

# Are parents of children hospitalized with severe community-acquired pneumonia more satisfied with care when physicians allow them to share decisions on the antibiotic route?

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## Abstract

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**Keywords:** community-acquired infections, evidence-based medicine, patient participation, pneumonia, preference-sensitive decisions, shared-decision making

**Context and objective** Despite convincing evidence that oral and injected amoxicillin have equal efficacy in children with severe community-acquired pneumonia (CAP), hospitalized children often receive injected antibiotics. To investigate whether shared decision-making (choosing the antibiotic route) influences parental satisfaction.

**Design, setting and participants** In a one-year questionnaire-based study, we enrolled consecutive children hospitalized for CAP. At admission, all children's parents received a leaflet on CAP. Parents arriving during the daytime were assigned to a shared group and could choose the antibiotic route, those admitted at other times were assigned to an unshared group for whom physicians chose the antibiotic route. Shared group parents answered anonymous questionnaire investigating why they chose a specific route. Parents in both groups answered another anonymous questionnaire at discharge assessing perceived satisfaction with care.

**Main outcome measure** Parents' satisfaction with perceived medical information as assessed by data from a questionnaire.

**Results** Of the 95 children enrolled, more children's parents were assigned to the unshared than the shared group (77 vs. 18). Of the 18 children's parents in the shared group, 14 chose the oral antibiotic route mainly to avoid painful injections. Doctors explanations were considered better in the shared than in the unshared group ( $P = 0.02$ ).

**Discussion and conclusions** The larger number of children's parents assigned to the unshared group reflects paediatricians' reluctance to offer shared-decision making. Well-informed parents prefer oral antibiotic therapy for children with severe CAP. Allowing parents choose the antibiotic route respects parents' wishes, reduces children's pain and improves satisfaction.

## Introduction

Community-acquired pneumonia (CAP) is a frequent disease predominantly affecting infants and children from 3 months to 5 years of age<sup>1,2</sup> and is among the major causes of death in developing countries.<sup>2</sup> In western countries, previously healthy children with CAP generally recover within about 2 days after antibiotic treatment, and fewer than 3–5% are hospitalized.<sup>3–6</sup>

Even though amoxicillin given orally or by intravenous injection has equal time-course efficacy in children with severe CAP aged from 3 months to 5 years,<sup>7,8</sup> in current clinical practice, children who are hospitalized often needlessly receive injected rather than oral antibiotics.<sup>9–11</sup> Possible reasons are that physicians envisage occult bacteraemia, and parents fear complications.<sup>12,13</sup> Equally important, injecting antibiotics causes children pain and discomfort<sup>14,15</sup> and numerous attempts at inserting the cannula often cause the child further distress.<sup>16,17</sup>

Encouraging doctors to deal appropriately with parents' worries and giving them adequate information about symptoms, disease and therapeutic options<sup>18,19</sup> might help to reduce antibiotic prescribing yet maintain parental satisfaction.<sup>20–22</sup> Evidence over the past decade underlines parents' concern about antibiotic use, clarifies the importance of parents' perception in shared decision making and highlights concern on how paediatricians wrongly prescribe antibiotics for presumed viral infections.<sup>20–25</sup> Many parents bring their children to hospital after several physician-prescribed antibiotic courses, complaining that no one explained why antibiotics were necessary.<sup>22,26,27</sup>

No published evidence is available on whether informed medical shared-decision making, allowing parents of children admitted for severe CAP to share in choosing injected or oral antibiotic therapy, respects parents' expectations and wishes. Nor do we know whether it helps improve parents' satisfaction and discourages improper injected antibiotic therapy. Another unanswered question is

whether shared decision making in acute hospital paediatric care encounters respects parents' expectations and wishes, avoids paediatricians' paternalistic prescribing<sup>28–30</sup> and influences parents' satisfaction with treatment for a common infectious disease. This information might help paediatricians appreciate the importance of parents' wishes and choices and thus make parents more satisfied with the proposed treatment plan.

