

## Limiting Antibiotic Use in Upper Respiratory Tract Infections

Upper respiratory tract infections can be defined as self-limited irritation and swelling of the upper airways with associated cough with no proof of pneumonia, lacking a separate condition to account for the patient symptoms, or with no history of COPD/emphysema/chronic bronchitis<sup>1</sup>. Upper respiratory tract infections (URTI) involve the nose, sinuses, pharynx, larynx, and the proximal large airways. The most common virus is rhinovirus. Other viruses include the influenza virus, adenovirus, enterovirus, and respiratory syncytial virus. Bacteria may cause roughly 15% of sudden onset pharyngitis presentations. The most common is *S. pyogenes*, a Group A streptococcus<sup>2</sup>. Upper respiratory tract infections are one of the most common illnesses that healthcare workers will encounter in an outpatient setting. The infection may vary from the common cold to a life-threatening illness like acute epiglottitis. Because of the diverse causes and presentation, upper respiratory tract infections are best managed by an inter-professional team. In 2015, 17.2 billion cases of URITs are estimated to have occurred<sup>3</sup>. Adults obtain a common cold around two to three times yearly whereas pediatrics can have up to eight cases yearly<sup>4</sup>. Fall months see a peak in incidence caused by the rhinovirus. Complications of upper respiratory tract infections are relatively rare, except with influenza. Many respiratory infections share common symptoms, making them difficult to diagnose using only syndromic presentation. The goal of treatment for URTI is symptom relief. Most people recover in 7 to 10 days. Symptoms might last longer in people who smoke. Patients should be encouraged to drink ample fluids, rest, discontinue smoking and remain compliant with the prescribed medications<sup>5</sup>. The key is to avoid over-prescribing of antibiotics but at the same time not missing a life-threatening infection.

As of today, a physician often has no choice but to rely on syndromic diagnosis for identification and treatment of a respiratory infection. Thus, the lack of reliable diagnostics is a major problem that complicates the

identification and the effective treatment and control of emerging and known pathogens. In Bangladesh like many other countries, routine molecular tests for upper respiratory pathogens are not widely performed and antibiotics abuse in treating upper respiratory tract infections (URTIs) is a major public health concern. The need to have a more standard and reliable approach to diagnose both common infections as well as documenting evidence of new pathogens that may lead to larger, more severe outbreaks is critical. A layered diagnostic strategy commencing with the availability of rapid POC technologies can greatly enhance our preparedness to future outbreaks. Early and accurate diagnosis of respiratory pathogens and associated outbreaks can allow for the control of spread, epidemiological modeling, targeted treatment, and decision making—as is evident with the current COVID-19 pandemic. Yet, with delays in getting reference laboratory tests and limited availability and poor sensitivity of point-of-care tests, syndromic diagnosis is the most-relied upon method in clinical practice today<sup>6</sup>. Discovery of highly sensitive and specific nucleic acid amplification tests, have become the diagnostic reference standard for viruses, represents an exciting advance in respiratory medicine. Most recently, molecular diagnostics have played an essential role in global health response to the novel coronavirus pandemic. The rapidly evolving technologies to use newer molecular tests for URTI in combination with clinical judgement and traditional methods would go a long way in the diagnosis, treatment and prevention of misuse of antibiotics<sup>6</sup>.

In a study published in the present issue of the journal, retrospective chart review documented viral pathogens using real-time multiplex PCR for 19 viruses and 3 bacteria using cartridge based rapid PCR platform recorded 67% confirmed respiratory pathogen, about 99% were due to various viral infections. The data were likely to be derived from tested laboratory samples in the study hospital. Syndromic differences with different viral

etiologies, duration and severity of symptoms and outcome (hospitalization or not) of the cases was not available. However, being 1<sup>st</sup> of its kind from Bangladesh is commendable and the data confirms the common viral etiologies in a selected population seeking health care services from a corporate hospital. The COVID cases were waning during the study period (2020-2022) and the small number of samples over long period would suggest a highly selected nature of case referrals (e.g., severe cases or patient/physician choice etc.).

Health authorities have been strongly encouraging physicians to decrease the prescribing of antibiotics to treat common URTIs because antibiotic usage does not significantly reduce recovery time for these viral illnesses<sup>7</sup>. A 2017 systematic review found three interventions which were probably effective in reducing antibiotic use for acute respiratory infections: C-reactive protein testing, Procalcitonin-guided management, and shared decision-making between physicians and patients<sup>8</sup>. The use of narrow-spectrum antibiotics has been shown to be just as effective as broad-spectrum alternatives for children with acute bacterial URTIs, and has a lower risk of side effects in children. (9) Decreased antibiotic usage may also help prevent drug-resistant bacteria. Some have advocated a delayed antibiotic approach to treating URTIs, which seeks to reduce the consumption of antibiotics while attempting to maintain patient satisfaction. A Cochrane review of 11 studies and 3,555 participants explored antibiotics for respiratory tract infections. It compared delaying antibiotic treatment to either starting them immediately or to no antibiotics. Outcomes were mixed depending on the respiratory tract infection; symptoms of acute otitis media and sore throat were modestly improved with immediate antibiotics with minimal difference in complication rate. Antibiotic usage was reduced when antibiotics were only used for ongoing symptoms and maintained patient satisfaction at 86%<sup>10</sup>.

Treatments with established effectiveness for those symptoms in adults are limited to over-the-counter analgesics and antihistamine/decongestant combinations. The American Academy of Pediatrics Choosing Wisely recommendation states that cough and cold medicines should be avoided for respiratory illness in children younger than four years<sup>11</sup>.

There is frequently a lack of awareness and outside pressure increasing antibiotic use in the outpatient

setting. There is a growing threat of antimicrobial resistance making it important to identify the scope of the problem and factors impacting antibiotic prescription. Expansion of stewardship programs or performance standards to the outpatient setting is necessary to combat excessive and inappropriate antibiotic use.

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