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Diagnostic Limitations and Antibiotic Overuse in Nigerian Primary Care

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Abstract

Antibiotic overuse in Nigerian primary care is not only a problem of prescribing behavior. It is also closely related to the diagnostic conditions under which primary care workers make everyday clinical decisions. In many primary health facilities, limited laboratory access, delayed test results, weak referral links, and shortage of basic diagnostic support make it difficult to distinguish bacterial infections from viral or self-limiting illnesses. Under this uncertainty, antibiotics may be used as a safer and faster option, especially when patients present with fever, respiratory symptoms, diarrhea, wound infection, or childhood illness. This paper discusses how diagnostic limitations contribute to empirical prescribing and antibiotic overuse in Nigerian primary care. It also considers the influence of patient expectations, community access to antibiotics, and weak antimicrobial stewardship at the primary care level. The paper argues that reducing antibiotic overuse should not rely only on asking clinicians to prescribe less. A more realistic response requires better diagnostic support, clearer prescribing guidance, continuing training for health workers, patient education, and stronger links between primary care, pharmacies, and surveillance systems. In this sense, antibiotic stewardship in Nigerian primary care should be built around clinical uncertainty rather than separated from it.

Keywords: antibiotic overuse, antimicrobial resistance, primary care, diagnostic limitations, empirical prescribing

1. Antibiotic Use in Primary Care Settings

Antibiotic use in Nigeria cannot be understood only from the hospital setting. A large part of everyday treatment begins much earlier, in primary care facilities, small clinics, community health centres, dispensaries, pharmacies, and other first-contact points. Patients often come with fever, cough, sore throat, diarrhea, urinary symptoms, wound infections, or childhood illnesses. These are common complaints, but they are not always easy to classify at the first visit. Some are caused by bacterial infection and may require antibiotics. Some are viral or self-limiting. Some need observation, follow-up, or referral. In primary care, this distinction is often made under time pressure and with limited diagnostic support.

The importance of primary care is also related to the structure of Nigeria's health system. Nigeria's National Action Plan on Antimicrobial Resistance 2017–2022 noted that, in 2005, the country had an estimated 23,640 health facilities, and 85.8% of them were primary health care facilities. It also described the primary level as the usual entry

point of communities into the health system (Federal Ministries of Agriculture, Environment and Health, 2017). This makes primary care a central place for discussing antibiotic use. If antibiotics are frequently prescribed at this level, the cumulative effect can be large, even when each individual prescription looks ordinary.

In many primary care encounters, antibiotics are used because they seem to offer a direct answer to uncertainty. A patient with fever may expect medication that feels strong. A parent may worry that a child's illness will worsen if no antibiotic is given. A clinician may be concerned that the patient will not return for review. In this kind of situation, antibiotic prescribing is not always a simple matter of poor knowledge. It may reflect a practical attempt to manage risk when better diagnostic tools, follow-up systems, and referral pathways are not fully available.

This point is important because discussions of antibiotic overuse sometimes sound as if the solution is only to tell health workers to prescribe less. That view is too narrow. Primary care workers often operate in a setting where laboratory confirmation is delayed, unaffordable, unavailable, or not trusted by patients. Even when guidelines advise more selective antibiotic use, the clinician may still have to decide quickly with limited information. The pressure is stronger when the illness involves young children, pregnant women, older adults, or patients who appear weak or unstable.

Antibiotic use in primary care is also shaped by the wider community environment. Patients may have used antibiotics before coming to the clinic. They may have bought drugs from a pharmacy or a patent medicine vendor. Some may keep leftover antibiotics at home or stop treatment once symptoms improve. Others may expect the same drug that worked during a previous illness, even if the present condition is different. These habits make the clinical encounter more complicated. A primary care worker is not only treating an infection; he or she is also responding to existing beliefs about antibiotics and recovery.

Nigeria's more recent Second One Health Antimicrobial Resistance National Action Plan 2024–2028 keeps antimicrobial stewardship, surveillance, detection capacity, and health system strengthening within the national response to AMR (Federal Ministry of Health and Social Welfare, 2024). This policy direction is relevant to primary care because the problem is not limited to specialist hospitals. If stewardship remains concentrated at higher-level facilities, many everyday antibiotic decisions will still happen outside strong guidance and feedback.

