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# BMJ Paediatrics Open

## Fighting the hidden pandemic of antimicrobial resistance in pediatrics: An Update and the International Pediatric Association recommendations "The IPA position paper"

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## VIEWPOINT

### Position Report from the International Pediatric Association

### Fighting the hidden pandemic of antimicrobial resistance in pediatrics: An Update and the International Pediatric Association recommendations

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11. Department of Child Health, Faculty of Medicine, University of Indonesia, Jakarta. Executive director of the IPA; Professor Pediatrics, Faculty of Medicine, Universitas Indonesia
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### 55 **The impact of antimicrobial resistance in pediatrics**

56 The “masked” or the “silent” pandemic of antimicrobial resistance (AMR) is one of the biggest emerging  
57 threats to global health. The global burden of resistant infections during the neonatal and pediatric period  
58 is currently alarming. According to a recent report, infections attributed to multi drug resistant (MDR)  
59 bacteria may account for up to 30% of the total cases<sup>1</sup>, while in specific areas, like in Middle East region,  
60 almost 90% of sepsis during the neonatal period in neonatal intensive care units (NICUs) were associated  
61 with resistant bacteria.<sup>2</sup> In the sub-Saharan Africa region, a recent meta- analysis in neonates showed that  
62 resistance to WHO recommended  $\beta$ -lactams was observed in 68%.<sup>3</sup> Several pediatric related issues have  
63 been identified, among others, the lack of pediatric antibiotic drug development, the limited pediatric  
64 clinical studies and therefore the lack of pediatric specific data, the limited drug options to treat MRD  
65 pediatric infections and finally the mis- or over-use of antibiotics. The 2016 ARPEC study reported a list  
66 of quality indicators to enhance the appropriate and prudent pediatric antimicrobial use.<sup>4</sup> The WHO report  
67 has identified for the first-time priorities for research and development of age-appropriate antibiotics in  
68 children. In response to the WHO global action plan to optimize the use of antimicrobial drugs both in  
69 adults and pediatrics, WHO has prepared and launched the updated WHO Model List of Essential  
70 Medicines (EML). The latter includes a pediatric section aiming to increase literacy and awareness related  
71 to the epidemiology, common infectious agents, diagnostic strategies and the impact of AMR. Most  
72 importantly, the EML-C includes guidance on antibiotic prescribing for the empiric treatment of common  
73 infections in children.

### 75 **The need to support initiatives related to infection control, infection prevention and antimicrobial 76 stewardship in pediatrics**

77 A concerted, massive global awareness campaign targeting all health care workers, the regulatory  
78 authorities as well as the public is urgently needed to combat this AMR pandemic. This is one face of the  
79 coin. The second face of the coin being another concerted, massive global campaign in expanding infection  
80 prevention strategies, including the vaccination coverage in both developed and developing countries. As  
81 a result of vaccination, antibiotic usage will reduce selection pressure that favors resistant organisms.  
82 One key aspect of AMR and hospital acquired infections (HAIs) associated with AMR is that through  
83 specific actions, these infections can be prevented (preventable harm and waste). It is estimated that up to  
84 60-70% of HAIs are considered avoidable through the improvement of infection prevention, infection  
85 control and antimicrobial stewardship multimodal strategies. Infections can be prevented by implementing  
86 a series of measures (known as bundles). The implementation of infection control and prevention strategies  
87 in pediatric health care remains worldwide a critical quality safety indicator that improves patient outcomes

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6 90 Strict legislation and monitoring regarding the over-the-counter availability of antibiotics is also an  
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8 91 important infection control pillar in combatting AMR. Unfortunately, acquisition of antibiotics without  
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12 93 of antibiotics, a recent survey showed that 2.3% of the respondents had acquired antibiotics without  
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14 94 prescription.<sup>5</sup> This will require careful attention to access to healthcare so children who require antibiotics  
15  
16 95 can secure an appropriate drug at the correct dose for the ideal length of time after evaluation by a healthcare  
17  
18 96 provider.

19 97 Key components of pediatric infection prevention and control programs both at the national and local levels  
20  
21 98 are the establishment of staff education and training; use of evidence-based guidelines; surveillance,  
22  
23 99 monitoring, audit and feedback regarding antibiotic use in antimicrobial stewardship programs; workload  
24  
25 100 and staffing; and rigorous maintenance of environmental hygiene. Of importance, priorities should be  
26  
27 101 addressed both at a global and national level in governance, planning, regulatory and legal frameworks with  
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29 102 close coordination and collaboration among key stakeholders in the public and private sectors to decrease  
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31 103 the risk of AMR in pediatrics.

