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Reducing asthma deaths in children: lessons from the National Review of Asthma Deaths

Key learning points:

- ▶ Findings from the National Review of Asthma Deaths
- ▶ Factors that affect asthma mortality
- ▶ How nurses in primary care can help to reduce childhood deaths from asthma

Asthma is the most common long-term condition to affect children with approximately one million children having asthma in UK.¹ The UK has the highest prevalence of asthma in the world² yet compared to rest of Europe we have some of the highest rates of asthma mortality compared to the rest of Europe.³ Though our rates of wheeze are two to three times higher than rates in these countries, mortality is five to 10 times higher. When we consider care in UK and any variation across the country, data from 2012 showed the emergency admission rate for children (0-17yrs) with asthma per 100,000 population ranged from 25.9 – 641.9 (25-fold variation) between (what were then) PCTs.⁴ This variation highlights an increasing inequity in asthma services and so standardising care and sharing good practice is key to lowering such inequity. Asthma UK reports that 90% of deaths and 75% of admissions are avoidable. The questions we need to consider is how are we getting it so wrong and how can we improve outcomes for our patients with asthma?

The National Review of Asthma Deaths (NRAD) recently published its report entitled *Why asthma kills*.⁵ This was a confidential enquiry that reviewed systematically deaths from asthma for a 12-month period from 1 February 2012. Over recent years asthma deaths numbers are not falling⁵ and so this report was tasked with understanding why people of all ages die from asthma so that recommendations can be made to prevent more deaths in future years. Meaningful data that could be interpreted was provided by 195 cases (age 4-97 years), 28 (14% of total cases) of which were children under the age of 19 years; 10 children under 10 years, 18 children 10-19 years.

CASE STUDY

You are the practice nurse and have been asked to see John, a 12-year-old boy with asthma. He presents with wheeze and breathlessness and mother thinks he's having an attack. Before you

see him you review the past year on your computer system. You discover the following:

- He is prescribed beclomethasone 100 two puffs twice a day for the past 12 months.
- He missed his last annual review.
- He has requested 15 repeat prescriptions of salbutamol in the past year.
- He has had three courses of prednisolone in the past six months.

The questions to be addressed are:

- What's your immediate management of this child?
- What's your chronic management of this child?
- What's your plan for follow-up?

INITIAL ASSESSMENT

With any child that presents with "poorly controlled" asthma, especially if apparently on high dose treatment, one must always consider whether the diagnosis of asthma is correct. Cough is an important symptom but there should be additional symptoms, especially one of either wheeze/difficulty breathing/chest tightness. Probability goes up further if there are clear allergic triggers, family or personal history of atopy (eczema, food allergy, asthma or hayfever), widespread wheeze on listening to the chest or improvement in symptoms on asthma therapy.⁷

This boy is acutely wheezy and the diagnosis of asthma is clear. Your first priority is to treat the acute attack so firstly needs basic observations to assign a grade of severity for this asthma attack. He needs an oxygen saturation measurement, a recording of heart and respiratory rate and a peak flow reading. These values should be recorded in his notes and mean you can allocated a severity grade. The National Institute for Health and Care Excellence (NICE) quality standard clearly states; "People with asthma who present with an exacerbation of their symptoms receive an objective measurement of severity at time of presentation."⁶

It's vital to gather some history of what was happening prior to this visit to GP to ascertain what treatment was being given at home.

If the child was receiving 10 puffs of ventolin every hour before coming, the grade of severity should be the one above that worked out with his observations. Furthermore, how the John and his parents managed his attack tells you how adept they are at doing it and is an opportunity to go through acute management at home and what to do or when to seek help. Potentially, they may have left it late, but you'll only know this if you ask.

NRAD found that 45% died from asthma without any medical assistance during final attack and 75% of children died before they reached hospital. Does this reflect poor education of how to manage their asthma?

ACUTE MANAGEMENT

NRAD found that in those who died, their previous attack was deemed to have been managed adequately in 35% of cases. More than half of acute attacks not managed correctly.

