



Young women's preferences for contraceptive education & development of an online educational resource

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ABSTRACT

Objectives: To explore young women's preferences for contraceptive education to inform the development of an educational resource and to pilot test the resource with patients and clinicians.

Methods: We performed a mixed-methods study to elicit preferences for contraceptive educational resources among patients, develop an online resource, and pilot test the resource with clinicians and patients to assess feasibility, systems usability, and contraceptive knowledge.

Results: Forty-one women aged 16-29 completed in-depth interviews: they preferred an online format which was recommended by a clinician, presented contraceptive methods in order of effectiveness, and contained information from experts and experiences from individual users. We adapted an existing website (bedsider.org) to create an online educational resource. Thirty clinicians and thirty patients completed surveys after use. System Usability Scale scores were high among patients (median [IQR]: 80 [72-86]) and clinicians (84 [75-90]). Patients answered more contraceptive knowledge questions correctly after interacting with the resource (9.9 ± 2.7 vs 12.0 ± 2.8 , $p < 0.001$).

Conclusions: We developed a contraceptive educational resource incorporating end-user feedback that was highly usable and increased patients' contraceptive knowledge. Future research should assess effectiveness and scalability among a larger sample of patients.

Innovation: This contraceptive educational resource can supplement clinician counseling to increase patient contraceptive knowledge.

1. Introduction

High-quality contraceptive counseling can align patients' preferences with contraceptive methods and has been shown to impact women's knowledge of contraceptive methods [1], use [1-3], and continuation [3]. There is wide-spread interest in improving contraceptive counseling. Prior studies have examined the use of decision aids [4-6], iOS applications ("apps") [7,8], and educational videos [9]. Data about the importance of clinician input regarding educational resources is limited [10]. An existing resource not included in the above review was the website [Bedsider.org](http://bedsider.org) [11]. [Bedsider.org](http://bedsider.org) is an online contraceptive education resource developed by Power to Decide and endorsed by the American College of Obstetricians and Gynecologists [12]. [Bedsider](http://bedsider.org) has been shown to increase the uptake of contraception [13], and while it has high acceptability among patients, clinicians have reported concerns about legitimacy and acceptability [12].

The objective of this study was to identify young women's preferences for a contraceptive educational resource that could be incorporated into

clinical settings to supplement clinician counseling. In conjunction with a brief, quantitative survey [14], we conducted qualitative interviews with young women to elicit feedback on three available contraceptive education resources. We integrated the feedback into an existing online resource ([Bedsider.org](http://bedsider.org)) to create a new educational resource. Subsequently, we surveyed clinicians and patients to assess the usability of the resource, feasibility of implementation, and effect on contraceptive knowledge among patients.

2. Methods

We conducted this mixed-methods study in three locations in the same city: a university-based family planning clinic; a community-based, federally-qualified health center (FQHC); and a hospital-based obstetrics and gynecology clinic that sees primarily publicly insured patients. At the family planning clinic, a non-clinician counselor provides structured contraceptive counseling adapted from the Contraceptive CHOICE Project

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[15] prior to the clinician visit. At the FQHC and hospital-based clinic, the contraceptive counseling was determined by the individual clinician without a standardized approach. We identified patients presenting for gynecology appointments and approached them for recruitment.

2.1. Patient participants

For the interviews and pilot testing, eligible participants were cis-gender female, 16-29 years of age, English speaking, not currently pregnant, sexually active with a biological male, without history of tubal ligation or hysterectomy, and were using or were willing to discuss contraceptive options. The in-depth interview participants were a subset of a larger sample that completed a quantitative survey to determine preferences for a contraceptive education tool, which has previously been described [14]. Interview participants provided written informed consent. Parental consent was not required for participants under 18 years of age as it is not required for minors to access contraceptive care. The Human Research Protection Office at Washington University School of Medicine provided approval prior to participant recruitment.

2.2. In-depth interviews

We chose several educational tools in written [16], online [11], and video [9,17] format to show to participants. We designed questions to elicit participant preferences for format of presentation, content of the tool, and more general impressions. We piloted the interview guide with an individual who met the eligibility criteria to assess the interview guide's ability to elicit open-ended feedback prior to enrolling participants. Three authors who completed masters-level coursework in qualitative research conducted interviews (CZ, RP, MD). All interview participants provided demographic information and a brief reproductive and contraceptive history. Participants received a gift card for completing the survey and interview. We conducted all interviews in private research offices and participants provided consent to have their interview audio recorded. We conducted interviews until we reached thematic saturation.

