Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

HHS Public Access

Author manuscript

*Sex Transm Dis*. Author manuscript; available in PMC 2016 August 01.

Published in final edited form as:

*Sex Transm Dis*. 2016 February ; 43(0 0 1): S102–S112. doi:10.1097/OLQ.0000000000000327.

# The Role of Behavioral Counseling in STD Prevention Program Settings

**Kathryn A. Brookmeyer**, **Matthew Hogben**, and **Jennine Kinsey**

DSTDP, Centers for Disease Control and Prevention

## Abstract

**Background—**Behavioral counseling for STD prevention is recommended for persons at risk, and the body of evidence yields numerous interventions that have STD preventive efficacy. What is needed is a review of the subset of these interventions that could be feasible in clinical settings, especially settings in STD prevention programs.

**Methods—**We reviewed existing systematic reviews of the literature and abstracted from them studies that fit the following criteria in that the interventions: (1) used no more than 60 minutes contact time in 1 to 2 sessions, (2) were individual-level and face to face, (3) took place in a clinical setting, (4) had STD outcomes available, (5) were based in the United States, (6) were peer-reviewed, and (7) had a control group.

**Results—**From 6 reviews (published 2006 – 2014) covering 91 studies, we found 13 analyses representing 11 intervention studies that fit the selection criteria. Of these 13, 5 returned lower STD rates in the intervention group at follow-up; one study reported a higher rate of STD in one subset of the intervention group (men who have sex with men: MSM). Studies with effects on STD at follow-up were quite similar to studies across populations, settings and follow-up periods, although successful interventions were more likely to demonstrate behavioral effects as well (5 of 5 versus 2 of 5 among 10 interventions measuring behavior change).

**Conclusions—**Counseling is likely to benefit some STD clinic attendees, although unlikely to benefit MSM. The balance of costs and benefits of implementing behavioral counseling in STD programs is unclear, but feasibility would be improved if behavioral counseling were implemented in the context of other prevention efforts. Because populations outside typical STD clinic settings could also benefit, programs may exercise a valuable role through partnerships.

The Centers for Disease Control and Prevention (CDC) estimates that approximately 20 million new cases of STDs occur every year in the United States, and nearly 50% of those cases occur amongst those aged 15 to 24.[1] In addition to increasing a person's risk for HIV infection, STDs can lead to severe reproductive health complications, such as infertility. In 2010, the inflation-adjusted direct medical costs of STDs (including HIV) were $16.9 billion in the United States.[2]

Correspondence to: Kathryn A Brookmeyer, PhD, Centers for Disease Control and Prevention, Mail Stop E-44, Atlanta, GA 30333, kbrookmeyer@cdc.gov.

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the U.S. Centers for Disease Control and Prevention.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

As the scope of review papers in this issue demonstrate, STD prevention programs can consider options from an extensive array of linked interventions for STD prevention. Behavioral counseling in STD prevention programs usually follows some other intervention that uncovered an infection or exposure risk (e.g., screening, partner notification). This context differs from behavioral counseling in many primary care settings in that virtually all persons seen by an STD program have high individual-level risk. In this paper, we review behavioral counseling interventions in that context: a clinic-based one-on-one intervention with an individual who has been diagnosed with an STD or who is at least at high risk of infection. Although we will concentrate on behavioral counseling delivered by STD program staff, we will also discuss using partnerships and technical assistance to improve counseling done elsewhere.

In 2001, the Surgeon General issued a call to action to promote sexual health and healthy sexual behavior.[3] Strategies mentioned in the report include increasing awareness, implementing and strengthening interventions and expanding the research base regarding effective sexual health activities. At present, CDC recommends that health care providers promote prevention of STDs for their patients through awareness of risk, protection, and treatment. Specifically, CDC and other national organizations promote an interactive, empathic, and nonjudgmental approach, tailored to the patient's personal risk.[4–6] The American Academy of Pediatrics recommends a similar approach to counseling for healthy development of sexuality among adolescents, albeit with more focus on delaying or reducing sexual activity.[7] Finally, the U.S. Preventive Services Task Force (USPSTF) recommends high-intensity behavioral counseling for adolescents and adults at risk for STDs.[8]

## Constraints on Behavioral Counseling in Clinical Settings

Rates of repeat infections in STD clinics and of incident STD infections in HIV care settings illustrate that there is a potential benefit for behavioral counseling in these and similar settings serving high-risk populations.[9,10] There are, however, three substantial constraints to consider with respect to behavioral counseling clinical settings, especially busy STD clinic settings. First are the closely related issues of time and cost. Clinicians consistently report that time constraints are the central barrier to taking sexual histories and providing STD/HIV education or counseling during a patient visit. High-intensity behavioral counseling, the most consistently supported version of this intervention, is defined as greater than two hours of contact time with recipients.[8] This is a commitment that would appear to be largely untenable in the majority of STD clinics.

Second, little is known about the balance of adaptation and fidelity. That is, behavioral interventions may need to be altered based on specific populations and settings seen in STD clinics and related settings, but some core elements in almost any intervention need to be retained. Programs may be able to be retained in full for specific populations within certain settings, but it is plausible that the adaptation most effective for a given program will depend on key characteristics of both the (1) intervention itself and the (2) specific needs of the setting and/or population of interest.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Given the challenges of time, cost and adaptation, the goal of this review is to provide an overview of brief behavioral interventions that could be conducted in one or two short sessions (30 minutes or less per session, or about 60 minutes total contact time). A review of effective and brief one to two session behavioral counseling interventions will allow for the identification of core components within the interventions, while detailing setting and population specifics. By understanding common core elements, the aim of the review is to shed light on both how and why specific behavioral counseling interventions are effective, and under which conditions such studies may be replicated. We aim to make this review relevant for the field and specifically for practices and programs which may want to integrate a behavioral counseling into their services, in order to prevent STD.