We designed this one-year, single-centre questionnaire-based study, enrolling parents of children aged from 3 months to 5 years hospitalized for severe CAP, with four aims. First, we assessed how parents perceive medical information given during shared decision making by allowing them to choose between oral or injected antibiotic therapy. Second, we investigated why they prefer their children to receive oral or injected antibiotic therapy. Third, we studied whether shared or unshared choices influence satisfaction. And finally, we sought information on how parents comply with home therapy. As the main outcome measure, we assessed parental satisfaction with perceived medical information by asking parents to answer two anonymous questionnaires, one on admission eliciting information on the reasons for choosing oral or injected therapy and the other at discharge investigating perceived satisfaction with care. At 7-day follow-up, we sought information on adherence with home antibiotic therapy.

## Methods

### Participants, study design and procedure

All children from 3 months to 5 years with a diagnosis of severe CAP admitted to the Paediatric Department at Bambino Gesù Children's Hospital from September 2007 to September 2008 were consecutively enrolled in a one-year questionnaire-based study and cared for by seven paediatricians shifting 12 h (8–8 pm). Inclusion criteria were children presenting to the hospital emergency department or directly referred to our department with a diagnosis of

severe CAP. Severe CAP was diagnosed if the child manifested two or more of the following signs:<sup>2-4,6</sup> temperature exceeding 38 °C; respiratory rate >50 breaths per minute for infants under 12 months and >40 breaths per minute for those older than 12 months; moderate or severe chest in-drawing; nasal flaring; cyanosis or intermittent apnoea in infants aged <1 year; noisy breathing; signs of dehydration or food refusal; O<sub>2</sub> saturation in air <92%; and standard chest radiographs disclosing pulmonary consolidations compatible with pneumonia.

Exclusion criteria were asthma; chest in-drawing responding to salbutamol therapy; laryngeal stridor; drowsiness or lethargy; difficulty with fluid intake; convulsions; vomiting; suspected septic shock; need for intensive care; suspected lung or heart disease; suspected hospital infection; suspected foreign body ingestion or aspiration pneumonia; previous or current malformations; immunodeficient patients; and chronic disease requiring other therapeutic options.

At admission, physicians caring for children during daytime shifts (8–8 pm) gave eligible parents oral information and a leaflet written in plain language explaining the diagnosis, therapy and prognosis of CAP. They also explained that we were conducting a study seeking preliminary information on whether parents should be involved in deciding between oral and injected antibiotic therapy. They then asked whether parents wanted to be involved in choosing the antibiotic route for their children. Parents arriving during the daytime (8–8 pm) were assigned to a shared group and could choose the antibiotic route, those admitted at other times or on holidays were assigned to an unshared comparison group for whom physicians chose the antibiotic route according to their own judgment and standard clinical practice. Parents in the unshared group also received oral and plain language written information within 24 h after admission. All parents gave their written informed consent.<sup>30</sup> According to the choice agreed with the parents, the child received one of the following two treatment regimens: oral amoxicillin plus

clavulanate 90 mg/kg/day (three daily doses) for 7–12 days, or injected amoxicillin plus clavulanate 90 mg/kg/day (three daily doses) for at least 24 h or until the fever subsided followed by oral amoxicillin plus clavulanate 90 mg/kg/day (three daily doses) for the remaining days (up to a total 10–12 days of therapy). Parents of children who chose the antibiotic route completed two anonymous questionnaires. The first questionnaire, administered within 24 h after admission, sought information on the reasons for parents' choice of oral or injected antibiotic therapy, asked parents whether they thought the two antibiotic routes equally effective, and inquired to what extent they felt free to choose (not at all, somewhat or completely). All children's parents completed a second anonymous questionnaire on discharge, asking about satisfaction with the medical information received, physicians' willingness to answer their questions, and understanding of the information received scored on a 5-point Likert scale from 1 = not at all to 5 = completely, as described by Trumble *et al.*<sup>31</sup>

Children in whom initial antibiotic therapy left clinical conditions unimproved received amoxicillin–clavulanate combined with oral or intravenous clarithromycin. Children who failed to respond within 24–48 h underwent standard chest radiography for further diagnostic assessment. Children with documented round pneumonia on chest radiography who failed to respond to amoxicillin–clavulanate therapy or responded poorly to the combined antibiotics were switched to ceftriaxone combined with vancomycin.

