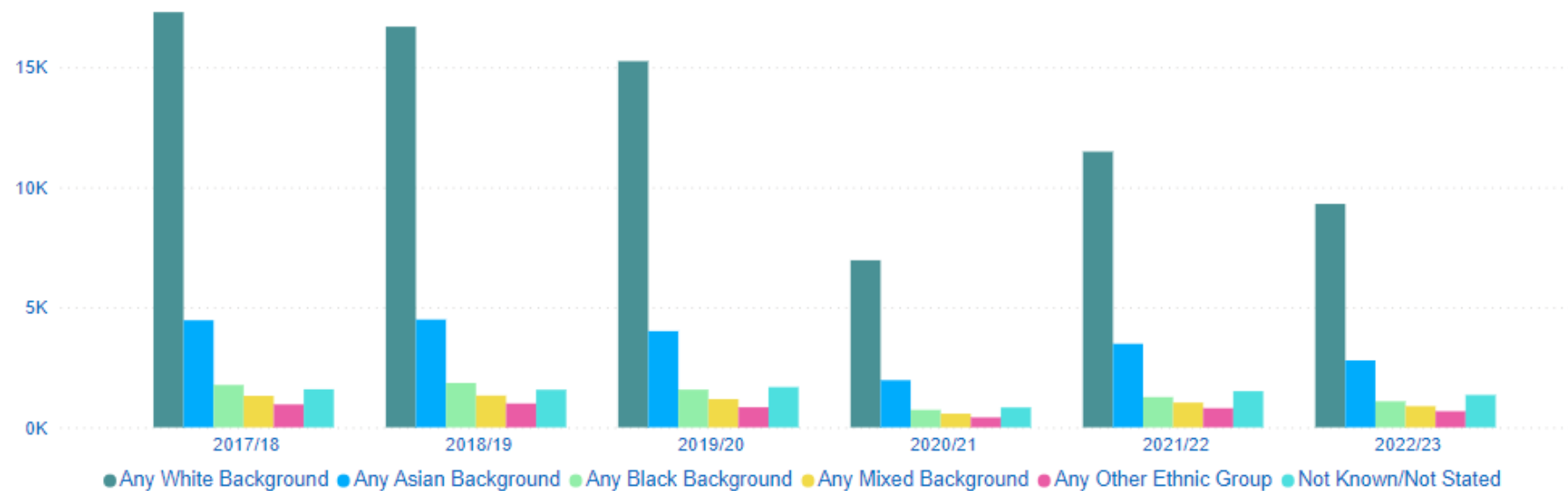
**Those most in need are still most in need**



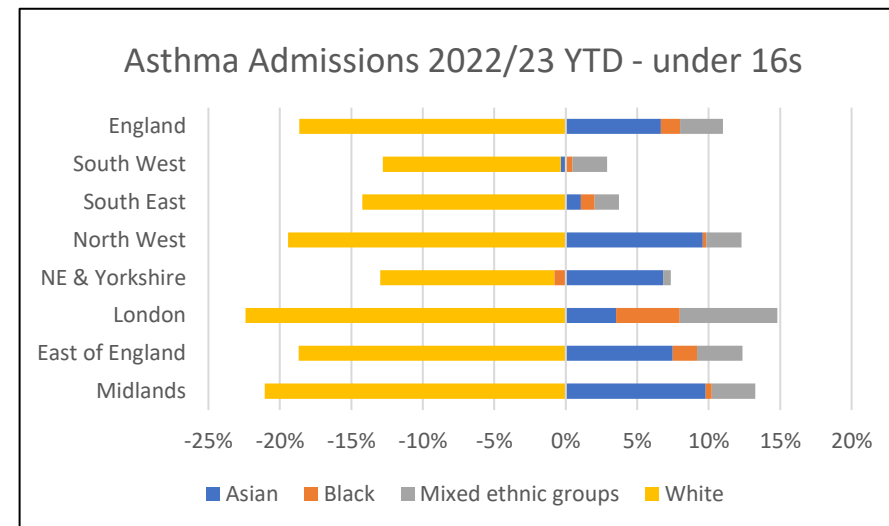
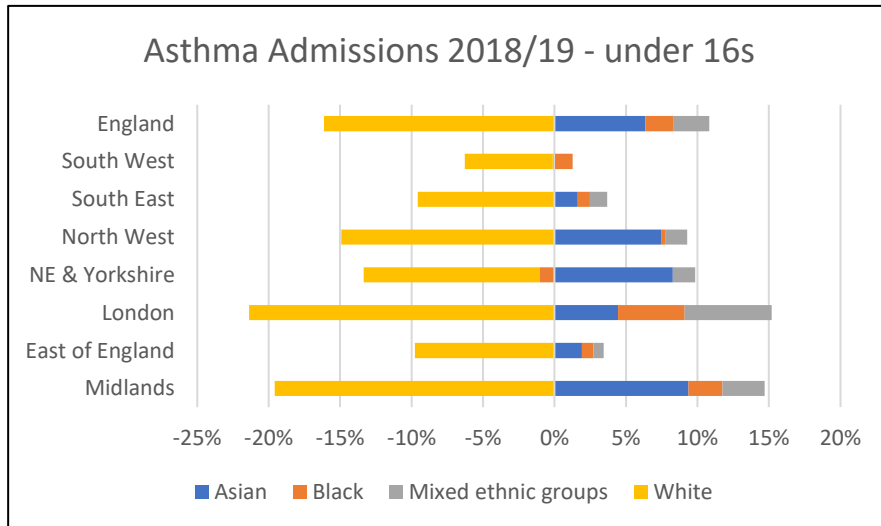
# Reduction in non-elective admissions across all ethnicities


Asthma Non-Elective Admissions by Financial Year and Ethnicity

All Age Groups



# Change in Asthma Admissions by ethnicity in under 16s (2018/19 vs 22/23)





What can  
we do?

- NHS
  - Keep doing the basics well

# NHS: More than the basics



DIFFERENT INTERVENTIONS



TARGETED INTERVENTIONS



# What we can do?

- **NHS**
  - **Keep doing the basics well**
  - **Diagnosis**
  - **Preschool wheeze**
  - **Awareness**
  - **New delivery models**
- Collaborate and work across boundaries

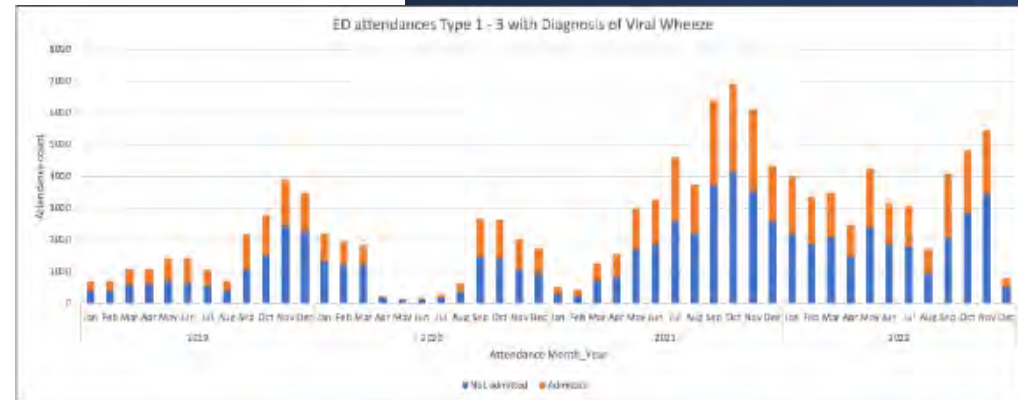
# Get the diagnosis right

Age Groups	Average monthly Volumes			% volumes var. vs. 2019/20	
	2019/20	2020/21	2021/22 (Apr-May 2021)	2021/21	2021/22 (Apr-May 2021)
0-17	11,767	5,458	5,038	-53.60%	-57.20%
18-29	9,262	5,739	5,213	-38.00%	-43.70%

The number of CYP being diagnosed with asthma has fallen by a higher percentage than nearly all other long-term conditions. Recent data shows that this is yet to improve and in some areas worsening still.

# Preschool wheeze

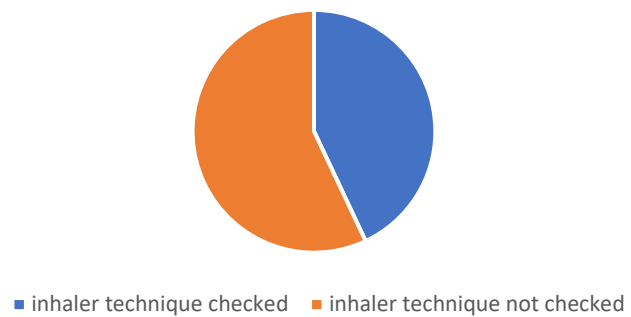
- Large numbers (135K in 2022)
- ED attendances doubled since 2019
  - Not matched by other respiratory conditions
- Admission numbers static
- **Can these attendances be prevented with better self management?**



# Inhaler technique check >5yrs vs < 5 yrs

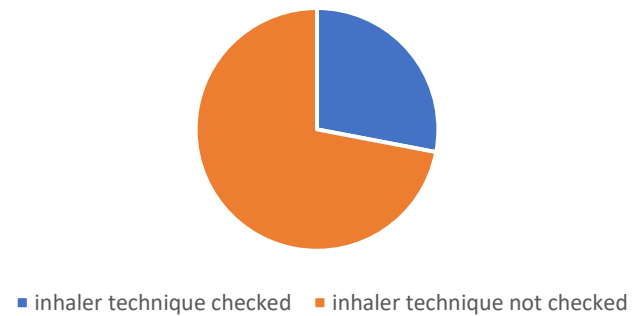
(Wales Primary care audit)

CYP age 6-18 years



No technique check in 57%

CYP age 1- 5 years

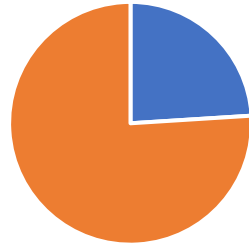


No technique check in 72%

# Self Management Tools >5yrs vs < 5 yrs

(Wales Primary care audit)

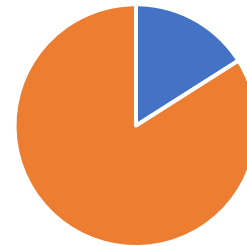
CYP age 6-18 years with a PAAP



■ PAAP ■ no PAAP

No PAAP in 77%

CYP age 1-5 years with a PAAP



■ PAAP ■ no PAAP

No PAAP 84%



UNIVERSITY OF  
BIRMINGHAM

CITY OF  
WOLVERHAMPTON  
COUNCIL

# Parents' views on barriers and facilitators to receiving asthma support for children in Wolverhampton: a qualitative study

*December 2022*

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# Diagnosis process



Receiving diagnosis was a turning point

- It was a drawn out process with several obstacles along the way (particularly when child under 5):
  - Perceived unwillingness of healthcare professionals to consider a diagnosis
  - Disregard for parents' concerns
  - Parents had to press for a diagnosis
  - Parents felt unsupported during this turbulent process.
- What parents felt could be improved:
  - More information at the point of diagnosis
  - More information for children under 5 and those awaiting a diagnosis
  - A faster diagnosis process that is less dependent on parent prompts

*"... prior to [having a diagnosis], we were just lurching from one hospital admission to the next. Sort of, we never knew which time she got ill would be the time that it would end up with her having to be taken in." (P7)*

*"I think if they'd have possibly listened a bit more and been a bit more understanding, it, it could have avoided us going into hospital and tying up their resources in four different instances before actually getting a diagnosis." (P6)*

*"So there needs to be a better system around diagnosing asthma in the under-fives. Because what is in place at the moment is non-existent. And it's appalling." (P8)*

# Resources package

- Wheeze management plan
  - Incorporating patient information
- Reducing Salbutamol safely plan
- Red flags/referral criteria
- Education sheet for practices:
  - Including signposting to patient resources

### What is Viral Wheeze?

Viruses, such as a cold, are common infections. Viruses can irritate the small breathing tubes in the lungs making them swell – this makes the breathing space smaller. When this happens it may make it harder for your child to breathe. You may hear a whistling noise when they breathe out, this is called a wheeze.

### Can I prevent it?

You can't stop your child catching a virus. Inhalers with spacers, like the ones used for asthma can help to manage your child's symptoms. Your child may be prescribed a blue inhaler with a spacer called salbutamol. This relaxes the muscles around the breathing tubes, opening them up, making it easier for them to breathe. It's important the child always uses the spacer otherwise they won't get the inhaler medicine to the right place. If you smoke, try to stop as cigarette smoke can irritate airways. Antibiotics will not help a viral infection.


### Is it asthma?

Most children with viral wheeze usually grow out and it doesn't develop into asthma. A small number of children with viral wheeze will go on to develop asthma but this is much less common.

### How can I treat Viral Wheeze?

- Follow the wheeze plan as soon as you think your child is starting to get a cold
- It is important that you use a spacer to administer the inhaler and use the correct technique.
- Shake the inhaler well and put it in the hole at the end of the spacer
- Place the mask over your child's nose and mouth.
- Press the inhaler once to release a "puff". Encourage your child to breathe in and out at a normal rate for a count of ten or for around twenty seconds – you will see the valve on the spacer moving.
- Repeat this until the required number of puffs have been given.
- Do not force your child – if they are crying the inhaler will not be effective.
- Ask your nurse for advice if giving your child their inhaler is difficult – make it fun with silly songs / games
- It is important to let your child rest and ensure they drink plenty of fluids

Scan this QR code to watch a video on how to give an inhaler to a younger child:




Wheeze Management Plan For

Date

My nurse/doctor's name and contact details are:

My inhalers are:



Please use this if your child starts to get wheeze or short of breath.

### Green zone: Getting a cold

Your child has:

- a cold (runny nose, coughing, sneezing)
- a mild wheeze
- shortness of breath

but they are still able to do their normal day-to-day activities such as going to nursery/school.

### Green Zone Action

- Give two puffs of their salbutamol (blue) inhaler through a spacer up to four hourly using the technique described on the back of this page.
- You can do this for a few days but if your child is not getting better, make an appointment to see a doctor.

### Amber zone: Getting Unwell

Your child has more symptoms, for example:

- out of breath
- coughing
- wheezing
- doesn't feel able to run around and play as usual.

### Amber Zone Action

1. Give two puffs of their salbutamol (blue) inhaler through a spacer up to four hourly using the technique described on the back of this page.
2. If you are not getting better, make an appointment to see a doctor. This can be your GP or your local out of hours service.

**IMPORTANT:** If your child is getting worse, call your GP or go to the hospital.

**AND**

**Move to the RED ZONE**

### Red zone: Severe

Your child seems very unwell

- They still have symptoms after six puffs of salbutamol or they need their blue inhaler more than every four hours
- They are not getting better, and you need to take action now.
- Give up to ten puffs of the blue inhaler via a spacer, one puff at a time.
- **AND**
- Arrange an urgent review with their doctor today, or go to the emergency department if this is not possible.

If your child is needs ten puffs of the blue inhaler again, or needs it more than every four hours, you should get a more urgent review (within the next few hours)

If your child is:

- Breathing fast
- Struggling or using a lot of effort to breathe – the skin between the ribs or neck sucking inwards
- Getting tired
- Unable to talk in a sentence / grunting / panting
- Pale/grey/blue around lips or face

**You should call 999**

**AND**

Whilst waiting for the ambulance, use the spacer to give one puff of their blue inhaler every 30 seconds, taking 5 breaths for every puff given.



# Awareness

- **6 most common languages**
- **Easy read**
- **Age specific**
  - 5-11 years
  - Young people



# Risk stratification and targeted interventions

- Paediatric asthma practitioners
- Targeted interventions to patients in Primary Care Networks (PCN)
- Highest Children and Young People's asthma admissions
- Two paediatric asthma practitioners in an Integrated Care System



# What we can do?

- NHS
  - Keep doing the basics well
  - Diagnosis
  - Preschool wheeze
  - Awareness
  - New delivery models
- **Collaborate and work across boundaries**

# Housing



- Awaab's law
- New guidance for landlords
- New powers for Ombudsman
- Pathways between health and housing
  - Identification
  - Communication

## Parallel interventions

### Awaab's Law (social housing)

- Timely assessments
- Timely actions
- Information for tenants

### Amended Guidance (crosscutting)

- Recommendations
- Detail

### Housing Ombudsman

- Barriers to access removed
- Unnecessary delays
  - Guidance<sup>1</sup> : Repairs should not be delayed whilst complaints are investigated
  - Michael Gove written to legal representatives<sup>2</sup>
- Inappropriate blame
  - Guidance<sup>3</sup>: Change in culture from inferring blame to taking responsibility
  - 'It's not lifestyle if decisions are a consequence of limited choices'



A close-up photograph of a man with a beard using a green vape pen. The image is partially obscured by a blue overlay on the left side, which contains the text.

sky news

# 1 IN 10 SCHOOL CHILDREN VAPING

# Summary



DOING THE BASICS IS  
IMPORTANT



MORE WE NEED TO DO IF  
WE WANT EQUITABLE  
OUTCOMES FOR EVERYONE



WORK TOGETHER IN THE  
NHS



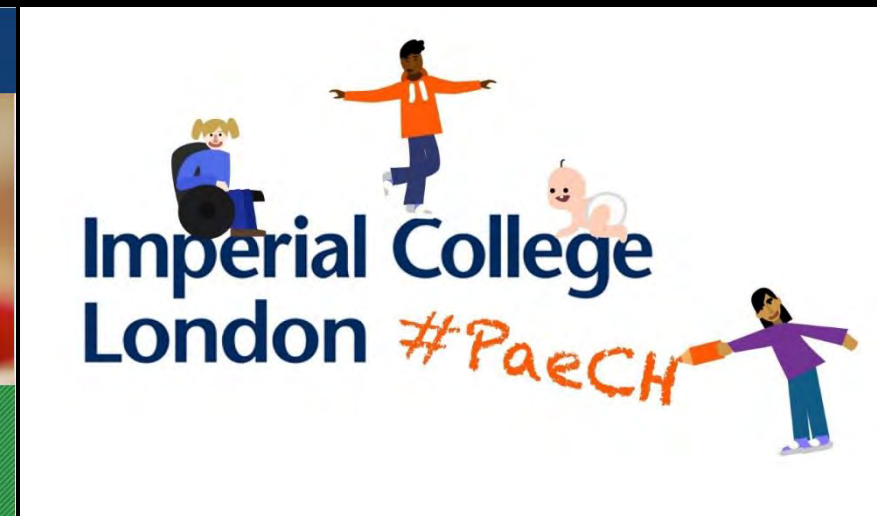
WORK ACROSS BOUNDARIES

True integrated care and better outcomes for everyone

# Vaping - risks to CYP with asthma

**Andrew Bush MD FHEA FRCP FRCPCH FERS FAPSR ATSF**  
**Imperial College & Royal Brompton Hospital**

[a.bush@imperial.ac.uk](mailto:a.bush@imperial.ac.uk)





# COI

- **I have no perceived or actual financial or other conflict of interest**

# Aims of the Presentation

- I will summarise what is known about the acute and long term toxicity of e-cigarettes, and the ongoing concerns of the paediatric community
- I will show scientific studies that e-cigarettes are not watered down tobacco, but have their own extra toxicities
- I will discuss the literature on the particular dangers posed to people with asthma: they are NOT 95% safer than tobacco in this context
- I will highlight the absolute importance of a better strategy to protect CYP

# Unfriendly Fire

- **What are e-cigarettes and who makes them?**
- **What is known about the acute toxicity of e-cigarettes?**
- **What is known about the long-term toxicity of e-cigarettes**
- **Summary: clear and present danger to out young people – how should we respond?**

# Manufacturers



- VUSE is owned by RJ Reynolds Vapor Company, a subsidiary of the Reynolds America
- British American Tobacco, the largest tobacco company in the Europe, launched Vype
- Blu was purchased from Lorillard, then bought by RJ Reynolds, then sold to Imperial Tobacco
- Altria, previously known as Phillip Morris USA, owns MarkTen and 35% share of JUUL
- The vast majority of the e-cigarette market share are brands owned by the tobacco industry

# What are they?

- Different ways of administering nicotine and ensuring addiction (boosts)
- 1000s of different liquids combining 1000s of different chemicals (e.g. websites reported 7,764 flavour labels 2013-4, 15,586 in 2016-7), largely unregulated
- If you don't know what's in them, how can you say they are safe?
- Eating is not the same as inhaling! (Baker's Asthma)



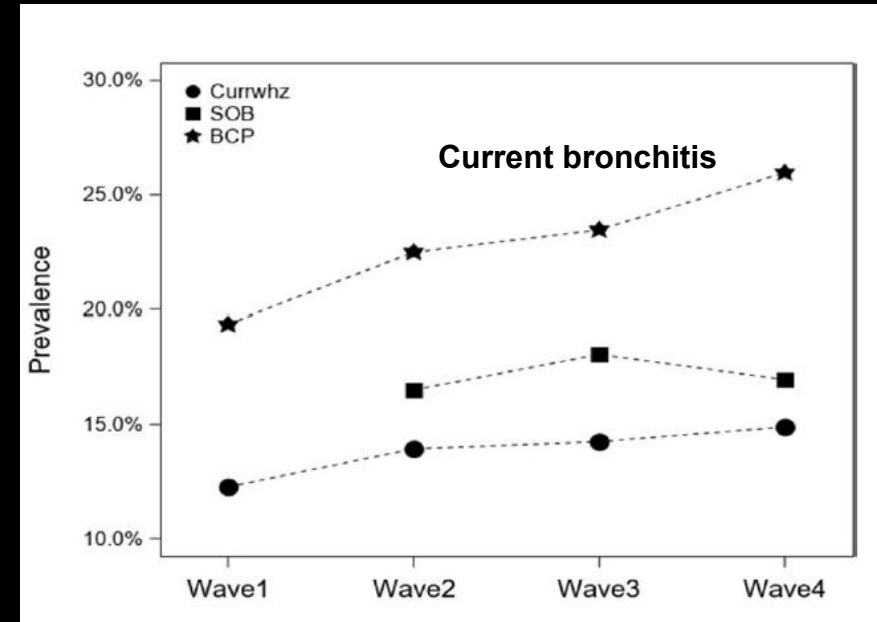
# What is actually inhaled?

- Analyses of the 18 different flavored, nicotine, and no-nicotine e- cigarette cartridges showed detectable levels of known carcinogens and toxic chemicals
- Tobacco-specific impurities potentially harmful to humans (e.g., anabasine) were detected in a majority of the samples tested
- 3 different e-cigarette cartridges with the same label had markedly different amounts of nicotine (26.8 to 43.2 mcg /100 mL puff)
- There was bacterial (27%) and fungal (81%) contamination of single use and refillable products from 75 different manufacturers.
- Analyses have shown that quality control processes can be inconsistent or non-existent

*Food and Drug Administration 2009;1-8; J Liq Chromatogr Relat Technol 2011;34:1442-58; Environ Health Perspect. 2019;127:047008*

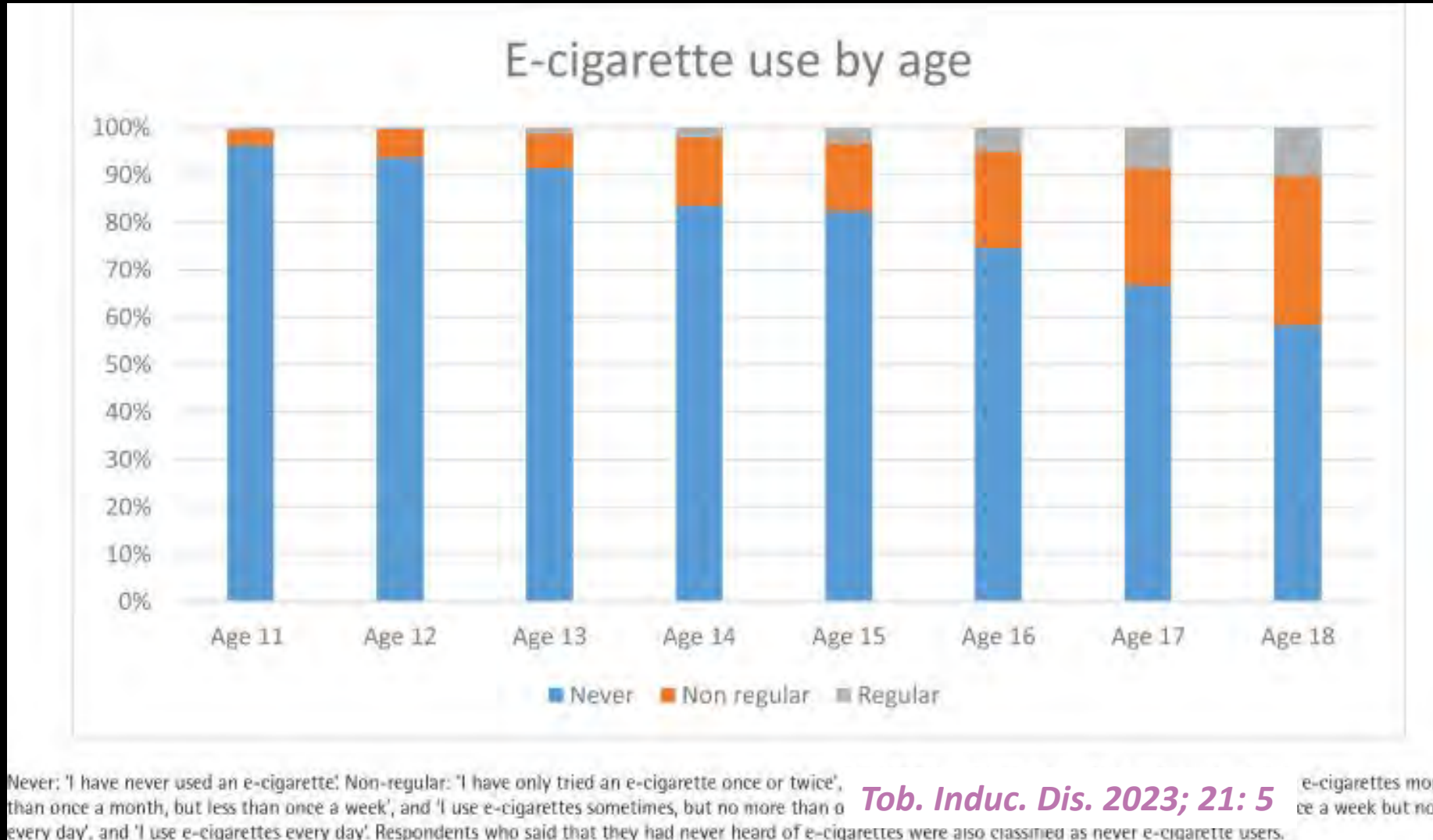
# INNOCENT BYSTANDERS: Passive vaping?

- 2797 participants in CCHS, surveys from 2014 (mean age 17.3 years) to 2019 (mean age 21.9 years)
- Second hand vaping increased from 11.7% to 15.6%
- Association between second hand vaping and bronchitis symptoms (OR 1.4, 95% CI 1.06-1.84) and SOB (1.53, 1.06-2.21) after controlling for multiple variables
- Second hand vaping is a real issue; and what will actual vaping do long term?



*Thorax 2022; 77: 683-68*

# Prevalence, UK 2022





# Unfriendly Fire

- What are e-cigarettes and who makes them?
- What is known about the acute toxicity of e-cigarettes?
- What is known about the long-term toxicity of e-cigarettes
- Summary: clear and present danger to out young people – how should we respond?

# Burn & Blast Injuries



*N Engl J Med 2016;  
375:1400-2 & 2019;  
380: 2460*

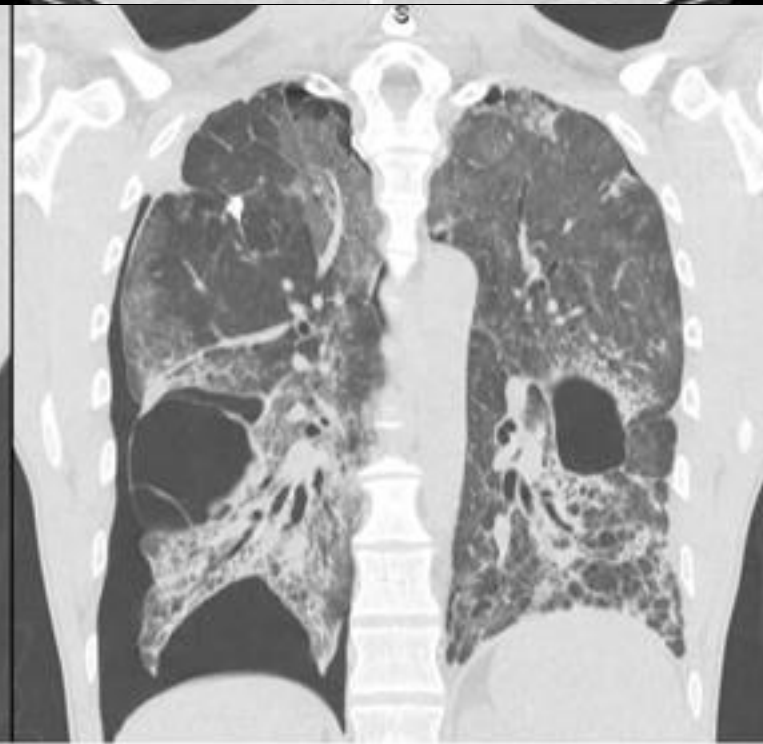
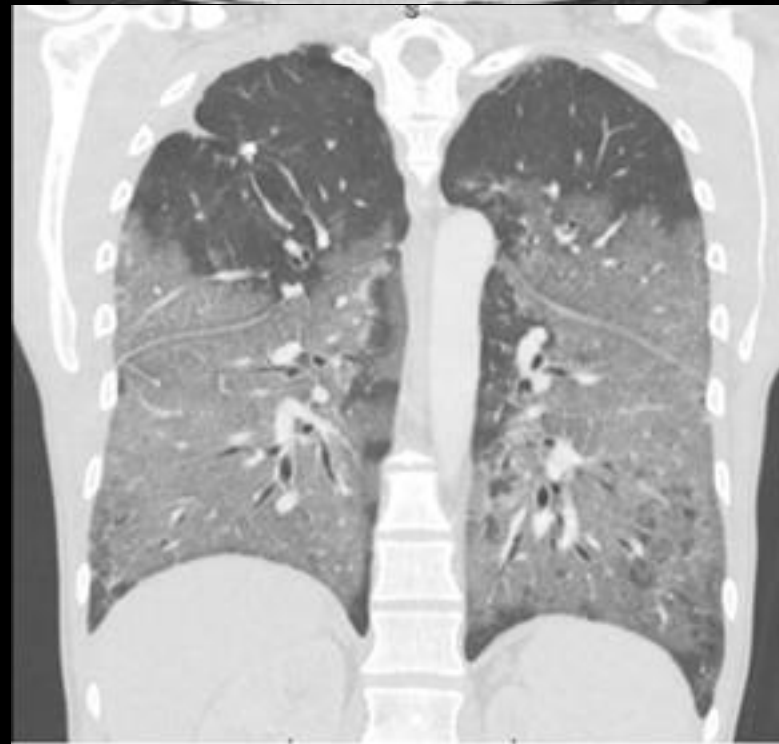
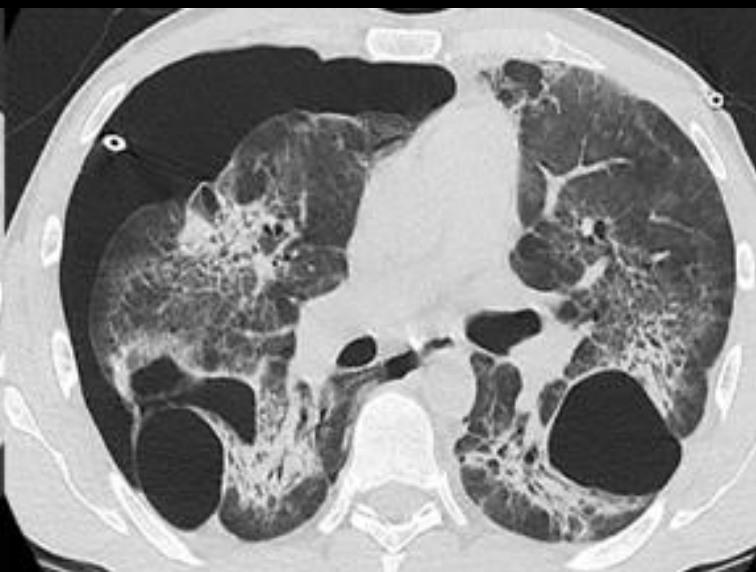
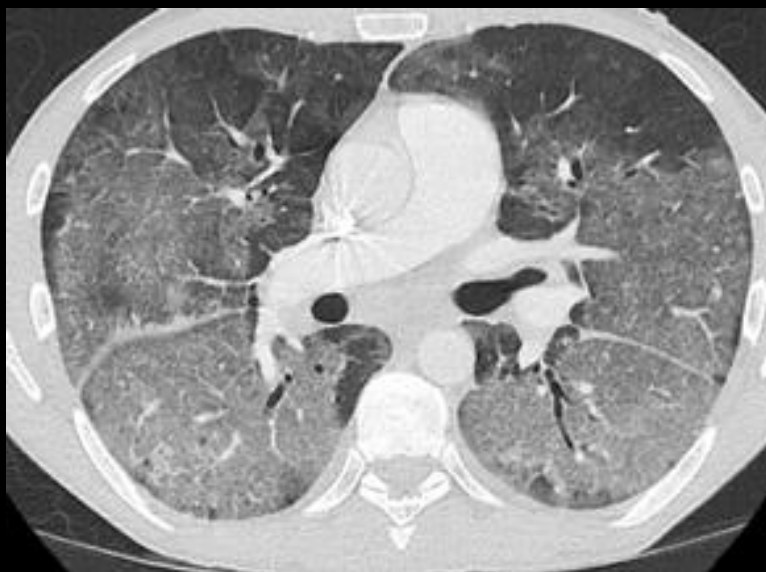
# EVALI

- Multiple lung diseases
- Cannabinoids not always in play
- The liquids and the devices are dangerous
- Funny resp illness – ask, could it be e-cigs?

*Landman, CMAJ epub*

**Table 1: Patterns of disease shown in case reports of vaping-associated pulmonary illnesses: an overview of the medical literature up to Oct. 30, 2019\***

Type of lung injury or predominant disease pattern	No. of cases	Age and sex	Associated imaging findings	Level of care required
Organizing pneumonia <sup>10-13,26</sup>	12	64M, 40F, 54M, 22M, 20M, 21M, 28M, 19M, 28M, 38M, 35M, 39M	1 patchy infiltrates, 11 diffuse GGO, 1 tree in bud, 1 pneumothorax with bilateral central opacities, bilateral reticulonodular opacities with subpleural sparing	7 hospital ward, 2 ICU, 3 unknown
Acute fibrinous pneumonitis with organization <sup>26</sup>	11†	44M, 42M, 51M, 25M, 21M, 34F, 28M, 54F, 67M, 19M, 40M	5 diffuse GGO, 2 bilateral centrilobular GGO, 1 perihilar GGO, 1 tree in bud, 1 diffuse bronchocentric micronodular GGO, 1 diffuse bilateral opacities	11 unknown
Lipoid pneumonia <sup>17-21</sup>	10	42F, “young” F, 35F, 31F, 20†, 23†, 23†, 25†, 29†, 47†	8 diffuse GGO, 3 “crazy paving,” 1 consolidation, 1 basilar GGO	6 hospital ward, 4 ICU
Acute alveolitis or diffuse alveolar damage <sup>9,13,26-28</sup>	8§	46M, 33M, 35M, 61M, 47F, 21M, 34F, 28M	6 bilateral diffuse GGO, 1 traction bronchiectasis	1 hospital ward, 6 ICU, 1 unknown
Pneumomediastinum or pneumothorax <sup>29-33</sup>	6	17M, 16M, 21M, 15M, 16M, 18M	2 pneumomediastinum, 1 tension pneumothorax, 3 nontension pneumothorax	6 hospital ward
Hypersensitivity pneumonitis <sup>5-8</sup>	4	73F, 16F, 23M, 18F	2 diffuse GGO, 2 septal thickening, 1 traction bronchiectasis, 1 honeycombing, 1 diffuse nodules	2 hospital ward, 1 ICU with ECMO, 1 ICU without ECMO
Granulomatous disease <sup>34,35</sup>	2	43F, 34F	2 bilateral nodules	2 hospital ward
Eosinophilic pneumonia <sup>15,16</sup>	2	18F, 20M	2 diffuse GGO, 1 airspace disease, 1 coalescing nodules	1 ICU, 1 hospital ward
Status asthmaticus <sup>36</sup>	2	16M, 14F	2 pneumomediastinum	2 ICU with ECMO
Bronchitis <sup>37,38</sup>	2	43M, 56F	1 no acute abnormality, 1 diffuse GGO, 1 “crazy paving”	1 outpatient, 1 hospital ward
Inhalational injury <sup>39,40</sup>	2	35F, 60M	1 nodular infiltrates, 1 mediastinal adenopathy, 1 bilateral GGO	1 ICU with ECMO, 1 hospital ward
Respiratory bronchiolitis-associated interstitial lung disease <sup>41</sup>	1	33M	Tree in bud	Hospital ward
Diffuse alveolar hemorrhage <sup>9</sup>	1	33M	Diffuse GGO	ICU
Hypereosinophilia with eosinophilic asthma <sup>42</sup>	1	18F	NA	Outpatient
Transient nodules in lung and liver <sup>43</sup>	1	45F	Multiple pulmonary and hepatic nodules	Hospital ward
Pleural effusion <sup>44</sup>	1	63M	Left-sided pleural effusion	Hospital ward
Severe persistent airflow obstruction in a long-standing smoker¶ <sup>45</sup>	1	45M	Patchy GGO, mosaic attenuation	Outpatient
Upper airway damage <sup>46</sup>	1	30M	Moderate uvulitis and edema of the paratracheal musculature	ICU







- Previously healthy 18 year old, 3 month HO vaping, required veno-venous ECMO, pulsed methyl prednisolone and reslizumab to save his life, *Arch Dis Child. 2020; 105:1114-1116*
- Two known asthmatics needing ECMO after vaping, *Journal of Asthma 2020; 57: 1168-1172*

# Unfriendly Fire

- What are e-cigarettes and who makes them?
- What is known about the acute toxicity of e-cigarettes?
- **What is known about the long-term toxicity of e-cigarettes?**
- Summary: clear and present danger to our young people – how should we respond?

# Long-term

- It took many decades before Sir Richard Doll showed that smoking caused lung cancer, and many years before everyone was convinced
- The Industry (now manufacturing vapes) did its best to hide the truth by suppressing data and sewing confusion
- We are still making new discoveries about adverse tobacco effects
- We cannot be reassuring about long term toxicity, especially when acute toxicity is **GREATER** than tobacco!!



