



A nationally-representative survey of health care provider counseling and provision of the female condom in South Africa and Zimbabwe

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2012-002208
Article Type:	Research
Date Submitted by the Author:	11-Oct-2012
Complete List of Authors:	Holt, Kelsey; Harvard School of Public Health, Department of Society, Human Development, and Health Blanchard, Kelly; Ibis Reproductive Health, Chipato, Tsungai; University of Zimbabwe-University of California San Francisco Collaborative Research Programme, Obstetrics and Gynecology Nhemachena, Tazaadza; University of Zimbabwe-University of California San Francisco Collaborative Research Programme, Obstetrics and Gynecology Blum, Maya; University of California, San Francisco, Ob-Gyn Stratton, Laura; University of California, San Francisco, Ob-Gyn Morar, Neetha; South African Medical Research Council, HIV Prevention Unit Ramjee, Gita; South African Medical Research Council, HIV Prevention Unit Harper, Cynthia; University of California, San Francisco, Ob-Gyn
Primary Subject Heading:	HIV/AIDS
Secondary Subject Heading:	Sexual health, Public health, Health services research
Keywords:	HIV, PREVENTION, Condoms, female, Health care providers, Africa, Southern

SCHOLARONE™
Manuscripts

1
2
3 **A nationally-representative survey of health care provider counseling and**
4 **provision of the female condom in South Africa and Zimbabwe**
5
6
7

8
9
10 **Short title: Provider counseling and provision of female condom in South Africa**
11 **and Zimbabwe**
12
13

14
15
16 Kelsey Holt¹, Kelly Blanchard², Tsungai Chipato³, Taazadza Nhemachena³, Maya Blum⁴,
17 Laura Stratton⁴, Neetha Morar⁵, Gita Ramjee⁵, Cynthia C. Harper⁴
18
19

20
21
22 1 Harvard School of Public Health, Boston, MA, USA (at the time of the study, Ms. Holt was
23 at Ibis Reproductive Health, Cambridge, MA, USA); 2 Ibis Reproductive Health, Cambridge,
24 MA, USA, and Johannesburg, South Africa; 3 UZ-UZ-UCSF Collaborative Programme on
25 Women's Health, Harare, Zimbabwe; 4 Bixby Center for Global Reproductive Health,
26 Department of Obstetrics, Gynecology and Reproductive Sciences, University of California,
27 San Francisco, CA, USA; 5 South African Medical Research Council HIV Prevention Research
28 Unit, Durban, South Africa
29
30
31
32
33
34
35

36 **Words: 2,914**
37
38
39

40 **Corresponding Author:** Kelsey Holt, MA; 216 West Broadway, Boston, MA 02127; phone
41 617-455-2693; email keh125@mail.harvard.edu
42
43
44
45

46 **Keywords:** HIV; prevention; condoms, female; health care providers; Africa, southern
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Article summary

1) Article focus:

- Cross-sectional study examining current female condom counseling and provision practices among a nationally-representative sample of health care providers in South Africa and Zimbabwe
- Assessment of whether providers view female condoms as more appropriate for certain types of patients, and how their FC practices varied compared to those for male condoms

2) Key Messages:

- Most providers reported offering female condoms (more so in Zimbabwe than in South Africa) but perceived a need for novel female barrier methods for HIV/STI prevention, suggesting female condoms do not meet all patient/provider needs or are not adequately well-known or accessible
- Providers reported less frequent female condom counseling of adolescents, women using hormonal contraception, and married women, compared to unmarried or HIV-positive women, suggesting the need for training emphasizing the importance of female condom counseling with all women
- Providers should be included in HIV training efforts to raise awareness of new and existing products

3) Strengths and Limitations:

- Strengths: this is the first nationally-representative survey in South Africa or Zimbabwe examining female condom counseling and provision and we obtained high response rates; thus, we are able to generalize to the entire provider populations of these two high HIV prevalence countries
- Limitations: Potential social desirability bias may have influenced responses toward more comprehensive levels of prevention counseling

Abstract

Objectives: Female condoms are the only female-initiated HIV and pregnancy prevention technology currently available. We examined female condom counseling and provision among providers in South Africa and Zimbabwe, high HIV-prevalence countries.

Design: Cross-sectional study using a nationally-representative survey.

Setting: All facilities that provide family planning or HIV/STI services in the two countries.

Participants: National probability sample of 1,444 nurses and physicians who provide family planning or HIV/STI services.

Primary and secondary outcome measures: Female condom practices with different female patients, including adolescents, married women, women using hormonal contraception, and by HIV status. Using multivariable logistic analysis, we measured variations in condom counseling by provider characteristics.

Results: Most providers reported offering female condoms (88%), but perceived a need for novel female barrier methods for HIV/STI prevention (85%). By patient type, providers reported less frequent female condom counseling of adolescents (55%), women using hormonal contraception (65%), and married women (66%), compared to unmarried (74%) or HIV-positive women (82%). Multivariable results showed providers in South Africa were less likely to counsel women on female condoms than in Zimbabwe (OR=0.48, 95% CI: 0.35-0.68, $p \leq 0.001$). However, South African providers were more likely to counsel women on male condoms (OR=2.39, 95% CI: 1.57-3.65, $p \leq 0.001$). Nurses counseled patients on female condoms more frequently than physicians (OR=5.41, 95% CI: 3.26-8.98, $p \leq 0.001$). HIV training, family planning training, provider location (urban vs. rural), and facility type (hospital vs. clinic) were not associated with greater condom counseling.

Conclusions: Female condoms were integrated into provider counseling and care, although providers reported a need for new female-initiated multipurpose prevention technologies, suggesting female condoms do not meet all patient/provider needs or are not

1
2
3 adequately well-known or accessible. Providers should be included in HIV training efforts to
4
5 raise awareness of new and existing products, and encouraged to educate all women.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

INTRODUCTION

There is growing recognition that no single intervention will be sufficient to halt the HIV epidemic and that combination prevention strategies tailored to the needs of specific populations have the most potential for decreasing HIV infection rates.(1) The female condom (FC) is the only available alternative to the male condom that provides protection from both HIV/STI infection and pregnancy, and it is a method that women can initiate. A review of research on the FC concluded that increased access to the method leads to an increase in protected sex acts in a population, and decreased STI incidence.(2) Though there have been promising results from recent clinical trials testing the effectiveness of novel woman-initiated methods, including microbicides(3) and pre-exposure prophylaxis,(4) conclusive proof of effectiveness and registration of a new product is unlikely for a number of years, and the FC continues to fill this important niche.

In sub-Saharan Africa, women are at increased risk of HIV/AIDS and heterosexual sex is the predominant mode of transmission.(5) HIV prevalence among women was estimated at 33% in the peak ages (25-29 years) in South Africa and 29% in Zimbabwe (30-39 years).(6, 7) Additionally, 24% of married women and 9% of never-married women in sub-Saharan Africa have an unmet need for contraception—rates higher than elsewhere in the developing world.(8) In South Africa and Zimbabwe, reported use of the FC is less than 1% compared to 4-6% use of male condoms among married women in peak ages.(7, 9)

Since the United States Food and Drug Administration (USFDA) approved the first available product—the FC1—in 1993, there has been a lack of commitment and resources to expand access to the FC among the international policy community.(10) In 2009, the USFDA approved a second-generation FC called FC2 made of synthetic latex rather than polyurethane. The FC2 is less expensive and makes less noise when used;(10) other new FC technologies are in development and could reduce costs further. In addition, the 2010 and

1
2
3 2011 U.S. PEPFAR *Fiscal Year Country Operational Plan (COP) Guidance* specifically
4 mentioned the importance of FCs in country program plans.(11) These new products and
5 policy developments are positive signs of increased support for the FC.
6
7

8
9
10 Health care provider participation, however, is essential to the success of FC
11 programs. Even if countries procure significant supplies, women and men may have limited
12 knowledge and access if providers do not discuss and provide FCs. Unlike the male condom,
13 the FC is typically obtained through provider contact, not dispensers, in the public sector.
14 Training and accurate information from providers could increase acceptability and sustained
15 use of the FC.(10)
16
17

18
19
20 Few studies have examined counseling and provision practices for FCs in sub-
21 Saharan Africa. Three early case studies exploring family planning providers' attitudes about
22 the FC in South Africa and Nigeria (where the FC was not yet introduced in the public
23 sector), and the United States (U.S.) found that U.S. providers lacked knowledge on the FC
24 despite product availability and saw the method as appropriate only for certain women, such
25 as sex workers or HIV-positive women.(12) In the U.S. and South Africa, providers reported
26 negative attitudes about the aesthetics and use of the FC, although providers in South
27 Africa were more enthusiastic after receiving training. In a study of voluntary counseling
28 and testing counselors in Kenya, many counselors recognized the need for a female-initiated
29 prevention method but felt uncomfortable with FCs or expressed concern about counseling
30 when FCs were not widely available.(13) These studies, albeit small and non-generalizable,
31 suggest a need for further investment in supporting providers to counsel and offer women
32 the FC.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

49 In this nationally-representative study of physicians and nurses, we examined FC
50 counseling and provision practices in South Africa and Zimbabwe. The two countries have
51 different histories of FC introduction that could impact provision at the health service level.
52 Zimbabwe was one of the first countries to introduce FCs in 1997 through the public sector
53 and innovative social marketing campaigns. Scale-up of male and female condoms in recent
54
55
56
57
58
59
60

1
2
3 years has been based on a national comprehensive behavior change strategy to reduce
4 sexual transmission of HIV.(14) FC distribution in the public sector in Zimbabwe increased
5 from about 400,000 in 2005 to more than 2,000,000 in 2008 and social marketing sales
6 have risen from about 900,000 in 2005 to more than 3,000,000 in 2008.(14) South Africa
7 introduced the FC shortly after Zimbabwe in 1998 primarily through public-sector family
8 planning clinics and community-based programs;(15) social marketing promotion efforts
9 also exist. FC distribution in South Africa is among the highest in the world (4.3 million FCs
10 distributed in public sector in 2008);(16) however, proportional to population size (the
11 population of South Africa is approximately four times that of Zimbabwe), Zimbabwe has
12 higher distribution rates.

13
14 We investigated counseling and provision practices among a nationally-
15 representative sample of providers to gauge the prevention services offered to a range of
16 patients in varied clinical settings. We assessed whether providers view FCs as more
17 appropriate for certain types of patients, and how their FC practices varied compared to
18 those for male condoms. The results have the potential to inform efforts to prepare
19 providers to expand access to this female-initiated prevention method for their patients.

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 **METHODS**

40 This study is part of a mixed-methods research project in Southern Africa
41 investigating providers' pregnancy and STI/HIV prevention practices. We completed national
42 probability surveys of physicians and nurses in South Africa and Zimbabwe in 2009.
43 Participants answered a series of questions on female and male condom counseling and
44 provision practices, as well as demographic and professional practice characteristics and
45 patient population. The surveys were preceded by 60 in-depth interviews of providers
46 serving female patients at risk of HIV, which revealed their views of FC use within their
47 patient populations.

1
2
3 We used a multistage, facility-based approach to generate a national probability
4 survey sample of providers. We randomly selected districts (with probability proportional to
5 size), then facilities that provided family planning or HIV/STI services within those districts
6 (stratified by type—hospital or clinic—and probability proportional to size), and recruited all
7 providers from those facilities who provided family planning or HIV/STI services. The
8 methodology has been described in detail elsewhere.⁽¹⁷⁾ The final sample included 1,019
9 providers representing 116 facilities from South Africa and 953 providers representing 130
10 facilities from Zimbabwe.

11
12 Data were collected via self-administered questionnaires distributed in-person in
13 Zimbabwe and telephone-administered questionnaires in South Africa (costs of in-person
14 visits were prohibitive due to the large country size). The study was approved by the
15 University of KwaZulu-Natal Biomedical Research Ethics Administration, the Medical
16 Research Council of Zimbabwe, the Western Institutional Review Board, and the University
17 of California, San Francisco Committee on Human Research.

18
19 Providers were asked whether they currently provide the FC and the male condom,
20 and whether they would like to receive more training (yes/no). Providers were also asked
21 about the frequency of female (and male) condom counseling, on a 4-point Likert scale
22 (never, sometimes, usually, or always), with the following types of female patients: women
23 in general, female teenagers, HIV-positive women, married women, unmarried women, and
24 women using hormonal contraception. They were asked whether they believe FCs are
25 appropriate contraceptives for women at risk of HIV infection (yes/no) and HIV-positive
26 women (yes/no), whether they routinely talk to female patients about pregnancy and
27 HIV/STI prevention in the same visit (yes/no), and how much of a need there is for more
28 female barrier methods for HIV/STI prevention (on a scale of 1-10).

29
30 We assessed clinician practices by country for different types of female patients in
31 these high HIV prevalence settings, using chi-square statistics for categorical variables and
32 t-tests for continuous variables. We analyzed condom counseling practices with

1
2
3 multivariable logistic regression to assess FC counseling by provider and practice-related
4 characteristics. We also analyzed male condom counseling practices for comparison. The
5 outcome variables were routine (usually/always) counseling on female and male condoms.
6
7 We adjusted analyses for the facility-based sampling scheme to account for clustering at the
8 facility level. We used Stata 11.0 (College Station, TX) for analyses. Significance was
9 defined as $P < 0.05$. We conducted thematic analysis of qualitative data to investigate open-
10 ended provider responses about their counseling and provision practices.
11
12
13
14
15
16
17
18
19

20 RESULTS

21
22 A total of 614 providers from South Africa and 830 providers from Zimbabwe
23 completed the survey ($N = 1,444$) with an overall response rate of 73.2%. In South Africa,
24 the response rate did not differ between hospitals (61%) and clinics (60%), though nurses
25 were more likely to respond than physicians (66% versus 39%). In Zimbabwe, providers in
26 hospitals were more likely to respond than in clinics (92% versus 81%), and physicians
27 were more likely to respond than nurses (100% versus 87%). The majority surveyed in
28 both countries were female (86%), nurses (91%) (Table 1). (17) Most reported prior training
29 in HIV prevention (80%) and family planning (63%). Participants were split between
30 hospital (55%) and clinic (45%) settings, and urban (48%) and rural (52%) areas. The
31 majority (70%) reported that most or all of their patients are at risk for HIV.
32
33
34
35
36
37
38
39
40
41
42

43 Almost all (99%) providers reported currently offering male condoms to patients
44 (Table 2). A large majority in both countries (88%) reported offering FCs, with a lower
45 proportion in South Africa (80%) than Zimbabwe (94%) ($p \leq 0.001$). More providers in South
46 Africa (28%) than Zimbabwe (14%) reported that they would like training on FCs
47 ($p \leq 0.001$).
48
49
50
51
52

53 Seventy-one percent reported routinely counseling (usually or always) women on
54 FCs; more providers reported FC counseling for HIV-positive (82%) and unmarried women
55 (74%), and fewer reported counseling for married women (66%), women using hormonal
56
57
58
59
60

1
2
3 contraception (65%), and female adolescents (55%). Most of these differences in
4 counseling by patient type were due to large variations in Zimbabwe where counseling for
5 HIV-positive women was 93%, but for adolescents was 50% (Table 2). In South Africa,
6 there was a lower level of routine counseling in general (62%), with little difference among
7 the patient types, ranging from 67% of HIV-positive women to 62% of adolescents.
8 However, 90% of providers in South Africa reported routine male condom counseling with
9 female patients compared to 80% in Zimbabwe. Similar within-country counseling patterns
10 held true for male condoms, with 94% routinely counseling female adolescents in South
11 Africa compared to 56% in Zimbabwe.

12
13 Support for the FC as a contraceptive method for HIV-positive women or women at
14 risk of HIV infection was high overall; in Zimbabwe there was near universal support for
15 women at risk of HIV infection (98% versus 84% in South Africa; $p \leq 0.001$) or HIV-positive
16 women (97% and 87%, respectively; $p \leq 0.001$) (Table 2). The large majority (89%)
17 reported routinely talking to female patients about pregnancy and HIV/STI prevention in the
18 same visit. About two-thirds of providers (68%) believed there is a very high (9 or 10 on a
19 scale of 1-10) need for more female barrier methods for HIV/STI prevention.

20
21 In multivariable logistic regression, several provider characteristics were found to be
22 significantly associated with routine condom counseling (Table 3). Providers in South Africa
23 were significantly less likely to counsel female patients on the FC (OR=0.48; $p \leq 0.001$), and
24 more likely to counsel on the male condom (OR=2.4; $p \leq 0.001$). Provider age was positively
25 associated with FC counseling (OR=1.02; $p \leq 0.001$), and nurses were significantly more
26 likely than physicians to counsel patients on both female (OR=5.4; $p \leq 0.001$) and male
27 condoms (OR=2.6; $p \leq 0.001$). HIV prevention training and family planning training were not
28 associated with FC counseling. HIV prevention training was associated with male condom
29 counseling in bivariate models, but in the multivariable models including a variable for
30 proportion of patients at risk of HIV (most/all), HIV training was no longer significant,
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 although high proportion of patients at risk of HIV was (OR=1.6; $p \leq 0.001$). Condom
4 counseling did not vary by urban versus rural clinical setting or in clinics or hospitals.
5
6

7 The in-depth interviews gave some insight into the reasons that some providers
8 might include the FC in counseling, while others might not. Many providers mentioned
9 logistical factors in the interviews, as well as physical attributes, which might restrict use.
10 Providers noted that FCs are expensive and are not always available in clinics. Several
11 considered physical features as method limitations, including discomfort and being highly
12 visible. Alternatively, many providers noted that some men who will not use a male condom
13 will agree to a FC, since the women puts it on. Providers noted that the FC could help
14 empower women since they could ensure it was used.
15
16
17
18
19
20
21
22
23

24 25 26 **DISCUSSION** 27

28 The FC was integrated into provider practices in Southern Africa, but to a lesser
29 extent than the male condom. Providers in Zimbabwe reported counseling patients on FCs
30 significantly more than providers in South Africa, which is likely attributable to the larger
31 public sector FC program in Zimbabwe, relative to population size. Providers across South
32 Africa may have been less likely to have learned about the FC due to the geographic
33 distance and smaller FC program per population. As in a previous study from Kenya,⁽¹³⁾
34 providers from both countries noted in interviews that the FC was not always available in
35 clinics even though it was distributed in the public sector. FCs, a basic technology, had
36 counseling patterns that were similar in rural and urban areas and clinics and hospitals,
37 unlike for more sophisticated technologies which in general are more available to urban
38 populations or in hospital settings.
39
40
41
42
43
44
45
46
47
48
49
50

51 Variations in counseling by patient type were wide in Zimbabwe, with high levels of
52 counseling for HIV-positive women. In Zimbabwe, providers were much less likely to report
53 female and male condom counseling with adolescents than with women in general,
54 suggesting the need for provider training emphasizing the importance of education of
55
56
57
58
59
60

1
2
3 adolescents on safe sex, perhaps even prior to sexual initiation; less than half of Zimbabwe
4 adults in the 2010-2011 DHS, however, supported condom education for 12-14year olds.(7)
5 Zimbabwe providers were also less likely to report condom counseling with women using
6 hormonal contraception, signaling the need for emphasis on dual protection of STIs and
7 pregnancy. In both countries, providers were less likely to counsel married women than
8 unmarried women on FCs, although it is essential to give all women information in these
9 high-prevalence settings. Condom use is less common among married women, although
10 one study of a condom intervention (female and male) showed increased use among HIV-
11 positive married women.(18) There were some signs in the qualitative data that providers
12 thought FCs might be more acceptable in marriage than male condoms in some cases where
13 the woman would be willing to make the effort and ensure use was consistent. Another
14 early study from the U.S. identified similar training needs among providers who saw FCs as
15 appropriate for only certain groups of women, such as HIV-positive women.(12)

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
A number of providers reported a desire for more FC training, signaling the need for
continued investment in programs and policies to support access to the FC in both
countries. Previous research from South Africa has demonstrated the positive impact of
training on provider attitudes.(12) Our results showed that neither having previous HIV
training nor serving a high proportion of at-risk patients significantly increased likelihood of
provider counseling on FCs. Efforts should be made to ensure that HIV and family planning
training in both countries include FCs, given the wider availability of supplies in recent
years. The finding that nurses were significantly more likely than physicians to report
counseling women on both male and female condoms reflects the prominent role that
nurses play in prevention counseling; however, physicians should also be prepared to
counsel women and men about their options for dual protection against pregnancy and
STIs.

Providers reported a strong need for new female-initiated barrier methods for
prevention and, similar to prior research from the U.S. and South Africa,(12) several

1
2
3 providers demonstrated negative attitudes about the aesthetics and use of the FC during
4 qualitative interviews. This finding suggests that current technologies may not meet all their
5 patient needs or are not adequately well-known or accessible, though it is important to note
6 that this research was conducted just before the new FC2 was approved by the USFDA. The
7 reported desire for training suggests that even as we work to develop new technologies, we
8 must also invest in programs and policies that ensure the potential for available existing
9 technologies is achieved.
10
11
12
13
14
15
16

17
18 These findings must be considered in light of study limitations. We did not ask
19 providers about availability or procurement cost of FCs in their health care systems. These
20 factors might influence their ability to provide them and thus the likelihood that they
21 counsel patients. Since providers are reporting on their counseling practices, it is likely that
22 social desirability bias influenced responses toward more comprehensive levels of
23 prevention counseling; therefore patients for whom we measured low levels of counseling
24 are likely to be in even greater need of FC education. Our study also has important
25 strengths. Our nationally representative surveys (with relatively high response rates) allow
26 us to generalize about providers' counseling and provision practices in these two countries;
27 this is the first research on FC counseling and provision in Southern Africa to include
28 representative national samples of providers. Further, very few data existed previously on
29 FC counseling and provision in sub-Saharan Africa overall and our study contributes
30 significantly to the literature on this topic by providing information on current provider
31 practices in two high HIV-prevalence countries.
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

47 Provider practices and support are essential to the successful integration of the FC
48 into HIV and family planning services, and ultimately to ensuring women can protect
49 themselves from both STI infection and unintended pregnancy. Our findings revealed
50 provider support for the FC as a dual-protection method, and a significant need for further
51 work promoting provider counseling in particular with adolescents, married women, and
52 women using hormonal contraception.
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

TABLE 1: Provider and Practice Characteristics

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Gender, n (%)			
Female	674 (82)	547 (90)	1221 (86)
Male	145 (18)	62 (10)	207 (15)
Provider type, n (%)			
Nurse	792 (95)	528 (86)	1320 (91)
Physician	38 (5)	86 (14)	124 (9)
Age, median years (range)	39 (20-74)	43 (23-69)	41 (20-74)
Previous training, n (%)			
HIV Prevention	629 (77)	510 (84)	1139 (80)
Family Planning	503 (61)	399 (66)	902 (63)
Type of facility, n (%)			
Hospital	484 (59)	309 (50)	793 (55)
Clinic	342 (41)	305 (50)	647 (45)
Urban	375 (45)	315 (51)	690 (48)
Rural	451 (55)	299 (49)	750 (52)
Proportion of patients at risk for HIV, n (%)			
None/Some	175 (22)	46 (8)	221 (16)
Half	112 (14)	92 (15)	204 (14)
Most/All	524 (65)	470 (77)	994 (70)

TABLE 2: Condom Counseling and Provision Practices and Female Condom Beliefs

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Currently offers condoms, n (%)			
Female condoms***	756 (94)	483 (80)	1,239 (88)
Male condoms	796 (99)	599 (99)	1,395 (99)
Would like training on condoms, n (%)			
Female condoms***	112 (14)	165 (28)	277 (20)
Male condoms***	56 (7)	109 (18)	165 (12)
Counsels routinely on female condoms with..., n (%)			
Women in general***	635 (78)	370 (62)	1005 (71)
Female teenagers***	403 (50)	372 (62)	775 (55)
HIV-positive women***	761 (93)	400 (67)	1161 (82)
Married women***	573 (70)	358 (60)	931 (66)
Unmarried women***	658 (81)	385 (64)	1,043 (74)
Women using hormonal contraception	529 (65)	380 (64)	909 (65)
Counsels routinely on male condoms with..., n (%)			
Women in general***	652 (80)	542 (90)	1194 (84)
Female teenagers***	448 (56)	565 (94)	1013 (72)
HIV-positive women	786 (97)	578 (96)	1,364 (96)
Married women***	610 (75)	514 (85)	1,124 (79)
Unmarried women***	683 (85)	554 (92)	1,237 (88)
Women using hormonal contraception***	537 (66)	535 (90)	1,072 (76)
Believes female condoms appropriate contraception for women at risk of HIV infection, n (%)***	800 (98)	503 (84)	1303 (92)

1				
2				
3				
4	Believes female condoms appropriate	794 (97)	519 (87)	1,313 (93)
5	contraception for HIV-positive women, n			
6	(%)***			
7				
8	Routinely talks to female patients about	718 (88)	536 (90)	1254 (89)
9	pregnancy and HIV/STI prevention in			
10	same visit, n (%)			
11				
12				
13	Believes there is a need for more female			
14	barrier methods for HIV/STI prevention,			
15	scale 1-10, n (%)			
16				
17	High (9-10)	537 (67)	412 (70)	949 (68)
18	Medium-High (7-8)	140 (17)	102 (17)	242 (17)
19	Medium (5-6)	72 (9)	45 (8)	117 (8)
20	Medium-Low (3-4)	23 (3)	7 (1)	30 (2)
21	Low (1-2)	35 (4)	23 (4)	58 (4)
22				
23				
24				
25				

26
27 *p≤0.05 **p≤0.010 ***p≤0.001

TABLE 3: Condom Counseling of Female Patients among Providers in South Africa and Zimbabwe: Odds Ratios from Multivariable Logistic Regression

Routine Condom Counseling (usually/always)	FEMALE condoms OR [95% CI]	MALE condoms OR [95% CI]
Country		
Zimbabwe (reference)	—	—
South Africa	0.48*** [.35 .68]	2.39*** [1.57 3.65]
Age (years)	1.02*** [1.02 1.05]	1.01 [1.00 1.03]
Provider type		
Physician (reference)	—	—
Nurse	5.41*** [3.26 8.98]	2.60** [1.47 4.58]
Trained in HIV Prevention	0.90 [.62 1.05]	1.35 [.87 2.08]
Trained in Family Planning	0.98 [.71 1.35]	1.02 [.70 1.51]
Facility Type		
Hospital (reference)	—	—
Clinic	0.88 [.61 1.25]	1.21 [.76 1.94]
Location		
Rural (reference)	—	—
Urban	0.85 [.61 1.25]	1.42 [0.93 2.14]
Most/all patients at HIV risk	1.21 [0.92 1.59]	1.58** [1.12 2.22]
Chi square (8 degrees of freedom)	96.08	70.24
N	1,324	1,328

*p ≤ 0.05 ** p ≤ 0.010 ***p ≤ 0.001

OR Odds Ratio

Acknowledgements

We gratefully acknowledge the National Institute of Child Health and Human Development for support of this study, NIH/NICHHD R01 HD046027. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

We are thankful for our field staff and the thoughtful contributions of our study participants.