All children were discharged within 24 h after the fever subsided and their clinical conditions had improved. At discharge, the seven attending paediatricians completed a questionnaire designed to confirm that they had given parents in the shared and unshared group the information leaflet, reportedly listened to the parent's needs and wishes, and collected questionnaire data on parents' satisfaction. At follow-up assessment, about 7 days after hospital discharge, the attending physician examined

the child clinically and completed a follow-up sheet (available on request from the first author). The families of all children who failed to attend follow-up were contacted by telephone within one month after discharge and asked the reason why.

### Statistical analysis

Three authors (PR, SC and VDS) collected the data and two authors (VDC and RD) analysed them. Descriptive data (demographic and clinical characteristics) were expressed as mean  $\pm$  SD, or median with interquartile range (IQR). Student's *t*-test was used to compare means, and the Mann–Whitney test to compare medians. Chi-square or Fisher exact test was used to compare categorical data (questionnaire answers). *P* values  $<0.05$  were considered to indicate statistical significance. Data were analysed with Statistical Package for Social Sciences software (USA version 13.0; SPSS® Inc, Chicago, IL, USA).

This study was approved by the Bambino Gesù hospital institutional review board.

### Results

Of the 99 consecutive parents of infants and children receiving treatment for severe CAP and initially selected for study, four children failed to meet the inclusion criteria (three because of asthma, one for wheezing), and 95 parents were enrolled. All of the parents approached consented to participate in the study. Demographic and clinical characteristics at admission were similar in the shared decision group ( $n = 18$  parents) and unshared decision group ( $n = 77$  parents) (Table 1).

Of the 18 children's parents offered a treatment choice, 14 preferred the oral antibiotic route and four preferred the injected route. Despite being admitted to the ward at times meeting the criteria for enrolment in the shared group, 40 of the 95 children enrolled were assigned to the unshared group (five enrolled on Saturday morning, 23 enrolled on week days, seven of these entered the ward during

the last 2 h during the afternoon shift, and 5 children whose medical records failed to specify the time of admission).

Neither oral nor injected antibiotics caused gastrointestinal distress or other adverse events. None of the children admitted for severe CAP whose parents chose oral antibiotics worsened during treatment. Two children in the unshared group who had round pneumonia responded poorly to the standard antibiotic regimen and were successfully switched to ceftriaxone combined with vancomycin.

Answers to the first questionnaire showed that of the 18 parents of children enrolled in the shared group, 14 chose the oral antibiotic route mainly to reduce pain from needle puncture, whereas four chose injected antibiotic therapy mainly because they thought their children would vomit oral suspensions (Table 2). All parents in the shared group reported that they completely understood the information about the effectiveness of the two antibiotic routes. When the 18 parents answered questions about freedom of choice only 11 of the 14 who chose oral therapy felt completely free, whereas one parent felt somewhat free to choose and two felt not at all free to choose. The questionnaire completed by the seven attending physicians at discharge reportedly confirmed that all parents in both groups received similar information. Data from the second questionnaire completed by all parents at discharge (Table 3) showed that both groups, shared and unshared, were mostly or completely satisfied with the perceived medical information. Questionnaire data also showed a trend towards higher satisfaction when children's parents shared in the decision to choose oral or injected antibiotic therapy. In reply to the last question ('Overall, how satisfied were you with the service you received from your doctor?'), more parents in the shared group than in the unshared group (94.4 vs. 85.7%) were mostly or completely satisfied. For question five more parents in the shared group than in the unshared group felt that the doctors explained what they were doing well ( $P = 0.02$  by Mann–Whitney test).