## Methods

We reviewed existing review articles published since 2000 that focused upon behavioral counseling interventions. We reviewed each review article's citations and included them in the present review if all of the following criteria were met: (1) the interventions comprised one to two sessions at 20–30 minutes each or 60 minutes total contact time, (2) they were one-on-one face-to-face sessions (no groups, no videos), (3) settings must be within health centers or other clinics, (4) STD outcomes available, even if not necessarily bio-markers, (5) intervention based in the United States, (6) peer-reviewed published work, and (7) must have a control or treatment as usual group. We did not constrain eligibility to counseling conducted in STD clinics because some primary care settings serve similar populations for similar purposes (sexual health care) under similar conditions.

We examined 91 papers from 6 reviews[8,11–15] published between 2006 and 2014: 21 (23.1%) appeared in more than one review. One review was the basis for Community Guide to Preventive Services recommendations for MSM[13] and two were bases for USPSTF behavioral counseling recommendations.[8,14] Thirteen of the 91 peer-reviewed articles (representing 11 studies) met all seven of the above listed criteria and were included in the review.[16–28] These articles are abstracted in Table 1. They covered 22,947 participants from ages 14 to 45 years, in a variety of clinical settings (7 of 11 studies included STD clinics). Where race, sexual orientation and gender were reported, African Americans and heterosexual persons were most likely to be a majority or plurality, but participants were drawn from across the spectrum of these constructs. More studies enrolled only women than only men, but overall proportions by gender were close to even. Follow-up rates, where given, were typically >70%.

## Results

Of the 13 papers included in Table 1, 4 found statistically significant reductions in STD at follow-up in the behavioral counseling group compared to the control group.[18,21,24,26] A fifth study[19] reported reduced signs of STD infection (6.8% vs. 0, $p < .05$) in the intervention group at 9 months post-intervention. The remaining 8 studies measured and found no differences between intervention and control groups in STD infection (gonorrhea, chlamydial infection, HIV, except for bacterial vaginosis in one study[27]). In some

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

circumstances, infections in the intervention and control groups both declined over the course of the studies.[25]

The 5 studies with significant intervention effects on STD rates had similar characteristics to the other 8 studies in most respects. Studies in both categories took place in STD and other clinic settings, used mostly 6-month or greater follow-up periods (9 of 13 studies), and addressed variation in age, gender and sexual orientation. Seven of 10 studies measuring behavior changes found at least one significant behavior change by condition, although this includes two studies that had inconsistent findings by either the behavior measured or the follow-up period. Moreover, there was greater consistency for behavior change effects among the studies with significant STD effects (5 of 5 versus 2 of 5). Five studies (6 articles) had active control groups: none of these studies was efficacious, compared to 5 of 6 studies (7 papers) with passive controls.

## Outcomes

Crosby et al. used a medical-records chart review to assess the study's primary outcome of STD acquisition.[26] Jemmott examined STD rates via specimens collected and analyzed in the hospital-based laboratory.[24] Kamb et al. examined incident STDs via laboratory tests, including HIV.[18] Bolu et al. conducted a secondary analysis of Kamb et al.'s RESPECT data; thus, the same outcome measures were assessed.[21] Effect sizes were small to moderate in magnitude, and certainly meaningful in practical terms (i.e., Cohen's $d = 0.20$ in one study; odds ratios of approximately 0.50 in two others).

For studies with positive findings on STD at follow-up, outcomes such as proportion of sex acts with a condom or amount of sex without condoms favored the intervention groups. Boekeloo[19] found protective intervention effects on condom use at 3 months, but not at 9 months. In terms of behavioral self-reported outcomes, Crosby[26] measured condom use during the last act of penetrative sex, number of sexual partners in the past 3 months, and proficiency of using condoms as measured via direct observation on a life-sized rubber penile model. Jemmott[24] investigated the self-reported proportion of protected sexual intercourse, frequency of unprotected sexual intercourse, and condom use during most recent intercourse. Kamb and Bolu[18,21] examined the behavioral outcomes of condom use with vaginal sex, number of sex partners, risks of their sex partners, participants' and partners' condom use beliefs, intentions, attitudes and perceived norms regarding the consistent use of condoms.

Two studies produced antagonistic effects for male subsets of participants. One follow-up to Project RESPECT that tested a booster session and rapid test found no overall increase in STD rates at follow-up, but did find higher rates at 12 months among men receiving rapid testing, RR = 1.34 (95%CI = 1.06 – 1.70).[22] In 2013, another RCT randomized participants to receive either (1) rapid HIV testing with brief patient centered risk-reduction counseling (Rapid RESPECT) or (2) rapid HIV testing with information only.[28] This study found no differences on STD at follow-up overall, or among heterosexual men or women. However, the study found an increased risk of STDs at 6 months among MSM receiving counseling, RR = 1.41, 98.3%CI = 1.05 – 1.90 (the unusual confidence interval corrects for multiple comparisons).

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

## Target Populations and Follow-up

The participants in efficacious short behavioral counseling interventions were at high-risk for acquiring new STD, either through design or empirically. Jemmott[24] sampled African-American women aged 18 to 45 seeking care at an outpatient women's clinic; 20% tested positive for at least one STD (empirically a high risk population). Crosby's[26] participants were African-American heterosexual men aged 18 to 29 years who were newly diagnosed with an STD at a publicly-funded STD clinic (high risk through design). Kamb[18] sampled HIV negative heterosexual men and women aged 14 and older; about one-third reported a previous STD at enrollment. Bolu[21] used the same sample of participants as Kamb, but looked specifically at the sub-population which reported a history of intravenous drug use, history of exchanging sex for money or drugs, reported a STD diagnosis at enrollment, or a previous HIV test at enrollment. Boekeloo[19] sampled young adolescents (12 – 15 years); these were sexually active and thus high-risk by definition at those ages.

