

Telling the truth about antibiotics: benefits, harms and moral duty in prescribing for children in primary care

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Synopsis

Antimicrobial resistance represents a growing threat to global health, yet antibiotics are frequently prescribed primary care for acute childhood illness, where there is evidence of very limited clinical effectiveness.

Moral philosophy supports the need for doctors to consider wider society, including future patients, when treating present individuals, and it is clearly wrong to waste antibiotics in situations where they are largely clinically ineffective at the expense of future generations.

Doctors should feel confident in applying principles of antibiotic stewardship when treating children in primary care, but they must explain these to parents. Provision of accurate, accessible information about the benefits and harms of antibiotics is key to an ethical approach to antimicrobial stewardship and to supporting shared decision making. Openness and honesty about drivers for antibiotic requests and prescribing may further allow parents to have their concerns heard and help clinicians to develop with them an understanding of shared goals.

Introduction

Antimicrobial resistance (AMR) poses ‘a fundamental threat to human health, development, and security’.¹ Demonstrable impact on global health² and dire predictions³ have led world leaders to commit to action addressing its root causes.¹

‘Antimicrobial stewardship’ (AMS) initiatives encourage prescribers only to prescribe antibiotics where there is a good chance of meaningful benefit. Such measures may be morally justified by the need to protect this ‘global public good’ as a precious resource,⁴ but can be difficult to reconcile with contemporary emphasis on patients’ right to self-determination. Indeed, focus on the needs and wishes of individual patients may explain the limited success of primary care interventions such as consultation toolkits, deferred prescriptions, point of care testing, and prescribing targets.⁵

In the UK, antibiotics are highly regulated and most are only available on prescription from health professionals. However, their use remains high, with 74 per cent prescribed in primary care.⁶ Most children with acute illness in the UK whose parents seek medical advice are seen by General Practitioners (GPs). A third of these consultations result in antibiotic prescription,⁷ despite most acute childhood illness being self-limiting, with very little benefit from treatment with antibiotics.⁸ A common reason for prescribing antibiotics is acute middle ear infections,⁹ where 82 per cent of children receive a prescription.¹⁰ Even where the cause is ill-defined, over 70 per cent are given antibiotics.⁷

Clinical effectiveness and AMR are important moral justifications for decisions about using antibiotics. However, a complex interrelation of attitudes, subjective norms, and perceived behavioural control motivate patients and prescribers.¹¹ We consider the impact of external influences and internal beliefs, as well as ethical rights and duties, on prescribing of antibiotics. To illustrate this, we use a clinical case to illustrate factors affecting the key ‘players’ involved (Figure 1). Highlighting moral and psychological arguments for and against antibiotic prescribing alongside evidence of clinical effectiveness, we call for more open, honest and clear communication between parents and clinicians to support informed shared decision making.

The ‘players’

The child

Thomas feels unwell. His ear hurts, and he cannot hear properly. He likes nursery, but does not want to go today: he feels cross and wants to be with his mother. He found taking antibiotics

very distressing when he was given them previously. He strongly disliked their taste and they gave him tummy ache and diarrhoea.

Young children often reject new or unfamiliar tastes, with sweet or salty foods being more likely to be accepted than sour or bitter ones.¹² Whilst antibiotics vary in their tolerability to children,¹³ most, being both novel to the child and bitter in taste, will run a high risk of rejection.¹⁴ Indeed, the palatability of some antibiotics is so poor that it has been suggested that they should not be prescribed for children in syrup form without first carrying out a taste test.¹⁴ Changes in a child's behaviour such as irritability, lethargy, and loss of appetite are common in all acute childhood illness. These non-specific features play an important part in parents' initial concerns and perception of illness severity, and consequently their desire for healthcare advice and for antibiotics.¹⁵ Many children taking antibiotics will also be affected by side effects. While usually mild, gastrointestinal upset with diarrhoea and vomiting is particularly common,¹⁶ and will contribute to the distressing experience of illness for the child, as well as his or her need for symptomatic relief and comfort from caregivers. Side effects may also be confused with symptoms of illness and thus fuel parental concerns.