# Unfriendly Fire

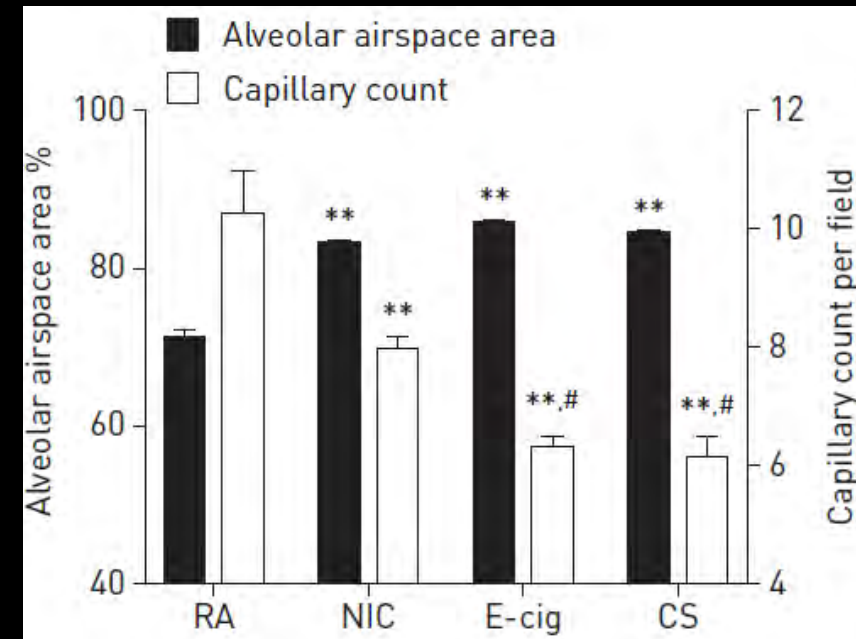
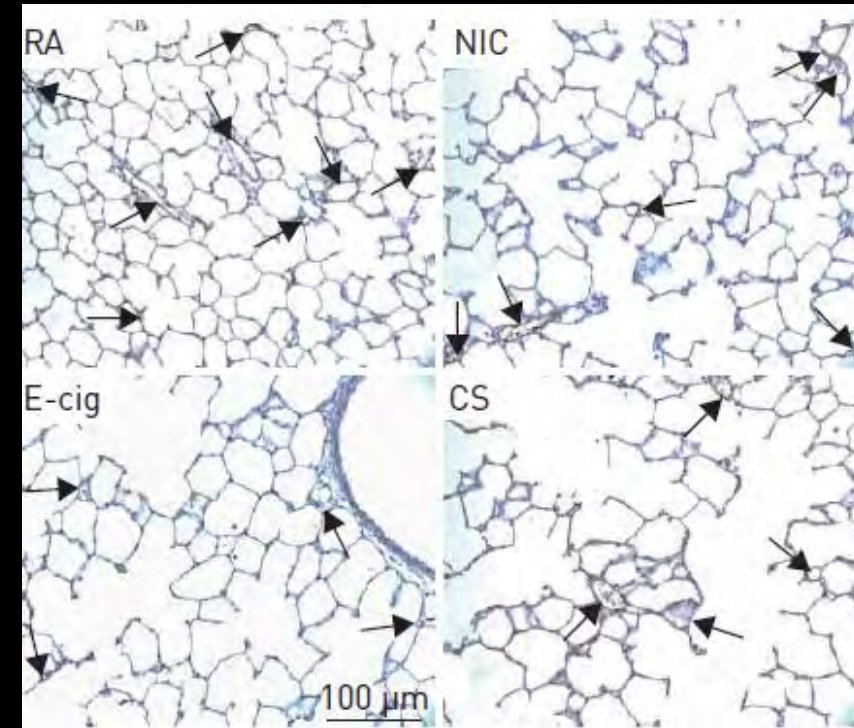
- What are e-cigarettes and who makes them?
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- What have we learned from basic science?



# Murine Emphysema

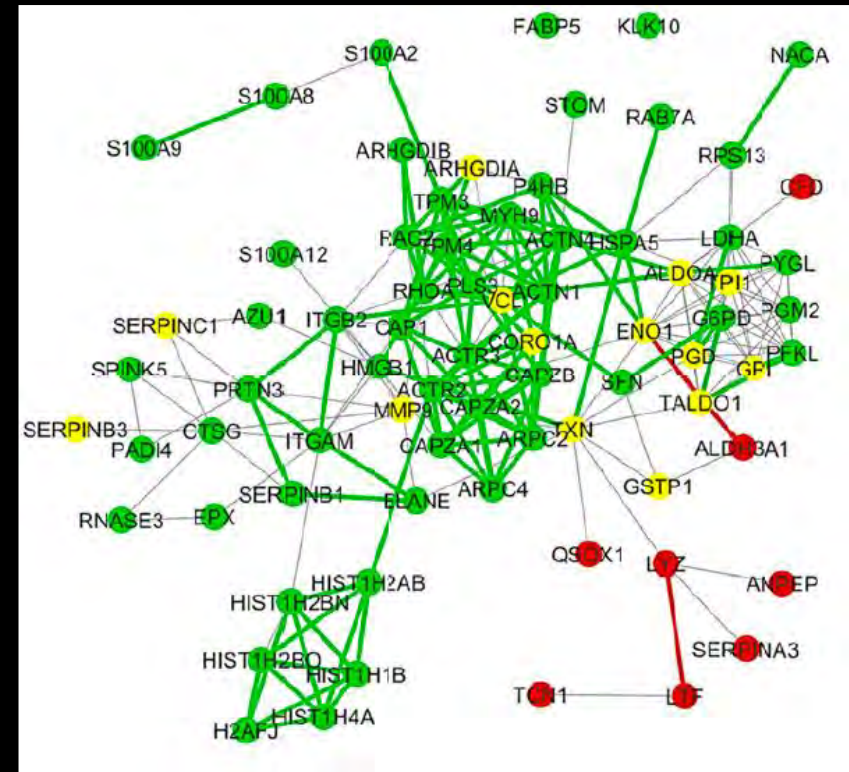
- 6 week Sprague-Dawley rats
- 4 groups: room air (RA), s/cut nicotine (NIC), E-cig vapour (E-cig), cigarette smoke (CS)
- Quantitative lung histology
- All three interventions were equally damaging to the lung
- NB – no ‘standard’ E-cig model!

*Eur Respir J. 2018; 51: 1701661*



# E-cigs: not dilute tobacco

- **Induced sputum in smokers, vapers and normal, quantitative proteomics**
- **Findings: increased oxidative stress with e-cigs; increased elastase and MMP; increased neutrophil and NET-associated proteins; change in mucus composition**
- **Peripheral neutrophils showed increased NETosis in e-cig users**



**E-cig**  
**Tobacco**  
**Both**

# Unfriendly Fire

- What are e-cigarettes and who makes them?
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- What is known about the long-term toxicity of e-cigarettes?
- What have we learned from basic science?
- What about people with asthma?

# Asthma and e-cigarettes

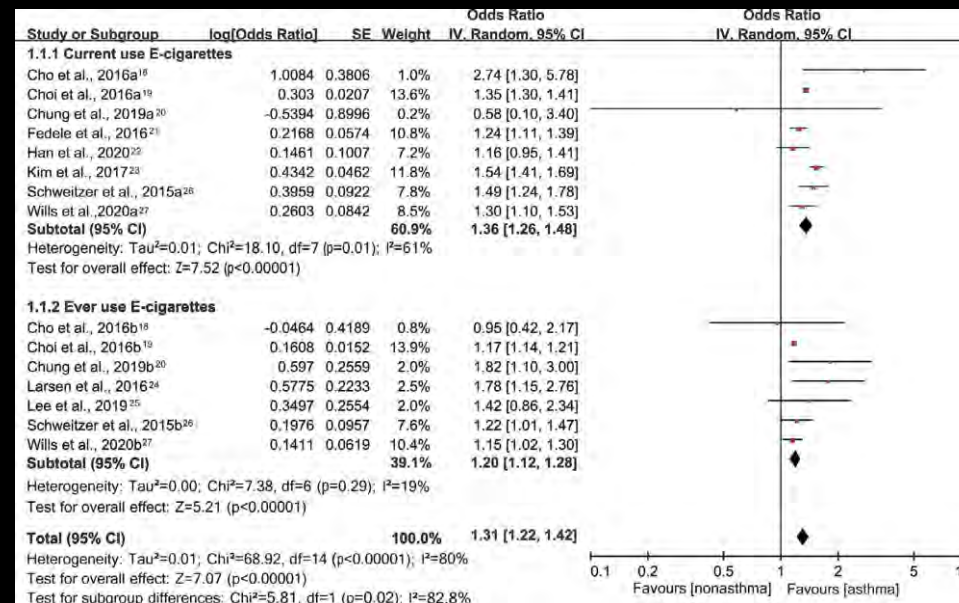
- Asthma and active use of e-cigarettes: associations
- Biological plausibility: e-cigarettes worsen asthma outcomes
- Does passive exposure matter?
- Do e-cigarettes cause asthma?
- Poly-addiction – another worry

# Association with asthma

- N=14,765 age 14-18 years, asthma significantly associated for ever use of e-cigarettes, AOR = 1.15 (CI 1.02–1.30, p = 0.02) and for currently using e-cigarettes, AOR = 1.30 (CI 1.10–1.53, p = 0.002)
- Also related to asthma were current cigarette smoking, AOR = 1.24 (CI 1.03–1.51, p = 0.03) and obesity, AOR = 1.48 (CI 1.30–1.68, p < 0.0001)
- E-cigarettes were at least as bad as tobacco, and had an additive effect for asthma beyond smoking (p = 0.03)
- Effect persisted after controlling for tobacco and marijuana

# Association: asthma and e-cigs

- 10 cross-sectional studies, N=483,948 subjects
- Asthma Dx and e-cig use, self-report
- Ever E-cigarette use 2.2%-45%, median 11.2%
- Current E-cigarette use ranged from 2.7%-25%, median 7.5%



## Conclusions:

1. Worrying prevalence of users with concomitant asthma
2. Association and causation not the same
3. What sort of asthma have we here?

# Asthma and e-cigarettes

- Asthma and active use of e-cigarettes: associations
- **Biological plausibility: e-cigarettes worsen asthma outcomes**
- Does passive exposure matter?
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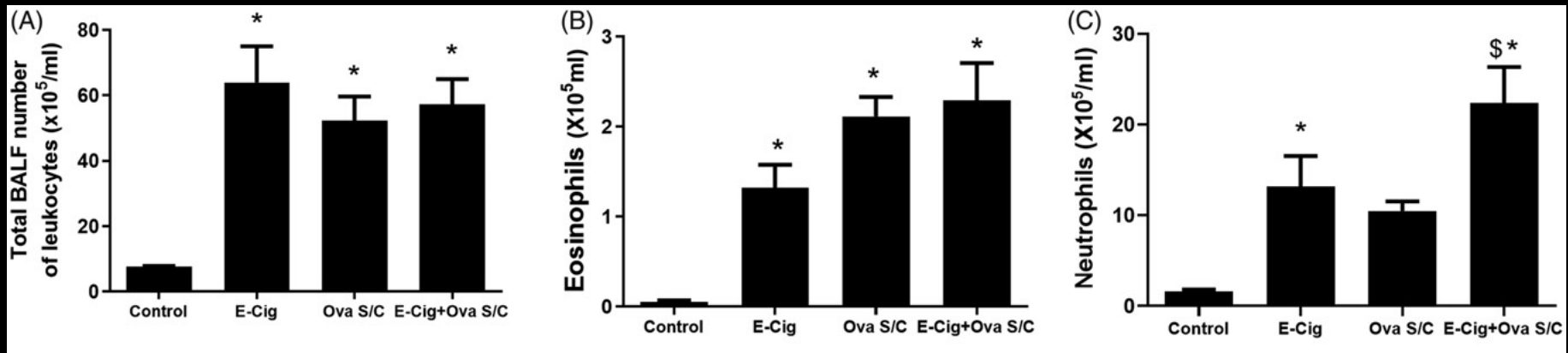
# Asthma attacks

- USA data from 2016–2019. N=218,911 participants, 2.0% experienced an asthma attack, and 0.5% visited the ER due to asthma.
- Current vaping associated with higher odds of having an asthma attack, *Yonsei Med J 2023; 64: 54-65*



# Airway Inflammation

- Vaping resulted in acute changes in pulmonary function and airway inflammation in stable moderately severe adult asthmatic patients, *Respirology* 2020; 25: 1037–1045
- Mouse model, E-Cig aerosol induced airway inflammation in controls and ovalbumin allergen driven airway. The E-cig inflammatory response was slightly higher in allergen-driven compared with healthy animals, *Inhalational toxicity* 2020; 32: 503–511



# Asthma and e-cigarettes

- Asthma and active use of e-cigarettes: associations
- Biological plausibility: e-cigarettes worsen asthma outcomes
- Does passive exposure matter?
- Do e-cigarettes cause asthma?
- Poly-addiction – another worry

# Passive exposure

- Frequent exposure associated with current wheeze (aPR = 1.30, 95% CI 1.04–1.59), current asthma (aPR = 1.56, 95% CI 1.13–2.16), and current uncontrolled asthma symptoms (aPR = 1.88, 95% CI 1.35–2.62), *Respir Res* 2020; 21: 300
- 21% of 11,830 CYP reported having an asthma attack in the past 12 months; secondhand ENDS aerosol exposure reported in 33%, was associated with higher odds of an asthma attack (adjusted OR, 1.27; 95% CI, 1.11-1.47), *CHEST* 2019; 155: 88-93

# Asthma and e-cigarettes

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# Causation of Asthma?

- Prospective longitudinal FU; asthma reported by 574/9141, average annual incidence 1.44% (range 0.35% to 2.02%).
- Exclusive cigarette use (HR: 1.71, 95% CI: 1.11–2.64) and dual cigarette and other combustible use (HR: 2.78, 95% CI: 1.65–4.70) associated with incident asthma, exclusive ENDS use (HR: 1.50, 95% CI: 0.92–2.44) was not *Preventive Medicine 2023; 171: 107512*
- The balance of evidence is against direct causation, but the degree of certainty is low; heavy reliance on self-reported data

# Asthma and e-cigarettes

- Asthma and active use of e-cigarettes: associations
- Biological plausibility: e-cigarettes worsen asthma outcomes
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# Polyaddiction

- 150,634 students age 16.2 (SD 1.1) years, co-use of tobacco, vapes and cannabis investigated
- Odds of lifetime asthma (vs. never had) elevated for triple Use (AOR = 1.14, CI 1.06–1.24), dual E-cigarette/Cannabis Use (1.17, 1.12–1.23), exclusive Cannabis Use (1.17, 1.11–1.23), and exclusive E-cigarette use (1.10, 1.02–1.18)
- Similar results were noted for recent Asthma. 88% of the triple group and 74% of the dual E-cigarette/Cannabis group reported both smoking and vaping cannabis (implications for EVALI)
- Polyaddiction common and worrying



# Unfriendly Fire

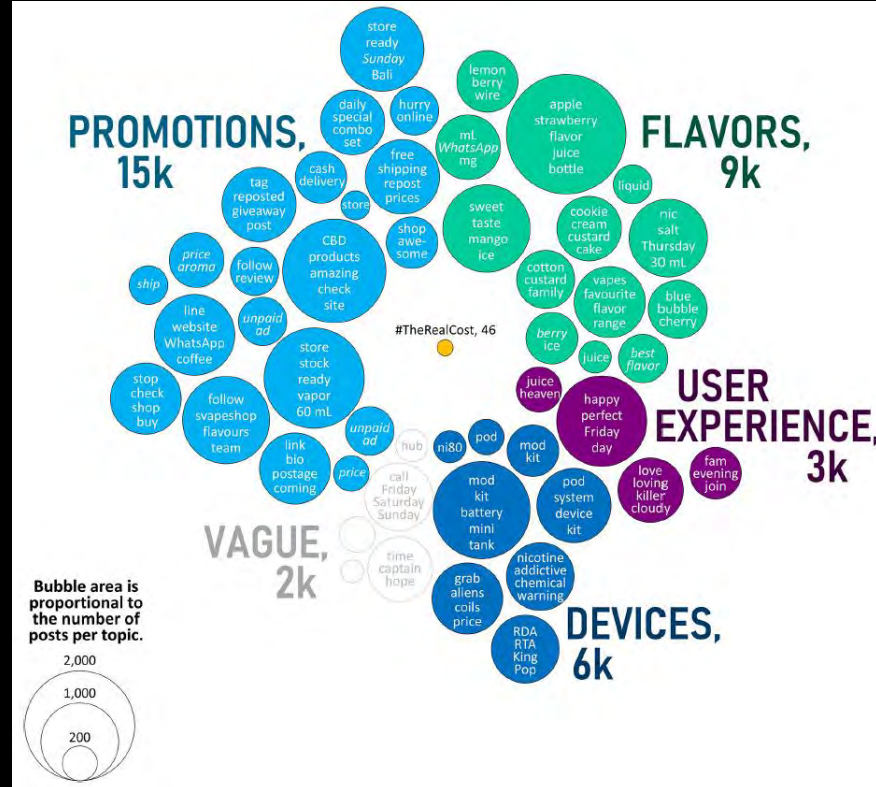
- What are e-cigarettes and who makes them?
- What is known about the acute toxicity of e-cigarettes?
- What is known about the long-term toxicity of e-cigarettes?
- What have we learned from basic science?
- What about people with asthma?
- **Summary and conclusions**

# Key Points

- E-cigarettes are the most commonly used tobacco product by CYP since 2014. 2.55 million USA CYP reported current EC use in 2022
- CYP with asthma have increased use of e-cigarettes and an increased frequency of asthma attacks
- Adult and mouse models reveal increased inflammation and lung damage associated with e-cigarette use when compared to no e-cigarette use or exposure
- Paediatricians are unlikely to provide cessation counselling for CYP who use e-cigarettes
- Screening CYP for e-cigarette use is important, especially if asthmatic

# SOCIAL MEDIA

- **245,894 posts over 4 years**
- **Vaping hashtags used 10<sup>5</sup> times more than FDA warnings**
- **Post-warning, 3X more likes and 6X more posts with >100 likes about vapes**
- **Pods (nicotine surge) more often**
- **Under-age followers**
- **“Influencers” on Tik-Tok**



*Front Commun* 2019; 4: 75

**Disgraced e-cigarette maker Juul has agreed to pay \$438.5 million to 33 states and Puerto Rico to settle an investigation into whether the vaping giant deceptively marketed its products and intentionally targeted children and teens, who are most vulnerable to nicotine addiction.**

<https://edition.cnn.com/2022/09/06/health/juul-settlement-marketing/index.html>

# MARKETING AS SMOKING CESSATION?

St Helens Rugby League stadium



Display of flavours



Blackburn Rovers FC

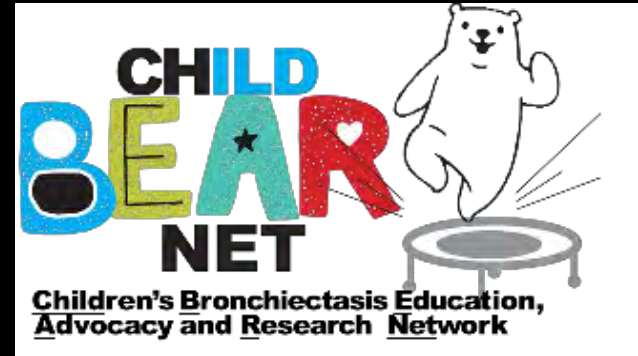


# Take-Home Messages

- **Vaping is promulgated by the tobacco industry, those pillars of rectitude and transparency: and it is totally unregulated**
- **E-cigarettes are dangerous to all children, there are extra risks from active and passive exposure to children with asthma**
- **It took decades for the long-term harm of tobacco to be detected; when will we know about vaping? And if acute toxicity worse, how can we be complacent about the long term?**
- **We desperately need legislation to protect children; the Australian model?**



# Many thanks to colleagues, funders, supporting centres, and especially the children & their families





**Thanks to  
you for  
listening!**





#AskAboutAsthma 2023



**Widening our view**

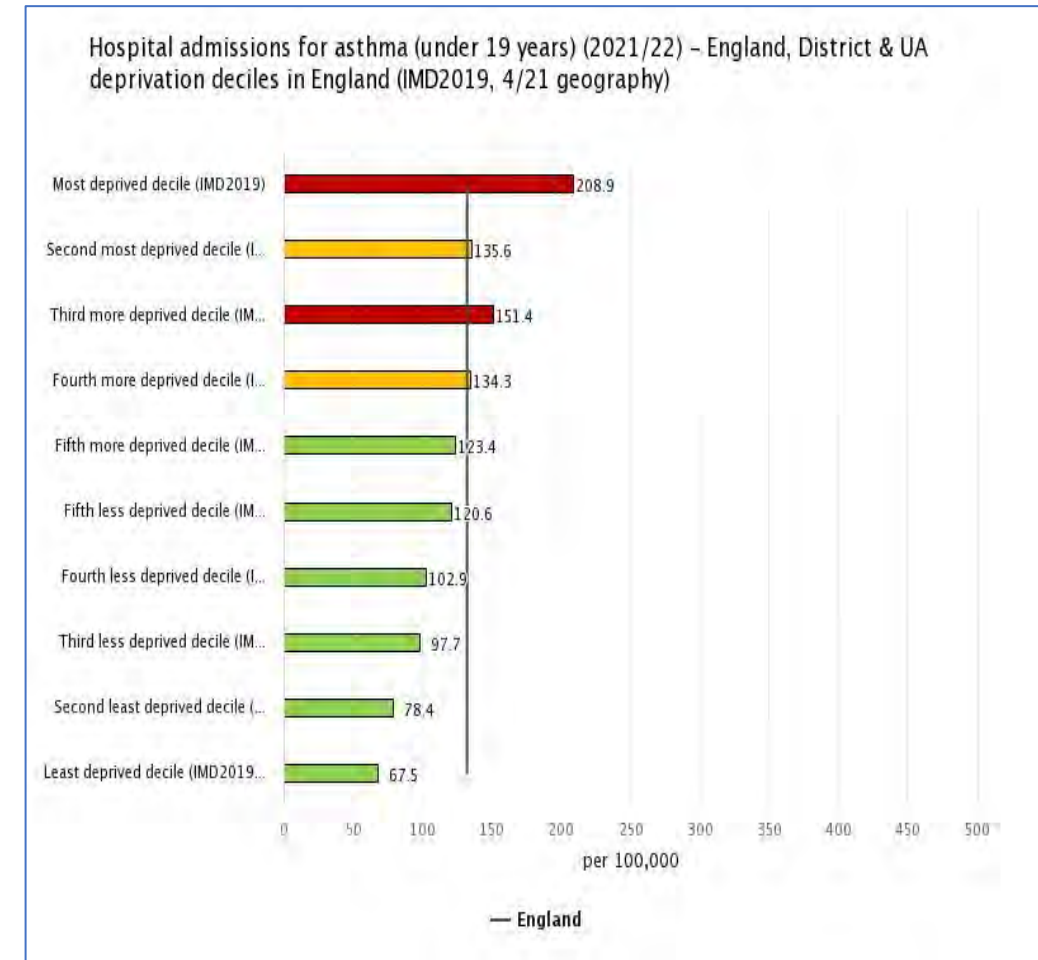
# Damp and mould in the home and the risks to health

Julie Billett

Deputy Regional Director, Office for Health Improvement and Disparities  
- London Region

# Widening our view to tackle health inequalities in asthma

- Asthma is **more prevalent within more deprived communities**<sup>1</sup> and those living in more deprived areas of England are **more likely to go to hospital** for their asthma
- The rate of hospital admissions for asthma in CYP in England is 3 times higher in the most deprived areas than the least deprived (see figure)
- Hospital admissions for asthma are higher for **Asian, Black and other ethnic groups** than White and Mixed ethnic groups<sup>2</sup>
- People from disadvantaged socio-economic groups are **more likely to be exposed to the causes and triggers** of asthma, such as smoking, air pollution and poor housing conditions.
- Londoners of **Asian ethnicity** are more likely to live in homes that fail to meet the Decent Homes Standard, and **Black Londoners** are more likely than people of other ethnicities to have damp problems in their homes<sup>3</sup>
- ‘**Widening our view**’ to improve asthma outcomes and tackle health inequalities must mean taking preventive action on these unequally distributed environmental causes and triggers



# Damp homes and health



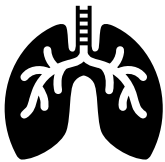
Housing conditions can have a significant impact on health and well-being,<sup>4</sup> particularly as people spend the majority (~80%) of their time indoors



Damp is the presence of unwanted moisture diffused through the air, condensed on a surface or within the solid substance of a building, typically with detrimental or unpleasant effects. Condensation and damp in homes can lead to the growth of mould on building surfaces.



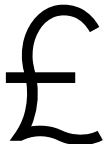
Mould, fungi, and bacterial growth can release spores, cells, fragments, and microbial volatile organic compounds (VOCs) into indoor air and are associated with adverse health effects when inhaled.<sup>5</sup> The more serious the damp and mould problem and the longer it is left untreated, the worse the health impacts and/or risks are likely to be.



Exposure to microbial contaminants, including indoor mould, is clinically linked to respiratory symptoms and infections, allergies, and asthma<sup>6</sup> and epidemiological evidence has shown consistent positive associations between the presence of damp and/or mould in residences with respiratory conditions, such as asthma, respiratory infections, rhinitis, and symptoms, such as cough and wheeze.<sup>7,8,9</sup> Severe and prolonged mould exposure can also be fatal.<sup>10</sup>



Cold or damp conditions can have a significant impact on mental health, with depression and anxiety more common among people living in these conditions.



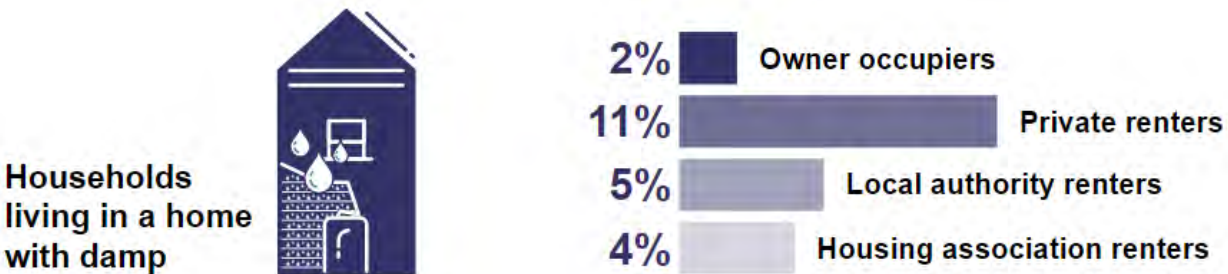
Each year, the NHS spends an estimated £1.4 billion annually on treating illnesses associated with living in cold or damp housing. When wider societal costs are considered, such as healthcare, that figure rises to £15.4 billion<sup>11</sup>

# Size of the problem – English Housing Survey, 2021-22<sup>12</sup>

In England, 935,000 households are living in a home with damp problems (4% of households).



Households in the private rented sector are more likely to live in a home with damp problems than social renting and owner occupied households

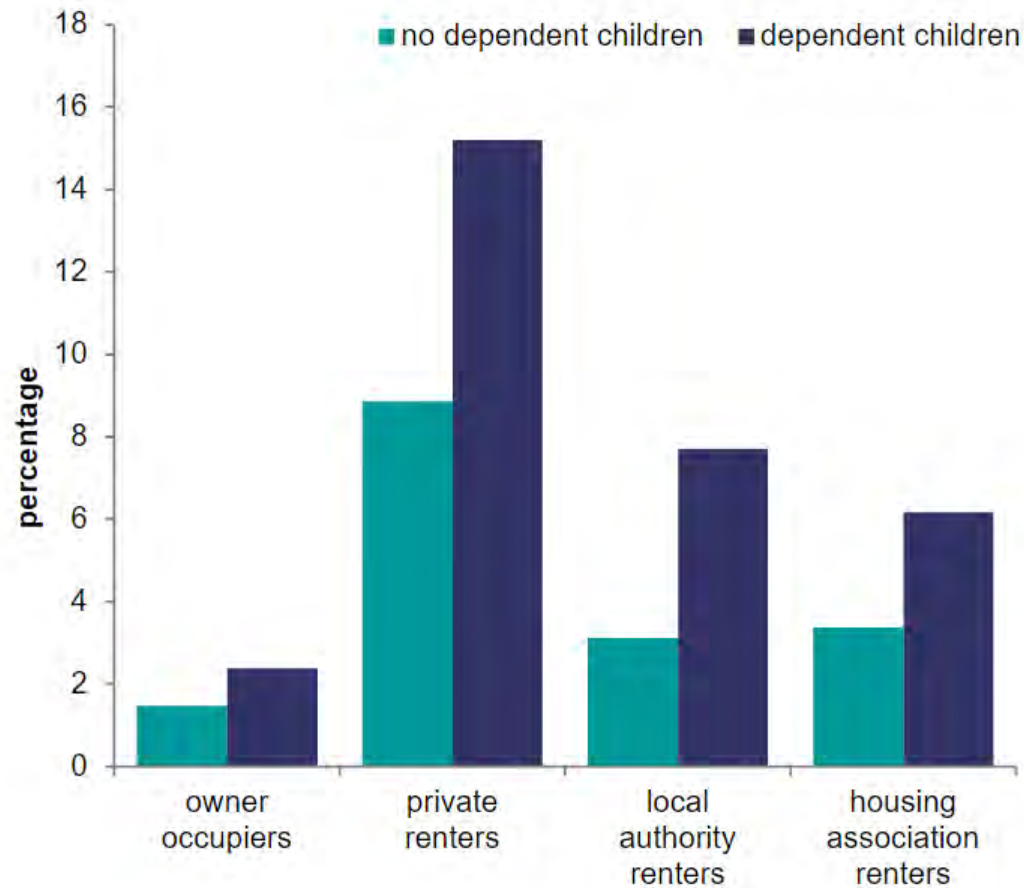


Overcrowded households are more likely to have damp problems than households that are not overcrowded.



# Damp problems disproportionately affect households with children

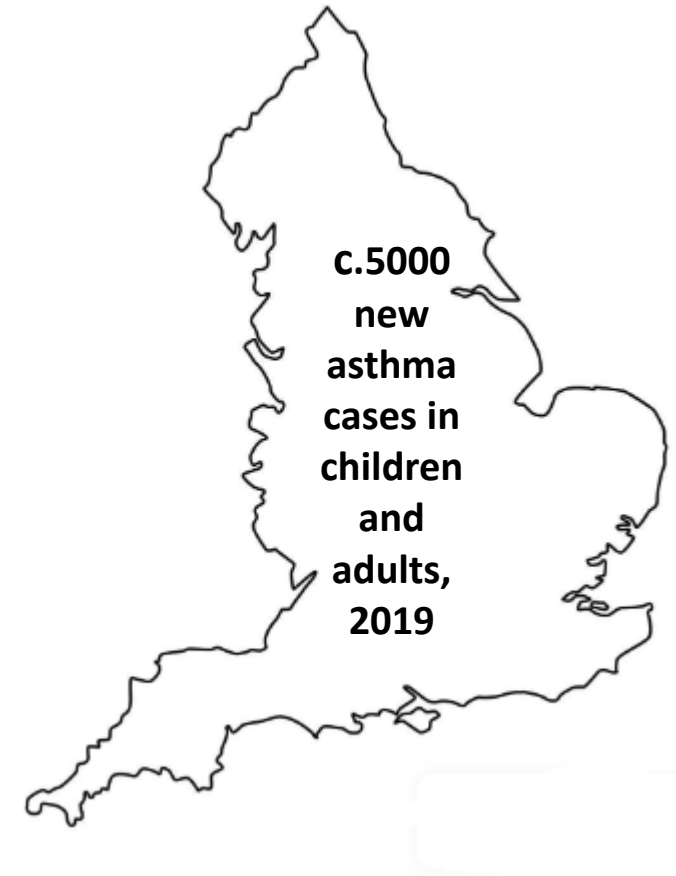
Damp, by dependent children in the household and tenure, 2021-22



Overall, **6% of households with dependent children** lived in a home suffering from a dampness problem compared with **3% of households without dependent children**

# Estimates of the burden of asthma associated with exposure to damp and/or mould

- 2023 study by Clark S et al<sup>13</sup> calculated estimates based on data from the English Household Survey together with epidemiological data/relationships and national health data to estimate Population Attributable Fractions (PAFs), disease incidence, and Disability Adjusted Life Years (DALYs)
- In England in 2019, estimated that exposure to damp and/or mould was associated with approximately
  - 0-14 years olds: 3,400 new cases of asthma (~650 DALYs)
  - 15-49 year olds: 1,600 new cases of asthma (~1500 DALYS)
  - 8500 lower respiratory infections (~600 DALYs) among children & adults
- Burden unequally distributed across dwellings based on income and ethnicity
- Other data sources (beyond the English Household Survey) suggest that the percentage of dwellings affected by damp and/or mould may be even higher, resulting in a possible 3–8-fold greater number of cases and DALYs.

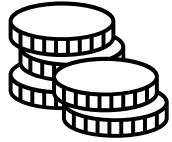


# Who is vulnerable to the adverse health impacts of damp and mould?

- Everyone is vulnerable to the health impacts of damp and mould, but people with certain health conditions, children and older adults are at greater risk of more severe health impacts
- Some people are more sensitive to the effects of mould and damp than others. These include
  - babies and young children
  - pregnant women and women in the post-partum period
  - older people
  - people with respiratory conditions, such as asthma or Chronic Obstructive Pulmonary Disease
  - people with allergies and skin conditions (such as eczema)
  - those with weakened immune systems (for example those undergoing chemotherapy or who are immunocompromised).
  - people who are bedbound, housebound or have mobility problems making it more difficult for them to get out of a home with damp and mould and into fresh air



# Recent drivers of growing concern and focus on the health risks of damp and mould



Rising energy costs and wider cost of living pressures



Rising levels of fuel poverty



Increasing focus on poor quality housing with respect to insulation and ventilation



Tragic death of **2-year old Awaab Ishak** in 2020 due to **prolonged exposure to mould** in his Rochdale home. His family's complaints about their living conditions were **repeatedly ignored**. Coroner's **Prevention of Future Deaths Report** (Nov 2022)<sup>10</sup> identified 5 key concerns and a request for action directed to the **Minister of State for Housing** and the **Secretary of State for Health**

# Government actions and response to the Coroner's Report into Awaab Ishak's death

## Reviewing the Decent Homes Standard

- Completing the review of the Decent Homes Standard, with a particular focus on how damp and mould are assessed.

## Reviewing the housing health and safety rating system (HHSRS)

- Completing the review of the HHSRS, with a focus on making it easier to understand and implement, as well as ensuring that damp and mould is properly captured and the evidence base is up to date.

## New laws on tackling serious hazards

- Amendments to the Social Housing Regulation Bill to introduce **'Awaab's Law'**, which will require landlords to fix reported health hazards within specified timeframes and enshrine tenants' rights into law .
- Providing **new powers for the Housing Ombudsman** and changing the law so that social housing residents can complain directly to the Ombudsman

## New guidance on the health risks of damp and mould

- Producing new guidance for housing professionals on the health risks of damp and mould.

# Guidance: Understanding and addressing the health risks of damp and mould in the home

- Published **7<sup>th</sup> September 2023**, developed by Department of Health and Social Care (DHSC), with the Department for Levelling Up, Housing and Communities (DLUHC) and UKHSA
- New, consolidated guidance** on the health impacts of damp and mould in homes, **tailored to the housing sector**.
- Designed to ensure **social and private sector landlords have a thorough understanding of their legal responsibilities**, and of the serious health risks that damp and mould pose. Landlords must treat cases of damp and mould with the utmost seriousness and act promptly to protect their tenants' health.
- The guidance also makes clear that **tenants should not be blamed for damp and mould**. It is the responsibility of landlords to identify and address the underlying cause - such as structural issues or inadequate ventilation
- See: [Understanding and addressing the health risks of damp and mould in the home - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/understanding-and-addressing-the-health-risks-of-damp-and-mould-in-the-home)



# Developing a damp and mould risk assessment tool to support health and care professionals in London

- A multi-agency task and finish group of London health partners (GLA, ADPH London, NHSE, OHID London, UKHSA) has been collaborating to develop a practical risk assessment tool on damp and mould – this work is endorsed and supported by London Directors of Housing and London Local Government Chief Executives



## Purpose:

- To support home visiting health and care professionals to understand and recognise damp and mould concerns and issues, identify those individuals and households most vulnerable to health risks of damp and mould exposure, and enable them to provide appropriate advice and take action
- To support London LAs with identifying households at increased risk of severe health impacts of damp and mould exposure
- To signpost tenants and residents to up to date information and advice

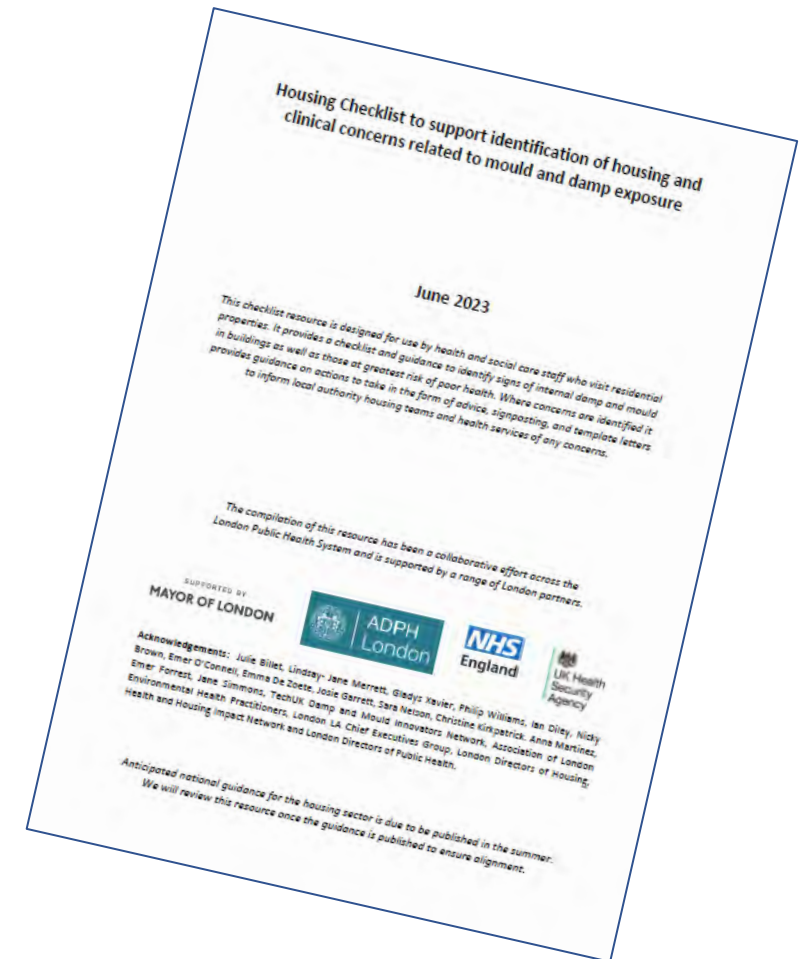


# Overview of London risk assessment tool

- Section 1: Identifying housing concerns
- Section 2: Assessing clinical vulnerability
- Section 3: Taking action – simple flowchart/algorithm to guide action
- Appendices: Template letters, factsheets

Currently undergoing final review to ensure this London tool aligns with new national guidance recently published by DHSC.

Expect to finalise and disseminate the tool widely in the next few weeks.



# Summary

- Majority of policy levers to tackle complex challenge of poor housing conditions (including damp and mould) and related structural issues of poverty, housing affordability and security sit beyond the health and care system
- However, housing is a critical determinant of health and should be seen as a public health issue
- Through integrated care systems, opportunities for NHS, local government, the housing sector and VCS to work together to improve housing and health outcomes
- Action to address and mitigate these environmental causes and triggers of asthma (and other health conditions) are an important part of a population health approach, focused on prevention and health equity
- Health professionals can ensure they are aware of the health risks of exposure to damp and mould and those groups who are at greater risk of adverse health impacts; know what advice to give, where to signpost patients/residents for further advice, information and support; and be aware of local pathways and processes for raising concerns with landlords and LAs and for housing assessment

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12. [English Housing Survey 2021 to 2022: housing quality and condition - GOV.UK \(www.gov.uk\)](#)
13. Clark, S.N.; Lam, H.C.Y.; Goode, E.-J.; Marczylo, E.L.; Exley, K.S.; Dimitroulopoulou, S. The Burden of Respiratory Disease from Formaldehyde, Damp and Mould in English Housing. *Environments* 2023, 10, 136. <https://doi.org/10.3390/environments10080136>

[Other useful links and resources](#)

[visual-summary-pdf-7022755693 \(nice.org.uk\)](#)



# Population health, health inequalities and children's asthma

## Widening our View

#AskAboutAsthma conference

Dr Jacqueline Lindo

Consultant in Public Health Medicine, NHSE London Region

14<sup>th</sup> Sept 2023

# Context





# Health inequalities and asthma

## National Bundle of Care for Children and Young People with Asthma Sept 2021

There are significantly higher rates of asthma incidence in black and minority ethnic (BAME) groups in England and Wales, with high rates reported among second and third generation descendants of South Asian and African Caribbean migrants and Irish children living in England

Poor air quality is an issue which particularly affects Gypsy and Traveller communities due the location of sites next to motorways and in areas with poor air quality

Asthma outcomes are worse for children and young people living in the most deprived areas.

Young people with asthma are more likely to have special educational needs for mental health reasons, perform worse in exams and leave school earlier than those without an asthma diagnosis

A recent global asthma report found that the impact of asthma, measured in disability adjusted life years, was highest in 5–19-year-olds and people over 60

Commonly the burden of disease is highest in older people and not young people as well, but **this is not the case for asthma.**

## Equality



The assumption is that **everyone benefits from the same supports**. This is equal treatment.

## Equity



**Everyone gets the supports they need** (this is the concept of "affirmative action"), thus producing equity.

## Justice



All 3 can see the game without supports or accommodations because **the cause(s) of the inequity was addressed**. The systemic barrier has been removed.