Data presented at the American Public Health Association annual meeting, Denver, 2010

For peer review only

REFERENCES

1. Kurth AE, Celum C, Baeten JM, et al. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 2011;**8**(1):62-72.
2. Vijayakumar G, Mabude Z, Smit J, et al. A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *Int J STD AIDS* 2006;**17**(10):652-9.
3. Abdool Karim Q, Abdool Karim S, Frohlich J, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010;**329**(5996):1168.
4. CDC. CDC Trial and Another Major Study Find PrEP Can Reduce Risk of HIV Infection among Heterosexuals. 2011 [cited 2012 February 22]; Available from: <http://www.cdc.gov/nchhstp/newsroom/PrEPHeterosexuals.html>.
5. UNAIDS. UNAIDS Outlook 2010. Switzerland: 2010.
6. Shisana O, Council HSR, Centre for AIDS Development R, et al. South African national HIV prevalence, incidence, behaviour and communication survey, 2008: A turning tide among teenagers?: HSRC Press; 2009.
7. Zimbabwe National Statistics Agency, International ICF. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc., 2012.

- 1
2
3 8. Sedgh G, Hussain R, Bankole A, et al. Women with an unmet need for contraception in
4
5 developing countries and their reasons for not using a method. *Occasional Report 2007*;37:5-40.
6
7
- 8
9
10 9. Department of Health, Medical Research Council, OrcMacro. South African Demographic and
11
12 Health Survey 2003. Praetoria: Department of Health, 2007.
13
14
- 15
16 10. Peters A, Jansen W, van Driel F. The female condom: the international denial of a strong
17
18 potential. *Reprod Health Matters* 2010;18(35):119-28.
19
20
- 21
22 11. CHANGE. Female Condoms and U.S. Foreign Assistance: An Unfinished Imperative for Women's
23
24 Health. Washington, D.C.: Center for Health and Gender Equity, 2011.
25
26
27
- 28
29 12. Mantell JE, Hoffman S, Weiss E, et al. The acceptability of the female condom: perspectives of
30
31 family planning providers in New York City, South Africa, and Nigeria. *J Urban Health* 2001;78(4):658-68.
32
33
34
- 35
36 13. Mung'ala L, Kilonzo N, Angala P, et al. Promoting female condoms in HIV voluntary counselling
37
38 and testing centres in Kenya. *Reprod Health Matters* 2006;14(28):99-103.
39
40
41
- 42
43 14. UNFPA. HIV Prevention Gains Momentum: Success in Female Condom Programming. New York:
44
45 UNFPA, 2011.
46
47
- 48
49 15. FHI. Female Condom Introduction in South Africa. Durham: 2007.
50
51
52
- 53
54 16. Republic of South Africa. COUNTRY PROGRESS REPORT ON THE DECLARATION OF
55
56 COMMITMENT ON HIV/AIDS. Republic of South Africa, 2010.
57
58
59
60

1
2
3 17. Harper C, Holt K, Nhemachena T, et al. Willingness of clinicians to integrate microbicides into
4 HIV prevention practices in Southern Africa. AIDS Behav 2012:Published Online First: 1 January 2012.
5
6 doi:10.1007/s10461-011-0109-6.
7
8
9

10
11
12 18. Callegari L, Harper CC, van der Straten A, et al. Consistent condom use in married Zimbabwean
13 women after a condom intervention. Sexually Transm Dis 2008;**35**(6):624-30.
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 **A nationally-representative survey of health care provider counseling and**
4 **provision of the female condom in South Africa and Zimbabwe**
5
6
7

8
9
10 **Short title: Provider counseling and provision of female condom in South Africa**
11 **and Zimbabwe**
12
13

14
15
16 Kelsey Holt¹, Kelly Blanchard², Tsungai Chipato³, Taazadza Nhemachena³, Maya Blum⁴,
17 Laura Stratton⁴, Neetha Morar⁵, Gita Ramjee⁵, Cynthia C. Harper⁴
18
19

20
21
22 1 Harvard School of Public Health, Boston, MA, USA (at the time of the study, Ms. Holt was
23 at Ibis Reproductive Health, Cambridge, MA, USA); 2 Ibis Reproductive Health, Cambridge,
24 MA, USA, and Johannesburg, South Africa; 3 UZ-UZ-UCSF Collaborative Programme on
25 Women's Health, Harare, Zimbabwe; 4 Bixby Center for Global Reproductive Health,
26 Department of Obstetrics, Gynecology and Reproductive Sciences, University of California,
27 San Francisco, CA, USA; 5 South African Medical Research Council HIV Prevention Research
28 Unit, Durban, South Africa
29
30
31
32
33
34
35

36 **Words: 2,914**
37
38
39

40 **Corresponding Author:** Kelsey Holt, MA; 216 West Broadway, Boston, MA 02127; phone
41 617-455-2693; email keh125@mail.harvard.edu
42
43
44
45

46 **Keywords:** HIV; prevention; condoms, female; health care providers; Africa, southern
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Article summary

1) Article focus:

- Cross-sectional study examining current female condom counseling and provision practices among a nationally-representative sample of health care providers in South Africa and Zimbabwe
- Assessment of whether providers view female condoms as more appropriate for certain types of patients, and how their FC practices varied compared to those for male condoms

2) Key Messages:

- Most providers reported offering female condoms (more so in Zimbabwe than in South Africa) but perceived a need for novel female barrier methods for HIV/STI prevention, suggesting female condoms do not meet all patient/provider needs or are not adequately well-known or accessible
- Providers reported less frequent female condom counseling of adolescents, women using hormonal contraception, and married women, compared to unmarried or HIV-positive women, suggesting the need for training emphasizing the importance of female condom counseling with all women
- Providers should be included in HIV training efforts to raise awareness of new and existing products

3) Strengths and Limitations:

- Strengths: this is the first nationally-representative survey in South Africa or Zimbabwe examining female condom counseling and provision and we obtained high response rates; thus, we are able to generalize to the entire provider populations of these two high HIV prevalence countries
- Limitations: Potential social desirability bias may have influenced responses toward more comprehensive levels of prevention counseling

Abstract

Objectives: Female condoms are the only female-initiated HIV and pregnancy prevention technology currently available. We examined female condom counseling and provision among providers in South Africa and Zimbabwe, high HIV-prevalence countries.

Design: Cross-sectional study using a nationally-representative survey.

Setting: All facilities that provide family planning or HIV/STI services in the two countries.

Participants: National probability sample of 1,444 nurses and physicians who provide family planning or HIV/STI services.

Primary and secondary outcome measures: Female condom practices with different female patients, including adolescents, married women, women using hormonal contraception, and by HIV status. Using multivariable logistic analysis, we measured variations in condom counseling by provider characteristics.

Results: Most providers reported offering female condoms (88%), but perceived a need for novel female barrier methods for HIV/STI prevention (85%). By patient type, providers reported less frequent female condom counseling of adolescents (55%), women using hormonal contraception (65%), and married women (66%), compared to unmarried (74%) or HIV-positive women (82%). Multivariable results showed providers in South Africa were less likely to counsel women on female condoms than in Zimbabwe (OR=0.48, 95% CI: 0.35-0.68, $p \leq 0.001$). However, South African providers were more likely to counsel women on male condoms (OR=2.39, 95% CI: 1.57-3.65, $p \leq 0.001$). Nurses counseled patients on female condoms more frequently than physicians (OR=5.41, 95% CI: 3.26-8.98, $p \leq 0.001$). HIV training, family planning training, provider location (urban vs. rural), and facility type (hospital vs. clinic) were not associated with greater condom counseling.

Conclusions: Female condoms were integrated into provider counseling and care, although providers reported a need for new female-initiated multipurpose prevention technologies, suggesting female condoms do not meet all patient/provider needs or are not

1
2
3 adequately well-known or accessible. Providers should be included in HIV training efforts to
4
5 raise awareness of new and existing products, and encouraged to educate all women.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

INTRODUCTION

There is growing recognition that no single intervention will be sufficient to halt the HIV epidemic and that combination prevention strategies tailored to the needs of specific populations have the most potential for decreasing HIV infection rates.(1) The female condom (FC) is the only available alternative to the male condom that provides protection from both HIV/STI infection and pregnancy, and it is a method that women can initiate. A review of research on the FC concluded that increased access to the method leads to an increase in protected sex acts in a population, and decreased STI incidence.(2) Though there have been promising results from recent clinical trials testing the effectiveness of novel woman-initiated methods, including microbicides(3) and pre-exposure prophylaxis,(4) conclusive proof of effectiveness and registration of a new product is unlikely for a number of years, and the FC continues to fill this important niche.

In sub-Saharan Africa, women are at increased risk of HIV/AIDS and heterosexual sex is the predominant mode of transmission.(5) HIV prevalence among women was estimated at 33% in the peak ages (25-29 years) in South Africa and 29% in Zimbabwe (30-39 years).(6, 7) Additionally, 24% of married women and 9% of never-married women in sub-Saharan Africa have an unmet need for contraception—rates higher than elsewhere in the developing world.(8) In South Africa and Zimbabwe, reported use of the FC is less than 1% compared to 4-6% use of male condoms among married women in peak ages.(7, 9)

Since the United States Food and Drug Administration (USFDA) approved the first available product—the FC1—in 1993, there has been a lack of commitment and resources to expand access to the FC among the international policy community.(10) In 2009, the USFDA approved a second-generation FC called FC2 made of synthetic latex rather than polyurethane. The FC2 is less expensive and makes less noise when used;(10) other new FC technologies are in development and could reduce costs further. In addition, the 2010 and

1
2
3 2011 U.S. PEPFAR *Fiscal Year Country Operational Plan (COP) Guidance* specifically
4 mentioned the importance of FCs in country program plans.(11) These new products and
5 policy developments are positive signs of increased support for the FC.
6
7

8
9
10 Health care provider participation, however, is essential to the success of FC
11 programs. Even if countries procure significant supplies, women and men may have limited
12 knowledge and access if providers do not discuss and provide FCs. Unlike the male condom,
13 the FC is typically obtained through provider contact, not dispensers, in the public sector.
14 Training and accurate information from providers could increase acceptability and sustained
15 use of the FC.(10)
16
17

18
19
20 Few studies have examined counseling and provision practices for FCs in sub-
21 Saharan Africa. Three early case studies exploring family planning providers' attitudes about
22 the FC in South Africa and Nigeria (where the FC was not yet introduced in the public
23 sector), and the United States (U.S.) found that U.S. providers lacked knowledge on the FC
24 despite product availability and saw the method as appropriate only for certain women, such
25 as sex workers or HIV-positive women.(12) In the U.S. and South Africa, providers reported
26 negative attitudes about the aesthetics and use of the FC, although providers in South
27 Africa were more enthusiastic after receiving training. In a study of voluntary counseling
28 and testing counselors in Kenya, many counselors recognized the need for a female-initiated
29 prevention method but felt uncomfortable with FCs or expressed concern about counseling
30 when FCs were not widely available.(13) These studies, albeit small and non-generalizable,
31 suggest a need for further investment in supporting providers to counsel and offer women
32 the FC.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

49 In this nationally-representative study of physicians and nurses, we examined FC
50 counseling and provision practices in South Africa and Zimbabwe. The two countries have
51 different histories of FC introduction that could impact provision at the health service level.
52 Zimbabwe was one of the first countries to introduce FCs in 1997 through the public sector
53 and innovative social marketing campaigns. Scale-up of male and female condoms in recent
54
55
56
57
58
59
60

1
2
3 years has been based on a national comprehensive behavior change strategy to reduce
4 sexual transmission of HIV.(14) FC distribution in the public sector in Zimbabwe increased
5 from about 400,000 in 2005 to more than 2,000,000 in 2008 and social marketing sales
6 have risen from about 900,000 in 2005 to more than 3,000,000 in 2008.(14) South Africa
7 introduced the FC shortly after Zimbabwe in 1998 primarily through public-sector family
8 planning clinics and community-based programs;(15) social marketing promotion efforts
9 also exist. FC distribution in South Africa is among the highest in the world (4.3 million FCs
10 distributed in public sector in 2008);(16) however, proportional to population size (the
11 population of South Africa is approximately four times that of Zimbabwe), Zimbabwe has
12 higher distribution rates.

13
14 We investigated counseling and provision practices among a nationally-
15 representative sample of providers to gauge the prevention services offered to a range of
16 patients in varied clinical settings. We assessed whether providers view FCs as more
17 appropriate for certain types of patients, and how their FC practices varied compared to
18 those for male condoms. The results have the potential to inform efforts to prepare
19 providers to expand access to this female-initiated prevention method for their patients.
20
21
22
23

24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 **METHODS**

40 This study is part of a mixed-methods research project in Southern Africa
41 investigating providers' pregnancy and STI/HIV prevention practices. We completed national
42 probability surveys of physicians and nurses in South Africa and Zimbabwe in 2009.
43 Participants answered a series of questions on female and male condom counseling and
44 provision practices, as well as demographic and professional practice characteristics and
45 patient population. The surveys were preceded by 60 in-depth interviews of providers
46 serving female patients at risk of HIV, which revealed their views of FC use within their
47 patient populations.
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 We used a multistage, facility-based approach to generate a national probability
4 survey sample of providers. We randomly selected districts (with probability proportional to
5 size), then facilities that provided family planning or HIV/STI services within those districts
6 (stratified by type—hospital or clinic—and probability proportional to size), and recruited all
7 providers from those facilities who provided family planning or HIV/STI services. The
8 methodology has been described in detail elsewhere.⁽¹⁷⁾ The final sample included 1,019
9 providers representing 116 facilities from South Africa and 953 providers representing 130
10 facilities from Zimbabwe.

11
12 Data were collected via self-administered questionnaires distributed in-person in
13 Zimbabwe and telephone-administered questionnaires in South Africa (costs of in-person
14 visits were prohibitive due to the large country size). The study was approved by the
15 University of KwaZulu-Natal Biomedical Research Ethics Administration, the Medical
16 Research Council of Zimbabwe, the Western Institutional Review Board, and the University
17 of California, San Francisco Committee on Human Research.

18
19 Providers were asked whether they currently provide the FC and the male condom,
20 and whether they would like to receive more training (yes/no). Providers were also asked
21 about the frequency of female (and male) condom counseling, on a 4-point Likert scale
22 (never, sometimes, usually, or always), with the following types of female patients: women
23 in general, female teenagers, HIV-positive women, married women, unmarried women, and
24 women using hormonal contraception. They were asked whether they believe FCs are
25 appropriate contraceptives for women at risk of HIV infection (yes/no) and HIV-positive
26 women (yes/no), whether they routinely talk to female patients about pregnancy and
27 HIV/STI prevention in the same visit (yes/no), and how much of a need there is for more
28 female barrier methods for HIV/STI prevention (on a scale of 1-10).

29
30 We assessed clinician practices by country for different types of female patients in
31 these high HIV prevalence settings, using chi-square statistics for categorical variables and
32 t-tests for continuous variables. We analyzed condom counseling practices with

1
2
3 multivariable logistic regression to assess FC counseling by provider and practice-related
4 characteristics. We also analyzed male condom counseling practices for comparison. The
5 outcome variables were routine (usually/always) counseling on female and male condoms.
6
7 We adjusted analyses for the facility-based sampling scheme to account for clustering at the
8 facility level. We used Stata 11.0 (College Station, TX) for analyses. Significance was
9 defined as $P < 0.05$. We conducted thematic analysis of qualitative data to investigate open-
10 ended provider responses about their counseling and provision practices.
11
12
13
14
15
16
17
18
19

20 RESULTS

21
22 A total of 614 providers from South Africa and 830 providers from Zimbabwe
23 completed the survey ($N = 1,444$) with an overall response rate of 73.2%. In South Africa,
24 the response rate did not differ between hospitals (61%) and clinics (60%), though nurses
25 were more likely to respond than physicians (66% versus 39%). In Zimbabwe, providers in
26 hospitals were more likely to respond than in clinics (92% versus 81%), and physicians
27 were more likely to respond than nurses (100% versus 87%). The majority surveyed in
28 both countries were female (86%), nurses (91%) (Table 1). (17) Most reported prior training
29 in HIV prevention (80%) and family planning (63%). Participants were split between
30 hospital (55%) and clinic (45%) settings, and urban (48%) and rural (52%) areas. The
31 majority (70%) reported that most or all of their patients are at risk for HIV.
32
33
34
35
36
37
38
39
40
41
42

43 Almost all (99%) providers reported currently offering male condoms to patients
44 (Table 2). A large majority in both countries (88%) reported offering FCs, with a lower
45 proportion in South Africa (80%) than Zimbabwe (94%) ($p \leq 0.001$). More providers in South
46 Africa (28%) than Zimbabwe (14%) reported that they would like training on FCs
47 ($p \leq 0.001$).
48
49
50
51
52

53 Seventy-one percent reported routinely counseling (usually or always) women on
54 FCs; more providers reported FC counseling for HIV-positive (82%) and unmarried women
55 (74%), and fewer reported counseling for married women (66%), women using hormonal
56
57
58
59
60

1
2
3 contraception (65%), and female adolescents (55%). Most of these differences in
4 counseling by patient type were due to large variations in Zimbabwe where counseling for
5 HIV-positive women was 93%, but for adolescents was 50% (Table 2). In South Africa,
6 there was a lower level of routine counseling in general (62%), with little difference among
7 the patient types, ranging from 67% of HIV-positive women to 62% of adolescents.
8 However, 90% of providers in South Africa reported routine male condom counseling with
9 female patients compared to 80% in Zimbabwe. Similar within-country counseling patterns
10 held true for male condoms, with 94% routinely counseling female adolescents in South
11 Africa compared to 56% in Zimbabwe.

12
13 Support for the FC as a contraceptive method for HIV-positive women or women at
14 risk of HIV infection was high overall; in Zimbabwe there was near universal support for
15 women at risk of HIV infection (98% versus 84% in South Africa; $p \leq 0.001$) or HIV-positive
16 women (97% and 87%, respectively; $p \leq 0.001$) (Table 2). The large majority (89%)
17 reported routinely talking to female patients about pregnancy and HIV/STI prevention in the
18 same visit. About two-thirds of providers (68%) believed there is a very high (9 or 10 on a
19 scale of 1-10) need for more female barrier methods for HIV/STI prevention.

20
21 In multivariable logistic regression, several provider characteristics were found to be
22 significantly associated with routine condom counseling (Table 3). Providers in South Africa
23 were significantly less likely to counsel female patients on the FC (OR=0.48; $p \leq 0.001$), and
24 more likely to counsel on the male condom (OR=2.4; $p \leq 0.001$). Provider age was positively
25 associated with FC counseling (OR=1.02; $p \leq 0.001$), and nurses were significantly more
26 likely than physicians to counsel patients on both female (OR=5.4; $p \leq 0.001$) and male
27 condoms (OR=2.6; $p \leq 0.001$). HIV prevention training and family planning training were not
28 associated with FC counseling. HIV prevention training was associated with male condom
29 counseling in bivariate models, but in the multivariable models including a variable for
30 proportion of patients at risk of HIV (most/all), HIV training was no longer significant,
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 although high proportion of patients at risk of HIV was (OR=1.6; $p \leq 0.001$). Condom
4 counseling did not vary by urban versus rural clinical setting or in clinics or hospitals.
5
6

7 The in-depth interviews gave some insight into the reasons that some providers
8 might include the FC in counseling, while others might not. Many providers mentioned
9 logistical factors in the interviews, as well as physical attributes, which might restrict use.
10 Providers noted that FCs are expensive and are not always available in clinics. Several
11 considered physical features as method limitations, including discomfort and being highly
12 visible. Alternatively, many providers noted that some men who will not use a male condom
13 will agree to a FC, since the women puts it on. Providers noted that the FC could help
14 empower women since they could ensure it was used.
15
16
17
18
19
20
21
22
23

24 25 26 **DISCUSSION** 27

28 The FC was integrated into provider practices in Southern Africa, but to a lesser
29 extent than the male condom. Providers in Zimbabwe reported counseling patients on FCs
30 significantly more than providers in South Africa, which is likely attributable to the larger
31 public sector FC program in Zimbabwe, relative to population size. Providers across South
32 Africa may have been less likely to have learned about the FC due to the geographic
33 distance and smaller FC program per population. As in a previous study from Kenya,⁽¹³⁾
34 providers from both countries noted in interviews that the FC was not always available in
35 clinics even though it was distributed in the public sector. FCs, a basic technology, had
36 counseling patterns that were similar in rural and urban areas and clinics and hospitals,
37 unlike for more sophisticated technologies which in general are more available to urban
38 populations or in hospital settings.
39
40
41
42
43
44
45
46
47
48
49
50

51 Variations in counseling by patient type were wide in Zimbabwe, with high levels of
52 counseling for HIV-positive women. In Zimbabwe, providers were much less likely to report
53 female and male condom counseling with adolescents than with women in general,
54 suggesting the need for provider training emphasizing the importance of education of
55
56
57
58
59
60

1
2
3 adolescents on safe sex, perhaps even prior to sexual initiation; less than half of Zimbabwe
4 adults in the 2010-2011 DHS, however, supported condom education for 12-14year olds.(7)
5 Zimbabwe providers were also less likely to report condom counseling with women using
6 hormonal contraception, signaling the need for emphasis on dual protection of STIs and
7 pregnancy. In both countries, providers were less likely to counsel married women than
8 unmarried women on FCs, although it is essential to give all women information in these
9 high-prevalence settings. Condom use is less common among married women, although
10 one study of a condom intervention (female and male) showed increased use among HIV-
11 positive married women.(18) There were some signs in the qualitative data that providers
12 thought FCs might be more acceptable in marriage than male condoms in some cases where
13 the woman would be willing to make the effort and ensure use was consistent. Another
14 early study from the U.S. identified similar training needs among providers who saw FCs as
15 appropriate for only certain groups of women, such as HIV-positive women.(12)

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
A number of providers reported a desire for more FC training, signaling the need for
continued investment in programs and policies to support access to the FC in both
countries. Previous research from South Africa has demonstrated the positive impact of
training on provider attitudes.(12) Our results showed that neither having previous HIV
training nor serving a high proportion of at-risk patients significantly increased likelihood of
provider counseling on FCs. Efforts should be made to ensure that HIV and family planning
training in both countries include FCs, given the wider availability of supplies in recent
years. The finding that nurses were significantly more likely than physicians to report
counseling women on both male and female condoms reflects the prominent role that
nurses play in prevention counseling; however, physicians should also be prepared to
counsel women and men about their options for dual protection against pregnancy and
STIs.

