

# Antibiotic documentation: death by a thousand clicks

Claire Ciarkowski, Valerie M Vaughn 

Internal Medicine, University of Utah Health, Salt Lake City, Utah, USA

## Correspondence to

Dr Claire Ciarkowski, Internal Medicine, University of Utah Health, Salt Lake City, UT 84132, USA; [claire.ciarkowski@hsc.utah.edu](mailto:claire.ciarkowski@hsc.utah.edu)

Accepted 23 August 2022  
Published Online First  
2 September 2022

Bacteria and clinicians have one thing in common: resistance. As widespread antibiotic use has increased, antimicrobial resistance has risen.<sup>1</sup> Despite this, many clinicians remain resistant to changing their antibiotic-prescribing habits.<sup>1</sup> Antimicrobial stewardship—which focuses on interventions to help optimise antibiotic selection, dose and duration—has gained substantial public health interest while continuing to face frequent frontline clinician opposition.<sup>2–3</sup> In this issue of *BMJ Quality and Safety*, Saini and colleagues' findings support a seemingly simple antimicrobial stewardship tool: documentation of antibiotic indications so that explicit reasons for the prescription are recorded.<sup>4</sup> In a scoping review of 123 publications, Saini and colleagues found beneficial effects of antibiotic indication documentation on the quality of patient care, including preventing errors, improving antibiotic prescribing and supporting communication at care transitions.<sup>4</sup> Yet, critical barriers—often in the form of clinician resistance—diminish the ability of many antibiotic stewards to implement the documentation of antibiotic indication. Critical questions remain unanswered related to best practices for implementation of antibiotic indications to maximise the benefits and minimise these challenges. Here, we seek to address these questions and offer key insights for implementation.

## THE COMPETING PURPOSES OF ANTIBIOTIC DOCUMENTATION

To understand how best to implement antibiotic indication documentation and engage stakeholders, it is important to understand the myriad and often competing purposes of documentation. Generally, documentation—both related and unrelated to antibiotics—serves many purposes. These vary from the immediately patient relevant (eg, improving interclinician or patient/clinician communication, enabling prospective audit

and feedback by pharmacists) to those with delayed clinical relevance (eg, enhancing retrospective research), and those largely for administrative purposes (eg, billing, resource distribution). In some countries, such as the USA where 35 of the studies included in the scoping review occurred, documentation also serves for legal protection (ie, defensive medicine).<sup>5</sup> For antimicrobial stewardship in particular, there is another useful purpose of documentation to consider: improved mindfulness. Specifically, the act of documentation itself may trigger a mindful moment that forces clinicians to pause and move from system 1 (fast) to system 2 (slow) thinking.<sup>6</sup> Slower, deliberative thinking has been shown to serve as an antibiotic self-timeout which reminds clinicians to reconsider antibiotic necessity and appropriateness.<sup>7</sup> Similarly, accountable justification, which requires clinicians to explicitly justify an antibiotic treatment plan, has been shown to reduce inappropriate antibiotic prescribing.<sup>8</sup>

Because documentation purposes and thus priorities vary, changes in antibiotic indication documentation can be difficult to implement. For example, Saini and colleagues found that notable barriers to documenting antibiotic indications included competing priorities and time burden.<sup>9–11</sup> In our practice, we find that documentation that is not directly and immediately clinically useful is often perceived by clinicians as an irrelevant administrative burden. Likewise, documentation interventions that hinder billing or quality compliance (eg, public reporting) may encounter leadership resistance. Thus, to engage clinicians and improve rates of antibiotic indication documentation, antimicrobial stewardship programmes must reframe the need for documentation in terms of clinical relevance, while not running counter to administrative needs.<sup>9</sup>

One way to improve clinician buy-in is by focusing on the salient, patient-relevant



► <http://dx.doi.org/10.1136/bmjqs-2021-014582>



© Author(s) (or their employer(s)) 2022. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Ciarkowski C, Vaughn VM. *BMJ Qual Saf* 2022;**31**:773–775.

reasons for improving antibiotic documentation. Take, as one example, care transitions. Nowhere is the need for documentation more acute than during transitions of care, where adverse events are common, often harmful, and where accurate documentation can serve as a critical tool for improving communication.<sup>12</sup> Because other forms of communication (eg, notes, verbal) are less common and reliable during care transitions (eg, to retail pharmacies), accurate documentation of antibiotic indications can prevent medication errors.<sup>13</sup> When antibiotic prescriptions sent to pharmacies do not include the indication within the patient instructions, the pharmacist is left inferring the indication, reducing their ability to confirm prescription accuracy and prevent errors.<sup>13</sup> Antibiotic stewards who wish to improve antibiotic indication documentation at discharge for one purpose (ie, optimising discharge antibiotic prescribing) could therefore have more successful clinical buy-in if they instead framed documentation in terms of improving communication and reducing harmful errors (eg, ‘bug-drug’ mismatch).

