

Oral Versus Intravenous Antibiotics: Do the Bugs Know (or Care)?

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What's so magical about the route of antibiotic administration? I can understand how lay persons may perceive parenteral antibiotics as "stronger," but sometimes I think medical personnel fall victim to the same misconception.

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What's so magical about the route of antibiotic administration? I can understand how lay persons may perceive parenteral antibiotics as "stronger," but sometimes I think medical personnel fall victim to the same misconception. Here's a study that suggests step-down to oral therapy is a better plan for children with pneumonia complicated by pleural effusion, although I think the authors' conclusions require evidence beyond just this one study's results.

Source: Shah SS, Srivastava R, Wu S, et al. Intravenous versus oral antibiotics for postdischarge treatment of complicated pneumonia. *Pediatrics*. 2016;138(6):e20161692; doi:10.1542/peds.2016-1692. See [AAP Grand Rounds commentary by Dr. Daniel Lesser](#) (subscription required).

This is a study utilizing patients generated from the **Pediatric Health Information System (PHIS)** database, an administrative database from children's hospitals that are members of the Children's Hospital Association. We've discussed PHIS studies previously in these pages. The main problem with data in PHIS and other administrative databases is that it is based on items such as charge and diagnosis codes, with no other clinical information available. Thus, one can lose a lot of the detail necessary to interpret outcomes of different treatments. The authors of this pneumonia study, however, attempted to correct for the missing details by having an army of investigators from 38 participating children's hospitals go into the medical records of patients to verify key elements of care. By doing so, the investigators added an additional layer of confidence to the data and their results.

They found that children hospitalized with pneumonia and parapneumonic effusion who went home still receiving intravenous antibiotic therapy had similar treatment failure rates to those sent home on oral antibiotics, but the IV group had significantly higher complications of therapy. Still, the study is retrospective in nature, and retrospective chart reviews don't have nearly the accuracy of data recording as prospective studies. For example, we don't know how thoroughly the effusions were drained for each patient, and whether a more precise subgroup analysis might identify some children who should receive IV therapy at discharge. That's why I thought the authors might have overstated their study's conclusion that these children should "preferentially receive oral antibiotics at discharge when effective oral options are available," because it implies a one-size fits all in what is likely a diverse group of patients.

That oral therapy generally is a better option than IV shouldn't be a big surprise to anyone. I've been a big proponent of oral antibiotic therapy for decades; it never made sense to me to think that, if we could achieve similar serum concentrations with oral as with IV therapy, that the bacteria would somehow "know" how that antibiotic made it to their hideouts in the body and die off more quickly with IV compared to oral therapy.

With that last statement, trainees from Children's National who have had the misfortune of working with me in the clinical setting might recognize this as the first member of "The Laws of Bud." The Laws have been a teaching trick of mine for over 30 years; they aren't truly laws, but rather a cross between an aphorism and a riddle (aphoriddle?), intended to pique curiosity and perhaps result in better retention of information by the student, resident, or fellow. They've changed over the years, but Law number 1 has always been "The bugs don't know." (Former trainees also might have recognized **last week's blog posting** as Law # 5, "Ten fingers, ten days." I've long maintained that if we were an animal species with 12 fingers instead of 10, we'd be treating infections for 12 days as a default; that's the level of evidence for most antibiotic duration dogma!)

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