# REDUCING HEALTHCARE INEQUALITIES FOR CHILDREN AND YOUNG PEOPLE

## CORE20

The most deprived **20%** of the national population as identified by the Index of Multiple Deprivation



The **Core20PLUS5** approach is designed to support Integrated Care Systems to drive targeted action in healthcare inequalities improvement

Target population

# CORE20 PLUS 5

## PLUS

ICS-chosen population groups experiencing poorer-than-average health access, experience and/or outcomes, who may not be captured within the Core20 alone and would benefit from a tailored healthcare approach e.g. inclusion health groups



Key clinical areas of health inequalities

1



## ASTHMA

Address over reliance on reliever medications and decrease the number of asthma attacks

2



## DIABETES

Increase access to Real-time Continuous Glucose Monitors and insulin pumps in the most deprived quintiles and from ethnic minority backgrounds & increase proportion of children and young people with Type 2 diabetes receiving annual health checks

3



## EPILEPSY

Increase access to epilepsy specialist nurses and ensure access in the first year of care for those with a learning disability or autism

4



## ORAL HEALTH

Address the backlog for tooth extractions in hospital for under 10s

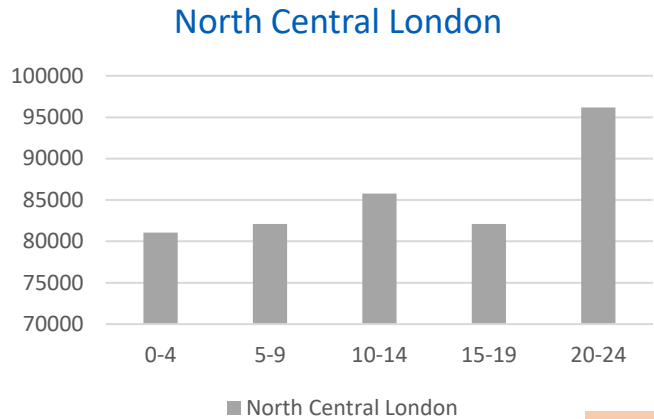
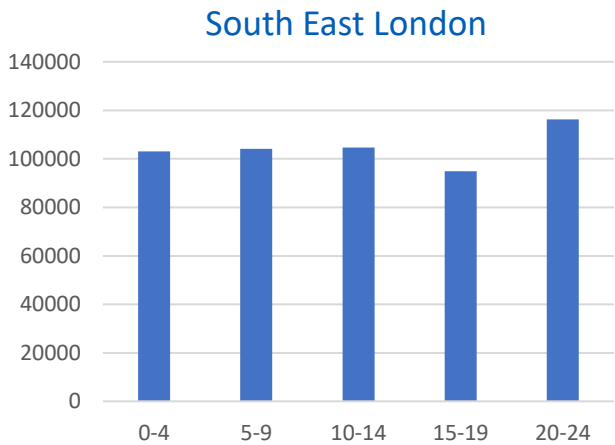
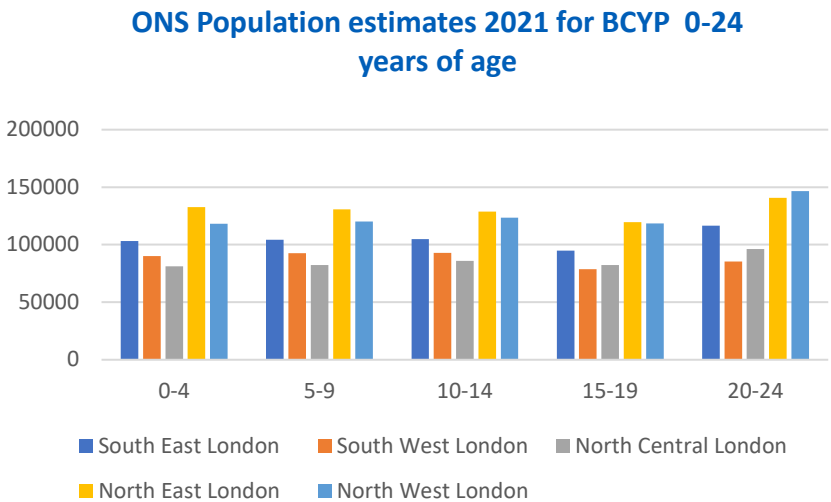
5



## MENTAL HEALTH

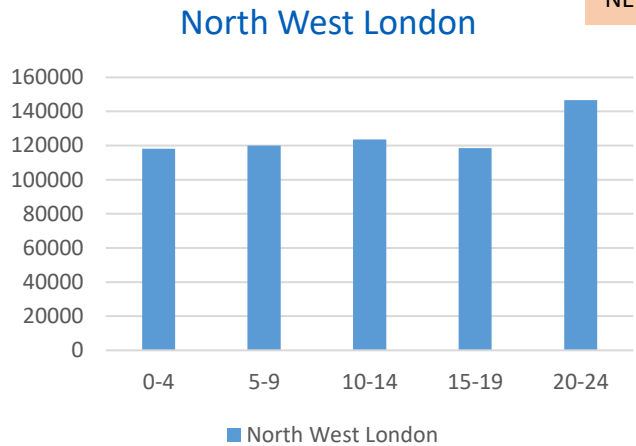
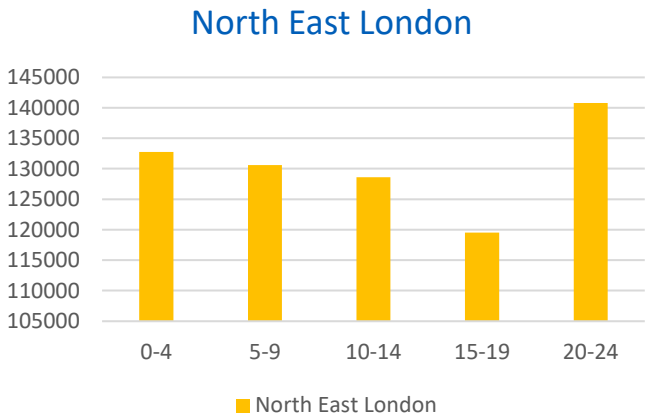
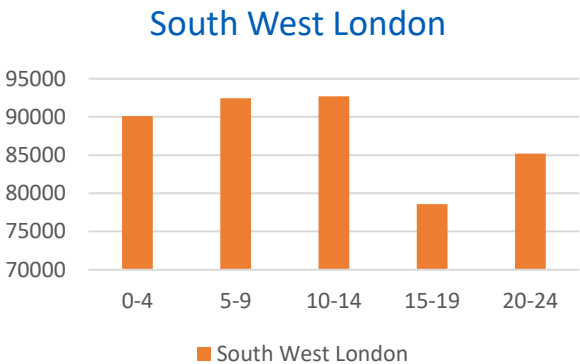
Improve access rates to children and young people's mental health services for 0-17 year olds, for certain ethnic groups, age, gender and deprivation

# Age (profile) for BCYP by ICS

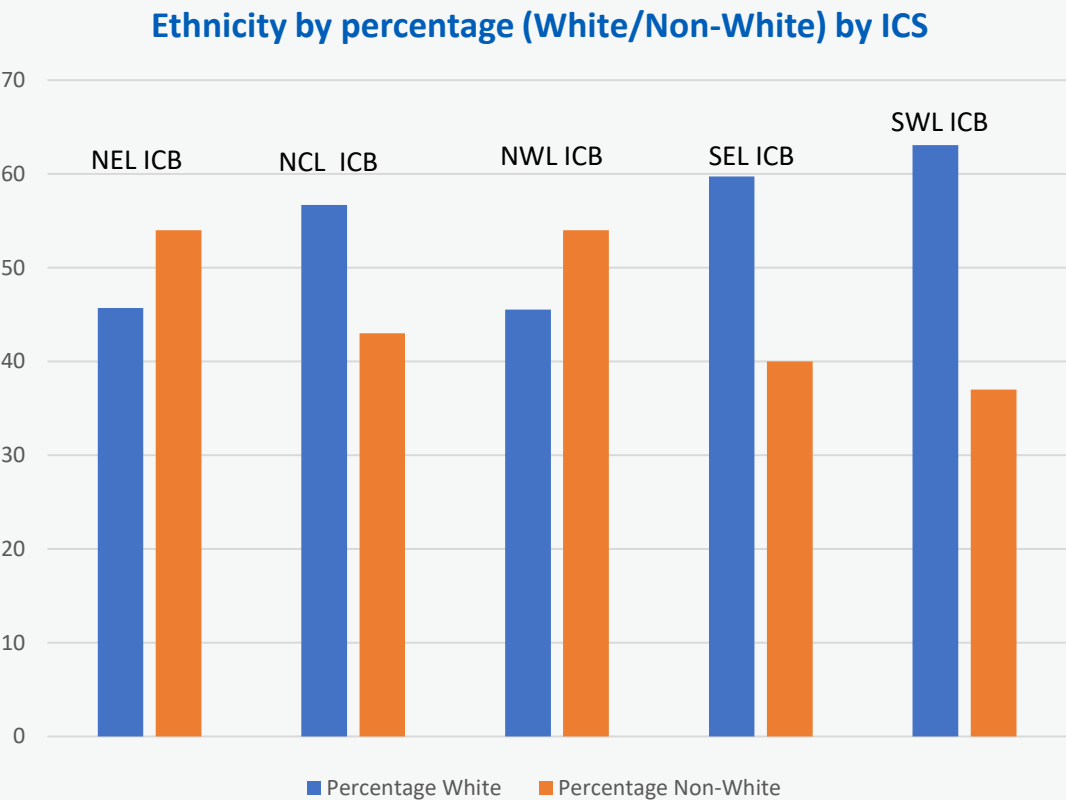


The BCYP population is estimated to be 0.65 M in NEL compared to 0.43M in NCL.

NCL	427262/30%
SWL	43896/9/30%
SEL	523206/30%
NWL	626724/30%
NEL	652212/32%



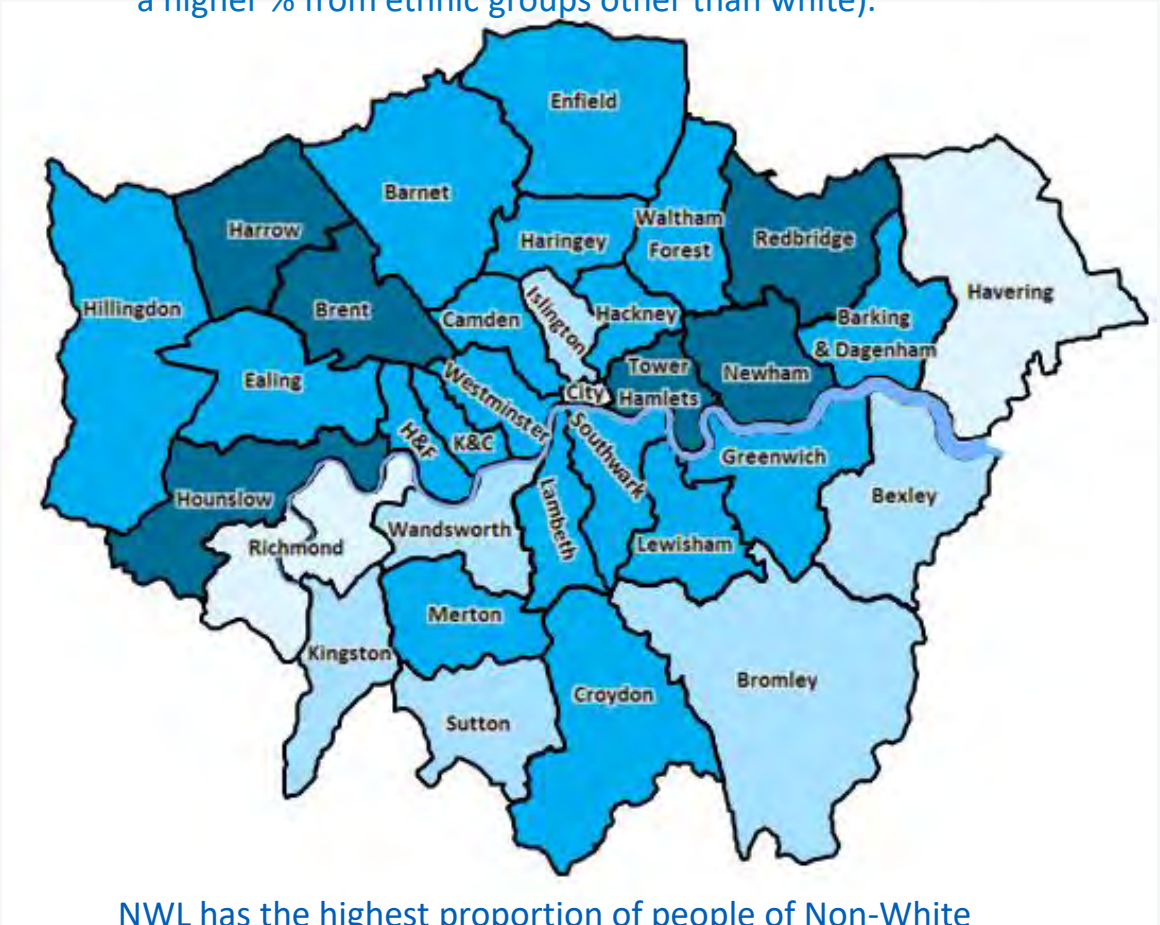
# Ethnicity



Fifty-three percent of the London population is of white ethnicity. The smallest ethnic group at <1% is Gypsy, Roma, Travellers (GRT).

## Population from an ethnic group other than white

The map below demonstrates the distribution of people of different ethnicities across London (the darker colours indicate a higher % from ethnic groups other than white).



NWL has the highest proportion of people of Non-White ethnicity (54%) compared to SWL (37 %)



# Deprivation

[Indices of multiple deprivation-IMD]



What are the Indices of Deprivation (IoD)?

The Indices of Deprivation are a unique measure of relative deprivation at a small local area level (Lower-layer Super Output Areas) across England.

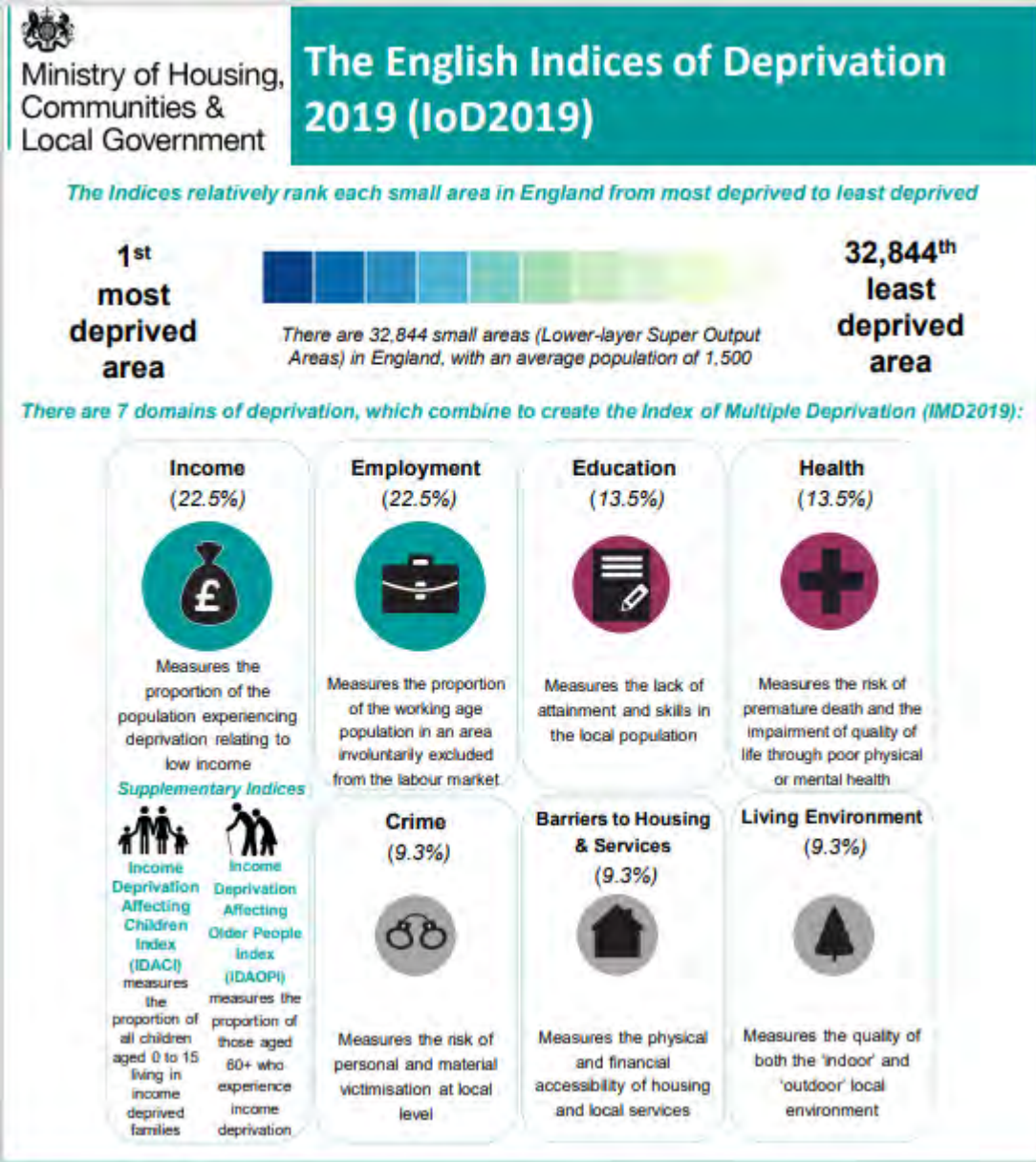
The IMD ranks every LSOA in England from 1 (most deprived area) to 32,844 (least deprived area).

Lower-Layer Super Output Areas (LSOAs) are a standard statistical geography designed to be of a similar population size, with an average of approximately 1,500 residents or 650 households.

Deprivation is measured in a broad way to encompass a wide range of aspects of an individual’s living conditions.

Combining information from the **seven domains** produces an overall relative measure of deprivation, the **Index of Multiple Deprivation (IMD)**.

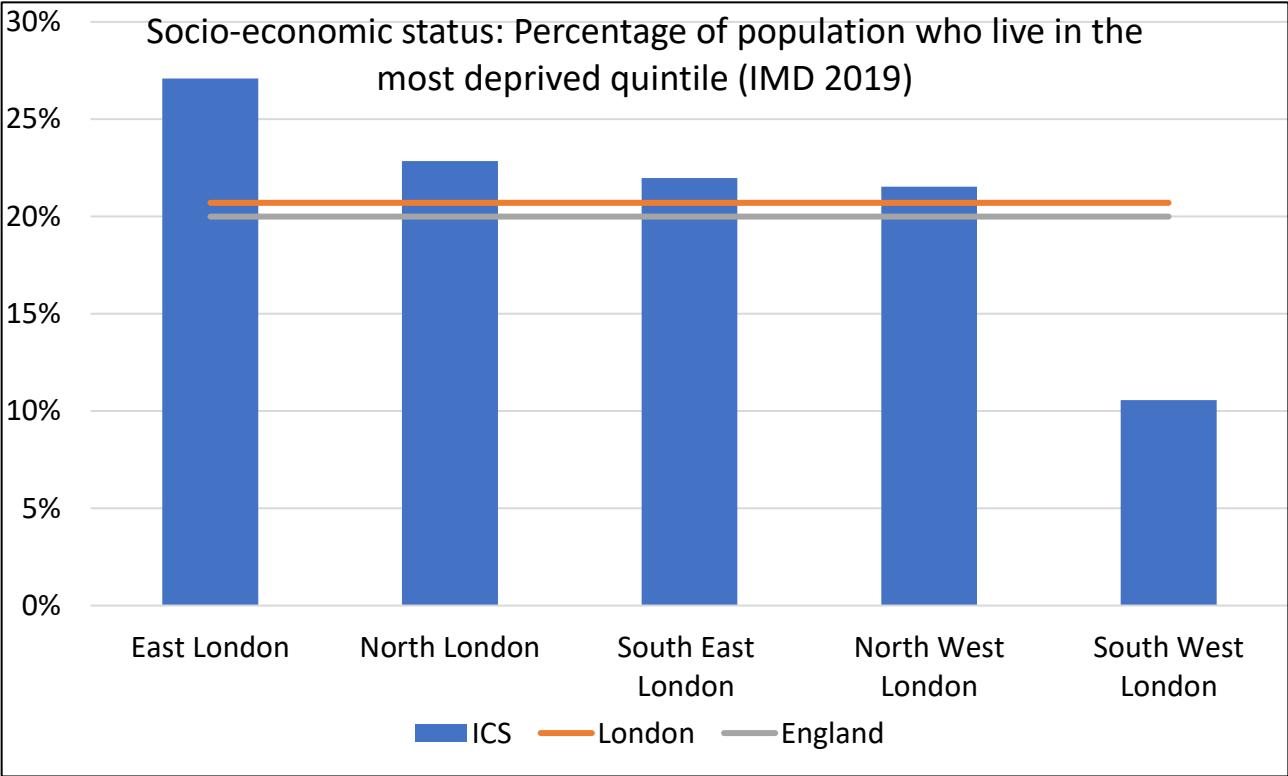
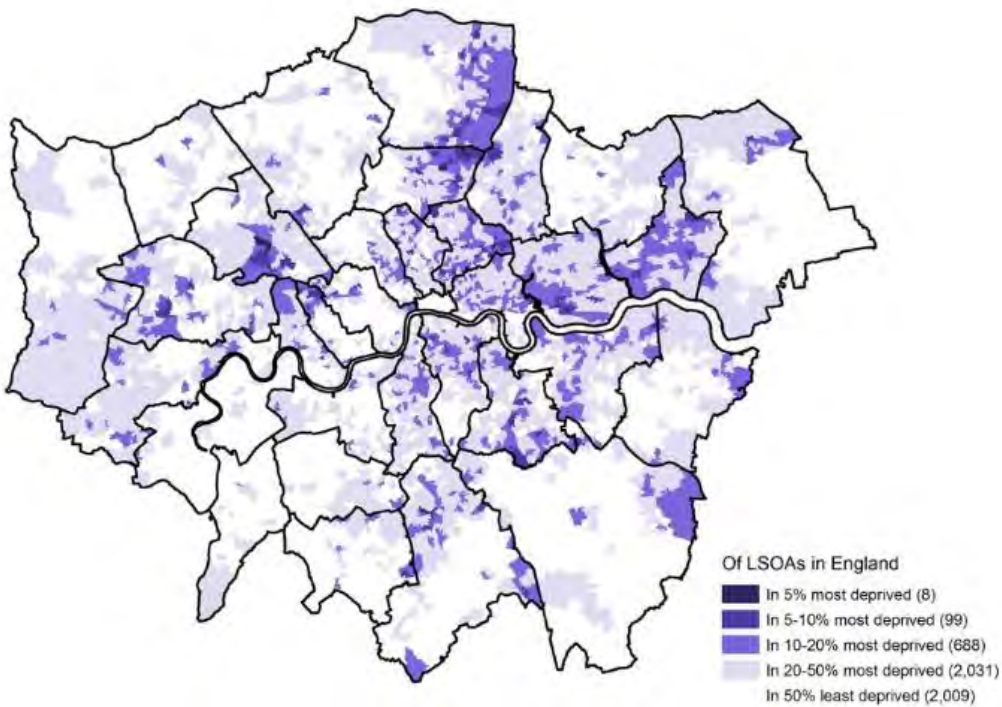
A range of summary measures are available for higher-level geographies such as local authorities, CCGs etc.



Overall, **London has a similar level of deprivation to that of England as a whole**. The number of neighbourhoods (LSOAs) in London among the **most deprived 5% in England is just eight out of a total of 4,835 LSOAs in London**, or 0.2 per cent of London’s LSOAs, and just two per cent more (a further 99 LSOAs) are in England’s most deprived 10%.

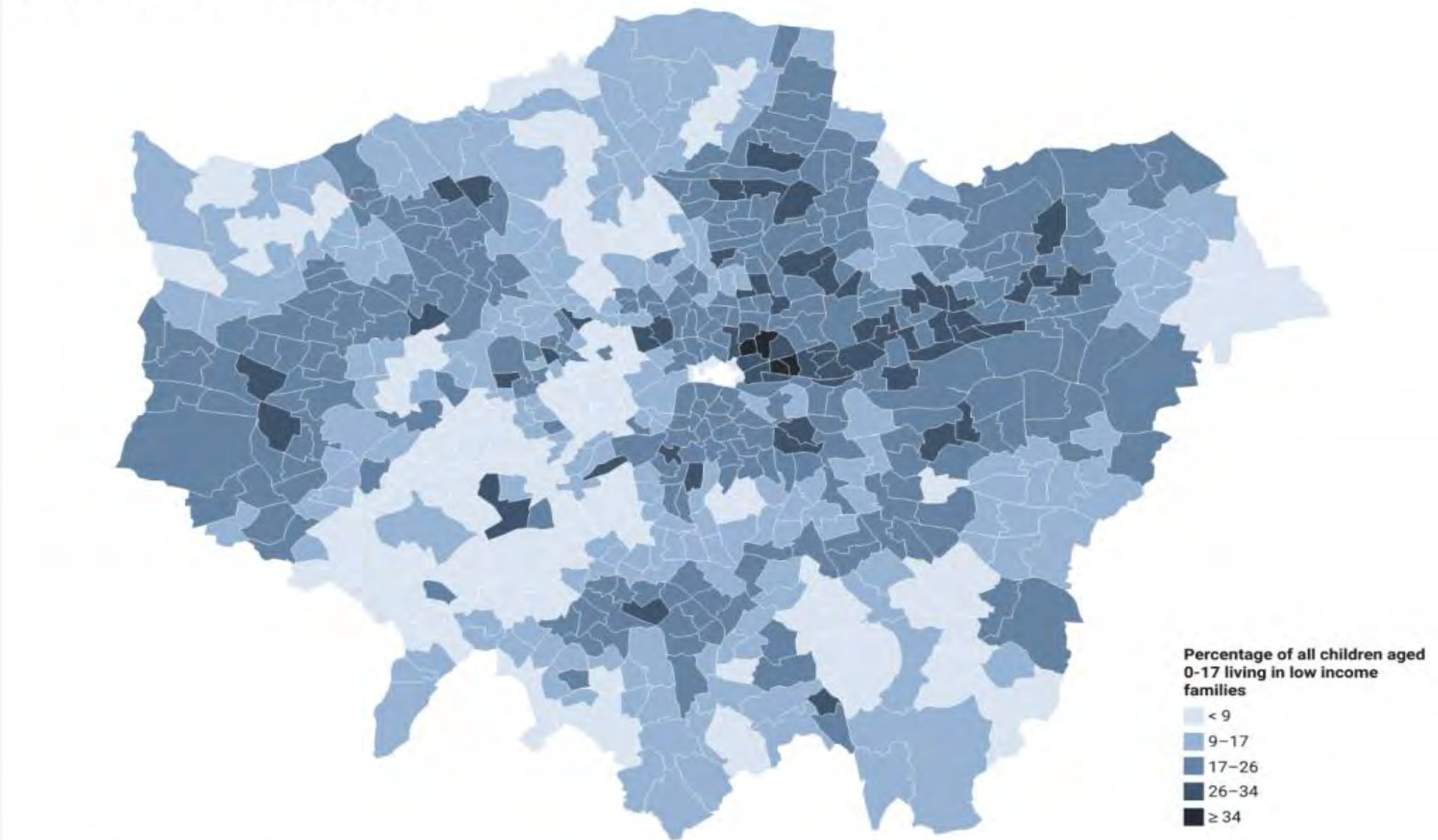
However, in terms of relative deprivation within London, **East London** has a higher proportion of its population that lives in areas categorised as amongst the most deprived in the country. **Southwest London** is less deprived than the rest of London (and England as a whole).

LSOAs in London according to IMD 2019 deciles [ published June 2020)



# Percentage of children under 18 living in low income families, 2020/21, London wards

Rate calculated as a percentage of all aged 0-17



*Note: Rates are calculated as a percentage of GLA ward estimates of 0-17 age group*  
Map: GLA City Intelligence Unit • Source: GLA • Map data: © GLA



# Asthma data

Fingertips data

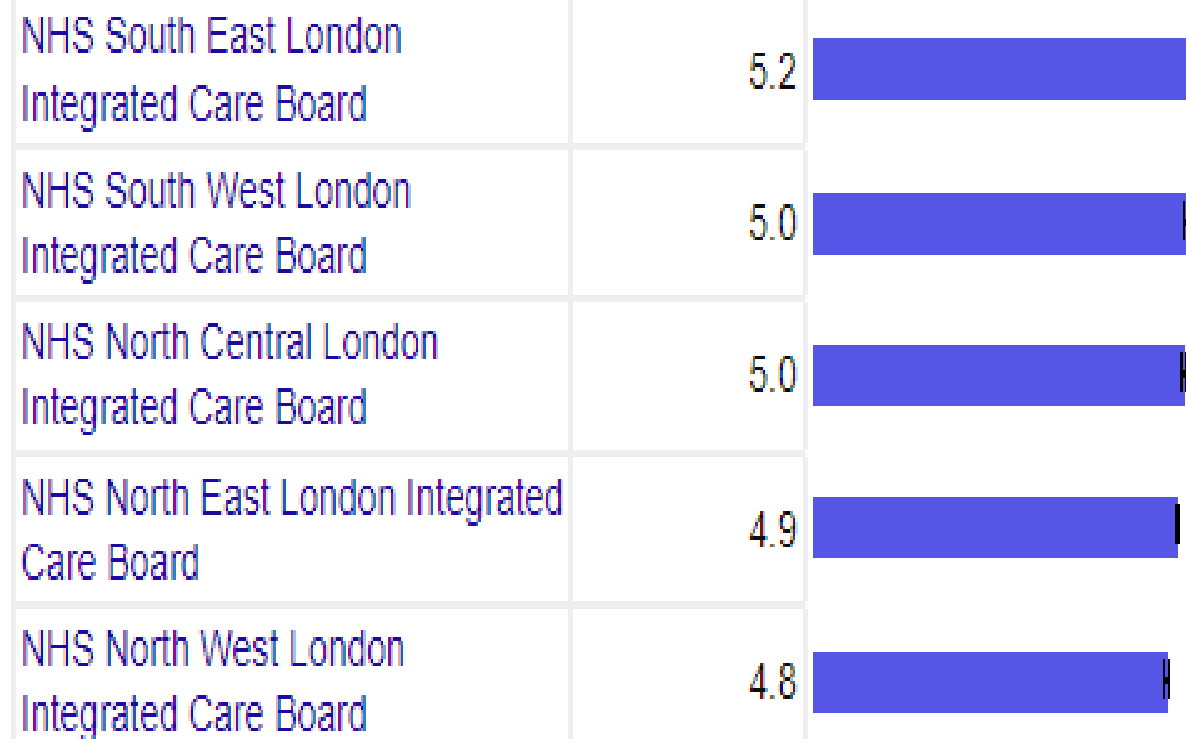


# Prevalence of asthma ( 6+ years)

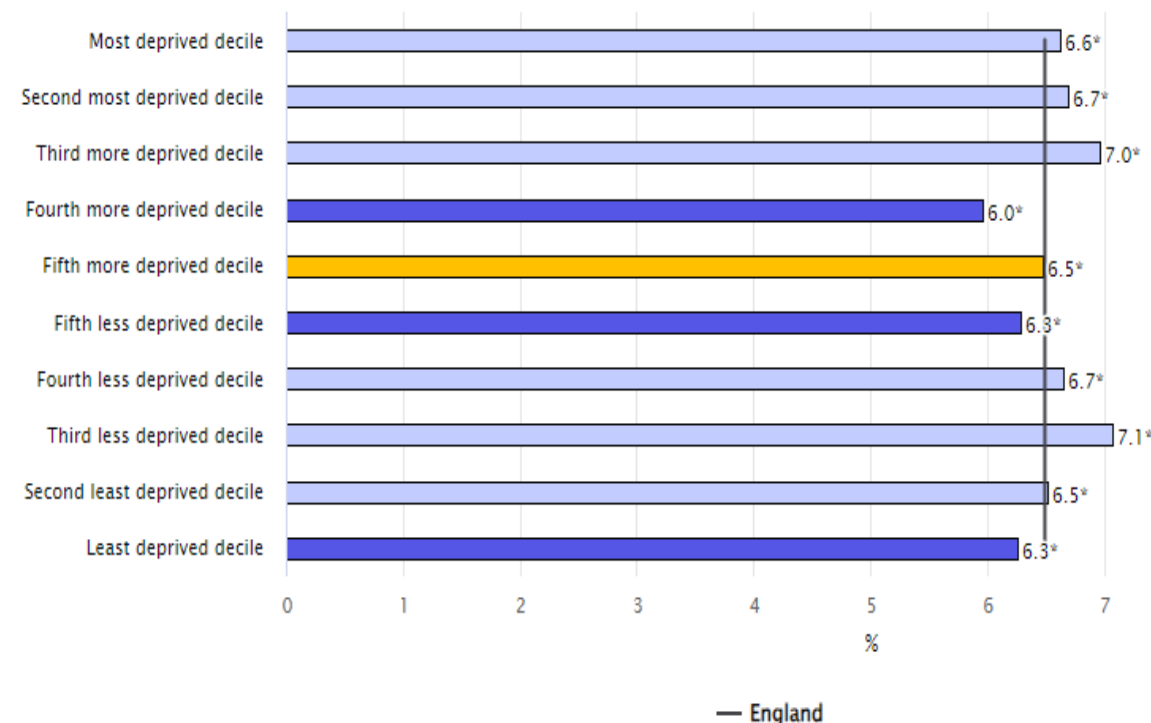
## Asthma QOF prevalence by London ICBs

21/22

England: 6.5 %



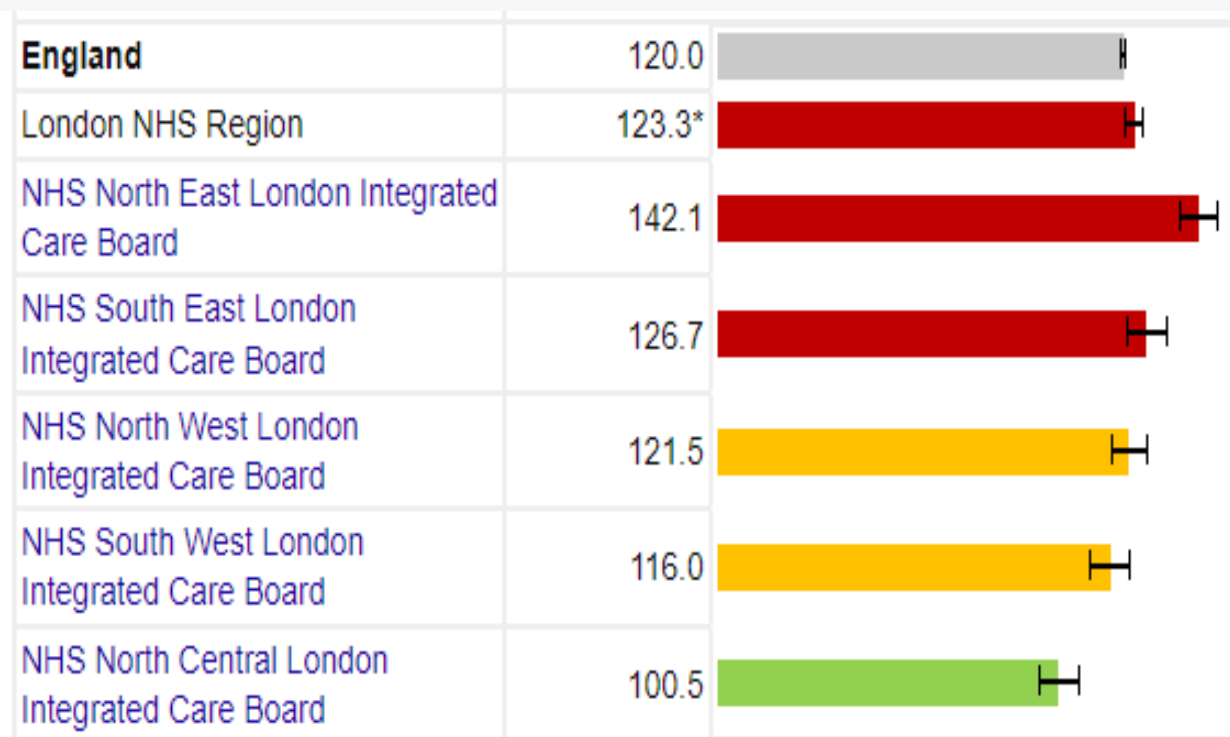
## Asthma QOF prevalence by deprivation decile in England (IMD 2019)



No gradient with deprivation

# Hospital Admissions for Asthma

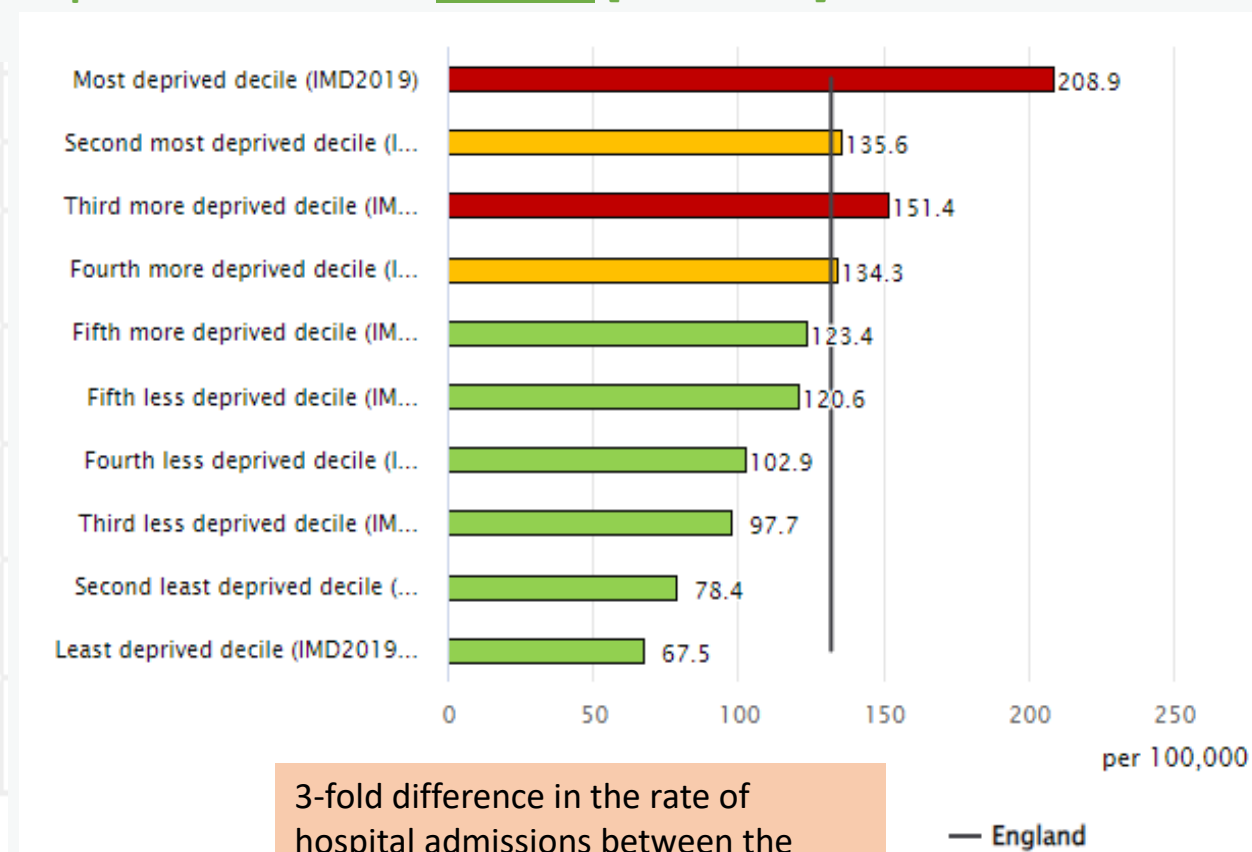
Hospital Admissions for asthma (under 19 years) 2021/22  
Crude Rate –per 100,000 by London ICB



Source: Hospital Episode Statistics (HES).

Higher rates of admission than England although lower overall prevalence.