**Table 1** Demographic and clinical characteristics for the 95 children admitted with severe community-acquired pneumonia, and their parents prospectively assigned according to the time of admission to the shared decision group (oral antibiotic therapy) or the unshared decision group (injected antibiotic therapy)

Demographic and clinical characteristics at admission	Shared decision group number of children/parents (mean age)	% (SD*)	Unshared decision group number of children/parents (mean age)	% (SD*)	<i>P</i> value
Children					
Males	12	23.1	40	76.9	0.3
Females	6	14.0	37	86.0	
Children's mean age (months)	35.0	(±21.8)	35.1	(±16.7)	1
Previous antibiotic treatment					
Yes	8	14.0	49	86.0	0.2
No	10	26.3	28	73.7	
Radiologic findings					
Localization in a single lobe	16	22.5	55	77.5	0.15
Localization in multiple lobes	2	8.3	22	91.7	
Pleural effusion					
Yes	2	11.8	15	81.2	0.5
No	16	20.5	62	79.5	
Parents					
Mean fathers' age (years)	38.8	(±5.2)	39.1	(±5.8)	0.8
Mean mothers' age (years)	36.1	(±4.5)	35.4	(±4.4)	0.5
Fathers' country					
Italian	17	19.1	72	20.9	1
Foreign	1	16.7	5	83.7	
Non-respondent	0				
Mothers' country					
Italian	15	17.9	69	81.9	1
Foreign	2	20.0	8	80.0	
Non-respondent	1				
Fathers' education level					
Primary school	4	20.0	16	80.0	1
Secondary school/University	14	18.7	61	81.3	
Mothers' education level					
Primary school	5	27.8	13	72.2	0.3
Secondary school/University	13	16.9	64	83.1	
Total	18		77		

\*Standard Deviation.

The median hospital stay in the 95 children was 6.0 (IQR 5.0–8.0) days. The median hospital stay was shorter in the 18 children in the shared group than in the 77 children in the unshared group: 5.0 (IQR 4.8–6.3) vs. 7.0 (IQR 5.0–8.5) days ( $P = 0.01$ ).

Of the 18 children enrolled in the shared group, 12 returned for follow-up assessment at about 7 days after discharge (66.7%) and 6 did not, and of the 77 children in the unshared group, 60 returned for follow-up (77.9%) and 17 did not. When the families of children who

failed to attend follow-up were contacted by telephone within 1 month after discharge to explain why, parents in both groups answered that they had complied with therapy, considered their children completely cured and therefore thought a further hospital visit unnecessary.

## Discussion

In this one-year, single-centre questionnaire-based study enrolling parents of children aged

**Table 2** Parental motivation in choosing the antibiotic route in the shared group (of the 18 children's parents 14 chose the oral route and 4 the injected route)

Why parents chose the oral route (more than one answer)	
Because needle punctures hurt	13/14
Because I think it is better than oral therapy	0
Because my child tolerates it better	2/14
Because I am afraid needles might cause an infection	0
Other reasons (not specified)	1/14
Why parents chose the injected route (more than one answer)	
Because my child is unable to swallow syrup	4/4
Because I think this route is better than oral therapy	1/4
Because I think my child will recover earlier	1/4
Other (because my child will eventually have an injection while in hospital)	1/4

from 3 months to 5 years hospitalized for severe CAP and investigating parental engagement and satisfaction in choosing the antibiotic route for their children, we answer all four questions raised. First, all the parents' enrolled in the study regardless of whether they shared or did not share in decision making appreciated the information they received during the medical encounter at admission and in the leaflet about CAP and expressed high perceived satisfaction at discharge. Most parents in the shared group chose oral therapy because it reduced pain from injections. Conversely, the four parents who chose injected therapy said that their child found it difficult to swallow oral suspensions (Table 2). Why some parents did not feel completely free in their choice and how they felt the doctor influenced their choice remain difficult problems to answer with an anonymous questionnaire. Presumably parents are unused to choosing between therapeutic options and expect the doctor to influence their decision.<sup>28</sup>