Providers reported a strong need for new female-initiated barrier methods for
prevention and, similar to prior research from the U.S. and South Africa,(12) several

1
2
3 providers demonstrated negative attitudes about the aesthetics and use of the FC during
4 qualitative interviews. This finding suggests that current technologies may not meet all their
5 patient needs or are not adequately well-known or accessible, though it is important to note
6 that this research was conducted just before the new FC2 was approved by the USFDA. The
7 reported desire for training suggests that even as we work to develop new technologies, we
8 must also invest in programs and policies that ensure the potential for available existing
9 technologies is achieved.
10
11
12
13
14
15
16

17
18 These findings must be considered in light of study limitations. We did not ask
19 providers about availability or procurement cost of FCs in their health care systems. These
20 factors might influence their ability to provide them and thus the likelihood that they
21 counsel patients. Since providers are reporting on their counseling practices, it is likely that
22 social desirability bias influenced responses toward more comprehensive levels of
23 prevention counseling; therefore patients for whom we measured low levels of counseling
24 are likely to be in even greater need of FC education. Our study also has important
25 strengths. Our nationally representative surveys (with relatively high response rates) allow
26 us to generalize about providers' counseling and provision practices in these two countries;
27 this is the first research on FC counseling and provision in Southern Africa to include
28 representative national samples of providers. Further, very few data existed previously on
29 FC counseling and provision in sub-Saharan Africa overall and our study contributes
30 significantly to the literature on this topic by providing information on current provider
31 practices in two high HIV-prevalence countries.
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

47 Provider practices and support are essential to the successful integration of the FC
48 into HIV and family planning services, and ultimately to ensuring women can protect
49 themselves from both STI infection and unintended pregnancy. Our findings revealed
50 provider support for the FC as a dual-protection method, and a significant need for further
51 work promoting provider counseling in particular with adolescents, married women, and
52 women using hormonal contraception.
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

TABLE 1: Provider and Practice Characteristics

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Gender, n (%)			
Female	674 (82)	547 (90)	1221 (86)
Male	145 (18)	62 (10)	207 (15)
Provider type, n (%)			
Nurse	792 (95)	528 (86)	1320 (91)
Physician	38 (5)	86 (14)	124 (9)
Age, median years (range)	39 (20-74)	43 (23-69)	41 (20-74)
Previous training, n (%)			
HIV Prevention	629 (77)	510 (84)	1139 (80)
Family Planning	503 (61)	399 (66)	902 (63)
Type of facility, n (%)			
Hospital	484 (59)	309 (50)	793 (55)
Clinic	342 (41)	305 (50)	647 (45)
Urban	375 (45)	315 (51)	690 (48)
Rural	451 (55)	299 (49)	750 (52)
Proportion of patients at risk for HIV, n (%)			
None/Some	175 (22)	46 (8)	221 (16)
Half	112 (14)	92 (15)	204 (14)
Most/All	524 (65)	470 (77)	994 (70)

TABLE 2: Condom Counseling and Provision Practices and Female Condom Beliefs

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Currently offers condoms, n (%)			
Female condoms***	756 (94)	483 (80)	1,239 (88)
Male condoms	796 (99)	599 (99)	1,395 (99)
Would like training on condoms, n (%)			
Female condoms***	112 (14)	165 (28)	277 (20)
Male condoms***	56 (7)	109 (18)	165 (12)
Counsels routinely on female condoms with..., n (%)			
Women in general***	635 (78)	370 (62)	1005 (71)
Female teenagers***	403 (50)	372 (62)	775 (55)
HIV-positive women***	761 (93)	400 (67)	1161 (82)
Married women***	573 (70)	358 (60)	931 (66)
Unmarried women***	658 (81)	385 (64)	1,043 (74)
Women using hormonal contraception	529 (65)	380 (64)	909 (65)
Counsels routinely on male condoms with..., n (%)			
Women in general***	652 (80)	542 (90)	1194 (84)
Female teenagers***	448 (56)	565 (94)	1013 (72)
HIV-positive women	786 (97)	578 (96)	1,364 (96)
Married women***	610 (75)	514 (85)	1,124 (79)
Unmarried women***	683 (85)	554 (92)	1,237 (88)
Women using hormonal contraception***	537 (66)	535 (90)	1,072 (76)
Believes female condoms appropriate contraception for women at risk of HIV infection, n (%)***	800 (98)	503 (84)	1303 (92)

1				
2				
3				
4	Believes female condoms appropriate	794 (97)	519 (87)	1,313 (93)
5	contraception for HIV-positive women, n			
6	(%)***			
7				
8	Routinely talks to female patients about	718 (88)	536 (90)	1254 (89)
9	pregnancy and HIV/STI prevention in			
10	same visit, n (%)			
11				
12				
13	Believes there is a need for more female			
14	barrier methods for HIV/STI prevention,			
15	scale 1-10, n (%)			
16				
17	High (9-10)	537 (67)	412 (70)	949 (68)
18	Medium-High (7-8)	140 (17)	102 (17)	242 (17)
19	Medium (5-6)	72 (9)	45 (8)	117 (8)
20	Medium-Low (3-4)	23 (3)	7 (1)	30 (2)
21	Low (1-2)	35 (4)	23 (4)	58 (4)
22				
23				
24				
25				

26
27 *p≤0.05 **p≤0.010 ***p≤0.001

TABLE 3: Condom Counseling of Female Patients among Providers in South Africa and Zimbabwe: Odds Ratios from Multivariable Logistic Regression

Routine Condom Counseling (usually/always)	FEMALE condoms OR [95% CI]	MALE condoms OR [95% CI]
Country		
Zimbabwe (reference)	—	—
South Africa	0.48*** [.35 .68]	2.39*** [1.57 3.65]
Age (years)	1.02*** [1.02 1.05]	1.01 [1.00 1.03]
Provider type		
Physician (reference)	—	—
Nurse	5.41*** [3.26 8.98]	2.60** [1.47 4.58]
Trained in HIV Prevention	0.90 [.62 1.05]	1.35 [.87 2.08]
Trained in Family Planning	0.98 [.71 1.35]	1.02 [.70 1.51]
Facility Type		
Hospital (reference)	—	—
Clinic	0.88 [.61 1.25]	1.21 [.76 1.94]
Location		
Rural (reference)	—	—
Urban	0.85 [.61 1.25]	1.42 [0.93 2.14]
Most/all patients at HIV risk	1.21 [0.92 1.59]	1.58** [1.12 2.22]
Chi square (8 degrees of freedom)	96.08	70.24
N	1,324	1,328

*p ≤ 0.05 ** p ≤ 0.010 ***p ≤ 0.001

OR Odds Ratio

Acknowledgements

We gratefully acknowledge the National Institute of Child Health and Human Development for support of this study, NIH/NICHHD R01 HD046027. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

We are thankful for our field staff and the thoughtful contributions of our study participants.

Data presented at the American Public Health Association annual meeting, Denver, 2010

Contributorship

Cynthia Harper, Kelly Blanchard, Tsungai Chipato, Taazadza Nhemachena, Gita Ramjee and Maya Blum contributed to the conception and design and all authors, including Neetha Morar, contributed to interpretation of data. Laura Stratton and Cynthia Harper conducted the analysis. Kelsey Holt wrote the article. All authors revised the article critically for important intellectual content and gave final approval of the version to be published.

Cynthia Harper was responsible for planning, conduct, reporting, and overall content of the study.

Funding

Funded by National Institutes of Health.

Data Sharing

The unpublished data from the study are governed by NIH rules and regulations for open access.

Competing Interests

There are no competing interests.

REFERENCES

1. Kurth AE, Celum C, Baeten JM, et al. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 2011;**8**(1):62-72.
2. Vijayakumar G, Mabude Z, Smit J, et al. A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *Int J STD AIDS* 2006;**17**(10):652-9.
3. Abdool Karim Q, Abdool Karim S, Frohlich J, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010;**329**(5996):1168.
4. CDC. CDC Trial and Another Major Study Find PrEP Can Reduce Risk of HIV Infection among Heterosexuals. 2011 [cited 2012 February 22]; Available from: <http://www.cdc.gov/nchhstp/newsroom/PrEPHeterosexuals.html>.
5. UNAIDS. UNAIDS Outlook 2010. Switzerland: 2010.
6. Shisana O, Council HSR, Centre for AIDS Development R, et al. South African national HIV prevalence, incidence, behaviour and communication survey, 2008: A turning tide among teenagers?: HSRC Press; 2009.
7. Zimbabwe National Statistics Agency, International ICF. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc., 2012.

- 1
2
3 8. Sedgh G, Hussain R, Bankole A, et al. Women with an unmet need for contraception in
4
5 developing countries and their reasons for not using a method. *Occasional Report 2007*;37:5-40.
6
7
- 8
9
10 9. Department of Health, Medical Research Council, OrcMacro. South African Demographic and
11
12 Health Survey 2003. Praetoria: Department of Health, 2007.
13
14
- 15
16 10. Peters A, Jansen W, van Driel F. The female condom: the international denial of a strong
17
18 potential. *Reprod Health Matters* 2010;18(35):119-28.
19
20
- 21
22 11. CHANGE. Female Condoms and U.S. Foreign Assistance: An Unfinished Imperative for Women's
23
24 Health. Washington, D.C.: Center for Health and Gender Equity, 2011.
25
26
27
- 28
29 12. Mantell JE, Hoffman S, Weiss E, et al. The acceptability of the female condom: perspectives of
30
31 family planning providers in New York City, South Africa, and Nigeria. *J Urban Health* 2001;78(4):658-68.
32
33
34
- 35
36 13. Mung'ala L, Kilonzo N, Angala P, et al. Promoting female condoms in HIV voluntary counselling
37
38 and testing centres in Kenya. *Reprod Health Matters* 2006;14(28):99-103.
39
40
41
- 42
43 14. UNFPA. HIV Prevention Gains Momentum: Success in Female Condom Programming. New York:
44
45 UNFPA, 2011.
46
47
- 48
49 15. FHI. Female Condom Introduction in South Africa. Durham: 2007.
50
51
52
- 53
54 16. Republic of South Africa. COUNTRY PROGRESS REPORT ON THE DECLARATION OF
55
56 COMMITMENT ON HIV/AIDS. Republic of South Africa, 2010.
57
58
59
60

1
2
3 17. Harper C, Holt K, Nhemachena T, et al. Willingness of clinicians to integrate microbicides into
4 HIV prevention practices in Southern Africa. AIDS Behav 2012:Published Online First: 1 January 2012.
5
6 doi:10.1007/s10461-011-0109-6.
7
8
9

10
11
12 18. Callegari L, Harper CC, van der Straten A, et al. Consistent condom use in married Zimbabwean
13 women after a condom intervention. Sexually Transm Dis 2008;**35**(6):624-30.
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



A nationally-representative survey of health care provider counseling and provision of the female condom in South Africa and Zimbabwe

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2012-002208.R1
Article Type:	Research
Date Submitted by the Author:	07-Dec-2012
Complete List of Authors:	Holt, Kelsey; Harvard School of Public Health, Department of Society, Human Development, and Health Blanchard, Kelly; Ibis Reproductive Health, Chipato, Tsungai; University of Zimbabwe-University of California San Francisco Collaborative Research Programme, Obstetrics and Gynecology Nhemachena, Tazaadza; University of Zimbabwe-University of California San Francisco Collaborative Research Programme, Obstetrics and Gynecology Blum, Maya; University of California, San Francisco, Ob-Gyn Stratton, Laura; University of California, San Francisco, Ob-Gyn Morar, Neetha; South African Medical Research Council, HIV Prevention Unit Ramjee, Gita; South African Medical Research Council, HIV Prevention Unit Harper, Cynthia; University of California, San Francisco, Ob-Gyn
Primary Subject Heading:	HIV/AIDS
Secondary Subject Heading:	Sexual health, Public health, Health services research
Keywords:	HIV, PREVENTION, Condoms, female, Health care providers, Africa, Southern

SCHOLARONE™
Manuscripts

1
2
3 **A nationally-representative survey of health care provider counseling and**
4 **provision of the female condom in South Africa and Zimbabwe**
5
6
7

8
9
10 **Short title: Provider counseling and provision of female condom in South Africa**
11 **and Zimbabwe**
12

13
14
15 Kelsey Holt¹, Kelly Blanchard², Tsungai Chipato³, Taazadza Nhemachena³, Maya Blum⁴,
16 Laura Stratton⁴, Neetha Morar⁵, Gita Ramjee⁵, Cynthia C. Harper⁴
17
18
19

20
21
22 1 Harvard School of Public Health, Boston, MA, USA (at the time of the study, Ms. Holt was
23 at Ibis Reproductive Health, Cambridge, MA, USA); 2 Ibis Reproductive Health, Cambridge,
24 MA, USA, and Johannesburg, South Africa; 3 UZ-UZ-UCSF Collaborative Programme on
25 Women's Health, Harare, Zimbabwe; 4 Bixby Center for Global Reproductive Health,
26 Department of Obstetrics, Gynecology and Reproductive Sciences, University of California,
27 San Francisco, CA, USA; 5 South African Medical Research Council HIV Prevention Research
28 Unit, Durban, South Africa
29
30
31
32
33
34
35

36 **Words: 2,914**
37
38
39

40 **Corresponding Author:** Kelsey Holt, MA; 216 West Broadway, Boston, MA 02127; phone
41 617-455-2693; email keh125@mail.harvard.edu
42
43
44
45

46 **Keywords:** HIV; prevention; condoms, female; health care providers; Africa, southern
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Article summary

1) Article focus:

- Cross-sectional study examining current female condom counseling and provision practices among a nationally-representative sample of health care providers in South Africa and Zimbabwe
- Assessment of whether providers view female condoms as more appropriate for certain types of patients, and how their FC practices varied compared to those for male condoms

2) Key Messages:

- Most providers reported offering female condoms (more so in Zimbabwe than in South Africa) but perceived a need for novel female barrier methods for HIV/STI prevention, suggesting female condoms do not meet all patient/provider needs or are not adequately well-known or accessible
- Providers reported less frequent female condom counseling of adolescents, women using hormonal contraception, and married women, compared to unmarried or HIV-positive women, suggesting the need for training emphasizing the importance of female condom counseling with all women
- Providers should be included in HIV training efforts to raise awareness of new and existing products

3) Strengths and Limitations:

- Strengths: this is the first nationally-representative survey in South Africa or Zimbabwe examining female condom counseling and provision and we obtained high response rates; thus, we are able to generalize to the entire provider populations of these two high HIV prevalence countries
- Limitations: Potential social desirability bias may have influenced responses toward more comprehensive levels of prevention counseling

Abstract

Objectives: Female condoms are the only female-initiated HIV and pregnancy prevention technology currently available. We examined female condom counseling and provision among providers in South Africa and Zimbabwe, high HIV-prevalence countries.

Design: Cross-sectional study using a nationally-representative survey.

Setting: All facilities that provide family planning or HIV/STI services in the two countries.

Participants: National probability sample of 1,444 nurses and physicians who provide family planning or HIV/STI services.

Primary and secondary outcome measures: Female condom practices with different female patients, including adolescents, married women, women using hormonal contraception, and by HIV status. Using multivariable logistic analysis, we measured variations in condom counseling by provider characteristics.

Results: Most providers reported offering female condoms (88%), but perceived a need for novel female barrier methods for HIV/STI prevention (85%). By patient type, providers reported less frequent female condom counseling of adolescents (55%), women using hormonal contraception (65%), and married women (66%), compared to unmarried (74%) or HIV-positive women (82%). Multivariable results showed providers in South Africa were less likely to counsel women on female condoms than in Zimbabwe (OR=0.48, 95% CI: 0.35-0.68, $p \leq 0.001$). However, South African providers were more likely to counsel women on male condoms (OR=2.39, 95% CI: 1.57-3.65, $p \leq 0.001$). Nurses counseled patients on female condoms more frequently than physicians (OR=5.41, 95% CI: 3.26-8.98, $p \leq 0.001$). HIV training, family planning training, provider location (urban vs. rural), and facility type (hospital vs. clinic) were not associated with greater condom counseling.

Conclusions: Female condoms were integrated into provider counseling and care, although providers reported a need for new female-initiated multipurpose prevention technologies, suggesting female condoms do not meet all patient/provider needs or are not

1
2
3 adequately well-known or accessible. Providers should be included in HIV training efforts to
4
5 raise awareness of new and existing products, and encouraged to educate all women.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

INTRODUCTION

There is growing recognition that no single intervention will be sufficient to halt the HIV epidemic and that combination prevention strategies tailored to the needs of specific populations have the most potential for decreasing HIV infection rates.(1) The female condom (FC) is the only available alternative to the male condom that provides protection from both HIV/STI infection and pregnancy, and it is a method that women can initiate. A review of research on the FC concluded that increased access to the method leads to an increase in protected sex acts in a population, and decreased STI incidence.(2) There have been promising results from recent clinical trials testing the effectiveness of novel woman-initiated methods of HIV prevention, including microbicides(3) and pre-exposure prophylaxis, which was recently endorsed by the Centers for Disease Control and Prevention (CDC) in the United States (U.S.) for use by heterosexual women at very high risk for HIV infection (e.g., women with HIV-positive sex partners). (4) However, conclusive proof of effectiveness and registration of a new woman-initiated HIV-prevention product recommended for widespread use is unlikely for a number of years, and the FC will remain an important option for women who desire pregnancy prevention and STI protection from a single product.

In sub-Saharan Africa, women are at increased risk of HIV/AIDS and heterosexual sex is the predominant mode of transmission.(5) HIV prevalence among women was estimated at 33% in the peak ages (25-29 years) in South Africa in 2008 and 29% in Zimbabwe (30-39 years) in 2010-2011.(6, 7) Among young people ages 15-24, HIV prevalence was 8.6% in South Africa in 2008 and 5.5% in Zimbabwe in 2010-11. (6,7) Additionally, 24% of married women and 9% of never-married women in sub-Saharan Africa have an unmet need for contraception—rates higher than elsewhere in the developing world.(8) In South Africa and Zimbabwe, reported use of the FC is less than 1% compared

1
2
3 to 4-6% use of male condoms among married women in peak ages of HIV prevalence (25-
4
5 29 years in South Africa and 30-39 years in Zimbabwe).(7, 9)
6

7
8 Since the United States Food and Drug Administration (USFDA) approved the first
9
10 available product—the FC1—in 1993, there has been a lack of commitment and resources to
11
12 expand access to the FC among the international policy community.(10) In 2009, the
13
14 USFDA approved a second-generation FC called FC2 made of synthetic latex rather than
15
16 polyurethane. The FC2 is less expensive and makes less noise when used;(10) other new FC
17
18 technologies are in development and could reduce costs further. In addition, the 2010 and
19
20 2011 U.S. PEPFAR *Fiscal Year Country Operational Plan (COP) Guidance* specifically
21
22 mentioned the importance of FCs in country program plans and the Caucus on New and
23
24 Underused Reproductive Health Technologies recently named the FC as one of several
25
26 “underused” reproductive health technologies.(11, 12) These new products and policy
27
28 developments are positive signs of increased support for the FC.
29

30
31 Health care provider participation, however, is essential to the success of FC
32
33 programs. Even if countries procure significant supplies, women and men may have limited
34
35 knowledge and access if providers do not discuss and provide FCs. Unlike the male condom,
36
37 the FC is typically obtained through provider contact (not dispensers) in the public sector
38
39 with no cost to the user, although in some settings there is also a strong presence of social
40
41 marketing campaigns. Training and accurate information from providers could increase
42
43 acceptability and sustained use of the FC.(10)
44

45
46 Few studies have examined counseling and provision practices for FCs in sub-
47
48 Saharan Africa. Three early case studies exploring family planning providers’ attitudes about
49
50 the FC in South Africa and Nigeria (where the FC was not yet introduced in the public
51
52 sector), and the U.S. found that U.S. providers lacked knowledge on the FC despite product
53
54 availability and saw the method as appropriate only for certain women, such as sex workers
55
56 or HIV-positive women.(13) In the U.S. and South Africa, providers reported negative
57
58 attitudes about the aesthetics and use of the FC, although providers in South Africa were
59
60

1
2
3 more enthusiastic after receiving training. In a study of voluntary counseling and testing
4 counselors in Kenya, many counselors recognized the need for a female-initiated prevention
5 method but felt uncomfortable with FCs or expressed concern about counseling when FCs
6 were not widely available.(14) In another small qualitative study of provider FC opinions in
7 Kenya, several health care providers reported support for FCs due to belief that FCs give
8 women "choice" and "control." (15) These studies, albeit small and non-generalizable,
9 suggest a need for further investment in supporting providers to counsel and offer women
10 the FC.
11
12
13
14
15
16
17
18
19

20 In this nationally-representative study of physicians and nurses, we examined FC
21 counseling and provision practices in South Africa and Zimbabwe. The two countries have
22 different histories of FC introduction that could impact provision at the health service level.
23 Zimbabwe was one of the first countries to introduce FCs in 1997 through the public sector
24 and innovative social marketing campaigns. Scale-up of male and female condoms in recent
25 years has been based on a national comprehensive behavior change strategy to reduce
26 sexual transmission of HIV and FCs are now offered in all public-sector facilities.(16, 17) FC
27 distribution in the public sector in Zimbabwe increased from about 400,000 in 2005 to more
28 than 2,000,000 in 2008 and social marketing sales have risen from about 900,000 in 2005
29 to more than 3,000,000 in 2008.(16) South Africa introduced the FC shortly after Zimbabwe
30 in 1998 primarily through public-sector family planning clinics and community-based
31 programs.(18) FC distribution in South Africa is among the highest in the world (4.3 million
32 FCs distributed in public sector in 2008);(19) however, FCs are not yet available in all
33 public-sector facilities in South Africa and proportional to population size (the population of
34 South Africa is approximately four times that of Zimbabwe), Zimbabwe has higher
35 distribution rates. Given these distribution efforts to increase stocking and availability in
36 both countries, we still lack national estimates of how many providers are able to offer
37 female condoms to patients.
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 We investigated counseling and provision practices among a nationally-
4
5 representative sample of providers to gauge the prevention services offered to a range of
6
7 patients in varied clinical settings. We assessed whether providers view FCs as more
8
9 appropriate for certain types of patients, and how their FC counseling practices varied
10
11 compared to those for male condoms. The results have the potential to inform efforts to
12
13 prepare providers to expand access to this female-initiated prevention method for their
14
15 patients.
16
17

18 19 20 **METHODS**

21
22 This study is part of a mixed-methods research project in Southern Africa
23
24 investigating providers' pregnancy and STI/HIV prevention practices. We completed national
25
26 probability surveys of physicians and nurses in South Africa and Zimbabwe in 2009.
27
28 Participants answered a series of questions on female and male condom counseling and
29
30 provision practices, as well as demographic and professional practice characteristics and
31
32 patient population. The surveys were preceded by 60 in-depth interviews of providers
33
34 serving female patients at risk of HIV, which revealed their views of FC use within their
35
36 patient populations.
37

38
39 We used a multistage, facility-based approach to generate a national probability
40
41 survey sample of providers. We randomly selected districts (with probability proportional to
42
43 size, based on estimated numbers of physicians and nurses), then facilities that provided
44
45 family planning or HIV/STI services within those districts (stratified by type—hospital or
46
47 clinic—and probability proportional to size), and recruited all providers from those facilities
48
49 who provided family planning or HIV/STI services. The sample consists of public facilities in
50
51 South Africa and Zimbabwe. Some non-governmental organizations are included in
52
53 Zimbabwe as they deliver primary care, and specifically family planning, to low-income
54
55 populations. The final sample included 1,019 providers representing 116 facilities (or 89%
56
57 of the total 130 selected facilities) from South Africa and 953 providers representing 130
58
59
60

1
2
3 facilities from Zimbabwe (94% of the total 138 facilities selected). The methodology has
4 been described in detail elsewhere.(20)
5
6

7 Data were collected via self-administered questionnaires distributed in-person in
8 Zimbabwe and telephone-administered questionnaires in South Africa (costs of in-person
9 visits were prohibitive due to the large country size). Approvals were granted as required
10 in each country, at the national, provincial, district and facility levels. In South Africa,
11 provincial approval was granted, as well as district-level approval where required by the
12 facility. In Zimbabwe, approval was granted at the national level, and either the provincial
13 or district level, as needed. The study was approved by the University of KwaZulu-Natal
14 Biomedical Research Ethics Administration, the Medical Research Council of Zimbabwe, the
15 Western Institutional Review Board, and the University of California, San Francisco
16 Committee on Human Research.
17
18
19
20
21
22
23
24
25
26
27

28 Providers were asked whether they currently provide the FC and the male condom,
29 and whether they would like to receive more training (yes/no). Providers were also asked
30 about the frequency of female (and male) condom counseling, on a 4-point Likert scale
31 (never, sometimes, usually, or always), with the following types of female patients: women
32 in general, female teenagers, HIV-positive women, married women, unmarried women, and
33 women using hormonal contraception. They were asked whether they believe FCs are
34 appropriate contraceptives for women at risk of HIV infection (yes/no) and HIV-positive
35 women (yes/no), whether they routinely talk to female patients about pregnancy and
36 HIV/STI prevention in the same visit (yes/no), and how much of a need there is for more
37 female barrier methods for HIV/STI prevention (on a scale of 1-10).
38
39
40
41
42
43
44
45
46
47
48

49 We assessed clinician practices by country for different types of female patients in
50 these high HIV prevalence settings, using chi-square statistics for categorical variables and
51 t-tests for continuous variables. We analyzed condom counseling practices with
52 multivariable logistic regression to assess FC counseling by provider and practice-related
53 characteristics. We also analyzed male condom counseling practices for comparison using
54
55
56
57
58
59
60

1
2
3 the same set of predictors. The two outcome variables were routine (usually/always)
4 counseling on female condoms and routine counseling on male condoms. We adjusted
5 analyses for the facility-based sampling scheme to account for clustering at the facility level.
6 We used Stata 11.0 (College Station, TX) for analyses. Significance was defined as $P < 0.05$.
7 We conducted thematic analysis of qualitative data to investigate open-ended provider
8 responses about their counseling and provision practices.
9
10
11
12
13
14

15 16 17 18 **RESULTS**

19
20 A total of 614 providers from South Africa and 830 providers from Zimbabwe
21 completed the survey ($N=1,444$) with an overall response rate of 73.2%. In South Africa,
22 the response rate did not differ between hospitals (61%) and clinics (60%), though nurses
23 were more likely to respond than physicians (66% versus 39%). In Zimbabwe, providers in
24 hospitals were more likely to respond than in clinics (92% versus 81%), and physicians
25 were more likely to respond than nurses (100% versus 87%). The most common reason for
26 not responding was busy clinic load or that the staff was not at the clinic. The majority
27 surveyed in both countries were nurses (91%) (Table 1).⁽¹⁷⁾ Ninety-six percent of the
28 nurses were female, and overall 86% of participants were female. Most reported prior
29 training in HIV prevention (80%) and family planning (63%). Participants were split
30 between hospital (55%) and clinic (45%) settings, and urban (48%) and rural (52%) areas.
31 Virtually all providers served adult women of reproductive age (99.7%), female teens
32 (98%), and the majority also saw male patients (86%). The majority (70%) reported that
33 most or all of their patients are at risk for HIV.
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

49 Almost all (99%) providers reported currently offering male condoms to patients
50 (Table 2). A large majority in both countries (88%) reported offering FCs, with a lower
51 proportion in South Africa (80%) than Zimbabwe (94%) ($p \leq 0.001$). While most physicians
52 offer female condoms (72%), a significantly higher proportion of nurses do (89%)
53 ($p \leq 0.001$). Availability is an important factor in being able to offer a method, and 27% of
54
55
56
57
58
59
60

1
2
3 providers reported they would offer female condoms if more easily available. Among the
4 small proportion currently not offering female condoms (13% n=169), 68% in South Africa
5 reported they would if it were more easily available and 54% in Zimbabwe. More providers
6 in South Africa (28%) than Zimbabwe (14%) reported that they would like training on FCs
7 (p≤0.001).
8
9
10
11
12

13
14 Seventy-one percent reported routinely counseling (usually or always) women on
15 FCs; more providers reported FC counseling for HIV-positive (82%) and unmarried women
16 (74%), and fewer reported counseling for married women (66%), women using hormonal
17 contraception (65%), and female adolescents (55%). Most of these differences in
18 counseling by patient type were due to large variations in Zimbabwe where counseling for
19 HIV-positive women was 93%, but for adolescents was 50% (Table 2). In South Africa,
20 there was a lower level of routine counseling in general (62%), with little difference among
21 the patient types, ranging from 67% of HIV-positive women to 62% of adolescents.
22 However, 90% of providers in South Africa reported routine male condom counseling with
23 female patients compared to 80% in Zimbabwe. Similar within-country counseling patterns
24 held true for male condoms, with 94% routinely counseling female adolescents in South
25 Africa compared to 56% in Zimbabwe.
26
27
28
29
30
31
32
33
34
35
36
37

38
39 Support for the FC as a contraceptive method for HIV-positive women or women at
40 risk of HIV infection was high overall; in Zimbabwe there was near universal support for
41 women at risk of HIV infection (98% versus 84% in South Africa; p≤0.001) or HIV-positive
42 women (97% and 87%, respectively; p≤0.001) (Table 2). The large majority (89%)
43 reported routinely talking to female patients about pregnancy and HIV/STI prevention in the
44 same visit. About two-thirds of providers (68%) believed there is a very high (9 or 10 on a
45 scale of 1-10) need for more female barrier methods for HIV/STI prevention.
46
47
48
49
50
51
52

53
54 In multivariable logistic regression, several provider characteristics were found to be
55 significantly associated with routine condom counseling (Table 3). Providers in South Africa
56 were significantly less likely to counsel female patients on the FC (OR=0.48; p≤0.001), and
57
58
59
60

1
2
3 more likely to counsel on the male condom (OR=2.4; $p \leq 0.001$). Provider age was positively
4 associated with FC counseling (OR=1.02; $p \leq 0.001$), and nurses were significantly more
5 likely than physicians to counsel patients on both female (OR=5.4; $p \leq 0.001$) and male
6 condoms (OR=2.6; $p \leq 0.001$). HIV prevention training and family planning training were not
7 associated with FC counseling. HIV prevention training was associated with male condom
8 counseling in bivariate models, but in the multivariable models including a variable for
9 proportion of patients at risk of HIV (most/all), HIV training was no longer significant,
10 although high proportion of patients at risk of HIV was (OR=1.6; $p \leq 0.001$). Condom
11 counseling did not vary by urban versus rural clinical setting or in clinics or hospitals.