Hospital admissions for Asthma (under 19 years) by deprivation decile in England [IMD 2019]

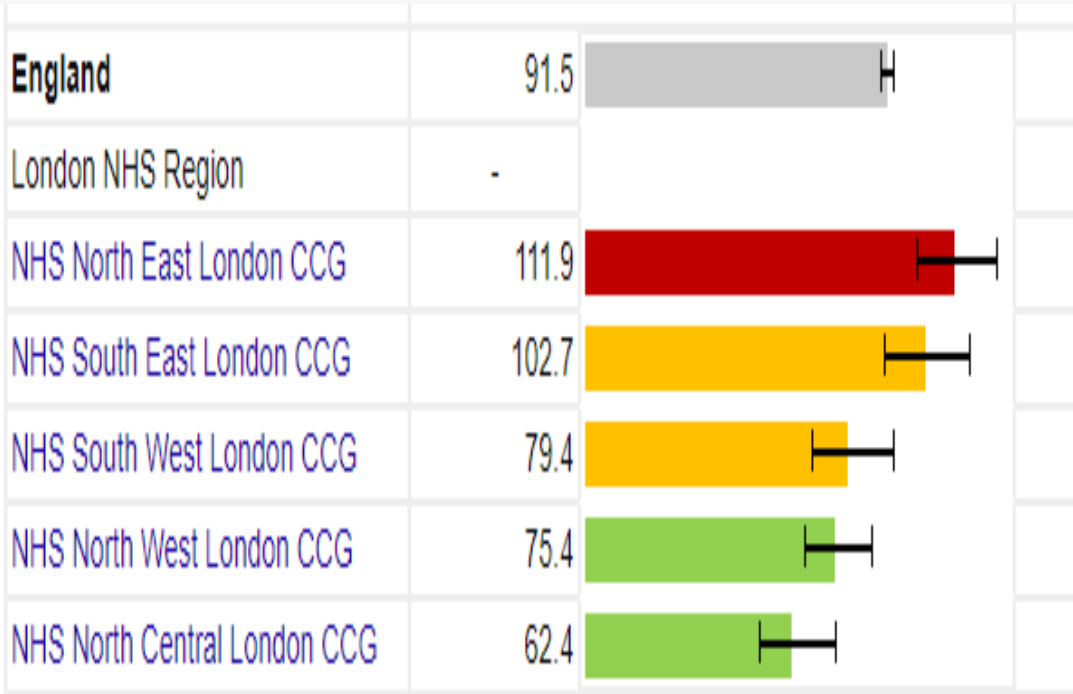


3-fold difference in the rate of hospital admissions between the least deprived and most deprived.



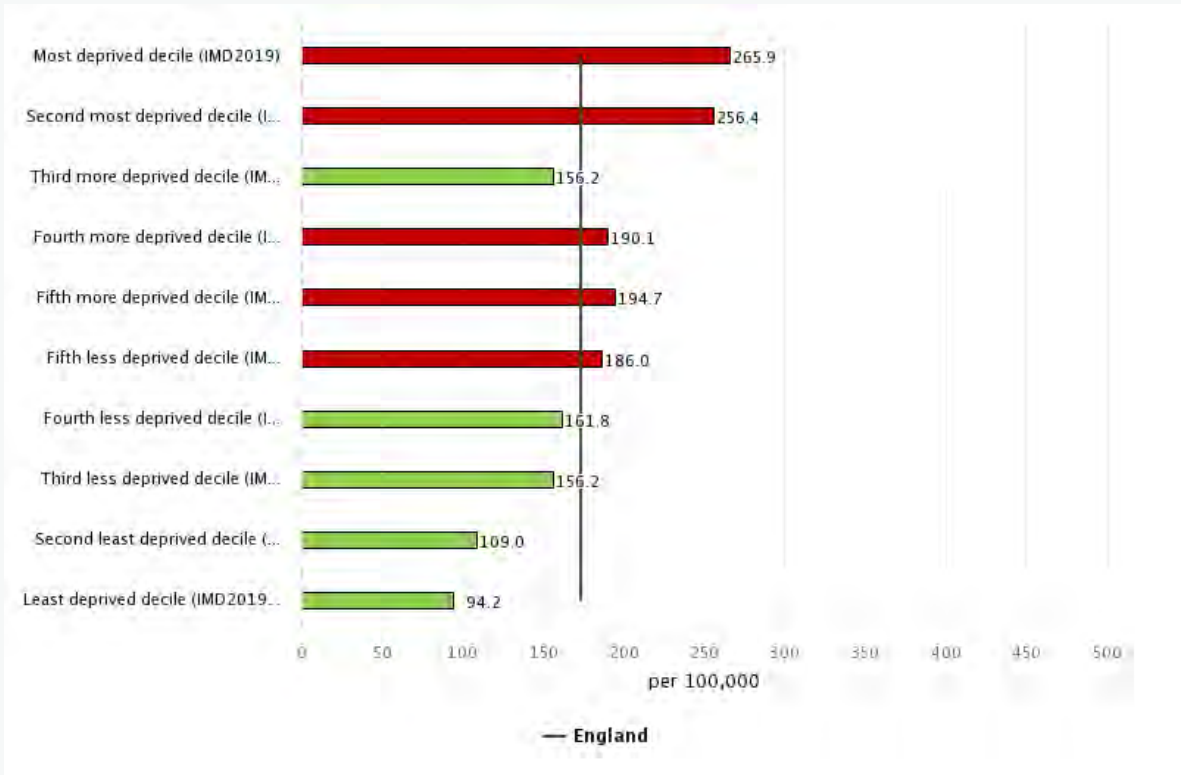
# Hospital Admissions for Asthma

Admissions for asthma ( 0 to 9 years) 2021/22  
Crude Rate- per 100,000 by ICB



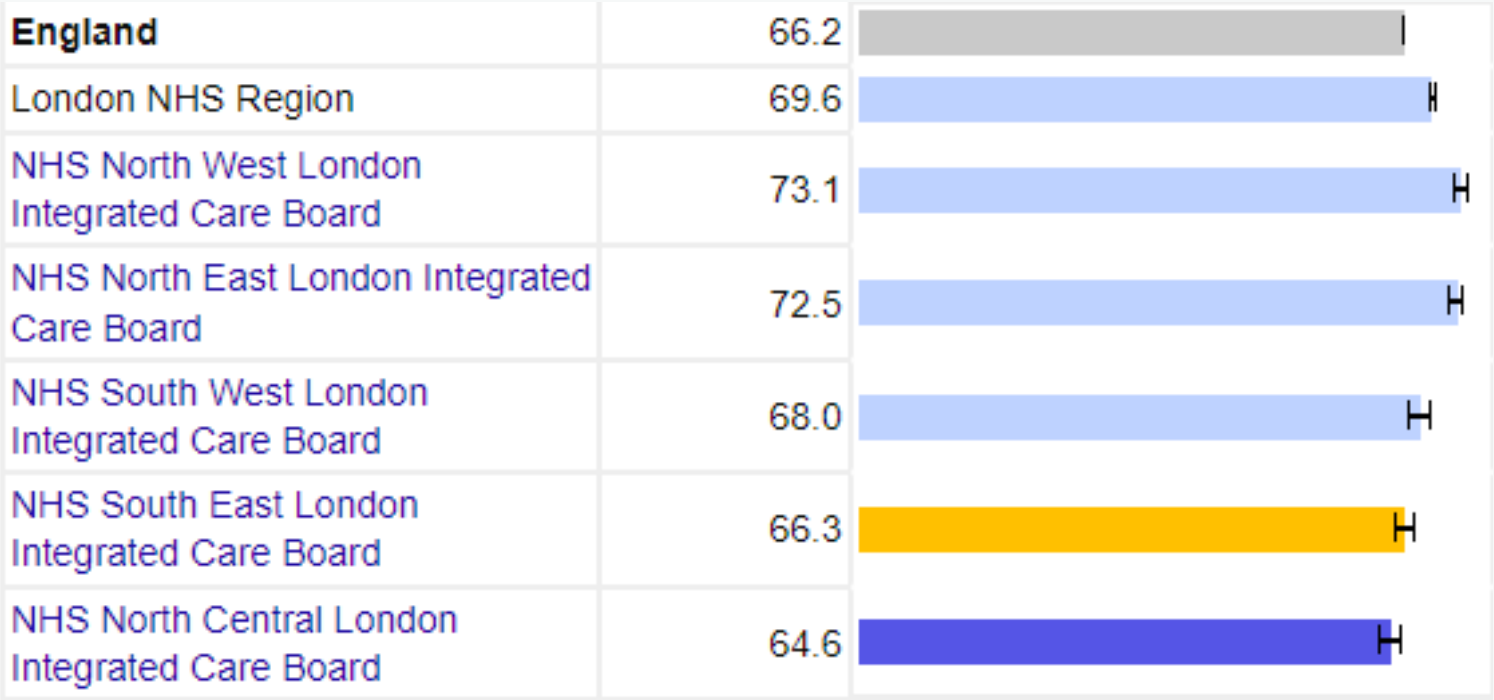
Source: OHID based on NHS Digital, Hospital Episode Statistics (HES), and NHS Digital, Patients Register

Hospital admissions for Asthma (0-9 years) by deprivation decile in England [IMD 2019]



# Second hand smoking status

Patients with asthma ( 6-19 years ): second hand smoking status recorded in the last 12 months 2021/22



Exposure to passive smoke at home delays recovery from an acute attack

Source: Quality and Outcomes Framework (QOF), NHS Digital

# Asthma reviews by ICB

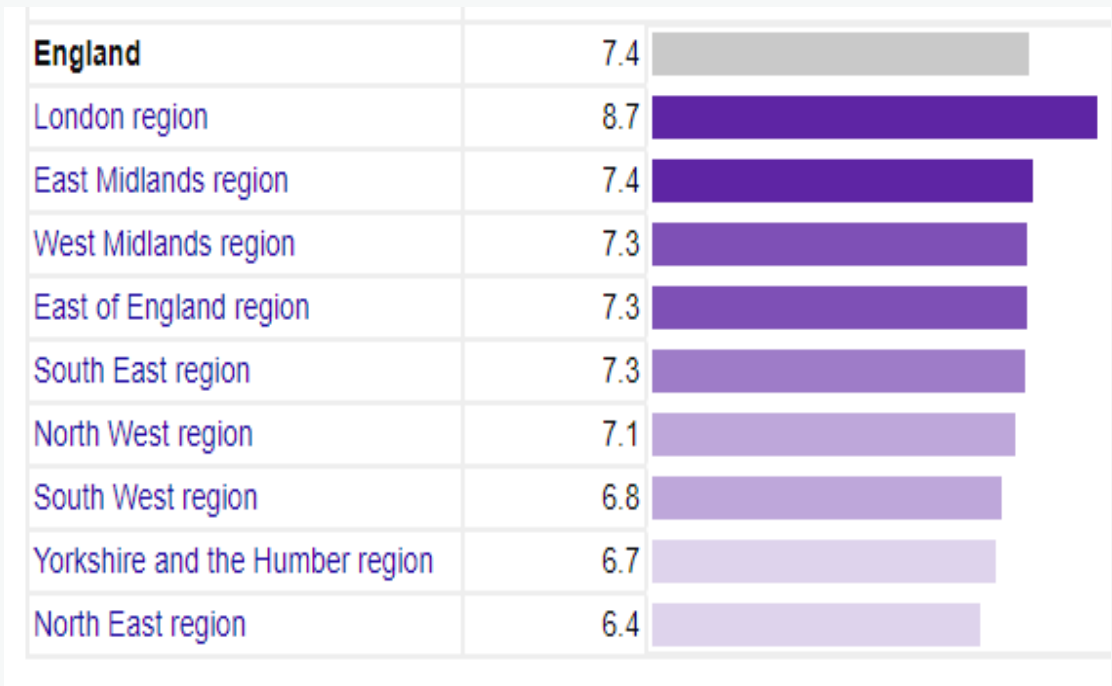
Patients with Asthma review (all ages) in the last 12 months 2021/22 (Proportion %)

England	52.5		
London NHS Region	55.9		
NHS North East London Integrated Care Board	59.9		H
NHS North West London Integrated Care Board	56.9		H
NHS North Central London Integrated Care Board	54.8		H
NHS South West London Integrated Care Board	54.4		H
NHS South East London Integrated Care Board	52.5		H

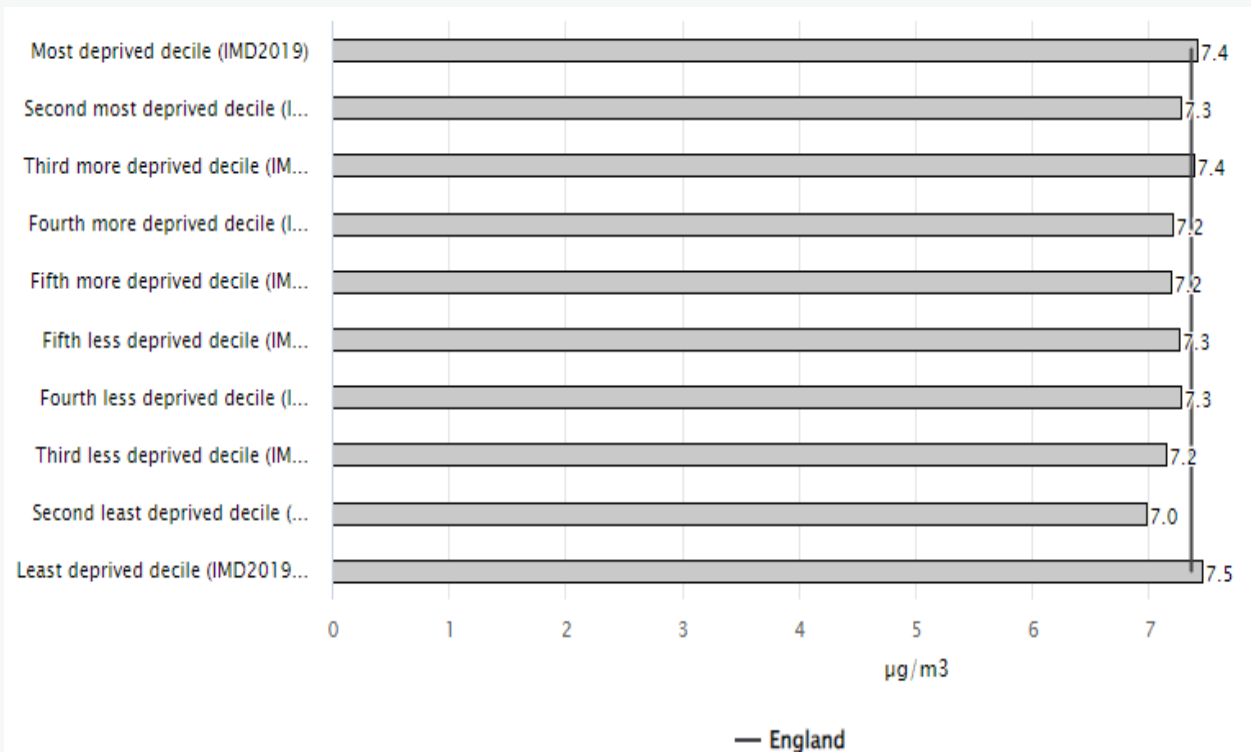
Source: Quality and Outcomes Framework (QOF), NHS Digital

# Air Pollution [1/2]

## Air pollution: fine particulate matter (concentrations of total PM 2.5) 2021



## Air pollution: fine particulate matter (concentrations of total PM 2.5)



## [2/2]The regions with the most patients registered at GP practices that exceed WHO air pollution limits for PM2.5

London has by far the biggest numbers – with 7.5 million patients attending a surgery that breaches WHO air pollution limits, representing three quarters of the GP population- 2019 report

Region	Exceed	Total Patients	Percentage
London	7,516,991	9,967,034	75.4%
East Midlands	2,151,134	5,014,389	42.9%
East of England	2,515,497	6,453,953	39.0%
South East	2,310,372	9,580,110	24.1%
West Midlands	1,458,278	6,233,965	23.4%

London boroughs particularly Lambeth, Newham and Wandsworth have the greatest number of patients registered in areas that exceed WHO air pollution limits- 'toxic GP surgeries',



England

# Widening our view



# Potential barriers to access and good outcomes

This illustration indicates some of the factors that may create barriers to being able to access services and/or achieve good health outcomes for some population groups.

ICBS may wish to explore the distribution of these factors within their populations and shape services/support accordingly.







# How can we use our shared intelligence ( data and insight) to improve health for CYP?

## Health and social care data

Urgent care data/mortality data by ethnicity, age, religion, gender

Do CYP with high rates of urgent care for asthma also have poor oral health?

Are they registered with a GP? Do they attend? Are they taking treatment?

Are they involved in social care?

Are they known to health visiting/school nursing?

## Where they live- Neighbourhood

Air quality ( indoors and outdoors)

Second hand smoke

Access to green space

Cold, damp housing

Exposure to advertising - vaping

## Economic Factors

Poverty

Cost of living

## Social Factors

Employment [ parents, older CYP]- ability to attend appointments

Parental factors- smoking in the home, parent with asthma

Violence [ in home/neighbourhood]

Family and peer relationships

Social care needs

# Life course Approach to Asthma

## Metrics - A life course approach (Asthma)

Where possible metrics will be broken down to illustrate existing inequalities

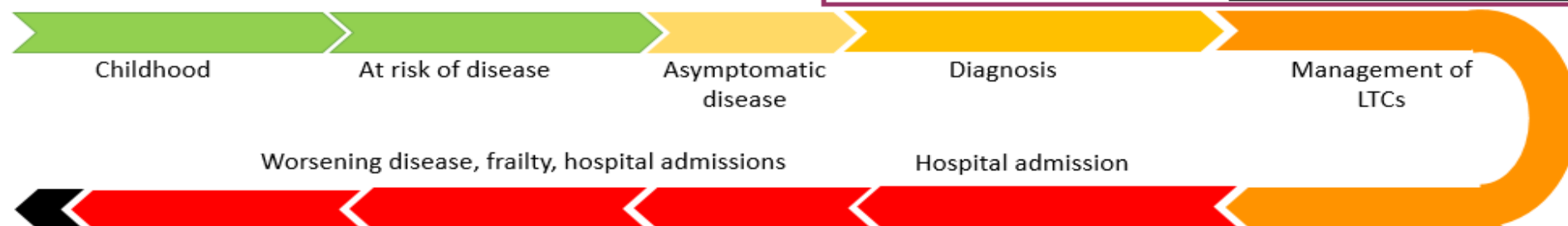
### Outcomes

**Risk Factors**  
Air quality (Concentration of fine particulate matter)  
Fuel poverty  
% of physically active adults

**Prevention / early detection**  
Vaccination Uptake (Flu COVID)  
Spirometry appointments

**Diagnosis**  
Rate of tests performed at Community Diagnostic Centres  
Rate of diagnoses conformed by spirometry  
No. of newly diagnosed patients added to Asthma registers

**Guideline driven care (QOF)**  
% patients with Asthma who had a review in the last 12 months  
% patients with Asthma control test completed as part of review  
NICE/RCP recommendations:-  
Inhaler technique  
Number of exacerbations  
Written action plan



**Empowering patients**  
Number of downloads of self-care apps  
% patients able to access self-care apps

**Mortality and end-of life care**  
% of patients with Asthma accessing community palliative care  
% of patients with Asthma dying in place of choice  
Premature (<75) mortality rate from Asthma  
Inequalities in premature mortality from Asthma (Slope Index)

**Advanced Care Planning**  
% patients with Asthma with an end-of-life care plan

**Acute care services**  
Emergency admission rate for Asthma  
Length of stay for Asthma

**Community care services**  
**What community services are there for children/adults**



# Main data sources

[Resources, guides and toolkits - Transformation Partners in Health and Care Partnership](#)

[Public health profiles - OHID \(phe.org.uk\)](#)

[NHS RightCare \(england.nhs.uk\)](#)

# #AskAboutAsthma: A+LUK's work on children and asthma

Sarah Woolnough  
CEO  
[swoolnough@asthmaandlung.org.uk](mailto:swoolnough@asthmaandlung.org.uk)



# The fight for breath

**1<sup>IN</sup> 5 PEOPLE**

people in the UK will  
experience a lung  
condition

Poor lung health is the

**3<sup>RD</sup> BIGGEST  
KILLER**

in the UK

Every

**10 SECONDS**

someone has an  
asthma attack

Every

**5 MINUTES**

someone dies from  
a lung condition



Our vision is for a world where everyone has healthy lungs. We'll do this by:

**Shining a light** on the need for better lung health, and tackling negative attitudes that hold back progress.

Tripling investment in **life-saving research**, through public funding + our pioneering work.

**Fighting for clean air** for all, wherever you live or are born in the UK.

Ensuring everyone who **needs a diagnosis** gets one, as quickly as possible

Providing vital **treatment + support** whenever people need it most.

Bringing together everyone affected by a lung condition to **make our voices heard.**



# Lung health and inequalities

- The links between deprivation, socio-economic status and lung health are well established
- Analysis in our *Breathing Unequal* report shows those in the most deprived communities are almost 3 times more likely to die during winter.
- High rates of lung disease are concentrated in North and East London
- We also see differential outcomes for CYP based on their family backgrounds



# What this means for children and young people

- Our strategy commits us to working towards better lung health for all, from birth and throughout our lives
- We know that infants and young children are at high risk from winter respiratory infections, when the health services are under huge pressure
- Asthma is one of the most common childhood health conditions, affecting 1 in 11 children
- Exposure to pollutants and hazards in the early years can leave children at risk of lung disease for life





# What this means for children and young people

In 2021/22 in England, children in the most deprived decile were:

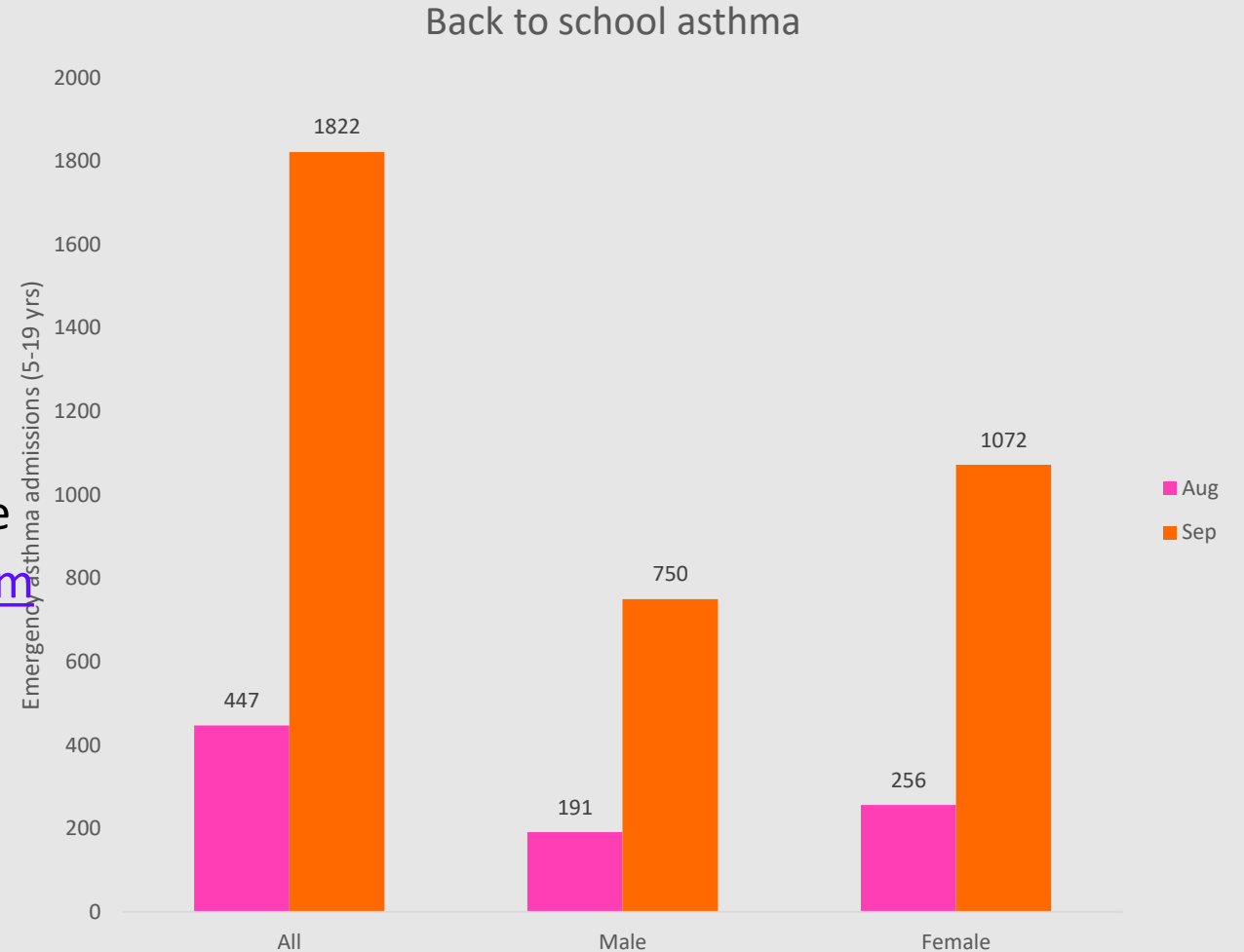
- 2x as likely to be admitted to hospital in an emergency for respiratory disease compared to the least deprived decile
- 4x as likely to be admitted to hospital in an emergency for asthma compared to the least deprived decile
- 50% more likely to be admitted to hospital in an emergency for pneumonia compared to the least deprived decile

Analysis of NHS England hospital admissions from bespoke Asthma + Lung UK data request 2023



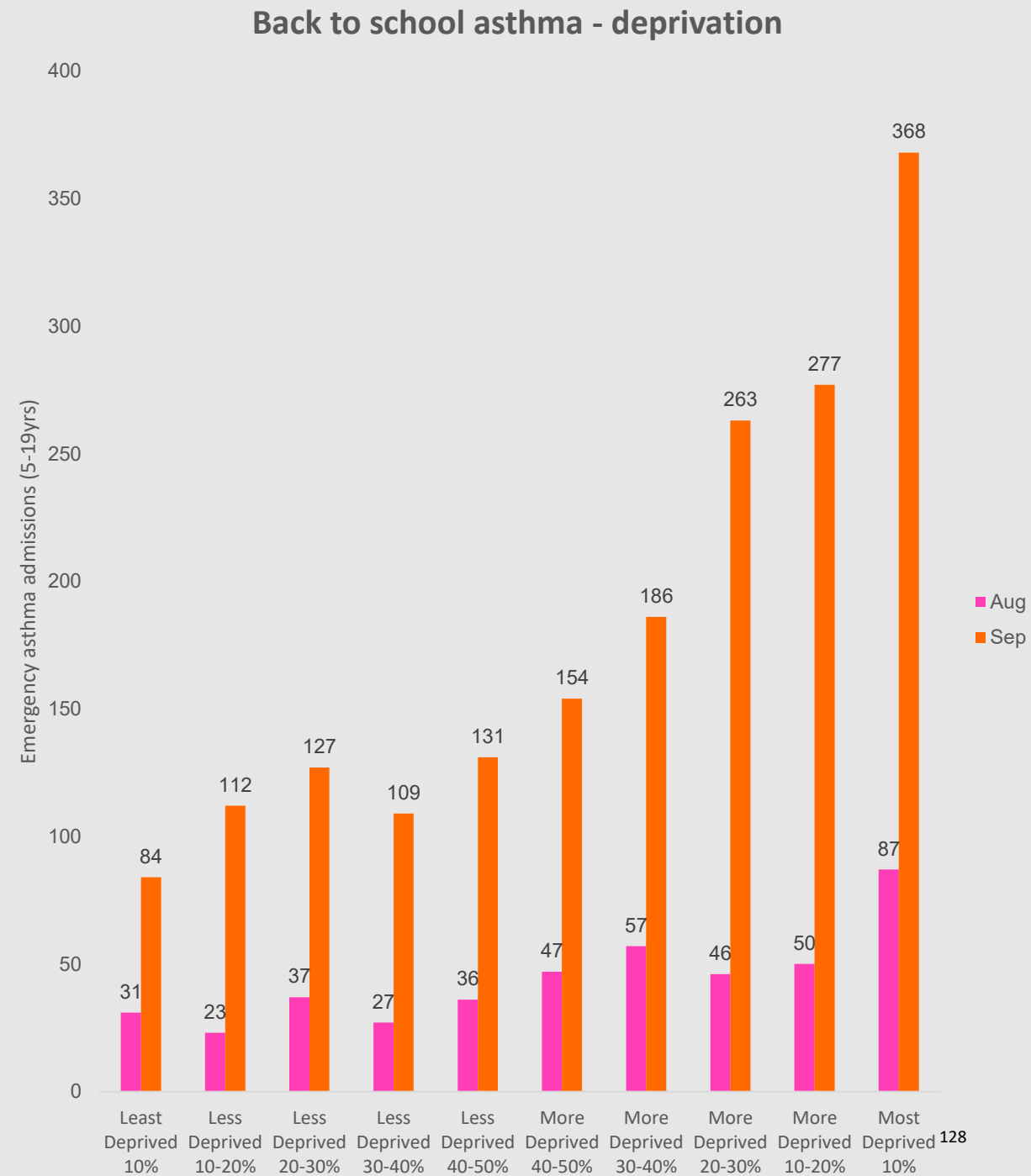
# What this means for children and young people

- Emergency asthma admissions increase significantly when children return to school, making the #AskAboutAsthma campaign so important at this time of year
- Correct inhaler use and an asthma action plan are essential – [an action plan can be downloaded from the Asthma + Lung UK website](#)



# What this means for children and young people

- Childhood admission rates are 1.4 times higher in North East London than in South West London
- Hospitalisation caused by a life-threatening asthma attack increases by 320% for children from the most deprived areas when returning to school
- This is almost double the increase in children from the least deprived areas



# Sonia and Jahmarley



# Sonia and Jahmarley

- Sonia home-schools her son Jahmarley, 8, because his asthma is so bad.
- Sonia is disabled, and struggles to get by on benefits, living in a one-bedroom council flat, and believes that the mould in her flat has made Jahmarley's asthma worse.
- “Both Jahmarley and I have developed asthma and I think a lot of it has to do with our living conditions.”



“ The rising cost of living  
has made things even  
harder for families like  
mine.”

- Sonia Destouche

# Sonia and Jahmarley

- "Living on benefits makes it hard to afford to pay for extra things like travel to and from hospitals and putting on the heating when it's cold, which is important when you have asthma, as cold weather can trigger an attack."
- "If I could afford it, I would move to a private rented property with no mould and in a nice area. Perhaps then Jahmarley's asthma would improve, and he could return to school, but sadly I'm not in that situation."



# Respiratory disparities in London

	Barking and Dagenham	Richmond upon Thames	Times worse
Respiratory death rate (per 100,000)	131.40	60.46	2.2x
COPD death rate (per 100,000)	59.94	21.99	2.7x
% smokers	11.3%	8.2%	1.4x
Winter mortality index*	57.2%	40.8%	1.4x
Avoidable mortality rate	325.9	164.2	2x

\*all-cause, not respiratory specifically but respiratory is the biggest driver

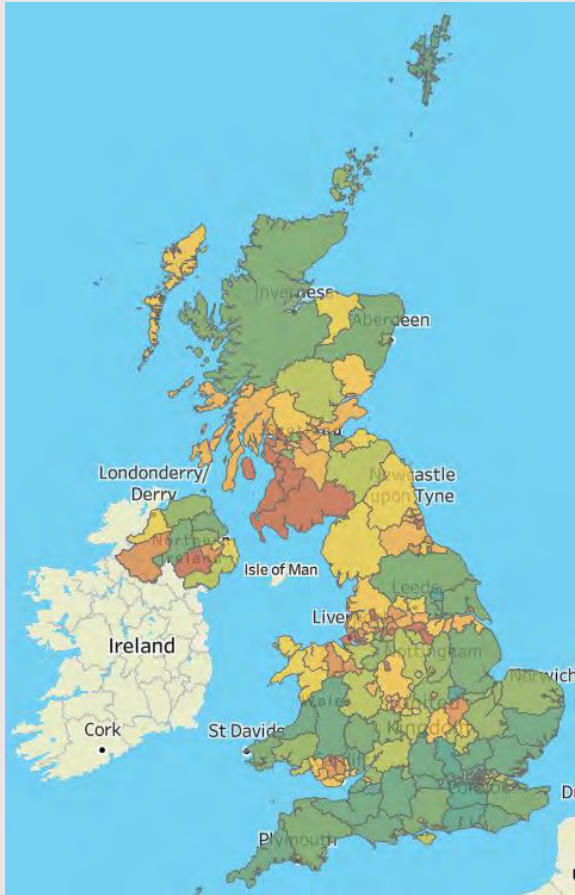
Data is across all age ranges.

# Respiratory admissions & deaths – England

<b>Worst 10 (151 is the worst)</b>	<b>Best 10 (1 is the best)</b>
<b>151 Knowsley</b>	<b>1 York</b>
<b>150 Salford</b>	<b>2 Bracknell Forest</b>
<b>149 Blackburn with Darwen</b>	<b>3 Barnet</b>
<b>148 Liverpool</b>	<b>4 Kensington and Chelsea</b>
<b>147 Blackpool</b>	<b>5 West Sussex</b>
<b>146 Manchester</b>	<b>6 Hounslow</b>
<b>145 Stoke-on-Trent</b>	<b>7 Westminster</b>
<b>144 Sunderland</b>	<b>8 Windsor and Maidenhead</b>
<b>143 Wirral</b>	<b>9 Richmond upon Thames</b>
<b>142 Tameside</b>	<b>10 Harrow</b>



# Respiratory index maps



Ranking of respiratory admissions and death rates



Respiratory admission rate



Respiratory mortality rate



# Causes



# What are we doing?

## Research and innovation

- Our research funding portfolio includes work to understand and treat childhood lung disease, including asthma
- Current projects include finding new ways to diagnose asthma in children and how technology can improve inhaler technique
- We are partners on research projects aiming to improve children's health, including evaluating the impact of the London ULEZ on children and monitoring near-fatal asthma attacks





# What are we doing?

## Research and innovation

Asthma + Lung UK is a key partner in respiratory insight work, including:

**CARE** - A clinical trial to test the use of ICS-formoterol as a reliever in children aged 4-11 years across a range of asthma severities

**SPIROMAC** – A clinical trial to test whether using spirometry in children can help guide more personalised treatment (with the aim of being able to safely reduce the amount of steroids children need to take)

**BREATHE4T** - Breathing Retraining for Asthma Trial of Home Exercises for Teenagers.





# What are we doing?

## Clean air

- We campaign for cleaner air for all, with a focus on towns and cities where children live, play and go to school
- Our local campaigning networks bring together parents, schools and children alongside others to call for cleaner air in their areas
- Our Little Lungs programme educates primary school children on air pollution and empowers them to fight for better





# What are we doing?

## Clean air - ULEZ

- Asthma + Lung UK has long supported the ULEZ expansion for cleaner air in London
- Toxic levels of air pollution contribute to up to 43,000 premature deaths per year, 4,000 in London
- Five million people will no longer breathe unsafe and toxic air thanks to the ULEZ expansion. This includes an estimated 87,000 children



# What are we doing?

## Clean air

- Our [Clean Air Champions](#) scheme is a programme for students to become ambassadors for clean air.
- Students become Champions by completing 3 activities:
  - one to raise awareness
  - one to spread the word
  - one to fundraise to support those communities worst affected by air pollution.
- Schools can sign up on the Asthma + Lung UK website.





# What are we doing?

## Cost of Living

- Targetted support for people with lung conditions on low incomes with bills
- Including everyone who uses an electrical device to be reimbursed for the additional costs of running these in full
- And exemption from prescription charges for people with lung conditions



# What are we doing?

## Health

- We are lobbying for equal access to proficient basic asthma care for all patients: FeNO diagnostics, annual asthma reviews, inhaler technique checks etc.
- Our recent publications such as Breathing Unequal, and Diagnosis the Problem: Right test, right time set our recommendations to improve healthcare services across the UK.
- Our upcoming campaign will update the cost of lung conditions to the NHS and model the impact of implementing best practice to influence political manifestos, government strategies including the Major conditions strategy.
- Engaging with respiratory leads in ICBs across the country to influence the health system from within.





