

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

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35 **Synopsis**

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

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

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

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69 **Introduction**

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

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

80 In the UK, antibiotics are highly regulated and most are only available on prescription from
81 health professionals. However, their use remains high, with 74 per cent prescribed in primary
82 care.⁶ Most children with acute illness in the UK whose parents seek medical advice are seen
83 by General Practitioners (GPs). A third of these consultations result in antibiotic prescription,⁷
84 despite most acute childhood illness being self-limiting, with very little benefit from treatment
85 with antibiotics.⁸ A common reason for prescribing antibiotics is acute middle ear infections,⁹
86 where 82 per cent of children receive a prescription.¹⁰ Even where the cause is ill-defined, over
87 70 per cent are given antibiotics.⁷

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

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98 **The ‘players’**

99 **The child**

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

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

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

117

118 **The parent**

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

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

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

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

138

139 **The GP**

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

143 Most doctors will be aware of the risk of AMR through antibiotic prescribing, though they may
144 vary in their sense of responsibility for contributing to this. A number of AMS initiatives
145 influence GPs, from financial incentives to threat of regulatory action for 'overprescribing'.²⁵

146 However, prognostic uncertainty, attitude to risk, and time and workload pressures may
147 outweigh GPs' concerns about AMR.²⁶ Fear of missing a serious infection in a child may
148 induce GPs to give antibiotics 'just in case'.¹⁹ Whilst the risk of serious consequences of not
149 prescribing antibiotics is low,^{7,27} tragic cases of fatal sepsis²⁸ may result in a perception of

150 higher stakes. Perceived pressure from parents,¹⁹ and a desire to maintain a healthy therapeutic
151 relationship whilst avoiding negative feedback,²⁹ may also prompt a decision to prescribe.

152 Prescribing often takes less time than explanation and advice on symptom control and why
153 antibiotics are not appropriate, and can be used as a strategy to curtail lengthy consultations.²²

154 Consequently, time constraints in primary care favour antibiotics.

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

161

162 **Benefits and harms of prescribing antibiotics**

163 Benefits

164 *i. Clinical efficacy*

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

170 Point of care testing can help alleviate diagnostic uncertainty,³² although GPs may use this
171 more as a communication aid.³³ Clinician experience and ‘gut instinct’ is also a valuable
172 measure.³⁴ However, it will remain hard to predict benefit from antibiotics and to differentiate
173 between an infection that is likely to resolve spontaneously and one which might leave some
174 vulnerable children open to complications without treatment.²⁶

175 Nevertheless, evidence exists to inform these assessments. In acute otitis media, for example,
176 studies show little evidence for efficacy of antibiotics. **Most children are better in 24 hours**
177 **regardless of antibiotics, and immediate treatment has no impact on incidence of pain, deafness,**
178 **tympanic membrane perforation or recurrence.**¹⁶ Antibiotics can reduce the likelihood of
179 **serious complications of acute otitis media, including mastoiditis. However, GPs would have**
180 **to treat nearly 5000 children to prevent one episode.**³⁵ Antibiotics seem to have most benefit in
181 **children less than two years old with bilateral acute otitis media, where four episodes need to**
182 **be treated for one additional beneficial outcome (NNTB), and in children of all ages with**
183 **otorrhoea (NNTB 3).**¹⁶

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

189

190 *ii. Benefits beyond clinical efficacy*

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

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

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

204 violating the central requirement for truthfulness in medical interactions.^{24,41} The ‘deception’
205 inherent in prescribing antibiotics knowing that they are highly unlikely to be clinically
206 effective may risk strengthening unrealistic expectations of antibiotics, or alternatively, in
207 providing an inconsistent message, lead to loss of trust in healthcare professionals and failure
208 to seek appropriate advice in future.

209

210 Harms

211 *i. Harm to the child*

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

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

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

227

228 *ii. Impact on health services*

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

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

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

241

242 *iii. The individual child versus the public*

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

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

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

257 Arguments for AMS focus on the risk of harm to others in a future without effective antibiotics.
258 However, by introducing responsibility for population health,⁵⁹ AMS creates a dilemma for
259 doctors, who must balance the interests of their patients with those of future populations.⁶⁰
260 Perhaps because of doctors’ traditional focus on their own patients, the balance tends to remain
261 on the side of the individual. Doctors immediate concern continues to be their patients,^{61,62} with
262 AMR ranked lowest in factors affecting their decision making.⁶³

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

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

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

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

292

293 **Autonomy and the rights of children and their parents**

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

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

305 reason.^{73,74} Patients have better outcomes when involved in treatment decisions⁷⁵ and this is
306 likely also true for children; engagement of children with interventions aimed at modifying
307 consulting and antibiotic use for childhood respiratory tract infection may be more effective
308 than interventions targeting their parents alone.⁷⁶ It is therefore essential that clinicians make
309 efforts to ascertain the child's perspective wherever possible.
310 Nevertheless, parents will generally have the ability to make healthcare decisions on behalf of
311 their child, and respect for their autonomy is important.⁷⁷ However, parental autonomy is not
312 absolute: it is limited by the child's best interests (Children Act 1989), and parents are not
313 entitled to demand treatment, such as antibiotics, that doctors do not think is justified.⁷⁸
314 Even where antibiotics are offered, the autonomy of parents may be compromised. Widespread
315 misconceptions about the benefits of antibiotics¹⁸ call into question the reality of autonomous
316 parental decision making. The risk of harm to their child from antibiotics may not be explained
317 to parents,⁴⁷ while most will expect to be offered the antibiotic with best chance of cure⁷⁹ and
318 will not be aware that choice is limited by guidelines to the agent least likely to cause resistance.
319 There is an increasingly clear ethical, professional and legal duty for openness with patients
320 about the risks and benefits of any treatment,⁸⁰ including the possible consequences of not
321 receiving treatment. This indicates a need for health professionals to provide an open, truthful
322 and clear rationale for their advice about antibiotics, involving parents fully in decisions about
323 their children.

324

325 **Conclusion**

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

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

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

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370 **Transparency declaration**

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

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375 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.