12
13 The in-depth interviews gave some insight into the reasons that some providers
14 might include the FC in counseling, while others might not, and what they think the best
15 approach is to encourage use. Many providers mentioned logistical factors in the interviews
16 that would restrict access to the method. Providers noted that FCs are more expensive than
17 male condoms and are not always supplied to clinics, especially in South Africa, where
18 availability was frequently mentioned as a problem. Several considered physical features as
19 method limitations, including discomfort and being highly visible.

20
21 Alternatively, many providers noted that some men who will not use a male condom
22 will agree to a FC, since the women puts it on. Providers noted that the FC could help
23 empower women since they could ensure it was used, although they also mentioned that
24 trust issues related to marriage and condom use arise with the female and male condom.
25 Many providers thought that husbands might be more willing to try female condoms if they
26 came with their wives to the clinic and were shown by the provider how to use it. As a
27 Zimbabwe physician said: "...the method is a bit awkward. It's quite difficult to use, so it
28 really remains for us to encourage the partner to accompany the lady to the surgery for
29 consultation so that we can have some kind of counseling between myself and the couple."
30 While counseling the couple was frequently brought up by providers, in one clinic the
31 provider also mentioned clinic support groups with peer counseling to help women to initiate

1
2
3 condom use. In the interviews most providers explained that in counseling adolescents, they
4 discussed abstinence and saying no to sex before marriage, which may explain the finding
5 in the survey data or lower counseling of adolescents on condom use in Zimbabwe. Some,
6 however, also mentioned condoms, after abstinence, and in South Africa, most providers in
7 the interviews reported they counseled adolescents on abstinence and condoms.
8
9
10
11
12
13

14 15 16 **DISCUSSION**

17
18 The FC was integrated into provider practices in Southern Africa, but to a lesser
19 extent than the male condom. Providers in Zimbabwe reported counseling patients on FCs
20 significantly more than providers in South Africa, which is likely attributable to the larger
21 public sector FC program in Zimbabwe, relative to population size. Providers across South
22 Africa may have been less likely to have learned about the FC due to the geographic
23 distance and smaller FC program per population. In South Africa, the government has
24 focused on reaching certain designated clinics with supplies and training so availability is not
25 yet ubiquitous. In the South African qualitative data, many providers commented that
26 availability in the clinic is still a problem, although the majority reported in the national
27 survey that if female condoms were more easily available, they would offer them. As in a
28 previous study from Kenya,⁽¹⁴⁾ providers from both countries noted in interviews that the
29 FC was not always available in clinics even though it was distributed in the public sector.
30 FCs, a basic technology, had counseling patterns that were similar in rural and urban areas
31 and clinics and hospitals, unlike for more sophisticated technologies which in general are
32 more available to urban populations or in hospital settings.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

49 Variations in counseling by patient type were wide in Zimbabwe, with high levels of
50 counseling for HIV-positive women. In Zimbabwe, providers were much less likely to report
51 female and male condom counseling with adolescents than with women in general,
52 suggesting the need for provider training emphasizing the importance of education of
53 adolescents on safe sex, perhaps even prior to sexual initiation; less than half of Zimbabwe
54
55
56
57
58
59
60

1
2
3 adults in the 2010-2011 DHS, however, supported condom education for 12-14year olds.(7)
4
5 Zimbabwe providers were also less likely to report condom counseling with women using
6
7 hormonal contraception, signaling the need for emphasis on dual protection of STIs and
8
9 pregnancy. In both countries, providers were less likely to counsel married women than
10
11 unmarried women on FCs, although it is essential to give all women information in these
12
13 high-prevalence settings as many married women are at risk of acquiring HIV from their
14
15 marital partner. Condom use is less common among married women, although one study of
16
17 a condom intervention (female and male) showed increased use among HIV-positive
18
19 married women.(21) There were some signs in the qualitative data that providers thought
20
21 FCs might be more acceptable in marriage than male condoms in some cases where the
22
23 woman would be willing to make the effort and ensure use was consistent. However,
24
25 providers noted trust issues may also arise with female condoms. Another early study from
26
27 the U.S. identified similar training needs among providers who saw FCs as appropriate for
28
29 only certain groups of women, such as HIV-positive women.(13)
30
31

32 A number of providers reported a desire for more FC training, signaling the need for
33
34 continued investment in programs and policies to support access to the FC in both
35
36 countries. Previous research from South Africa has demonstrated the positive impact of
37
38 training on provider attitudes.(13) Our results showed that neither having previous HIV
39
40 training nor serving a high proportion of at-risk patients significantly increased likelihood of
41
42 provider counseling on FCs. Efforts should be made to ensure that HIV and family planning
43
44 training in both countries include FCs, given the wider availability of supplies in recent
45
46 years. The finding that nurses were significantly more likely than physicians to report
47
48 counseling women on both male and female condoms reflects the prominent role that
49
50 nurses play in prevention counseling; nurses therefore should be a priority for training as
51
52 they deliver much of the primary care. However, physicians should also be prepared to
53
54 counsel women and men about their options for dual protection against pregnancy and
55
56 STIs.
57
58
59
60

1
2
3 Providers reported a strong need for new female-initiated barrier methods for
4 prevention and, similar to prior research from the U.S. and South Africa,(13) several
5 providers demonstrated negative attitudes about the aesthetics and use of the FC during
6 qualitative interviews. This finding suggests that current technologies may not meet all their
7 patient needs or are not adequately well-known or accessible, though it is important to note
8 that this research was conducted just before the new FC2 was approved by the USFDA. The
9 reported desire for training suggests that even as we work to develop new technologies, we
10 must also invest in programs and policies that ensure the potential for available existing
11 technologies is achieved.
12
13

14
15
16
17
18
19
20
21
22 These findings must be considered in light of study limitations. We did not ask
23 providers directly about stocking of FCs in their health care systems or whether they had
24 prior training in FC counseling. Expense to the health system and availability at the clinic
25 level (in addition to whether they have had prior training on FC provision) would influence
26 their ability to provide them and thus the likelihood that they counsel patients. Since
27 providers are reporting on their counseling practices, it is likely that social desirability bias
28 influenced responses toward more comprehensive levels of prevention counseling; therefore
29 patients for whom we measured low levels of counseling are likely to be in even greater
30 need of FC education. Our study also has important strengths. Our nationally
31 representative surveys (with relatively high response rates) allow us to generalize about
32 providers' counseling and provision practices in these two countries; this is the first research
33 on FC counseling and provision in Southern Africa to include representative national samples
34 of providers. Further, very few data existed previously on FC counseling and provision in
35 sub-Saharan Africa overall and our study contributes significantly to the literature on this
36 topic by providing information on current provider practices in two high HIV-prevalence
37 countries.
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53

54
55 As discussed in Mantell et al. (2000), a number of previous studies have documented
56 the role of providers as "gatekeepers" to new products and the influence that provider
57
58
59
60

1
2
3 acceptance of new prevention methods can have on their successful introduction and
4 uptake. (22) Thus provider practices and support are essential to the successful integration
5 of the FC into HIV and family planning services, and ultimately to ensuring women can
6 protect themselves from both STI infection and unintended pregnancy. Our findings
7 revealed provider support for the FC as a dual-protection method, and a significant need for
8 further work promoting provider counseling in particular with adolescents, married women,
9 and women using hormonal contraception.
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

TABLE 1: Provider and Practice Characteristics

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Gender, n (%)			
Female	674 (82)	547 (90)	1221 (86)
Male	145 (18)	62 (10)	207 (15)
Provider type, n (%)			
Nurse	792 (95)	528 (86)	1320 (91)
Physician	38 (5)	86 (14)	124 (9)
Age, median years (range)	39 (20-74)	43 (23-69)	41 (20-74)
Previous training, n (%)			
HIV Prevention	629 (77)	510 (84)	1139 (80)
Family Planning	503 (61)	399 (66)	902 (63)
Type of facility, n (%)			
Hospital	484 (59)	309 (50)	793 (55)
Clinic	342 (41)	305 (50)	647 (45)
Location, n (%)			
Urban	375 (45)	315 (51)	690 (48)
Rural	451 (55)	299 (49)	750 (52)
Proportion of patients at risk for HIV, n (%)			
None/Some	175 (22)	46 (8)	221 (16)
Half	112 (14)	92 (15)	204 (14)
Most/All	524 (65)	470 (77)	994 (70)

TABLE 2: Condom Counseling and Provision Practices and Female Condom Beliefs

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Currently offers condoms, n (%)			
Female condoms***	756 (94)	483 (80)	1,239 (88)
Male condoms	796 (99)	599 (99)	1,395 (99)
Would offer female condoms if more Easily available, n (%)	230 (31)	129 (22)	359 (27)
Among providers offering female condoms, counsels routinely with..., n (%) (N=1,226)			
Women in general***	602 (80)	329 (69)	931 (76)
Female teenagers***	377 (50)	328 (69)	705 (58)
HIV-positive women***	711 (95)	352 (74)	1,063 (87)
Married women***	544 (72)	319(67)	863 (70)
Unmarried women***	622 (83)	342 (72)	964 (79)
Women using hormonal contraception	500 (67)	336 (71)	836 (68)
Among all providers, counsels routinely on female condoms with..., n (%)			
Women in general***	635 (78)	370 (62)	1005 (71)
Female teenagers***	403 (50)	372 (62)	775 (55)
HIV-positive women***	761 (93)	400 (67)	1161 (82)
Married women***	573 (70)	358 (60)	931 (66)
Unmarried women***	658 (81)	385 (64)	1,043 (74)

1				
2				
3				
4	Women using hormonal contraception	529 (65)	380 (64)	909 (65)
5				
6				
7	Among all providers, counsels routinely on			
8	male condoms with..., n (%)			
9				
10	Women in general***	652 (80)	542 (90)	1194 (84)
11	Female teenagers***	448 (56)	565 (94)	1013 (72)
12	HIV-positive women	786 (97)	578 (96)	1,364 (96)
13	Married women***	610 (75)	514 (85)	1,124 (79)
14	Unmarried women***	683 (85)	554 (92)	1,237 (88)
15	Women using hormonal contraception***	537 (66)	535 (90)	1,072 (76)
16				
17				
18				
19				
20				
21				
22	Believes female condoms appropriate	800 (98)	503 (84)	1303 (92)
23	contraception for women at risk of HIV			
24	infection, n (%)***			
25				
26				
27	Believes female condoms appropriate	794 (97)	519 (87)	1,313 (93)
28	contraception for HIV-positive women, n			
29	(%)***			
30				
31				
32	Routinely talks to female patients about	718 (88)	536 (90)	1254 (89)
33	pregnancy and HIV/STI prevention in			
34	same visit, n (%)			
35				
36				
37	Believes there is a need for more female			
38	barrier methods for HIV/STI prevention,			
39	scale 1-10, n (%)			
40	High (9-10)	537 (67)	412 (70)	949 (68)
41	Medium-High (7-8)	140 (17)	102 (17)	242 (17)
42	Medium (5-6)	72 (9)	45 (8)	117 (8)
43	Medium-Low (3-4)	23 (3)	7 (1)	30 (2)
44	Low (1-2)	35 (4)	23 (4)	58 (4)
45				
46				
47				
48				
49				
50				
51				
52	Would like training on condoms, n (%)			
53	Female condoms***	112 (14)	165 (28)	277 (20)
54	Male condoms***	56 (7)	109 (18)	165 (12)
55				
56				
57				
58				
59				
60				

1
2
3 *p≤0.05 **p≤0.010 ***p≤0.001
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

TABLE 3: Condom Counseling of Female Patients among Providers in South Africa and Zimbabwe: Odds Ratios from Multivariable Logistic Regression

Routine Condom Counseling (usually/always)	FEMALE condoms OR [95% CI]	MALE condoms OR [95% CI]
Country		
Zimbabwe (reference)	—	—
South Africa	0.48*** [.35 .68]	2.39*** [1.57 3.65]
Age (years)	1.02*** [1.02 1.05]	1.01 [1.00 1.03]
Provider type		
Physician (reference)	—	—
Nurse	5.41*** [3.26 8.98]	2.60** [1.47 4.58]
Trained in HIV Prevention	0.90 [.62 1.05]	1.35 [.87 2.08]
Trained in Family Planning	0.98 [.71 1.35]	1.02 [.70 1.51]
Facility Type		
Hospital (reference)	—	—
Clinic	0.88 [.61 1.25]	1.21 [.76 1.94]
Location		
Rural (reference)	—	—
Urban	0.85 [.61 1.25]	1.42 [0.93 2.14]
Most/all patients at HIV risk	1.21 [0.92 1.59]	1.58** [1.12 2.22]
Chi square (8 degrees of freedom)	96.08	70.24
N	1,324	1,328

*p ≤ 0.05 ** p ≤ 0.010 ***p ≤ 0.001

OR Odds Ratio

Acknowledgements

We gratefully acknowledge the National Institute of Child Health and Human Development for support of this study, NIH/NICHHD R01 HD046027. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

We are thankful for our field staff and the thoughtful contributions of our study participants.

Data presented at the American Public Health Association annual meeting, Denver, 2010

For peer review only

REFERENCES

1. Kurth AE, Celum C, Baeten JM, et al. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 2011;**8**(1):62-72.
2. Vijayakumar G, Mabude Z, Smit J, et al. A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *Int J STD AIDS* 2006;**17**(10):652-9.
3. Abdool Karim Q, Abdool Karim S, Frohlich J, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010;**329**(5996):1168.
4. CDC. CDC Issues Interim Guidance on Use of Medication to Prevent HIV Infection among Heterosexually Active Adults. 2012 [cited 2012 December 05]; Available from: <http://www.cdc.gov/nchhstp/newsroom/2012/PrEP-HeterosexualGuidance-PressRelease.html>.
5. UNAIDS. UNAIDS Outlook 2010. Switzerland: 2010.
6. Shisana O, Council HSR, Centre for AIDS Development R, et al. South African national HIV prevalence, incidence, behaviour and communication survey, 2008: A turning tide among teenagers?: HSRC Press; 2009.
7. Zimbabwe National Statistics Agency, International ICF. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc., 2012.

- 1
2
3 8. Sedgh G, Hussain R, Bankole A, et al. Women with an unmet need for contraception in
4
5 developing countries and their reasons for not using a method. *Occasional Report* 2007;**37**:5-40.
6
7
- 8
9
10 9. Department of Health, Medical Research Council, OrcMacro. South African Demographic and
11
12 Health Survey 2003. Praetoria: Department of Health, 2007.
13
14
- 15
16 10. Peters A, Jansen W, van Driel F. The female condom: the international denial of a strong
17
18 potential. *Reprod Health Matters* 2010;**18**(35):119-28.
19
20
- 21
22 11. CHANGE. Female Condoms and U.S. Foreign Assistance: An Unfinished Imperative for Women's
23
24 Health. Washington, D.C.: Center for Health and Gender Equity, 2011.
25
26
27
- 28
29 12. Reproductive Health Supplies Coalition. Female Condom Product Brief: Caucus on New and
30
31 Underused Reproductive Health Technologies. Brussels, Belgium: Reproductive Health Supplies
32
33 Coalition, 2012.
34
35
36
- 37
38 13. Mantell JE, Hoffman S, Weiss E, et al. The acceptability of the female condom: perspectives of
39
40 family planning providers in New York City, South Africa, and Nigeria. *J Urban Health* 2001;**78**(4):658-68.
41
42
43
- 44
45 14. Mung'ala L, Kilonzo N, Angala P, et al. Promoting female condoms in HIV voluntary counselling
46
47 and testing centres in Kenya. *Reprod Health Matters* 2006;**14**(28):99-103.
48
49
50
- 51
52 15. Kaler A. "It's some kind of women's empowerment": the ambiguity of the female condom as a
53
54 marker of female empowerment. *Soc Sci Med* 2001;**52**(5):783-96.
55
56
57
58
59
60

- 1
2
3 16. UNFPA. HIV Prevention Gains Momentum: Success in Female Condom Programming. New York:
4 UNFPA, 2011.
5
6
7
8
9
10 17. CHANGE. Female Condoms: Lessons from Zimbabwe. Washington, D.C.: Center for Health and
11 Gender Equity, 2010.
12
13
14
15
16 18. FHI. Female Condom Introduction in South Africa. Durham: 2007.
17
18
19
20
21 19. Republic of South Africa. COUNTRY PROGRESS REPORT ON THE DECLARATION OF
22 COMMITMENT ON HIV/AIDS. Republic of South Africa, 2010.
23
24
25
26
27 20. Harper C, Holt K, Nhemachena T, et al. Willingness of clinicians to integrate microbicides into
28 HIV prevention practices in Southern Africa. AIDS Behav 2012:Published Online First: 1 January 2012.
29 doi:10.1007/s10461-011-0109-6.
30
31
32
33
34
35
36 21. Callegari L, Harper CC, van der Straten A, et al. Consistent condom use in married Zimbabwean
37 women after a condom intervention. Sexually Transm Dis 2008;**35**(6):624-30.
38
39
40
41 22. Mantell JE, Scheepers E, Abdool Karim Q. Introducing the female condom through the public health
42 sector: Experiences from South Africa. AIDS Care 2000;**12**(5):589-601.
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9 **A nationally-representative survey of health care provider counseling and**
10 **provision of the female condom in South Africa and Zimbabwe**
11

12
13
14 **Short title: Provider counseling and provision of female condom in South Africa**
15 **and Zimbabwe**
16

17
18 Kelsey Holt¹, Kelly Blanchard², Tsungai Chipato³, Taazadza Nhemachena³, Maya Blum⁴,
19 Laura Stratton⁴, Neetha Morar⁵, Gita Ramjee⁵, Cynthia C. Harper⁴
20
21

22
23
24 1 Harvard School of Public Health, Boston, MA, USA (at the time of the study, Ms. Holt was
25 at Ibis Reproductive Health, Cambridge, MA, USA); 2 Ibis Reproductive Health, Cambridge,
26 MA, USA, and Johannesburg, South Africa; 3 UZ-UZ-UCSF Collaborative Programme on
27 Women's Health, Harare, Zimbabwe; 4 Bixby Center for Global Reproductive Health,
28 Department of Obstetrics, Gynecology and Reproductive Sciences, University of California,
29 San Francisco, CA, USA; 5 South African Medical Research Council HIV Prevention Research
30 Unit, Durban, South Africa
31
32
33
34

35 **Words: 2,914**
36

37
38 **Corresponding Author:** Kelsey Holt, MA; 216 West Broadway, Boston, MA 02127; phone
39 617-455-2693; email keh125@mail.harvard.edu
40
41

42
43 **Keywords:** HIV; prevention; condoms, female; health care providers; Africa, southern
44
45
46
47
48
49
50
51
52
53
54

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Article summary

1) Article focus:

- Cross-sectional study examining current female condom counseling and provision practices among a nationally-representative sample of health care providers in South Africa and Zimbabwe
- Assessment of whether providers view female condoms as more appropriate for certain types of patients, and how their FC practices varied compared to those for male condoms

2) Key Messages:

- Most providers reported offering female condoms (more so in Zimbabwe than in South Africa) but perceived a need for novel female barrier methods for HIV/STI prevention, suggesting female condoms do not meet all patient/provider needs or are not adequately well-known or accessible
- Providers reported less frequent female condom counseling of adolescents, women using hormonal contraception, and married women, compared to unmarried or HIV-positive women, suggesting the need for training emphasizing the importance of female condom counseling with all women
- Providers should be included in HIV training efforts to raise awareness of new and existing products

3) Strengths and Limitations:

- Strengths: this is the first nationally-representative survey in South Africa or Zimbabwe examining female condom counseling and provision and we obtained high response rates; thus, we are able to generalize to the entire provider populations of these two high HIV prevalence countries
- Limitations: Potential social desirability bias may have influenced responses toward more comprehensive levels of prevention counseling

Abstract

Objectives: Female condoms are the only female-initiated HIV and pregnancy prevention technology currently available. We examined female condom counseling and provision among providers in South Africa and Zimbabwe, high HIV-prevalence countries.

Design: Cross-sectional study using a nationally-representative survey.

Setting: All facilities that provide family planning or HIV/STI services in the two countries.

Participants: National probability sample of 1,444 nurses and physicians who provide family planning or HIV/STI services.

Primary and secondary outcome measures: Female condom practices with different female patients, including adolescents, married women, women using hormonal contraception, and by HIV status. Using multivariable logistic analysis, we measured variations in condom counseling by provider characteristics.

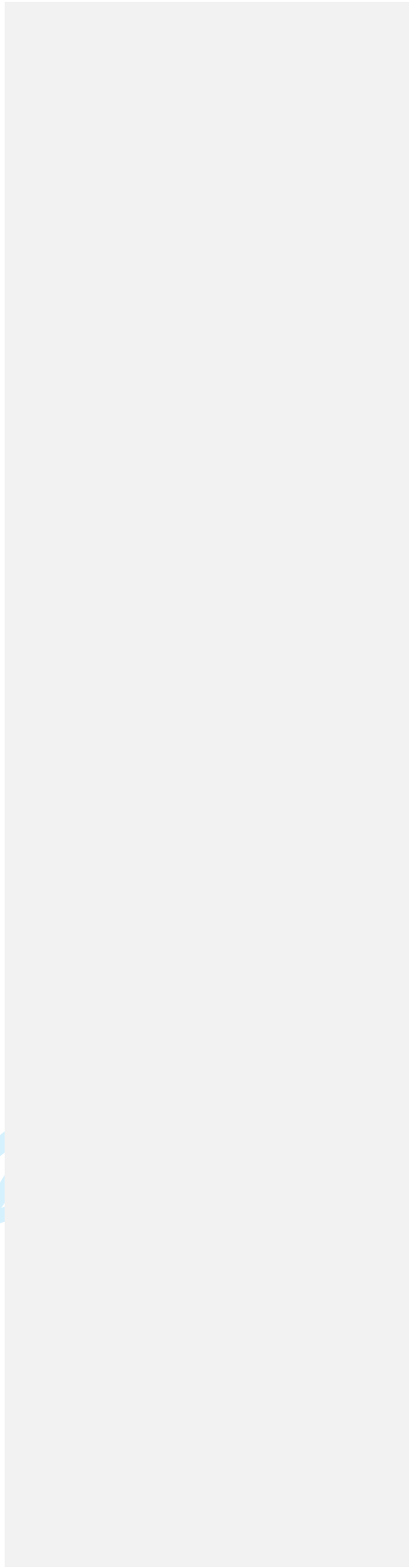
Results: Most providers reported offering female condoms (88%), but perceived a need for novel female barrier methods for HIV/STI prevention (85%). By patient type, providers reported less frequent female condom counseling of adolescents (55%), women using hormonal contraception (65%), and married women (66%), compared to unmarried (74%) or HIV-positive women (82%). Multivariable results showed providers in South Africa were less likely to counsel women on female condoms than in Zimbabwe (OR=0.48, 95% CI: 0.35-0.68, $p \leq 0.001$). However, South African providers were more likely to counsel women on male condoms (OR=2.39, 95% CI: 1.57-3.65, $p \leq 0.001$). Nurses counseled patients on female condoms more frequently than physicians (OR=5.41, 95% CI: 3.26-8.98, $p \leq 0.001$). HIV training, family planning training, provider location (urban vs. rural), and facility type (hospital vs. clinic) were not associated with greater condom counseling.

Conclusions: Female condoms were integrated into provider counseling and care, although providers reported a need for new female-initiated multipurpose prevention technologies, suggesting female condoms do not meet all patient/provider needs or are not

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

adequately well-known or accessible. Providers should be included in HIV training efforts to raise awareness of new and existing products, and encouraged to educate all women.