# What you can do

- Call for action on housing quality and standards
- Help us campaign for ambitious air quality targets and action to support families to move to less polluting modes of transport
- Email your MP about the Major Conditions Strategy
- Push for new policies to hit our 2030 Smokefree target so children are protected from second hand smoke
- Sign our petition for a cleaner travel access fund  
[https://action.asthmaandlung.org.uk/page/126181/petition/1?ea\\_tracking\\_id=Policy\\_WebsiteALUK\\_Block\\_CleanAirCampaignsHub](https://action.asthmaandlung.org.uk/page/126181/petition/1?ea_tracking_id=Policy_WebsiteALUK_Block_CleanAirCampaignsHub)
- Talk to us about policy and practice in your ICS
- Look out for our new campaign on respiratory health coming later this month





**ASTHMA+**  
**LUNG UK**

**THANK YOU**

# Health inequalities and poverty proofing in asthma

Ian Sinha  
Consultant respiratory paediatrician

# Structure

- Childhood asthma inequalities in the UK
- Mechanisms for these inequalities
- What can be done/is being done?
- Declarations relevant to things I discuss in this talk: I lead a research group studying poverty and child health, including work with HDRUK; National Respiratory Audit Programme paediatric lead; NICE asthma committee member/advisor; NHSE taskforce and oversight committee; no political or financial declarations
- Acknowledgments to several colleagues





Original research

## Disadvantage in early-life and persistent asthma in adolescents: a UK cohort study

Hanna Creese <sup>1</sup>, Eric Lai <sup>2,3</sup>, Kate Mason <sup>2</sup>, Daniela K Schlüter <sup>2</sup>,  
Sejal Saglani <sup>4</sup>, David Taylor-Robinson <sup>2</sup>, Sonia Saxena <sup>1</sup>

- Longitudinal study from Millennium Cohort (n>7000)
- Incidence of asthma in children of the most educated mothers: 13%
- Incidence of asthma in children of the least educated mothers: 20%
- **Of the 70% increased risk of having persistent asthma, 59% is attributable to adverse exposures by the age of 3 years**



## ORIGINAL ARTICLE

# Persistent variations in national asthma mortality, hospital admissions and prevalence by socioeconomic status and region in England

Ramyani P Gupta,<sup>1</sup> Mome Mukherjee,<sup>2</sup> Aziz Sheikh,<sup>2</sup> David P Strachan<sup>1</sup>

To cite: Gupta RP, Mukherjee M, Sheikh A, et al. Thorax Epub ahead of print: [please include Day Month Year]. doi:10.1136/thorax-2017-210714

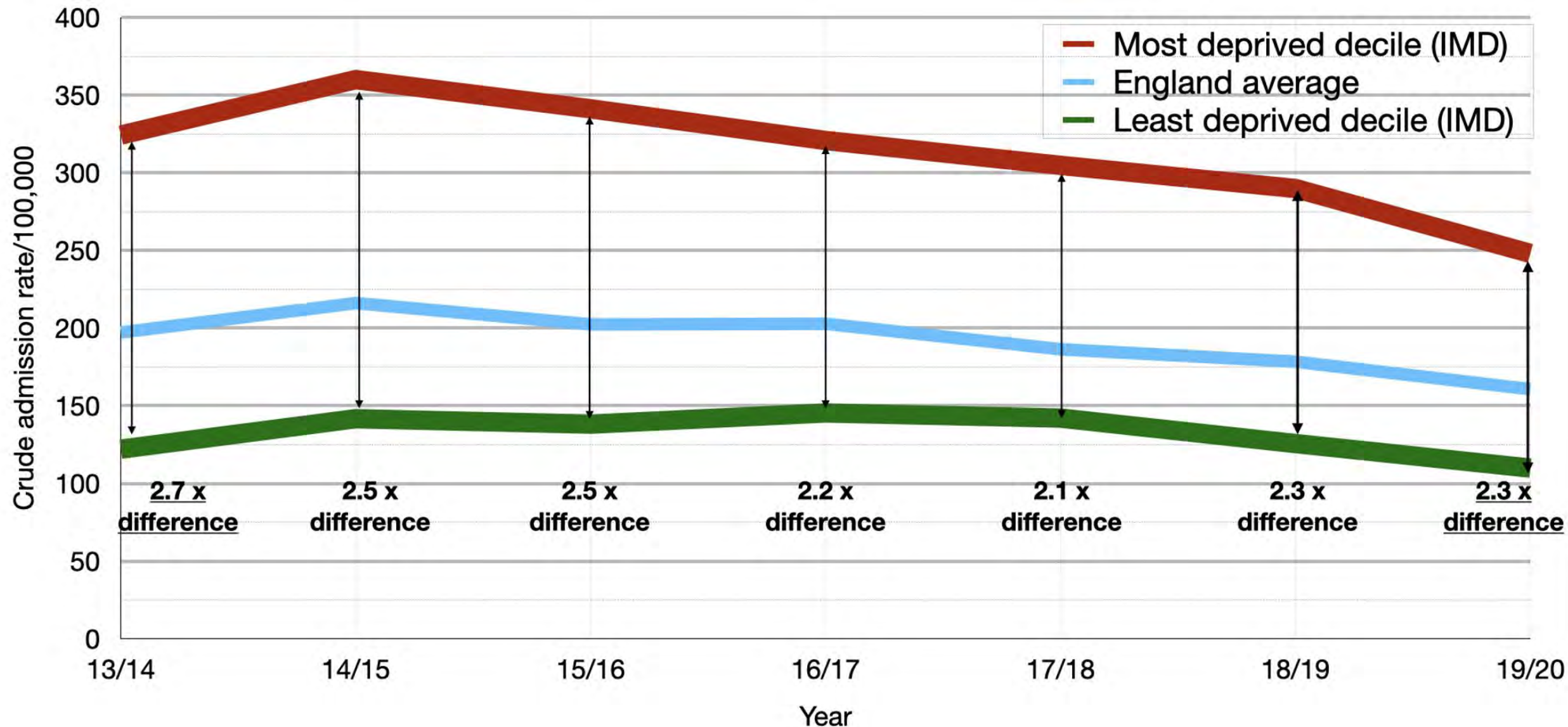
(A) Mortality		5–44 years		
IMD	N deaths	IRR	95% CI	
Least deprived 1	263	1.00	Reference	
2	291	0.96	0.81	1.13
3	244	0.85	0.72	1.02
4	297	0.85	0.72	1.01
5	275	0.8	0.69	0.96
Linear trend for IMD		0.95	0.91	0.99
(P value)		0.006		

(B) Admissions		5–44 years		
IMD	N admissions	IRR	95% CI	
Least deprived 1	40 428	1.00	Reference	
2	47 402	1.22	1.20	1.23
3	59 025	1.64	1.62	1.66
4	79 155	2.28	2.25	2.31
5	1 13 570	3.3	3.30	3.38
Linear trend for IMD		1.37	1.37	1.37
(P value)		<0.001		

3 of 7 diagnosis		5–44 years		
IMD	N diagnosed	IRR	95% CI	
Least deprived 1	123	1.00	Reference	
2	136	1.21	0.96	1.54
3	147	1.31	1.04	1.66
4	157	1.27	1.01	1.60
5	184	1.4	1.10	1.73
Linear trend for IMD		1.07	1.02	1.12
(P value)		0.007		

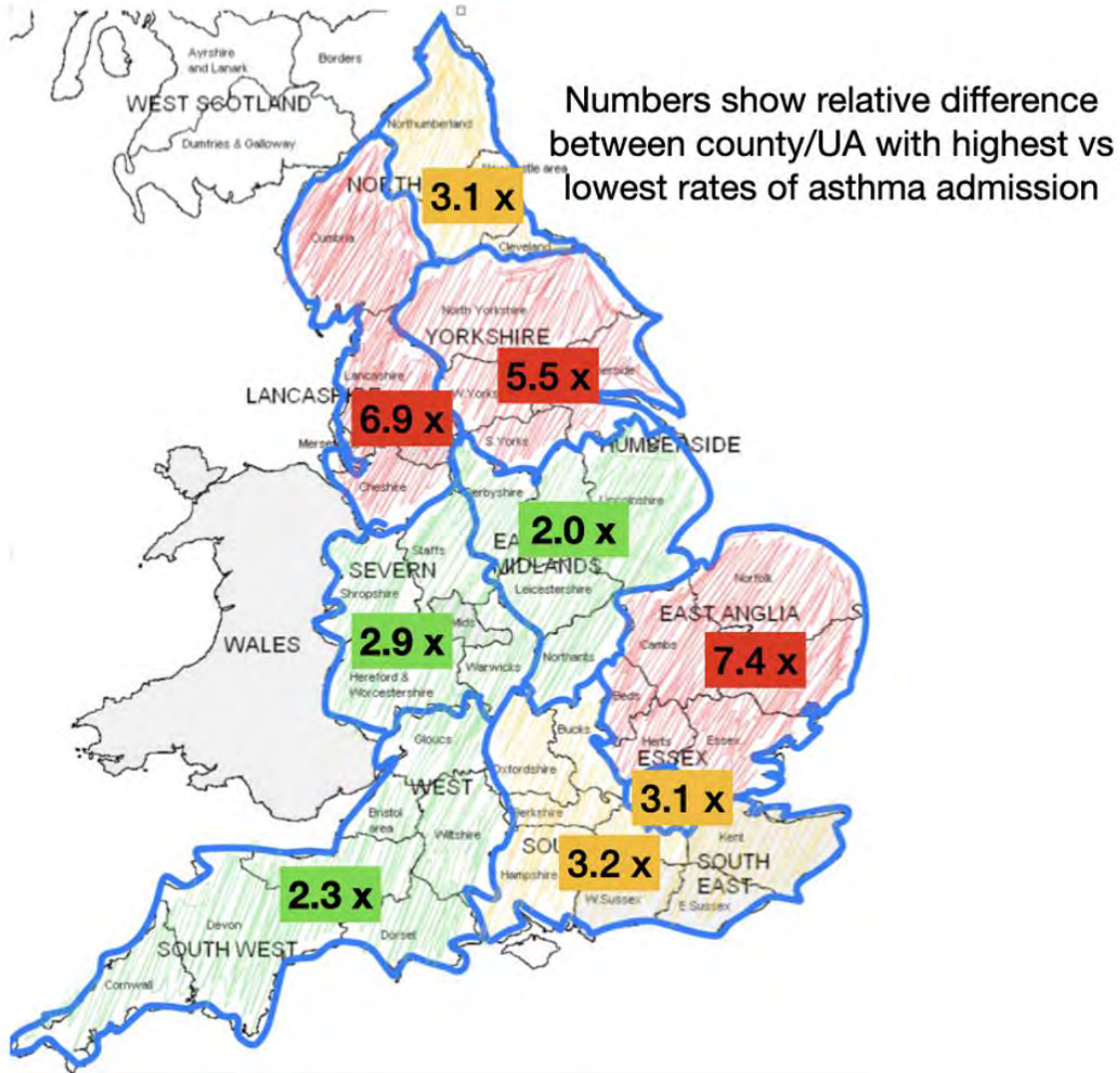
(D) Symptoms		5–44 years		
IMD	N severe symptoms	IRR	95% CI	
Least deprived 1	47	1.00	Reference	
2	59	1.47	1.01	2.13
3	71	1.77	1.23	2.53
4	94	2.00	1.42	2.84
5	113	2.4	1.70	3.33
Linear trend for IMD		1.22	1.13	1.31
(P value)		<0.001		

# Asthma admission rates 0-19 yrs by county and UA deprivation deciles (OHID fingertips), 2013-2020

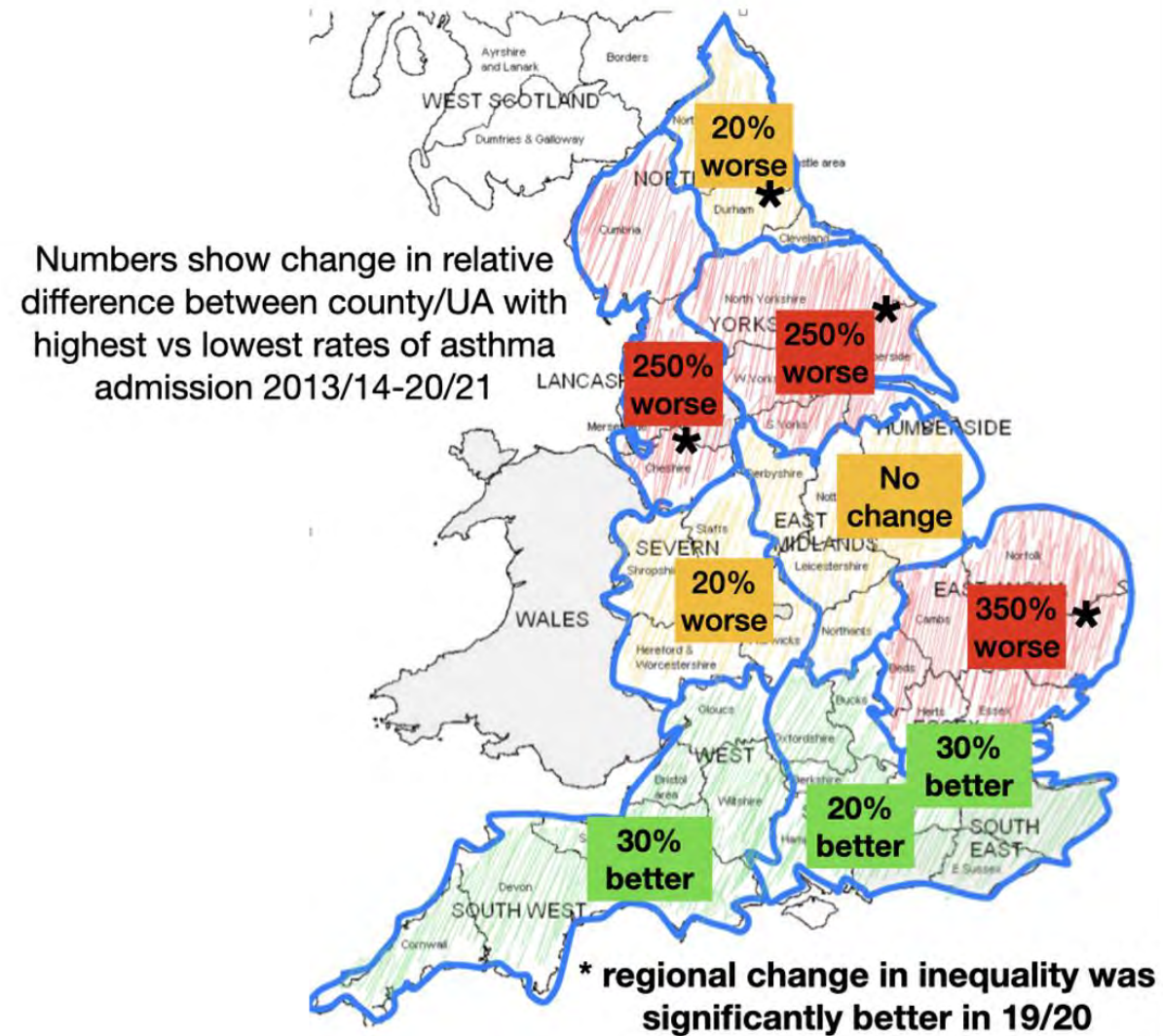




## By region: inter-county/UA variation in asthma admission, 0-19 years (OHID fingertips, 2020-21)

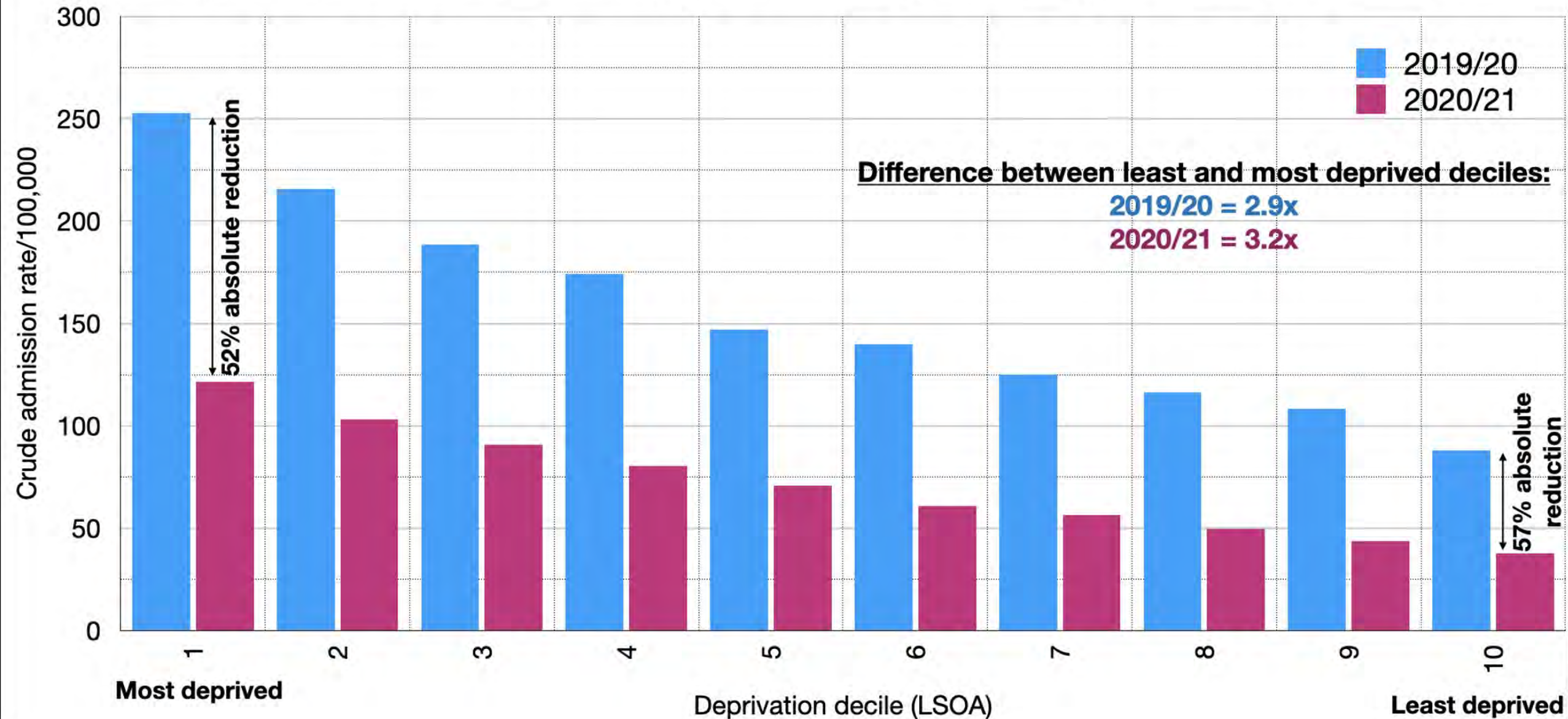


## By region: changes in inter-county/UA variation in asthma admission (0-19 years) 2013/14-2020/21





# Asthma admission rates 0-19 yrs by LSOA deprivation deciles (OHID fingertips), 2019/20-20/21





## Insufficient financial income



Inadequate National Living Wage

Gender imbalance in employment and pay - including drop in earnings related to motherhood

Inadequate worker's rights and protections

Insufficient benefits

## Acute shocks to the system



Loss of earnings  
Benefits sanctions  
Unexpected urgent costs

## Child poverty and health inequalities in the UK: a guide for paediatricians

Alice R Lee,<sup>1,2</sup> Camilla C Kingdon,<sup>3</sup> Max Davie,<sup>4</sup> Daniel Hawcutt,<sup>5,6</sup> Ian P Sinha<sup>1,2</sup>

Review



**Mothers are at particular risk of the drivers of poverty**

## Low financial resilience



Inadequate money for savings

Inability to call on family and friends

Debt



## High financial outgoings



Accommodation  
Food  
Childcare  
School provisions  
Connectivity  
Fuel

Less opportunities for children

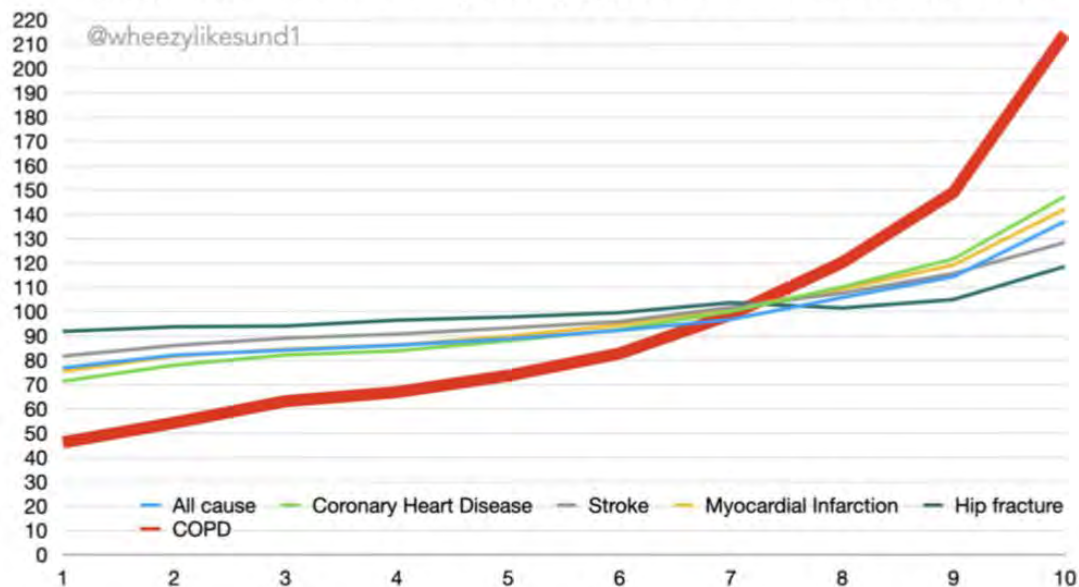


# The respiratory system is PARTICULARLY vulnerable to poverty

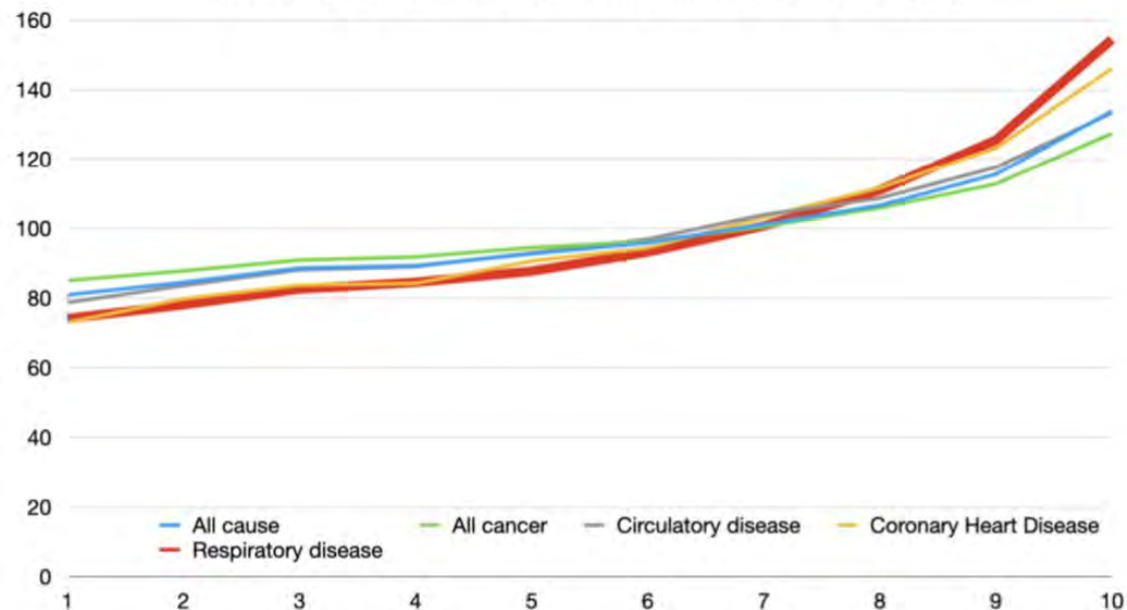
Data from Lee et al 2022; presented at ERS



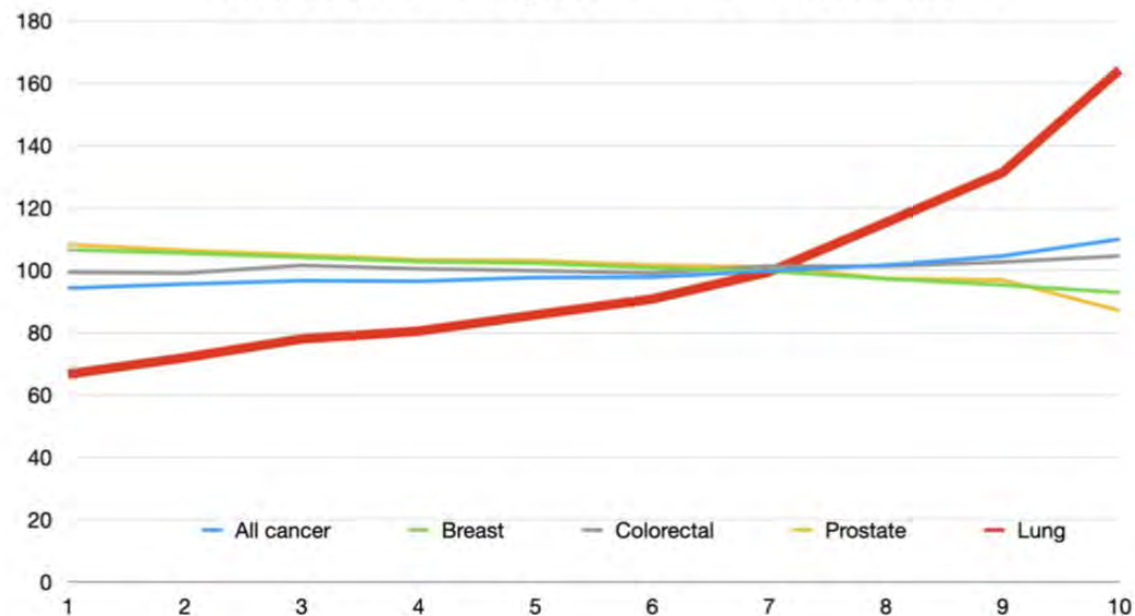
Emergency admission rate (adults) by Council Ward IMD score decile



Mortality by Council Ward IMD score decile (all ages)



Incidence of cancers by Council Ward IMD score decile





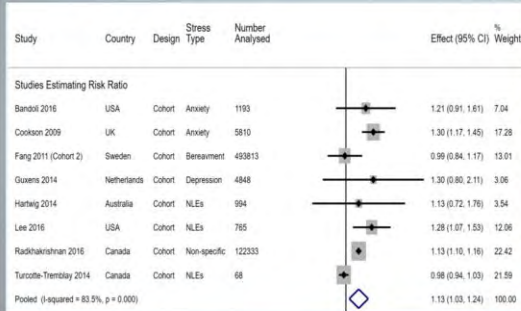
# Prenatal stress increases the risk of offspring asthma by 13%

Flanigan 2018  
Clin Exp Allergy. 2018  
30 studies

Particularly anxiety and depression

Doesn't increase the risk of atopic sensitisation

Increased early-onset and persistent wheezing



**Cortisol → Th1/Th2**



**Preterm birth**

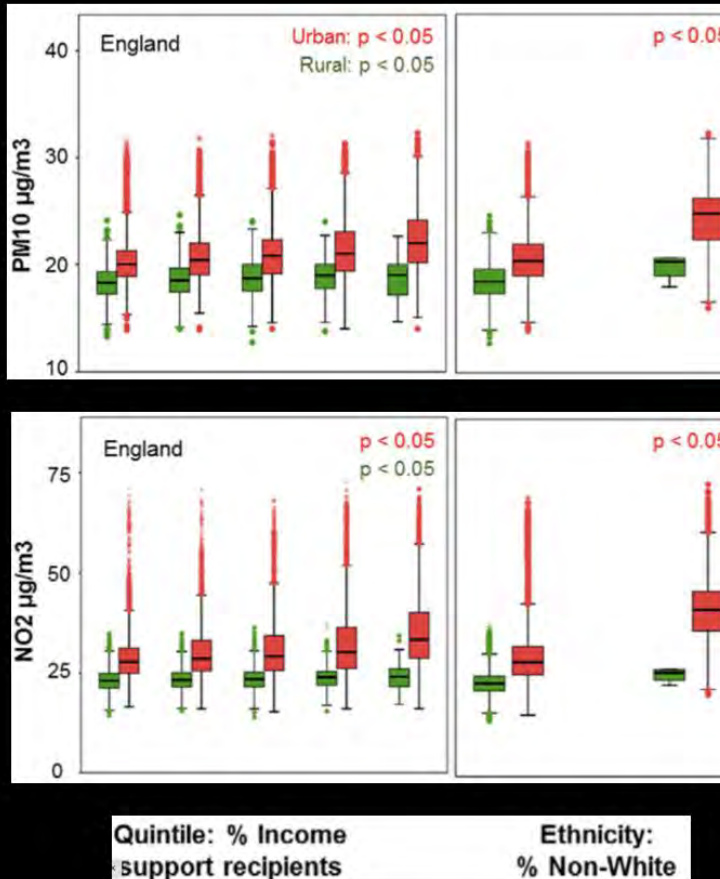
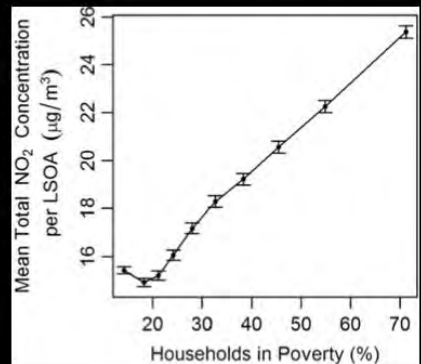
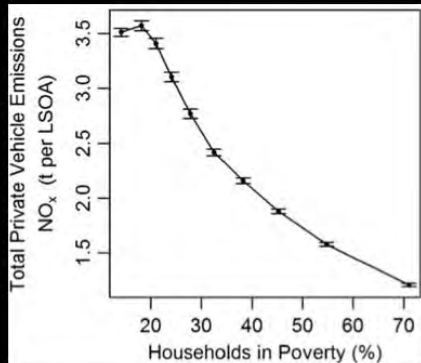
**Impaired growth**

**Altered microbiome**

**Less healthy lifestyle**



# INJUSTICE IN AIR POLLUTION EXPOSURE



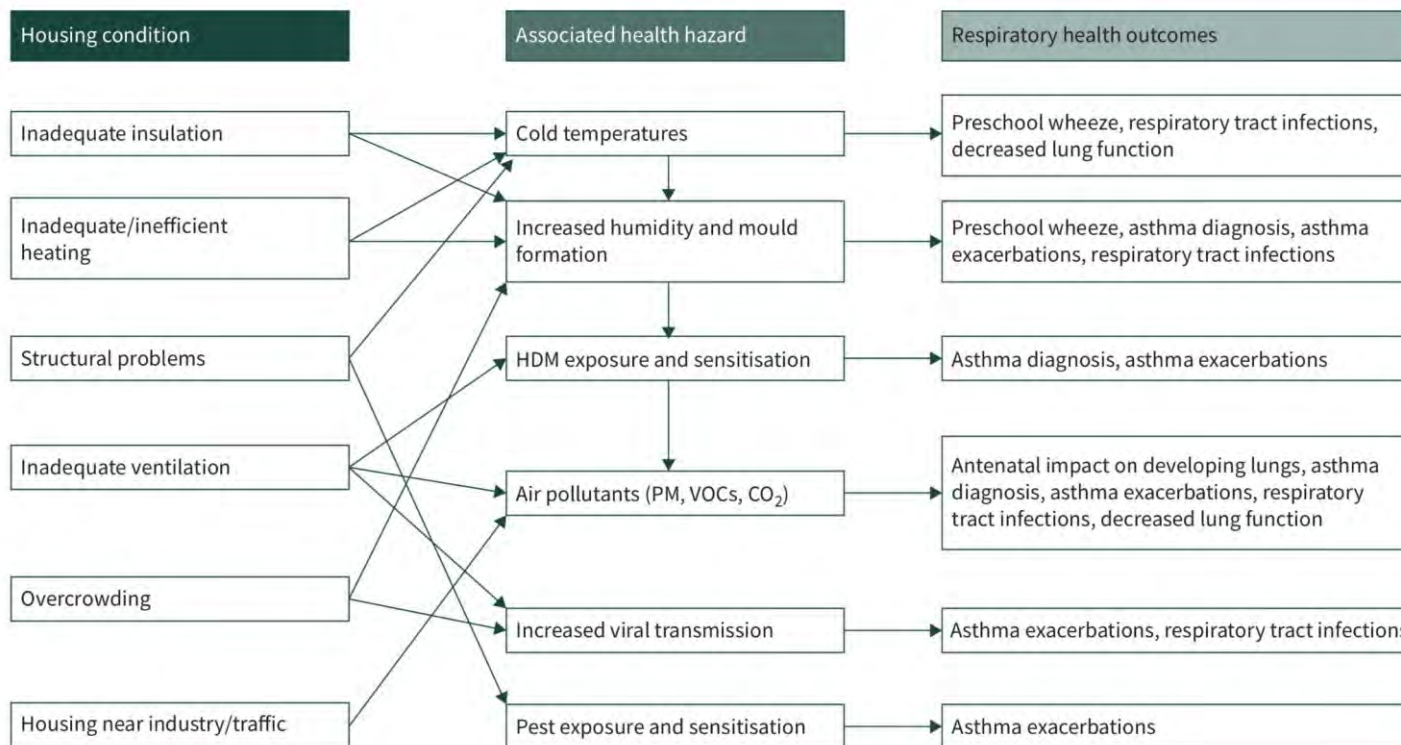
- Communities with >20% black people:
  - PM<sub>10</sub> 3 mcg/m<sup>3</sup> higher
  - NO<sub>2</sub> 10 mcg/m<sup>3</sup> higher
- Most deprived quintile:
  - PM<sub>10</sub> 1.5 mcg/m<sup>3</sup> higher
  - NO<sub>2</sub> 4.4 mcg/m<sup>3</sup> higher





# The impact of poor housing and indoor air quality on respiratory health in children

Karl A. Holden<sup>1,2,5</sup>, Alice R. Lee<sup>1,2,5</sup>, Daniel B. Hawcutt<sup>2,3</sup> and Ian P. Sinha<sup>2,4</sup>



Open Access

Research

## BMJ Open Associations between environmental exposures and asthma control and exacerbations in young children: a systematic review

Smita Dick,<sup>1</sup> Emma Doust,<sup>2</sup> Hilary Cowie,<sup>2</sup> Jon G Ayres,<sup>3</sup> Steve Turner<sup>1</sup>

### Damp housing/mould

In the intervention study identified,<sup>22</sup> where children were recruited after presenting to primary or secondary care with acute asthma symptoms, there was a reduction in exacerbations in the intervention group compared with the control group (10% vs 28%, absolute numbers of exacerbations 1 vs 11) However, the study had a small sample size (n=62) and the ages of the children ranged from 2 to 17 years. In an observational study, indoor and outdoor air samples for fungi were obtained on five occasions over 2 years from the homes of 936 children with moderate-to-severe asthma. Exposure to fungal species was associated with increased asthma exacerbations among children exposed to those species compared with non-sensitised peers<sup>23</sup>; typically, the increased risk for exacerbation was 1.4 per 10-fold increase in outdoor or indoor fungal exposure.



# Marmot report - fuel poverty

Lee et al 2022



FUEL POVERTY,  
COLD HOMES  
AND HEALTH  
INEQUALITIES  
IN THE UK



Joyce Carol Oates  
on Twitter storms, grief, and writing her 61st novel  
→ G2



Clowning around Photographers on how they took pictures of Boris Johnson  
→ G2



Thursday 1 September 2022  
£2.50  
From £1.85 for subscribers

# The Guardian

News provider of the year

## Children may die if families turn off heat, warn experts

### Small talk leaves a big impression, study shows

**Robert Booth**  
**Andrew Gregory**

Cold homes will damage children's lungs and brain development and lead to deaths as part of a "significant humanitarian crisis" this winter, health experts have warned.

Unless the next prime minister curbs soaring fuel bills, children face a wave of respiratory illness with long-term consequences, according to a review by Sir Michael Marmot, the director of UCL's Institute of Health Equity, and Prof Ian Sinha, a respiratory consultant at Liverpool's Alder Hey children's hospital.

Sinha said he had "no doubt" that cold homes would cost children's lives this winter, although they could not predict how many, with damage done to young lungs leading to chronic obstructive pulmonary disease (COPD), emphysema and bronchitis for others in adulthood.

The warning comes as the Resolution Foundation thinktank predicts Britain is facing the deepest living standards squeeze in a century, with a typical household losing £3,000 in real-terms income over two years, inflation hitting 15% for the poorest households, and the cost of living crisis lasting into 2024.

It forecasts that 3 million more people will be living in absolute poverty, and relative child poverty will hit its highest level since the peaks of the 1990s, in a "frankly terrifying" outlook for living standards.

Huge numbers of cash-strapped households are preparing to turn heating systems down or off when the energy price cap increases to £3,549 from 1 October.

The president of the British Paediatric Respiratory Society also told the Guardian child deaths were likely. "There will be excess deaths among some children where families are forced into not being able to heat their homes," said Dr Simon Langton-Hewer. "It will be dangerous, I'm afraid."

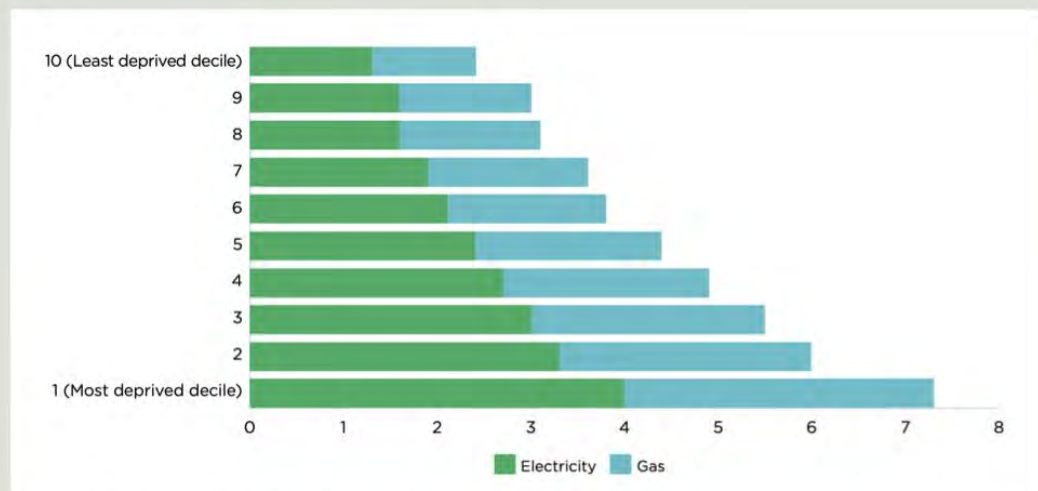
In the UK, 45 million

Britons may be mocked for weather-related small talk but exchanging idle pleasantries can leave a lasting impression and affect future social interactions, research suggests.

The study found just four minutes of chit-chat could reveal aspects of personality, such as whether we are extroverted or introverted, and influenced subsequent social interactions.

