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Rationality of Antibiotic Use in Upper Respiratory Tract Infections in Primary Care

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ABSTRACT

Upper respiratory tract infections frequently led to antibiotic prescribing in primary care despite the predominance of self-limited viral illness, creating avoidable adverse effects and contributing to antimicrobial resistance. This article examined how rational antibiotic use could be implemented for upper respiratory tract infection syndromes in outpatient first-contact care. A narrative literature review was conducted using secondary sources from recent peer-reviewed research and relevant clinical guidance, and findings were synthesized through qualitative thematic analysis. The review found that antibiotics were justified only in a limited subset of presentations, particularly high-probability or confirmed streptococcal pharyngitis, acute bacterial rhinosinusitis defined by characteristic time-course patterns, and selected acute otitis media meeting diagnostic and severity criteria. In contrast, routine prescribing for viral syndromes, broad-spectrum selection without indication, and unnecessarily prolonged courses represented common forms of inappropriate use. Practical stewardship strategies that reduced unnecessary prescribing included syndrome-specific decision algorithms, structured communication with safety-netting, delayed prescribing in defined uncertainty zones, and routine audit with feedback. These findings supported a targeted approach that aligned clinical decision-making with patient safety and long-term antibiotic effectiveness.

INTRODUCTION

Upper respiratory tract infections remain one of the most frequent clinical reasons for seeking care in primary care settings. Symptoms such as sore throat, nasal congestion, rhinorrhea, cough, facial pressure, ear pain, and low grade fever disrupt sleep, work, and school attendance, so patients often arrive with an urgent expectation of rapid improvement (Shubeilat et al., 2023a). This expectation intersects with the realities of brief consultations, limited access to immediate microbiologic confirmation, and the clinician's duty to reduce risk. In that intersection, antibiotics are frequently perceived as a quick, decisive response even when the underlying illness is likely viral and self limiting. The result is a persistent gap between what antibiotics can realistically achieve in uncomplicated URTI syndromes and what many patients believe antibiotics will deliver (Rotsides, 2021).

The core clinical problem is a mismatch between etiology and treatment. Most common cold presentations are viral. A large proportion of acute pharyngitis in adults is viral. Most episodes of acute rhinosinusitis start as viral and resolve without antibacterial therapy. Many cases of acute otitis media improve with analgesia and observation when diagnostic criteria are met and follow up is feasible. Antibiotics do not meaningfully shorten illness duration in most of these scenarios, and they do not prevent symptom recurrence driven by viral exposure or by inflammation (Spurling et al., 2017). Yet antibiotics carry predictable harms. At the individual level these include gastrointestinal upset, rashes, candidiasis, and allergic reactions. At the community level repeated and unnecessary exposure accelerates antimicrobial resistance, which undermines the effectiveness of first line agents for future

bacterial infections. When prescribing becomes routine for viral syndromes, the clinical encounter also becomes medicalized, reinforcing the idea that URTIs require antibiotics and increasing future demand (McNicholas & Hooper, 2022).

Rational antibiotic use in primary care is best understood as a disciplined decision process under uncertainty. The aim is not to label every episode with a confirmed pathogen. The aim is to identify patterns that meaningfully raise the probability of bacterial disease or the risk of clinically important complications. This requires structured clinical reasoning (Sijbom et al., 2023). In pharyngitis, for example, a careful history and examination can separate a high probability streptococcal pattern from a viral pattern, and targeted testing where available can refine decisions further. In acute rhinosinusitis, the temporal pattern of illness matters more than isolated findings such as the color of nasal discharge (Schmidt et al., 2018). Persistent symptoms without improvement, severe onset with high fever and prominent facial pain, or a clear pattern of worsening after initial improvement can shift clinical suspicion toward bacterial disease. In acute otitis media, accurate otoscopic assessment is essential, because misdiagnosis inflates antibiotic use and erodes the feasibility of observation strategies (Smolinski et al., 2022).