Three of the 5 studies[18,21,24] examined outcomes after a 12-month follow-up period, the longest time frame examined in any of the investigations. Boekeloo[19] went to 9 months; Crosby[26] reviewed STD outcomes at 6 months and behaviors at 3 months post-intervention. The remaining 8 studies, however, also used follow-up times >6 months. The shortest follow-up was 2 months in a brief counseling study in an adolescent health clinic.[16]

## Facilitator Characteristics and Costs

Crosby[26] used lay health advisors to administer the intervention, with the over-arching conceptualization that the most effective facilitators are those from the community, most like those for whom the intervention is intended. Specifically, Crosby and colleagues recruited a young African-American male who grew up and resided in the targeted community. Jemmott[24] prioritized similar factors and selected African-American women from the study catchment area. However, the facilitators hired were nurses with a median of 14 years nursing experience and a 10 years' experience working with African-American women. Kamb and Bolu[18,21] do not discuss their facilitator characteristics within their studies, but do note that behavioral counseling was conducted with a trained HIV counselor or clinician.

Cost data were not identified explicitly in most studies. One study estimated intervention counseling costs at $8 ($12 in 2015 dollars) over control conditions, which they noted would be cost-saving at preventing 145 HIV infections per 241,000 people counseled (< 0.1% prevalence). Another study provided the average costs (2010 dollars) per patient counseled in intervention and control arms: $56 and $23, respectively ($60 and $25 in 2015 dollars).[28] We also estimated the resources required to operate the intervention in terms of staffing and visit context. All studies except one[27] recruited participants in the context of an existing clinic visit for care. Nine studies delivered the intervention through existing staff (2 physicians, 2 nurses, 5 counselors), two used research staff, and one other used a lay health advisor model.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

### Intervention Theory and other Key Elements

In a 20-minute one-time intervention, Jemmott[24] used social cognitive theory as the underpinnings for Sister-to-Sister and strove to present behavioral counseling in a culturally-sensitive and gender appropriate frame, delivered over the course of a routine medical visit. Prioritizing empowering and educating woman through the teaching of behavioral skills, this intervention was designed to increase condom use skills, including practice with an anatomical model. The intervention also utilized role playing as a tactic to increase self-efficacy and negotiation of condom use with partner. Crosby[26] prioritized condom education through the Information, Motivation, and Behavioral Skills (IMB) model.[29] The intervention was designed to promote quality, correctness and consistency of condom use. The facilitators emphasized condom skill acquisition and initiating condom use in a one-time, 45 to 50 minute session. RESPECT[18,21] was an individual-level, client-focused intervention, consisting of two brief, 20-minute interactive counseling sessions – the 2-session version was as efficacious as the 4-session version. Based on the Theory of Reasoned Action and Social Cognitive Theory,[30,31] the provider determined what behaviors place the client at increased risk and used a “teachable moment” to increase the client’s concern about his/her personal risk and develop a risk reduction strategy. This early version of RESPECT used a standard HIV test, necessitating days between the initial discussion and follow-up. Most studies, whether efficacious or not, were based on principles of social cognitive theory.

## Discussion

We reviewed studies to find interventions that were both efficacious and feasible in time-constrained clinical settings, delivered principally by existing staff under existing patient care conditions. Thus, we reviewed interventions that could be implemented within 60 minutes total contact time in a one-on-one interaction within a clinic setting. We found 13 analyses that fit our criteria, with 5 showing evidence of efficacy with respect to STD infection rates at follow-up. There was more consistency with respect to behavior change, and behavior changes were associated with lower STD incidence in all 5 studies showing an effect on STD at follow-up. This low proportion of efficacious studies, however, is somewhat at odds with other reviews, and we emphasize that the discussion pertains to a select group of interventions, not to all behavioral counseling. In the remainder of this discussion, we focus upon key factors of behavioral counseling interventions, consider approaches that may improve feasibility, and comment on potential future action.

### Key Factors in Short Behavioral Individualized Counseling

In some respects, the sample characteristics of interventions varied little according to the success of the intervention. The populations were typically high-risk in comparison to the general population in that most were either STD-infected or had been previously diagnosed with STD (but not HIV). They were *not* especially high-risk compared to STD clinic attendees in general. More salient is that nearly all participants were heterosexual males and females (including adolescents), and that effects were generally strongest for these populations. Gay, bisexual and other MSM and WSW were largely absent from the studies, appearing in 4 of 13.[22–24,27] Moreover, intervention STD effects were typically weaker for MSM, with one study even producing an antagonistic effect on incidence.[28] Tailoring and

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

personalized counseling approaches appeared to be a necessary condition, but most effective if matched with practical skills around condom use (Carey[25] was the principal exception to this rule). Matching the facilitator at least by race and gender appeared consistently helpful, although the effect of this moderator was not empirically measured. Finally, the composition of control groups should not be overlooked: RCTs with active controls were far less likely to be efficacious (sometimes active controls were chosen for good reason, because that condition represented the standard of care). If we restrict conclusions to studies with minimal interventions in control groups, conclusions are far more favorable to behavioral counseling.