Each interview was professionally transcribed and transcripts were uploaded into NVivo 11 Pro. We developed a codebook using an iterative modified, grounded-theory process by three authors (CZ, RP, MD) and all authors reviewed the codebook. Six transcripts were coded by three authors (CZ, RP, MD) and interrater reliability was calculated using the kappa statistic for each pair of coders. The two authors with the highest kappa and percent agreement (CZ, MD) double coded ten transcripts with a 99% agreement ($\kappa=0.82$). We discussed all coding discrepancies among all authors until consensus was reached. We randomly assigned the remaining 35 transcripts to these two authors for coding.

2.3. Development of online contraceptive education resource

We used feedback from participant interviews about the existing contraceptive education resources to determine preferred mode of delivery, important content to include in the resource, preferences for visual presentation of information, and factors that would make such a resource trustworthy, such as the perceived sources of information, use of data from primary sources, and logos. Based on this feedback, we developed an online, contraceptive educational resource. We obtained approval to adapt existing images and content from the bedsider.org method explorer website [11] into this resource. We partnered with a web design group to develop a beta version of the online contraceptive education resource. We reviewed and updated all content as appropriate, with addition of references to primary literature and national organization recommendations for contraceptive provision [18-20]. We altered key elements for design and application in our particular clinical setting based on the feedback from study participants.

2.4. Pilot testing of contraceptive educational resource

After developing the educational resource, we recruited patients and clinicians for pilot testing. Patients were recruited using the same process and inclusion criteria described above. Eligible clinicians were attending physicians and nurse practitioners providing contraception at the participating sites and resident physicians at the hospital-based clinic. We invited clinicians to participate in pilot testing through emails from the study team with links to view the resource and complete the online survey. Participants reviewed a consent information sheet prior to participating in research activities.

Patient participants completed an online survey on a tablet computer at their scheduled appointment. We assessed contraceptive knowledge using 16 true/false questions [21,22]; participants could reply true, false, or I don't know. Patients were then directed to interact with the online educational resource, and complete the System Usability Scale (SUS), a validated 10-item questionnaire designed to evaluate ease of use of a site, application, or environment being tested. The SUS is scored from 0-100; a total SUS score >68 is considered an above average score and ≥ 80 is considered a high score [23]. Then, we asked patients the following questions about the resource with responses on a 5-point Likert scale (strongly disagree (1) to strongly agree (5)): 1) if they would feel comfortable viewing the resource in the waiting room and exam room; 2) if they had enough time to view the information; 3) if they could see themselves using the resource; 4) if they were satisfied with the amount of information; and 5) if they trusted the information. Finally, we repeated the contraceptive knowledge assessment survey. Patients received a gift card for completing the survey.

We asked clinicians to view the website and complete the SUS [23] via email, with a link to allow them to view the website on their chosen device. They also provided feedback on their perceived feasibility of implementing the website in their clinical setting and how the website could be introduced to their patients. Clinicians provided brief demographic and practice information. Clinicians received a gift card for completing the survey.

We used frequencies and percentages to describe patient and clinician characteristics. We calculated the time patients spent viewing the website by calculating the difference (in minutes) between the timestamps on the questions patients answered immediately before and after viewing the website. We calculated the number of correct, incorrect, and unknown answers for the contraceptive knowledge assessment before and after patients viewed the website. We also calculated an incorrect/unknown total. We used the appropriate descriptive statistics, mean \pm standard deviation or median (interquartile range) for each contraceptive knowledge variable based on the distribution of the value (normal vs. non-normal). We compared the difference in correct answers before and after viewing the website using a paired-samples t-test and estimated effect size using Cohen's *d*. A Cohen's *d* >0.8 was considered a large effect size. Differences in the number of incorrect and unknown answers were assessed using Wilcoxon signed ranks test. We calculated SUS scores according to published instructions [23]. Statistical analyses were conducted using SPSS Statistics, Version 27 (IBM Corp., Armonk, NY).