"It might seem like a drain on time and productivity but our research suggests small talk is an important

Figure 6. Household expenditure on energy as a percentage of total expenditure, by equivalised disposable income group (deciles), England, 2020



Source: Department for Business, Energy & Industrial Strategy (2)




# WE MUST ALSO CONSIDER GOVERNMENTAL AND CORPORATE VECTORS OF NUTRITION-RELATED ILLNESS IN CHILDREN

Open access

Original research

## BMJ Open Ultra-processed foods and excessive free sugar intake in the UK: a nationally representative cross-sectional study

Fernanda Rauber <sup>1,2</sup> Maria Laura da Costa Louzada,<sup>2,3</sup>  
Euridice Martinez Steele,<sup>1,2</sup> Leandro F M de Rezende,<sup>2,4</sup> Christopher Millett,<sup>2,5</sup>  
Carlos A Monteiro,<sup>1,2</sup> Renata B Levy<sup>2,6</sup>

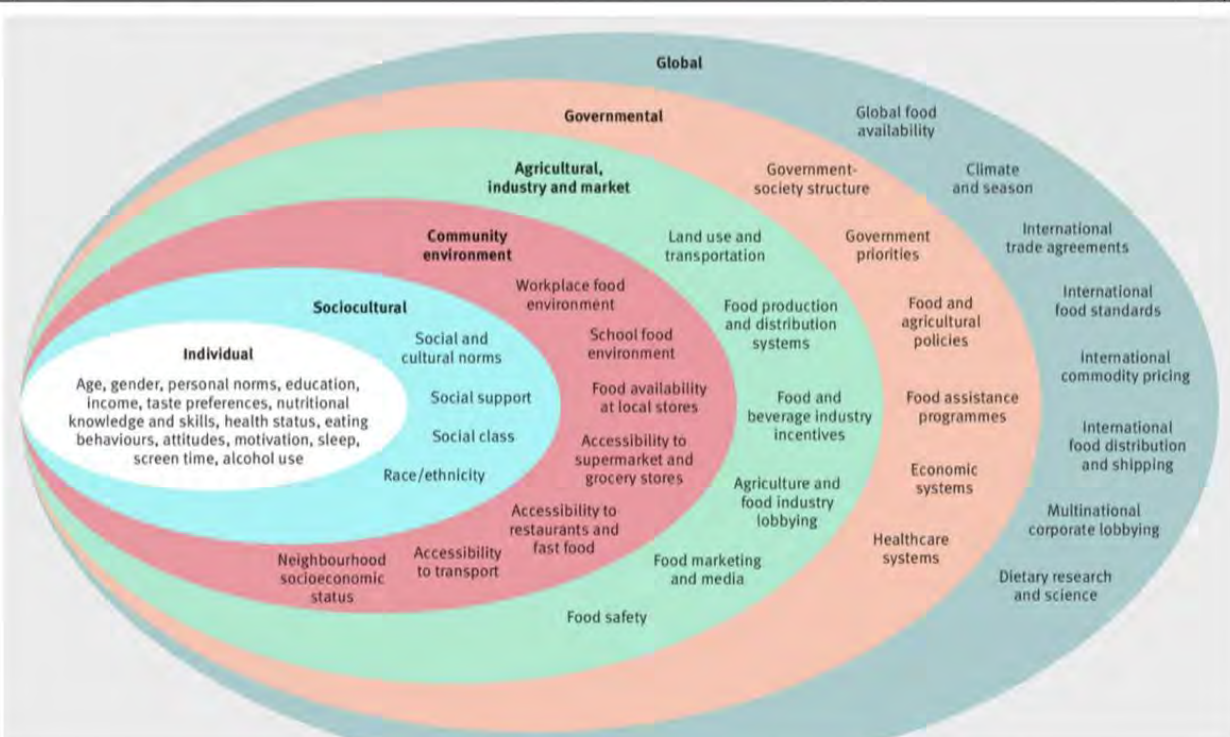
“by eliminating ultra-processed food ... the prevalence of excessive free sugar intake ... in children and adolescents ... could be from 74% to 45% and from 83% to 53%, respectively”

SCIENCE AND POLITICS OF NUTRITION

## Role of government policy in nutrition—barriers to and opportunities for healthier eating

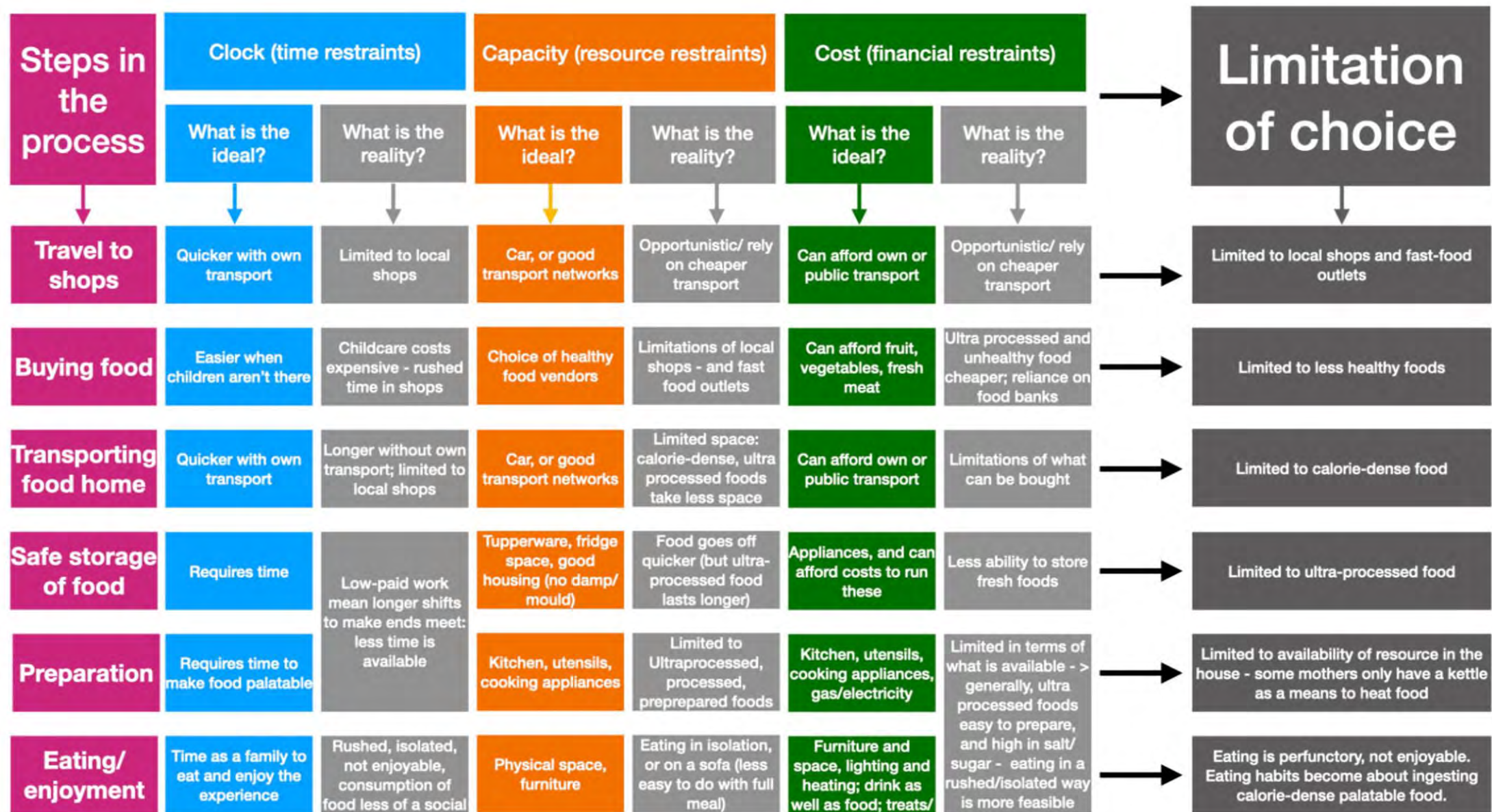
Dariush Mozaffarian and colleagues review strategies governments can use to improve nutrition and health

BMJ: first publish



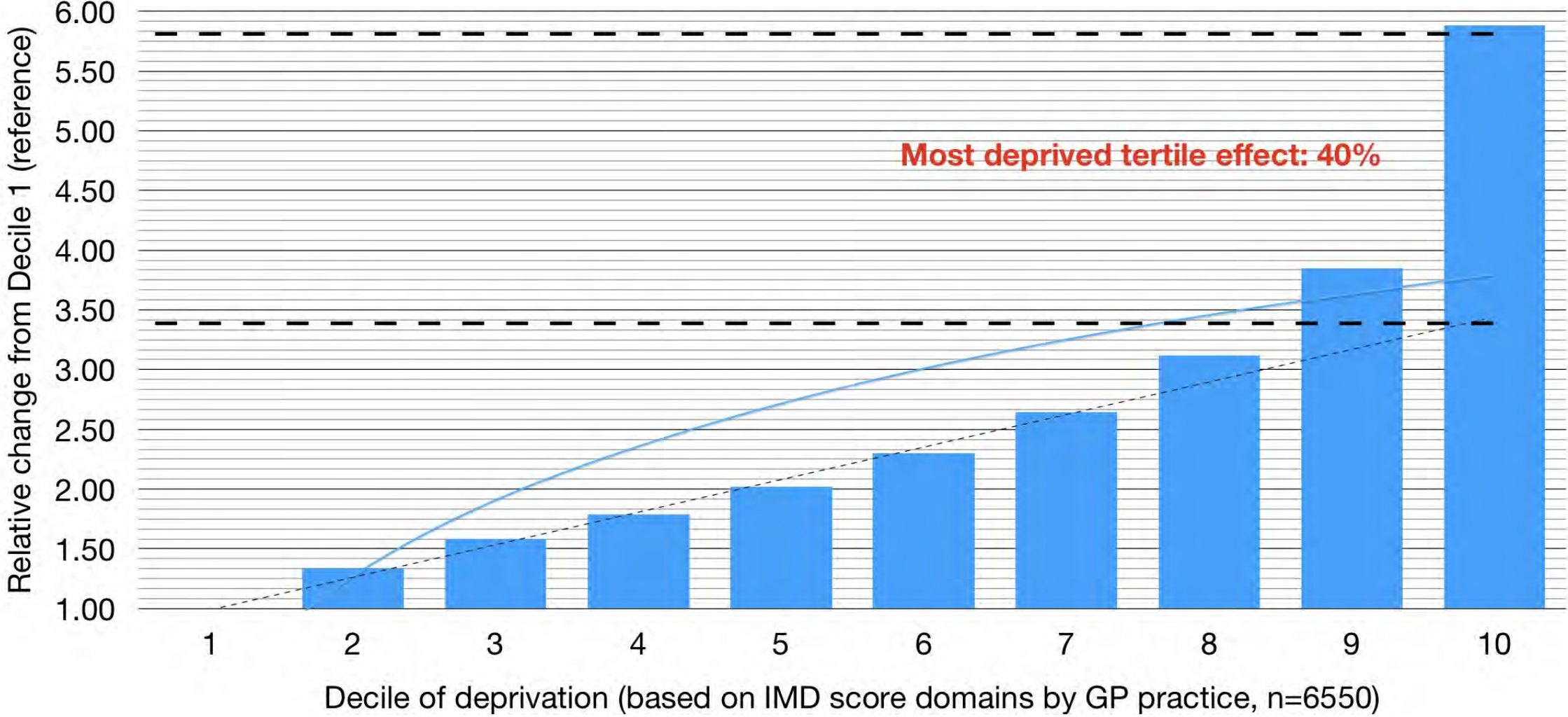
Multilayered influences beyond personal knowledge and preference alter food choices. Government can consider these influences as potential targets, barriers, facilitators, and effect modifiers of food policies. Reproduced with permission from Ashfin et al<sup>2</sup>





**Figure 7** Example of a 'clock/capacity/cost analysis' of limitations of healthy living choices. This example relates to the process behind cooking a healthy meal.

# The Inverse Care Law: Number of paediatric patients per FTE GP





# Children and young people asthma

## Variations in Care

### Respiratory nurse specialist

51.5%



Access to a respiratory nurse specialist trained in the care of CYP with asthma\*

### Clinical lead

86.8%



Designated lead for CYP with asthma\*

### FeNO and spirometry

61.0%



Access to both diagnostic tools\*

### Transition service

62.5%



Formal transition from child to adult asthma services\*

### Smoking cessation service

36.8%



Availability of smoking cessation service to which CYP and families can be referred/signposted

Images taken from Adamson A, Amusan L, Andrews R, Bunning T, Emblem P, Hurst J, Kailla C, Quint J, Sinha I, Stone P. *National Asthma and COPD Audit Programme: Child and young person asthma 2021 organisational audit. Resourcing and organisation of care in hospitals in England and Wales. Summary report*. London: RCP, 2022. [Online] Available from

[https://www.nacap.org.uk/nacap/welcome.nsf/0/9E5E1E7F3C3B1A1580258868006E181F/\\$file/NACAP\\_CYPA\\_Organisational\\_Summary\\_Report\\_2021\\_v2.pdf](https://www.nacap.org.uk/nacap/welcome.nsf/0/9E5E1E7F3C3B1A1580258868006E181F/$file/NACAP_CYPA_Organisational_Summary_Report_2021_v2.pdf)



## Variations in Care

Discharge Chart 1 - [ALL]

Children and young people

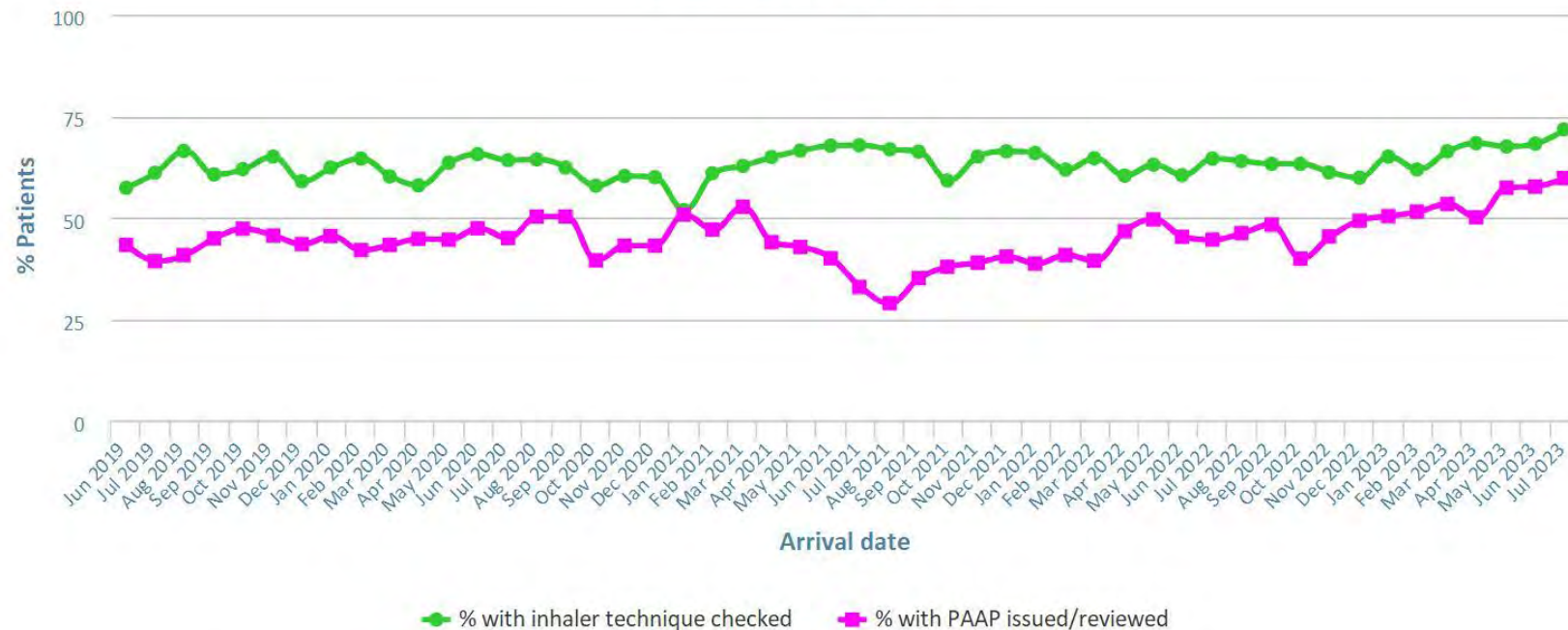
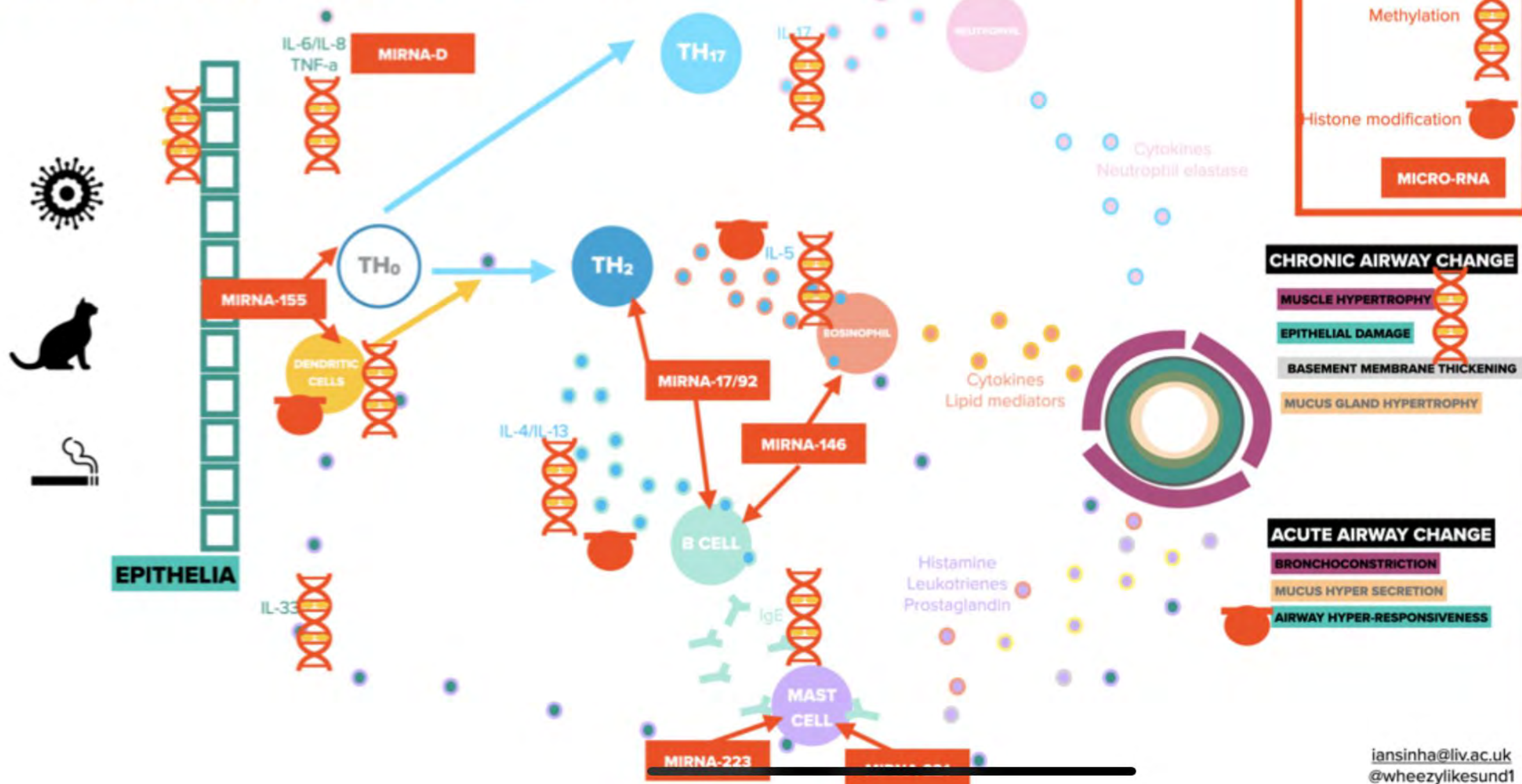


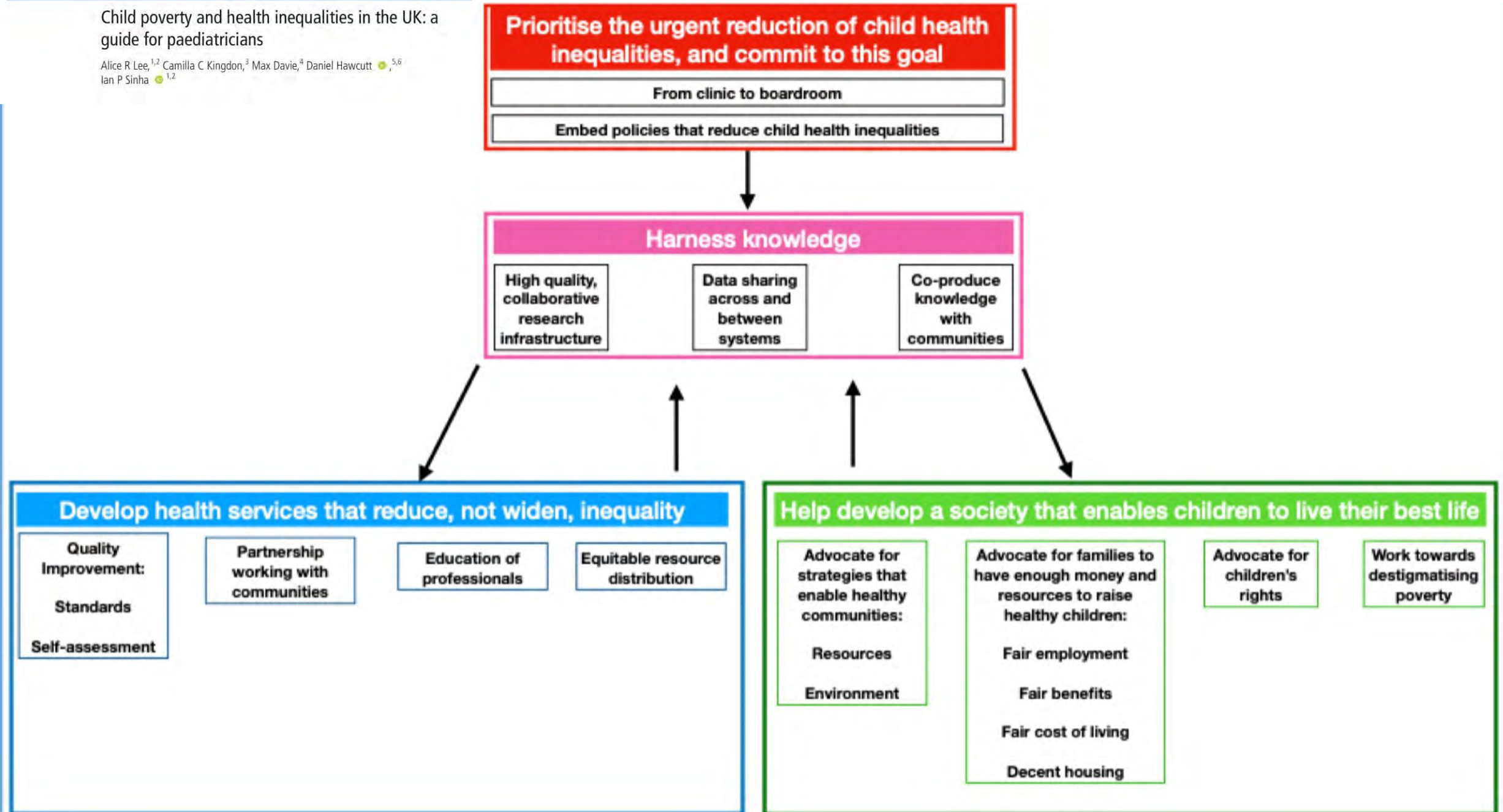
Chart data is indicative status only - © Royal College of Physicians - Technology by Crown Informatics (ID: NACAP-CYP-D1)

# EPIGENETICS IN ASTHMA



# Child poverty and health inequalities in the UK: a guide for paediatricians

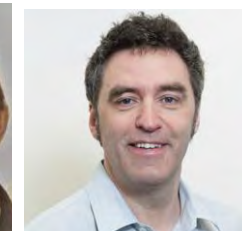
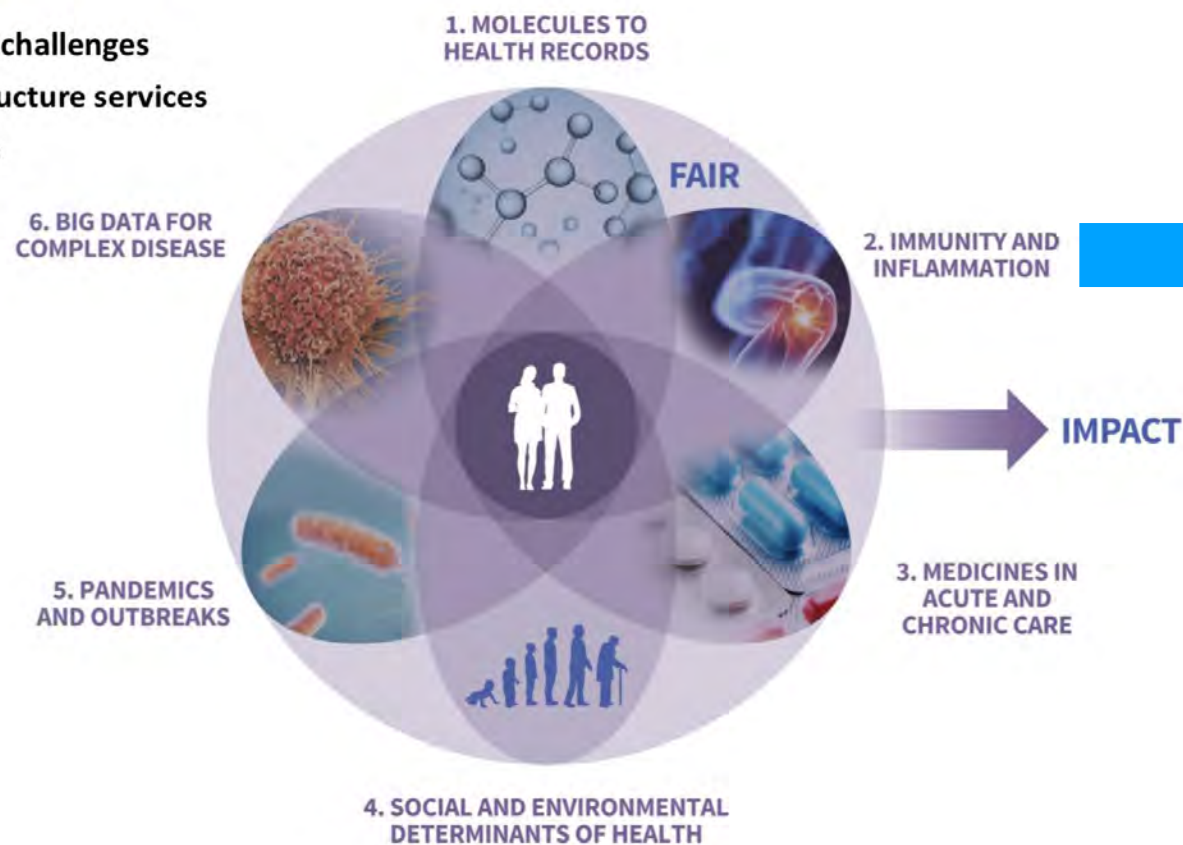
Alice R Lee,<sup>1,2</sup> Camilla C Kingdon,<sup>3</sup> Max Davie,<sup>4</sup> Daniel Hawcutt,<sup>5,6</sup>  
Ian P Sinha<sup>1,2</sup>





## Our Six Research Driver Programmes

- Address major health and societal challenges
- Guide development of the infrastructure services
- Outward looking with global reach



# Place Based Approaches to Respiratory Inequalities

- Understand the ethos, assets, and difficulties of a place
- Empower the voice of the community
- Develop links and data-driven approaches
- Parent champion models of care

Components of the Population Intervention Triangle



Figure 5. The Population Intervention Triangle model (PIT).

<https://www.gov.uk/government/publications/health-inequalities-place-based-approaches-to-reduce-inequalities/place-based-approaches-for-reducing-health-inequalities-main-report>



# STIGMA IS THE MACHINERY OF INEQUALITY

## • What needs to be done?

- **Fairer benefits:**
  - Amount, eligibility and administration
- **More affordable living costs:**
  - Housing, childcare, food
- **Better jobs:**
  - Better pay, robust hours, permanence

## • We must stop thinking child poverty is inevitable

- It is **NOT** a direct result of the economy
- It is **NOT** the fault of families in poverty
- It **IS** a man-made societal problem
- It **IS** the result of governmental choices
- It **IS** an issue of human rights

POVERTY IS AN ISSUE OF CHILDREN'S RIGHTS -

## WITH RIGHTS COME RESPONSIBILITIES



### Watchdog must do more to protect boy, 5, from landfill fumes, court rules

Doctors say Mathew Richards' life expectancy has been shortened due to exposure to hydrogen sulphide fumes



▲ Rebecca Currie with her son, Mathew Richards, five, who lives near the landfill site in Silverdale, Staffordshire. Photograph: Julian Hamilton/Outright

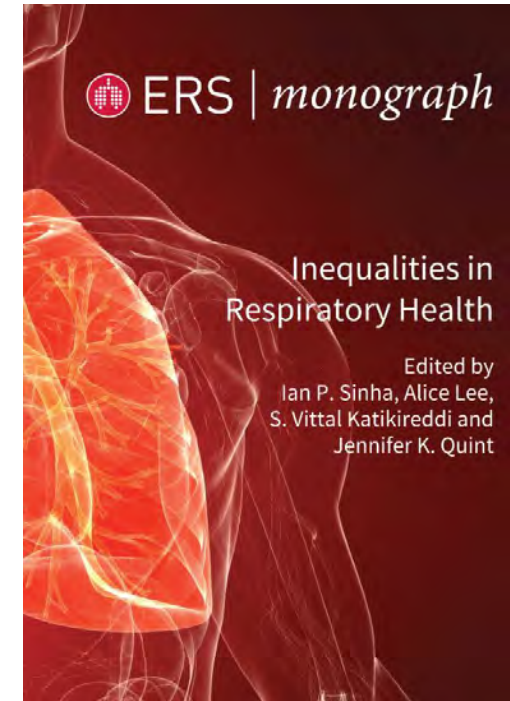
The high court has ruled the Environment Agency must do more to protect a five-year-old boy from landfill fumes that doctors say are shortening his life expectancy.

In a landmark judgment on Thursday, a high court judge said he was not satisfied that the EA was complying with its legal duty to protect the life of Mathew Richards, whose respiratory health problems are being worsened by fumes from a landfill site near his home in Silverdale, near Newcastle-under-Lyme.

The court accepted evidence from Dr Ian Sinha, a paediatric respiratory consultant at Alder Hey children's hospital, who said exposure to hydrogen sulphide fumes from the site "will have a lifelong detrimental effect on Mathew's future respiratory health" and would reduce his life expectancy.

# Summary

- The links between poverty and childhood asthma are clear - in terms of symptoms, exacerbations, and physiology
- Mechanisms are interlinked and complex, and reflect wide, deeply entrenched societal problems
- Exciting work is underway to address these problems
- Thank you



# **A.C.E- Assisting Children to Excel**

## **A health and housing proof of concept**

**Connie Jennings**

**Director Stronger Communities whg**





# The drivers



Walsall is part of the Black Country and is in the top **10%** of the most deprived districts in the country

**30%** of children live in **persistent poverty** and in some wards this is as high as **50%**

Healthy life expectancy is just **56.8** years

There is a higher prevalence of **hypertension, diabetes, kidney disease, depression** and **dementia**

Higher mortality from conditions considered preventable including **asthma**

**34%** of people living in disadvantaged communities are managing a long-term condition or disability



# The partners

**whg** is a place based social landlord providing over **21,000** homes within **19** local authority areas

**80%** of whg homes are located within a Core20 area

whg are Board Members of Walsall Together ICP

**NHS Black Country CYP Asthma Transformation Team** is part of the BC ICS implementing the NHS Bundle of Care for CYP

**Walsall Healthcare NHS Trust** provides hospital and community services for around 260,000 local residents

**George Coller Memorial Fund** registered charity with an overall aim to raise awareness of **asthma** and improve healthcare for children



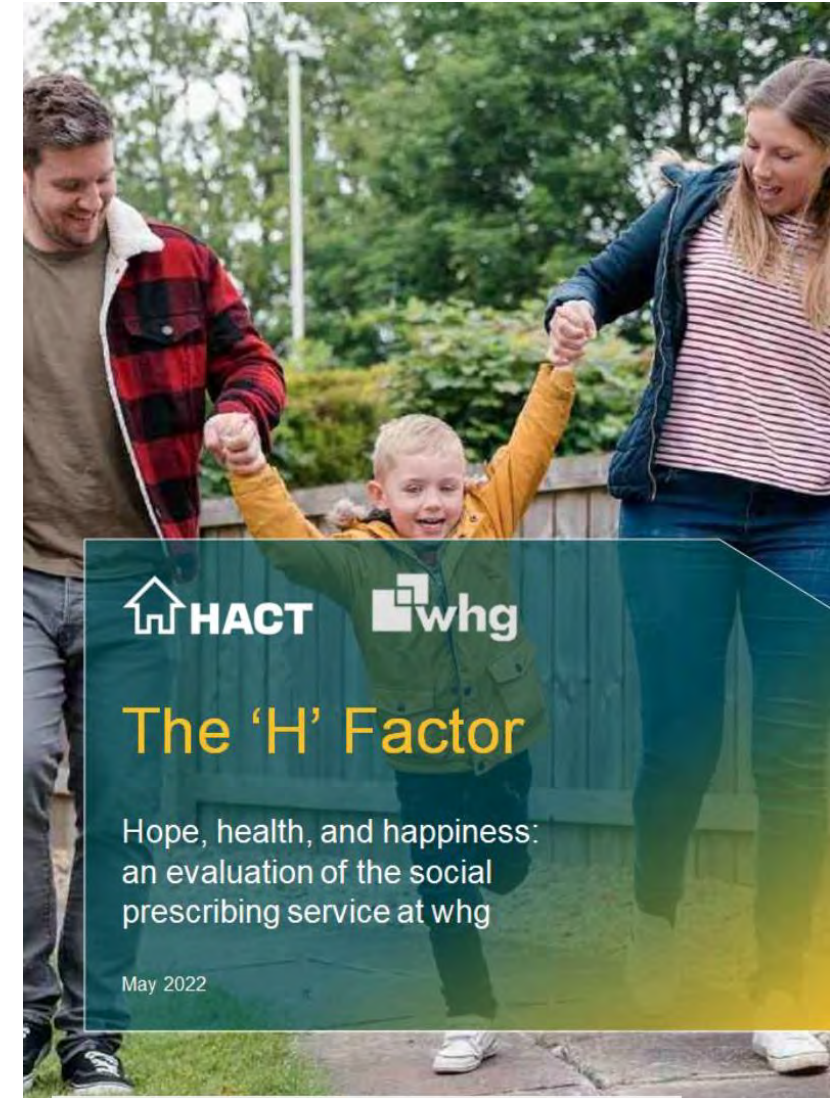


# The timeline



## Key events

- **2018** Hakeem Hussain died aged 7 from a preventable asthma attack
- **2022** coroner reported that Hakeem had been impacted by secondary smoke in his home
- **2022** whg completed desktop research and used local health data to understand correlation between poverty and asthma
- **A.C.E** was designed as a 12-month proof of concept, launched in July **2022**
- **2023** coroner's report identified that Awaad Ishak died due to extensive exposure to mould
- This led to creation of the Social Housing Act 2023 (Awaab's Law)



# The strategy



## whg Corporate Plan

### Successful People Successful Places

- Improve the health and prosperity of **10,000** people

## whg Health Wellbeing Strategy

### The H Factor- Health, Hope and Happiness

- Use **Social Prescribing** techniques to improve health
- Reduce the impact of poverty on children and families





# The model

whg's evidence-based **Community Champion** model proven **accelerator** to engage the **CORE20** population (often called hard to reach).

- Lived experience
- Theory of change
- Pied pipers - human bridge
- Maslow hierarchy of needs
- Clever conversations nudge
- Evidence based
- Model can be replicated and scaled, lifted and shifted



# The approach



- **Identify** children who live in a whg home with poor asthma control
- Identify whg homes where environmental conditions may impact on asthma, take prompt action
- Design **direct referral pathway** between health and housing
- Use strength-based approach, provide advice to parents
- Deal with **wider concerns** i.e. fuel poverty, barriers to engagement, language barriers

## Health equity





# A.C.E- Assisting Children to Excel

- A.C.E working group established between health and housing
- whg Community Champions/Social Prescribers trained in **CYP Tier 1** asthma awareness
- 100 asthma self management support packs distributed
- **87 asthma assessments** completed with those who scored low retested and signposted to GP services
- **93 children** provided with warm winter **coats, shoes** and **fuel vouchers**





# A.C.E- Assisting Children to Excel

- 23 homes identified with damp or mould leading to **priority repairs** being undertaken by whg (approach remove the damp and mould or move the customer)
- 2 families moved into **more suitable** accommodation
- Initial discussions with National Housing Federation re **Asthma Friendly Homes** approach
- Promotion within housing sectors publication Inside Housing (A.C.E. and #AskAboutAsthma campaign)
- Year 2 programme now launched with learning from POC embedded
- <https://www.insidehousing.co.uk/insight/insight/how-a-walsall-social-landlord-is-fast-tracking-damp-repairs-for-children-with-asthma-82319>



**Connie Jennings**  
**Director of Stronger**  
**Communities**

**07921934922**

**[Connie.jennings@whgrp.co.uk](mailto:Connie.jennings@whgrp.co.uk)**

# Case study: A severe asthma event

**Dr Oliver Anglin**

GP, Hampstead Group Practice

Clinical Director CYP Transformation, NHS England - London

# Context setting

- We are going to hear from Vasif from Croydon, 14, and his mum Rukhsana
- Vasif was diagnosed aged 3 following breathing difficulties and a visit to hospital
- No hospital admissions since
- Known asthmatic to GP
- Atopic, triggers include cold air, dust, grass. No eczema or food allergies.
- Mum, older sister and older brother have asthma & hayfever
- Dad smokes in house; evidence of mould, damp, cold conditions
- Medication: Repeat Seretide accuhaler 100 -1 dose bd, **however**, according to mum on Seretide 125 MDI, salbutamol MDI(x1) prn, montelukast, salbutamol nebuliser (April 21), cetirizine.
- Poor adherence. Lots of asthma meds in the house as the whole family asthmatic; inhalers used interchangeably and salbutamol used daily (even when not required)
- 3 courses of steroids in the year, the last one 3 months before the attack
- Seen by asthma nurse 1 month prior to attack; said would take Seretide
- Used salbutamol 7-10 times per day 3 weeks prior to attack
- **Admitted in December 2022**
- **Cardiac arrest in the ambulance, downtime of 20 minutes**
- **Length of time in hospital: 54 days**





- Risk of asthma as potentially fatal condition not communicated/ realised, both individually and within the family
- Poor adherence
- Lack of awareness of triggers (or not paying attention to them)
- Overuse of SABA and other flags not picked up by primary care
- Salbutamol bought over the counter and shared amongst the family
- Unprescribed home nebuliser use
- Lack of communication with parents/the wider family
- Environmental risk – damp, mould, cold

#AskAboutAsthma 2023



## Clinical Update

Dr Louise Fleming



# Conflict of interest disclosure

Affiliation / Financial interest	Commercial company
Grants/research support:	Asthma UK: Joan Bending, Evelyn Bending, Mervyn Stephens and Olive Stephens Memorial Fellowship; NIHR (EME); Asthma UK Centre for Applied Research
Honoraria or consultation fees:	Novartis, Chiesi, Astra Zeneca, Teva
Participation in a company sponsored bureau:	Astra Zeneca, Boehringer Ingelheim, Novartis, Synexus, GSK, Sanofi, Respi UK

All fees paid directly to my institution

**Member of GINA Science Committee**



# Overview: Recent Updates

- Diagnosis
- Anti inflammatory reliever therapy
- Severe asthma
- Environmental considerations

# Guideline Updates

- BTS/SIGN/NICE update in progress
- ERS Practice guideline diagnosis of asthma (published 2021)
- GINA global report updated annually (May 2023)

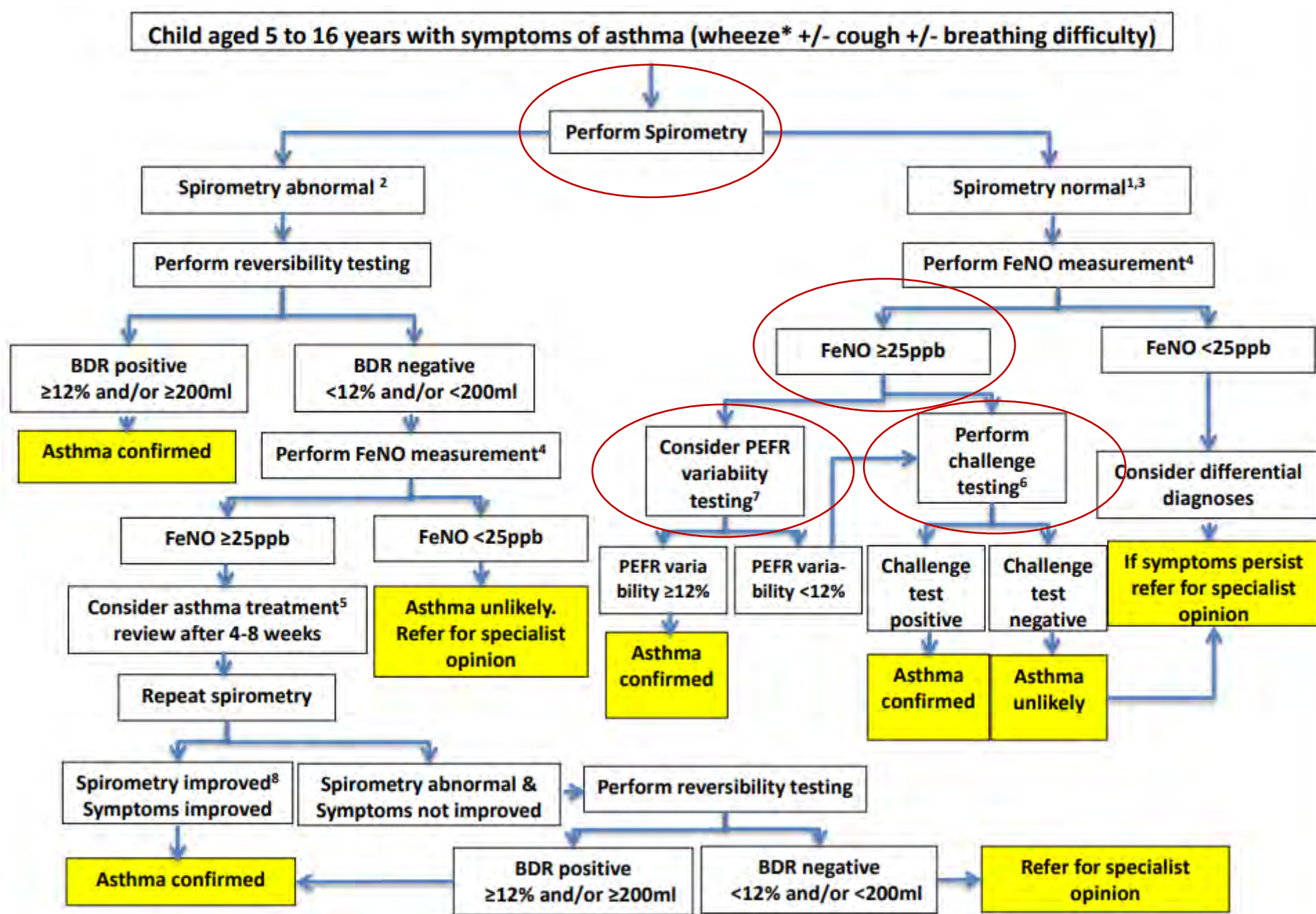
## Other updates

- Symbicort 200/6 licensed in UK for as needed use  $\geq 12$  years



## European Respiratory Society clinical practice guidelines for the diagnosis of asthma in children aged 5–16 years

- ERS Taskforce (including patient and parent representatives)
- Set of 9 PICO questions
- GRADE approach to assess quality of evidence and strength of recommendations
- Modified Delphi