In sum, a short behavioral counseling intervention for heterosexual clinic patients with known risk behaviors, perhaps facilitated by those who can establish ready rapport with clients through similarity[24,26] or training (RESPECT studies),[18,21] and using a behavioral skills approach and interactive and personalized discussions on how to decrease risk, has the best potential to result in sexual risk reduction and decreased rates of reinfection. Some of these points are reflected in other areas of STD prevention in program settings. For example, a 2012 review of interventions with African American men named male facilitators as reinforcers of effectiveness,[32] and the value of interactive counseling has been established with partner notification across several studies.[33]

## Moving Forward with Behavioral Counseling

The first consideration is cost, whether measured directly or in terms of resource allocation. Most efficacious studies used existing staff and visits, although one required hiring a lay health advisor. Although these conditions minimize hiring and outreach costs, the interventions still require training and take time. If we take the $60 per session estimated from Project AWARE as a reasonable metric for a 2015 counseling session, a program has to decide whether this money is best spent averting infections through counseling, or seeking infections through, say, expanded screening. This in turn is partly dependent on STD/HIV prevalence in the targeted population. Efficacious interventions were spread across clinical settings, so community prevalence around intervention venues could vary.

Three related logistic considerations relevant to STD programs appear to play a significant role in counseling effectiveness: contact time, repeat contact and testing circumstances. Contact time, which is the indicator the USPSTF uses for “intensity,” allows for more skills practice and interaction. These are theoretically-based and empirically confirmed features of successful counseling across numerous topic areas.[34] The successful interventions reviewed here show that these components can be delivered in 60 minutes or fewer, and that to do so requires no particular disciplinary specialty. Delivery, however, does require specialized training and the ability to move beyond didactic instruction.

The second issue is repeat contact (e.g., multiple sessions). Repeat contact provides an opportunity to reinforce content and commitment, maintain interaction and rapport, and adjust behavior change plans – in the short term. Project RESPECT’s two sessions were delivered over a 7 – 10 day period; adding a booster session 6 months later had no effect in a later RCT.[22] An STD program that has the capacity to follow-up with patients or that does so for purposes like re-interviews (i.e., if partner notification is involved) may use such

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

opportunities to implement counseling. Retesting is another opportunity, but this typically occurs more than 10 days after initial treatment.

Third, there is the issue of HIV testing, which has changed over the time period of this review. Project RESPECT was conducted before the advent of rapid HIV testing and did not include men who have sex with men (MSM) in its initial RCT;[18] MSM account for nearly two-thirds of new HIV infections in the United States. Later studies based on RESPECT have shown either no differences for MSM[22,23] or antagonistic effects on STD incidence.[28]

A case for targeting behavioral interventions is thus made more complex as one of the most vulnerable populations, MSM, appear to receive the least benefit in terms of STD incidence. We hypothesize that many MSM in STD clinics know they are at high risk, know generally why this is so (a combination of behaviors, community prevalence and effects of stigma), and have been at risk for some time. Clinically-based behavioral counseling is a difficult avenue for successful intervention under these circumstances, especially as the magnitude of change required to affect incidence increases with high community prevalence. The evidence suggests many of these factors also apply to heterosexual men in STD clinics, although we found evidence that social cognitive interventions that used lay counselors who are representative of the affected communities remain effective for heterosexual men.[26]

Moreover, the bulk of counseling interventions and the recommendations on which they are based, are specific to a subset of prevention behaviors – condom use, reductions in numbers of partners, and, less often, partner selection criteria (e.g., sero-adaptative choices). These are not necessarily attractive options as intervention targets. More promising, however, is the advent of PrEP;[35] a different behavioral outcome from those in this review, but certainly emerging as a component of prevention program action with substantial behavioral counseling ramifications. Interestingly, a recent pilot of doxycycline prophylaxis for HIV-infected MSM engaging in risky sexual behavior showed promise for reducing STD among this select population,[36] although there remain significant practical and ethical considerations.[37]

To augment the efficacy of behavioral counseling interventions, health departments may consider integrating behavioral counseling with other prevention efforts. Integration serves multiple purposes and thereby increases cost efficiency as well as overall prevention effectiveness. For example, a second behavioral counseling session combined with a re-test reminder and check on partner treatment, is testable in many program settings in an experimental or a quality improvement framework. There is more reason for research and development: the reasons why a select number of such interventions were shown to be effective bears further investigation. Finally, there are behavioral counseling examples that diverge from sexual behavior as a topic, but that still affect STD at follow-up. For one example, an evaluation of counseling to prevent alcohol-exposed pregnancies in two clinics had effects on sexual behavior, although it did not measure STD.[38]

Finally, there is a potential role for STD programs in indirect action on behavioral counseling. Programs may take a role in providing guidance or technical assistance for STD prevention counseling in settings outside STD clinics. Many of the people for whom

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

interventions appeared most efficacious are seen outside STD clinic settings. CDC's Division of STD Prevention (DSTDP) is in the process of trying to fill this gap by developing feasible and sustainable behavioral counseling interventions that can fit within health care settings such as community health centers with minimal adjustments to current practice. DSTDP is also attempting to develop a successful mechanism by which behavioral counseling meets reimbursement requirements, thus furthering the opportunity for sustainable behavioral counseling.

### Conclusion

Short behavioral counseling interventions are appropriate for many STD clinic populations and for primary care settings serving vulnerable populations (e.g., CHCs in high prevalence areas). They require, however, attention and resources to sustain and may be most efficiently managed if they are combined with other prevention activities. Such activities require research or evaluation, as those combinations have not been clearly analyzed to date – some combinations are visible in studies, but not formally evaluated. High-risk MSM do not appear to benefit from behavioral counseling as currently construed. That noted, behavioral counseling topics extend beyond condom use and numbers of partners, so there is clearly scope for continued efforts to find the best interventions to use for reducing STD incidence.