For peer review only



INTRODUCTION

There is growing recognition that no single intervention will be sufficient to halt the HIV epidemic and that combination prevention strategies tailored to the needs of specific populations have the most potential for decreasing HIV infection rates.(1) The female condom (FC) is the only available alternative to the male condom that provides protection from both HIV/STI infection and pregnancy, and it is a method that women can initiate. A review of research on the FC concluded that increased access to the method leads to an increase in protected sex acts in a population, and decreased STI incidence.(2) ~~Though~~ There have been promising results from recent clinical trials testing the effectiveness of novel woman-initiated methods of HIV prevention, including microbicides(3) and pre-exposure prophylaxis, which was recently endorsed by the Centers for Disease Control and Prevention (CDC) in the United States (U.S.) for use by heterosexual women at very high risk for HIV infection (e.g., women with HIV-positive sex partners). (4) ~~However,~~ conclusive proof of effectiveness and registration of a new woman-initiated HIV-prevention product recommended for widespread use is unlikely for a number of years, and the FC ~~continues to fill this important niche~~ will remain an important option for women who desire pregnancy prevention and STI protection from a single product.

In sub-Saharan Africa, women are at increased risk of HIV/AIDS and heterosexual sex is the predominant mode of transmission.(5) HIV prevalence among women was estimated at 33% in the peak ages (25-29 years) in South Africa in 2008 and 29% in Zimbabwe (30-39 years) in 2010-2011.(6, 7) Among young people ages 15-24, HIV prevalence was 8.6% in South Africa in 2008 and 5.5% in Zimbabwe in 2010-11. (6,7) Additionally, 24% of married women and 9% of never-married women in sub-Saharan Africa have an unmet need for contraception—rates higher than elsewhere in the developing world.(8) In South Africa and Zimbabwe, reported use of the FC is less than 1% compared

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

to 4-6% use of male condoms among married women in peak ages [of HIV prevalence \(25-29 years in South Africa and 30-39 years in Zimbabwe\)](#).(7, 9)

Since the United States Food and Drug Administration (USFDA) approved the first available product—the FC1—in 1993, there has been a lack of commitment and resources to expand access to the FC among the international policy community.(10) In 2009, the USFDA approved a second-generation FC called FC2 made of synthetic latex rather than polyurethane. The FC2 is less expensive and makes less noise when used;(10) other new FC technologies are in development and could reduce costs further. In addition, the 2010 and 2011 U.S. PEPFAR *Fiscal Year Country Operational Plan (COP) Guidance* specifically mentioned the importance of FCs in country program plans [and the Caucus on New and Underused Reproductive Health Technologies recently named the FC as one of several “underused” reproductive health technologies](#).(11, 12) These new products and policy developments are positive signs of increased support for the FC.

Formatted: Highlight

Health care provider participation, however, is essential to the success of FC programs. Even if countries procure significant supplies, women and men may have limited knowledge and access if providers do not discuss and provide FCs. Unlike the male condom, the FC is typically obtained through provider contact, [\(not dispensers\)](#), in the public sector [with no cost to the user, although in some settings there is also a strong presence of social marketing campaigns](#). Training and accurate information from providers could increase acceptability and sustained use of the FC.(10)

Few studies have examined counseling and provision practices for FCs in sub-Saharan Africa. Three early case studies exploring family planning providers’ attitudes about the FC in South Africa and Nigeria (where the FC was not yet introduced in the public sector), and the [United States \(U.S.\)](#) found that U.S. providers lacked knowledge on the FC despite product availability and saw the method as appropriate only for certain women, such as sex workers or HIV-positive women.(123) In the U.S. and South Africa, providers reported negative attitudes about the aesthetics and use of the FC, although providers in

1
2
3
4
5
6
7
8
9 South Africa were more enthusiastic after receiving training. In a study of voluntary
10 counseling and testing counselors in Kenya, many counselors recognized the need for a
11 female-initiated prevention method but felt uncomfortable with FCs or expressed concern
12 about counseling when FCs were not widely available.⁽¹³⁴⁾ [In another small qualitative](#)
13 [study of provider FC opinions in Kenya, several health care providers reported support for](#)
14 [FCs due to belief that FCs give women "choice" and "control."](#) ⁽¹⁵⁾ These studies, albeit
15 small and non-generalizable, suggest a need for further investment in supporting providers
16 to counsel and offer women the FC.
17
18
19
20
21

22 In this nationally-representative study of physicians and nurses, we examined FC
23 counseling and provision practices in South Africa and Zimbabwe. The two countries have
24 different histories of FC introduction that could impact provision at the health service level.
25 Zimbabwe was one of the first countries to introduce FCs in 1997 through the public sector
26 and innovative social marketing campaigns. Scale-up of male and female condoms in recent
27 years has been based on a national comprehensive behavior change strategy to reduce
28 sexual transmission of HIV [and FCs are now offered in all public-sector facilities.](#)^(146, 17)
29 FC distribution in the public sector in Zimbabwe increased from about 400,000 in 2005 to
30 more than 2,000,000 in 2008 and social marketing sales have risen from about 900,000 in
31 2005 to more than 3,000,000 in 2008.⁽¹⁴⁶⁾ South Africa introduced the FC shortly after
32 Zimbabwe in 1998 primarily through public-sector family planning clinics and community-
33 based programs; ~~(158) social marketing promotion efforts also exist.~~ FC distribution in
34 South Africa is among the highest in the world (4.3 million FCs distributed in public sector in
35 2008);⁽¹⁶⁹⁾ however, [FCs are not yet available in all public-sector facilities in South Africa](#)
36 [and](#) proportional to population size (the population of South Africa is approximately four
37 times that of Zimbabwe), Zimbabwe has higher distribution rates. [Given these distribution](#)
38 [efforts to increase stocking and availability in both countries, we still lack national estimates](#)
39 [of how many providers are able to offer female condoms to patients.](#)
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

We investigated counseling and provision practices among a nationally-representative sample of providers to gauge the prevention services offered to a range of patients in varied clinical settings. We assessed whether providers view FCs as more appropriate for certain types of patients, and how their FC [counseling](#) practices varied compared to those for male condoms. The results have the potential to inform efforts to prepare providers to expand access to this female-initiated prevention method for their patients.

METHODS

This study is part of a mixed-methods research project in Southern Africa investigating providers' pregnancy and STI/HIV prevention practices. We completed national probability surveys of physicians and nurses in South Africa and Zimbabwe in 2009. Participants answered a series of questions on female and male condom counseling and provision practices, as well as demographic and professional practice characteristics and patient population. The surveys were preceded by 60 in-depth interviews of providers serving female patients at risk of HIV, which revealed their views of FC use within their patient populations.

We used a multistage, facility-based approach to generate a national probability survey sample of providers. We randomly selected districts (with probability proportional to size, [based on estimated numbers of physicians and nurses](#)), then facilities that provided family planning or HIV/STI services within those districts (stratified by type—hospital or clinic—and probability proportional to size), and recruited all providers from those facilities who provided family planning or HIV/STI services. [The sample consists of public facilities in South Africa and Zimbabwe. Some non-governmental organizations are included in Zimbabwe as they deliver primary care, and specifically family planning, to low-income populations. The final sample included 1,019 providers representing 116 facilities \(or 89% of the total 130 selected facilities\) from South Africa and 953 providers representing 130](#)

Formatted: Font: Verdana, 10 pt, Not Bold

1
2
3
4
5
6
7
8
9 [facilities from Zimbabwe \(94% of the total 138 facilities selected\).](#) The methodology has
10 been described in detail elsewhere. ~~(2017) The final sample included 1,019 providers~~
11 ~~representing 116 facilities from South Africa and 953 providers representing 130 facilities~~
12 ~~from Zimbabwe.~~

13
14
15 Data were collected via self-administered questionnaires distributed in-person in
16 Zimbabwe and telephone-administered questionnaires in South Africa (costs of in-person
17 visits were prohibitive due to the large country size). [Approvals were granted as required](#)
18 [in each country, at the national, provincial, district and facility levels. In South Africa,](#)
19 [provincial approval was granted, as well as district-level approval where required by the](#)
20 [facility. In Zimbabwe, approval was granted at the national level, and either the provincial](#)
21 [or district level, as needed.](#) The study was approved by the University of KwaZulu-Natal
22 Biomedical Research Ethics Administration, the Medical Research Council of Zimbabwe, the
23 Western Institutional Review Board, and the University of California, San Francisco
24 Committee on Human Research.
25
26

Formatted: Font: Verdana, 10 pt

Formatted: Font: Verdana, 10 pt

27
28
29
30
31
32 Providers were asked whether they currently provide the FC and the male condom,
33 and whether they would like to receive more training (yes/no). Providers were also asked
34 about the frequency of female (and male) condom counseling, on a 4-point Likert scale
35 (never, sometimes, usually, or always), with the following types of female patients: women
36 in general, female teenagers, HIV-positive women, married women, unmarried women, and
37 women using hormonal contraception. They were asked whether they believe FCs are
38 appropriate contraceptives for women at risk of HIV infection (yes/no) and HIV-positive
39 women (yes/no), whether they routinely talk to female patients about pregnancy and
40 HIV/STI prevention in the same visit (yes/no), and how much of a need there is for more
41 female barrier methods for HIV/STI prevention (on a scale of 1-10).
42
43
44
45
46
47
48

49 We assessed clinician practices by country for different types of female patients in
50 these high HIV prevalence settings, using chi-square statistics for categorical variables and
51 t-tests for continuous variables. We analyzed condom counseling practices with
52
53
54

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

multivariable logistic regression to assess FC counseling by provider and practice-related characteristics. We also analyzed male condom counseling practices for comparison [using the same set of predictors](#). The [two](#) outcome variables were routine (usually/always) counseling on female [condoms](#) and [routine counseling on](#) male condoms. We adjusted analyses for the facility-based sampling scheme to account for clustering at the facility level. We used Stata 11.0 (College Station, TX) for analyses. Significance was defined as $P < 0.05$. We conducted thematic analysis of qualitative data to investigate open-ended provider responses about their counseling and provision practices.

RESULTS

A total of 614 providers from South Africa and 830 providers from Zimbabwe completed the survey (N=1,444) with an overall response rate of 73.2%. In South Africa, the response rate did not differ between hospitals (61%) and clinics (60%), though nurses were more likely to respond than physicians (66% versus 39%). In Zimbabwe, providers in hospitals were more likely to respond than in clinics (92% versus 81%), and physicians were more likely to respond than nurses (100% versus 87%). [The most common reason for not responding was busy clinic load or that the staff was not at the clinic](#). The majority surveyed in both countries were ~~female (86%)~~, nurses (91%) (Table 1). (17) [Ninety-six percent of the nurses were female, and overall 86% of participants were female](#). Most reported prior training in HIV prevention (80%) and family planning (63%). Participants were split between hospital (55%) and clinic (45%) settings, and urban (48%) and rural (52%) areas. [Virtually all providers served adult women of reproductive age \(99.7%\), female teens \(98%\), and the majority also saw male patients \(86%\)](#). The majority (70%) reported that most or all of their patients are at risk for HIV.

Almost all (99%) providers reported currently offering male condoms to patients (Table 2). A large majority in both countries (88%) reported offering FCs, with a lower proportion in South Africa (80%) than Zimbabwe (94%) ($p \leq 0.001$). [While most physicians](#)

1
2
3
4
5
6
7
8
9 offer female condoms (72%), a significantly higher proportion of nurses do (89%)
10 ($p \leq 0.001$). Availability is an important factor in being able to offer a method, and 27% of
11 providers reported they would offer female condoms if more easily available. Among the
12 small proportion currently not offering female condoms (13% $n=169$), 68% in South Africa
13 reported they would if it were more easily available and 54% in Zimbabwe. More providers
14 in South Africa (28%) than Zimbabwe (14%) reported that they would like training on FCs
15 ($p \leq 0.001$).

16
17
18
19
20
21 Seventy-one percent reported routinely counseling (usually or always) women on
22 FCs; more providers reported FC counseling for HIV-positive (82%) and unmarried women
23 (74%), and fewer reported counseling for married women (66%), women using hormonal
24 contraception (65%), and female adolescents (55%). Most of these differences in
25 counseling by patient type were due to large variations in Zimbabwe where counseling for
26 HIV-positive women was 93%, but for adolescents was 50% (Table 2). In South Africa,
27 there was a lower level of routine counseling in general (62%), with little difference among
28 the patient types, ranging from 67% of HIV-positive women to 62% of adolescents.
29 However, 90% of providers in South Africa reported routine male condom counseling with
30 female patients compared to 80% in Zimbabwe. Similar within-country counseling patterns
31 held true for male condoms, with 94% routinely counseling female adolescents in South
32 Africa compared to 56% in Zimbabwe.

33
34
35
36
37
38
39
40 Support for the FC as a contraceptive method for HIV-positive women or women at
41 risk of HIV infection was high overall; in Zimbabwe there was near universal support for
42 women at risk of HIV infection (98% versus 84% in South Africa; $p \leq 0.001$) or HIV-positive
43 women (97% and 87%, respectively; $p \leq 0.001$) (Table 2). The large majority (89%)
44 reported routinely talking to female patients about pregnancy and HIV/STI prevention in the
45 same visit. About two-thirds of providers (68%) believed there is a very high (9 or 10 on a
46 scale of 1-10) need for more female barrier methods for HIV/STI prevention.
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

In multivariable logistic regression, several provider characteristics were found to be significantly associated with routine condom counseling (Table 3). Providers in South Africa were significantly less likely to counsel female patients on the FC (OR=0.48; $p \leq 0.001$), and more likely to counsel on the male condom (OR=2.4; $p \leq 0.001$). Provider age was positively associated with FC counseling (OR=1.02; $p \leq 0.001$), and nurses were significantly more likely than physicians to counsel patients on both female (OR=5.4; $p \leq 0.001$) and male condoms (OR=2.6; $p \leq 0.001$). HIV prevention training and family planning training were not associated with FC counseling. HIV prevention training was associated with male condom counseling in bivariate models, but in the multivariable models including a variable for proportion of patients at risk of HIV (most/all), HIV training was no longer significant, although high proportion of patients at risk of HIV was (OR=1.6; $p \leq 0.001$). Condom counseling did not vary by urban versus rural clinical setting or in clinics or hospitals.

The in-depth interviews gave some insight into the reasons that some providers might include the FC in counseling, while others might not, [and what they think the best approach is to encourage use](#). Many providers mentioned logistical factors in the interviews [that, as well as physical attributes, which might would restrict access to the method use](#). Providers noted that FCs are [more expensive than male condoms](#) and are not always [supplied to available in clinics, especially in South Africa, where availability was frequently mentioned as a problem](#). Several considered physical features as method limitations, including discomfort and being highly visible.

Alternatively, many providers noted that some men who will not use a male condom will agree to a FC, since the woman puts it on. Providers noted that the FC could help empower women since they could ensure it was used, [although they also mentioned that trust issues related to marriage and condom use arise with the female and male condom](#). [Many providers thought that husbands might be more willing to try female condoms if they came with their wives to the clinic and were shown by the provider how to use it. As a Zimbabwe physician said: "...the method is a bit awkward. It's quite difficult to use, so it](#)

1
2
3
4
5
6
7
8
9 [really remains for us to encourage the partner to accompany the lady to the surgery for](#)
10 [consultation so that we can have some kind of counseling between myself and the couple.”](#)
11 [While counseling the couple was frequently brought up by providers, in one clinic the](#)
12 [provider also mentioned clinic support groups with peer counseling to help women to initiate](#)
13 [condom use-](#)

14
15
16
17 [In the interviews most providers explained that in counseling adolescents, they](#)
18 [discussed abstinence and saying no to sex before marriage, which may explain the finding](#)
19 [in the survey data or lower counseling of adolescents on condom use in Zimbabwe. Some,](#)
20 [however, also mentioned condoms, after abstinence, and in South Africa, most providers in](#)
21 [the interviews reported they counseled adolescents on abstinence and condoms.](#)
22
23
24
25
26

27 DISCUSSION

28
29 The FC was integrated into provider practices in Southern Africa, but to a lesser
30 extent than the male condom. Providers in Zimbabwe reported counseling patients on FCs
31 significantly more than providers in South Africa, which is likely attributable to the larger
32 public sector FC program in Zimbabwe, relative to population size. Providers across South
33 Africa may have been less likely to have learned about the FC due to the geographic
34 distance and smaller FC program per population. [In South Africa, the government has](#)
35 [focused on reaching certain designated clinics with supplies and training so availability is not](#)
36 [yet ubiquitous. In the South African qualitative data, many providers commented that](#)
37 [availability in the clinic is still a problem, although the majority reported in the national](#)
38 [survey that if female condoms were more easily available, they would offer them.](#) As in a
39 previous study from Kenya,⁽¹³⁴⁾ providers from both countries noted in interviews that the
40 FC was not always available in clinics even though it was distributed in the public sector.
41
42 FCs, a basic technology, had counseling patterns that were similar in rural and urban areas
43 and clinics and hospitals, unlike for more sophisticated technologies which in general are
44 more available to urban populations or in hospital settings.
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Variations in counseling by patient type were wide in Zimbabwe, with high levels of counseling for HIV-positive women. In Zimbabwe, providers were much less likely to report female and male condom counseling with adolescents than with women in general, suggesting the need for provider training emphasizing the importance of education of adolescents on safe sex, perhaps even prior to sexual initiation; less than half of Zimbabwe adults in the 2010-2011 DHS, however, supported condom education for 12-14-year olds.⁽⁷⁾ Zimbabwe providers were also less likely to report condom counseling with women using hormonal contraception, signaling the need for emphasis on dual protection of STIs and pregnancy. In both countries, providers were less likely to counsel married women than unmarried women on FCs, although it is essential to give all women information in these high-prevalence settings [as many married women are at risk of acquiring HIV from their marital partner](#). Condom use is less common among married women, although one study of a condom intervention (female and male) showed increased use among HIV-positive married women.⁽²¹⁴⁸⁾ There were some signs in the qualitative data that providers thought FCs might be more acceptable in marriage than male condoms in some cases where the woman would be willing to make the effort and ensure use was consistent. [However, providers noted trust issues may also arise with female condoms](#). Another early study from the U.S. identified similar training needs among providers who saw FCs as appropriate for only certain groups of women, such as HIV-positive women.⁽¹²¹³⁾

A number of providers reported a desire for more FC training, signaling the need for continued investment in programs and policies to support access to the FC in both countries. Previous research from South Africa has demonstrated the positive impact of training on provider attitudes.⁽¹²¹³⁾ Our results showed that neither having previous HIV training nor serving a high proportion of at-risk patients significantly increased likelihood of provider counseling on FCs. Efforts should be made to ensure that HIV and family planning training in both countries include FCs, given the wider availability of supplies in recent years. The finding that nurses were significantly more likely than physicians to report

1
2
3
4
5
6
7
8
9 counseling women on both male and female condoms reflects the prominent role that
10 nurses play in prevention counseling; [nurses therefore should be a priority for training as](#)
11 [they deliver much of the primary care.](#)¹¹ However, physicians should also be prepared to
12
13 counsel women and men about their options for dual protection against pregnancy and
14
15 STIs.
16

17 Providers reported a strong need for new female-initiated barrier methods for
18 prevention and, similar to prior research from the U.S. and South Africa,⁽¹²³⁾ several
19 providers demonstrated negative attitudes about the aesthetics and use of the FC during
20 qualitative interviews. This finding suggests that current technologies may not meet all their
21 patient needs or are not adequately well-known or accessible, though it is important to note
22 that this research was conducted just before the new FC2 was approved by the USFDA. The
23 reported desire for training suggests that even as we work to develop new technologies, we
24 must also invest in programs and policies that ensure the potential for available existing
25 technologies is achieved.
26
27
28
29
30
31

32 These findings must be considered in light of study limitations. We did not ask
33 providers [directly](#) about [stocking availability or procurement cost](#) of FCs in their health care
34 systems [or whether they had prior training in FC counseling](#). [Expense to the health system](#)
35 [and availability at the clinic level \(in addition to whether they have had prior training on FC](#)
36 [provision\)](#) ~~These factors might~~ [would](#) influence their ability to provide them and thus the
37 likelihood that they counsel patients. Since providers are reporting on their counseling
38 practices, it is likely that social desirability bias influenced responses toward more
39 comprehensive levels of prevention counseling; therefore patients for whom we measured
40 low levels of counseling are likely to be in even greater need of FC education. Our study
41 also has important strengths. Our nationally representative surveys (with relatively high
42 response rates) allow us to generalize about providers' counseling and provision practices in
43 these two countries; this is the first research on FC counseling and provision in Southern
44 Africa to include representative national samples of providers. Further, very few data
45
46
47
48
49
50
51
52
53

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

existed previously on FC counseling and provision in sub-Saharan Africa overall and our study contributes significantly to the literature on this topic by providing information on current provider practices in two high HIV-prevalence countries.

As discussed in Mantell et al. (2000), a number of previous studies have documented the role of providers as “gatekeepers” to new products and the influence that provider acceptance of new prevention methods can have on their successful introduction and uptake. (22) Thus p

Provider practices and support are essential to the successful integration of the FC into HIV and family planning services, and ultimately to ensuring women can protect themselves from both STI infection and unintended pregnancy. Our findings revealed provider support for the FC as a dual-protection method, and a significant need for further work promoting provider counseling in particular with adolescents, married women, and women using hormonal contraception.

Formatted: Not Highlight

TABLE 1: Provider and Practice Characteristics

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Gender, n (%)			
Female	674 (82)	547 (90)	1221 (86)
Male	145 (18)	62 (10)	207 (15)
Provider type, n (%)			
Nurse	792 (95)	528 (86)	1320 (91)
Physician	38 (5)	86 (14)	124 (9)
Age, median years (range)	39 (20-74)	43 (23-69)	41 (20-74)
Previous training, n (%)			
HIV Prevention	629 (77)	510 (84)	1139 (80)
Family Planning	503 (61)	399 (66)	902 (63)
Type of facility, n (%)			
Hospital	484 (59)	309 (50)	793 (55)
Clinic	342 (41)	305 (50)	647 (45)
Location, n (%)			
Urban	375 (45)	315 (51)	690 (48)
Rural	451 (55)	299 (49)	750 (52)
Proportion of patients at risk for HIV, n (%)			
None/Some	175 (22)	46 (8)	221 (16)
Half	112 (14)	92 (15)	204 (14)
Most/All	524 (65)	470 (77)	994 (70)

Formatted: Font: Bold

TABLE 2: Condom Counseling and Provision Practices and Female Condom Beliefs

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Currently offers condoms, n (%)			
Female condoms***	756 (94)	483 (80)	1,239 (88)
Male condoms	796 (99)	599 (99)	1,395 (99)
<u>Would offer female condoms if more Easily available, n (%)</u>	<u>230 (31)</u>	<u>129 (22)</u>	<u>359 (27)</u>
<u>Would like training on condoms, n (%)</u>			
Female condoms***	112 (14)	165 (28)	277 (20)
Male condoms***	56 (7)	109 (18)	165 (12)
<u>Among providers offering female condoms, counselors routinely with..., n (%) (N=1,226)</u>			
<u>Women in general***</u>	<u>602 (80)</u>	<u>329 (69)</u>	<u>931 (76)</u>
<u>Female teenagers***</u>	<u>377 (50)</u>	<u>328 (69)</u>	<u>705 (58)</u>
<u>HIV-positive women***</u>	<u>711 (95)</u>	<u>352 (74)</u>	<u>1,063 (87)</u>
<u>Married women***</u>	<u>544 (72)</u>	<u>319 (67)</u>	<u>863 (70)</u>
<u>Unmarried women***</u>	<u>622 (83)</u>	<u>342 (72)</u>	<u>964 (79)</u>
<u>Women using hormonal contraception</u>	<u>500 (67)</u>	<u>336 (71)</u>	<u>836 (68)</u>
<u>Among all providers, counselors routinely on female condoms with..., n (%)</u>			
Women in general***	635 (78)	370 (62)	1005 (71)
Female teenagers***	403 (50)	372 (62)	775 (55)
HIV-positive women***	761 (93)	400 (67)	1161 (82)
Married women***	573 (70)	358 (60)	931 (66)
Unmarried women***	658 (81)	385 (64)	1,043 (74)

Formatted: Space After: 6 pt, Don't add space between paragraphs of the same style

Formatted: Centered

Formatted: Left

Women using hormonal contraception	529 (65)	380 (64)	909 (65)
Among all providers, counsels routinely on male condoms with..., n (%)			
Women in general***	652 (80)	542 (90)	1194 (84)
Female teenagers***	448 (56)	565 (94)	1013 (72)
HIV-positive women	786 (97)	578 (96)	1,364 (96)
Married women***	610 (75)	514 (85)	1,124 (79)
Unmarried women***	683 (85)	554 (92)	1,237 (88)
Women using hormonal contraception***	537 (66)	535 (90)	1,072 (76)
Believes female condoms appropriate contraception for women at risk of HIV infection, n (%)***	800 (98)	503 (84)	1303 (92)
Believes female condoms appropriate contraception for HIV-positive women, n (%)***	794 (97)	519 (87)	1,313 (93)
Routinely talks to female patients about pregnancy and HIV/STI prevention in same visit, n (%)	718 (88)	536 (90)	1254 (89)
Believes there is a need for more female barrier methods for HIV/STI prevention, scale 1-10, n (%)			
High (9-10)	537 (67)	412 (70)	949 (68)
Medium-High (7-8)	140 (17)	102 (17)	242 (17)
Medium (5-6)	72 (9)	45 (8)	117 (8)
Medium-Low (3-4)	23 (3)	7 (1)	30 (2)
Low (1-2)	35 (4)	23 (4)	58 (4)
Would like training on condoms, n (%)			
<u>Female condoms***</u>	<u>112 (14)</u>	<u>165 (28)</u>	<u>277 (20)</u>
<u>Male condoms***</u>	<u>56 (7)</u>	<u>109 (18)</u>	<u>165 (12)</u>

