Antibiotic Use: Understanding Behavioral Intentions

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December 4, 2025

The Foundation of Behavioral Intentions in Health Psychology

Behavioral intentions represent the immediate antecedent to actual behavior, reflecting the degree of conscious planning or motivation an individual possesses to engage in a specific action. In the context of public health, and particularly concerning the appropriate use of medications, understanding **behavioral intentions (BI)** is paramount because they serve as the most proximal predictor of subsequent actions, such as adherence to prescribed regimens or the appropriate seeking of medical care. These intentions are not simply wishes; rather, they are commitments to action, formed through a complex interplay of cognitive and affective processes. For antibiotics, the relevant intentions studied include the intention to complete the full course of medication, the intention to not demand antibiotics for perceived viral illnesses, and the intention to dispose of unused medication correctly. Highlighting intentions allows researchers and public health officials to target preventative strategies effectively, focusing on the cognitive pathways that lead to misuse rather than merely addressing the behavior after it has occurred.

The psychological literature consistently demonstrates that while intentions are strong predictors of behavior, a significant gap often exists between what people plan to do and what they actually execute, a phenomenon known as the **intention-behavior gap**. This disparity is particularly relevant in health behaviors where situational factors, emotional states, and environmental constraints intervene between the initial formation of the intention and the moment of execution. For instance, a patient may strongly intend to take their antibiotic dose precisely every twelve hours, but external factors--such as forgetfulness, changes in daily routine, or unpleasant side effects--may disrupt this planned behavior. Therefore, assessing behavioral intentions provides a crucial baseline, but effective interventions must also incorporate strategies designed to bridge this gap, often involving implementation intentions or detailed action planning, which specify when, where, and how the intended behavior will be performed, thereby increasing the likelihood of successful execution.

Furthermore, intentions related to antibiotic use are often categorized into two critical areas: intentions related to appropriate consumption (adherence once prescribed) and intentions related to appropriate seeking (demand reduction). The intention to adhere involves following the duration and dosage instructions provided by a healthcare professional, which is essential for ensuring the eradication of the target pathogen and minimizing the opportunity for resistance development. Conversely, the intention to seek relates to the patient's predisposition to request or demand antibiotics when presenting with symptoms, especially those indicative of viral infections for which antibiotics are ineffective. Researchers must differentiate between these two types of intentions, as the psychological drivers and influencing factors--such as perceived necessity, fear of symptoms worsening, or desire for immediate relief--are often distinct for each domain, requiring tailored communication strategies to foster responsible usage intentions.

The Crisis of Antibiotic Misuse and Resistance

The global proliferation of **Antimicrobial Resistance (AMR)** represents one of the most pressing public health challenges of the 21st century, rendering previously treatable infections dangerous or lethal. Central to the acceleration of AMR is the widespread misuse and overuse of antibiotics, behaviors that are directly preceded and influenced by individual behavioral intentions. When individuals intend to use antibiotics inappropriately--whether by demanding them for non-bacterial infections, stopping a course prematurely once symptoms abate, or sharing prescriptions with others--they contribute directly to the selection pressure that allows resistant strains of bacteria to thrive. This phenomenon shifts the focus from purely biological mechanisms of resistance to the underlying psychological and behavioral drivers that perpetuate the crisis. Understanding the intentions that lead to misuse is therefore indispensable for designing effective behavioral interventions aimed at preserving the efficacy of existing antimicrobial agents.

A significant aspect of misuse driven by poor intentions is the phenomenon of self-medication and the hoarding of antibiotics. Patients in many regions often possess unused antibiotics, sometimes leftovers from previous prescriptions, which they intend to use for future illnesses without professional consultation. This intention is often fueled by a desire for cost savings, convenience, or a belief in their own diagnostic capability. Such practices bypass the crucial step of professional diagnosis, leading to the use of inappropriate agents, incorrect dosages, and insufficient durations, all of which are powerful catalysts for resistance. The intention to self-medicate, rather than seeking appropriate medical advice, highlights a critical gap in health literacy and trust in the medical system, necessitating public health campaigns that specifically target the dangers associated with using non-prescribed or saved medication. These communications must clearly articulate the link between casual use and the serious, long-term public health consequences of AMR.