## References

1. Satterwhite CL, Torrone E, Meites E, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. Sex Transm Dis. 2013; 40:187–193. [PubMed: 23403598]
2. Chesson HW, Gift TL, Owusu-Edusei K Jr, Tao G, Johnson AP, Kent CK. A brief review of the estimated economic burden of sexually transmitted infections in the United States: inflation-adjusted updates of previously published cost studies. Sex Transm Dis. 2011; 38:889–891. [PubMed: 21934557]
3. US Public Health Service. The Surgeon General's call to action to promote sexual health and responsible sexual behavior. Washington, DC: US Department of Health and Human Services; 2001.
4. Centers for Disease Control and Prevention. A guide to taking a sexual history. Atlanta: Department of Health and Human Services; 2008.
5. Brook G, Bacon L, Evans C, et al. 2013 UK national guideline for consultations requiring sexual history taking. Int J STD AIDS. 2014; 25:391–404. [PubMed: 24285601]
6. Rogstad KE, Ahmed-Jushuf IH, Robinson AJ. Standards for comprehensive sexual health services for young people under 25 years. Int J STD AIDS. 2002; 13:420–424. [PubMed: 12015018]
7. http://brightfutures.aap.org/pdfs/Guidelines_PDF/11_8_Sexuality.pdf (Bright Futures, intro comment)
8. O'Connor EA, Lin JS, Burda BU, Henderson JT, Walsh ES, Whitlock EP. Behavioral counseling to prevent sexually transmitted infections: A systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2014; 161:874–883. [PubMed: 25243895]
9. Mayer KH, Bush T, Keith H, et al. Ongoing sexually transmitted disease acquisition and risk-taking behavior among US HIV-infected patients in primary care: Implications for prevention interventions. Sex Transm Dis. 2012; 39:1–7. [PubMed: 22183836]
10. Evans C, Das C, Kinghorn G. A retrospective study of recurrent chlamydia infection in men and women: is there a role for targeted screening for those at risk? Int J STD AIDS. 2009; 20:188–192. [PubMed: 19255268]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript


11. Lyles CM, Kay LS, Crepaz N, et al. Best-evidence interventions: Findings from a systematic review of HIV behavioral interventions for US populations at high risk, 2000 – 2004. Am J Public Health. 2007; 97:133–143. [PubMed: 17138920]
12. Herbst JH, Kay LS, Passin WF, et al. A systematic review and meta-analysis of behavioral interventions to reduce HIV risk behaviors of Hispanics in the United States and Puerto Rico. AIDS Behav. 2007; 11:25–47. [PubMed: 16917668]
13. Herbst JH, Beeker C, Mathew A, et al. The effectiveness of individual-, group-, and community-level HIV behavioral risk-reduction interventions for adult men who have sex with men: a systematic review. Am J Prev Med. 2007; 32(suppl 4):S38–S67. [PubMed: 17386336]
14. Lin JS, Whitlock E, O'Connor E, Bauer V. Behavioral counseling to prevent sexually transmitted infections: A systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2008; 149:497–508. [PubMed: 18838730]
15. Eaton LA, Huedo-Medina TB, Kalichman SC, et al. Meta-analysis of single-session behavioral interventions to prevent sexually transmitted infections: Implications for bundling prevention packages. Am J Public Health. 2012; 102:e34–e44. [PubMed: 22994247]
16. Mansfield CJ, Conroy ME, Emans SJ, Woods ER. A pilot study of AIDS education and counseling of high-risk adolescents in an office setting. J Adolesc Health. 1993; 14:115–119. [PubMed: 8476874]
17. Orr DP, Langefeld CD, Katz BP, Caine VA. Behavioral intervention to increase condom use among high-risk female adolescents. J Pediatr. 1996; 128:288–295. [PubMed: 8636834]
18. Kamb ML, Fishbein M, Douglas JM Jr, et al. Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases: a randomized controlled trial. JAMA. 1998; 280:1161–1167. [PubMed: 9777816]
19. Boekeloo BO, Schamus LA, Simmens SJ, Cheng TL, O'Connor K, D'Angelo LJ. A STD/HIV prevention trial among adolescents in managed care. Pediatrics. 1999; 103:107–115. [PubMed: 9917447]
20. Gollub EL, French P, Loundou A, Latka M, Rogers C, Stein Z. A randomized trial of hierarchical counseling in a short clinic-based intervention to reduce the risk of sexually transmitted diseases in women. AIDS. 2000; 14:1249–1255. [PubMed: 10894290]
21. Bolu OO, Lindsey C, Kamb ML, et al. Is HIV/sexually transmitted disease prevention counseling effective among vulnerable populations?: A subset analysis of data collected for a randomized, controlled trial evaluating counseling efficacy (Project RESPECT). Sex Transm Dis. 2005; 31:469–474. [PubMed: 15273579]
22. Metcalf CA, Malotte CK, Douglas JM Jr, et al. Efficacy of a booster counseling session 6 months after HIV testing and counseling: A randomized, controlled trial (RESPECT-2). Sex Transm Dis. 2005; 32:123–129. [PubMed: 15668620]
23. Metcalf CA, Douglas JM, Malotte CK, et al. Relative efficacy of prevention counseling with rapid and standard HIV testing: A randomized, controlled trial (RESPECT-2). Sex Transm Dis. 2005; 32:130–138. [PubMed: 15668621]
24. Jemmott LS, Jemmott JB, O'Leary A. Effects on sexual risk behavior and STD rate of brief HIV/STD prevention interventions for Africa American women in primary care settings. Am J Public Health. 2007; 97:1034–1040. [PubMed: 17463391]
25. Carey MP, Senn TE, Vanable PA, Coury-Doniger P, Urban MA. Brief and intensive behavioral interventions to promote sexual risk reduction among STD clinic patients: results from a randomized controlled trial. AIDS Behav. 2010; 14:504–517. [PubMed: 19590947]
26. Crosby R, DiClemente RJ, Charnigo R, Snow G, Troutman A. A brief, clinic-based, safer sex intervention for heterosexual African American men newly diagnosed with an STD: a randomized controlled trial. Am J Public Health. 2009; 99(suppl 1):S96–S103. [PubMed: 19218185]
27. Marrazzo JM, Thomas KK, Ringwood K. A behavioural intervention to reduce persistence of bacterial vaginosis among women who report sex with women: results of a randomized trial. Sex Transm Infect. 2011; 87:399–405. [PubMed: 21653935]
28. Metsch LR, Feaster DJ, Gooden L, et al. Effect of risk-reduction counseling with rapid HIV testing on risk of acquiring sexually transmitted infections: the AWARE randomized clinical trial. JAMA. 2013; 310:1701–1710. [PubMed: 24150466]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