### WHAT DO WE MEAN BY GOOD DOCUMENTATION?

As we pause to consider best practices for implementation, it is important to first define what we mean by antibiotic indication documentation. Critically, this includes *where* documentation should occur. As clinicians ourselves, we recognise that clinicians often document antibiotic indications not once—but many times—including in clinician notes, interclinician handoff tools, inpatient antibiotic orders, outpatient antibiotic prescriptions and patient instructions. This complexity is not accounted for in most studies of antibiotic indications: in Saini and colleagues’ paper only 19 of the studies refer to documentation of the antibiotic indication as part of the prescription itself. For better or worse, many documentation interventions are operationalised in orders, including adjustments to the electronic health record (EHR) through order sets, drop-down menus and prompted indications.<sup>4</sup> This type

of EHR-driven documentation can serve as a nudge to improve prescribing, but come with unintended costs.<sup>14</sup>

Notably, all documentation interventions require additional clinician work. While demonstrably important, EHR-focused documentation interventions fail to account for documentation that may—or may not—already be occurring elsewhere. For example, the rise of EHR note templates can both hinder and benefit documentation. While note templates may remind clinicians to include antibiotic indications, they can lead to ‘note bloat’ and additions that are clinically irrelevant. The disjointed approach to documentation can lead to alert fatigue and annoy end-users who fail to see the value in including an indication in the order when it is already documented elsewhere.<sup>10</sup> Similarly, too many documentation requirements can lead clinicians to over-ride or bypass mandatory fields.<sup>10 11</sup> Finding the ‘sweet spot’ of antibiotic documentation to improve compliance and help stewardship without impeding clinician workflow is critical.

### BEST PRACTICES FOR IMPLEMENTATION OF ANTIBIOTIC INDICATIONS

We have summarised some high-level best practices for increasing antibiotic indication documentation in [table 1](#). Critically, improving antibiotic indications requires an easy, user-centred, well-designed process. When not designed and implemented with end-user engagement, clinicians may manipulate or game clinical decision support tools to bypass restrictions and take short cuts. For example, in a study by Baysari and colleagues, the investigators created a drop-down system for restricted antibiotics that was meant to improve antibiotic-prescribing habits.<sup>10</sup> The drop-down included only appropriate indications and clinicians were required to obtain stewardship approval if the planned use was for an indication other than in the drop-down. Rather than waste time by calling for approval, clinicians instead bypassed the approval process and gamed the system by selecting ‘appropriate’

**Table 1** Documentation best practices, barriers and additional questions

Purpose of indication	Barriers	Best practices	Future questions
Improve antibiotic prescribing during order entry (eg, nudging, decision support or mindful moment).	<ul style="list-style-type: none"> <li>▶ Alert fatigue.</li> <li>▶ Uncertainty of diagnosis.</li> <li>▶ Need for efficiency.</li> <li>▶ Gaming.</li> <li>▶ Incongruent with decision-making process.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Early end-user engagement during design and testing.</li> <li>▶ Incorporate into existing workflows.</li> <li>▶ Frame in terms of improved patient care.</li> <li>▶ Make doing the ‘right’ thing easy.</li> </ul>	<p>How to streamline documentation (ie, reduce the need for multiple places/layers of documentation)?</p> <p>Can mindful moments be triggered in other ways (eg, during note writing, checklists, timeouts)?</p>
Allow prospective audit and feedback.	<ul style="list-style-type: none"> <li>▶ Resistance to feedback.</li> <li>▶ Highly clinician dependent.</li> <li>▶ Resource intense.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use existing documentation rather than requiring additional documentation.</li> <li>▶ Frame in terms of improved patient care.</li> </ul>	<p>How can hospitals with fewer resources successfully conduct prospective audit and feedback?</p>
Communication.	<ul style="list-style-type: none"> <li>▶ Redundancy of documentation.</li> <li>▶ Multiple modalities for documentation (paper, EHR).</li> <li>▶ Multiple systems preventing closed loop communication.</li> <li>▶ Need to protect patient privacy.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Mandatory indication on prescriptions.</li> <li>▶ Patient instructions with clear antibiotic indication and directions.</li> <li>▶ Frame as a safety issue.</li> </ul>	<p>How to harness technology to communicate across settings without imposing threats to patient privacy?</p>

EHR, electronic health record.

indications, even when that indication was untrue.<sup>10</sup> Because of this gaming, the intervention had no effect on antibiotic prescribing or documentation habits.<sup>10</sup> When interviewed about these workarounds, clinicians reported they wanted to save time and minimise disruptions to their workflow.<sup>10</sup>

In their scoping review, Saini and colleagues mapped barriers and facilitators using the Capability, Opportunity, Motivation (COM-B) model for behaviour change. They acknowledge *opportunity* in the form of incentives, rewards and EHR improvements may overcome barriers to documentation such as lack of time and logistical challenges.<sup>4</sup> Long term, we need better systems to allow open interactions between all members of the patient's care team and improve inter-clinician communication around antibiotic indications. For example, in Taiwan, cloud-based technology allows clinicians, nurses and pharmacists to access patients' prescription history and has resulted in enhanced medication safety.<sup>15</sup> A similar system exists in the USA for opioids and controlled substances; however, this is a state-dependent rather than a nationwide database. As technology improves, having interoperable systems to allow communication of medication information—including antibiotic indication, dose and duration—may become more feasible.