The term rationality in antibiotic prescribing includes several linked elements. It requires correct indication, selection of an agent whose spectrum is appropriate for the likely pathogen, dosing that achieves therapeutic exposure, and a duration aligned with evidence and guideline recommendations. Rationality also requires a plan for monitoring and reassessment. In primary care this plan often determines whether antibiotics are truly necessary at the first visit. When probability of bacterial infection is low, supportive care with explicit safety netting can be safer and more appropriate than antibiotics. Safety netting means clear instructions about expected symptom course, what symptoms should trigger earlier review, and when reassessment is needed. A coherent follow up plan can reduce defensive prescribing because it provides a structured alternative to uncertainty (Stuart & Kneer, 2021).

Non rational prescribing in URTIs typically takes several forms. The most common is antibiotic use for clearly viral syndromes such as uncomplicated common cold and viral sore throat. Another is the choice of broad spectrum antibiotics when a narrow spectrum option would suffice, increasing ecological pressure for resistance. A further form is excessive duration, often chosen out of habit or a belief that longer treatment is inherently safer, despite evidence that unnecessary exposure increases adverse effects without proportional benefit. These patterns do not arise solely from lack of knowledge. They are sustained by consultation dynamics, patient expectations, time pressure, and system constraints such as limited diagnostic tools and limited opportunities for follow up (Maidi et al., 2024).

Because these drivers are multi level, improvement requires more than reminders to prescribe less. Effective change tends to combine decision support with communication strategies and with measurement. Decision support can be as simple as a one page algorithm for pharyngitis and acute rhinosinusitis, integrated into routine documentation. Communication strategies emphasize validation of symptoms, brief explanation of why antibiotics are not helpful in a likely viral illness, and a concrete care plan that addresses relief, duration, and warning signs. Measurement can be implemented through simple indicators such as the proportion of common cold diagnoses receiving antibiotics or the proportion of sore throat cases receiving antibiotics without documented criteria. Feedback based on such indicators can normalize better practice within a clinic and reduce the sense that prudent prescribing is an individual choice rather than a shared standard (Xu et al., 2025).

This review focuses on antibiotic rationality for URTIs in primary care by clarifying when antibiotics are justified, how inappropriate prescribing typically manifests, why overuse persists, and which stewardship strategies are most practical in routine ambulatory care. The emphasis is on approaches that protect patients from both under treatment of true bacterial disease and over treatment of self limited viral illness, while aligning day to day clinical decisions with long term public health goals related to antimicrobial effectiveness.

RESEARCH METHODS

This study used a narrative literature review design. The analysis relied solely on secondary data drawn from peer-reviewed journal articles published within the last five years and selected clinical guidance relevant to antibiotic decision-making for upper respiratory tract infections in primary care. Sources were read in full and organized by topic, then examined using qualitative data analysis through

thematic coding to identify three recurring domains that were discussed in the paper, namely clinical indications for antibiotics across URTI syndromes, common patterns of inappropriate prescribing, and practical stewardship strategies used in outpatient settings. The synthesis was interpretive and descriptive, aiming to integrate findings across sources without statistical pooling.

RESULTS AND DISCUSSION

1. When antibiotics are indicated in upper respiratory tract infections

Antibiotics have a legitimate role in a limited subset of upper respiratory tract infection presentations. The clinical objective is to identify that subset with disciplined pattern recognition, rather than to treat symptoms as a proxy for bacterial disease. Across syndromes, two principles remain stable. First, most uncomplicated presentations are viral and improve with symptomatic care and time. Second, antibiotics become reasonable when the probability of bacterial infection is meaningfully elevated or when the patient's risk profile makes early treatment preferable. Clinical practice guidelines and trials consistently support selective prescribing anchored in diagnostic criteria, illness trajectory, and reassessment plans (Smith et al., 2023).