29. Fisher JD, Fisher WA. Changing AIDS risk behavior. Psychol Bull. 1992; 111:455–474. [PubMed: 1594721]
30. Albarracin D, Johnson BT, Fishbein M, Muellerleile P. Reasoned action and planned behavior as models of condom use: A meta-analysis. Psychol Bull. 2001; 127:142–161. [PubMed: 11271752]
31. Bandura, A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall; 1986.
32. Henny KD, Crepaz N, Lyles CM, et al. Efficacy of HIV/STI behavioral interventions for heterosexual African American men in the United States: A meta-analysis. AIDS Behav. 2012; 16:1092–1114. [PubMed: 22234436]
33. Trelle S, Shang A, Nartey L, Cassell JA, Low N. Improved effectiveness of partner notification for patients with sexually transmitted infections: Systematic review. BMJ. 2007; 334:354. [PubMed: 17237298]
34. Albarracin D, Moon-Ho H, Earl AN, Glasman LR, Durantini MR. A test of major assumptions about behavior change: A comprehensive look at the effects of passive and active HIV prevention interventions since the beginning of the epidemic. Psychol Bull. 2005; 131:856–897. [PubMed: 16351327]
35. Krakower DS, Jain S, Mayer KH. Antiretrovirals for Primary HIV Prevention: the Current Status of Pre- and Post-exposure Prophylaxis. Curr HIV/AIDS Rep. 2015; 12:127–138. [PubMed: 25600106]
36. Bolan RK, Beymer MR, Weiss RE, Flynn RP, Leibowitz AA, Klausner JD. Doxycycline prophylaxis to reduce incident syphilis among HIV-infected men who have sex with men who continue to engage in high-risk sex: A randomized, controlled pilot study. Sex Transm Dis. 2015; 42:98–103. [PubMed: 25585069]
37. Golden MR, Handsfield HH. Pre-exposure prophylaxis to prevent bacterial sexually transmitted infections in men who have sex with men. Sex Transm Dis. 2015; 42:104–106. [PubMed: 25585070]
38. Hutton HE, Chander G, Green PP, Hutsell CA, Weingarten K, Peterson KL. A novel integration effort to reduce the risk for alcohol-exposed pregnancy among women attending urban STD clinics. Pub Health Rep. 2014; 129(Suppl 1):56–62. [PubMed: 24385650]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

## Table 1

Elements of behavioral counseling interventions included in review

| Citation | Setting, Time, Geographic location, Resources | Population and Infection | Intervention and central results | Study conclusions |
|---|---|---|---|---|
| Mansfield et al. 1993[16] | Adolescent health clinic at children's hospital. January – April, 1990. Northeastern U.S. Physician-delivered Visit context: STD management. | Adolescents with at least one STD (unspecified). N = 90 Gender = 93% female Age = 17.6 years (SD = 2.0). FU = 92.2% at 2 months | • **Intervention:** Counseling session to discuss perceived susceptibility to HIV as well as standard counseling (20 minutes)<br>• **Control (Active):** individualized HIV risk assessment plus condom use counseling and offer of condoms (10 minutes)<br>• No significant differences between intervention and control group in terms of condom frequency of use, number of newly diagnosed STDs, number of partners per month.<br>• Both groups saw overall increase in condom use over time. | Individualized counseling did not appear more effective over and above education. |
| Orr et al. 1996[17] | Two family planning clinics and one STD clinic. Unspecified time period. Unspecified location. Researcher-delivered Context: visit for "reproductive health concerns" | Sexually active adolescents treated for chlamydia. N = 209 Gender = female Age = 15–19 years. FU = 53.6% at 5–7 months | • **Intervention:** Control activities plus condom use skills practice, intervention designed to increase perceived susceptibility to STD and decrease perceived barriers to condom use, and role play (10 – 20 minutes)<br>• **Control (Active)** Individual discussion with nurse about STD (partner notification and condom use) plus information (10 – 20 minutes)<br>• At follow-up, increased use of condoms (OR=2.4, p=.02, but use remained inconsistent and rates of reinfection with CT was not significant (p=.3). | Difficult to influence high-risk adolescents to perfect users of condoms; condom use embedded in larger social context and health behaviors. |
| Kamb et al. 1998[18] | Five STD clinics. July 1993 – September 1996. Baltimore, MD; Denver, CO; Lon Beach, CA; Newark, NJ; San Francisco, CA. Physician-delivered (control sessions) or HIV counselor-delivered (intervention) Context: STD clinic patients seeking care. | Heterosexual persons (14+ years, 59% African American) in STD clinics, HIV-negative. N = 5758 Gender = 43% female Age = 25 years (median). FU = 66% at 6 months (analyses on ITT basis) | • **Intervention (2 or 4 sessions)** Interactive counseling to change perceived efficacy, norms and attitudes about condom use. Risk reduction planning at final session (20 minutes per session in 2-session arm; 20 minutes first session 60 minutes for others in 4-session arm)<br>• **Control (2 sessions):** Information and brief | Counseling sessions decrease new STDs and increase condom use. 2 sessions at 20 minutes per session were equivalent to 4 sessions. Counseling costs estimated at $8 greater than control condition (~1997). This is $12 in 2015 dollars. |

