


## Concise Communication

# Antimicrobial physician and pharmacist experience and perception of an antimicrobial Self-Stewardship Time-Out Program (SSTOP) intervention at eight Veterans' Affairs medical centers

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### Abstract

We explored experiences and perceptions surrounding the Self-Stewardship Time-Out Program (SSTOP) intervention across implementation sites to improve antimicrobial use. Semistructured qualitative interviews were conducted with Antibiotic Stewardship physicians and pharmacists, from which 5 key themes emerged. SSTOP may serve to achieve sustainable promotion of antibiotic use improvements.

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Antimicrobial stewardship programs (ASPs) that combine education, clinical guidelines, decision support, restrictions on antimicrobial use, and interventions to change antimicrobial therapy can reduce antibiotic resistance and improve patient outcomes.<sup>1</sup> Continued development of effective implementation strategies to achieve sustainable improvements in antibiotic prescribing is needed.<sup>2</sup>

Concerns about the consequences of inadequately treated infection often prompt initiation of unduly broad-spectrum and unneeded therapy antimicrobial therapy prior to the availability of microbiological or other data to substantiate infection diagnosis.<sup>3,4</sup> Antibiotic timeouts, in which a reassessment of the continued need for continuation of initial antibiotic selection are undertaken when more diagnostic information is available,<sup>5,6</sup> are one CDC-recommended antibiotic stewardship intervention.

We used an antimicrobial Self-Stewardship Time Out Program (SSTOP) to evaluate the implementation of an “antibiotic timeout” intervention at Veterans' Affairs medical centers.<sup>6</sup> Based on dual process theory<sup>7</sup>, the SSTOP intervention requires providers to undertake a deliberative consideration of specific criteria before continuing therapy. Assisting the increased cognitive effort, SSTOP provides patient-specific decisional support by supplying clinical and microbiological information and links to educational guidelines. We assessed ASP physician and pharmacist experiences related to the SSTOP intervention across implementation sites.

### Methods

#### SSTOP intervention

SSTOP introduced an automated templated note embedded in the electronic health record to prompt providers to review continued use of anti-methicillin-resistant *S. aureus* (MRSA) therapy (ie, vancomycin) and antipseudomonal  $\beta$ -lactam therapy 3 days after the initiation of antibiotics. SSTOP provided decisional support via an antibiotic dashboard that included a summary report of integrated clinical and laboratory data to assist in determining whether and how to adjust antibiotic therapy after three days of treatment. Facility-level quarterly reports on antibiotic de-escalation rates and usage of targeted antibiotics were provided to ASP physician and pharmacists.<sup>8</sup>

#### Setting and participants

The ASP physicians and pharmacists were identified at each site and were invited to participate by e-mail. In-person site visits and individual semistructured interviews with ASP physicians and pharmacists (ie, ASP champions) were conducted at 8 Veterans' Affairs medical center facilities from January 2019 to January 2021.

The study consent process and procedures were approved by the VA Central Institutional Review Board (CIRB no. 18-03) and by the Research and Development Committee at the Greater Los Angeles VA Health Care System.

#### Study design

We iteratively designed interview guides for preimplementation interviews (existing stewardship programs) and for postimplementation interviews (implementation process and challenges) (Appendix 1 online). Interviews were conducted via phone or

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Site	Pre-Intervention Qualitative Interviews	Pre-Intervention Site visit	Vancomycin Template Launch Date	Early Post-Intervention Qualitative Interviews	Antipsuedomonal Template Launch Date	12-Month + Post-Intervention Qualitative Interviews
1	Jan. 2019 (N=1)	2/13/2019	6/17/2019	Oct. 2019 (N=2)	2/10/2021	June 2020 (N=1); July 2020 (N=1)
2	Jan. 2019 (N=2)	2/14/2019	1st week of 7/2019	Sept. 2019 (N=2)	6/15/2020	June 2020 (N=2)
3	Feb. 2019 (N=1)	2/15/2019	6/18/2019	Oct. 2019 (N=2)	7/15/2020	June 2020 (N=1)
4	March 2019 (N=1)	3/25/2019	10/7/2019	Nov. 2019 (N=1); Dec. 2019 (N=1)	7/1/2021	
5	April 2019 (N=2)	4/29/2019	No template/Brochures	Oct. 2020 (N=3)	No template/Brochures	
6	May 2019 (N=2); Nov. 2019 (N=1)	5/16/2019	Delayed-1/11/2021		Delayed	
7	July 2019 (N=2)	7/17/2019	No template/Brochures	Nov. 2020 (N=1)	No template/Brochures	
8	March 2020 (N=1)	2/19/2020	3/2/2020	*	11/2/2020	Jan. 2021 (N=1)

**Figure 1.** SSTOP process and timeline.

video conference by the qualitative lead (J.B.), then they were audio-recorded and transcribed.