3. Results

3.1. In-depth interviews

Forty-one patients completed in-depth interviews between March and September 2018; participant characteristics are presented in Table 1. Three main themes emerged around preferences for a contraceptive educational resource: 1) format for information delivery, 2) content of the educational resource, and 3) trustworthiness of the information presented. Supporting quotes for these themes are shown in Table 2. Interview participants expressed a preference for an online website format over application, video, or written modalities. Some participants suggested this format provided comprehensive information which could then be tailored to their own needs. "Cause it [the website] gives you all the information in one....It's

Table 1
Demographic and reproductive characteristics of interview subjects.

Characteristic	N = 41 n (%)
Age (categorical)	
16–19 years	7 (17.1)
20–24 years	21 (51.2)
25–29 years	13 (31.7)
Race	
Black	22 (53.7)
White & Other	14 (34.1)
Refused	5 (12.2)
Hispanic	
Yes	2 (4.9)
No	39 (95.1)
Federal poverty level	
<100%	26 (63.4)
100%-200%	7 (17.1)
>200%	8 (19.5)
Education	
≤ High school	13 (31.7)
Some college	12 (29.3)
4+ years college	16 (39.0)
Marital status	
Never married	33 (80.5)
Married/living with partner	7 (17.1)
Separated/divorced/widowed	1 (2.4)
Sexual relationship	
Sexually active, monogamous	25 (61.0)
Sexually active, not monogamous	10 (24.4)
Not sexually active	5 (12.2)
Missing	1 (2.4)
Ever Pregnant	17 (41.5)
How do you feel about having a child now or in the future?	
You don't want to have one	5 (12.2)
Yes, <1 year from now	2 (4.9)
Yes, 1-5 years from now	18 (43.9)
Yes, >5 years from now	14 (34.1)
Refused	1 (2.4)
Don't know	1 (2.4)
Who should make decisions about birth control	
Myself	26 (63.4)
Myself with healthcare provider	14 (34.1)
Missing	1 (2.4)
Current contraceptive method	
None	5 (12.2)
IUD or Implant	11 (36.7)
DMPA, OCPs, Ring	13 (43.3)
Barrier method	8 (26.7)
Abstinence	2 (4.9)
Not sexually active	2 (4.9)

IUD – intrauterine device; DMPA – depomedroxyprogesterone acetate; OCP – oral contraceptive pill

very, very, very detailed. And it literally breaks it down. It doesn't give you too much information to where you're like sitting there reading forever....I feel like it takes out a lot of the key points and just put it in one, and makes it easy" (213). However, one participant did express concerns about having enough time to view the website in the health center setting; "But if you ... if you're just coming into the clinic, you've got a nine o'clock appointment, you've got 10 minutes to spare, this [the website] is very overwhelming" (3563).

A preference for presentation of contraceptive methods in order of effectiveness also emerged during the interviews. Participants verbalized several factors which they felt would make the contraceptive education tool more trustworthy. One factor was a preference for a clinician recommendation for the resource. Some participants specified that a clinician with whom they have a trusted relationship would be a more reliable recommender of any information source; "it depends on if I trust that doctor. So if I trust him, I'll trust where he's telling me to look at, yes." (213) Another factor that participants reported would make an educational resource more trustworthy was if the recommendation came from a source with particular knowledge or expertise in the field, such as a provider with experience specifically in contraceptive care.

Participants also expressed that the name of the website would influence the credibility of the website, reporting that ".org" or a professional organization conferred higher trustworthiness. Some thought a ".com" name was less credible and that the website creators may have financial incentives to recommend specific contraceptive methods. Finally, participants mentioned preferring information about methods from other contraceptive users that have similar lived experiences to themselves.

Based on participant feedback, we worked with [Bedsider.org](https://bedsider.org) to create an educational resource that was web-based, had a non-commercial affiliation, and presented methods in order of effectiveness. We included video testimonials from patients, and the resource was formatted for desktops, tablets, and mobile devices.

3.2. Pilot testing of the contraceptive educational resource

Sixty participants completed pilot testing of the educational resource in September and October 2019; 30 patients and 30 clinicians. We recruited ten patients from each of the participating clinical sites, 10% were 16–19 years of age, 63% were 20–24, and 27% were 25–29. Participating clinicians were 87% obstetrician/gynecologists and 13% nurse practitioners. Clinicians had worked with patients for a median of 6 years (IQR 3-14) and at their current site for a median of 3 years (IQR 1-7).