# DIAGNOSTIC TESTS

	Recommendation	Remarks
PICO 1. In children aged 5–16 years under investigation for asthma, should the presence of the symptoms wheeze, cough and breathing difficulty be used to diagnose asthma?	<ul style="list-style-type: none"> <li>The task force recommends against diagnosing asthma based on symptoms alone (strong recommendation against the intervention, moderate quality of evidence)</li> </ul>	<ul style="list-style-type: none"> <li>Recurrent wheeze, cough and breathing difficulty are key symptoms of asthma. The task force considers a history of recurrent reported wheeze or wheeze on auscultation as the most important symptom of asthma</li> <li>Children with chronic cough (<i>i.e.</i> cough for &gt;4 weeks) as the only symptom are unlikely to have asthma and should be investigated according to the ERS guidelines for chronic cough in children [32] and a referral for further investigations to exclude differential diagnoses should be considered</li> </ul>
PICO 3. In children aged 5–16 years under investigation for asthma, should spirometry testing be used to diagnose asthma?	<ul style="list-style-type: none"> <li>The task force recommends spirometry as part of the diagnostic work-up of children aged 5–16 years with suspected asthma (strong recommendation for the intervention, moderate quality of evidence)</li> </ul>	<ul style="list-style-type: none"> <li>An <math>FEV_1/FVC</math> &lt;LLN or &lt;80%, or an <math>FEV_1</math> &lt;LLN or &lt;80% pred should be considered supportive of an asthma diagnosis. It is important to be aware that not all children are able to perform a sufficient FVC manoeuvre, resulting in a false normal <math>FEV_1/FVC</math> ratio</li> <li>A normal spirometry result does not exclude asthma</li> </ul>
PICO 4. In children aged 5–16 years under investigation for asthma, should BDR testing be used to diagnose asthma?	<ul style="list-style-type: none"> <li>The task force recommends BDR testing in all children with <math>FEV_1</math> &lt;LLN or &lt;80% pred and/or <math>FEV_1/FVC</math> &lt;LLN or &lt;80% (strong recommendation for the intervention, based on clinical experience)</li> </ul>	<ul style="list-style-type: none"> <li>Consider an increase in <math>FEV_1</math> <math>\geq 12\%</math> and/or <math>\geq 200</math> mL following inhalation of 400 <math>\mu</math>g SABA as diagnostic of asthma</li> <li>BDR &lt;12% does not exclude asthma</li> <li>Most task force members consider BDR testing when baseline spirometry is normal if the clinical history is strongly suggestive of asthma</li> </ul>
PICO 5. In children aged 5–16 years under investigation for asthma, should $F_{eNO}$ testing be used to diagnose asthma?	<ul style="list-style-type: none"> <li>The task force recommends measurement of <math>F_{eNO}</math> as part of the diagnostic work-up of children aged 5–16 years with suspected asthma (strong recommendation for the intervention, moderate quality of evidence)</li> </ul>	<ul style="list-style-type: none"> <li>A <math>F_{eNO}</math> value <math>\geq 25</math> ppb in a child with asthma symptoms should be considered as supportive of a diagnosis of asthma</li> <li>A <math>F_{eNO}</math> value &lt;25 ppb does not exclude asthma</li> </ul>

# National Bundle: Early and Accurate Diagnosis

## Diagnostic hubs

- EAD 1
  - ICSs should develop diagnostic hubs
  - Incorporate spirometry and FeNO
  - Appropriately trained staff
  - Criteria to support appropriate referral

## Diagnostic Pathways and Guidance

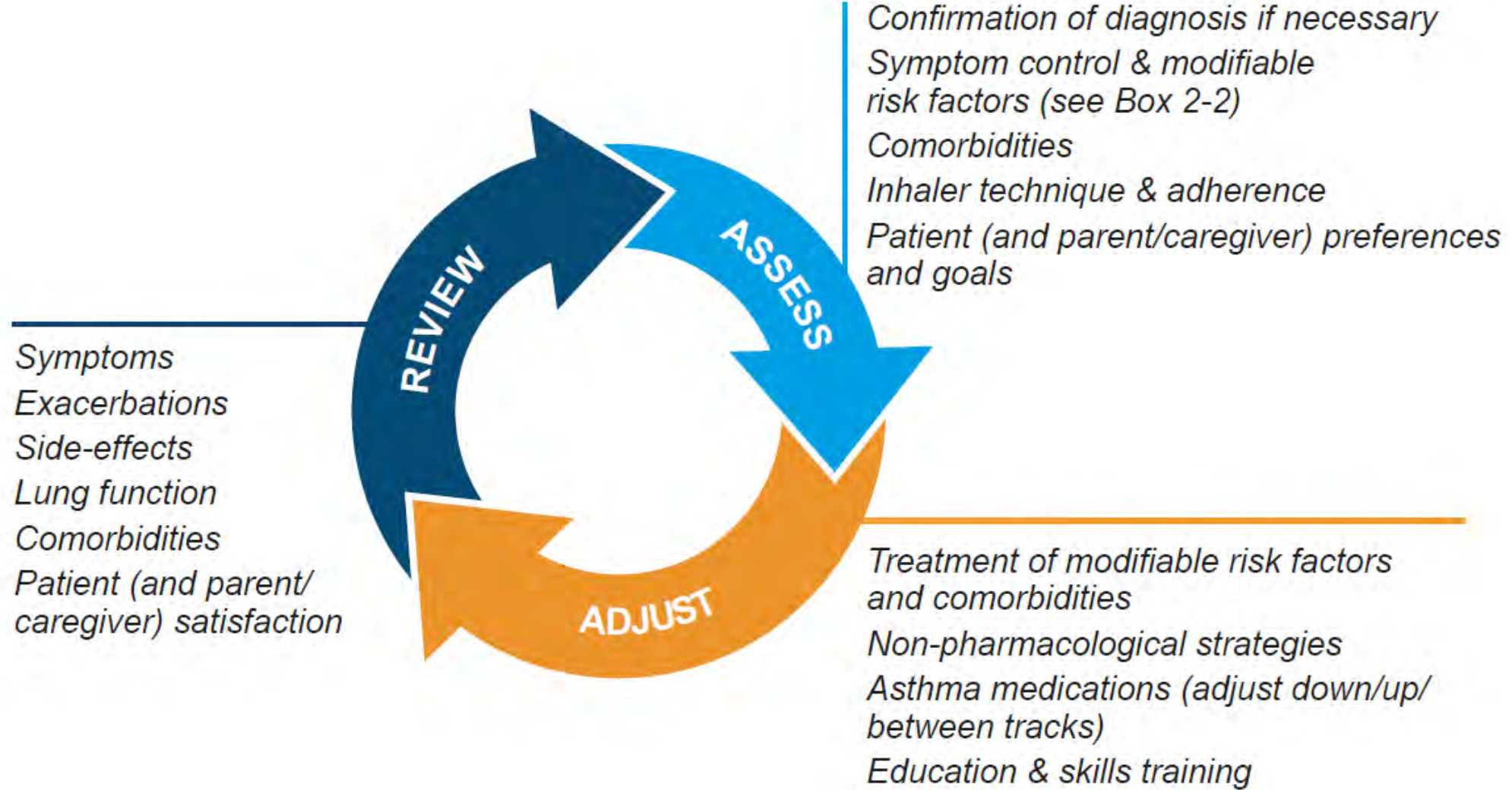
- EAD 2
  - Diagnosis based on clinical features and efforts should be made to ascertain an objective marker of airway inflammation and / or obstruction
- EAD 3
  - Diagnosis recorded in notes and coded
- EAD 4
  - Development of health education strategies

# Overview: Recent Updates

- Diagnosis
- **Anti inflammatory reliever therapy**
- Severe asthma
- Environmental considerations

# The Global Initiative for Asthma (GINA)

- GINA was established by the WHO and NHLBI in 1993
  - To increase awareness about asthma
  - To improve asthma prevention and management through a coordinated worldwide effort
  - Independent since 2014, funded only by the sale and licensing of its reports and figures
- The GINA report is a global evidence-based strategy that can be adapted for local health systems and medicine availability
  - Downloaded from over 200 countries
- The GINA Strategy Report is updated every year
  - Twice-yearly cumulative review of new evidence (including GRADE reviews)
  - Evidence integrated across whole asthma strategy, not isolated PICOT questions
  - Careful attention to study design, populations, and clinical relevance
  - Extensive external review
  - Practical focus: not just 'what', but 'how'
- All members of GINA Science Committee are active in clinical asthma research
  - See [www.ginasthma.com/aboutus/methodology](http://www.ginasthma.com/aboutus/methodology)





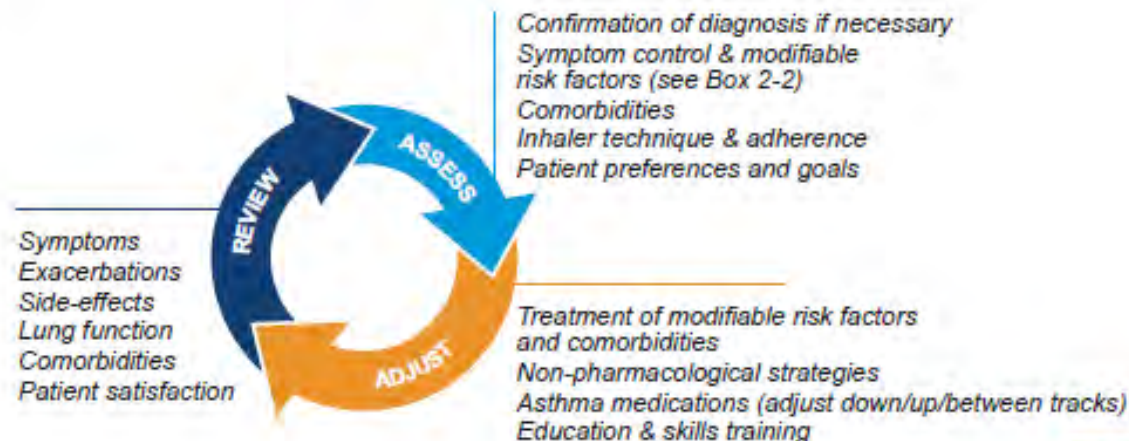
# Goals of asthma treatment

- Few asthma symptoms
  - No sleep disturbance
  - No exercise limitation
- } Symptom control (e.g. ACT, ACQ)
- Maintain normal lung function
  - Prevent flare-ups (exacerbations)
  - Prevent asthma deaths
  - Avoid medication side-effects
- } Risk reduction
- The patient's goals may be different
  - Symptom control and risk may be discordant
    - Patients with few symptoms can still have severe exacerbations

# GINA 2023 – Adults & adolescents 12+ years

## Personalized asthma management

Assess, Adjust, Review  
for individual patient needs



### TRACK 1: PREFERRED CONTROLLER and RELIEVER

Using ICS-formoterol as the reliever\* reduces the risk of exacerbations compared with using a SABA reliever, and is a simpler regimen

#### STEPS 1 – 2

As-needed-only low dose ICS-formoterol

#### STEP 3

Low dose maintenance ICS-formoterol

#### STEP 4

Medium dose maintenance ICS-formoterol

#### STEP 5

Add-on LAMA  
Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: As-needed low-dose ICS-formoterol\*

See GINA severe asthma guide

### TRACK 2: Alternative CONTROLLER and RELIEVER

Before considering a regimen with SABA reliever, check if the patient is likely to adhere to daily controller treatment

#### STEP 1

Take ICS whenever SABA taken\*

#### STEP 2

Low dose maintenance ICS

#### STEP 3

Low dose maintenance ICS-LABA

#### STEP 4

Medium/high dose maintenance ICS-LABA

#### STEP 5

Add-on LAMA  
Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: as-needed ICS-SABA\*, or as-needed SABA

Other controller options (limited indications, or less evidence for efficacy or safety – see text)

Low dose ICS whenever SABA taken\*, or daily LTRA, or add HDM SLIT

Medium dose ICS, or add LTRA, or add HDM SLIT

Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS

Add azithromycin (adults) or LTRA. As last resort consider adding low dose OCS but consider side-effects

\*Anti-inflammatory reliever (AIR)

As-needed-only ICS-formoterol  
(‘AIR-only’)

**STEPS 1 – 2**

As-needed-only low dose ICS-formoterol\*

**STEP 3**

Low dose  
maintenance  
ICS-formoterol\*

**STEP 4**

Medium dose  
maintenance  
ICS-formoterol

**STEP 5**

Add-on LAMA  
Refer for assessment  
of phenotype. Consider  
high dose maintenance  
ICS-formoterol,  
± anti-IgE, anti-IL5/5R,  
anti-IL4Rα, anti-TSLP

RELIEVER: As-needed low-dose ICS-formoterol\*

\*An anti-inflammatory reliever  
(AIR)

**TRACK 1: PREFERRED  
CONTROLLER and RELIEVER**  
Using ICS-formoterol as the reliever\*  
reduces the risk of exacerbations  
compared with using a SABA  
reliever, and is a simpler regimen

Maintenance and reliever therapy  
(MART) with ICS-formoterol



# GINA 2023 – Adults & adolescents 12+ years

Personalized asthma management  
Asthma Action Plan  
for individual patient care



**TRACK 2:** Alternative  
**CONTROLLER** and **RELIEVER**  
Before considering a regimen  
with SABA reliever, check if the  
patient is likely to adhere to daily  
controller treatment

**STEP 1**  
Take ICS whenever  
SABA taken\*

**STEP 2**  
Low dose  
maintenance ICS

**STEP 3**  
Low dose  
maintenance  
ICS-LABA

**STEP 4**  
Medium/high  
dose maintenance  
ICS-LABA

**STEP 5**  
Add-on LAMA  
Refer for assessment  
of phenotype. Consider  
high dose maintenance  
ICS-LABA, ± anti-IgE,  
anti-IL5/5R, anti-IL4R,  
anti-TSLP

RELIEVER: as-needed SABA, or as-needed ICS-SABA\*

\*An anti-inflammatory reliever  
(AIR) for Steps 3–5

# Terminology

- Reliever
  - For symptom relief, or before exercise or allergen exposure
- Controller (a term mostly used for ICS-containing treatment)
  - Function: targets both domains of asthma control (symptom control and future risk)
- Maintenance treatment
  - Frequency: regularly scheduled, e.g. twice daily
- Anti-inflammatory reliever ('AIR'), e.g. low dose ICS-formoterol or ICS-SABA
  - Provides a small dose of ICS as well as bronchodilator, when taken for symptom relief
  - **As-needed ICS-formoterol** can be used either **as-needed-only** in Steps 1–2 ('AIR-only'), or with maintenance ICS-formoterol, i.e. **maintenance and reliever therapy**, in Steps 3–5 ('MART')
  - **As-needed ICS-SABA** is currently recommended by GINA as a reliever for patients taking maintenance ICS-containing treatment in Steps 3–5; only one small study in Steps 1–2
  - Some small studies with separate ICS and SABA inhalers



# Why is GINA Track 1 preferred?

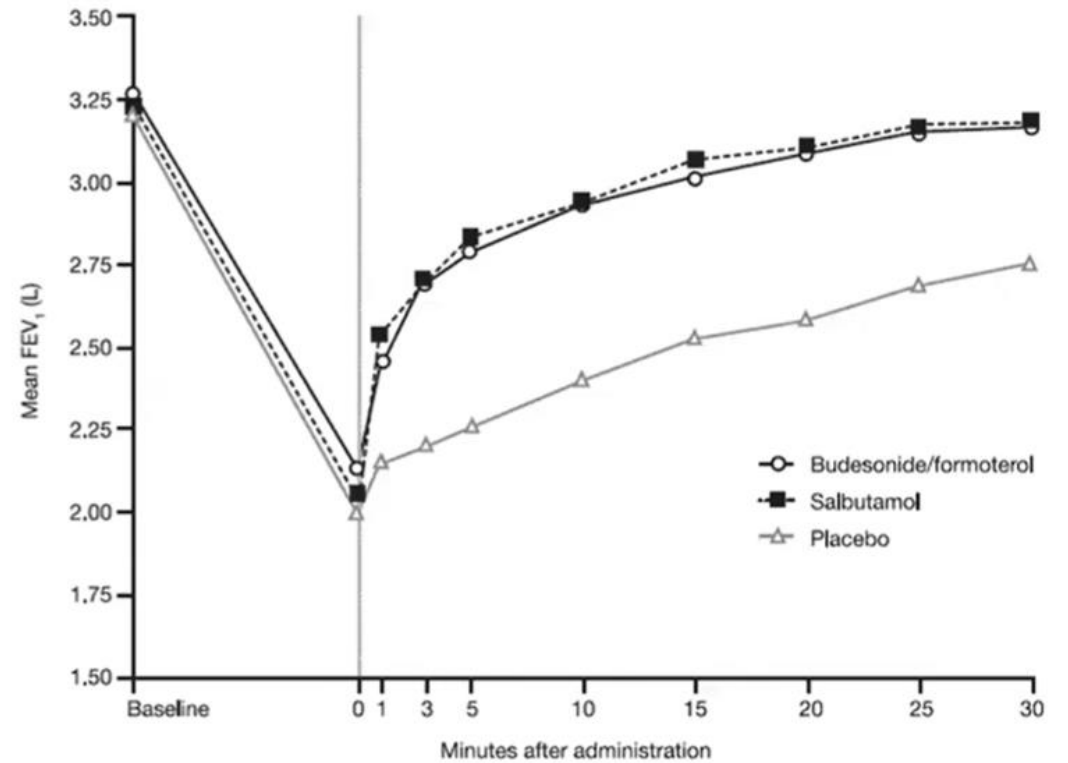
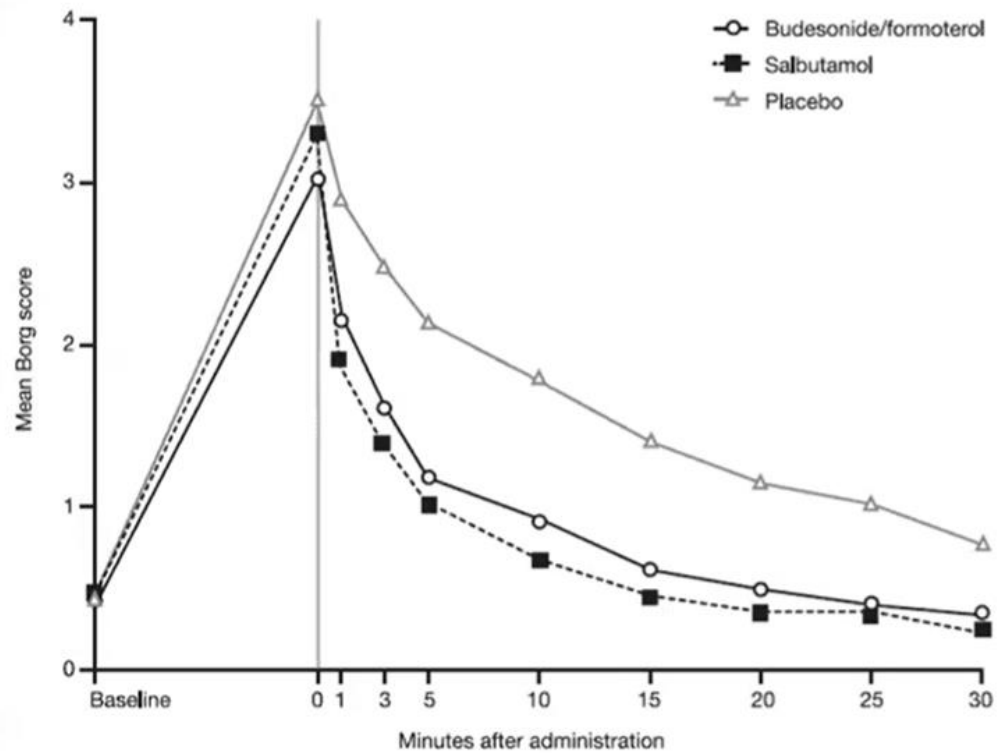
- Simplicity of approach for patients and clinicians
  - A single medication is used for symptom relief, and for maintenance treatment if needed
  - Treatment stepped down or up by changing the number of doses
  - Immediate small increase in both ICS and formoterol when symptoms occur
- **Steps 3–5:** weight of evidence for effectiveness and safety of MART with ICS-formoterol versus comparators plus as-needed SABA (n~30,000) *(Sobieraj et al, JAMA 2018; Cates et al, Cochrane 2013)*
  - One RCT (n=3,132) with as-needed ICS-SABA vs as-needed SABA *(Papi et al, NEJMed 2022)*
  - ICS-SABA cannot be used for maintenance and reliever therapy
- **Steps 1–2:** weight of evidence (n~10,000) for effectiveness and safety of as-needed-only ICS-formoterol compared with SABA alone, and compared with low-dose ICS plus as-needed SABA *(Crossingham et al, Cochrane 2021)*
  - One 6-month RCT (n=455) with as-needed ICS-SABA *(Papi et al, NEJMed 2007)*

# Classification of $\beta_2$ -Agonists

- Short-Acting
  - Salbutamol
  - Levalbuterol
  - Terbutaline
- Long-Acting
  - Salmeterol
  - Formoterol
- Ultra-Long-Acting
  - Vilanterol
  - Indacaterol
  - Olodaterol

$\beta_2$ -Agonist	Onset	Maximum bronchodilation	Duration
Salbutamol	2-3 mins	15 mins	3 – 6 hours
Salmeterol	15-20 mins	30 mins	12 hours
Formoterol	1-3 mins	10-15 mins	12 hours
Vilanterol	5 -10 mins	22 hours	48 – 72 hours

# Onset of action: formoterol



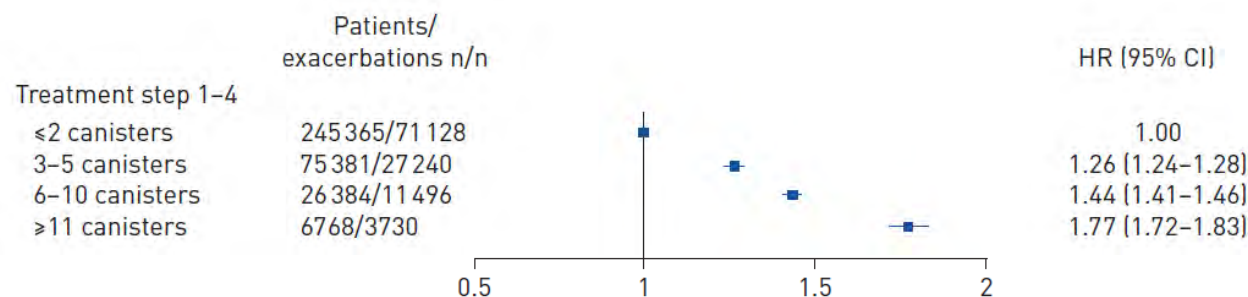
# Evidence Summary: Concerns about SABA only treatment and overuse

## Regular or frequent use of SABA, even for 1-2 weeks is associated with adverse effects

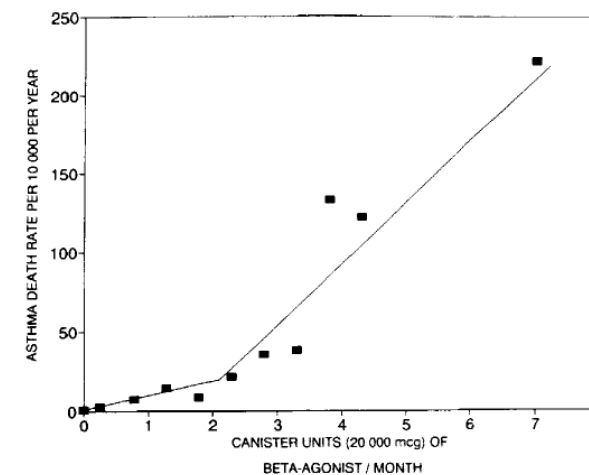
- $\beta$ -receptor downregulation, decreased bronchoprotection, rebound hyperresponsiveness, decreased bronchodilator response

Hancox, Respir Med 2000  
Aldridge, AJRCCM 2000  
Stanford, AAI 2012

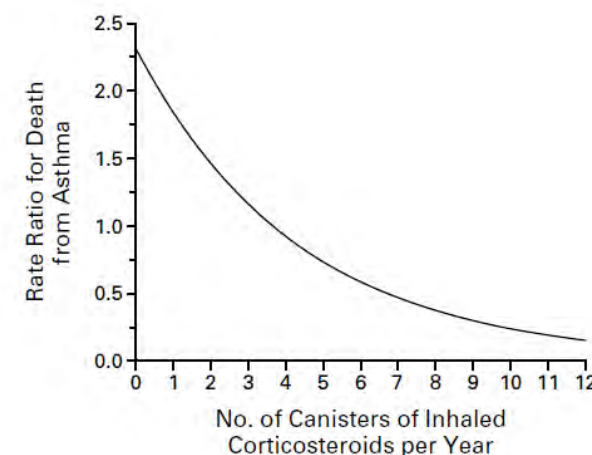
Patel M, Clin Exp Allergy 2013; 43:1144–1151.  
Johnston SL, Thorax 2009; 64:739–741.  
Edwards MR, J Biol Chem 2007; 282:15366–15375. 52.  
Turner S, J Allergy Clin Immunol 2016; 138:107.e5–113.e5



Nwaru, Eur Respir J 2020; 55: 1901872



Suissa AJRCCM, 1994:149;604-610



Suissa NEJM, 2000:343;332-326

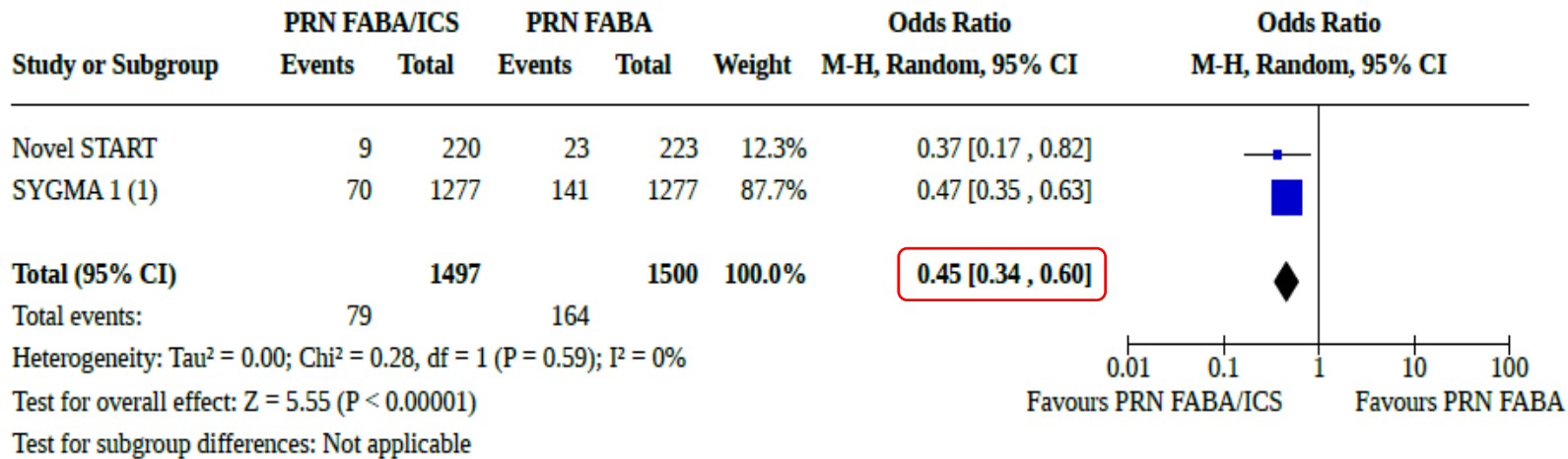
# Evidence Summary: Studies of as needed ICS-Formoterol

- SYGMA 1 (adults and adolescents)
  - 52 week, DB RCT, 3849 participants
  - terbutaline as needed / budesonide-formoterol as needed / budesonide maintenance
- SYGMA 2 (adults and adolescents)
  - 52 week, DBRCT, 4215 participants
  - budesonide-formoterol as needed / budesonide maintenance
- NOVEL START (adults only)
  - 52 week open label, parallel group
  - albuterol as needed / budesonide maintenance / budesonide formoterol as needed
- PRACTICAL (adults only)
  - 52 week open label, parallel group
  - ICS-formoterol as needed / budesonide maintenance

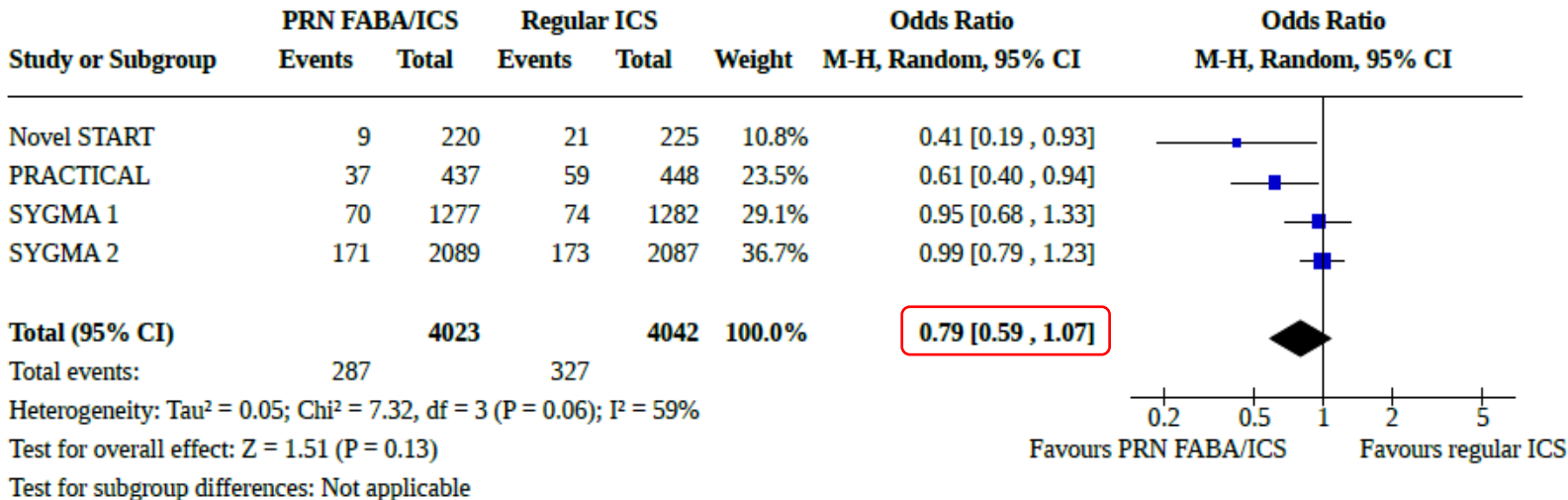
O'Byrne P, N Engl J Med 2018;378:1865-76  
Bateman E, N Engl J Med 2018;378:1877-87  
Beasley R, N Engl J Med 2019;380:2020-30  
Hardy J, Lancet 2019;394;919-928



# Evidence Summary: AIR as needed



55% reduction in severe exacerbations compared with SABA alone



Similar risk of severe exacerbations as with daily ICS + as-needed SABA

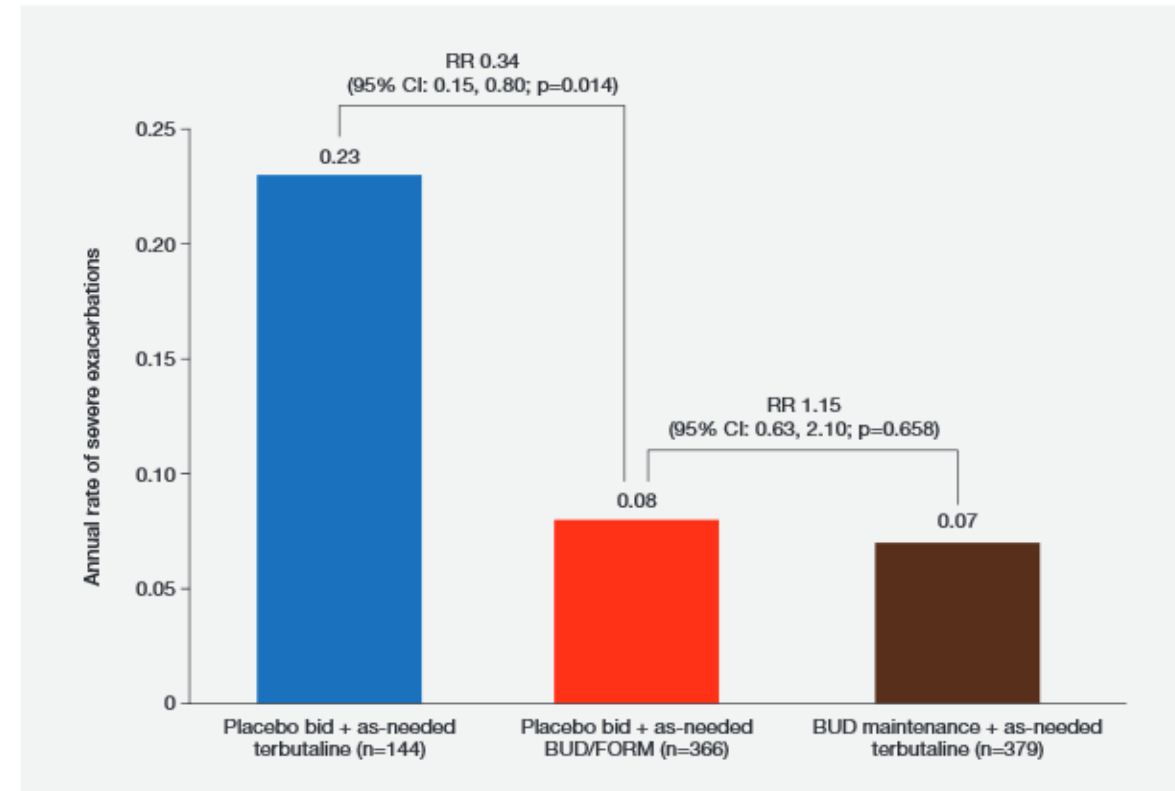
# SYGMA 1 and 2 Pooled Adolescent Results

Table 1. Baseline demographics and clinical characteristics: pooled adolescent population from SYGMA 1 and 2

	As-needed terbutaline (n=144)	As-needed BUD/FORM (n=366)	BUD maintenance + as-needed terbutaline (n=379)
Age, years, mean (SD)	13.9 (1.6)	14.2 (1.7)	14.1 (1.7)

- Annual rate of severe exacerbations significantly lower in BUD/FORM as needed compared to as needed terbutaline
- Exacerbation rate with as needed BUD/FORM was comparable to maintenance BUD

Figure 2. Annual severe exacerbation rate: pooled adolescent population from SYGMA 1 and 2

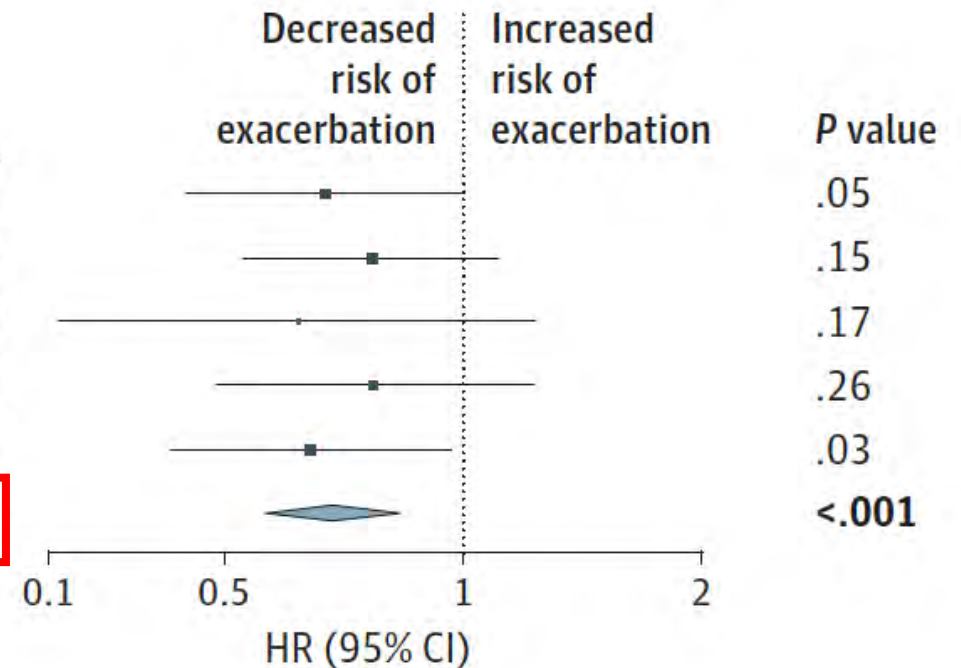


# Evidence Summary: AIR as part of MART

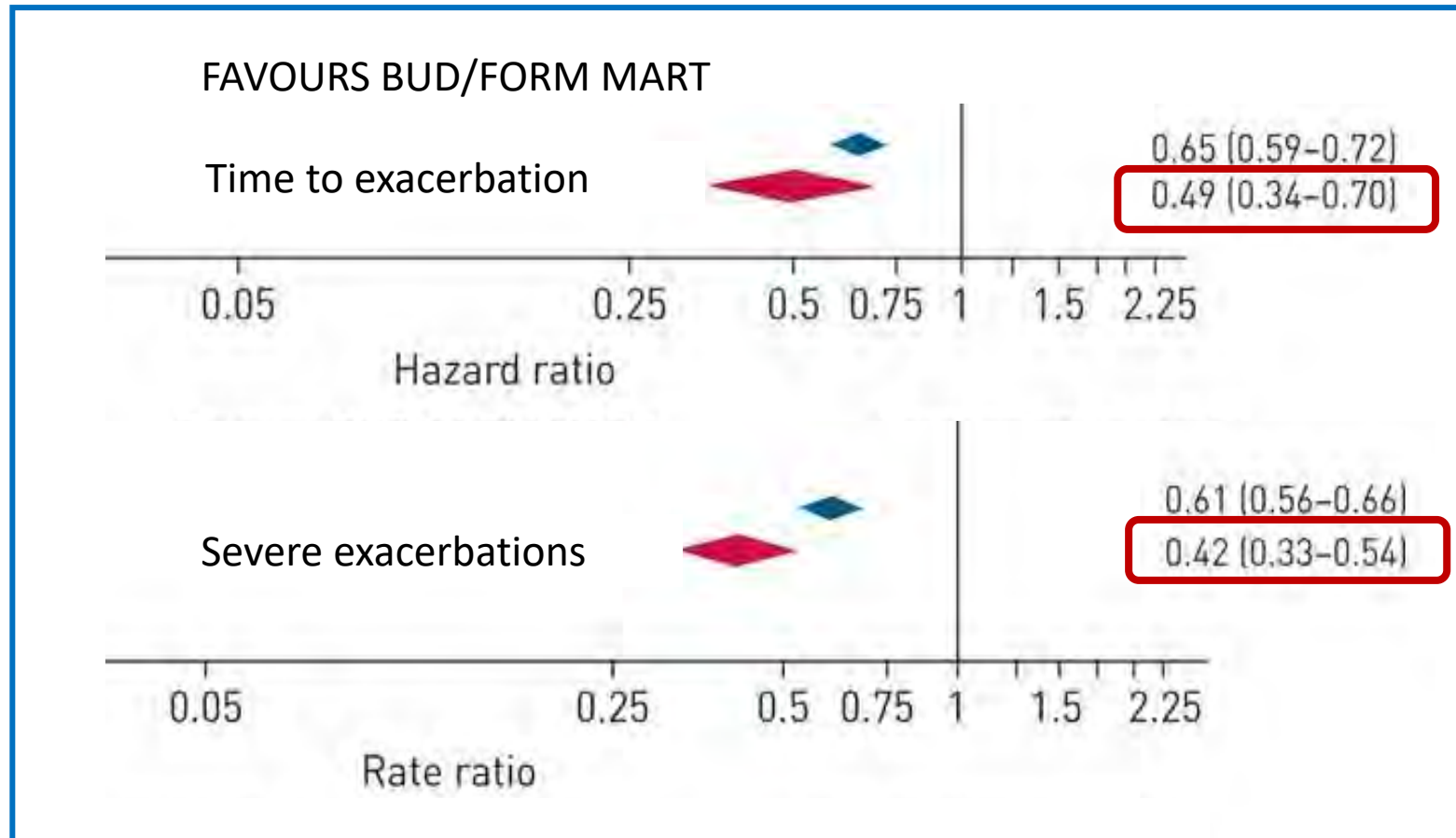
- Meta-analysis, 5 RCTs, step 3-4 GINA vs. SMART

## **B** SMART vs same GINA step 3 or 4

Trial	No. exacerbation, No./total No. (%)		HR (95% CI)
	SMART	GINA step 3 or 4	
AHEAD <sup>10</sup>	40/327 (12.2)	61/348 (17.5)	0.67 (0.45-1.00)
COMPASS <sup>8</sup>	41/333 (12.3)	108/681 (15.9)	0.77 (0.53-1.10)
Patel et al, <sup>9</sup>	13/46 (28.3)	21/48 (43.8)	0.62 (0.31-1.23)
SAKURA <sup>12</sup>	35/251 (13.9)	38/215 (17.7)	0.77 (0.49-1.22)
SMILE <sup>11</sup>	42/339 (12.4)	58/325 (17.8)	0.64 (0.43-0.96)
<b>Total</b>	<b>171/1296 (13.2)</b>	<b>286/1617 (17.7)</b>	<b>0.70 (0.58-0.85)</b>



# Evidence Summary: AIR as part of MART- Adolescents



Adults  
Adolescents

Post hoc analysis of six double blind RCTs (BUD/FORM MART)