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

| Citation | Setting, Time, Geographic location, Resources | Population and Infection | Intervention and central results | Study conclusions |
|---|---|---|---|---|
| | | | encouragement to use condoms (5 minutes per session)<br>• At 6 months, compared to control, fewer new STDs in the 4-session (RR = 0.69, 95%CI = 0.54–0.88) and 2-session (RR = 0.71, 95%CI = 0.58–0.89) counseling arms<br>• Self-reported condom use higher in counseling arms (p <.05) | |
| Boekeloo et al. 1999[19] | Five managed care sites. August 1995 – June 1997. Washington, DC. Physician-delivered, Context: general health assessment. | Adolescents (80% African American) receiving a general health examination. N = 215 Gender = 51% female Age = 12–15 years. FU = 92% at 9 months | • **Intervention:** STD risk assessment and theoretically tailored education about safe sexual behavior (abstinence and condom use).<br>• **Control:** No education provided<br>• At 3-mo follow-up, more condom use in the intervention group (OR= 18.05, CI= 1.27–256.03); at 9 month follow-up, no group differences in sexual behavior, but greater signs of possible STD infection in control group. | Effect on condom use was short-lived; possible effects on STD over longer term |
| Gollub et al. 2000[20] | STD clinic. May 1995 – October 1996. Philadelphia, PA. Counselor-delivered Visit context: STD clinic patients seeking care | Women of reproductive age in waiting room of clinic, diagnosed with one or more of chlamydia, gonorrhea, syphilis or trichomoniasis. N = 1591 Gender = female Age = 27.7 years. FU = n/a at 6 months (analyses on ITT basis) | • **Intervention:** Skills training with multiple methods of contraception/STD prevention, presented in hierarchical order (15 – 30 minutes)<br>• **Control (Active):** counselor-based education on condom use, plus negotiation skills (15 – 30 minutes)<br>• Note – sessions were sometimes delivered in small groups<br>• No significant differences between hierarchical messaging and single messaging groups in terms of reinfection rates. | Single session designed to increase reproductive choices was not any more effective than education about single choice (male or female condom). |
| Bolu et al. 2005[21] | Five STD clinics.[1] July 1993 – September 1996. Baltimore, MD; Denver, CO; Lon Beach, CA; Newark, NJ; San Francisco, | Heterosexual males and females in STD clinics (14+ years, 27% with STD at baseline), HIV negative. | • **Intervention (2 or 4 sessions)** Interactive counseling to change perceived efficacy, norms and attitudes about condom use. Risk | Short counseling sessions decrease new STDs, most notably groups vulnerable to |

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

| Citation | Setting, Time, Geographic location, Resources | Population and Infection | Intervention and central results | Study conclusions |
|---|---|---|---|---|
| | CA.<br>Physician-delivered (control sessions) or HIV counselor-delivered (intervention)<br>Context: STD clinic patients seeking care. | N = 4328<br>Gender = 43% female<br>Age = 25 (median)<br>FU = n/a at 12 months (analyses on ITT basis) | reduction planning at final session (20 minutes per session in 2-session arm; 20 minutes first session 60 minutes for others in 4-session arm)<br>• **Control (2 sessions):** Information and brief encouragement to use condoms (5 minutes per session)<br>• Note – study data drawn from Kamb[18] | acquisition through high community prevalence or<br>risk behaviors. |
| | | | • In 12 months, fewer STDs observed between the brief counseling group and the info-only arm for adolescents (OR= .53; .32–.86), African Americans (OR= .72; .55–.96), and persons who exchange sex for money or drugs (OR= .50; .29–.85). | |
| Metcalf et al. 2005[22, 23] | Three STD clinics.<br>February 1999 – September 2001.<br>Denver, CO; Long Beach, CA; Newark, NJ.<br>Counselor-delivered<br>Visit context: STD clinic patients seeking care | Heterosexual males and females and men who have sex with men (MSM:<br>9.7% of all males) in STD<br>clinics, HIV negative.<br>N = 3342<br>Gender = 45.7% female<br>Age = 15–39 years.<br>FU = 72.9% at 12 months<br>(analyses on ITT basis) | • **Interventions:** 2-session interactive counseling per control plus rapid HIV testing or counseling booster at 6 months.<br>• **Control (Active):** 2-session interactive counseling with risk reduction planning based on motivational interviewing (20 minutes per session)<br>• Note – intervention design is a 2 (HIV test type: rapid vs. “standard”)×2 (6-month booster vs. no booster) factorial design reported in two manuscripts. | Counseling with either test<br>(standard or rapid) had similar effects on STD incidence. The booster made no difference to STD<br>incidence, although some<br>risk behaviors declined. |
| | | | • No significant differences in STD incidence in rapid vs. standard testing comparison (RR ~1.1–1.2) or in booster versus no booster (RR ~1.0)<br>• Small effects on risk behaviors, including multiple sex partners (RR = 0.86, 95%CI = 0.76–0.98) and sex with a one-time partner (RR = 0.81, 95%CI = 0.69–0.96). Results were similar across sample sex and orientation. | |