For this paper, primary care is treated as the practical frontline of antibiotic use. It is the level where diagnostic uncertainty, patient expectation, limited resources, and weak follow-up meet each other most directly. Antibiotic overuse in this setting should not be explained only as irrational prescribing. It is better understood as a response to a difficult clinical environment. The following discussion therefore focuses on diagnostic constraints and how they push ordinary primary care decisions toward empirical antibiotic use.

2. Diagnostic Constraints in Nigerian Health Facilities

Diagnostic constraint in Nigerian primary care is not only a matter of whether a clinic has a laboratory or not. It is a wider problem that includes test availability, cost, staff capacity, specimen handling, result turnaround time, and the clinician's access to reliable clinical guidance. In many first-contact health facilities, diagnosis still depends heavily on symptoms, physical examination, and the clinician's experience. This does not mean that primary care workers lack clinical knowledge. It means that many of them work in conditions where a more precise diagnosis is difficult to reach before treatment is started.

The problem is especially clear in common infectious presentations. Fever, cough, sore throat, diarrhea, urinary symptoms, and wound complaints may look simple, but they can come from different causes. A fever may suggest malaria, bacterial infection, viral illness, or another inflammatory condition. A cough may be viral, bacterial, allergic, or related to tuberculosis. Diarrhea may require rehydration rather than antibiotics, but it may also signal a bacterial infection in some cases. Without timely diagnostic support, the clinician has to make a decision before the cause is clear.

Laboratory access is one part of the problem. Some facilities may not have routine microbiology testing. Others may have basic tests but no culture and susceptibility testing. Even when samples can be sent to another facility, the delay may be too long for ordinary primary care decisions. Patients may not return for review, or they may seek treatment elsewhere before the

result is available. In such cases, testing does not always guide the first prescription. It becomes more useful for severe or referred cases than for the everyday infections seen in primary care.

Cost also affects diagnostic use. A test that is clinically helpful may still be avoided if the patient cannot pay for it. In low-resource settings, patients often expect treatment during the same visit. When they have already spent money on transport, consultation, or previous medicines, asking them to pay for further tests may be difficult. A clinician may know that a test would improve the decision, but may still prescribe based on symptoms because it is the more practical option for that patient at that moment.

Another constraint is the uneven availability of point-of-care tests. Rapid tests can reduce uncertainty in some conditions, but they do not solve all diagnostic problems. A study of malaria rapid diagnostic test use among primary health care workers in Ebonyi State found that many workers used rapid diagnostic testing, but clinical practice did not always follow test results in a simple way. The study reported that 81.4% of surveyed health workers usually used malaria rapid diagnostic tests, while 18.6% usually relied only on clinical symptoms. It also found that some workers combined antibiotics with antimalarial treatment or prescribed antimalarials even after negative test results. This kind of finding is useful because it shows that diagnostic tools are necessary, but their effect depends on training, confidence in results, patient expectation, and prescribing habits.

Diagnostic constraints are also linked with weak surveillance and local resistance information. Clinicians may know that antimicrobial resistance is a growing problem, but they may not have access to local data that can guide antibiotic choice. Without local resistance patterns, prescribing often depends on broad guidelines, past experience, or what is available in the facility. WHO's Global Antimicrobial Resistance and Use Surveillance System emphasizes the importance of AMR surveillance for tracking resistance and antimicrobial use. For primary care, this matters because prescribing decisions are better when clinicians know which antibiotics are still likely to work in their setting.

The review literature on Nigeria also points to the same difficulty. Recent discussions of antimicrobial resistance in Nigeria have linked the problem with extensive antibiotic use, weak antimicrobial stewardship, limited diagnostic tools, insufficient surveillance, and gaps in infection prevention. These issues are not separate from primary care. They shape the conditions in which ordinary clinicians decide whether to prescribe antibiotics for common infections.

Diagnostic limitations should therefore be understood as a practical clinical environment, not merely as a technical absence. A health facility may have some tests but not enough trained staff. It may have staff but lack timely results. It may have guidelines but lack local resistance data. It may have rapid tests for one disease but not for other common infections. These gaps do not force antibiotic overuse in every case, but they make selective prescribing harder. They also help explain why antibiotics may be chosen when the diagnosis remains uncertain.