Typical common cold presents with rhinorrhea, nasal congestion, sneezing, mild sore throat, cough, and low grade fever. The etiologic base is overwhelmingly viral, so antibiotics offer no clinically relevant symptom reduction for most patients and expose them to adverse effects and broader resistance pressure. Rational management emphasizes symptom relief, hydration, rest, and clear expectations about duration. Nasal symptoms often peak early and gradually improve over a week, while cough can persist longer without implying bacterial disease. When antibiotics are considered in a patient who initially appears to have a cold, the question is usually not whether the cold itself merits antibiotics, but whether the presentation actually reflects a different diagnosis, a complication, or a high risk host. Severe systemic toxicity, progressive dyspnea, pleuritic chest pain, or signs consistent with pneumonia shift the clinical pathway toward further evaluation rather than reflex prescribing. Stewardship guidance treats uncomplicated viral URTI as a core opportunity to reduce unnecessary antibiotics through consistent practice norms and patient education.

Sore throat is a high pressure presentation because discomfort is prominent and patients often expect antibiotics. In adults, viral etiologies predominate, while group A streptococcus remains clinically relevant because targeted antibiotics can reduce symptom duration modestly and reduce specific complications in appropriately selected patients. Selective prescribing therefore hinges on estimating the likelihood of group A streptococcal infection using clinical prediction tools and, where available, rapid antigen testing (Krüger et al., 2021).

Clinical scoring systems such as Centor or McIsaac emphasize fever, tonsillar exudate, tender anterior cervical lymphadenopathy, and absence of cough, with age adjustment in McIsaac. These tools do not replace clinical judgment, but they provide a structured estimate that can guide testing and treatment thresholds (Poerbonegoro et al., 2022). In settings with rapid antigen detection tests, confirmatory testing can reduce unnecessary antibiotic exposure by narrowing treatment to patients with evidence of streptococcal infection. In settings without rapid testing, higher score thresholds can be used to support selective empiric treatment, while intermediate probability cases can be managed with symptomatic care and reassessment, depending on local epidemiology and follow up feasibility.

Evidence from a large randomized trial supports structured approaches that integrate clinical scoring and rapid testing, showing reductions in antibiotic use alongside acceptable clinical outcomes and symptom control, compared with less structured strategies. This reinforces a practical point for primary care. The most reliable way to avoid over treatment is not to argue about antibiotics at the end of the visit, but to document and communicate a transparent decision rule from the start of the assessment. Antibiotics are most defensible when the clinical pattern aligns with streptococcal disease and the decision is supported by a score and, ideally, a test. Conversely, features such as cough, rhinorrhea, conjunctivitis, hoarseness, or oral ulcers point toward viral illness and make antibiotics inappropriate.

When antibiotics are indicated for likely or confirmed group A streptococcal pharyngitis, rationality includes appropriate agent selection, dosing, and duration. Narrow spectrum agents effective against group A streptococcus are generally preferred, aligning therapy with pathogen coverage while minimizing collateral damage to the microbiome and selective pressure for resistance. The specific

agent choice depends on guideline recommendations, allergy history, and local formulary, but the underlying stewardship logic remains consistent across settings.

Acute rhinosinusitis is commonly mismanaged because many patients and some clinicians over interpret symptom severity or nasal discharge characteristics as evidence of bacterial infection. In reality, most cases are viral and improve without antibiotics. The most useful discriminator is illness trajectory rather than a single symptom (Smith et al., 2023). Guideline based approaches identify bacterial acute rhinosinusitis using patterns such as persistent symptoms without improvement beyond about ten days, severe onset with high fever and purulent nasal discharge or facial pain lasting several days at the beginning of illness, or worsening symptoms after an initial improvement, often described as double worsening (Fokkens et al., 2020).

These patterns matter because they correspond to clinical contexts in which bacterial infection is more plausible. Persistent symptoms suggest failure of typical viral resolution. Severe onset suggests a more aggressive process. Double worsening suggests secondary bacterial infection after an initial viral episode. Under this framework, antibiotics become reasonable when one of these patterns is present and symptoms are compatible with sinus involvement such as facial pain or pressure, maxillary tooth pain, or nasal obstruction. In contrast, early illness with fluctuating congestion and discharge, even if thick or discolored, typically remains viral and does not justify antibiotics (Lucas et al., 2022).