The parent

Mrs Parker's primary concern is for Thomas' wellbeing. She wants to remove his pain, is anxious about his hearing loss, and worries about what to do if he gets worse. Parents describe the need for a 'sense of control' of the 'perceived threat' of symptoms such as fever or pain and potential harm, and a fear they may fail to recognize a serious problem.¹⁷ Knowledge about antibiotics and infection varies considerably,¹⁸ and distressing reports of adverse events may increase anxiety.¹⁹ Safety-netting by other healthcare providers may also prompt parents to seek assessment of their child.

However, this does not necessarily mean that parents expect antibiotics. Parents feel a serious moral responsibility in caring for sick children,¹⁷ and may feel a need to share this.¹⁵ In consulting their GP, they seek reassurance that the illness is not serious, and practical advice on monitoring and controlling symptoms.¹⁹ In fact, many parents may be disinclined to accept antibiotics²⁰ due to difficulty in administering them, worries about side effects, or fear that exposure to antibiotics will result in their child becoming 'resistant' to their effects.^{17,21}

Mrs Parker's secondary concern is her need to return to work. Working parents face significant external pressures including the need for appropriate childcare.²² Many nurseries have policies to exclude children with fever or infection unless they have antibiotics.²³ Furthermore, care of children is an area subject to societal judgement and parents may feel pressure from family,

friends or other carers to seek health advice; perhaps antibiotics may be used to demonstrate that they have taken action to safeguard against serious illness.

The GP

Dr Jones' first concern is also the wellbeing of her patient.²⁴ Dr Jones is motivated not to prescribe antibiotics by familiarity with evidence on treatment of acute childhood illness and a reluctance to set up a cycle of re-consulting based on expectation of antibiotics, .

Most doctors will be aware of the risk of AMR through antibiotic prescribing, though they may vary in their sense of responsibility for contributing to this. A number of AMS initiatives influence GPs, from financial incentives to threat of regulatory action for 'overprescribing'.²⁵ However, prognostic uncertainty, attitude to risk, and time and workload pressures may outweigh GPs' concerns about AMR.²⁶ Fear of missing a serious infection in a child may induce GPs to give antibiotics 'just in case'.¹⁹ Whilst the risk of serious consequences of not prescribing antibiotics is low,^{7,27} tragic cases of fatal sepsis²⁸ may result in a perception of higher stakes. Perceived pressure from parents,¹⁹ and a desire to maintain a healthy therapeutic relationship whilst avoiding negative feedback,²⁹ may also prompt a decision to prescribe. Prescribing often takes less time than explanation and advice on symptom control and why antibiotics are not appropriate, and can be used as a strategy to curtail lengthy consultations.²² Consequently, time constraints in primary care favour antibiotics.

GP workload has risen dramatically in recent years.³⁰ Increased practice size and more part time working means that watchful waiting is challenging. Difficulty in scheduling follow-up is likely influence both GPs' inclination to prescribe and parents' wish to receive antibiotics. GPs may prescribe to avoid the need for subsequent consultations or use of out of hours services; antibiotics are more likely to be prescribed at the end of the week where follow up is unavailable.³¹

Benefits and harms of prescribing antibiotics

Benefits

i. Clinical efficacy

Parents and healthcare professionals share key goals in acute childhood illness: removal of distress, resolution of symptoms, and avoidance of serious consequences. Clearly, there will be situations where antibiotics are likely to provide these benefits, where they are effective and necessary treatments. Unfortunately, identifying these situations is often difficult, particularly in primary care, and arguably especially in children.

Point of care testing can help alleviate diagnostic uncertainty,³² although GPs may use this more as a communication aid.³³ Clinician experience and ‘gut instinct’ is also a valuable measure.³⁴ However, it will remain hard to predict benefit from antibiotics and to differentiate between an infection that is likely to resolve spontaneously and one which might leave some vulnerable children open to complications without treatment.²⁶ Nevertheless, evidence exists to inform these assessments. In acute otitis media, for example, studies show little evidence for efficacy of antibiotics. Most children are better in 24 hours regardless of antibiotics, and immediate treatment has no impact on incidence of pain, deafness, tympanic membrane perforation or recurrence.¹⁶ Antibiotics can reduce the likelihood of serious complications of acute otitis media, including mastoiditis. However, GPs would have to treat nearly 5000 children to prevent one episode.³⁵ Antibiotics seem to have most benefit in children less than two years old with bilateral acute otitis media, where four episodes need to be treated for one additional beneficial outcome (NNTB), and in children of all ages with otorrhoea (NNTB 3).¹⁶