3. Empirical Prescribing Under Clinical Uncertainty

Empirical prescribing is not always irrational. In primary care, it often begins from a real clinical concern. A patient comes with fever, cough, diarrhea, urinary symptoms, or a wound infection. The clinician has to decide whether to treat immediately, observe, refer, or ask for further tests. When diagnostic support is weak, this decision is made with incomplete information. Antibiotics then become a way to manage uncertainty, especially when the clinician worries that a bacterial infection may be missed.

This kind of prescribing is understandable in some cases. Delayed treatment for a serious bacterial infection can lead to worse outcomes. A clinician may not want to send a sick child, a pregnant woman, an older patient, or a visibly weak patient home without active treatment. In such situations, antibiotic use may appear safer than waiting. The difficulty is that the same logic can spread to many ordinary cases where antibiotics are not clearly needed. Once this habit becomes routine, empirical prescribing moves from careful risk management to overuse.

Fever is a common example. In Nigerian primary care, fever may be linked to malaria, respiratory infection, urinary infection, gastrointestinal illness, or other causes. Without reliable and timely testing, the clinician may treat several possible causes at once. An antibiotic may be added even when bacterial infection has not been

confirmed. This may make the treatment feel more complete, but it also exposes patients to unnecessary antibiotics. The problem is not only one wrong prescription. The larger issue is repeated use of antibiotics across many uncertain cases.

Respiratory symptoms show the same problem. Many upper respiratory infections are viral and self-limiting, but symptoms such as cough, sore throat, chest discomfort, or fever can be difficult to judge in a short consultation. Patients may expect medicine, and clinicians may feel pressure to give something stronger than advice, rest, fluids, or symptomatic treatment. In this setting, antibiotics may be prescribed even when the likely benefit is limited. The prescription becomes a response to uncertainty, patient expectation, and limited follow-up rather than clear evidence of bacterial disease.

Diarrheal illness is another area where uncertainty matters. Some patients need rehydration, dietary advice, and observation. Some may require further assessment or targeted treatment. If stool testing is unavailable or unaffordable, antibiotics may be used too broadly. This is especially likely when the patient is young, dehydrated, or worried about rapid recovery. Yet unnecessary antibiotic use in diarrheal illness can disturb normal flora, increase adverse effects, and contribute to resistance.

The choice of broad-spectrum antibiotics is also linked to diagnostic uncertainty. When the pathogen is unknown, a clinician may choose an antibiotic that covers more possibilities. This may seem reasonable in a single encounter. But broad-spectrum use creates stronger selection pressure for resistant organisms. It can also make future infections harder to treat. In primary care, where many cases are mild or moderate, the frequent use of broad-spectrum antibiotics can gradually weaken the effectiveness of common treatment options.

Another part of the problem is follow-up. Selective prescribing is easier when the clinician can review the patient after one or two days, check whether symptoms improve, and adjust treatment if needed. In many primary care settings, follow-up is uncertain. Patients may live far from the facility, lack money for another visit, or prefer to seek medicine from a pharmacy if symptoms continue. Because the clinician cannot be sure that the patient will return, antibiotics may be given during the first visit as a precaution.

Referral also affects prescribing. If referral pathways are weak, expensive, or slow, primary care workers may try to treat more conditions at the first-contact level. This can be appropriate for many common illnesses, but it also increases pressure to prescribe antibiotics when the case is unclear. A clinician may know that further assessment is needed, but if referral is unlikely to happen, treatment decisions are pushed back to the primary care facility.

In this sense, empirical prescribing is not only a matter of individual judgment. It is shaped by the surrounding system. Limited diagnostic tools, delayed test results, patient expectations, uncertain follow-up, weak referral, and fear of clinical deterioration all push prescribing in the same direction. Antibiotic overuse then becomes a pattern produced by uncertainty.

A realistic response should begin from this point. It is not enough to say that antibiotics should be used only when necessary. The more difficult question is how a primary care worker can know what is necessary in an uncertain setting. Without better diagnostic support and practical guidance, calls for reduced prescribing may sound correct but remain difficult to follow. Antibiotic stewardship in Nigerian primary care therefore needs to address the clinical uncertainty that drives empirical prescribing.