Because some paediatricians were reluctant to engage parents in medical decisions, the number of participants differed in the shared and unshared group. Hence, given that parents who participate are far more likely to collaborate with professionals in healthcare decisions, they were presumably differently engaged in

shared decision-making processes. Underlining this difference, answers to the question on how parents perceived the explanations given differed significantly in the shared and unshared groups (question 5 Table 3) probably because they reflect doctors and patients' way of perceiving their role during acute paediatric hospital encounters.

A major finding was that engaging parents in medical decisions helped to shorten our children's hospital stay.

When we investigated parental satisfaction about information and services received, more parents in the shared than in the unshared group said that they were completely satisfied with the doctors' services (question 10 Table 3). Despite the low statistical power, our findings are in line with previous evidence that satisfaction with treatment depends less on the type of prescription received and more on the time the physician devotes to listening to patients and giving them information about the illness.<sup>24,27,29</sup> In current clinical practice, the systematic use of simple easy-to-understand information sheets<sup>30,32-34</sup> helps to share the diagnostic-therapeutic iter before physicians propose therapeutic options in accordance with the patients' provenance and culture.<sup>30,32,35,36</sup>

During clinical assessment at 7 days follow-up after discharge, we found that all the children completed the prescribed antibiotic therapy although more of the highly educated patients in the unshared group than in the shared group returned for follow-up assessment. Subsequent telephone calls to parents who failed to attend follow-up surprisingly disclosed that parents in the shared group who were satisfied with their child's treatment thought it unnecessary to give the doctor feedback on their child's treatment outcome. This unexpected finding confirms our conviction that if physicians respect parents' expectations and wishes, parents who are satisfied with the chosen treatment consider themselves able to appraise their child's outcome autonomously.<sup>26,27,29</sup>

Our study again underlines that prescribing is a difficult clinical undertaking and one that

**Table 3** Percentage satisfaction in the 95 parents of children enrolled in the shared decision-making group (18 parents) and unshared (comparison group) (77 parents) who responded to the 10 questions in the second questionnaire completed at discharge (modified by Trumble *et al.* 2006)

The 10 questions	Satisfaction levels					<i>P</i> values by Mann-Whitney test
	Not at all (%)	Somewhat (%)	Moderately (%)	Mostly (%)	Completely (%)	
1. How well did the doctor listen to your concerns and questions?						
Shared	0	1 (5.6)	1 (5.6)	6 (33.3)	10 (55.6)	0.08
Unshared	0	7 (9.1)	6 (7.8)	40 (52.0)	24 (31.2)	
2. How respectful was the doctor?						
Shared	0	1 (5.6)	2 (11.1)	2 (11.1)	13 (72.2)	0.50
Unshared	0	1 (1.3)	5 (6.5)	26 (33.8)	45 (58.4)	
3. How well did the doctor understand your problem?						
Shared	0	1 (5.6)	0	5 (27.8)	12 (66.7)	0.24
Unshared	3 (3.9)	3 (3.9)	6 (7.8)	24 (31.2)	41 (53.2)	
4. How well did the doctor deal with your child's problem?						
Shared	0	1 (5.6)	1 (5.6)	5 (27.8)	11 (61.1)	0.10
Unshared	1 (1.3)	3 (3.9)	12 (15.6)	31 (40.3)	30 (39.0)	
5. How well did the doctor explain to you what they were doing?						
Shared	0	0	2 (11.1)	3 (16.7)	13 (72.2)	0.02*
Unshared	1 (1.3)	7 (9.1)	7 (9.1)	31 (40.3)	31 (40.3)	
6. Did the doctor use easily understandable words?						
Shared	0	0	2 (11.1)	4 (22.2)	12 (66.7)	0.10
Unshared	0	3 (3.9)	5 (6.5)	37 (48.1)	32 (41.6)	
7. How well did the doctor cover the topics you expected?						
Shared	1 (5.6)	0	1 (5.6)	5 (27.8)	11 (61.1)	0.10
Unshared	2 (2.7)	3 (4.0)	8 (10.7)	34 (45.4)	28 (37.4)	
8. Were you satisfied with the amount of time the doctor spent with you?						
Shared	0	2 (11.1)	0	9 (50.0)	7 (38.9)	0.51
Unshared	2 (2.6)	2 (2.6)	11 (14.5)	36 (47.4)	25 (32.9)	
9. Were you satisfied with the doctor's medical ability?						
Shared	0	1 (5.6)	1 (5.6)	8 (44.4)	8 (44.4)	0.24
Unshared	0	2 (2.6)	9 (11.7)	38 (49.4)	28 (36.4)	
10. Overall, how satisfied were you with the service you received from your doctor?						
Shared	0	1 (5.5)	0	7 (38.9)	10 (55.5)	0.23
Unshared	0	2 (2.6)	8 (10.4)	35 (45.4)	31 (40.3)	

