

Pulling teeth or pulling together? Time to improve antibiotic prescribing in dentistry

Daphne Yii¹ MSc (Public Health), Yvonne Peijun Zhou¹ MSc (Infectious Diseases),
Shimin Jasmine Chung² FRCP (UK)

Antibiotic use in third molar (3M) surgeries is commonplace despite a growing body of evidence showing that routine prophylactic antibiotics offer little benefit in healthy patients. It also fuels the global public health crisis of antimicrobial resistance (AMR). This practice appears to remain deeply entrenched worldwide and is believed to be significantly caused by behavioural barriers.¹ It is perceived and accepted that antibiotics reduce the likelihood of a post-procedure infection, but clinicians may be blindsided to the associated risks. In 3M surgeries, the number needed to treat (NNT) is 19, which is a relatively high NNT.² This implies that a significant number of healthy patients may potentially experience adverse effects from unnecessary antibiotic exposure.

To address the misuse of antibiotics in 3M surgeries, Yong et al. used a behavioural change model, the COM-B framework, to design interventions and measure their effectiveness.³ In contrast to most antimicrobial stewardship (AMS) initiatives that are led by infectious diseases physicians and infectious diseases pharmacists, this initiative that was led from the ground up by the Division of Oral and Maxillo-facial Surgery (OMS) at the National University Centre for Oral Health Singapore is laudable. First, it reflected the ownership of appropriate antibiotic use by OMS, a surgical specialty. Second, instead of using established core strategies, such as prospective audit and feedback (PAF)/preauthorisation,⁴ the decision by the OMS team to apply behavioural sciences in planning their AMS interventions was strategic and polished. PAF would be too labour-intensive to implement and pre-authorisation of amoxicillin, a commonly used narrow spectrum antibiotic for 3M surgery, would be onerous and unpalatable to prescribers.⁵ They first tried to understand the behavioural factors driving antibiotic prescribing habits. With the capability, opportunity and motivation for behavioural change or COM-B framework, they then systematically addressed the identified issues to improve the capability of the clinicians; created

opportunities for good practice; and motivated the stakeholders by engaging them, addressing their concerns and communicating clear targets of the AMS initiative. With this approach, they significantly reduced antibiotic use for 3M surgeries from 84.45% to 20.89% (way beyond their projected target) without an increase in complication rates, and the results were still sustained for 8 months post-intervention. Their strategy serves as a model to the wider AMS community in dentistry and beyond.⁶

Simply put, Yong et al. worked on the ground and changed practice. The authors invested in identifying facilitators and barriers to behavioural change. Specifically, they were able to (1) identify and address knowledge gaps in AMR and appropriate antibiotic use; (2) empower clinicians through guideline development; (3) allay clinicians' fears of practising differently from group culture, the risk of surgical complications and patient complaints; and (4) develop countermeasures to address prescribers' indifference to AMR.

They also created an ecosystem for a successful antimicrobial stewardship programme (ASP) and embraced the core elements of AMS recommended by the Centers for Disease Control and Prevention. They had the support of their institution's directorate and committed programme leads. They designed strategic interventions using a behavioural change model aimed at both clinicians and patients alike, tracked antibiotic consumption and reported their findings to the relevant stakeholders, and provided evidence-based recommendations to encourage good clinical practice.^{3,7} Furthermore, the authors showcased the importance of involving a multidisciplinary team in driving behavioural change, and we believe it was one of the major factors in the successful implementation of the AMS initiative. Apart from clinicians, they ensured dental assistants, patient service associates and pharmacists were supportive of the initiative as they would be able to counsel patients on appropriate antibiotic use at various

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¹ Department of Pharmacy, Singapore General Hospital, Singapore

² Department of Infectious Diseases, Singapore General Hospital, Singapore

Correspondence: Dr Shimin Jasmine Chung, Department of Infectious Diseases, Singapore General Hospital, 20 College Road, Level 3, Singapore 169856.

Email: jasmine.chung.s.m@singhealth.com.sg

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touchpoints in the patient's journey. Often overlooked in AMS initiatives are the patients, who as recipients of inappropriate antibiotics are key stakeholders, need to be effectively engaged and educated in the areas of AMS and AMR. For example, Yong et al. described instances where patients specifically requested antibiotics post-surgery, inevitably leading to antibiotics being prescribed. From a clinical perspective, there was a clear guidance provided to discontinue antibiotics in 3M surgeries. However, recommendations were nuanced to allow antibiotic use in high-risk patients, such as immunocompromised patients and those at higher risk of infections due to medical comorbidities or surgical complications. Education sessions and resources (e.g. posters) were also provided to empower clinicians to counsel patients against the routine use of antibiotic prophylaxis in 3M surgeries. There was firm commitment to discontinue the AMS interventions should infection rates or patient complaints increase. These, we believe, were important for stakeholder buy-in and centre-wide adoption of practice change.