The relationship between perceived illness severity and behavioral intention is also highly relevant. When individuals perceive their symptoms to be severe, they often form a strong intention to seek immediate, powerful relief, frequently translating into an intention to demand antibiotics, regardless of the cause of the illness. This intention is reinforced by societal expectations that a visit to the doctor should result in a tangible, active treatment, often equating antibiotics with efficacy and rapid recovery. Public health efforts must therefore focus on reshaping these expectations, ensuring that patients intend to trust the diagnostic process and accept non-antibiotic treatments when appropriate. Furthermore, addressing the intentions of prescribers--who sometimes prescribe antibiotics unnecessarily due to patient pressure (a form of subjective norm)--is equally important, requiring institutional and educational support to reinforce the intention to adhere strictly to prescribing guidelines, even in the face of demanding patients.

Theoretical Models Guiding Antibiotic Intentions

The study of behavioral intentions toward antibiotics is predominantly grounded in established social cognition models, most notably the **Theory of Planned Behavior (TPB)**, which provides a robust framework for predicting and explaining health-related actions. The TPB posits that intentions are determined by three key constructs: attitudes toward the behavior, subjective norms, and perceived behavioral control. Applied to antibiotic use, a patient's intention to complete a full course, for example, is influenced by their personal positive or negative evaluation of that action (attitude), the perceived social pressure to perform or not perform the action (subjective norm), and their belief in their ability to successfully perform the action (perceived behavioral control). These models offer researchers the capacity to dissect the cognitive architecture underlying misuse and identify specific, modifiable factors that can be targeted in interventions.

The TPB evolved from the **Theory of Reasoned Action (TRA)**, which originally only included attitude and subjective norms. The addition of perceived behavioral control (PBC) became necessary to account for behaviors that are not entirely under volitional control, a common situation in health behaviors like medication adherence. For antibiotic consumption, PBC is crucial; a patient might have a positive attitude and feel social pressure to finish the medication (high intention), but if they lack access to transport to the pharmacy, cannot afford the drug, or struggle to remember doses (low PBC), the intention is unlikely to translate into behavior. Therefore, interventions based on TPB must not only address beliefs and social influence but must also actively seek to enhance the patient's confidence and perceived capability to overcome potential barriers.

Other psychological models, such as the **Health Belief Model (HBM)** and the **Protection Motivation Theory (PMT)**, also inform the study of antibiotic intentions by emphasizing threat and efficacy appraisal. The HBM suggests that intentions are driven by the perceived susceptibility to illness, the perceived severity of the illness, and the perceived benefits and barriers associated with the preventative action (e.g., responsible antibiotic use). When patients perceive low susceptibility to antibiotic-resistant infections or low severity of the consequences of misuse, their intention to adhere to responsible behaviors decreases. Integrating the insights from these models helps create a richer understanding, suggesting that effective messaging must not only target the cognitive determinants of TPB but also raise awareness regarding the genuine threat posed by AMR and the personal benefits derived from prudent medication use.

Attitudinal Components Influencing Antibiotic Behavior

Attitudes, defined as an individual's positive or negative evaluation of performing a specific behavior, constitute a foundational element in the formation of behavioral intentions toward antibiotics. These attitudes are complex and multifaceted, often encompassing both instrumental

beliefs (the perceived utility or consequences of the behavior) and experiential beliefs (the feelings or emotions associated with the behavior). For instance, an instrumental attitude might involve the belief that "taking the full course of antibiotics will effectively cure my infection and prevent relapse." Conversely, a negative experiential attitude might stem from the belief that "taking this antibiotic makes me feel nauseous and disrupts my daily routine," thereby reducing the intention to adhere. Interventions must therefore address both the cognitive benefits and the emotional costs associated with responsible antibiotic behavior to effectively shift intentions.

A particularly challenging attitudinal component is the widespread misconception regarding the effectiveness of antibiotics against viral infections, such as the common cold or flu. Many patients hold the entrenched belief that antibiotics are a general cure-all for severe respiratory illnesses. This mistaken belief generates a strong, positive attitude toward demanding antibiotics even when medically unwarranted, creating a high intention to seek them out. Changing this deeply held attitude requires more than simple factual information; it demands counter-attitudinal messaging that addresses the underlying emotional drivers, such as the fear of prolonged illness or the pressure to return to work quickly. Educational campaigns that successfully differentiate between bacterial and viral infections and emphasize the risks of using antibiotics inappropriately are critical for reducing this positive, yet misinformed, attitudinal driver of misuse.

Furthermore, attitudes toward completing the prescribed course are heavily influenced by the patient's initial symptomatic relief. When symptoms rapidly improve, a patient may develop a negative attitude toward continuing the medication, viewing the remaining doses as unnecessary, wasteful, or burdensome. This shift in attitude reduces the intention to complete the regimen, leading to premature cessation and increasing the risk of relapse and resistance. To counter this, communication must proactively frame the importance of the full course, emphasizing that the final doses target the most resilient bacteria and that symptom disappearance is not synonymous with complete bacterial eradication. Successful adherence interventions frequently focus on reinforcing the positive attitude toward completion by linking it directly to long-term health outcomes and the prevention of future, more severe infections.