Usability as measured by the SUS was high for both patients and clinicians (Figure 1). Patients had a median total score of 80 (interquartile range 72-86), and clinicians had a median total score of 84 (IQR 75-90). The majority of participants had average or high usability scores; 90% of patients had a score >68 (above average) and 60% had a score ≥ 80 (high), while 90% of clinicians had a score >68 (above average) and 67% had a score ≥ 80 (high).

Most clinicians (87%) thought the website could easily be integrated into the clinical workflow at their site. They expressed multiple ways their practice could introduce the website to the patient (Table 3), most commonly a poster in the exam room (87%) and introduction of the resource to the patient by the clinician (80%) or a nurse (83%). When asked how clinicians would integrate the website into the patient rooming process, 70% agreed with using the website as standard practice for all preventative gynecology and postpartum appointments as well as prenatal appointments at a specified gestational age. Forty percent agreed with using the website as standard practice for all gynecology appointments. Most clinicians said they would integrate the resource into their rooming process at the health center by utilizing a prompt from the medical assistant or clinician (90% and 50%, respectively). Half the clinicians reported availability of an electronic device in the exam room to view the resource, while 83% had wireless internet access for patients in their health center. Clinicians estimated most patients had their own smartphone they could use to access the resource (Table 3).

Patients spent an average of 4 minutes on the website, median (IQR): 2 (2-4) and 87% reported adequate time to view the website to their satisfaction. Most patients were satisfied with the amount of information the website provided (97%) and trusted the information (90%). All participants said they would feel comfortable using the website in the exam room while waiting for the clinician, and 90% would be comfortable using it in the waiting room. After viewing the website, the mean number of correct answers to contraceptive knowledge questions increased from 9.9 ± 2.7 to 12.0 ± 2.8 ($p < 0.001$, Cohen's $d = 0.91$). The decrease in mean number of incorrect/unknown answers was due to a decrease in the number of unknown answers (decrease in median score from 4 to 1), while there was no significant change in the number of incorrect answers (Table 4).

4. Discussion and conclusion

4.1. Discussion

Using a mixed-methods approach, we explored user preferences for a contraceptive educational resource, developed an online resource, and pilot tested it with patients and clinicians. In the qualitative interviews,

Table 2
Example quotations from participants for qualitative themes identified.

Format for information delivery	
Online - Preferred	"I like the website the best. Because ... it provides the most information. I can move at my own pace. Questions that are more specific to me, I can answer." (3523) "I liked the website. It's easy to use. I can get as little or as much information as I want" (3772).
Online - Limitation of time	"But if you ... if you're just coming into the clinic, you've got a nine o'clock appointment, you've got 10 minutes to spare, this [the website] is very overwhelming" (3563).
Paper	"It's a lot on the paper. [...] I feel like this is a lot to look at. It's a lot like crammed on one ... one piece of paper." (14)
Video	"I wouldn't want to [watch the video]. If I was sitting down with my doctor and they're like, "Oh, here's a quick little six-minute video about IUDs," and they started that, I'd probably be like, oh, God, really?" (3536)
Preference for resource contents – in order of effectiveness	
	"...it has it directly layered from, you know, not effective to very effective. So that's good. I like that." (3804) "I like the layout of this. I like the like least effective to most effective with the percentages." (3772) "I like this timeline here, [...] yeah, the least effective and the most effective timeline is nice..." (3536)
Trustworthiness of Resource	
Clinician recommendation	"I mean there's a lot of authority that doctors have and ... I would assume that they want the best health outcomes for me. So, I would typically trust what they say." (3593)
Relationship with clinician	"it depends on if I trust that doctor. So if I trust him, I'll trust where he's telling me to look at, yes." (213)
Clinician's expertise	"I think that that [information] should come from people who've had experiences with the birth control...including doctors." (353) "I prefer a doctor or nurse, somebody who actually experienced a lot of birth control." (25) "I can read the studies and digest them, but maybe...I can't read all of them. Or like I don't have the actual...practical experience of either giving people IUDs, or treating people who have had them, and their experiences...so I guess having...her expertise was ...the biggest factor." (3523)
Domain name	"I definitely try not to take actual medical advice from anything that's .com." (3536) "...if it seems like a credible website of like a .org or something ...um, I'm gonna trust it a lot more than if I just, you know, just Google just any old thing. You just have to be careful about what you're reading." (3563)
Similar lifestyle	"well I'm still in school so they tell us all the time if it doesn't say org ...or edu ...it's not the best source." (3682) "I don't care about if a method works for someone whose life is totally different than mine,... but for somebody who has a similar lifestyle and similar considerations, if they say, "Okay, this works for me," then I'm more willing to believe that." (3621) "...well, I'm not like 40 years old looking for birth control. So I want something that is relevant toward ... to me and, yeah, but so, seeing people similar to me in the testimonials, so I don't know if that's like age or something, but, yeah" (3515)