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

| Citation | Setting, Time, Geographic location, Resources | Population and Infection | Intervention and central results | Study conclusions |
|---|---|---|---|---|
| Jemmott et al. 2007[24] | Women's health clinic.<br>March 1993 – November 1996.<br>Newark, NJ.<br>Nurse-delivered<br>Visit context: Patients seeking care (not STD-specific). | Sexually experienced African American women<br>seeking primary care services.<br>N = 564<br>Gender = female<br>Age = 18–45 years.<br>FU = 86.9% at 12 months | • **Intervention:** HIV/STD prevention tailored behavioral skills-building and empowerment (20-minute and 200-minute versions)<br>• **Control:** General health promotion (20-minute and 200-minute versions)<br>• Note – longer versions were conducted in small groups<br>• At 12-mo follow-up, skill-building intervention reported less unprotected sex (d= .23, p= .02) and more protected sex than info-only group (d= .24, p= .03). Skill-building intervention group less likely to test positive for STD than control participants (d= .20, p= . 03). | Brief culturally sensitive, skill-building interventions can reduce STD incidence and self-reported STD risk behaviors (group-based similar to individual skills re incidence). Intervention effects can be sustained at 12-mo follow-up. |
| Carey et al. 2009[25] | STD clinic.<br>Unspecified time (< 2008).<br>Upstate NY.<br>Nurse-delivered<br>Visit context: STD clinic patients seeking care | Adults (88% heterosexual, 64% African American) with high-risk history – sexual risk behavior (multiple sex partners, inconsistent condom use)<br>in last 3 months. Baseline prevalence = 18.1% (GC or CT).<br>N = 1483<br>Gender = 46.4% female<br>Age = 29.2 years (SD=9.7).<br>FU = 70.4% at 12 months<br>(analyses on ITT basis) | • **Interventions:** brief, tailored motivational counseling (15 minutes) or brief information video (15 minutes) with intensive information workshop (4 hours) or intensive motivational counseling (4 hours)<br>• **Controls (1 active):** brief tailored motivational counseling or brief information video (15 minutes)<br>• Note – the 6 study arms were formed from a 2 (brief vs. intensive)×3 (control vs. information vs. IMB model) factorial design<br>• All 6 conditions (including info-only condition) yielded significant declines in infection rates over time, but *not* between conditions – reductions in new infections observed only relative to baseline and not between conditions.<br>• Risk behaviors declined over time, but not differentially by condition. | Behavioral interventions and workshops no more effective than information-only group. Behavioral effects were also uncorrelated with interventions. |

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

| Citation | Setting, Time, Geographic location, Resources | Population and Infection | Intervention and central results | Study conclusions |
|---|---|---|---|---|
| Crosby et al. 2009[26] | STD clinic<br>September 2004 – May 2006<br>Southern U.S. city<br>Nurse-delivered (control), lay health advisor (intervention)<br>Visit context: STD patients seeking care | African American heterosexual men newly diagnosed with an STD (unspecified).<br>N = 266<br>Gender = male<br>Age = 18–29 years.<br>FU = 74.1% at 3 months (behavioral assessment). Medical record review at 6 months. | • **Intervention:** Nurse-based advice and condom provision per control plus a single session with a lay health advisor using a motivational interviewing approach based on the Information, Motivation, Behavior model (45–50 minutes)<br>• **Control:** Nurse-delivered advice to use condoms plus condom provision (< 10 minutes)<br>• The intervention group was less likely to acquire subsequent STDs (OR = 0.46, 95%CI = 0.28–0.76) and more likely to report condom use at last sex (OR = 2.25, 95%CI = 1.24–4.07), and fewer acts of unprotected sex (*M* = 12.3 versus 29.4, p = .04). | Overall, intervention delivered by a lay health professional was shown to be efficacious. |
| Marrazzo et al. 2011[27] | Health center<br>October 2004 – December 2006<br>Unspecified location.<br>Researcher-delivered<br>Visit context: community recruitment | Heterosexual women with bacterial vaginosis (BV).<br>N = 89<br>Gender = female<br>Age = 16–35 years.<br>FU = 91.0% at 1 month | • **Intervention:** Motivational interviewing based on principles of Health Belief Model (perceived benefits and barriers to action; perceived susceptibility to and severity of the STD)<br>• **Control:** Pap smear educational materials delivered in a counseling session<br>• No decrease of BV at 1-month follow-up or on recurring BV over study period (12 months).<br>• Increased use of gloves for digital-vaginal sex in intervention arm (69% vs. 39%, p = .01), but no differences in other risk behaviors. | Effect on primary outcome not seen. Some change in risk behaviors. |
| Metsch et al. 2013[28] | STD clinics<br>April – December 2010<br>Pittsburgh PA, Miami and Jacksonville FL, Los Angeles and San Francisco CA, Columbia SC, Washington DC, Seattle WA, Portland OR<br>Counselor-delivered<br>Visit context: STD clinic patients seeking care | Heterosexual men and women and MSM (27.9%), HIV negative.<br>N = 5012<br>Gender = 34.0% female<br>Age = 68.5% < 25 years.<br>FU = 86.9% at 6 months (analyses on ITT basis) | • **Intervention:** Patient-centered counseling based on the individual's specific sexual risk behaviors and interactive planning for risk reduction steps<br>• **Control:** Information-only (CDC recommended information)<br>• Increased risk of STDs at 6 months among MSM (aRR=1.41; CI, 1.05– | Counseling plus HIV rapid test does not have an added benefit from info-only session plus rapid test. Cost per case detected was higher in intervention arm (baseline). |

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

| Citation | Setting, Time, Geographic location, Resources | Population and Infection | Intervention and central results | Study conclusions |
|---|---|---|---|---|
| | | | 1.90); no differences overall or among MSW or women. For MSM, Rapid RESPECT resulted in fewer number of unprotected sex partners (. 71; .61–.83), but not fewer number of sex partners (. 91; .80–1.03).<br>• Average cost per patient counseled = $56 (counseling) and $23 (control). Average cost in 2010 US$ per HIV infection detected at baseline = $5296 (counseling) and $2175 (control). | |

Notes. MSM = men who have sex with men; ITT = Intention to treat; FU = Follow-up; n/a = not available or not applicable.