The Role of Subjective Norms and Social Influence

Subjective norms encapsulate the perceived social pressure to engage or not engage in a specific behavior, reflecting what individuals believe important others think they should do, and their motivation to comply with those expectations. In the realm of antibiotic use, subjective norms are immensely powerful, originating from diverse sources including healthcare providers, family members, peers, and broader cultural expectations. These norms often manifest in two forms: **injunctive norms**, which describe beliefs about what ought to be done (e.g., "My doctor expects me to finish this medication"), and **descriptive norms**, which describe beliefs about what others actually do (e.g., "Most people I know stop taking antibiotics when they feel better"). Both types of

norms significantly shape the individual's intention to use antibiotics responsibly.

The influence of the prescribing physician represents the most potent subjective norm. Patients are highly motivated to comply with the instructions given by a trusted medical professional. However, this normative influence can be double-edged. While a clear instruction to complete the course fosters adherence intentions, perceived hesitation or ambiguity from the prescriber, or a willingness to prescribe antibiotics under pressure, can reinforce the patient's intention to misuse or demand the medication. Research suggests that effective communication techniques, such as explicit commitment language and shared decision-making, enhance the positive injunctive norm, solidifying the patient's intention to follow the regimen. Conversely, if a patient perceives that their physician is simply prescribing antibiotics to satisfy a request (a descriptive norm about medical practice), their trust and subsequent adherence intention may be compromised.

Beyond the clinical setting, familial and peer norms play a substantial role, particularly in cultures where immediate family members heavily influence healthcare decisions. If a family member advises the patient to save leftover doses for future ailments, this strong descriptive norm can override the patient's personal intention to dispose of the medication correctly. Furthermore, societal norms related to quick fixes and the expectation of rapid recovery often fuel the intention to demand antibiotics. Addressing these pervasive social influences requires interventions that extend beyond the individual patient, targeting community leaders, pharmacists, and family caregivers to ensure that the normative environment supports responsible antibiotic stewardship. For example, campaigns that highlight that "most people know antibiotics don't work for colds" can effectively shift descriptive norms toward prudence.

Perceived Behavioral Control and Access Barriers

Perceived Behavioral Control (PBC) refers to an individual's belief regarding the ease or difficulty of performing a specific behavior, encompassing both internal factors (such as skills and knowledge) and external factors (such as resources and opportunities). In the context of antibiotic intentions, PBC is a crucial determinant, often acting as a moderator between a strong intention and the actual behavior. A patient may possess the ideal intention--to take the medication precisely as directed--but if their PBC is low, the intention is unlikely to be realized. Therefore, assessing and enhancing PBC is essential for translating responsible intentions into sustained responsible actions.

Internal control factors involve self-efficacy, memory, and practical knowledge. Patients who have high self-efficacy regarding medication management--meaning they are confident in their ability to remember multiple doses, manage side effects, and integrate the regimen into a busy schedule--demonstrate stronger predictive power between intention and behavior. Conversely, low internal PBC, often seen in elderly patients or those with complex polypharmacy, requires specific

behavioral support, such as pill organizers, reminder systems, or simplified dosing schedules, to raise their confidence and capability. Furthermore, practical knowledge about potential side effects or drug interactions is integral to PBC, as unexpected adverse events can significantly lower a patient's perceived control over the process, leading to premature cessation despite a strong initial intention to comply.

External control factors often present significant barriers to adherence, particularly in low-resource settings. These barriers include the financial cost of the medication, geographical proximity to pharmacies, availability of specific drugs, and the general complexity of the healthcare system. For example, a patient with a strong intention to complete a ten-day course might be forced to stop after five days due to financial constraints or the inability to secure time off work to refill the prescription. When external barriers are severe, they directly attenuate the link between intention and behavior, regardless of how positively motivated the individual is. Effective public health policies must therefore address these structural barriers to ensure that patients who intend to use antibiotics responsibly are empowered by the necessary resources and access to do so, thus maximizing the predictive validity of behavioral intentions.

Interventions Targeting Intentions: Education and Policy

Interventions designed to foster responsible antibiotic use must strategically target the core components that shape behavioral intentions--attitude, subjective norms, and perceived behavioral control. Educational campaigns serve as the primary tool for shifting attitudes, focusing on correcting misconceptions about antibiotic efficacy against viruses and emphasizing the personal and public risks of AMR. These campaigns must utilize clear, easily digestible messaging, often employing fear appeals (highlighting the severity of AMR) alongside efficacy messages (highlighting the protective benefits of responsible use) to maximize their impact on intention formation.