4. Community Factors in Antibiotic Overuse

Antibiotic overuse in Nigerian primary care does not begin and end inside the consultation room. Many patients enter the clinic with ideas about antibiotics already formed by previous illness, family advice, pharmacy experience, or medicine purchased before the visit. Some have taken antibiotics before seeing a health worker. Some come to the clinic because the first medicine did not work. Others arrive with a clear expectation that antibiotics should be prescribed. These community factors make primary care prescribing more difficult.

One important factor is the social meaning of antibiotics. For many patients, antibiotics are not understood as drugs for specific bacterial infections. They may be seen more generally as strong medicine for fever, cough, diarrhea, body pain, wound complaints, or childhood illness. If symptoms improve after a previous antibiotic course, the patient may remember the antibiotic as the reason for recovery, even when the illness

may have been self-limiting. This kind of experience can shape later expectations. When a clinician explains that antibiotics are not needed, the patient may feel that treatment is incomplete.

Self-medication also plays a major role. In Nigeria, antibiotics are formally prescription medicines, but weak enforcement, informal drug sales, and common self-medication have made inappropriate use difficult to control in daily life. Recent public health discussions have described how patients may buy antibiotics without valid prescriptions, use incomplete courses, save leftover medicines, or share drugs with family members. These practices can make antibiotic use feel ordinary rather than risky. They also reduce the ability of primary care workers to guide treatment from the beginning.

Community pharmacies and patent and proprietary medicine vendors are also central to the issue. They often serve as the first point of care, especially where clinics are distant, crowded, costly, or slow. For many families, buying medicine directly is faster than going through a formal consultation. Earlier research noted that Nigeria had an estimated 200,000 patent and proprietary medicine vendors, and that they were a first source of care for many childhood illnesses such as malaria and diarrhea. This shows why antibiotic use cannot be discussed only through clinics and hospitals. Drug retail outlets are part of the practical health care pathway for many people.

This does not mean that community pharmacies or medicine vendors should simply be blamed. They fill a real access gap. In places where formal primary care is weak, they may be easier to reach and more trusted for quick advice. The problem is that this access can also encourage non-prescription antibiotic use. Studies on Nigerian medicine vendors and community pharmacies have pointed to non-prescription sales of antibiotics and the influence of customer demand. If a patient asks for an antibiotic and can easily obtain it, the pressure on formal primary care becomes stronger as well. A clinician who refuses antibiotics may worry that the patient will simply buy them elsewhere.

Patient expectation can therefore shape prescribing even when antibiotics are not clinically necessary. In a short consultation, it takes time to explain why a viral illness does not need antibiotics, why symptoms may take several days to improve, or why observation is safer than unnecessary medication. If the clinic is busy, this conversation may be shortened. The prescription then becomes a way to satisfy the patient, reduce anxiety, and end the consultation. It is not ideal, but it is understandable in a strained primary care environment.

Household medicine use adds another layer. Antibiotics left from earlier treatment may be kept for later illness. A parent may give a child an old antibiotic when fever returns. A neighbor may recommend a drug that worked for a similar symptom. Patients may stop antibiotics once they feel better and keep the remaining tablets. These habits make it harder to maintain correct dose and duration. They also increase the risk that antibiotics are used for the wrong illness, at the wrong dose, or for too short a period.

Public knowledge about antimicrobial resistance is still important, but knowledge alone is not enough. Some patients may have heard that antibiotic misuse is harmful, yet still buy antibiotics because they need quick relief, cannot afford repeated clinic visits, or do not trust that symptomatic care is sufficient. Others may understand resistance as a distant public health problem, not as something connected to their own use of medicine. Health education therefore needs to be practical. It should explain common situations, such as coughs and colds, diarrhea, fever, incomplete treatment, and leftover medicine, instead of only repeating that AMR is dangerous.

These community factors feed back into primary care. A clinician does not meet a patient in a neutral setting. The patient may already have used antibiotics, may expect antibiotics, or may have easy access to them outside the clinic. The health worker's decision is shaped by this background. Reducing antibiotic overuse in Nigerian primary care therefore requires attention to community habits, pharmacy practice, medicine vendor regulation, and public communication. Without these elements, stewardship inside clinics will remain too narrow.