Formatted Table

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

*p≤0.05 **p≤0.010 ***p≤0.001

For peer review only

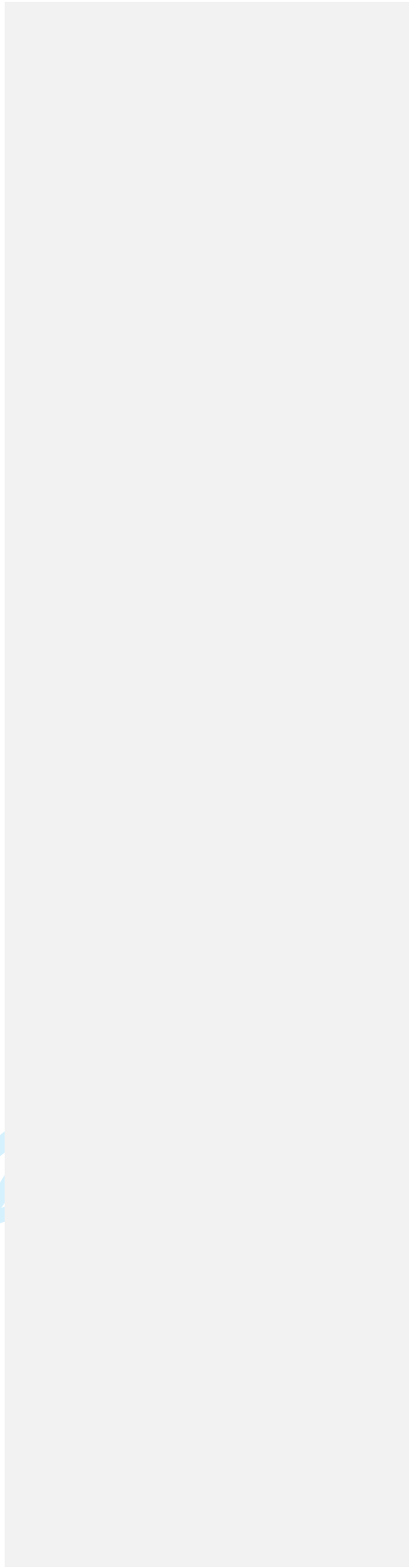


TABLE 3: Condom Counseling of Female Patients among Providers in South Africa and Zimbabwe: Odds Ratios from Multivariable Logistic Regression

Routine Condom Counseling (usually/always)	FEMALE condoms OR [95% CI]	MALE condoms OR [95% CI]
Country		
Zimbabwe (reference)	—	—
South Africa	0.48*** [.35 .68]	2.39*** [1.57 3.65]
Age (years)	1.02*** [1.02 1.05]	1.01 [1.00 1.03]
Provider type		
Physician (reference)	—	—
Nurse	5.41*** [3.26 8.98]	2.60** [1.47 4.58]
Trained in HIV Prevention	0.90 [.62 1.05]	1.35 [.87 2.08]
Trained in Family Planning	0.98 [.71 1.35]	1.02 [.70 1.51]
Facility Type		
Hospital (reference)	—	—
Clinic	0.88 [.61 1.25]	1.21 [.76 1.94]
Location		
Rural (reference)	—	—
Urban	0.85 [.61 1.25]	1.42 [0.93 2.14]
Most/all patients at HIV risk	1.21 [0.92 1.59]	1.58** [1.12 2.22]
Chi square (8 degrees of freedom)	96.08	70.24
N	1,324	1,328

*p ≤ 0.05 ** p ≤ 0.010 ***p ≤ 0.001

OR Odds Ratio

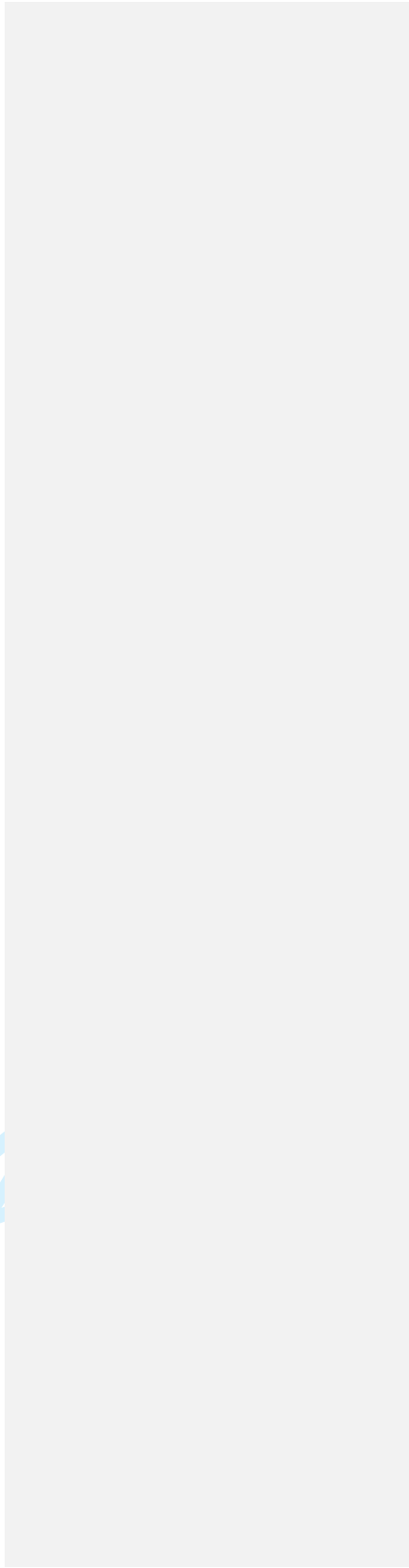
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Acknowledgements

We gratefully acknowledge the National Institute of Child Health and Human Development for support of this study, NIH/NICHD R01 HD046027. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH. We are thankful for our field staff and the thoughtful contributions of our study participants.

Data presented at the American Public Health Association annual meeting, Denver, 2010

For peer review only



REFERENCES

1. Kurth AE, Celum C, Baeten JM, et al. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 2011;**8**(1):62-72.
2. Vijayakumar G, Mabude Z, Smit J, et al. A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *Int J STD AIDS* 2006;**17**(10):652-9.
3. Abdool Karim Q, Abdool Karim S, Frohlich J, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010;**329**(5996):1168.
4. [CDC. CDC Issues Interim Guidance on Use of Medication to Prevent HIV Infection among Heterosexually Active Adults. 2012 \[cited 2012 December 05\]; Available from: <http://www.cdc.gov/nchhstp/newsroom/2012/PrEP-HeterosexualGuidance-PressRelease.html>. CDC- CDC Trial and Another Major Study Find PrEP Can Reduce Risk of HIV Infection among Heterosexuals. 2011 \[cited 2012 February 22\]; Available from: \[Error! Hyperlink reference not valid. http://www.cdc.gov/nchhstp/newsroom/PrEPHeterosexuals.html\]\(http://www.cdc.gov/nchhstp/newsroom/PrEPHeterosexuals.html\).](#)
5. UNAIDS. UNAIDS Outlook 2010. Switzerland: 2010.
6. Shisana O, Council HSR, Centre for AIDS Development R, et al. South African national HIV prevalence, incidence, behaviour and communication survey, 2008: A turning tide among teenagers?: HSRC Press; 2009.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

7. Zimbabwe National Statistics Agency, International ICF. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc., 2012.

8. Sedgh G, Hussain R, Bankole A, et al. Women with an unmet need for contraception in developing countries and their reasons for not using a method. Occasional Report 2007;**37**:5-40.

9. Department of Health, Medical Research Council, OrcMacro. South African Demographic and Health Survey 2003. Praetoria: Department of Health, 2007.

10. Peters A, Jansen W, van Driel F. The female condom: the international denial of a strong potential. Reprod Health Matters 2010;**18**(35):119-28.

11. CHANGE. Female Condoms and U.S. Foreign Assistance: An Unfinished Imperative for Women's Health. Washington, D.C.: Center for Health and Gender Equity, 2011.

12. Reproductive Health Supplies Coalition. Female Condom Product Brief: Caucus on New and Underused Reproductive Health Technologies. Brussels, Belgium: Reproductive Health Supplies Coalition, 2012.

Formatted: Not Highlight

123. Mantell JE, Hoffman S, Weiss E, et al. The acceptability of the female condom: perspectives of family planning providers in New York City, South Africa, and Nigeria. J Urban Health 2001;**78**(4):658-68.

134. Mung'ala L, Kilonzo N, Angala P, et al. Promoting female condoms in HIV voluntary counselling and testing centres in Kenya. Reprod Health Matters 2006;**14**(28):99-103.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

15. [Kaler A. "It's some kind of women's empowerment": the ambiguity of the female condom as a marker of female empowerment. Soc Sci Med 2001;52\(5\):783-96.](#)

Formatted: Font: Bold

146. UNFPA. HIV Prevention Gains Momentum: Success in Female Condom Programming. New York: UNFPA, 2011.

17. [CHANGE. Female Condoms: Lessons from Zimbabwe. Washington, D.C.: Center for Health and Gender Equity, 2010.](#)

158. FHI. Female Condom Introduction in South Africa. Durham: 2007.

196. Republic of South Africa. COUNTRY PROGRESS REPORT ON THE DECLARATION OF COMMITMENT ON HIV/AIDS. Republic of South Africa, 2010.

1720. Harper C, Holt K, Nhemachena T, et al. Willingness of clinicians to integrate microbicides into HIV prevention practices in Southern Africa. AIDS Behav 2012:Published Online First: 1 January 2012. doi:10.1007/s10461-011-0109-6.

2118. Callegari L, Harper CC, van der Straten A, et al. Consistent condom use in married Zimbabwean women after a condom intervention. Sexually Transm Dis 2008;35(6):624-30.

22. [Mantell JE, Scheepers E, Abdool Karim Q. Introducing the female condom through the public health sector: Experiences from South Africa. AIDS Care 2000;12\(5\):589-601.](#)

Formatted: Font: Bold



A nationally-representative survey of health care provider counseling and provision of the female condom in South Africa and Zimbabwe

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2012-002208.R2
Article Type:	Research
Date Submitted by the Author:	30-Jan-2013
Complete List of Authors:	Holt, Kelsey; Harvard School of Public Health, Department of Society, Human Development, and Health Blanchard, Kelly; Ibis Reproductive Health, Chipato, Tsungai; University of Zimbabwe-University of California San Francisco Collaborative Research Programme, Obstetrics and Gynecology Nhemachena, Tazaadza; University of Zimbabwe-University of California San Francisco Collaborative Research Programme, Obstetrics and Gynecology Blum, Maya; University of California, San Francisco, Ob-Gyn Stratton, Laura; University of California, San Francisco, Ob-Gyn Morar, Neetha; South African Medical Research Council, HIV Prevention Unit Ramjee, Gita; South African Medical Research Council, HIV Prevention Unit Harper, Cynthia; University of California, San Francisco, Ob-Gyn
Primary Subject Heading:	HIV/AIDS
Secondary Subject Heading:	Sexual health, Public health, Health services research, Infectious diseases
Keywords:	HIV, PREVENTION, Condoms, female, Health care providers, Africa, Southern

SCHOLARONE™
Manuscripts

1
2
3 **A nationally-representative survey of health care provider counseling and**
4 **provision of the female condom in South Africa and Zimbabwe**
5
6
7

8
9
10 **Short title: Provider counseling and provision of female condom in South Africa**
11 **and Zimbabwe**
12
13

14
15
16 Kelsey Holt¹, Kelly Blanchard², Tsungai Chipato³, Taazadza Nhemachena³, Maya Blum⁴,
17
18 Laura Stratton⁴, Neetha Morar⁵, Gita Ramjee⁵, Cynthia C. Harper⁴
19
20

21
22 1 Harvard School of Public Health, Boston, MA, USA (at the time of the study, Ms. Holt was
23
24 at Ibis Reproductive Health, Cambridge, MA, USA); 2 Ibis Reproductive Health, Cambridge,
25
26 MA, USA, and Johannesburg, South Africa; 3 UZ-UZ-UCSF Collaborative Programme on
27
28 Women's Health, Harare, Zimbabwe; 4 Bixby Center for Global Reproductive Health,
29
30 Department of Obstetrics, Gynecology and Reproductive Sciences, University of California,
31
32 San Francisco, CA, USA; 5 South African Medical Research Council HIV Prevention Research
33
34 Unit, Durban, South Africa
35

36 **Words: 2,914**
37
38

39
40 **Corresponding Author:** Kelsey Holt, MA; 216 West Broadway, Boston, MA 02127; phone
41
42 617-455-2693; email keh125@mail.harvard.edu
43
44

45
46 **Keywords:** HIV; prevention; condoms, female; health care providers; Africa, southern
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Article summary

1) Article focus:

- Cross-sectional study examining current female condom counseling and provision practices among a nationally-representative sample of health care providers in South Africa and Zimbabwe
- Assessment of whether providers view female condoms as more appropriate for certain types of patients, and how their FC practices varied compared to those for male condoms

2) Key Messages:

- Most providers reported offering female condoms (more so in Zimbabwe than in South Africa) but perceived a need for novel female barrier methods for HIV/STI prevention, suggesting female condoms do not meet all patient/provider needs or are not adequately well-known or accessible
- Providers reported less frequent female condom counseling of adolescents, women using hormonal contraception, and married women, compared to unmarried or HIV-positive women, suggesting the need for training emphasizing the importance of female condom counseling with all women
- Providers should be included in HIV training efforts to raise awareness of new and existing products

3) Strengths and Limitations:

- Strengths: this is the first nationally-representative survey in South Africa or Zimbabwe examining female condom counseling and provision and we obtained high response rates; thus, we are able to generalize to the entire provider populations of these two high HIV prevalence countries
- Limitations: Potential social desirability bias may have influenced responses toward more comprehensive levels of prevention counseling

Abstract

Objectives: Female condoms are the only female-initiated HIV and pregnancy prevention technology currently available. We examined female condom counseling and provision among providers in South Africa and Zimbabwe, high HIV-prevalence countries.

Design: Cross-sectional study using a nationally-representative survey.

Setting: All facilities that provide family planning or HIV/STI services.

Participants: National probability sample of 1,444 nurses and physicians who provide family planning or HIV/STI services.

Primary and secondary outcome measures: Female condom practices with different female patients, including adolescents, married women, women using hormonal contraception, and by HIV status. Using multivariable logistic analysis, we measured variations in condom counseling by provider characteristics.

Results: Most providers reported offering female condoms (88%; 1239/1415), but perceived a need for novel female barrier methods for HIV/STI prevention (85%; 1191/1396). By patient type, providers reported less frequent female condom counseling of adolescents (55%; 775/1411), women using hormonal contraception (65%; 909/1409), and married women (66%; 931/1416), compared to unmarried (74%; 1043/1414) or HIV-positive women (82%; 1161/1415). Multivariable results showed providers in South Africa were less likely to counsel women on female condoms than in Zimbabwe (OR=0.48, 95% CI: 0.35-0.68, $p \leq 0.001$). However, South African providers were more likely to counsel women on male condoms (OR=2.39, 95% CI: 1.57-3.65, $p \leq 0.001$). Nurses counseled patients on female condoms more frequently than physicians (OR=5.41, 95% CI: 3.26-8.98, $p \leq 0.001$). HIV training, family planning training, location (urban vs. rural), and facility type (hospital vs. clinic) were not associated with greater condom counseling.

Conclusions: Female condoms were integrated into provider counseling and care, although providers reported a need for new female-initiated multipurpose prevention technologies, suggesting female condoms do not meet all patient/provider needs or are not

1
2
3 adequately well-known or accessible. Providers should be included in HIV training efforts to
4
5 raise awareness of new and existing products, and encouraged to educate all women.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

INTRODUCTION

There is growing recognition that no single intervention will be sufficient to halt the HIV epidemic and that combination prevention strategies tailored to the needs of specific populations have the most potential for decreasing HIV infection rates.(1) The female condom (FC) is the only available alternative to the male condom that provides protection from both HIV/STI infection and pregnancy, and it is a method that women can initiate. A review of research on the FC concluded that increased access to the method leads to an increase in protected sex acts in a population, and decreased STI incidence.(2) There have been promising results from recent clinical trials testing the effectiveness of novel woman-initiated methods of HIV prevention, including microbicides(3) and pre-exposure prophylaxis, which was recently endorsed by the Centers for Disease Control and Prevention (CDC) in the United States (U.S.) for use by heterosexual women at very high risk for HIV infection (e.g., women with HIV-positive sex partners). (4) However, conclusive proof of effectiveness and registration of a new woman-initiated HIV-prevention product recommended for widespread use is unlikely for a number of years, and the FC will remain an important option for women who desire pregnancy prevention and STI protection from a single product.

In sub-Saharan Africa, women are at increased risk of HIV/AIDS and heterosexual sex is the predominant mode of transmission.(5) HIV prevalence among women was estimated at 33% in the peak ages (25-29 years) in South Africa in 2008 and 29% in Zimbabwe (30-39 years) in 2010-2011.(6, 7) Among young people ages 15-24, HIV prevalence was 8.6% in South Africa in 2008 and 5.5% in Zimbabwe in 2010-11. (6,7) Additionally, 24% of married women and 9% of never-married women in sub-Saharan Africa have an unmet need for contraception—rates higher than elsewhere in the developing world.(8) In South Africa and Zimbabwe, reported use of the FC is less than 1% compared

1
2
3 to 4-6% use of male condoms among married women in peak ages of HIV prevalence (25-
4
5 29 years in South Africa and 30-39 years in Zimbabwe).(7, 9)
6

7
8 Since the United States Food and Drug Administration (USFDA) approved the first
9
10 available product—the FC1—in 1993, there has been a lack of commitment and resources to
11
12 expand access to the FC among the international policy community.(10) In 2009, the
13
14 USFDA approved a second-generation FC called FC2 made of synthetic latex rather than
15
16 polyurethane. The FC2 is less expensive and makes less noise when used;(10) other new FC
17
18 technologies are in development and could reduce costs further. In addition, the 2010 and
19
20 2011 U.S. PEPFAR *Fiscal Year Country Operational Plan (COP) Guidance* specifically
21
22 mentioned the importance of FCs in country program plans and the Caucus on New and
23
24 Underused Reproductive Health Technologies recently named the FC as one of several
25
26 “underused” reproductive health technologies.(11, 12) These new products and policy
27
28 developments are positive signs of increased support for the FC.
29

30
31 Health care provider participation, however, is essential to the success of FC
32
33 programs. Even if countries procure significant supplies, women and men may have limited
34
35 knowledge and access if providers do not discuss and provide FCs. Unlike the male condom,
36
37 the FC is typically obtained through provider contact (not dispensers) in the public sector
38
39 with no cost to the user, although in some settings there is also a strong presence of social
40
41 marketing campaigns. Training and accurate information from providers could increase
42
43 acceptability and sustained use of the FC.(10)
44

45
46 Few studies have examined counseling and provision practices for FCs in sub-
47
48 Saharan Africa. Three early case studies exploring family planning providers’ attitudes about
49
50 the FC in South Africa and Nigeria (where the FC was not yet introduced in the public
51
52 sector), and the U.S. found that U.S. providers lacked knowledge on the FC despite product
53
54 availability and saw the method as appropriate only for certain women, such as sex workers
55
56 or HIV-positive women.(13) In the U.S. and South Africa, providers reported negative
57
58 attitudes about the aesthetics and use of the FC, although providers in South Africa were
59
60

1
2
3 more enthusiastic after receiving training. In a study of voluntary counseling and testing
4 counselors in Kenya, many counselors recognized the need for a female-initiated prevention
5 method but felt uncomfortable with FCs or expressed concern about counseling when FCs
6 were not widely available.(14) In another small qualitative study of provider FC opinions in
7 Kenya, several health care providers reported support for FCs due to belief that FCs give
8 women "choice" and "control." (15) These studies, albeit small and non-generalizable,
9 suggest a need for further investment in supporting providers to counsel and offer women
10 the FC.
11
12
13
14
15
16
17
18
19

20 In this nationally-representative study of physicians and nurses, we examined FC
21 counseling and provision practices in South Africa and Zimbabwe. The two countries have
22 different histories of FC introduction that could impact provision at the health service level.
23 Zimbabwe was one of the first countries to introduce FCs in 1997 through the public sector
24 and innovative social marketing campaigns. Scale-up of male and female condoms in recent
25 years has been based on a national comprehensive behavior change strategy to reduce
26 sexual transmission of HIV and FCs are now offered in all public-sector facilities.(16, 17) FC
27 distribution in the public sector in Zimbabwe increased from about 400,000 in 2005 to more
28 than 2,000,000 in 2008 and social marketing sales have risen from about 900,000 in 2005
29 to more than 3,000,000 in 2008.(16) South Africa introduced the FC shortly after Zimbabwe
30 in 1998 primarily through public-sector family planning clinics and community-based
31 programs.(18) FC distribution in South Africa is among the highest in the world (4.3 million
32 FCs distributed in public sector in 2008);(19) however, FCs are not yet available in all
33 public-sector facilities in South Africa and proportional to population size (the population of
34 South Africa is approximately four times that of Zimbabwe), Zimbabwe has higher
35 distribution rates. Given these distribution efforts to increase stocking and availability in
36 both countries, we still lack national estimates of how many providers are able to offer
37 female condoms to patients.
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 We investigated counseling and provision practices among a nationally-
4
5 representative sample of providers to gauge the prevention services offered to a range of
6
7 patients in varied clinical settings. We assessed whether providers view FCs as more
8
9 appropriate for certain types of patients, and how their FC counseling practices varied
10
11 compared to those for male condoms. The results have the potential to inform efforts to
12
13 prepare providers to expand access to this female-initiated prevention method for their
14
15 patients.
16
17

18 19 20 **METHODS**

21
22 This study is part of a mixed-methods research project in Southern Africa
23
24 investigating providers' pregnancy and STI/HIV prevention practices. We completed national
25
26 probability surveys of physicians and nurses in South Africa and Zimbabwe in 2009.
27
28 Participants answered a series of questions on female and male condom counseling and
29
30 provision practices, as well as demographic and professional practice characteristics and
31
32 patient population. The surveys were preceded by 60 in-depth interviews of providers
33
34 serving female patients at risk of HIV, which revealed their views of FC use within their
35
36 patient populations.
37

38
39 We used a multistage, facility-based approach to generate a national probability
40
41 survey sample of providers. We randomly selected districts (with probability proportional to
42
43 size, based on estimated numbers of physicians and nurses), then facilities that provided
44
45 family planning or HIV/STI services within those districts (stratified by type—hospital or
46
47 clinic—and probability proportional to size), and recruited all providers from those facilities
48
49 who provided family planning or HIV/STI services. The sample consists of public facilities in
50
51 South Africa and Zimbabwe. Some non-governmental organizations are included in
52
53 Zimbabwe as they deliver primary care, and specifically family planning, to low-income
54
55 populations. The final sample included 1,019 providers representing 116 facilities (or 89%
56
57 of the total 130 selected facilities) from South Africa and 953 providers representing 130
58
59
60

1
2
3 facilities from Zimbabwe (94% of the total 138 facilities selected). The methodology has
4 been described in detail elsewhere.(20)
5
6

7 Data were collected via self-administered questionnaires distributed in-person in
8 Zimbabwe and telephone-administered questionnaires in South Africa (costs of in-person
9 visits were prohibitive due to the large country size). Approvals were granted as required
10 in each country, at the national, provincial, district and facility levels. In South Africa,
11 provincial approval was granted, as well as district-level approval where required by the
12 facility. In Zimbabwe, approval was granted at the national level, and either the provincial
13 or district level, as needed. The study was approved by the University of KwaZulu-Natal
14 Biomedical Research Ethics Administration, the Medical Research Council of Zimbabwe, the
15 Western Institutional Review Board, and the University of California, San Francisco
16 Committee on Human Research.
17
18
19
20
21
22
23
24
25
26
27

28 Providers were asked whether they currently provide the FC and the male condom,
29 and whether they would like to receive more training (yes/no). Providers were also asked
30 about the frequency of female (and male) condom counseling, on a 4-point Likert scale
31 (never, sometimes, usually, or always), with the following types of female patients: women
32 in general, female teenagers, HIV-positive women, married women, unmarried women, and
33 women using hormonal contraception. They were asked whether they believe FCs are
34 appropriate contraceptives for women at risk of HIV infection (yes/no) and HIV-positive
35 women (yes/no), whether they routinely talk to female patients about pregnancy and
36 HIV/STI prevention in the same visit (yes/no), and how much of a need there is for more
37 female barrier methods for HIV/STI prevention (on a scale of 1-10).
38
39
40
41
42
43
44
45
46
47
48

49 We assessed clinician practices by country for different types of female patients in
50 these high HIV prevalence settings, using chi-square statistics for categorical variables and
51 t-tests for continuous variables. We analyzed condom counseling practices with
52 multivariable logistic regression to assess FC counseling by provider and practice-related
53 characteristics. We also analyzed male condom counseling practices for comparison using
54
55
56
57
58
59
60

1
2
3 the same set of predictors. The two outcome variables were routine (usually/always)
4 counseling on female condoms and routine counseling on male condoms. We adjusted
5 analyses for the facility-based sampling scheme to account for clustering at the facility level.
6 We used Stata 11.0 (College Station, TX) for analyses. Significance was defined as $P < 0.05$.
7 We conducted thematic analysis of qualitative data to investigate open-ended provider
8 responses about their counseling and provision practices.
9
10
11
12
13
14