Evidence syntheses indicate that antibiotics confer limited average benefit in uncomplicated adult acute rhinosinusitis, with absolute effects that are often small and must be weighed against adverse events. Benefits are more likely in subgroups with stronger evidence of bacterial disease, which supports the guideline emphasis on strict clinical thresholds. A rational plan therefore pairs a high threshold for antibiotics with strong symptomatic management, including analgesics, saline irrigation, and guidance about expected symptom course and warning signs. This approach maintains patient safety while avoiding routine antibiotic exposure for conditions that would resolve spontaneously.

Acute otitis media is a syndrome where diagnostic accuracy determines antibiotic rationality. Over diagnosis inflates antibiotic use, while accurate diagnosis allows selective antibiotics and safe observation strategies. Guideline criteria emphasize a bulging tympanic membrane or new onset otorrhea not due to otitis externa, plus signs of middle ear effusion and inflammation. When these criteria are not met, antibiotics should generally be avoided, and alternative diagnoses considered, such as otitis media with effusion without acute infection or referred pain (Carson et al., 2025).

For children who meet diagnostic criteria, observation with close follow up is an evidence based option in selected cases (Kadir, 2026b). Observation is typically appropriate for children with mild symptoms, no severe systemic illness, and reliable access to reassessment within 48 to 72 hours. Immediate antibiotics are favored for younger children, severe symptoms such as moderate to severe otalgia, high fever, bilateral disease in younger ages, or presence of otorrhea. This stratified approach reduces unnecessary antibiotic exposure while preserving timely treatment for those most likely to benefit. The rationale rests on the natural history of otitis media, where a substantial proportion of cases improve with analgesia alone, and on the balance of modest antibiotic benefits against adverse effects such as diarrhea and rash.

Observation is not a refusal to treat. It is a structured plan. It requires pain management, explicit expectations, and a clear trigger for starting antibiotics or returning for evaluation. More recent analyses continue to support watchful waiting when criteria are met and follow up is feasible, reinforcing that stewardship compatible care can be clinically safe and acceptable.

Acute laryngitis is typically viral and antibiotics are not indicated in routine cases. Hoarseness, voice loss, and throat irritation usually resolve with voice rest, hydration, and symptom management. Antibiotics do not meaningfully change the course for most patients and contribute to unnecessary exposure. Similarly, nonspecific acute cough illnesses without evidence of pneumonia should not routinely trigger antibiotics. While cough is sometimes interpreted by patients as a sign of bacterial infection, it is commonly part of viral URTI physiology and airway inflammation. Stewardship efforts often target these presentations because they contribute to high volumes of unnecessary prescriptions in outpatient settings.

Some patients warrant a different threshold because the risk of complications is higher or the tolerance for uncertainty is lower. Immunocompromised patients, those with significant cardiopulmonary disease, and certain extremes of age may require earlier escalation and closer monitoring. Even in these groups, rationality does not mean automatic antibiotics for every URTI

symptom. It means a lower threshold for evaluation of alternative diagnoses, earlier reassessment, and selective antibiotics when bacterial infection becomes plausible. The key safeguard is explicit documentation of the risk rationale and the clinical features that justify a departure from standard thresholds.

Across URTI syndromes, appropriate antibiotic use is inseparable from the way decisions are explained and operationalized. A rational indication still fails if the patient does not understand the plan or if follow up is not feasible. This is why guideline consistent thresholds are often paired with strategies such as safety netting and delayed prescribing. Delayed prescribing can be particularly useful in uncertainty zones where bacterial probability is not high enough for immediate antibiotics but where patient anxiety or follow up barriers create pressure. Systematic review evidence supports delayed strategies as a way to reduce antibiotic consumption without clear worsening of outcomes for many acute respiratory infections (Spurling et al., 2017).