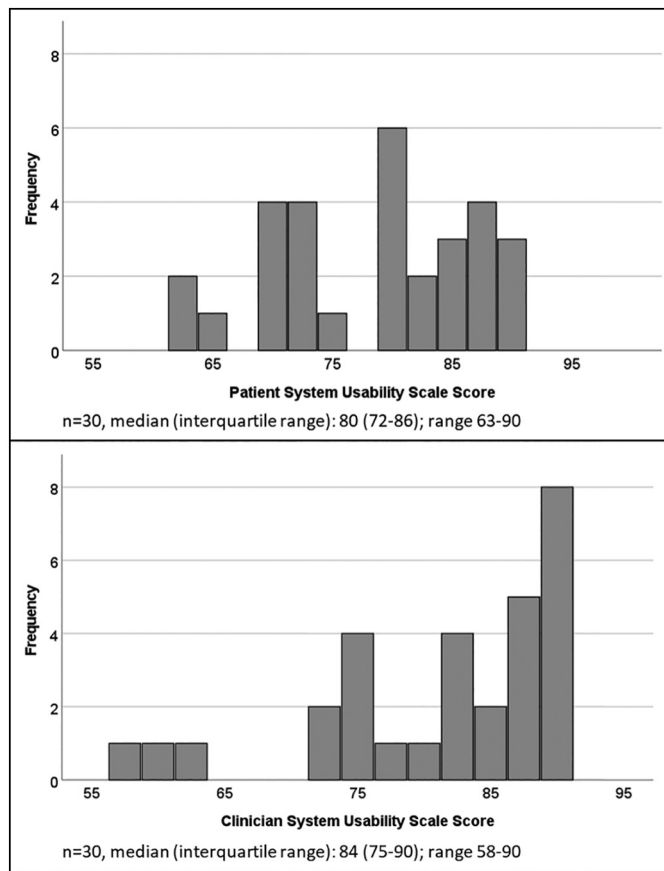


Fig. 1. Distribution of system usability scale scores for patients and clinicians.

we found that an online format was preferred over video or paper. We also found a preference for presentation of contraceptive methods by effectiveness and recommendation for use from a trusted provider. In addition, participants expressed preferences regarding the information source, the domain name of the website, and representation from similar people to their lived experiences.

Our qualitative interviews with end-users support the findings from a quantitative survey conducted with the same population previously published regarding preferences for receipt of contraceptive information and trustworthiness of of clinicians as information sources [14]. Based on feedback from participants during the interviews, we modified the [bedsider.org](#) website, which has been found to be an acceptable educational resource by patient participants [12,13]. However, concerns about appropriateness of language and presentation have been expressed by some clinicians in health center settings [12,24]. We integrated feedback from patients and streamlined content for use in the clinical setting. While we did not design the website to take a specific amount of time to view, our goal was to reduce the amount of information presented to create a resource which could be viewed concisely. By adjusting the content within the website, we developed a website that was acceptable to both patients and clinicians.

Our findings are strengthened by integrating quantitative data with qualitative findings and feedback from patients and clinicians. Data from patients and clinicians support the usability of this educational resource. Multiple studies have tested the feasibility of contraceptive decision-support tools [12,24,25]. However, few have quantitatively measured usability, as measured with SUS in this study. We found an increase in contraceptive knowledge among participants who interacted with the website. This is similar to other studies of contraceptive decision support resources [7-9]. Pilot data incorporated feedback from both patients and clinicians, compared to some prior studies incorporating one or the other [12,24].