5. Stewardship Strategies for Primary Care

Antimicrobial stewardship in Nigerian primary care should begin from the conditions in which primary care workers actually prescribe. Hospital-based stewardship often depends on specialist teams, microbiology reports, electronic records, and formal audit systems. These tools are useful, but they cannot simply be copied into

every primary health facility. Many primary care settings work with fewer staff, limited diagnostic support, weak follow-up, and a heavy patient load. A primary care stewardship strategy therefore has to be simpler, more practical, and closer to everyday clinical work.

The first need is usable prescribing guidance. Guidelines for primary care should not be long documents that health workers rarely open during consultation. They should focus on common conditions such as fever, upper respiratory symptoms, diarrhea, urinary complaints, skin and wound infections, and childhood illness. For each condition, the guidance should help the clinician decide when antibiotics are likely to be needed, when symptomatic treatment is enough, when observation is reasonable, and when referral is safer. This kind of guidance does not remove clinical judgment. It gives judgment a clearer frame.

Prescribing guidance also has to recognize local realities. A recommendation that depends on tests unavailable in most first-contact facilities will not be followed consistently. If a guideline advises culture and susceptibility testing for many ordinary cases, but the test is expensive or delayed, clinicians may return to empirical treatment. For this reason, guidance should include alternatives for low-diagnostic settings. It can specify warning signs, follow-up advice, delayed prescribing options, and referral points. A good primary care guideline should answer the question that a clinician actually faces: what can be done safely when the diagnosis is still uncertain?

Training is another central part of stewardship. Primary care workers need regular support in differentiating likely bacterial infections from viral or self-limiting conditions. They also need support in explaining non-antibiotic treatment to patients. This second part is often neglected. A clinician may know that an antibiotic is unnecessary, but still prescribe it because the patient expects medicine. Training should therefore include communication skills, not only pharmacology. Health workers need ways to explain why antibiotics are not useful for many coughs and colds, why diarrhea often needs fluid replacement more than antibiotics, and why returning for review may be safer than taking unnecessary drugs.

Diagnostic support should be strengthened in a realistic way. Not every primary care facility can have full microbiology capacity, but some improvements are still possible. More reliable use of rapid diagnostic tests, better specimen referral, clearer links with laboratories, and faster feedback from higher-level facilities can reduce uncertainty. WHO's GLASS framework emphasizes the role of surveillance and standardized data in guiding public health action, and Nigeria's second AMR national action plan also gives attention to detection capacity and surveillance. For primary care, the practical meaning is clear: clinicians need more than general warnings about resistance. They need diagnostic and resistance information that can influence ordinary prescribing decisions.

Stewardship should also include simple review and feedback. A primary care facility does not need a complex electronic system before it can improve prescribing. It can start with periodic review of antibiotic prescriptions for selected common conditions. Supervisors can look at whether antibiotics were used for cough, diarrhea, fever, or wounds, and whether the prescription matched available guidance. The purpose should not be punishment. It should help health workers see patterns in their own prescribing. Without feedback, overuse can become invisible because each prescription seems reasonable in isolation.

Community pharmacies and patent medicine vendors should not be left outside stewardship. Many patients obtain antibiotics before or after visiting formal health facilities. If stewardship focuses only on clinics, patients may still buy antibiotics without proper assessment. Pharmacists and medicine vendors can play a role in patient education, referral, and discouraging inappropriate antibiotic use. This requires clearer regulation, but also practical cooperation. They are already part of the real treatment pathway for many communities. Ignoring them would make primary care stewardship incomplete.

Patient education should be connected with clinical practice. It is not enough to tell the public that antimicrobial resistance is dangerous. Patients need messages that match everyday decisions: antibiotics do not treat most viral colds; fever does not always mean a bacterial infection; stopping antibiotics early may be harmful; leftover drugs should not be reused; and not receiving antibiotics does not mean receiving no care. These messages should be

repeated in clinics, pharmacies, schools, radio programs, and community health activities. The same message should come from different points in the health system, otherwise patients will hear one thing in the clinic and another thing at the drug shop.

Infection prevention and control also belongs in this discussion. Reducing infection reduces the need for antibiotics. Primary care facilities need basic but consistent practices: hand hygiene, safe injection practice, wound care, cleaning of surfaces, waste handling, and early identification of patients who need referral. These measures may look basic, but they are part of antibiotic stewardship because they reduce avoidable infections and unnecessary treatment.