### Data analysis

Transcripts were uploaded into MAXQDA, a qualitative data program (VERBI Software, Berlin, Germany). We performed thematic content analysis via consensus-based inductive and deductive coding (Appendix 2 online).<sup>9</sup> Our analysis team included experienced qualitative researchers (C.C.G., J.J., and J.B.) with antimicrobial stewardship expertise.

Moreover, 13% of the transcripts were coded via group consensus (by C.C.G., J.J., and J.B.). This process involved all team members who coded transcripts prior to meetings where the final coding consensus was entered into MAXQDA during group discussion. The remaining 87% were coded by paired members of the analysis team (C.C.G. and J.J.). Discrepancies were resolved by the qualitative lead (J.B.) and/or the primary investigator (M.B.G.).

### Results

In total, 13 preintervention interviews and 18 postintervention interviews were conducted with 7 ASP physician champions and 8 pharmacist champions. Two sites were unable to launch the note templates due to lack of resources; however, these sites utilized other SSTOP tools and participated in interviews. The SSTOP process and timeline are shown in Figure 1.

Preimplementation responses informed implementation by identifying perceived intervention barriers and facilitators. Pre- and postimplementation barriers and facilitators were similar; thus, we focused on the findings related to the SSTOP note template: feedback, challenges, and opportunities. Five primary themes emerged. Representative quotations are presented in Table 1.

#### *Theme 1: SSTOP intervention was perceived as valuable and straightforward*

Feedback from ASP champions indicates ways in which prescribers were critical of aspects of the note template, but they liked the note template process overall and deemed it to be straightforward. ASP champions perceived that many providers valued the note template, indicating it was helpful in both thinking about antibiotics prior to initiation and for identification of appropriate antibiotics.

The data feedback reports developed and distributed by the SSTOP team allowed sites to see the intervention in action.

Comparative rankings motivated sites to view their reports and to compare their antimicrobial use. Several sites indicated their intent to continue using the SSTOP templates after study completion.

#### *Theme 2. Strong existing stewardship and local culture facilitated SSTOP implementation*

Facilitators of successful implementation included pre-existing strong stewardship support, participation of local champions (eg, infectious disease fellow), and implementation setting (eg, medicine service). Implementing the templates first in a setting led by a group of clinicians with low resistance helped ensure the success of the template.

#### *Theme 3. Implementation barriers included staff turnover (eg, rotating residents), service level support (ie, surgery service), insufficient information technology (IT) support, and the need to remind providers to use the template*

Many facilities involved in the SSTOP intervention were academic/teaching institutions, thus as each new set of residents rotated through their facility extra time/effort was required to ensure everyone was educated on the SSTOP templates and protocols. Installing the SSTOP templates required access and support of clinical applications coordinators (CACs) at each site. Some sites lacked steady access to this resource and therefore experienced challenges and delays in SSTOP implementation. The primary perceived barrier to SSTOP template utilization was lack or loss of a local champion to ensure that the template was completed.

#### *Theme 4. Recommendations largely centered on enhancing note template usability and SSTOP feedback reports (eg, inclusion of patient/provider-level data)*

Sites offered suggestions to improve note template usability, such as having an open text field embedded within the note and including provider-level antimicrobial use in feedback reports.