15 16 17 18 **RESULTS**

19
20 A total of 614 providers from South Africa and 830 providers from Zimbabwe
21 completed the survey ($N=1,444$) with an overall response rate of 73.2%. In South Africa,
22 the response rate did not differ between hospitals (61%) and clinics (60%), though nurses
23 were more likely to respond than physicians (66% versus 39%). In Zimbabwe, providers in
24 hospitals were more likely to respond than in clinics (92% versus 81%), and physicians
25 were more likely to respond than nurses (100% versus 87%). The most common reason for
26 not responding was busy clinic load or that the staff was not at the clinic. The majority
27 surveyed in both countries were nurses (91%) (Table 1).⁽¹⁷⁾ Ninety-six percent of the
28 nurses were female, and overall 86% of participants were female. Most reported prior
29 training in HIV prevention (80%) and family planning (63%). Participants were split
30 between hospital (55%) and clinic (45%) settings, and urban (48%) and rural (52%) areas.
31 Virtually all providers served adult women of reproductive age (99.7%), female teens
32 (98%), and the majority also saw male patients (86%). The majority (70%) reported that
33 most or all of their patients are at risk for HIV.
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

49 Almost all (99%) providers reported currently offering male condoms to patients
50 (Table 2). A large majority in both countries (88%) reported offering FCs, with a lower
51 proportion in South Africa (80%) than Zimbabwe (94%) ($p \leq 0.001$). While most physicians
52 offer female condoms (72%), a significantly higher proportion of nurses do (89%)
53 ($p \leq 0.001$). Availability is an important factor in being able to offer a method, and 27% of
54
55
56
57
58
59
60

1
2
3 providers reported they would offer female condoms if more easily available. Among the
4 small proportion currently not offering female condoms (13% n=169), 68% in South Africa
5 reported they would if it were more easily available and 54% in Zimbabwe. More providers
6 in South Africa (28%) than Zimbabwe (14%) reported that they would like training on FCs
7 (p≤0.001).
8
9
10
11
12

13
14 Seventy-one percent reported routinely counseling (usually or always) women on
15 FCs; more providers reported FC counseling for HIV-positive (82%) and unmarried women
16 (74%), and fewer reported counseling for married women (66%), women using hormonal
17 contraception (65%), and female adolescents (55%). Most of these differences in
18 counseling by patient type were due to large variations in Zimbabwe where counseling for
19 HIV-positive women was 93%, but for adolescents was 50% (Table 2). In South Africa,
20 there was a lower level of routine counseling in general (62%), with little difference among
21 the patient types, ranging from 67% of HIV-positive women to 62% of adolescents.
22 However, 90% of providers in South Africa reported routine male condom counseling with
23 female patients compared to 80% in Zimbabwe. Similar within-country counseling patterns
24 held true for male condoms, with 94% routinely counseling female adolescents in South
25 Africa compared to 56% in Zimbabwe.
26
27
28
29
30
31
32
33
34
35
36
37

38
39 Support for the FC as a contraceptive method for HIV-positive women or women at
40 risk of HIV infection was high overall; in Zimbabwe there was near universal support for
41 women at risk of HIV infection (98% versus 84% in South Africa; p≤0.001) or HIV-positive
42 women (97% and 87%, respectively; p≤0.001) (Table 2). The large majority (89%)
43 reported routinely talking to female patients about pregnancy and HIV/STI prevention in the
44 same visit. About two-thirds of providers (68%) believed there is a very high (9 or 10 on a
45 scale of 1-10) need for more female barrier methods for HIV/STI prevention.
46
47
48
49
50
51
52

53
54 In multivariable logistic regression, several provider characteristics were found to be
55 significantly associated with routine condom counseling (Table 3). Providers in South Africa
56 were significantly less likely to counsel female patients on the FC (OR=0.48; p≤0.001), and
57
58
59
60

1
2
3 more likely to counsel on the male condom (OR=2.4; $p \leq 0.001$). Provider age was positively
4 associated with FC counseling (OR=1.02; $p \leq 0.001$), and nurses were significantly more
5 likely than physicians to counsel patients on both female (OR=5.4; $p \leq 0.001$) and male
6 condoms (OR=2.6; $p \leq 0.001$). HIV prevention training and family planning training were not
7 associated with FC counseling. HIV prevention training was associated with male condom
8 counseling in bivariate models, but in the multivariable models including a variable for
9 proportion of patients at risk of HIV (most/all), HIV training was no longer significant,
10 although high proportion of patients at risk of HIV was (OR=1.6; $p \leq 0.001$). Condom
11 counseling did not vary by urban versus rural clinical setting or in clinics or hospitals.

12
13 The in-depth interviews gave some insight into the reasons that some providers
14 might include the FC in counseling, while others might not, and what they think the best
15 approach is to encourage use. Many providers mentioned logistical factors in the interviews
16 that would restrict access to the method. Providers noted that FCs are more expensive than
17 male condoms and are not always supplied to clinics, especially in South Africa, where
18 availability was frequently mentioned as a problem. Several considered physical features as
19 method limitations, including discomfort and being highly visible.

20
21 Alternatively, many providers noted that some men who will not use a male condom
22 will agree to a FC, since the women puts it on. Providers noted that the FC could help
23 empower women since they could ensure it was used, although they also mentioned that
24 trust issues related to marriage and condom use arise with the female and male condom.
25 Many providers thought that husbands might be more willing to try female condoms if they
26 came with their wives to the clinic and were shown by the provider how to use it. As a
27 Zimbabwe physician said: "...the method is a bit awkward. It's quite difficult to use, so it
28 really remains for us to encourage the partner to accompany the lady to the surgery for
29 consultation so that we can have some kind of counseling between myself and the couple."
30 While counseling the couple was frequently brought up by providers, in one clinic the
31 provider also mentioned clinic support groups with peer counseling to help women to initiate

1
2
3 condom use. In the interviews most providers explained that in counseling adolescents, they
4 discussed abstinence and saying no to sex before marriage, which may explain the finding
5 in the survey data or lower counseling of adolescents on condom use in Zimbabwe. Some,
6 however, also mentioned condoms, after abstinence, and in South Africa, most providers in
7 the interviews reported they counseled adolescents on abstinence and condoms.
8
9
10
11
12
13

14 15 16 **DISCUSSION**

17
18 The FC was integrated into provider practices in Southern Africa, but to a lesser
19 extent than the male condom. Providers in Zimbabwe reported counseling patients on FCs
20 significantly more than providers in South Africa, which is likely attributable to the larger
21 public sector FC program in Zimbabwe, relative to population size. Providers across South
22 Africa may have been less likely to have learned about the FC due to the geographic
23 distance and smaller FC program per population. In South Africa, the government has
24 focused on reaching certain designated clinics with supplies and training so availability is not
25 yet ubiquitous. In the South African qualitative data, many providers commented that
26 availability in the clinic is still a problem, although the majority reported in the national
27 survey that if female condoms were more easily available, they would offer them. As in a
28 previous study from Kenya,⁽¹⁴⁾ providers from both countries noted in interviews that the
29 FC was not always available in clinics even though it was distributed in the public sector.
30 FCs, a basic technology, had counseling patterns that were similar in rural and urban areas
31 and clinics and hospitals, unlike for more sophisticated technologies which in general are
32 more available to urban populations or in hospital settings.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

49 Variations in counseling by patient type were wide in Zimbabwe, with high levels of
50 counseling for HIV-positive women. In Zimbabwe, providers were much less likely to report
51 female and male condom counseling with adolescents than with women in general,
52 suggesting the need for provider training emphasizing the importance of education of
53 adolescents on safe sex, perhaps even prior to sexual initiation; less than half of Zimbabwe
54
55
56
57
58
59
60

1
2
3 adults in the 2010-2011 DHS, however, supported condom education for 12-14year olds.(7)
4
5 Zimbabwe providers were also less likely to report condom counseling with women using
6
7 hormonal contraception, signaling the need for emphasis on dual protection of STIs and
8
9 pregnancy. In both countries, providers were less likely to counsel married women than
10
11 unmarried women on FCs, although it is essential to give all women information in these
12
13 high-prevalence settings as many married women are at risk of acquiring HIV from their
14
15 marital partner. Condom use is less common among married women, although one study of
16
17 a condom intervention (female and male) showed increased use among HIV-positive
18
19 married women.(21) There were some signs in the qualitative data that providers thought
20
21 FCs might be more acceptable in marriage than male condoms in some cases where the
22
23 woman would be willing to make the effort and ensure use was consistent. However,
24
25 providers noted trust issues may also arise with female condoms. Another early study from
26
27 the U.S. identified similar training needs among providers who saw FCs as appropriate for
28
29 only certain groups of women, such as HIV-positive women.(13)
30
31

32 A number of providers reported a desire for more FC training, signaling the need for
33
34 continued investment in programs and policies to support access to the FC in both
35
36 countries. Previous research from South Africa has demonstrated the positive impact of
37
38 training on provider attitudes.(13) Our results showed that neither having previous HIV
39
40 training nor serving a high proportion of at-risk patients significantly increased likelihood of
41
42 provider counseling on FCs. Efforts should be made to ensure that HIV and family planning
43
44 training in both countries include FCs, given the wider availability of supplies in recent
45
46 years. The finding that nurses were significantly more likely than physicians to report
47
48 counseling women on both male and female condoms reflects the prominent role that
49
50 nurses play in prevention counseling; nurses therefore should be a priority for training as
51
52 they deliver much of the primary care. However, physicians should also be prepared to
53
54 counsel women and men about their options for dual protection against pregnancy and
55
56 STIs.
57
58
59
60

1
2
3 Providers reported a strong need for new female-initiated barrier methods for
4 prevention and, similar to prior research from the U.S. and South Africa,(13) several
5 providers demonstrated negative attitudes about the aesthetics and use of the FC during
6 qualitative interviews. This finding suggests that current technologies may not meet all their
7 patient needs or are not adequately well-known or accessible, though it is important to note
8 that this research was conducted just before the new FC2 was approved by the USFDA. The
9 reported desire for training suggests that even as we work to develop new technologies, we
10 must also invest in programs and policies that ensure the potential for available existing
11 technologies is achieved.
12
13
14
15
16
17
18
19
20
21

22 These findings must be considered in light of study limitations. We did not ask
23 providers directly about stocking of FCs in their health care systems or whether they had
24 prior training in FC counseling. Consequently, results do not shed light on how many
25 providers in stocked clinics are providing patients with FC; rather, we only know how many
26 providers overall, in both stocked and unstocked clinics, are offering the method. Provision
27 in stocked clinics, especially with trained providers, is likely to be higher. Expense to the
28 health system and availability at the clinic level (in addition to whether they have had prior
29 training on FC provision) would influence their ability to provide them and thus the
30 likelihood that they counsel patients. Since providers are reporting on their counseling
31 practices, it is likely that social desirability bias influenced responses toward more
32 comprehensive levels of prevention counseling; therefore patients for whom we measured
33 low levels of counseling are likely to be in even greater need of FC education. Our study
34 also has important strengths. Our nationally representative surveys (with relatively high
35 response rates) allow us to generalize about providers' counseling and provision practices in
36 these two countries; this is the first research on FC counseling and provision in Southern
37 Africa to include representative national samples of providers. Further, very few data
38 existed previously on FC counseling and provision in sub-Saharan Africa overall and our
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 study contributes significantly to the literature on this topic by providing information on
4
5 current provider practices in two high HIV-prevalence countries.
6

7
8 As discussed in Mantell et al. (2000), a number of previous studies have documented
9
10 the role of providers as “gatekeepers” to new products and the influence that provider
11
12 acceptance of new prevention methods can have on their successful introduction and
13
14 uptake. (22) Thus provider practices and support are essential to the successful integration
15
16 of the FC into HIV and family planning services, and ultimately to ensuring women can
17
18 protect themselves from both STI infection and unintended pregnancy. Our findings
19
20 revealed provider support for the FC as a dual-protection method, and a significant need for
21
22 further work promoting provider counseling in particular with adolescents, married women,
23
24 and women using hormonal contraception.
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

TABLE 1: Provider and Practice Characteristics

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Gender, n (%)			
Female	674 (82)	547 (90)	1221 (86)
Male	145 (18)	62 (10)	207 (15)
Provider type, n (%)			
Nurse	792 (95)	528 (86)	1320 (91)
Physician	38 (5)	86 (14)	124 (9)
Age, median years (range)	39 (20-74)	43 (23-69)	41 (20-74)
Previous training, n (%)			
HIV Prevention	629 (77)	510 (84)	1139 (80)
Family Planning	503 (61)	399 (66)	902 (63)
Type of facility, n (%)			
Hospital	484 (59)	309 (50)	793 (55)
Clinic	342 (41)	305 (50)	647 (45)
Location, n (%)			
Urban	375 (45)	315 (51)	690 (48)
Rural	451 (55)	299 (49)	750 (52)
Proportion of patients at risk for HIV, n (%)			
None/Some	175 (22)	46 (8)	221 (16)
Half	112 (14)	92 (15)	204 (14)
Most/All	524 (65)	470 (77)	994 (70)

TABLE 2: Condom Counseling and Provision Practices and Female Condom Beliefs

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Currently offers condoms, n (%)			
Female condoms***	756 (94)	483 (80)	1,239 (88)
Male condoms	796 (99)	599 (99)	1,395 (99)
Would offer female condoms if more Easily available, n (%)			
Among providers offering female condoms, counsels routinely with..., n (%) (N=1,226)			
Women in general***	602 (80)	329 (69)	931 (76)
Female teenagers***	377 (50)	328 (69)	705 (58)
HIV-positive women***	711 (95)	352 (74)	1,063 (87)
Married women***	544 (72)	319(67)	863 (70)
Unmarried women***	622 (83)	342 (72)	964 (79)
Women using hormonal contraception	500 (67)	336 (71)	836 (68)
Among all providers, counsels routinely on female condoms with..., n (%)			
Women in general***	635 (78)	370 (62)	1005 (71)
Female teenagers***	403 (50)	372 (62)	775 (55)
HIV-positive women***	761 (93)	400 (67)	1161 (82)
Married women***	573 (70)	358 (60)	931 (66)
Unmarried women***	658 (81)	385 (64)	1,043 (74)

1				
2				
3				
4	Women using hormonal contraception	529 (65)	380 (64)	909 (65)
5				
6				
7	Among all providers, counsels routinely on			
8	male condoms with..., n (%)			
9				
10	Women in general***	652 (80)	542 (90)	1194 (84)
11	Female teenagers***	448 (56)	565 (94)	1013 (72)
12	HIV-positive women	786 (97)	578 (96)	1,364 (96)
13	Married women***	610 (75)	514 (85)	1,124 (79)
14	Unmarried women***	683 (85)	554 (92)	1,237 (88)
15	Women using hormonal contraception***	537 (66)	535 (90)	1,072 (76)
16				
17				
18				
19				
20				
21				
22	Believes female condoms appropriate	800 (98)	503 (84)	1303 (92)
23	contraception for women at risk of HIV			
24	infection, n (%)***			
25				
26				
27	Believes female condoms appropriate	794 (97)	519 (87)	1,313 (93)
28	contraception for HIV-positive women, n			
29	(%)***			
30				
31				
32	Routinely talks to female patients about	718 (88)	536 (90)	1254 (89)
33	pregnancy and HIV/STI prevention in			
34	same visit, n (%)			
35				
36				
37	Believes there is a need for more female			
38	barrier methods for HIV/STI prevention,			
39	scale 1-10, n (%)			
40	High (9-10)	537 (67)	412 (70)	949 (68)
41	Medium-High (7-8)	140 (17)	102 (17)	242 (17)
42	Medium (5-6)	72 (9)	45 (8)	117 (8)
43	Medium-Low (3-4)	23 (3)	7 (1)	30 (2)
44	Low (1-2)	35 (4)	23 (4)	58 (4)
45				
46				
47				
48				
49				
50				
51				
52	Would like training on condoms, n (%)			
53	Female condoms***	112 (14)	165 (28)	277 (20)
54	Male condoms***	56 (7)	109 (18)	165 (12)
55				
56				
57				
58				
59				
60				

1
2
3 *p≤0.05 **p≤0.010 ***p≤0.001
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

TABLE 3: Condom Counseling of Female Patients among Providers in South Africa and Zimbabwe: Odds Ratios from Multivariable Logistic Regression

Routine Condom Counseling (usually/always)	FEMALE condoms OR [95% CI]	MALE condoms OR [95% CI]
Country		
Zimbabwe (reference)	—	—
South Africa	0.48*** [.35 .68]	2.39*** [1.57 3.65]
Age (years)	1.02*** [1.02 1.05]	1.01 [1.00 1.03]
Provider type		
Physician (reference)	—	—
Nurse	5.41*** [3.26 8.98]	2.60** [1.47 4.58]
Trained in HIV Prevention	0.90 [.62 1.05]	1.35 [.87 2.08]
Trained in Family Planning	0.98 [.71 1.35]	1.02 [.70 1.51]
Facility Type		
Hospital (reference)	—	—
Clinic	0.88 [.61 1.25]	1.21 [.76 1.94]
Location		
Rural (reference)	—	—
Urban	0.85 [.61 1.25]	1.42 [0.93 2.14]
Most/all patients at HIV risk	1.21 [0.92 1.59]	1.58** [1.12 2.22]
Chi square (8 degrees of freedom)	96.08	70.24
N	1,324	1,328

*p ≤ 0.05 ** p ≤ 0.010 ***p ≤ 0.001

OR Odds Ratio

Acknowledgements

We gratefully acknowledge the National Institute of Child Health and Human Development for support of this study, NIH/NICHHD R01 HD046027. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

We are thankful for our field staff and the thoughtful contributions of our study participants.

Data presented at the American Public Health Association annual meeting, Denver, 2010

For peer review only

REFERENCES

1. Kurth AE, Celum C, Baeten JM, et al. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 2011;**8**(1):62-72.
2. Vijayakumar G, Mabude Z, Smit J, et al. A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *Int J STD AIDS* 2006;**17**(10):652-9.
3. Abdool Karim Q, Abdool Karim S, Frohlich J, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010;**329**(5996):1168.
4. CDC. CDC Issues Interim Guidance on Use of Medication to Prevent HIV Infection among Heterosexually Active Adults. 2012 [cited 2012 December 05]; Available from: <http://www.cdc.gov/nchhstp/newsroom/2012/PrEP-HeterosexualGuidance-PressRelease.html>.
5. UNAIDS. UNAIDS Outlook 2010. Switzerland: 2010.
6. Shisana O, Council HSR, Centre for AIDS Development R, et al. South African national HIV prevalence, incidence, behaviour and communication survey, 2008: A turning tide among teenagers?: HSRC Press; 2009.
7. Zimbabwe National Statistics Agency, International ICF. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc., 2012.

- 1
2
3 8. Sedgh G, Hussain R, Bankole A, et al. Women with an unmet need for contraception in
4
5 developing countries and their reasons for not using a method. *Occasional Report* 2007;**37**:5-40.
6
7
- 8
9
10 9. Department of Health, Medical Research Council, OrcMacro. South African Demographic and
11
12 Health Survey 2003. Praetoria: Department of Health, 2007.
13
- 14
15
16 10. Peters A, Jansen W, van Driel F. The female condom: the international denial of a strong
17
18 potential. *Reprod Health Matters* 2010;**18**(35):119-28.
19
- 20
21
22 11. CHANGE. Female Condoms and U.S. Foreign Assistance: An Unfinished Imperative for Women's
23
24 Health. Washington, D.C.: Center for Health and Gender Equity, 2011.
25
26
27
- 28
29
30 12. Reproductive Health Supplies Coalition. Female Condom Product Brief: Caucus on New and
31
32 Underused Reproductive Health Technologies. Brussels, Belgium: Reproductive Health Supplies
33
34 Coalition, 2012.
35
36
37
- 38
39 13. Mantell JE, Hoffman S, Weiss E, et al. The acceptability of the female condom: perspectives of
40
41 family planning providers in New York City, South Africa, and Nigeria. *J Urban Health* 2001;**78**(4):658-68.
42
43
44
- 45
46 14. Mung'ala L, Kilonzo N, Angala P, et al. Promoting female condoms in HIV voluntary counselling
47
48 and testing centres in Kenya. *Reprod Health Matters* 2006;**14**(28):99-103.
49
- 50
51
52 15. Kaler A. "It's some kind of women's empowerment": the ambiguity of the female condom as a
53
54 marker of female empowerment. *Soc Sci Med* 2001;**52**(5):783-96.
55
56
57
58
59
60

- 1
2
3 16. UNFPA. HIV Prevention Gains Momentum: Success in Female Condom Programming. New York:
4 UNFPA, 2011.
5
6
7
8
9
10 17. CHANGE. Female Condoms: Lessons from Zimbabwe. Washington, D.C.: Center for Health and
11 Gender Equity, 2010.
12
13
14
15
16 18. FHI. Female Condom Introduction in South Africa. Durham: 2007.
17
18
19
20
21 19. Republic of South Africa. COUNTRY PROGRESS REPORT ON THE DECLARATION OF
22 COMMITMENT ON HIV/AIDS. Republic of South Africa, 2010.
23
24
25
26
27 20. Harper C, Holt K, Nhemachena T, et al. Willingness of clinicians to integrate microbicides into
28 HIV prevention practices in Southern Africa. AIDS Behav 2012:Published Online First: 1 January 2012.
29 doi:10.1007/s10461-011-0109-6.
30
31
32
33
34
35
36 21. Callegari L, Harper CC, van der Straten A, et al. Consistent condom use in married Zimbabwean
37 women after a condom intervention. Sexually Transm Dis 2008;**35**(6):624-30.
38
39
40
41 22. Mantell JE, Scheepers E, Abdool Karim Q. Introducing the female condom through the public health
42 sector: Experiences from South Africa. AIDS Care 2000;**12**(5):589-601.
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9 **A nationally-representative survey of health care provider counseling and**
10 **provision of the female condom in South Africa and Zimbabwe**
11

12
13
14 **Short title: Provider counseling and provision of female condom in South Africa**
15 **and Zimbabwe**
16

17
18 Kelsey Holt¹, Kelly Blanchard², Tsungai Chipato³, Taazadza Nhemachena³, Maya Blum⁴,
19 Laura Stratton⁴, Neetha Morar⁵, Gita Ramjee⁵, Cynthia C. Harper⁴
20
21

22
23
24 1 Harvard School of Public Health, Boston, MA, USA (at the time of the study, Ms. Holt was
25 at Ibis Reproductive Health, Cambridge, MA, USA); 2 Ibis Reproductive Health, Cambridge,
26 MA, USA, and Johannesburg, South Africa; 3 UZ-UZ-UCSF Collaborative Programme on
27 Women's Health, Harare, Zimbabwe; 4 Bixby Center for Global Reproductive Health,
28 Department of Obstetrics, Gynecology and Reproductive Sciences, University of California,
29 San Francisco, CA, USA; 5 South African Medical Research Council HIV Prevention Research
30 Unit, Durban, South Africa
31
32
33
34

35 **Words: 2,914**
36

37
38 **Corresponding Author:** Kelsey Holt, MA; 216 West Broadway, Boston, MA 02127; phone
39 617-455-2693; email keh125@mail.harvard.edu
40
41

42
43 **Keywords:** HIV; prevention; condoms, female; health care providers; Africa, southern
44
45
46
47
48
49
50
51
52
53
54

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Article summary

1) Article focus:

- Cross-sectional study examining current female condom counseling and provision practices among a nationally-representative sample of health care providers in South Africa and Zimbabwe
- Assessment of whether providers view female condoms as more appropriate for certain types of patients, and how their FC practices varied compared to those for male condoms

2) Key Messages:

- Most providers reported offering female condoms (more so in Zimbabwe than in South Africa) but perceived a need for novel female barrier methods for HIV/STI prevention, suggesting female condoms do not meet all patient/provider needs or are not adequately well-known or accessible
- Providers reported less frequent female condom counseling of adolescents, women using hormonal contraception, and married women, compared to unmarried or HIV-positive women, suggesting the need for training emphasizing the importance of female condom counseling with all women
- Providers should be included in HIV training efforts to raise awareness of new and existing products

3) Strengths and Limitations:

- Strengths: this is the first nationally-representative survey in South Africa or Zimbabwe examining female condom counseling and provision and we obtained high response rates; thus, we are able to generalize to the entire provider populations of these two high HIV prevalence countries
- Limitations: Potential social desirability bias may have influenced responses toward more comprehensive levels of prevention counseling

Abstract

Objectives: Female condoms are the only female-initiated HIV and pregnancy prevention technology currently available. We examined female condom counseling and provision among providers in South Africa and Zimbabwe, high HIV-prevalence countries.

Design: Cross-sectional study using a nationally-representative survey.

Setting: All facilities that provide family planning or HIV/STI services ~~in the two countries~~.

Participants: National probability sample of 1,444 nurses and physicians who provide family planning or HIV/STI services.

Primary and secondary outcome measures: Female condom practices with different female patients, including adolescents, married women, women using hormonal contraception, and by HIV status. Using multivariable logistic analysis, we measured variations in condom counseling by provider characteristics.