Multiple researchers and contraceptive care teams have developed educational resources that supplement in-person contraceptive counseling [4-9]. Similar studies of contraceptive decision-support resources have

Table 3
Clinician feedback on tool integration into clinical flow.

Characteristic	N = 30
Who or what could introduce the website to patients? (check all that apply)	
Poster in the exam room	26 (86.7)
Nurse	25 (83.3)
Clinician	24 (80.0)
Medical assistant	23 (76.7)
Front desk staff	11 (36.7)
Email prior to appointment*	2 (6.7)
Contraceptive counselor*	1 (3.3)
How would you integrate the use of the website into the patient rooming process? (check all that apply)	
Question from medical assistant	27 (90.0)
Introduced to well woman/postpartum appointments	21 (70.0)
Question from clinician	15 (50.0)
Introduced to GYN appointments	12 (40.0)
Question from front desk staff	8 (26.7)
Notes column on clinic schedule	6 (20.0)
Do you have an electronic device in the exam room patients could use to access the website?	
Yes	15 (50.0)
No	15 (50.0)
Do you have wi-fi accessible to patients?	
Yes	25 (83.3)
No	5 (16.7)
What percentages of your patients would you estimate have their own smartphone they could use to access the website?	
0–24%	0 (0.0)
25–49%	1 (3.3)
50–74%	9 (30.0)
75–100%	20 (66.7)

* responses created from free text by respondent

found them acceptable to patients [24,25]. However, some clinicians have expressed concerns about duplicating established workflows and increasing wait times [25]. Additionally, studies of web-based contraceptive education resources have revealed participant preferences for online formats, and suggest multiple acceptable implementation options [26]. Most of these resources have not been scaled up for use in larger patient populations and different clinical settings, necessitating further research.

Although our findings are encouraging, the data have limitations. We conducted a pilot assessment of usability, feasibility, and contraceptive knowledge, and results should be tested in a larger study. We recruited participants from publicly-funded health centers from one city, with the majority living at or below the federal poverty level, which may limit generalizability. Additionally, we recruited English-speaking patients, which limits the generalizability to non-English-speaking populations. Participants' experience and interpretation of the website's utility was also likely influenced by their own experiences with contraceptive counseling, which varied between recruitment sites and clinicians. Lastly, the clinicians surveyed were primarily obstetrician-gynecologists. Perception of usability may differ among providers in other settings, especially those who provide contraceptive services less frequently. Further studies could account for variability in the type of clinician.

4.2. Innovation

This educational resource has the potential to augment contraceptive counseling provided by clinicians. Clinicians can recommend this resource to patients prior to an appointment, and the resource may increase patients' contraceptive knowledge and equip the patient to better identify their preferred contraceptive method(s) for further discussion with the clinician.

4.3. Conclusion

We developed an online contraceptive education resource, adapted from an existing contraceptive education website based on preferences

Table 4

Number of correct and incorrect contraceptive knowledge responses before and after viewing the contraceptive education website among 30 participants.

Measure	Pre-test	Post-test	p	d
Total Correct Answers	9.9 ± 2.7	12.0 ± 2.8	<0.001	0.91
Total Incorrect/Unknown Answers	6.1 ± 2.7	4.0 ± 2.8		
Total Incorrect Answers	1 (0-2)	2 (1-3)	0.15	
Total Unknown Answers	4 (2-7)	1 (0-4)	<0.001	

Total questions asked = 16. Total correct and incorrect/unknown are presented as mean ± SD. For the sub-comparison of incorrect and unknown, data were no longer normally distributed and are presented as median and interquartile range. P-values were calculated using paired-samples t-tests and Wilcoxon rank sum, effect size was estimated using Cohen's *d*

from the end-user patient population. Both clinicians and patients had high system usability scores of the website, patients' contraceptive knowledge was increased after exposure, and clinicians identified several options for integration into clinical workflow. Future research should examine the implementation of the educational resource in different health centers or prior to health center visits and assess the impact on contraceptive knowledge, contraceptive behavior, and satisfaction amongst participants in a larger sample of patients.

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Declaration of Competing Interest

Dr. Madden serves on a data safety monitoring board for phase 4 safety studies of Bayer contraceptive products. The other authors do not have any competing interests to report.

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