Targeting subjective norms requires interventions focused on social influence and communication. In the clinical setting, this involves training healthcare providers in **antibiotic stewardship communication**, ensuring they clearly articulate why antibiotics are necessary (or unnecessary) and explicitly state the expectation for adherence, thereby strengthening the injunctive norm. Furthermore, community-level interventions can utilize social marketing techniques to promote positive descriptive norms, such as highlighting the high percentage of people in the community who avoid demanding antibiotics for colds. Policy interventions, such as restricting over-the-counter access or implementing rigorous surveillance systems, also indirectly influence intentions by raising the perceived difficulty (lowering PBC) or increasing the social salience (strengthening injunctive norms) of appropriate use.

To effectively bridge the intention-behavior gap, interventions must also incorporate

implementation intention strategies. These involve helping patients form specific plans detailing when, where, and how they will take their medication, often phrased as "If situation X arises (e.g., I forget my dose), then I will perform action Y (e.g., take it immediately when I see the pill organizer)." This technique helps automate the behavior, making execution less reliant on conscious effort and memory. Furthermore, leveraging technology, such as automated text message reminders, directly supports patients with low perceived behavioral control related to memory, transforming a strong intention into realized behavior by removing the logistical barriers to execution.

Measuring and Predicting Intentions

The measurement of behavioral intentions is typically achieved through standardized self-report questionnaires derived from the underlying theoretical models, such as the TPB. These instruments quantify the strength of an individual's intention using multi-item scales, usually involving Likert-type responses (e.g., "I intend to complete the full course of antibiotics," rated from "Strongly disagree" to "Strongly agree"). Accurate measurement is critical because the strength of the intention is a key predictor of the likelihood of the behavior occurring, provided that perceived behavioral control is also high.

However, measuring intentions related to sensitive health behaviors is complicated by potential biases, most notably **social desirability bias**. Patients may over-report their intention to adhere to responsible practices (e.g., claiming a strong intention to never demand antibiotics) because they believe this is the socially accepted or medically desired response, even if their true intention is weaker. Researchers must employ careful scale construction, anonymity assurances, and potentially implicit measures to mitigate this bias and obtain a more accurate assessment of genuine behavioral predisposition. Furthermore, intention measures must be specific to the behavior, the target, the context, and the time frame (TABA principle) to maximize predictive validity--for example, measuring the intention to take a specific antibiotic for a specific duration, rather than general intentions about medication use.

Despite the inherent limitations of self-report, behavioral intention remains the most powerful single predictor of future health behavior in many psychological models. Predictive studies consistently show that intentions, particularly when combined with high perceived behavioral control, account for a substantial portion of the variance in adherence behaviors and antibiotic seeking. However, the predictive power often diminishes over long periods. Therefore, longitudinal studies are necessary to track how intentions evolve over the course of an illness and treatment, allowing for the timing of interventions to coincide with periods where intentions might weaken, such as when symptoms begin to resolve or when side effects become bothersome.

Future Directions and Research Gaps

Future research focusing on behavioral intentions toward antibiotics must move beyond simple cross-sectional correlations and delve deeper into dynamic and contextual factors. One critical area is the exploration of the **intention-behavior gap** using advanced methodologies. While TPB identifies the determinants of intention, future work needs to better integrate dual-process models--which distinguish between reflective (intentional) and impulsive (automatic) processes--to understand how habitual behaviors and environmental cues override conscious intentions, particularly in high-stress clinical settings or when patients are fatigued.

There is also a significant need for greater cross-cultural and comparative research. Behavioral intentions regarding antibiotics are heavily influenced by cultural factors, including beliefs about illness causation, trust in medical authority, and availability of alternative medicines. The drivers of intentions in high-income countries (where physician pressure is often key) may differ substantially from those in low- and middle-income countries (where access, cost, and self-medication are dominant). Comparative studies utilizing standardized intention measures are essential for developing globally relevant and culturally sensitive stewardship interventions.

Finally, research should focus on integrating intention-based models with policy and systems-level changes. While individual intentions are important, the most effective strategies will likely involve interventions that make the desired behavior easier and the undesired behavior harder. This involves designing healthcare systems that inherently support responsible intentions, such as mandatory commitment prompts at the time of prescription, automated follow-ups, and default settings that favor non-antibiotic treatments for common viral symptoms. Future research must evaluate how these structural changes interact with individual psychological determinants to strengthen the link between responsible intention and actual antibiotic stewardship behavior.