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## Low-intensity outreach to increase uptake of HIV preexposure prophylaxis among patients with sexually transmitted infections

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### BACKGROUND

Patients with rectal sexually transmitted infections (STIs) and syphilis are at very high risk of HIV infection, yet many are not using HIV preexposure prophylaxis (PrEP) (1). Prior studies that have evaluated outreach strategies to increase PrEP uptake among high-risk individuals have resulted in fewer than 1% initiating PrEP (2–3). Thus, the optimal strategies for increasing PrEP uptake among individuals who may benefit from PrEP are not yet known. In the context of HIV treatment, electronic communication has been increasingly used over the past decade for healthcare service delivery and education (4). Secure email messaging, in particular, has emerged as a key component of patient-centered care, and when leveraged effectively, leads to improvements in chronic disease management and increased patient retention rates (5). Moreover, many patients want to use electronic communication with their healthcare providers, and such communication enables greater patient engagement, leading to improved outcomes and efficiency (6).

Our objective was to pilot a one-time secure message or letter to individuals with rectal STIs or syphilis to increase linkage to PrEP care. This low-cost intervention would be a scalable strategy to increase linkage to PrEP care among individuals at risk of HIV infection.

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Compliance with Ethical Standards

**Conflicts of interest:** RRG declares that he has no conflict of interest. JEV declares that he has not conflict of interest. LBH declares that he has no conflict of interest. TTT declares that he has no conflict of interest. JLM reports past research support from Merck.

**Ethical approval:** All procedures performed in our study were in accordance with the ethical standards of Kaiser Permanente Northern California and with the 1964 Helsinki declaration and later its amendments or comparable ethical standards.

**Informed consent:** Informed consent waiver was obtained for this study from the Kaiser Permanente Institutional Review Board.

## METHODS

We identified all HIV-uninfected members of Kaiser Permanente (KP) Northern California, a large integrated healthcare system, who were 18 years old, were not on PrEP, and had been diagnosed with rectal gonorrhea or chlamydia, or had a positive treponemal test and received penicillin treatment for syphilis, at the San Francisco or Oakland Medical Centers from January through July 2017. KP implemented a nationwide comprehensive electronic health record, called KP HealthConnect, in 2004. A patient portal is integrated with KP HealthConnect and includes several functions that empower patients to manage their own health and care, such as the ability to exchange secure email messages with their providers (7). In our pilot project, a PrEP clinician sent eligible patients a secure, password-protected email message through the KP electronic health record, or a mailed letter if patients had not enabled the secure messaging feature. The outreach intervention was conducted 2–4 months after the eligibility period. Information about PrEP was provided, as well as information about how to access PrEP at KP, including a phone number for self-referral.

We abstracted demographic data and intervention outcomes from the electronic health record. We assessed the feasibility of the secure message intervention by the proportion of emails opened. We also assessed the proportion of patients linked to PrEP care and receiving prescriptions for PrEP by three months after outreach. We defined linkage to PrEP care as a referral for PrEP documented in the electronic health record. We determined the number of days from the diagnosis of rectal STI, or treatment for syphilis, to the date the outreach intervention was administered for each patient. We used chi-square and Fisher's exact tests to identify characteristics associated with use of the secure messaging platform, opening the email, and linkage to PrEP care.

## RESULTS

A total of 126 HIV-uninfected patients had a rectal STI (56.4%) or syphilis (43.7%). Of these, 119 (94.4%) were cis men, four (3.2%) were cis women, and three (2.4%) were trans women. The median age was 36 years (interquartile range, 28–52 years), and 48 (38.1%) were White, 36 (28.6%) Hispanic, 18 (14.3%) Asian, and 19 (15.1%) Black. We sent a one-time secure email to 97 (77.0%) or letter to 29 (23.0%) individuals with information about PrEP and how to access it at KP. Asian (94.4%) and White (87.5%) participants were more likely to use the secure messaging platform than Hispanic (69.4%) and Black (52.6%) individuals ( $P=0.005$ ), but there were no differences in use of secure messaging platform by age or gender. The median time from STI to outreach was 164 days (interquartile range, 98–222).

Of those sent a secure email, 78 (78.8%) read the message. There were no differences in the proportion who read the message by age, gender, or race/ethnicity, but there was a trend toward more rectal STI patients reading the message compared with those diagnosed with syphilis (85.0% vs. 69.2%,  $P=0.06$ ). In the group sent secure emails, 12 (12.4%) were linked to PrEP care, of whom 11 (91.7%) filled a PrEP prescription (Table 1). All patients who were linked to PrEP care were in the group that read the secure email; none were linked to PrEP care in the group that did not read the email (15.8% vs. 0.0%,  $P=0.06$ ). Among those

sent a secure email, Hispanic patients were more likely to be linked to PrEP care (32.0%) than White (4.8%) or Black (0.0%) patients ( $P=0.019$ ), while age, gender, and type of STI were not associated with linkage to PrEP care. Those who were sent the email within 90 days after their STI were more likely to be linked to PrEP care than those with a longer duration from STI to outreach (26.1% vs. 8.1%,  $P=0.033$ ). No individuals sent letters were linked to PrEP care.

