

## Antimicrobial Stewardship and Osteopathic Medicine: A Call to Action

Robert Orenstein, DO

Dr Orenstein is the editor in chief of the American Osteopathic Association.

From the Infectious Diseases Department at Mayo Clinic in Phoenix, Arizona.

Address correspondence to *The Journal of the American Osteopathic Association*, 142 E Ontario St, Chicago, IL 60611-2864.

E-mail: [jaoa@osteopathic.org](mailto:jaoa@osteopathic.org)

**E**merging antimicrobial resistance is a public health and patient safety crisis. The Centers for Disease Control and Prevention estimates that each year in the United States, at least 2 million people acquire serious multiple-resistant infections that directly result in 23,000 deaths.<sup>1</sup> The key driver of this crisis is excessive prescription of antimicrobials. Osteopathic physicians have an opportunity to improve antimicrobial use in primary care by conducting original research and gathering evidence on how osteopathic manipulative treatment (OMT) may enhance or preclude the need for antimicrobials.

important advances for managing these diseases. Whereas smallpox and polio were eradicated by vaccines, the greatest impact of antibiotics was seen in the management of streptococcal infections such as scarlet, rheumatic, and postpartum fevers. However, throughout the 20th century, pneumonia remained the leading cause of death, with bacterial infections accounting for approximately 100,000 deaths per year.<sup>3</sup> Despite the introduction of increasingly potent antibiotics, the mortality rate of pneumococcal pneumonia remained consistent for a century.

### The Antimicrobial Era

The 20th century welcomed the antimicrobial era. These drugs revolutionized the management of previously fatal infectious diseases and dramatically enhanced our nation's public health. The ability to prevent and control infections through the wise use of these agents led to major advances in the fields of surgery, oncology, immunology, and transplantation. Much of the advanced care provided today relies on the ability of antimicrobials to resolve complications of these modern therapeutics.

However, the past several decades have witnessed the rapid emergence of antimicrobial resistance. The development of new antimicrobials has stalled, which has compromised physicians' ability to treat patients safely and effectively. Some common infections can no longer be treated with currently available antibiotics, and scaremongers harken a return to the "preatibiotic era."

Before the clinical application of penicillin in the 1940s, epidemic infectious diseases were the leading causes of death.<sup>2</sup> In the early 19th century, diphtheria, dysentery, typhoid, measles, whooping cough, scarlet fever, and tuberculosis were common causes of death in US children, and lobar pneumonias often led to death in US adults.<sup>2</sup> Improved sanitation, pasteurization, and immunization were

### Combatting the Overuse of Antibiotics

One significant change over the past several decades has been the increasing use of antibiotics to manage upper respiratory tract infections (URTIs).<sup>4</sup> Over 250 million prescriptions are written for antibiotics in outpatient practice, with nearly half for inappropriate indications.<sup>5</sup> Much of the excessive antibiotic prescriptions are for common URTIs, most of which are viral and do not require antibiotics. Osteopathic physicians are trained in principles regarding the innate ability of the body to heal itself, and they practice OMT to enhance that ability. Thus, osteopathic medicine may offer a solution to the overprescribing of antibiotics. In a review of 9.6 million office visits to osteopathic physicians for URTIs between 1997 and 2001, antibiotics were prescribed in 56.4% of visits (5.41 million prescriptions).<sup>6</sup> Interestingly, in the 0.2% of patients who received "physiotherapy" (likely OMT), no antibiotics were prescribed.<sup>6</sup>

Why prescribe antibiotics for these conditions when there is no evidence of their benefit and significant evidence of harm?<sup>7</sup> How did osteopathic physicians manage these diseases before antibiotics were introduced, and were their techniques beneficial? What research supports the use of OMT for managing these common infections?

Studies suggest that several strategies may reduce unnecessary antibiotic use.<sup>5,7,8</sup> Delayed prescribing and office signage discouraging patients from requesting antibiotics for colds and interdisciplinary stewardship teams have proven effective.<sup>8</sup> Hospitals in the United States will soon be required to have antimicrobial stewardship programs.<sup>9</sup> Osteopathic physicians offer a unique philosophic approach to health care, one that partners with patients to enhance their health, using both manipulative and pharmacologic therapies to help patients maintain health and to prevent disease.

The current issue of *The Journal of the American Osteopathic Association* (*JAOA*) includes 3 important articles<sup>10-12</sup> that offer additional solutions to this public health crisis. The first article is a subgroup analysis of the Multicenter Osteopathic Pneumonia Study in the Elderly, or MOPSE.<sup>10</sup> Noll et al<sup>10</sup> studied 7 centers where patients were randomly assigned to 1 of 3 arms: OMT, light touch, or usual therapy. Results of the original nonblinded trial<sup>13</sup> published in 2010 indicated that adjunctive OMT could reduce the length of stay and duration of antibiotic use in elderly patients with pneumonia compared with patients who received conventional therapy in a per-protocol analysis. “Usual” therapy was not standardized, and limited risk adjustment across the sites in this trial existed. Patients with more serious illness may have been excluded from receiving OMT and thus would not be assessed in the per-protocol analysis but would be included in an intention-to-treat analysis. In the subgroup analysis published in the current issue, Noll et al<sup>10</sup> studied several outcomes and identified which groups may have benefitted the most. They found that OMT for pneumonia reduced length of stay in the subgroup of patients aged 50 to 74 years and seemed to reduce in-hospital mortality in patients aged 75 years or older with more severe pneumonia classifications.

Although multicenter studies are needed to address the role of OMT in many illnesses, the post-hoc subgroup analysis by Noll et al<sup>10</sup> has many

limitations and the authors’ conclusions cannot be generalized for all subgroups. Additionally, length of hospital stay and parenteral therapy is confounded by many variables and is not the best marker of the effectiveness of the intervention. In most intervention trials, the intention-to-treat analysis is regarded as the standard assessment. This analysis takes into account all of the mitigating factors that could affect the patient outcomes. Mixing the results of both intention-to-treat and per-protocol analyses can be confusing.

A second article by Noll<sup>11</sup> summarizes the mechanistic and clinical evidence for OMT in a host of infectious diseases. Although the evidence for OMT in antimicrobial stewardship remains indirect, this summary stimulates a call to action. By using a multicenter model, similar to other established clinical trial networks, the osteopathic medical profession can measure the efficacy of OMT for managing URTIs, minimize unnecessary antibiotic use, and determine whether OMT is a helpful adjunct to immunization.

The third article comes from an interdisciplinary team at Creighton University and describes the effective implementation of antimicrobial stewardship programs at 2 academic medical centers.<sup>12</sup> Foral et al<sup>12</sup> illustrate the importance of interdisciplinary teams and communication strategies to improve antimicrobial use and outcomes. Osteopathic physicians can use these lessons to model programs at their community-based hospitals.

## Call to Action

The 3 articles<sup>10-12</sup> in the current issue of the *JAOA* present opportunities for scholarly advancement in the osteopathic medical profession. Preventing infectious diseases, enhancing patients’ immune systems, working in interdisciplinary teams, and using OMT to improve our patients’ health are all foundations of osteopathic medicine. Research in health services and primary care delivery models are a path

forward for those in our profession who seek to demonstrate the osteopathic difference. The *JAOA* congratulates this group of authors<sup>10-12</sup> for helping to move the clock forward, and we appeal to the rest of our growing profession to provide the evidence we need to demonstrate our value to the public's health. (doi:10.7556/jaoa.2016.112)

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