Based on this evidence, it is unsurprising that professional guidelines recommend a restrictive approach to antibiotic use in situations of this kind. PHE³⁶ and NICE³⁷ guidelines recommend ‘no antibiotics’ or ‘delayed antibiotics’ in treatment of most childhood acute otitis media. Two to three day delayed or immediate antibiotics are recommended only in children with otorrhoea and in those aged less than two years with bilateral infection.

ii. Benefits beyond clinical efficacy

Assessment of treatment benefit is highly subjective: parents’ and clinicians’ conception of an ideal outcome may differ widely. A small reduction in duration of illness,¹⁶ or risk of complications^{16,35} may seem sufficient justification for antibiotics to some parents. Indeed, for some clinicians, a duty based, beneficent approach, focused on the individual,³⁸ as promoted by the GMC,²⁴ might support prescribing antibiotics with small chance of benefit where there was little risk of harm.

Described as ‘*more than a treatment*’,¹⁷ obtaining antibiotics helps some parents to cope, providing reassurance that their concerns are taken seriously. It may also help preserve good doctor-patient relationships, avoiding conflict over direct requests for antibiotics.³⁹ Regardless of their clinical effect, issuing antibiotics may permit access to childcare and allow parents to return to work.⁴⁰

However, there are very significant opportunity costs in prescribing antibiotics for these ‘indications’. Apart from unnecessary contribution to AMR, this approach misleads patients,

violating the central requirement for truthfulness in medical interactions.^{24,41} The ‘deception’

inherent in prescribing antibiotics knowing that they are highly unlikely to be clinically effective may risk strengthening unrealistic expectations of antibiotics, or alternatively, in providing an inconsistent message, lead to loss of trust in healthcare professionals and failure to seek appropriate advice in future.

Harms

i. Harm to the child

The incidence of harmful effects with antibiotic use in children is high.⁴² One in fourteen is likely to develop vomiting, diarrhoea or a rash because of treatment,¹⁶ while antibiotic use in children has also been linked to an increased risk of asthma,⁴³ obesity,⁴⁴ juvenile idiopathic arthritis,⁴⁵ and reduced microbiome diversity.⁴⁶

More importantly, the risks of AMR to the individual child treated with antibiotics are increasingly real. Patients treated with antibiotics carry bacteria resistant to that antibiotic for up to 12 months after treatment,⁵ and when people develop antibiotic resistant infections in primary care their outcomes are worse, with failure of treatment, more severe symptoms and delayed recovery.⁴⁷ Though the occurrence of such resistant infections currently remains relatively rare, and the vast majority of side effects experienced by children are very mild, it is essential that the existence of these risks be acknowledged by clinicians and explained to parents.

Finally there may be a further risk to children in antibiotic prescribing through false reassurance: where clinicians have real concerns, prescription of antibiotics may allay concerns of both parents and clinicians when hospital assessment might be more appropriate.

ii. Impact on health services

The cost of most commonly used antibiotics is relatively low compared with many other drugs, so their prescription is unlikely to result directly in a serious financial burden for health systems in developed countries, although the volume of antibiotic prescribing is such that their cost is high.⁴⁸ The greater burden may come from resource use, through heightened expectations of future prescriptions, driving a cycle of early re-attendance and thus intensifying pressures in primary care.^{49,50} Further significant costs will arise from treating patients with antibiotic resistant infections.⁴⁷

However, there may also be negative health service impact from decisions not to prescribe antibiotics. Parents unable to obtain antibiotics in primary care may seek help elsewhere,

adding to strain on acute NHS services such as Accident and Emergency, or following other avenues, such as private GP services⁵¹ or ‘self-prescribing’ via overseas-based Internet pharmacies that give potentially unregulated access to antibiotics online.^{52,53}

iii. The individual child versus the public

Medical practice has traditionally been viewed as a beneficent therapeutic interaction between doctor and patient,⁵⁴ unaffected by outside interference. This ideal still influences professional guidelines, with the GMC²⁴ requiring that doctors make the individual patient their first concern.