# GINA 2023 – Adults & adolescents 12+ years

Personalised asthma management  
Asthma Action Strategy  
for individual patient care



**TRACK 2:** Alternative  
**CONTROLLER** and **RELIEVER**  
Before considering a regimen  
with SABA reliever, check if the  
patient is likely to adhere to daily  
controller treatment

**STEP 1**  
Take ICS whenever  
SABA taken\*

**STEP 2**  
Low dose  
maintenance ICS

**STEP 3**  
Low dose  
maintenance  
ICS-LABA

**STEP 4**  
Medium/high  
dose maintenance  
ICS-LABA

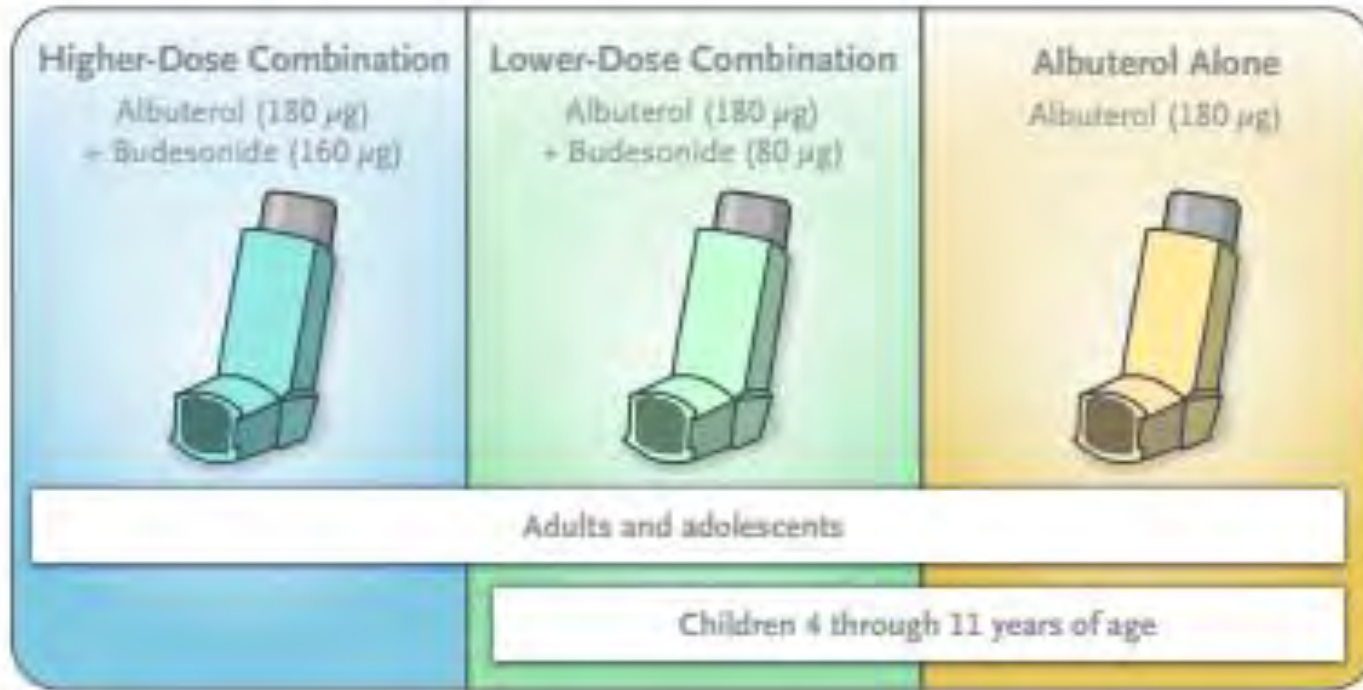
**STEP 5**  
Add-on LAMA  
Refer for assessment  
of phenotype. Consider  
high dose maintenance  
ICS-LABA, ± anti-IgE,  
anti-IL5/5R, anti-IL4R,  
anti-TSLP

RELIEVER: as-needed SABA, or as-needed ICS-SABA\*

\*An anti-inflammatory reliever  
(AIR) for Steps 3–5



# MANDALA study



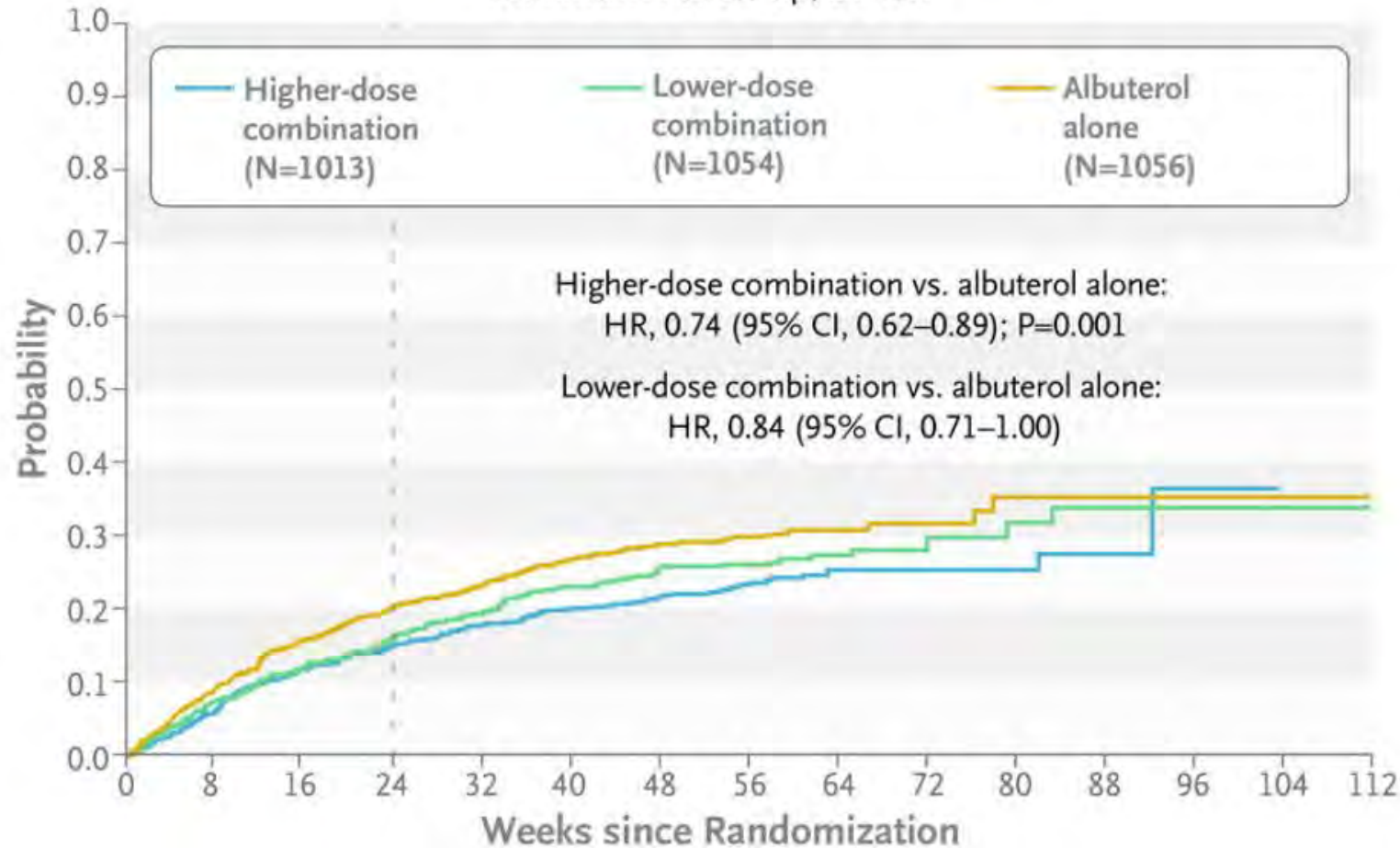
- RCT
- Moderate-severe asthma
- Medium to high dose of ICS or low to high dose of ICS/LABA
- 3 arms
- Adolescents and children included

<https://www.nejm.org/doi/10.1056/NEJMdo006554/full/>

# MANDALA study

## First Severe Asthma Exacerbation

Minimum Follow-up, 24 Wk



- For patients taking Step 3–5 maintenance treatment, HR for severe exacerbations was 0.73 (95% CI 0.61–0.88) with albuterol-budesonide 2 puffs of 80/80 mcg taken as needed, compared with 2 puffs of 80 mcg albuterol taken as needed
- Most benefit seen in Step 3

# Adolescents and Children: Step 3 and Above



Characteristic	Albuterol (180 µg)– Budesonide (160 µg) (N = 1013)	Albuterol (180 µg)– Budesonide (80 µg) (N = 1054)	Albuterol (180 µg) (N = 1056)	All Patients (N = 3123)
Age				
Mean — yr	50.6±15.1	48.5±16.7	49.1±17.2	49.4±16.4
Distribution — no. (%)				
≥4 to <12 yr	0	41 (3.9)	42 (4.0)	83 (2.7)
≥12 to <18 yr	34 (3.4)	32 (3.0)	34 (3.2)	100 (3.2)
≥18 to <65 yr	787 (77.7)	804 (76.3)	783 (74.1)	2374 (76.0)
≥65 yr	192 (19.0)	177 (16.8)	197 (18.7)	566 (18.1)

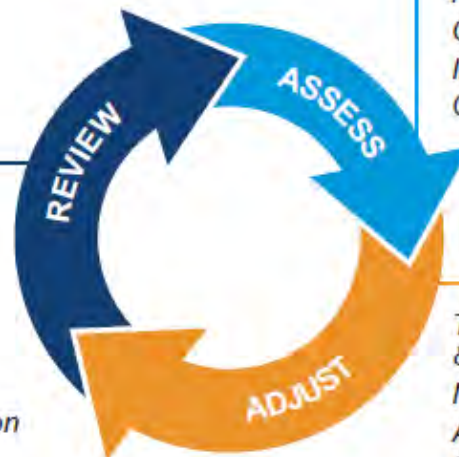


# GINA 2023 – Children 6–11 years

## Personalized asthma management:

Assess, Adjust, Review

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



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

Treatment of modifiable risk factors  
& comorbidities  
Non-pharmacological strategies  
Asthma medications (adjust down or up)  
Education & skills training

## Asthma medication options:

Adjust treatment up and down for  
individual child's needs

### PREFERRED CONTROLLER

to prevent exacerbations  
and control symptoms

Other controller options  
(limited indications, or  
less evidence for efficacy  
or safety)

#### STEP 1

Low dose ICS  
taken whenever  
SABA taken\*

Consider daily  
low dose ICS

#### STEP 2

Daily low dose inhaled corticosteroid (ICS)  
(see table of ICS dose ranges for children)

Daily leukotriene receptor antagonist (LTRA), or  
low dose ICS taken whenever SABA taken\*

#### STEP 3

Low dose ICS-  
LABA, OR medium  
dose ICS, OR  
very low dose  
ICS-formoterol  
maintenance and  
reliever (MART)

Low dose  
ICS + LTRA

#### STEP 4

Medium dose  
ICS-LABA,  
OR low dose  
ICS-formoterol  
maintenance and  
reliever therapy  
(MART).  
Refer for expert  
advice

Add tiotropium  
or add LTRA

#### STEP 5

Refer for  
phenotypic  
assessment  
± higher dose  
ICS-LABA or  
add-on therapy,  
e.g. anti-IgE,  
anti-IL4Rα,  
anti-IL5

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 relievers (AIR)

# Evidence Summary: ICS +SABA (Step 1-2)

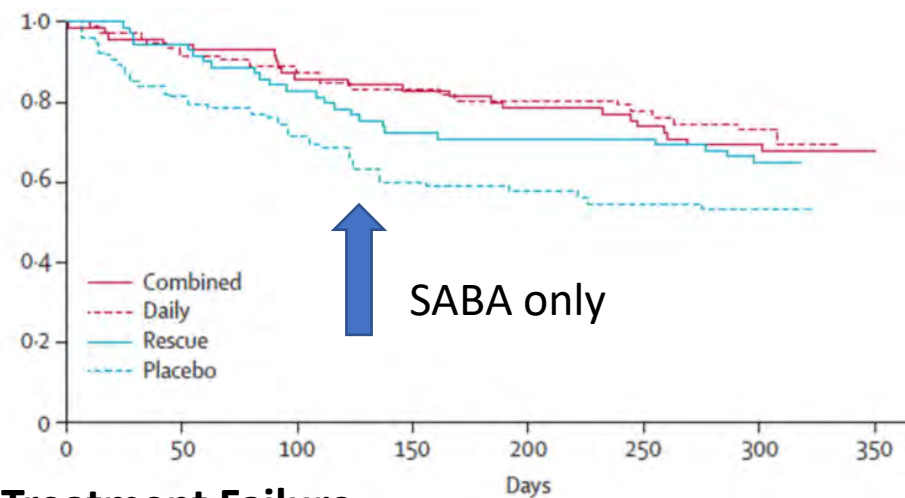
- TREXA (TReating children to prevent EXacerbations of Asthma)
  - 44 week DB RCT
  - Beclomethasone maintenance and rescue / beclomethasone maintenance / beclomethasone reliever / placebo
  - All groups also had albuterol reliever
- ASIST (Asthma Symptom-Based Adjustment of Inhaled Steroid Therapy in African-American Children)
  - Open label, pragmatic equivalence trial
  - Beclomethasone maintenance plus albuterol rescue / beclomethasone taken whenever albuterol needed



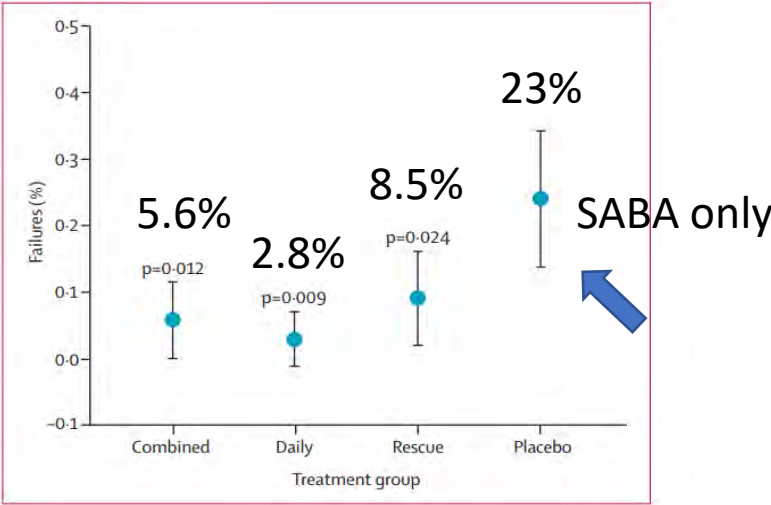


# TREXA RESULTS

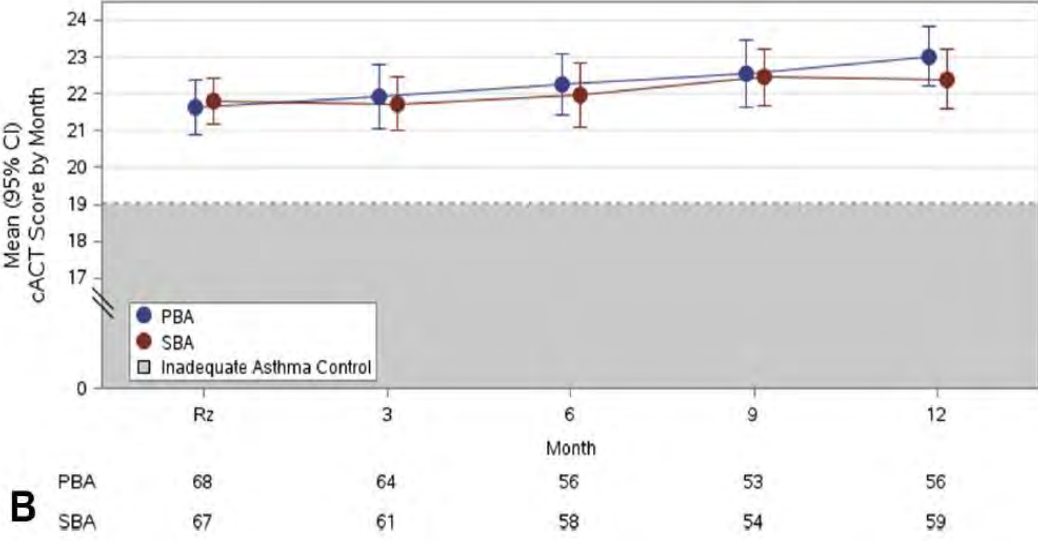
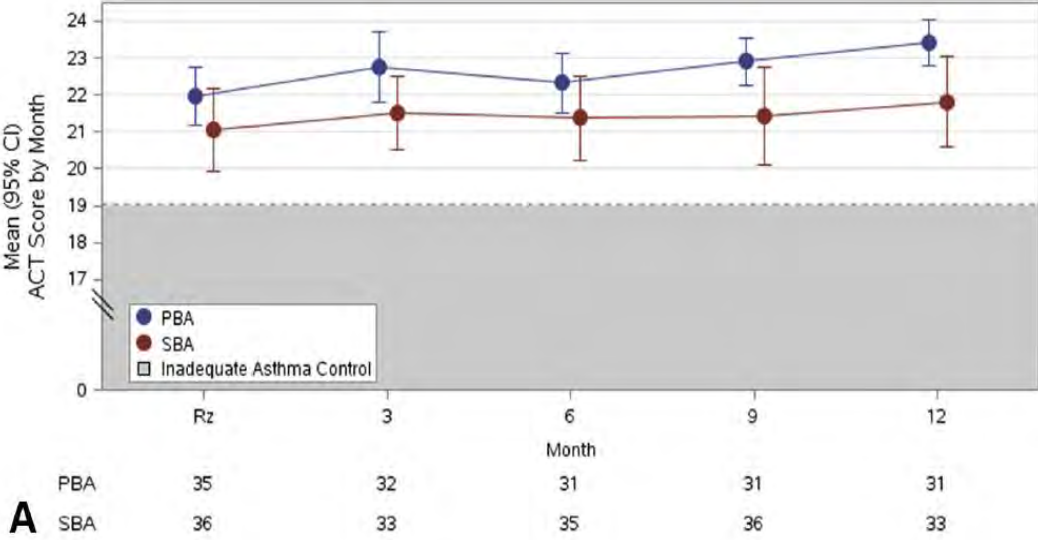
Time to first exacerbation



Treatment Failure

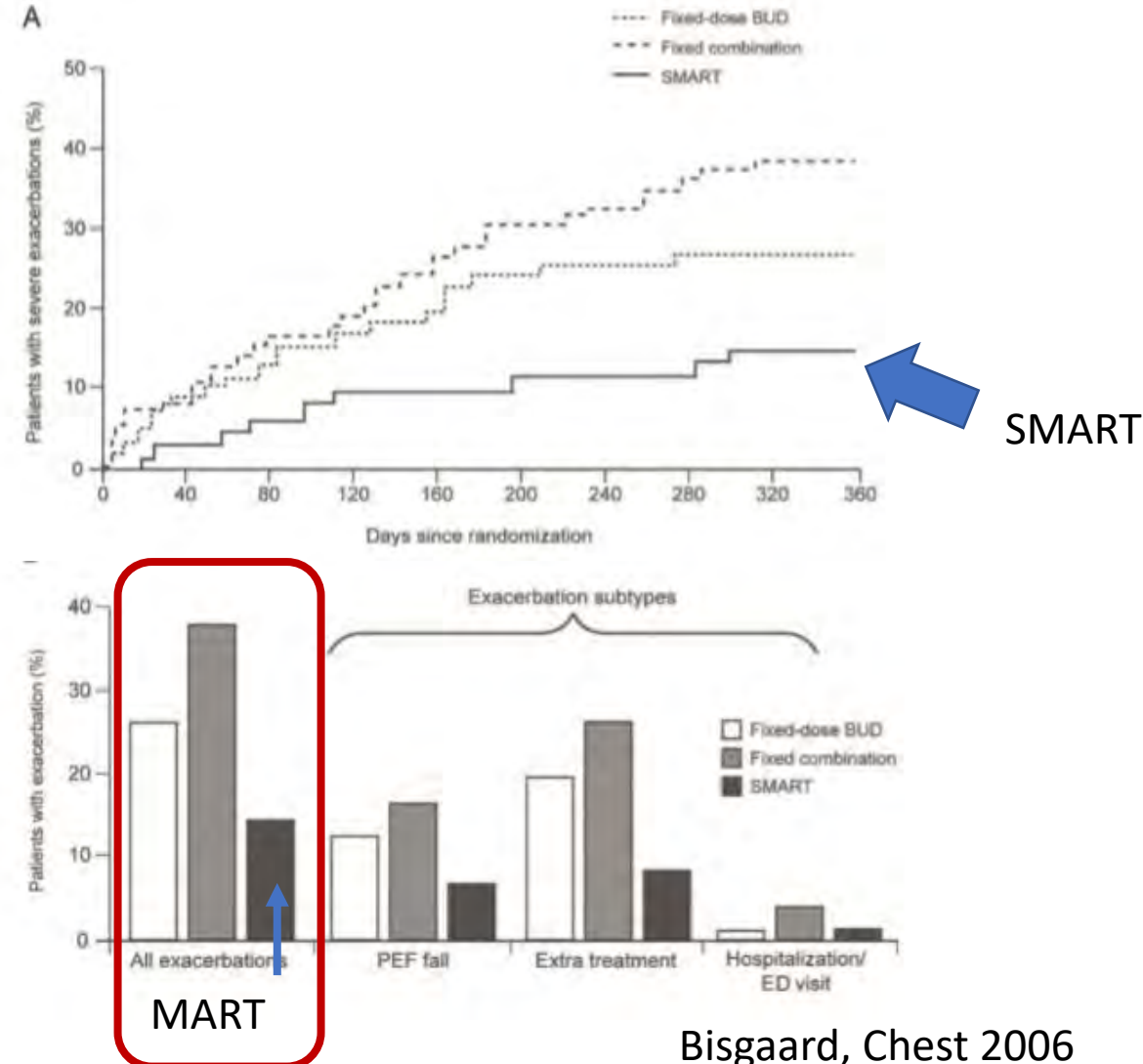


# ASIST RESULTS



# MART: Children 6 - 11years

- 12 month double blind RCT
- 341 children aged 4 -11 years randomised to:
  1. SMART: Budesonide/formoterol 80/4.5mcg once daily maintenance plus additional doses for symptom relief
  2. Fixed combination: 80/4.5mcg once daily
  3. Fixed dose budesonide: 320mcg BUD once daily
- Reduction in exacerbations by 70 - 79% compared to ICS and ICS-formoterol



Step	Age (years)	Medication and strength: mcg/inhalation metered dose via DPI* (delivered dose)	Dosage with DPI
Steps 1–2 (AIR-only)	6–11	No evidence to date	1 inhalation whenever needed
	12–17	Budesonide-formoterol 200/6 (160/4.5)	
	≥18	Budesonide-formoterol 200/6 (160/4.5)	
Step 3 MART	6–11	Budesonide-formoterol 100/6 (80/4.5)	1 inhalation once or twice daily (once daily for children), plus 1 inhalation whenever needed
	12–17	Budesonide-formoterol 200/6 (160/4.5)	
	≥18	Budesonide-formoterol 200/6 (160/4.5) or beclometasone-formoterol 100/6 (84.6/5.0)	
Step 4 MART	6–11	Budesonide-formoterol 100/6 (80/4.5)	2 inhalations twice daily (1 inhalation twice daily for children), plus 1 inhalation whenever needed
	12–17	Budesonide-formoterol 200/6 (160/4.5)	
	≥18	Budesonide-formoterol 200/6 (160/4.5) or beclometasone-formoterol 100/6 (84.6/5.0)	
Step 5 MART	6–11	Not recommended	2 inhalations twice daily, plus 1 inhalation whenever needed
	12–17	Budesonide-formoterol 200/6 (160/4.5)	
	≥18	Budesonide-formoterol 200/6 (160/4.5) or beclometasone-formoterol 100/6 (84.6/5.0)	

DPI: dry powder inhaler. For pMDIs with 3 mcg (2.25 mcg) formoterol, use double the number of puffs

# Practical advice for GINA Track 1

- Patients may be unsure that ICS-formoterol will work as well as their usual SABA
  - Suggest that they try it out at a convenient time
  - Emphasise that they need to use the ICS-formoterol instead of their previous SABA, and that they need to take more doses when they have more symptoms
- Advise patients to have two inhalers (if possible), 1 at home, 1 in bag/pocket
- Budesonide-formoterol can be used before exercise (*Lazarinis et al, Thorax 2014*) or before/during allergen exposure (*Duong et al, JACI 2007*)
- Advise patients to rinse and spit out after maintenance doses, but no need with as-needed doses
  - No increased incidence of candidiasis in RCTs with this recommendation (n~30,000)
- Use an action plan customised to MART
  - Maintenance doses stay the same, as-needed ICS-formoterol doses are increased

# Overview: Recent Updates

- Diagnosis
- Anti inflammatory reliever therapy
- **Severe asthma**
- Environmental considerations



# Difficult-to-treat and severe asthma

- Changes in GINA 2023
  - Mepolizumab (anti-IL5) added as a Step 5 option for children 6–11 years with severe eosinophilic asthma (*Jackson et al, Lancet 2022*)
- Regardless of regulatory approvals, GINA recommends biologic therapy for asthma **only** if asthma is severe, and **only** if treatment has been optimized
- Head-to-head studies are needed
- Severe asthma guide will be published shortly in full size

## STEP 5

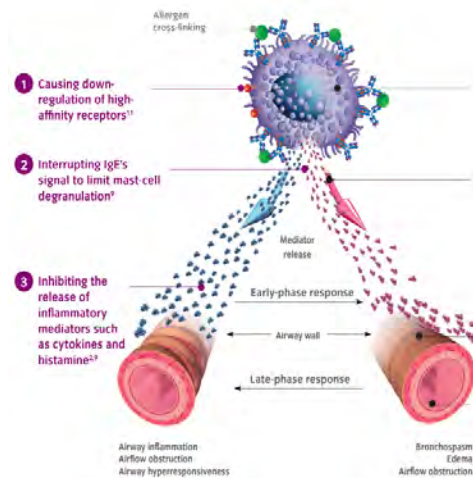
Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy, e.g. anti-IgE, anti-IL4R $\alpha$ , anti-IL5

As last resort, consider add-on low dose OCS, but consider side-effects

# Biologic summary

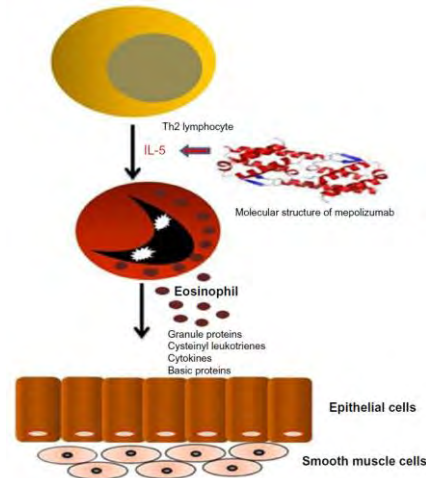
## OMALIZUMAB

- IgE binds to allergens triggering the release of mediators which causes inflammation
- Recombinant IgG<sub>1</sub> monoclonal anti-IgE antibody
- Eligibility: atopic asthma ≥6 yrs
- Dose based on IgE level 30 – 1500IU/ml and weight
- Injections every 2 to 4 weeks
- Reduction in exacerbations
- Improvements in quality of life



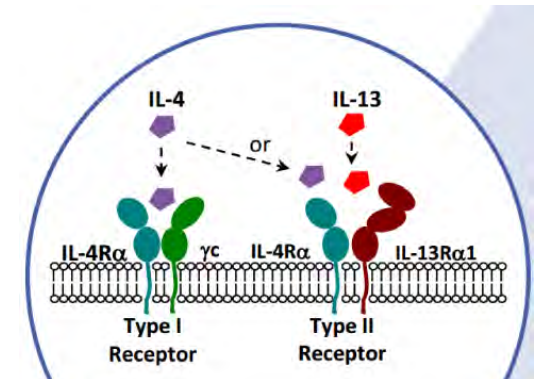
## MEPOLIZUMAB

- IL-5 is a key cytokine in eosinophil function
- Mepolizimab: recombinant monoclonal antibody to IL-5
- Eligibility: eosinophilic asthma ≥6 yrs (blood eos)
- Injections every 4 weeks
- Reduction in exacerbations
- Adolescents RR 0.6 (0.17 – 2.1)
- 6-11 years 0.73 (0.56 – 0.96)



## DUPIUMAB

- Binds to IL4 receptor  $\alpha$
- Blocks signalling of IL4 and IL13 (promote class switching of B cells to produce IgE and recruit eosinophils)
- SC injections every 2 weeks
- Hyper-eosinophilia in 4 -25%
- Reduction in exacerbations
- Improvement in lung function

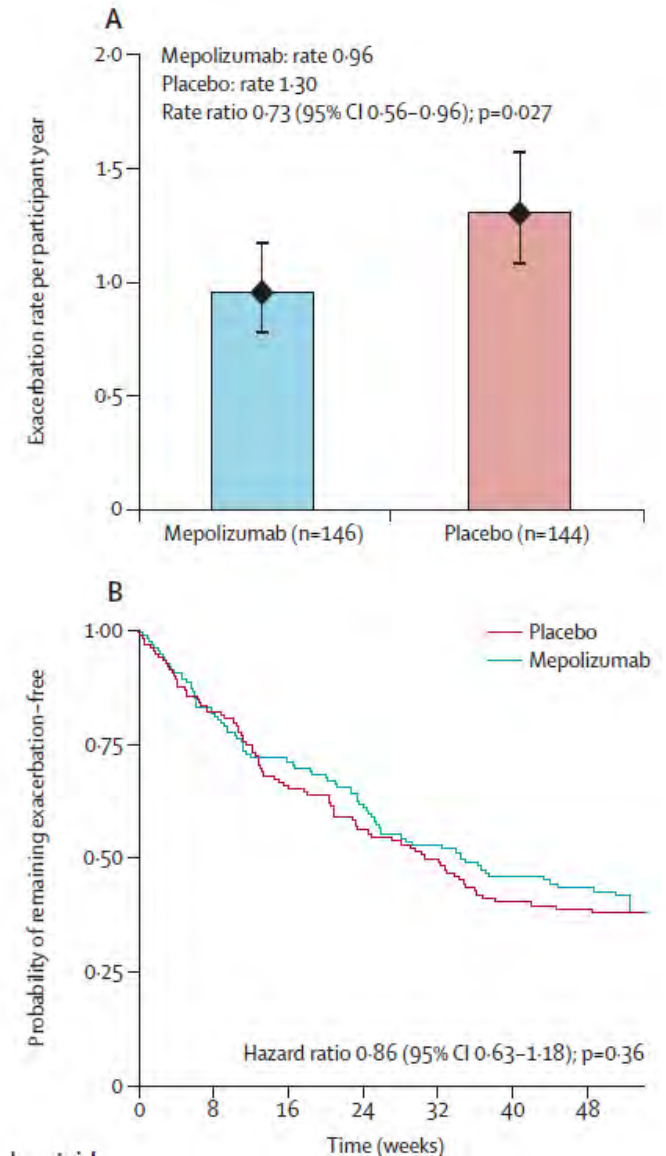


# Mepolizumab: Children Aged 6 – 17 years

MUPPITS-2: Randomised, double blind, placebo controlled, parallel-group trial

- Randomised, double blind, placebo controlled, parallel group trial
- 585 children and adolescents from disadvantaged socio-economic neighbourhoods
- Eosinophils  $\geq 150$  cells/ $\mu$ L and  $\geq 2$  exacerbations in previous year
- 27% reduction in severe exacerbations (adult studies  $>50\%$ )

Jackson, Lancet 2022;400:502-11



# Dupilumab: Children Aged 6 – 11 years

VOYAGE study: Children aged 6 -11 years, moderate to severe asthma (medium dose ICS plus second controller or high dose ICS alone or in combination,  $\geq 1$  severe exacerbation in previous year,  $FEV_1 \leq 95\%$ )

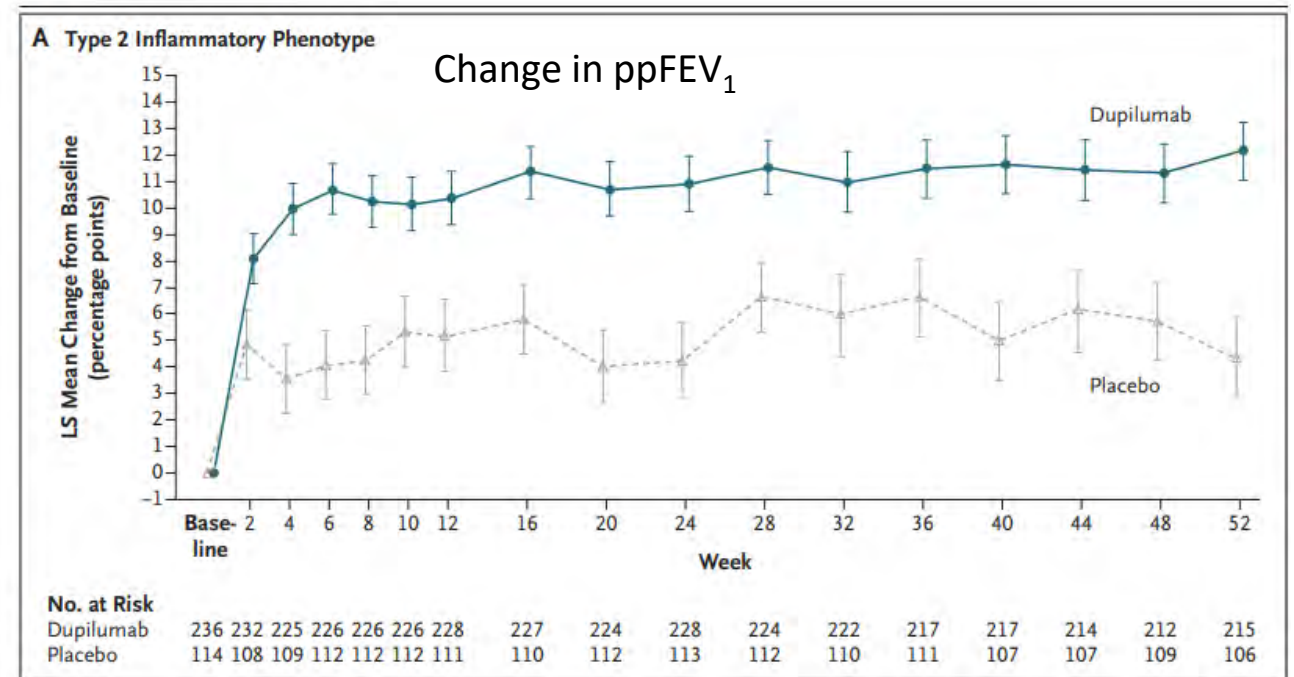
- 408 children randomised 2: 1 dupilumab versus placebo
- 100mg <30kg
- 200mg >30kg
- Every 2 weeks for 52 weeks
- Home administration allowed after 12 weeks

## Annualized rate of severe asthma exacerbations:

Dupilumab: 0.31 (0.22 to 0.42)

Placebo: 0.75 (0.54 to 1.03)

Relative risk reduction: 59.3%



Bacharier, NEJM 2021;385:2230-40

# Overview: Recent Updates

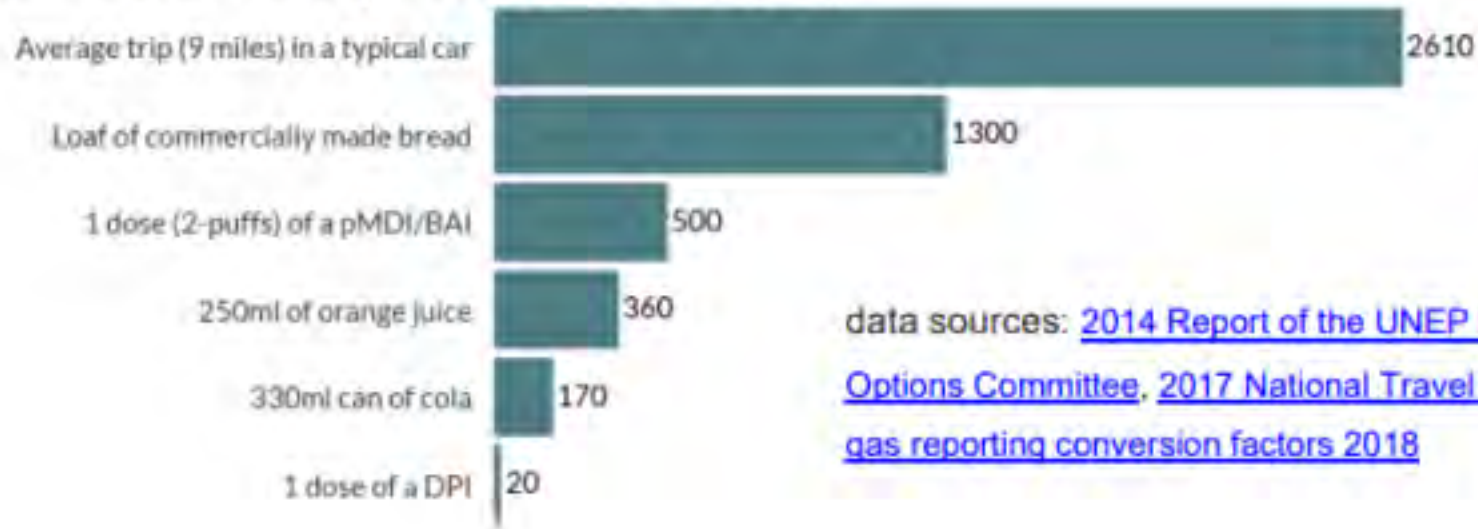
- Diagnosis
- Anti inflammatory reliever therapy
- Severe asthma
- **Environmental considerations**



# Environmental Considerations

**Figure 1. NICE inhalers for asthma patient decision aid estimated carbon footprint comparison (g CO<sub>2</sub> eq)**

**Estimated carbon footprint comparison (g CO<sub>2</sub>eq)**



data sources: [2014 Report of the UNEP Medical Technical Options Committee](#), [2017 National Travel Survey](#) & [Greenhouse gas reporting conversion factors 2018](#)

**For this patient, which is the right class of medication?**

Consider exacerbation risk reduction, symptom control, adverse effects  
If different reliever and controller inhalers are needed, consider questions below for both

⋮

**For these medications, which inhalers are currently available to the patient?**

Consider local availability, access, number of inhalers and cost to patient (higher cost → non-adherence → more exacerbations)

**Which of these inhalers can the patient use correctly after training?**

Test technique often: faulty technique → more symptoms, more urgent health care, and greater environmental burden

**OPTIMAL INHALER SELECTION**

**Safest and best for the patient and for the planet**

**Which of these inhalers has the lowest environmental impact?**

Consider manufacturing, propellant (for pMDIs), and potential for recycling

**Follow-up: Is the patient satisfied with the medication(s) and inhaler(s)?**

Consider all of above steps

- What is the right medication for this patient?
  - Control symptoms and reduce exacerbations
  - Urgent healthcare and hospitalization have a heavy environmental burden
- Which inhaler(s) can the patient access for this medication?
  - Low/middle income countries often have limited choice and access
  - Cost of inhalers is a major burden
- Which of these inhalers can the patient use correctly?
- What are the environmental implications of these inhaler(s)?
  - Manufacture
  - Propellant (for pMDIs)
  - Recycling potential
- Is the patient satisfied with the treatment and the inhaler?
  - Consider the patient's environmental priorities
  - Avoid 'green guilt', which may contribute to poor adherence
  - Check inhaler technique frequently

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SCHWEIZERISCHER NATIONALFONDS  
ZUR FÖRDERUNG DER WISSENSCHAFTLICHEN FORSCHUNG



Asthma UK Centre  
for Applied Research



# Next steps and close

Chaired by:

**Dr Oliver Anglin**

GP, Hampstead Group Practice

Clinical Director CYP Transformation, NHS England - London



# Social media

Join the conversation and share what you have learnt from today's conference using the hashtag **#AskAboutAsthma**:

- **Twitter:** @BCYP\_NHSLDN
- **Instagram:** @BCYP\_NHSLDN

To view all the content from the week so far including short videos, blogs and podcasts please visit our webpage, hosted on: [#AskAboutAsthma 2023 - Transformation Partners in Health and Care](#)



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# Thank You



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