Additionally, Saini and colleagues noted strategies to reduce alert fatigue and increase ease of documentation could help with clinicians' *capability* and *motivation* to provide an indication on the antibiotic prescription.<sup>4</sup> For example, automating or prepopulating indications based on documentation elsewhere (eg, in notes) could reduce the burden on clinicians and prevent gaming. Or the reverse—prepopulating notes based on antibiotic orders or prescriptions may better fit into workflow where orders are often written before notes. This latter solution would also provide an opportunity to incorporate 'nudges' to prod clinicians towards better prescribing.

In summary, we operate in an imperfect system where antibiotic indication documentation serves many purposes and occurs in many forms which can impede implementation. Myriad strategies to improve documentation have been attempted with mixed results. Until we have a system that can facilitate communication across all pertinent individuals, we must work to optimise what we have. This includes leveraging technology and behaviour change strategies to help documentation serve multiple purposes simultaneously. Doing all that, without increasing burden on clinicians, is the key to any successful antimicrobial stewardship—or documentation—intervention.

**Twitter** Valerie M Vaughn @ValerieVaughnMD

**Funding** VMV is supported by a Career Development Award from the Agency for Healthcare Research and Quality (K08HS026530).

**Disclaimer** The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

**Competing interests** None declared.

**Patient consent for publication** Not applicable.

**Provenance and peer review** Commissioned; internally peer reviewed.

**ORCID iD**

Valerie M Vaughn <http://orcid.org/0000-0001-7057-0728>

## REFERENCES

- Duane TM, Zuo JX, Wolfe LG, *et al*. Surgeons do not listen: evaluation of compliance with antimicrobial stewardship program recommendations. *Am Surg* 2013;79:1269–72.
- Shlaes DM, Gerding DN, John JF, *et al*. Society for healthcare epidemiology of America and infectious diseases Society of America joint Committee on the prevention of antimicrobial resistance: guidelines for the prevention of antimicrobial resistance in hospitals. *Infect Control Hosp Epidemiol* 1997;18:275–91.
- Polk R. Optimal use of modern antibiotics: emerging trends. *Clin Infect Dis* 1999;29:264–74.
- Saini S, Leung V, Si E, *et al*. Documenting the indication for antimicrobial prescribing: a scoping review. *BMJ Qual Saf* 2022;31:787–99.
- Saint S, Vaughn VM, Chopra V, *et al*. Perception of Resources Spent on Defensive Medicine and History of Being Sued Among Hospitalists: Results from a National Survey. *J Hosp Med* 2018;13:26–9.
- Kahneman D. *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux, 2011.
- Graber CJ, Jones MM, Glassman PA, *et al*. Taking an Antibiotic Time-out: Utilization and Usability of a Self-Stewardship Time-out Program for Renewal of Vancomycin and Piperacillin-Tazobactam. *Hosp Pharm* 2015;50:1011–24.
- Meeker D, Linder JA, Fox CR, *et al*. Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices: A Randomized Clinical Trial. *JAMA* 2016;315:562–70.
- Chaves NJ, Ingram RJ, MacIsaac CM, *et al*. Sticking to minimum standards: implementing antibiotic stewardship in intensive care. *Intern Med J* 2014;44:1180–7.
- Baysari MT, Del Gigante J, Moran M, *et al*. Redesign of computerized decision support to improve antimicrobial prescribing. A controlled before-and-after study. *Appl Clin Inform* 2017;8:949–63.
- Beardsley J, Vestal M, Rosario N, *et al*. Accuracy of and prescriber perceptions related to documenting antibiotic indications during order entry at an academic medical center. *Am J Health Syst Pharm* 2020;77:282–7.
- Tully AP, Hammond DA, Li C, *et al*. Evaluation of Medication Errors at the Transition of Care From an ICU to Non-ICU Location. *Crit Care Med* 2019;47:543–9.
- Chui MA. Safety in the Retail Pharmacy. *Patient Safety Network* 2018.
- Vaughn VM, Linder JA. Thoughtless design of the electronic health record drives overuse, but purposeful design can nudge improved patient care. *BMJ Qual Saf* 2018;27:583–6.
- Liao C-Y, Wu M-F, Poon S-K, *et al*. Improving medication safety by cloud technology: Progression and value-added applications in Taiwan. *Int J Med Inform* 2019;126:65–71.