32 104 Another important aspect is the investment in the development of antiseptics and anti-infectives for the  
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34 105 pediatric population. A major barrier to effective antimicrobial therapy is shortages of key antibiotics (such  
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36 106 as amoxicillin). The supply of antibiotics must not be left to the market but requires additionally targeted  
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38 107 transnational support from governments, NGOs, and philanthropy. All new and existing drugs need  
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40 108 evidence-based dosage regimens from clinical studies for all age-groups (modelling and simulation will be  
41  
42 109 useful to supplement carefully designed clinical studies) and formulations that are appropriate for all age  
43  
44 110 groups in all climatic settings. Drug development of antibiotics in pediatrics should be driven by  
45  
46 111 pharmaceutical policy that ensures that children's needs are included in the development of novel  
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48 112 approaches such as the "subscription model".  
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#### 51 114 **Conclusion**

52 115  
53 116 The IPA workshop conducted by a group of multinational experts at the 30<sup>th</sup> Congress of the IPA in  
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55 117 Gandhinagar, Gujarat, India on February, 18<sup>th</sup>, 2023 is a an example of such campaigns, and many other  
56  
57 118 larger steps should follow in the coming few months or years, in order to end, or at least to halt, this masked  
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59 119 or silent AMR pandemic. The International Pediatric Association position against antimicrobial resistance  
60  
61 120 in pediatrics:  
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3 122 1. IPA recommends to the pediatricians and IPA member societies globally to use all indicators  
4 123 related with the prompt discontinuation or de-escalation of antibiotics according to microbial  
5 124 culture results, the early switch from broad spectrum empiric to narrower spectrum definitive  
6 125 antimicrobial therapy in children when possible.
- 7  
8 126 2. IPA recommends to the pharmaceutical industry to increase their efforts in development of new  
9 127 effective antimicrobial agents and to provide sufficient amounts of appropriate antibiotics in  
10 128 pediatric formulations (the current shortage frequently urges pediatricians to use inappropriate  
11 129 broad-spectrum treatment).
- 12 130 3. IPA recommends to the pediatricians and IPA member societies globally to perform the complete  
13 131 documentation for antibiotic prescription in the patient's medical charts.
- 14 132 4. IPA recommends to the pediatricians and IPA member societies globally that the choice of  
15 133 antibiotic, dose, route of administration and duration of treatment for common infectious  
16 134 syndromes in pediatrics should be in alignment with the recommendations for antibiotics included  
17 135 in the WHO Model List of Essential Medicines in children<sup>13</sup> and Essential Medicines for Children  
18 136 and the WHO AWaRe.
- 19 137 5. IPA recommends action by multiple stakeholders for rational pharmaceutical policy that addresses  
20 138 AMR. This needs to include reliable global supply of key antibiotics, development of dosage  
21 139 regimens and dosage forms that are appropriate for children, and the inclusion of paediatric-specific  
22 140 elements in incentives and drivers for the development of antifeactives.
- 23 141 6. IPA supports any initiative driven by any global or national agency that fosters public and  
24 142 healthcare provider awareness and literacy, prioritizing the need to advocate with local, national  
25 143 and international governments for legislation to reduce OTC antibiotics.
- 26 144 7. IPA supports the need for pediatric specific research and more accurate and accessible diagnostics  
27 145 to avoid antibiotic overuse.
- 28 146 8. IPA will collaborate together with global stakeholders, agencies and organizations to enhance  
29 147 public awareness and most importantly leverage high-level scientific and political engagement,  
30 148 financial resources and technical expertise, adapting to country-level needs and demands for  
31 149 tackling AMR with focus on the pediatric population.

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## Fighting the hidden pandemic of antimicrobial resistance in pediatrics: recommendations from the International Pediatric Association

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## 1 Fighting the hidden pandemic of antimicrobial resistance in pediatrics: 2 recommendations from the International Pediatric Association

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43 **Keywords:** antimicrobial resistance, AMR, antibiotic prescription, pediatrics, infection prevention, public  
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51 **Summary box:** IPA strongly recommends:

- 52 • early switch from broad spectrum empiric to narrower spectrum definitive antimicrobial therapy
- 53 • complete documentation for antibiotic prescription in the patient's medical charts
- 54 • to invest in paediatric-specific elements for the development of antifectives
- 55 • to enhance high-level scientific and political engagement, financial resources and technical expertise for  
56 tackling AMR

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3 55**4 56 The impact of antimicrobial resistance in pediatrics**

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89 and reduce preventable harm in children, such as the incidence of pediatric infections due to AMR in both  
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91 Strict legislation and monitoring regarding the over-the-counter availability of antibiotics is also an  
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94 of antibiotics, a recent survey showed that 2.3% of the respondents had acquired antibiotics without  
95 prescription [5]. This will require careful attention to access to healthcare so children who require  
96 antibiotics can secure an appropriate drug at the correct dose for the ideal length of time after evaluation by  
97 a healthcare provider. An important point is to establish the early diagnosis of the infection, demanding the  
98 adequate taking of samples, the request for cultures and the use of molecular tools that identify the etiology  
99 and avoid the inappropriate administration of antibiotics.

100 Key components of pediatric infection prevention and control programs both at the national and local levels  
101 are the establishment of staff education and training; use of evidence-based guidelines; surveillance,  
102 monitoring, audit and feedback regarding antibiotic use in antimicrobial stewardship programs; workload  
103 and staffing; and rigorous maintenance of environmental hygiene. Of importance, priorities should be  
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113 groups in all climatic settings. Drug development of antibiotics in pediatrics should be driven by  
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115 approaches such as the "subscription model".

116

## 117 **Recommendations**

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119 The International Pediatric Association position against antimicrobial resistance in pediatrics:

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- 121 1. to the pediatricians and IPA member societies globally to use all indicators related with the prompt  
122 discontinuation or de-escalation of antibiotics according to microbial culture results, the early

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34 147 tackling AMR with focus on the pediatric population.  
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