In practice, the most defensible antibiotic decisions for URTIs share three attributes. The syndrome diagnosis is supported by defined clinical criteria. The bacterial suspicion is anchored in a time course pattern or a validated prediction rule rather than a single subjective sign. The management plan includes symptom control and a reassessment pathway that protects against deterioration. When these attributes are present, antibiotics are more likely to deliver net benefit, and when they are absent, antibiotics are more likely to be unnecessary and harmful (Llor et al., 2022).

2. Common forms of inappropriate antibiotic prescribing in primary care

Inappropriate antibiotic use in primary care is not a single behavior but a cluster of recurring patterns that appear across upper respiratory tract infection syndromes. At a population level, the scale of the problem is substantial. A national analysis of US ambulatory care visits estimated that a sizeable share of outpatient antibiotic prescribing is inappropriate, highlighting respiratory diagnoses as a major contributor. In routine practice, these patterns persist because they are reinforced by symptom driven expectations, diagnostic uncertainty, workflow pressure, and imperfect follow up capacity (Schmidt et al., 2018). The net result is predictable. Antibiotics are provided when bacterial probability is low, broader agents are selected when narrow options would be sufficient, and durations exceed what evidence and guidelines support. Stewardship frameworks treat these patterns as modifiable quality problems that can be tracked and improved through practice level systems rather than relying on individual willpower alone (Kadir, 2026a).

The first and most common form is antibiotic prescribing for clearly viral syndromes (Shubeilat et al., 2023b). Uncomplicated common cold and acute rhinopharyngitis, acute laryngitis, and many sore throat presentations with viral features continue to attract antibiotics despite the absence of meaningful benefit. When antibiotics are provided in these cases, the prescription functions as a symbolic response to illness rather than a targeted therapy. This is clinically consequential because viral URTIs are frequent and clustered seasonally. Even a modest tendency to prescribe in viral syndromes produces a large cumulative volume of unnecessary exposure. Stewardship guidance explicitly prioritizes these viral syndromes as high yield targets for reducing inappropriate prescribing because the clinical risk of withholding antibiotics is low when safety netting is done well.

A closely related pattern is antibiotic prescribing based on single signs that are weak discriminators of bacterial infection. Discolored nasal discharge, the presence of cough, subjective severity, or a brief early course of sinus pressure are often misread as proof of bacterial disease, especially in acute rhinosinusitis. Guideline based criteria emphasize time course and progression rather than isolated findings, yet practice often drifts toward treating color and discomfort as bacterial markers. This shortcut is understandable in short consultations, but it predictably inflates prescribing because many viral illnesses produce thick or colored secretions through inflammatory mechanisms. The same logic applies to sore throat where patients equate throat redness with bacterial infection. Without structured prediction rules or testing where available, antibiotics become a default response to nonspecific inflammation rather than a response to probable streptococcal disease.

A third form is spectrum escalation without indication (Bianco et al., 2022). Even when an antibiotic is justified, selection frequently leans toward broader spectrum agents when narrow spectrum therapy would be adequate for the likely pathogen. A recent systematic review and meta analysis on outpatient respiratory tract infections reported patterns consistent with excessive use of broad spectrum antimicrobials and highlighted benchmark expectations that narrow spectrum options should dominate

when antibiotics are prescribed. Broad spectrum use is not merely a technical deviation. It increases collateral damage by selecting for resistance in bystander organisms and by disrupting the microbiome more extensively than necessary. In primary care, this can translate into higher rates of adverse effects and a faster erosion of first line antibiotic effectiveness in the community.