Initial management should be 10 puffs of ventolin 100 via a mouthpiece (blue) spacer. There's no benefit using 5mg nebuliser but if they need oxygen (saturations < 92%) or have life-threatening asthma they should have a nebuliser. In this setting they need referring to hospital but until transfer is organised, stabilisation can be attempted using three "back-to-back" salbutamol nebulisers and administration of oral steroids within one hour of presentation.⁶ Children with severe or life-threatening asthma need urgent referral to hospital. Perhaps the hardest severity to manage is "moderate asthma" as they need a period of observation after giving them 10 puffs of ventolin to ensure they can cope for three to four hours before needing a repeat dose. During this period you can assess their inhaler technique and go over their chronic management. If the patient however has a history of life-threatening attacks you might refer them to hospital even if moderate asthma for a longer period of observation. If they can go home they must be given a personal asthma action plan (PAAP).

Only then can they go home to continue regular ventolin, 10 puffs every 4 hours but to seek medical advice if needs it more frequently. They must have a PAAP and it should mention the following:

- Triggers and current treatment.
- How to spot symptoms getting worse and what to do when they are.
- What to do in an emergency and when to call for help and who to call.

They should be told to come back after 48 hours for a review or sooner. The NICE statement regarding children treated for asthma in hospital or out-of-hours is that all should be followed up by their own GP practice within 48 hours.⁶

NRAD found that 10% of those who died did so within 28 days of hospital admission for an asthma attack. Prompt follow up of any child with asthma attack is key to ensure complete recovery.

CHRONIC MANAGEMENT

It's vital all sufferers of asthma whenever they present with an acute exacerbation should have an assessment of their control and a review regarding chronic management. It is likely that your experience of asthma sufferers is they often don't attend for their annual review but you can't assume this means their control is good.

Patients must always have a two-minute assessment to ascertain their control (in the weeks before recent attacks started) and not be asked simply "how is your asthma?" as often they will wrongly assume its fine.

One clue to help in assessing control is their rate of prescribing

for ventolin. If a patient has well controlled asthma all year round, they won't need more than three or four ventolin inhalers in a year. (This might be different for children as need inhalers at school or possible more than one house, but check where they are).

NRAD found that 39% of those who died had been prescribed more than 12 ventolin inhalers during their final year. Six patients had more than 50. Practices need alerts in place to highlight patients who are being prescribed excessive ventolin to get urgent assessment of their asthma.

If on direct questioning you ascertain their asthma is not controlled then you need to address this. If we take John, our case, from the little information we have its clear his control is poor since he needs a lot of ventolin, and has needed three courses of steroids in past six months. This might have been highlighted if he'd attended a review, but it's clear now at this GP visit and needs addressing now.

To assess why someone is badly controlled need to look at the following points:

1. Is it asthma? Review history as previously described and ensure correct diagnosis is made.
2. Are they taking their medicine? Adherence is key, with good asthma control associated with adherence >80% of treatment in one recent study.⁹ In primary care you have access to prescribing and can see how often they are requesting preventer treatment. You need to ask how often they might forget and whose supervising administration as poor control might warrant a period of parents watching each dose being given for a period. Poor adherence needs tackling and discussing around importance of preventer treatment and safety of steroid inhalers. This NRAD review can be mentioned and it should be emphasised that asthma kills children every year. If you suspect adherence isn't improving this should warrant a referral to secondary care. One reason for adherence might be they don't like the inhaler device (for example spacer in teenagers) so alternatives must be sought.
3. Are they taking their medicine correctly? All children must use a spacer for administration of all pressurized metered-dose inhalers (pMDI). No child can master the technique as the medicine via a pMDI comes out so quickly, the majority hits the back of the throat. Don't be fooled and emphasise they must use a spacer and show them how to do it at every review. Online videos can help to show them in clinic. In fact Levy et al showed adults achieve better control if they take inhaled steroids via a spacer or breath-activated device then via a pMDI alone.¹⁰ If they won't use a spacer then show them breath-activated alternatives. It's vital when a patient is started on a new inhaler they are showed how to use it properly at initiation.⁶
4. Is there something in the environment triggering the asthma? NRAD found that 36% of children who died were exposed to passive smoking. Persistent exposure to smoke will aggravate symptoms and lead to potential steroid resistance.¹¹ Dangers of smoking must be emphasised and smoking cessation treatment be offered to parents. Allergic triggers other potential problem, important ones being; house dust mite, pollens, pet dander and moulds. Ask about home environment and whether asthma is much better when on holiday away from home. Consider allergy testing to confirm a link between suggesting any changes. Hayfever is strongly associated with asthma and so symptoms of runny/itchy nose and eyes should be asked about and aggressively treated – see nicwe review by Scadding et al.¹² If you suspect an environmental trigger that parents aren't changing, a