## DISCUSSION

Among individuals with a recent diagnosis of a rectal STI or syphilis, low-intensity outreach via secure email message was a low-cost, feasible intervention to increase linkage to PrEP care in our healthcare system. Of those sent a secure email, one in eight were linked to PrEP care in the following three months, including nearly one in three Hispanic individuals. Patients were more likely to be linked to PrEP care if outreach occurred within 90 days of STI diagnosis or treatment. Among those who were linked to PrEP care, over 90% filled a PrEP prescription. There were no linkages to PrEP care among individuals who were mailed letters. These findings suggest that a one-time secure email message is feasible and may be sufficient to increase linkage to PrEP care for some individuals, while others may need more intensive interventions to overcome barriers to PrEP uptake.

Although we observed modest PrEP uptake after secure message outreach, our results are more robust than what has been previously demonstrated with linkage to PrEP care using more traditional community outreach methods. In two recent studies involving in-person recruitment to PrEP services at social venues frequented by men who have sex with men, only 1 (0.6% of total) and 2 (0.5% of total) participants from each respective study were linked to PrEP care and filled prescriptions for PrEP (2–3). These studies were limited by the inability to determine whether participants sought PrEP elsewhere. Given that KP is a closed healthcare system, we were able to determine whether patients sent a secure message or letter were linked to PrEP services.

We observed variation in linkage to PrEP care by race/ethnicity, ranging from 0% of Black individuals to 32% of Hispanic individuals sent the secure email message. The high uptake among Hispanic patients is encouraging, given that this group is disproportionately affected by HIV infection and has been underrepresented among PrEP users (8). It may be that the Hispanic patients in our setting were not aware of PrEP or its availability at KP until receiving our secure email message. This is supported by prior results in which Hispanics reported high willingness to take PrEP once aware of its benefits (9). In contrast, we observed no linkages to PrEP care among Black patients. Prior studies involving Black participants have demonstrated high knowledge of and willingness to use PrEP, but barriers to PrEP uptake included concerns about potential side effects and mistrust of medical providers and the pharmaceutical industry (10–11). These concerns were not addressed with this low-intensity outreach intervention. Given the high incidence of HIV infection among Black individuals in the United States (12), future outreach interventions will need to directly address the barriers to PrEP uptake among this population.

Our pilot project has several limitations. First, without a control group, we could not determine the effectiveness of the intervention. Second, we were unable to assess patient perspectives on our PrEP outreach intervention, which may elucidate why most patients who received the secure email message or letter were not linked to PrEP care. As a result, we were unable to identify the remaining barriers to PrEP uptake. Third, while we were able to assess feasibility of the secure message by documenting that it was opened, we were unable to confirm receipt of the letter. Fourth, individuals who were sent the letter may not have been as engaged with the healthcare system, given that they had not activated the KP secure messaging feature; this may partially explain why there were no linkages to PrEP care in this group. Finally, San Francisco and Oakland have high PrEP uptake relative to other areas, and barriers to PrEP linkage likely differ in locations where PrEP use is less common.

In this pilot project, we demonstrate the feasibility of a low-intensity, secure message outreach intervention to a population at very high risk for HIV infection. Further studies are urgently needed to evaluate the feasibility and effectiveness of scalable interventions to increase PrEP uptake in at-risk populations.

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**Table 1.**

Characteristics associated with linkage to PrEP care after outreach via email or letter, Kaiser Permanente San Francisco and Oakland Medical Centers, 2017 (N=126)

	Outreach by email or letter			Outreach by email		
	No linkage	Linkage	<i>P</i>	No linkage	Linkage	<i>P</i>
N (row %)	114 (90.5)	12 (9.5)		85 (87.6)	12 (12.4)	
Age, n (row %)			0.69			0.63
<30	32 (86.5)	5 (13.5)		23 (82.1)	5 (17.9)	
30–49	49 (92.5)	4 (7.6)		38 (90.5)	4 (9.5)	
50	33 (91.7)	3 (8.3)		24 (88.9)	3 (11.1)	
Gender, n (row %)			1			1
Cismen	107 (89.9)	12 (10.1)		80 (87.0)	12 (13.0)	
Ciswomen	4 (100.0)	0 (0.0)		3 (100.0)	0 (0.0)	
Transwomen	3 (100.0)	0 (0.0)		2 (100.0)	0 (0.0)	
Race/ethnicity, n (row %)			0.037			0.019
White	46 (95.8)	2 (4.2)		40 (95.2)	2 (4.8)	
Hispanic	28 (77.8)	8 (22.2)		17 (68.0)	8 (32.0)	
Asian	16 (88.9)	2 (11.1)		15 (88.2)	2 (11.8)	
Black	19 (100.0)	0 (0.0)		10 (100.0)	0 (0.0)	
Other/unknown	5 (100.0)	0 (0.0)		3 (100.0)	0 (0.0)	
Type of STI, n (row %)			1			1
Rectal	64 (90.1)	7 (9.9)		51 (87.9)	7 (12.1)	
Syphilis	50 (90.9)	5 (9.1)		34 (87.2)	5 (12.8)	
Type of outreach, n (row %)			0.07			—
Email	85 (87.6)	12 (12.4)		—	—	
Letter	29 (100.0)	0 (0.0)		—	—	
Days from STI to outreach, n (row %)			0.021			0.033
90	21 (77.8)	6 (22.2)		17 (73.9)	6 (26.1)	
>90	93 (93.9)	6 (6.1)		68 (91.9)	6 (8.1)	
Opened the email, n (row %)			—			0.06
No	—	—		21 (100.0)	0 (0.0)	
Yes	—	—		64 (84.2)	12 (15.8)	

PrEP, preexposure prophylaxis; STI, sexually transmitted infection.