Note that parents in both groups, shared and unshared, were mostly or completely satisfied with the medical information perceived. The significant self-rating satisfaction with the doctors' explanations (question 5) and the high though not significant satisfaction level overall in the shared decision-making group implying that parents who were allowed to choose the antibiotic route (oral vs. injected) felt more satisfied than those who were not.

\*Significant *P* value.

also raises a morally complex problem. Even asking a patient to adhere to the proposed therapy is in itself an ethically flawed concept because it tacitly assumes the patient's obedience and coercion.<sup>27,28</sup> The main problem in prescribing antibiotics for severe CAP in children is not selecting the antibiotic but choosing the best administration route. We conjecture that whenever possible, allowing parents of children with severe CAP to choose the

antibiotic route themselves discourages coercion, encourages concordance with the treatment proposed, helps parents to reach satisfaction, reduces anxiety about their children's health and avoids the need to consult the physician again.<sup>30,34</sup>

Even though 28 children with severe CAP were enrolled during normal week day working hours, physicians decided not to allow them to choose the antibiotic route. Discussion during

meetings held when this study ended suggested that paediatricians who chose to start with injected therapy without engaging parents in the decision, presuming that it leads to faster discharge, often based their choice on published guidelines.<sup>5,6</sup> Even the latest clinical practice guidelines<sup>35</sup> neglect to cite the two relevant Cochrane reviews concluding that oral and injected therapy are equally effective in severe CAP.<sup>8,19</sup> Another possible drawback meriting further investigation is that paediatricians transfer their own concerns to already worried parents.<sup>36</sup> Our experience in this study again unfortunately suggests, though does not prove, that hospital physicians are generally reluctant to listen carefully to parents needs and wishes.<sup>37</sup> Whenever possible, allowing well-informed parents to choose the antibiotic route and encouraging physicians to prescribe oral antibiotic therapy for children with severe CAP would do much to lower treatment costs, shorten hospital stay and reduce children's pain and suffering from avoidable injections.<sup>7,11,38</sup>

### Limitations

Our study's main limitations are that it was conducted in a single-centre over a limited time span, collected data from a small number of subjects and included imbalanced shared and unshared groups. Although questionnaires were anonymous, the answers given by parents could have suffered from a desirability bias, because respondents answered as they thought the doctor wanted them to answer.<sup>39,40</sup>

### Conclusion

When parents of children hospitalized with severe CAP share in decisions about which route to choose for antibiotic therapy, their satisfaction with treatment improves. Most of them choose oral treatment. To improve satisfaction further, we need to find out how hospital physicians could inform children's parents better about severe CAP using more easily understandable and non-alarming words. We also need to investigate what parents allowed

to choose the antibiotic route for severe CAP expect and prefer.

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### Conflict of interest

The authors do not have any conflict of interest to declare.

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