referral to secondary care is warranted to test and confirm your suspicions.

- Are they on the right medicine? Of course a simple reason why someone's control is poor might just be because they need higher doses of preventative treatment, but this conclusion should only be made after previous issues addressed. Poor control should prompt education and possible step up in treatment immediately. Then the patient should be reviewed in six to eight weeks to ensure that treatment change has worked and asthma control is now adequate. If control is still not good, referral to secondary care must be the next step.

BACK TO OUR CASE JOHN

John is deemed to have "moderate asthma" and improves with 10 puffs of ventolin. While he's observed you have time to address issues since its clear he's poorly controlled. He denies using a spacer but says he takes his preventer inhaler every day. You explain importance of his treatment and issue him a PAAP. You show him how to use a spacer properly and he thinks he will use it. You advise the parents to supervise him with his preventer treatment. In view of his control you put his steroid dose up to beclomathasone 200 - two puffs twice a day - and request a review in six weeks. Ideally you give him a peak flow meter and ask him to measure readings twice a day to assess variability on this new treatment regime. You want to bring him back quickly in case he needs a combined inhaler like seretide but happy to not try now, in light of a history of poor adherence and poor technique.

Safeguarding issues for children with asthma

Whether managed in primary or tertiary care, children with asthma will potentially be required to attend numerous appointments dependent on the severity of their condition. For children to physically be present at appointments requires a parent or carer to take them. Powell and Appleton suggest that there is a need for all health professionals to be more proactive in ensuring the well-being and safety of children, particularly when they are known to miss appointments.¹³

In the case of children, the concept of DNA (did not attend) needs to be replaced by the simple fact that they 'were not brought.'¹³ Such failure to either not bring their child to appointments, or not assist them in their concordance with medication may constitute neglect. "Neglect is the persistent failure to meet a child's basic physical and/or psychological needs resulting in serious impairment of health and/or development. This may involve the parent or carer failing to ensure access to the appropriate medical care of treatment."¹⁴ Neglect is now recognised as one of the most dangerous forms of abuse because of its harmful and sometimes fatal effects.¹⁵ With this in mind if you have a scheduled clinic or appointment and the child is absent it is good practice to follow this up either by contacting the family directly or if this does not resolve the issue by contacting the Health Visitor for the under-fives population or the School Nurse for those age five to 18. To do nothing must not be an option.

CONCLUSION

We have outlined an approach to management of asthma in light of up-to-date evidence. The clear theme from NRAD is that there is complacency in the management of asthma in primary, secondary and tertiary care. This is not a time to apportion blame or responsibility but a call to action to improve the care we provide,

reduce variation and work closer together across all healthcare settings including pharmacy and education. Children are not "mini-adults" and developing a partnership with parents to achieve good control is vital, along with looking for alternative diagnoses and allergic triggers. It's important any health professional tasked with managing children should have necessary training to deal with this different population.

On a final note, a significant number of cases that could have contributed to NRAD were never investigated due to lack of engagement by the responsible clinician involved with the care of that patient who died. Every death is a tragedy, and rarely its one person's fault but health professionals shouldn't compound that tragedy by not learning from that death and so all future deaths of asthma should be subject to a local confidential enquiry and learning points established.

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