In addition, the shared decision-making process encouraged ownership of the AMS initiative. Notably, infection rates post-intervention were very low (<1%), which provided very convincing local data that stopping antibiotics post-3M surgery is indeed safe. In a post-intervention focus group discussion, the clinicians expressed both confidence and their commitment to using antibiotics more judiciously. It is clear that there is a niche role for AMS in dentistry. Based on international data, dentists contribute to 10% of total antibiotics prescribed, of which 50–80% of prescriptions are inappropriate.⁸ The focus of the AMS initiative driven by Yong et al. targeted antibiotic use in 3M surgeries, a “high-yield” domain for AMS interventions, but there is still more to be done to promote AMS in dentistry, especially in Singapore.^{1,3,8} In a retrospective study evaluating antibiotic use in primary care in Singapore, it was observed that antibiotics were more likely to be prescribed during a dental consult as compared to other visits, and this is an area worth reviewing.⁹ The development and publication of the first national clinical practice guidelines on antibiotic use in dentistry by the College of Dental Surgeons Singapore in 2024 is a small step forward to drive the AMS agenda in dentistry and would be a useful resource, especially in the primary care setting.¹⁰ In general, ASPs in dentistry are currently not as well-endowed as the more mature ASPs in public acute care hospitals, which are predominantly led by infectious diseases physicians, infectious diseases pharmacists and executives with inputs from the microbiologist and infection preventionists.⁴ Nonetheless, successful AMS initiatives can still be initiated and driven from the ground up by champions within the field, even those who are neither infectious

diseases-trained nor pharmacy-trained. Using behavioural change models to recommend sustainable AMS interventions would be the way forward in healthcare.

Finally, beyond the behavioural sciences involved, the interventions designed by Yong et al. in the study were foremostly clinically sound and user-centric, facilitating adoption and implementation. Their approach was holistic, and they created a microcosm conducive to practice change. This, we believe, was the recipe for their success.

Ethics statement

Not applicable.

Declaration

The authors declare there are no affiliations with or involvement in any organisation or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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REFERENCES

1. Cuevas-Gonzalez MV, Cuevas-Gonzalez JC, Espinosa-Cristobal LF, et al. Use or abuse of antibiotics as prophylactic therapy in oral surgery: A systematic review. *Medicine (Baltimore)* 2023;102:e35011.
2. Lodi G, Azzi L, Varoni EM, et al. Antibiotics to prevent complications following tooth extractions. *Cochrane Database Syst Rev* 2021;2:CD003811.
3. Yong CW, Choe R, Chua SKX, et al. Utilising a COM-B framework to modify antibiotic prescription behaviours following third molar surgeries. *Ann Acad Med Singap* 2025;54:Online First.
4. Chua AQ, Kwa AL, Tan TY, et al. Ten-year narrative review on antimicrobial resistance in Singapore. *Singapore Med J* 2019;60:387-96.
5. Barlam TF, Cosgrove SE, Abbo LM, et al. Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clin Infect Dis* 2016;62:e51-77.
6. Pouly E, Coppry M, Rogues AM, et al. Systematic review of factors promoting behaviour change toward antibiotic use in hospitals. *Clin Microbiol Infect* 2022;28:911-9.
7. Mendelson M, Morris AM, Thursky K, et al. How to start an antimicrobial stewardship programme in a hospital. *Clin Microbiol Infect* 2020;26:447-53.
8. Mendez-Romero J, Rodriguez-Fernandez A, Ferreira M, et al. Interventions to improve antibiotic use among dentists: a systematic review and meta-analysis. *J Antimicrob Chemother* 2025.
9. Koh SWC, Lee VME, Low SH, et al. Prescribing Antibiotics in Public Primary Care Clinics in Singapore: A Retrospective Cohort Study. *Antibiotics (Basel)* 2023;12:762.
10. College of Dental Surgeons, Singapore, Academy of Medicine, Singapore. Practice Guidelines: Use of Antibiotics in Dentistry. December 2024. https://www.ams.edu.sg/view-pdf.aspx?file=media%5C7397_fi_330.pdf&ofile=Use+of+Antibiotics+in+Dentistry+v.12122024.pdf. Accessed 1 June 2025.