#### *Theme 5. COVID-19 affected clinical practice and SSTOP implementation*

All sites reported that high volumes of COVID-19 cases were a significant challenge. Specific pandemic-related barriers included reduction of stewardship activities such as regular MRSA screening practices, weekly stewardship rounds, and stewardship committee planning. Other barriers included changes in workflow due to staff

**Table 1.** Quotations of Key Themes From Semistructured Interviews With Antimicrobial Stewardship Physicians and Pharmacists (ie, ASP Champions)

Location	Comment by ASP Champion
<b>Theme 1: SSTOP intervention was perceived as valuable and straightforward.</b>	
Site 1	“I have talked to several people who have interacted with the staff notes. Everyone loves it. Nobody has found that it interferes with their workflow. It's not (...) time-consuming.”
Site 5	“(…) I agree with the hospitalists who mentioned that it [note template] kind of changes their thought process. When people start thinking about (...) incorporating that into their thought process, when they have somebody on antibiotics—‘Oh, I should be thinking about de-escalating.’ Because in the past, I mean, it's always been part of the ID thought process, but I don't know that it's been part of the thought process for medicine. But I think this has just kind of accelerated the timeline where people are looking to potentially de-escalate therapy.”
Site 4	“(…) One of the good things about the template is (...) it does walk people through different pathways, I think that probably the ID consult service is getting consulted more often, in terms of like, whether or not patients should be continued on therapy. So I think in some ways it's helpful, or it's been helpful, for us to determine, you know, earlier intervention from an ID consult perspective.”
Site 5	“(…) The data tools that we're able to use (...) to (...) see how we compare to other VA facilities has been helpful for us, as the stewardship program, to (...) understand our antimicrobial use and really try to target, you know, where we need to improve. So I think that data tools through SSTOP have definitely been very helpful.”
Site 1	“Oh yeah, I'd love to [continue to use the SSTOP templates] (...) we also used the reports for our yearly report, so those graphs were very helpful, for showing, the medical executive committee, you know, our performance compared to other people.”
Site 5	“(…) We are really interested in continu[ing] to be part of SSTOP. We love [the] (...) graphs, and we use it quite a bit.”
<b>Theme 2. Strong existing stewardship and local culture facilitated SSTOP implementation.</b>	
Site 5	“(…) It's been relatively smooth sailing (...) we've been dealing with a very friendly service that is compliant and happy to do what we want them to do and so it remains to be seen how this is going to roll out in the units and on the surgical service. I know there's a lot of buy-in from the medical director for the MICU and the chief of pulmonary.”
Site 3	“(…) My fellow is doing it [ensuring the template is completed] so it's been very easy for me.”
Site 5	“(…) It adds an extra thing to do (...) for the providers, (...) it's helpful in terms of trying to walk them through processes and thinking about whether or not they're using the correct antibiotic for their particular patient. (...) We have 2 senior fellows that are helping us with that [reviewing the list of patients and completing the note template].”
<b>Theme 3. Implementation barriers included staff turnover (eg, rotating residents), service level support (ie, surgery service), insufficient information technology (IT) support, and the need to remind providers to use the template.</b>	
Site 4	“(…) One of the barriers probably is that (...) the residents, and the interns are constantly changing. So it's not like you have the same group of people and trying to make sure that all of those individuals are educated on a routine basis, and remember, sometimes I think can be [a] challenge.”
Site 1	“[We are] in the process of hiring 5 new pharmacist(s) to replace people who have left (...) so we are short on people and doing double duty for certain individuals (...) we're not having (...) the automatic discontinuation of the order, like was intended, (...) 'cause we had concerns about things being missed because we didn't have enough staff (...)”
Site 5	“(…) An additional struggle is that we have 1 CAC who can do reminder dialogues here, (...) she was blasted with COVID work—and rightly so. I told her this can't take priority over the COVID stuff.” “(…) We kind of ran into issues with having dedicated staff to be able to implement and roll it [SSTOP template] out (...) part of that was (...) IT support as well. (...) CAC support being able to build this in (...) I like the SSTOP templates. (...) I can envision us potentially (...) implementing the SSTOP templates (...) later down the line. (...) we just need kind of more support, I think from an IT standpoint to be able to build that in.”
Site 7	“So when I started it back last year, I had an ID fellow, [name], that was helping, and then I had an ID physician, [name], who was on the team and we were working on it together as the three of us. (...) it was going pretty well then.”
Site 1	“(…) It's hands-on assistance 'cuz we're not doing it for them [prescribers/providers] but we have to remind them to do it. It's (...) Not part of their daily practice (...) to remind themselves or say, 'hey, it's day three I need to do the note and I need to be more aware of what's going on and thinking about de-escalation' (...) It's (...) calling them and saying, 'hey, they're due for the note today' (...) and letting them do the note and then (...) thinking about the possibility of de-escalation (...). I think it's gonna take a long time to get them to really get in the habit of doing it themselves.”
<b>Theme 4. Recommendations largely centered on enhancing note template usability and SSTOP feedback reports (eg, inclusion of patient/provider-level data).</b>	
Site 3	“A little more ability to text and add in a (...) place for people to write things down and not just use the note. (...) explain why they want to continue [antibiotic use].”
Site 5	“I'm a big fan of the reports that we have right now through the Pyramid analytics [SSTOP data feedback report]. (...) I do wonder if there is possibility to really kind of get it down to patient-level data (...) also prescriber-level data. (...) [it] would be useful for us as a stewardship program, to basically look and see individuals that are prescribing antimicrobials, and basically try to identify trends.”
<b>Theme 5. COVID-19 affected clinical practice and SSTOP implementation.</b>	
Site 7	“[Pre-pandemic] We were able to (...) talk to patients in—, or talk to the teams in person (...) and then when COVID happened in March, we kind of all started working from home, so we weren't actually on site (...) it became more difficult to talk to teams (...).”
Site 2	“(…) All of our ID attendings were pulled in many different directions. So it really fell to myself and our other ID pharmacist to really, manage a lot of the patients who had COVID and non-COVID conditions from an antibiotic standpoint.”