A fourth form is non rational duration and course design (Fokkens et al., 2020). Courses may be extended longer than needed because of habitual norms such as finishing long courses to ensure cure, or because clinicians aim to prevent re attendance. Longer exposure increases the probability of adverse events and resistance selection without guaranteeing better outcomes in self limiting or borderline indications. Conversely, overly short or irregular use can occur when patients stop early because symptoms improve, which reflects a different stewardship failure. Both extremes point to the same underlying issue. Antibiotics are treated as a general remedy for respiratory discomfort rather than a targeted intervention with evidence based dose and duration parameters. The CDC outpatient stewardship framework emphasizes that action for quality improvement includes optimizing agent choice and duration, not only reducing total prescribing.

A fifth form is immediate prescribing in uncertainty zones where observation, delayed prescribing, or reassessment would be safer and more consistent with evidence (Davey et al., 2021). Delayed prescribing is a pragmatic strategy that reduces antibiotic consumption compared with immediate prescribing, and Cochrane evidence indicates that delayed strategies can lower use while maintaining similar symptom control and complication rates in many respiratory infections. When immediate antibiotics are given instead, the prescription often reflects a substitute for follow up capacity or a response to anticipated dissatisfaction. This has downstream effects. Immediate antibiotics can increase re consultation expectations, whereas delayed or no antibiotic strategies can normalize supportive care when paired with clear instructions (Heath et al., 2023).

These inappropriate patterns matter because they reinforce each other. Viral prescribing trains patient expectations, which increases pressure for immediate antibiotics, which then makes broad spectrum choices and longer durations more likely, because the prescription is framed as a decisive cure rather than a probabilistic intervention. A safer and more rational pattern requires consistent diagnostic thresholds, disciplined antibiotic selection, and a structured plan for symptom management and reassessment, all of which are central elements of outpatient stewardship models.

Antibiotic overprescribing for upper respiratory tract infections in primary care is sustained by interacting forces at clinician, patient, and system levels. The determinants are not random. A systematic review that built a determinants framework found recurring drivers such as infection type, comorbidity, and the clinician's perception that a patient wants antibiotics, which repeatedly predicts inappropriate prescribing. The most consistent pattern is that uncertainty and social pressure converge at the point of prescribing, and antibiotics become a shortcut for reassurance, efficiency, or conflict avoidance rather than a targeted response to probable bacterial disease.

Clinical uncertainty is a primary driver. Many URTI presentations share overlapping symptoms, and immediate microbiologic confirmation is rarely available in routine outpatient encounters. Under uncertainty, clinicians may shift toward immediate antibiotics to reduce perceived risk, even when the pretest probability of bacterial infection is low. This tendency strengthens when a clinician anticipates that the patient may reconsult, complain, or deteriorate, especially in settings where follow-up is difficult. The uncertainty is not only diagnostic. It is also prognostic. Clinicians must decide whether a benign viral trajectory is likely, whether bacterial disease is plausible, and whether complications are credible within a short window. When these judgments are made quickly, antibiotics can feel like a low effort hedge. Stewardship guidance addresses this by emphasizing policy and practice changes that support consistent decision thresholds and follow-up structures rather than relying only on individual discretion.

Time pressure and workflow constraints amplify uncertainty. Short appointments leave limited space for careful explanation, shared decision-making, and explicit safety-netting. In that context, writing a prescription can appear faster than negotiating expectations. The problem is that speed creates downstream costs. It normalizes antibiotics for self-limited illness, increases repeat demand, and shifts future consultations toward a transactional pattern where antibiotics are expected. Outpatient stewardship frameworks explicitly identify tracking and reporting plus practice-level interventions as mechanisms to counteract this drift by changing default behavior and reducing reliance on ad hoc negotiation in every visit.

Patient expectations are another robust driver. Expectations are not necessarily expressed as direct requests. They often appear as cues, such as emphasizing inability to work, prior "success" with antibiotics, fear that symptoms are worsening, or insistence that sputum or nasal discharge color proves bacterial infection. A recent study in the Annals of Family Medicine links antibiotic expectations to limited knowledge of antibiotic risks, implying that expectations are partly a risk-perception gap rather than simple demand for medication. Clinicians frequently overestimate patient demand, and this perceived demand can be more predictive of prescribing than actual patient preference, which helps explain why interventions that reframe the consultation conversation can reduce prescribing without harming satisfaction.