A practical stewardship strategy for Nigerian primary care should therefore combine several modest actions rather than depend on one large reform. Short prescribing guidance, continuing training, better use of rapid tests, clearer referral links, prescription review, pharmacy engagement, patient education, and infection prevention can reinforce each other. None of these measures will solve antibiotic overuse alone. Together, they can make careful prescribing easier for health workers who now make decisions under uncertainty.

6. Realistic Directions for Reducing Antibiotic Overuse

Reducing antibiotic overuse in Nigerian primary care should not be understood as simply asking health workers to prescribe fewer antibiotics. That kind of message is easy to state, but it does not fully match the clinical setting described above. Primary care workers often make decisions with limited diagnostic tools, uncertain follow-up, strong patient expectations, and weak referral support. If these conditions do not change, restriction alone may only increase anxiety among clinicians and patients. It may also create the risk that some patients who truly need antibiotics do not receive them in time.

A more realistic direction is to make careful prescribing easier. This means that clinicians should have practical guidance for common infections, simple diagnostic support where possible, and clearer routes for referral when cases are beyond the capacity of the primary facility. For example, fever, cough, diarrhea, urinary symptoms, and wound infections should not all lead automatically to antibiotics. But health workers need usable criteria for deciding when antibiotics are likely to help, when observation is safe, and when the patient should be referred. Without this support, uncertainty will continue to push prescribing toward antibiotics.

Diagnostic improvement should be gradual and targeted. It is unrealistic to expect every primary health facility to have full microbiology services. Still, basic changes can matter. Better use of rapid tests, more reliable specimen referral, closer links between primary facilities and laboratories, and faster feedback from higher-level centres can reduce unnecessary empirical prescribing. These measures do not remove uncertainty completely, but they reduce the need to treat every unclear infection as if it were bacterial.

The role of follow-up also needs more attention. Many unnecessary prescriptions happen because the clinician cannot be sure that the patient will return if symptoms worsen. A better follow-up system may reduce the pressure to prescribe antibiotics immediately. This could include clear return advice, community health worker follow-up, phone-based check-ins where feasible, and referral instructions for warning signs. In primary care, safe non-prescribing depends not only on clinical confidence but also on whether the patient can be reviewed again.

Patient communication should be treated as part of stewardship. If a patient leaves the clinic feeling that no antibiotic means no real treatment, overuse will continue through other channels. Health workers need time and simple language to explain why antibiotics are not useful for many viral illnesses, why diarrhea often requires rehydration more than antibiotics, and why taking leftover drugs may be harmful. This communication is not a minor addition to treatment. It is one of the conditions that allows selective prescribing to work.

Community pharmacies and patent medicine vendors also need to be included. Many patients use these outlets before visiting a clinic or after leaving one. If antibiotics remain easy to obtain without proper assessment, clinic-based stewardship will have limited effect. Regulation is necessary, but regulation alone may not be enough. Pharmacists and medicine vendors should also be connected with referral advice, patient education, and basic rules on when antibiotics should not be supplied. They are part of the real treatment pathway, even if they are not always treated as part of formal primary care.

Surveillance should also become more useful for primary care. National and state-level AMR data are important, but they must eventually return to the level where prescribing decisions are made. If primary care workers do not know which antibiotics are becoming less effective in their area, they will continue to rely on habit, older training, or medicine availability. Local resistance information, even if incomplete at first, can help improve prescribing choices. It can also make stewardship feel less like an external demand and more like a clinical tool.

The final direction is to keep antibiotic stewardship balanced. The goal is not to make antibiotics difficult to use for patients who need them. The goal is to reduce unnecessary use while protecting timely treatment for serious bacterial infections. This balance matters in Nigerian primary care because clinicians work in settings where delayed treatment may carry real risks. A credible stewardship approach should therefore recognize the pressure of clinical uncertainty and offer support for managing it.

Antibiotic overuse in Nigerian primary care is shaped by more than individual prescribing habits. It is connected with diagnostic limitations, patient expectations, medicine access, weak follow-up, and limited local resistance information. Reducing overuse requires a response that fits this environment. Better diagnosis, practical guidelines, continuing training, patient education, pharmacy engagement, infection prevention, and surveillance feedback are not separate solutions. They are connected parts of a more realistic primary care response to antimicrobial resistance.

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