However, prescribing antibiotics does not affect only those individuals. In economic theory, costs or benefits to third parties as a consequence of an activity are termed externalities. In contrast to most other medical treatments, antibiotics produce several notable externalities.⁵⁵

Some of these effects on others are positive: for example, the use of antibiotics for some infections prevents spread of disease,⁵⁶ and antibiotic treatment allowing individuals to return to work helps maintain a productive society. However, AMR represents a very significant negative externality, where use of antibiotics for present individuals has substantial harmful impact on society. This has been likened to the economic problem of the ‘tragedy of the commons’,^{57,58} where overgrazing of common land by farmers results in benefit to individuals in the short term, but eventually leads to the ‘tragedy’ for all of the destruction of the land.

Arguments for AMS focus on the risk of harm to others in a future without effective antibiotics. However, by introducing responsibility for population health,⁵⁹ AMS creates a dilemma for doctors, who must balance the interests of their patients with those of future populations.⁶⁰

Perhaps because of doctors’ traditional focus on their own patients, the balance tends to remain on the side of the individual. Doctors immediate concern continues to be their patients,^{61,62} with AMR ranked lowest in factors affecting their decision making.⁶³

Whilst there is strong ethical and practical justification for doctors’ focus on individuals, moral philosophy may be helpful in understanding the population focus of AMS as an ethical approach. Perhaps the most obvious justification for AMS is utilitarian. Utilitarianism, as advocated by Mill,⁶⁴ argues that the best action is one resulting in the greatest happiness for greatest number of people. Utilitarian approaches are often used in medicine in decisions about resource allocation: evidence of clinical and cost-effectiveness support decisions seeking to maximize the total population experience of the ‘happiness’ of cure, within available resources.

In the context of AMR, evidence of clinical ineffectiveness in most acute childhood illness

would support limitation of antibiotics, as greater societal happiness could be anticipated through preservation of antibiotic utility.

Mill's 'harm principle' allows restriction of individual freedoms where necessary to protect others from harm.⁶⁴ Applied to AMR this could justify limiting antibiotics where their prescription presents a significant risk of development of resistance and consequent harm to future individuals. However, this raises the question of what moral obligation we owe to future individuals. Rawls concluded that '*persons in different generations have duties and obligations to one another just as contemporaries do.*'⁶⁵ This 'justice between generations' suggests a duty to consider the risk of harm our actions may cause to future individuals.⁶⁵ In AMR this risk is very significant indeed, and we likely all have a duty to consider this in our use of antibiotics.⁶⁶ So, it is clearly wrong to squander antibiotics at the expense of future generations by using them where they will be of no benefit.⁶⁷ Of course, where there is a possibility of effectiveness of antibiotics, the balance will be altered. For example, not giving antibiotics in bacterial infections likely to be self-limiting, or using older less effective agents in order to preserve antibiotics of 'last resort', will still suggest conflict between interests of individual and public health.⁶⁰ However, doctors have a clear duty to consider others and future individuals in making decisions about treatment of current patients.

Furthermore, the idea that the interests of a present identified child are weighed against those of unidentified future others is perhaps too simplistic. Antibiotic resistance already has a direct impact on individuals,⁵ while the interests of future patients are particularly relevant to children: it is they who will become adults in an era of limited effective antibiotics.

Autonomy and the rights of children and their parents

The current focus on patient-centred care and shared decision-making emphasises the high value placed on choice and individual autonomy. Broad ethical justification for AMS notwithstanding, clinicians' decisions about 'appropriate' antibiotic use can appear to restrict autonomy, imposing conditions on the choice of individuals who may have very different standards of risk and benefit to healthcare professionals and policy makers.⁶⁸

The United Nations Convention on the Rights of the Child,⁶⁹ requires that the 'views of the child be given due weight in accordance with age and maturity'. Doctors must involve children as far as possible in decision making, even if they are not competent to make their own decisions.⁷⁰ Of course, very young children may be able to contribute little, but children of all ages have often been excluded from conversations about their health which are directed mainly at their parents,^{71,72} with clinicians overcautious about their ability to understand and

reason.^{73,74} Patients have better outcomes when involved in treatment decisions⁷⁵ and this is likely also true for children; engagement of children with interventions aimed at modifying consulting and antibiotic use for childhood respiratory tract infection may be more effective than interventions targeting their parents alone.⁷⁶ It is therefore essential that clinicians make efforts to ascertain the child's perspective wherever possible.