(Continued)

**Table 1.** (Continued)

Location	Comment by ASP Champion
Site 5	“[Due to COVID-19] (...) we have remote access (...) it’s not the same interaction (...), it’s not that they decided we’re going to throw away thinking about appropriate use of antibiotics, it’s just that there was not a regular consistency of feedback, checking of things, following up on the recommendations, so there was a little more—some of the things were lax.”
Site 7	“(…) Patients that were getting (...) more severe, they [providers] would leave antibiotics on longer, or (...) the providers were worried that the patients had COVID and another bacterial infection, so they would (...) keep antibiotics on these patients. (...) it was a little bit harder to de-escalate or stop unnecessary antibiotics during that time.”

Note. ASP, Antimicrobial stewardship program; SSTOP, self-stewardship time-out program; ID, infectious disease; MICU, medical intensive care unit; IT, information technology; CAC, clinical applications coordinators.

working from home and staff being pulled into multiple directions (eg, writing COVID-19 policies), which complicated the implementation of SSTOP.

## Discussion

We identified facilitators of and barriers to SSTOP implementation and related antibiotic stewardship activity as well as the impact of COVID-19 on these activities.<sup>7</sup> The SSTOP note templates were considered generally valuable and straightforward (theme 1). Dual process theory is a meta-theory explaining one’s motivation, attention, and decision making. We used it to design the SSTOP tools to direct clinicians toward system 2 thinking, that is, rule-based, deliberative cognitive processing. Concurrently, we facilitated the development of more stewardship-friendly automatic system 1 thinking by supporting patterns of thought and behavior that will make appropriate stewardship more intuitive.<sup>7</sup> As in our prior work, clinicians using SSTOP templates explicitly reported their cognition guided by templates.<sup>7</sup>

Implementation was facilitated by local champions and a strong culture of stewardship (theme 2). Conversely, barriers to implementation included the complex mission of facilities with roles in education and training and IT support issues such as coordination with CACs (theme 3). Many of these barriers may be difficult to overcome; however, themes 2 and 3 reflect the importance of a stewardship culture and social and tangible support for attending physicians and residents to participate in that culture. The importance of culture is further supported by theme 4, tailoring to the site-specific context.

Clinicians noted the motivating factor of comparison to other facilities, which may point to the important process of social comparison in this context that could be studied further and used to strengthen stewardship interventions.<sup>10</sup> Clinicians indicated the template facilitated earlier involvement with ID specialists, a potential enhancement to collaboration that may strengthen clinician–ASP relations.

The impact of the emergence of COVID-19 (theme 5) was far-reaching due to temporary cessations of stewardship activities, briefly, at-home work schedules, and demands for ID specialists to help develop COVID-19 policies and provide patient care.

This study had one limitation. We focused on ASP physician and pharmacist experiences in this study. Thus, the experiences of prescribing clinicians were not captured.

Our findings support the value of the SSTOP “time out” intervention as an effective antibiotic stewardship strategy, and we identified potential barriers to implementation. Plans for continued

utilization of the note templates after the project concluded suggests that SSTOP may serve to achieve sustainable promotion of antibiotic use improvements.

**Supplementary material.** To view supplementary material for this article, please visit <https://doi.org/10.1017/ice.2022.266>

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