Communication dynamics sit at the center of expectation management. When clinicians can validate distress, explain why antibiotics are unlikely to help, and provide a concrete care plan with return precautions, antibiotic use decreases. Evidence from randomized trials supports this mechanism. In the GRACE INTRO communication and CRP training trial follow-up, communication training produced sustained reductions in antibiotic prescribing at 12 months, indicating that consultation skills can shift prescribing norms beyond a short intervention window. This aligns with the CDC stewardship framework, which highlights communication skills training as a practical strategy to manage patient concerns about prognosis, benefits and harms, and self-limited conditions.

System constraints often determine whether non-antibiotic management is feasible. Follow-up access is a pivotal variable. When patients face travel barriers, cost barriers, limited appointment availability, or inconsistent continuity of care, clinicians may prescribe antibiotics to avoid the risk of deterioration without reassessment. Diagnostic tool availability also matters. Point-of-care support can reduce uncertainty and provide a defensible basis for withholding antibiotics, especially in acute cough and lower respiratory tract presentations that overlap with URTI-related prescribing behavior. A cluster randomized trial showed that either C-reactive protein point-of-care testing or enhanced communication skills training reduced antibiotic prescribing without compromising recovery and satisfaction, illustrating how diagnostic support and communication can address two different components of the prescribing pressure. More recent work in primary care respiratory medicine continues to examine these combined strategies in real-world practice environments.

Measurement and accountability gaps sustain overprescribing. When prescribing data are not visible to clinicians or leadership, behavior remains shaped by habit and perceived norms rather than feedback. Audit and feedback is a practical lever in this domain. A systematic review and meta-analysis in Clinical Infectious Diseases evaluates audit-and-feedback interventions aimed at antibiotic prescribing in primary care and discusses why effectiveness varies, supporting the idea that feedback design and context matter. The CDC framework incorporates tracking and reporting as a core element because measurement converts stewardship from an abstract principle into an operational standard.

Delayed prescribing often emerges as a behavioral compromise when uncertainty and expectation pressure are high. Clinicians who are not confident withholding antibiotics outright can use delayed prescriptions to reduce antibiotic consumption while maintaining patient safety and satisfaction. Cochrane evidence supports delayed prescribing as a strategy that can significantly reduce unnecessary antibiotic use for respiratory tract infections in appropriate contexts. The existence of this compromise highlights the underlying driver. Overprescribing is frequently less about clinical necessity and more about managing uncertainty, reassurance, and system limitations within a single encounter (Dewi et al., 2020).

CONCLUSION

Antibiotic rationality for upper respiratory tract infections in primary care depends on disciplined case selection and transparent decision rules. Antibiotics are justified in a limited set of scenarios where bacterial probability is materially elevated or where guideline criteria support early treatment, such as high-probability or confirmed streptococcal pharyngitis, acute bacterial rhinosinusitis defined by time-course patterns, and selected acute otitis media cases meeting diagnostic and severity thresholds. Outside these zones, routine antibiotics provide little clinical benefit and create predictable harm through adverse events, microbiome disruption, and accelerated antimicrobial resistance, while also normalizing the expectation that self-limited respiratory illness requires antimicrobial therapy.

Persistent overuse is driven by the convergence of diagnostic uncertainty, time pressure, perceived patient demand, limited follow-up capacity, and weak feedback systems. The most workable

correction in primary care combines syndrome-specific algorithms, structured communication and safety-netting, delayed prescribing in defined uncertainty zones, and routine tracking with audit and feedback, reinforced by clinic-wide commitment and patient education. These interventions reduce antibiotic consumption without worsening outcomes and align day-to-day prescribing with stewardship goals that protect current patients while preserving antibiotic effectiveness for future bacterial infections.

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