Nevertheless, parents will generally have the ability to make healthcare decisions on behalf of their child, and respect for their autonomy is important.⁷⁷ However, parental autonomy is not absolute: it is limited by the child's best interests (Children Act 1989), and parents are not entitled to demand treatment, such as antibiotics, that doctors do not think is justified.⁷⁸

Even where antibiotics are offered, the autonomy of parents may be compromised. Widespread misconceptions about the benefits of antibiotics¹⁸ call into question the reality of autonomous parental decision making. The risk of harm to their child from antibiotics may not be explained to parents,⁴⁷ while most will expect to be offered the antibiotic with best chance of cure⁷⁹ and will not be aware that choice is limited by guidelines to the agent least likely to cause resistance. There is an increasingly clear ethical, professional and legal duty for openness with patients about the risks and benefits of any treatment,⁸⁰ including the possible consequences of not receiving treatment. This indicates a need for health professionals to provide an open, truthful and clear rationale for their advice about antibiotics, involving parents fully in decisions about their children.

Conclusion

In 1945, Fleming highlighted the potential for bacteria to develop resistance to antibiotics, and called for restraint in their use, suggesting that 'thoughtless' persons 'playing' with antibiotics could hold moral responsibility for adverse consequences resulting from resistance.⁸¹ The threat of AMR and its potential for harm to individuals, both now and in the future, provide strong moral justification for avoiding unnecessary antibiotic prescription, and doctors should feel confident in applying principles of AMR in the care of children.

Evidence of clinical effectiveness is key to decision making about antibiotic prescribing in acute childhood illness. Numerous other factors influence parents' desire for antibiotics and clinicians' inclination to prescribe, and consideration of benefits and harms highlights perceived benefits of antibiotics other than clinical effectiveness. However, it is essential to recognize that antibiotics are not a solution to social problems such as childcare. Nor should they be used to avoid conflict between parents and clinicians, or to mitigate communication

failures. Their purpose is to treat bacterial infection, and where this is likely absent or self-limiting other means should be found to address concerns of parents and clinicians. An ethical approach to AMS with children with acute illness in primary care requires openness and honesty on the part of professionals, providing accurate and accessible evidence on the pros and cons of antibiotics. Focusing on the shared goal of benefit to the child, this will support the fully informed involvement of parents and their children in decisions about antibiotics. This must be underpinned by protected time in the consultation to discuss these issues, as acknowledged in the Five Year Forward View and other policy documents.⁸²

Contributors

BH is a Clinical Lecturer in Primary Care in the Department of Primary Care and Public Health, Imperial College London, and is funded by the National Institute for Health Research (NIHR). He conceived of the idea for the article, drafted the manuscript and is guarantor. SS is a Professor of Primary Care in the Department of Primary Care and Public Health, Imperial College London, and leads the Child Health Unit within the Department. She reviewed and revised all drafts of the article. CCB is a Professor of Primary Care in the Nuffield Department of Primary Health Sciences, University of Oxford. He reviewed and commented on later drafts of the article. AM is a Professor of Primary Care in the Department of Primary Care and Public Health, Imperial College London. He reviewed and commented on later drafts of the article. All authors approved the final manuscript.

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We have read and understood JAC policy on transparency and declare the following interests:
BH, SS, CCB and AM are all General Practitioners working in the NHS.

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Ethical approval was not required or sought in the writing of this article.

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Figure 1: Case

Mrs Parker visits her general practitioner (GP) with her 4-year-old child, Thomas, who has an ear infection. She knows this is likely to get better by itself, but wants antibiotics because the nursery refuses to have him back until he is well or on antibiotics, and she must be at work today. Thomas is in pain and cannot hear well on one side. Mrs Parker is concerned about leaving this untreated. The GP, Dr Jones, finds Thomas has no fever but his left eardrum is red. Dr Jones considers Thomas unlikely to benefit from antibiotics.