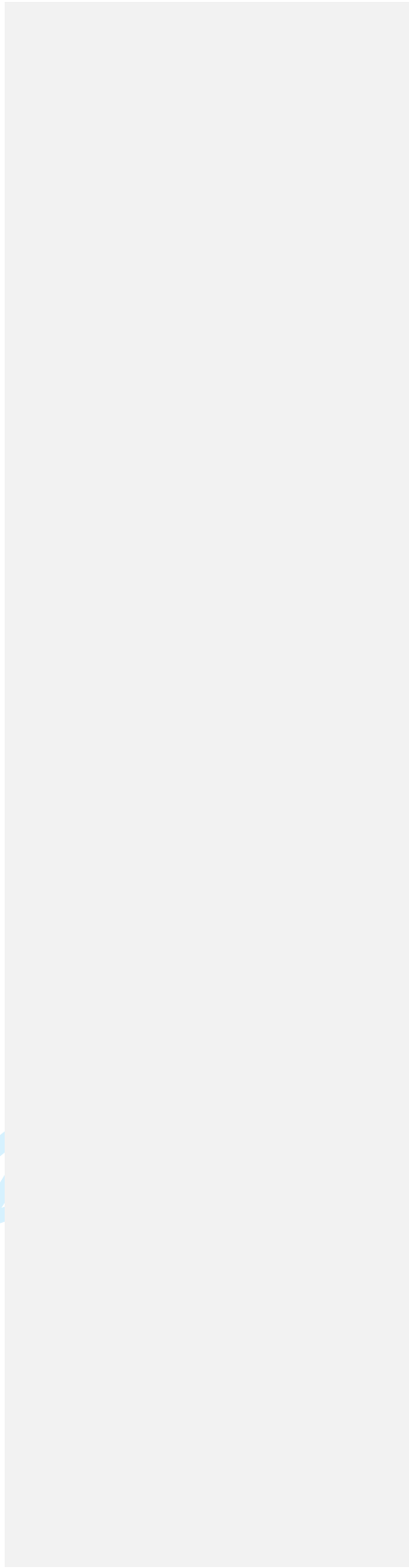
Results: Most providers reported offering female condoms (88%; [1239/1415](#)), but perceived a need for novel female barrier methods for HIV/STI prevention (85%; [1191/1396](#)). By patient type, providers reported less frequent female condom counseling of adolescents (55%; [775/1411](#)), women using hormonal contraception (65%; [909/1409](#)), and married women (66%; [931/1416](#)), compared to unmarried (74%; [1043/1414](#)) or HIV-positive women (82%; [1161/1415](#)). Multivariable results showed providers in South Africa were less likely to counsel women on female condoms than in Zimbabwe (OR=0.48, 95% CI: 0.35-0.68, $p \leq 0.001$). However, South African providers were more likely to counsel women on male condoms (OR=2.39, 95% CI: 1.57-3.65, $p \leq 0.001$). Nurses counseled patients on female condoms more frequently than physicians (OR=5.41, 95% CI: 3.26-8.98, $p \leq 0.001$). HIV training, family planning training, ~~provider~~-location (urban vs. rural), and facility type (hospital vs. clinic) were not associated with greater condom counseling.

Conclusions: Female condoms were integrated into provider counseling and care, although providers reported a need for new female-initiated multipurpose prevention technologies, suggesting female condoms do not meet all patient/provider needs or are not

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

adequately well-known or accessible. Providers should be included in HIV training efforts to raise awareness of new and existing products, and encouraged to educate all women.

For peer review only



INTRODUCTION

There is growing recognition that no single intervention will be sufficient to halt the HIV epidemic and that combination prevention strategies tailored to the needs of specific populations have the most potential for decreasing HIV infection rates.⁽¹⁾ The female condom (FC) is the only available alternative to the male condom that provides protection from both HIV/STI infection and pregnancy, and it is a method that women can initiate. A review of research on the FC concluded that increased access to the method leads to an increase in protected sex acts in a population, and decreased STI incidence.⁽²⁾ ~~Though~~ There have been promising results from recent clinical trials testing the effectiveness of novel woman-initiated methods [of HIV prevention](#), including microbicides⁽³⁾ and pre-exposure prophylaxis, [which was recently endorsed by the Centers for Disease Control and Prevention \(CDC\) in the United States \(U.S.\) for use by heterosexual women at very high risk for HIV infection \(e.g., women with HIV-positive sex partners\)](#).⁽⁴⁾ ~~However,~~ conclusive proof of effectiveness and registration of a new [woman-initiated HIV-prevention product recommended for widespread use](#) is unlikely for a number of years, and the FC ~~continues to fill this important niche~~ [will remain an important option for women who desire pregnancy prevention and STI protection from a single product](#).

In sub-Saharan Africa, women are at increased risk of HIV/AIDS and heterosexual sex is the predominant mode of transmission.⁽⁵⁾ HIV prevalence among women was estimated at 33% in the peak ages (25-29 years) in South Africa [in 2008](#) and 29% in Zimbabwe (30-39 years) [in 2010-2011](#).^(6, 7) [Among young people ages 15-24, HIV prevalence was 8.6% in South Africa in 2008 and 5.5% in Zimbabwe in 2010-11. \(6,7\)](#) Additionally, 24% of married women and 9% of never-married women in sub-Saharan Africa have an unmet need for contraception—rates higher than elsewhere in the developing world.⁽⁸⁾ In South Africa and Zimbabwe, reported use of the FC is less than 1% compared

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

to 4-6% use of male condoms among married women in peak ages [of HIV prevalence \(25-29 years in South Africa and 30-39 years in Zimbabwe\)](#).(7, 9)

Since the United States Food and Drug Administration (USFDA) approved the first available product—the FC1—in 1993, there has been a lack of commitment and resources to expand access to the FC among the international policy community.(10) In 2009, the USFDA approved a second-generation FC called FC2 made of synthetic latex rather than polyurethane. The FC2 is less expensive and makes less noise when used;(10) other new FC technologies are in development and could reduce costs further. In addition, the 2010 and 2011 U.S. PEPFAR *Fiscal Year Country Operational Plan (COP) Guidance* specifically mentioned the importance of FCs in country program plans [and the Caucus on New and Underused Reproductive Health Technologies recently named the FC as one of several “underused” reproductive health technologies](#).(11, 12) These new products and policy developments are positive signs of increased support for the FC.

Formatted: Highlight

Health care provider participation, however, is essential to the success of FC programs. Even if countries procure significant supplies, women and men may have limited knowledge and access if providers do not discuss and provide FCs. Unlike the male condom, the FC is typically obtained through provider contact, [\(not dispensers\)](#), in the public sector [with no cost to the user, although in some settings there is also a strong presence of social marketing campaigns](#). Training and accurate information from providers could increase acceptability and sustained use of the FC.(10)

Few studies have examined counseling and provision practices for FCs in sub-Saharan Africa. Three early case studies exploring family planning providers’ attitudes about the FC in South Africa and Nigeria (where the FC was not yet introduced in the public sector), and the [United States \(U.S.\)](#) found that U.S. providers lacked knowledge on the FC despite product availability and saw the method as appropriate only for certain women, such as sex workers or HIV-positive women.(123) In the U.S. and South Africa, providers reported negative attitudes about the aesthetics and use of the FC, although providers in

1
2
3
4
5
6
7
8
9 South Africa were more enthusiastic after receiving training. In a study of voluntary
10 counseling and testing counselors in Kenya, many counselors recognized the need for a
11 female-initiated prevention method but felt uncomfortable with FCs or expressed concern
12 about counseling when FCs were not widely available.⁽¹³⁴⁾ [In another small qualitative](#)
13 [study of provider FC opinions in Kenya, several health care providers reported support for](#)
14 [FCs due to belief that FCs give women "choice" and "control."](#) ⁽¹⁵⁾ These studies, albeit
15 small and non-generalizable, suggest a need for further investment in supporting providers
16 to counsel and offer women the FC.
17
18
19
20
21

22 In this nationally-representative study of physicians and nurses, we examined FC
23 counseling and provision practices in South Africa and Zimbabwe. The two countries have
24 different histories of FC introduction that could impact provision at the health service level.
25 Zimbabwe was one of the first countries to introduce FCs in 1997 through the public sector
26 and innovative social marketing campaigns. Scale-up of male and female condoms in recent
27 years has been based on a national comprehensive behavior change strategy to reduce
28 sexual transmission of HIV [and FCs are now offered in all public-sector facilities.](#) ^(146, 17)
29 FC distribution in the public sector in Zimbabwe increased from about 400,000 in 2005 to
30 more than 2,000,000 in 2008 and social marketing sales have risen from about 900,000 in
31 2005 to more than 3,000,000 in 2008.⁽¹⁴⁶⁾ South Africa introduced the FC shortly after
32 Zimbabwe in 1998 primarily through public-sector family planning clinics and community-
33 based programs;⁽¹⁵⁸⁾ ~~social marketing promotion efforts also exist.~~ FC distribution in
34 South Africa is among the highest in the world (4.3 million FCs distributed in public sector in
35 2008);⁽¹⁶⁹⁾ however, [FCs are not yet available in all public-sector facilities in South Africa](#)
36 [and](#) proportional to population size (the population of South Africa is approximately four
37 times that of Zimbabwe), Zimbabwe has higher distribution rates. [Given these distribution](#)
38 [efforts to increase stocking and availability in both countries, we still lack national estimates](#)
39 [of how many providers are able to offer female condoms to patients.](#)
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

We investigated counseling and provision practices among a nationally-representative sample of providers to gauge the prevention services offered to a range of patients in varied clinical settings. We assessed whether providers view FCs as more appropriate for certain types of patients, and how their FC [counseling](#) practices varied compared to those for male condoms. The results have the potential to inform efforts to prepare providers to expand access to this female-initiated prevention method for their patients.

METHODS

This study is part of a mixed-methods research project in Southern Africa investigating providers' pregnancy and STI/HIV prevention practices. We completed national probability surveys of physicians and nurses in South Africa and Zimbabwe in 2009. Participants answered a series of questions on female and male condom counseling and provision practices, as well as demographic and professional practice characteristics and patient population. The surveys were preceded by 60 in-depth interviews of providers serving female patients at risk of HIV, which revealed their views of FC use within their patient populations.

We used a multistage, facility-based approach to generate a national probability survey sample of providers. We randomly selected districts (with probability proportional to size, [based on estimated numbers of physicians and nurses](#)), then facilities that provided family planning or HIV/STI services within those districts (stratified by type—hospital or clinic—and probability proportional to size), and recruited all providers from those facilities who provided family planning or HIV/STI services. [The sample consists of public facilities in South Africa and Zimbabwe. Some non-governmental organizations are included in Zimbabwe as they deliver primary care, and specifically family planning, to low-income populations. The final sample included 1,019 providers representing 116 facilities \(or 89% of the total 130 selected facilities\) from South Africa and 953 providers representing 130](#)

Formatted: Font: Verdana, 10 pt, Not Bold

1
2
3
4
5
6
7
8
9 ~~facilities from Zimbabwe (94% of the total 138 facilities selected).~~ The methodology has
10 been described in detail elsewhere. ~~(2017) The final sample included 1,019 providers~~
11 ~~representing 116 facilities from South Africa and 953 providers representing 130 facilities~~
12 ~~from Zimbabwe.~~

13
14
15 Data were collected via self-administered questionnaires distributed in-person in
16 Zimbabwe and telephone-administered questionnaires in South Africa (costs of in-person
17 visits were prohibitive due to the large country size). Approvals were granted as required
18 in each country, at the national, provincial, district and facility levels. In South Africa,
19 provincial approval was granted, as well as district-level approval where required by the
20 facility. In Zimbabwe, approval was granted at the national level, and either the provincial
21 or district level, as needed. The study was approved by the University of KwaZulu-Natal
22 Biomedical Research Ethics Administration, the Medical Research Council of Zimbabwe, the
23 Western Institutional Review Board, and the University of California, San Francisco
24 Committee on Human Research.
25
26

Formatted: Font: Verdana, 10 pt

Formatted: Font: Verdana, 10 pt

27
28
29
30
31
32 Providers were asked whether they currently provide the FC and the male condom,
33 and whether they would like to receive more training (yes/no). Providers were also asked
34 about the frequency of female (and male) condom counseling, on a 4-point Likert scale
35 (never, sometimes, usually, or always), with the following types of female patients: women
36 in general, female teenagers, HIV-positive women, married women, unmarried women, and
37 women using hormonal contraception. They were asked whether they believe FCs are
38 appropriate contraceptives for women at risk of HIV infection (yes/no) and HIV-positive
39 women (yes/no), whether they routinely talk to female patients about pregnancy and
40 HIV/STI prevention in the same visit (yes/no), and how much of a need there is for more
41 female barrier methods for HIV/STI prevention (on a scale of 1-10).
42
43
44
45
46
47
48

49 We assessed clinician practices by country for different types of female patients in
50 these high HIV prevalence settings, using chi-square statistics for categorical variables and
51 t-tests for continuous variables. We analyzed condom counseling practices with
52
53
54

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

multivariable logistic regression to assess FC counseling by provider and practice-related characteristics. We also analyzed male condom counseling practices for comparison using the same set of predictors. The two outcome variables were routine (usually/always) counseling on female condoms and routine counseling on male condoms. We adjusted analyses for the facility-based sampling scheme to account for clustering at the facility level. We used Stata 11.0 (College Station, TX) for analyses. Significance was defined as $P < 0.05$. We conducted thematic analysis of qualitative data to investigate open-ended provider responses about their counseling and provision practices.

RESULTS

A total of 614 providers from South Africa and 830 providers from Zimbabwe completed the survey (N=1,444) with an overall response rate of 73.2%. In South Africa, the response rate did not differ between hospitals (61%) and clinics (60%), though nurses were more likely to respond than physicians (66% versus 39%). In Zimbabwe, providers in hospitals were more likely to respond than in clinics (92% versus 81%), and physicians were more likely to respond than nurses (100% versus 87%). The most common reason for not responding was busy clinic load or that the staff was not at the clinic. The majority surveyed in both countries were ~~female (86%),~~ nurses (91%) (Table 1). (17) Ninety-six percent of the nurses were female, and overall 86% of participants were female. Most reported prior training in HIV prevention (80%) and family planning (63%). Participants were split between hospital (55%) and clinic (45%) settings, and urban (48%) and rural (52%) areas. Virtually all providers served adult women of reproductive age (99.7%), female teens (98%), and the majority also saw male patients (86%). The majority (70%) reported that most or all of their patients are at risk for HIV.

Almost all (99%) providers reported currently offering male condoms to patients (Table 2). A large majority in both countries (88%) reported offering FCs, with a lower proportion in South Africa (80%) than Zimbabwe (94%) ($p \leq 0.001$). While most physicians

1
2
3
4
5
6
7
8
9 offer female condoms (72%), a significantly higher proportion of nurses do (89%)
10 ($p \leq 0.001$). Availability is an important factor in being able to offer a method, and 27% of
11 providers reported they would offer female condoms if more easily available. Among the
12 small proportion currently not offering female condoms (13% $n=169$), 68% in South Africa
13 reported they would if it were more easily available and 54% in Zimbabwe. More providers
14 in South Africa (28%) than Zimbabwe (14%) reported that they would like training on FCs
15 ($p \leq 0.001$).
16
17
18
19

20
21 Seventy-one percent reported routinely counseling (usually or always) women on
22 FCs; more providers reported FC counseling for HIV-positive (82%) and unmarried women
23 (74%), and fewer reported counseling for married women (66%), women using hormonal
24 contraception (65%), and female adolescents (55%). Most of these differences in
25 counseling by patient type were due to large variations in Zimbabwe where counseling for
26 HIV-positive women was 93%, but for adolescents was 50% (Table 2). In South Africa,
27 there was a lower level of routine counseling in general (62%), with little difference among
28 the patient types, ranging from 67% of HIV-positive women to 62% of adolescents.
29 However, 90% of providers in South Africa reported routine male condom counseling with
30 female patients compared to 80% in Zimbabwe. Similar within-country counseling patterns
31 held true for male condoms, with 94% routinely counseling female adolescents in South
32 Africa compared to 56% in Zimbabwe.
33
34
35
36
37
38
39

40
41 Support for the FC as a contraceptive method for HIV-positive women or women at
42 risk of HIV infection was high overall; in Zimbabwe there was near universal support for
43 women at risk of HIV infection (98% versus 84% in South Africa; $p \leq 0.001$) or HIV-positive
44 women (97% and 87%, respectively; $p \leq 0.001$) (Table 2). The large majority (89%)
45 reported routinely talking to female patients about pregnancy and HIV/STI prevention in the
46 same visit. About two-thirds of providers (68%) believed there is a very high (9 or 10 on a
47 scale of 1-10) need for more female barrier methods for HIV/STI prevention.
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

In multivariable logistic regression, several provider characteristics were found to be significantly associated with routine condom counseling (Table 3). Providers in South Africa were significantly less likely to counsel female patients on the FC (OR=0.48; $p \leq 0.001$), and more likely to counsel on the male condom (OR=2.4; $p \leq 0.001$). Provider age was positively associated with FC counseling (OR=1.02; $p \leq 0.001$), and nurses were significantly more likely than physicians to counsel patients on both female (OR=5.4; $p \leq 0.001$) and male condoms (OR=2.6; $p \leq 0.001$). HIV prevention training and family planning training were not associated with FC counseling. HIV prevention training was associated with male condom counseling in bivariate models, but in the multivariable models including a variable for proportion of patients at risk of HIV (most/all), HIV training was no longer significant, although high proportion of patients at risk of HIV was (OR=1.6; $p \leq 0.001$). Condom counseling did not vary by urban versus rural clinical setting or in clinics or hospitals.

The in-depth interviews gave some insight into the reasons that some providers might include the FC in counseling, while others might not, and what they think the best approach is to encourage use. Many providers mentioned logistical factors in the interviews that, as well as physical attributes, which might would restrict access to the method use. Providers noted that FCs are more expensive than male condoms and are not always supplied to available in clinics, especially in South Africa, where availability was frequently mentioned as a problem. Several considered physical features as method limitations, including discomfort and being highly visible.

Alternatively, many providers noted that some men who will not use a male condom will agree to a FC, since the woman puts it on. Providers noted that the FC could help empower women since they could ensure it was used, although they also mentioned that trust issues related to marriage and condom use arise with the female and male condom. Many providers thought that husbands might be more willing to try female condoms if they came with their wives to the clinic and were shown by the provider how to use it. As a Zimbabwe physician said: "...the method is a bit awkward. It's quite difficult to use, so it

1
2
3
4
5
6
7
8
9 really remains for us to encourage the partner to accompany the lady to the surgery for
10 consultation so that we can have some kind of counseling between myself and the couple.”
11 While counseling the couple was frequently brought up by providers, in one clinic the
12 provider also mentioned clinic support groups with peer counseling to help women to initiate
13 condom use-

14
15
16
17 In the interviews most providers explained that in counseling adolescents, they
18 discussed abstinence and saying no to sex before marriage, which may explain the finding
19 in the survey data or lower counseling of adolescents on condom use in Zimbabwe. Some,
20 however, also mentioned condoms, after abstinence, and in South Africa, most providers in
21 the interviews reported they counseled adolescents on abstinence and condoms.
22
23
24
25
26

27 **DISCUSSION**

28
29 The FC was integrated into provider practices in Southern Africa, but to a lesser
30 extent than the male condom. Providers in Zimbabwe reported counseling patients on FCs
31 significantly more than providers in South Africa, which is likely attributable to the larger
32 public sector FC program in Zimbabwe, relative to population size. Providers across South
33 Africa may have been less likely to have learned about the FC due to the geographic
34 distance and smaller FC program per population. In South Africa, the government has
35 focused on reaching certain designated clinics with supplies and training so availability is not
36 yet ubiquitous. In the South African qualitative data, many providers commented that
37 availability in the clinic is still a problem, although the majority reported in the national
38 survey that if female condoms were more easily available, they would offer them. As in a
39 previous study from Kenya,⁽¹³⁴⁾ providers from both countries noted in interviews that the
40 FC was not always available in clinics even though it was distributed in the public sector.
41 FCs, a basic technology, had counseling patterns that were similar in rural and urban areas
42 and clinics and hospitals, unlike for more sophisticated technologies which in general are
43 more available to urban populations or in hospital settings.
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Variations in counseling by patient type were wide in Zimbabwe, with high levels of counseling for HIV-positive women. In Zimbabwe, providers were much less likely to report female and male condom counseling with adolescents than with women in general, suggesting the need for provider training emphasizing the importance of education of adolescents on safe sex, perhaps even prior to sexual initiation; less than half of Zimbabwe adults in the 2010-2011 DHS, however, supported condom education for 12-14-year olds.⁽⁷⁾ Zimbabwe providers were also less likely to report condom counseling with women using hormonal contraception, signaling the need for emphasis on dual protection of STIs and pregnancy. In both countries, providers were less likely to counsel married women than unmarried women on FCs, although it is essential to give all women information in these high-prevalence settings [as many married women are at risk of acquiring HIV from their marital partner](#). Condom use is less common among married women, although one study of a condom intervention (female and male) showed increased use among HIV-positive married women.⁽²¹⁴⁸⁾ There were some signs in the qualitative data that providers thought FCs might be more acceptable in marriage than male condoms in some cases where the woman would be willing to make the effort and ensure use was consistent. [However, providers noted trust issues may also arise with female condoms](#). Another early study from the U.S. identified similar training needs among providers who saw FCs as appropriate for only certain groups of women, such as HIV-positive women.⁽¹²¹³⁾

A number of providers reported a desire for more FC training, signaling the need for continued investment in programs and policies to support access to the FC in both countries. Previous research from South Africa has demonstrated the positive impact of training on provider attitudes.⁽¹²¹³⁾ Our results showed that neither having previous HIV training nor serving a high proportion of at-risk patients significantly increased likelihood of provider counseling on FCs. Efforts should be made to ensure that HIV and family planning training in both countries include FCs, given the wider availability of supplies in recent years. The finding that nurses were significantly more likely than physicians to report

1
2
3
4
5
6
7
8
9 counseling women on both male and female condoms reflects the prominent role that
10 nurses play in prevention counseling; nurses therefore should be a priority for training as
11 they deliver much of the primary care. ~~+~~ However, physicians should also be prepared to
12
13
14 counsel women and men about their options for dual protection against pregnancy and
15
16 STIs.

17
18 Providers reported a strong need for new female-initiated barrier methods for
19 prevention and, similar to prior research from the U.S. and South Africa,⁽¹²³⁾ several
20
21 providers demonstrated negative attitudes about the aesthetics and use of the FC during
22
23 qualitative interviews. This finding suggests that current technologies may not meet all their
24
25 patient needs or are not adequately well-known or accessible, though it is important to note
26
27 that this research was conducted just before the new FC2 was approved by the USFDA. The
28
29 reported desire for training suggests that even as we work to develop new technologies, we
30
31 must also invest in programs and policies that ensure the potential for available existing
32
33 technologies is achieved.

34
35 These findings must be considered in light of study limitations. We did not ask
36
37 providers directly about ~~stocking availability or procurement cost~~ of FCs in their health care
38
39 systems or whether they had prior training in FC counseling. Consequently, results do not
40
41 shed light on how many providers in stocked clinics are providing patients with FC; rather,
42
43 we only know how many providers overall, in both stocked and unstocked clinics, are
44
45 offering the method. Provision in stocked clinics, especially with trained providers, is likely
46
47 to be higher. Expense to the health system and availability at the clinic level (in addition to
48
49 whether they have had prior training on FC provision) ~~These factors might would~~ influence
50
51 their ability to provide them and thus the likelihood that they counsel patients. Since
52
53 providers are reporting on their counseling practices, it is likely that social desirability bias
54
55 influenced responses toward more comprehensive levels of prevention counseling; therefore
56
57 patients for whom we measured low levels of counseling are likely to be in even greater
58
59 need of FC education. Our study also has important strengths. Our nationally
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

representative surveys (with relatively high response rates) allow us to generalize about providers' counseling and provision practices in these two countries; this is the first research on FC counseling and provision in Southern Africa to include representative national samples of providers. Further, very few data existed previously on FC counseling and provision in sub-Saharan Africa overall and our study contributes significantly to the literature on this topic by providing information on current provider practices in two high HIV-prevalence countries.

[As discussed in Mantell et al. \(2000\), a number of previous studies have documented the role of providers as "gatekeepers" to new products and the influence that provider acceptance of new prevention methods can have on their successful introduction and uptake. \(22\) Thus p](#)

Provider practices and support are essential to the successful integration of the FC into HIV and family planning services, and ultimately to ensuring women can protect themselves from both STI infection and unintended pregnancy. Our findings revealed provider support for the FC as a dual-protection method, and a significant need for further work promoting provider counseling in particular with adolescents, married women, and women using hormonal contraception.

Formatted: Not Highlight

TABLE 1: Provider and Practice Characteristics

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Gender, n (%)			
Female	674 (82)	547 (90)	1221 (86)
Male	145 (18)	62 (10)	207 (15)
Provider type, n (%)			
Nurse	792 (95)	528 (86)	1320 (91)
Physician	38 (5)	86 (14)	124 (9)
Age, median years (range)	39 (20-74)	43 (23-69)	41 (20-74)
Previous training, n (%)			
HIV Prevention	629 (77)	510 (84)	1139 (80)
Family Planning	503 (61)	399 (66)	902 (63)
Type of facility, n (%)			
Hospital	484 (59)	309 (50)	793 (55)
Clinic	342 (41)	305 (50)	647 (45)
Location, n (%)			
Urban	375 (45)	315 (51)	690 (48)
Rural	451 (55)	299 (49)	750 (52)
Proportion of patients at risk for HIV, n (%)			
None/Some	175 (22)	46 (8)	221 (16)
Half	112 (14)	92 (15)	204 (14)
Most/All	524 (65)	470 (77)	994 (70)

Formatted: Font: Bold

TABLE 2: Condom Counseling and Provision Practices and Female Condom Beliefs

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Currently offers condoms, n (%)			
Female condoms***	756 (94)	483 (80)	1,239 (88)
Male condoms	796 (99)	599 (99)	1,395 (99)
<u>Would offer female condoms if more Easily available, n (%)</u>	<u>230 (31)</u>	<u>129 (22)</u>	<u>359 (27)</u>
<u>Would like training on condoms, n (%)</u>			
—Female condoms***	112 (14)	165 (28)	277 (20)
—Male condoms***	56 (7)	109 (18)	165 (12)
<u>Among providers offering female condoms, counselors routinely with..., n (%) (N=1,226)</u>			
<u>Women in general***</u>	<u>602 (80)</u>	<u>329 (69)</u>	<u>931 (76)</u>
<u>Female teenagers***</u>	<u>377 (50)</u>	<u>328 (69)</u>	<u>705 (58)</u>
<u>HIV-positive women***</u>	<u>711 (95)</u>	<u>352 (74)</u>	<u>1,063 (87)</u>
<u>Married women***</u>	<u>544 (72)</u>	<u>319 (67)</u>	<u>863 (70)</u>
<u>Unmarried women***</u>	<u>622 (83)</u>	<u>342 (72)</u>	<u>964 (79)</u>
<u>Women using hormonal contraception</u>	<u>500 (67)</u>	<u>336 (71)</u>	<u>836 (68)</u>
<u>Among all providers, c</u>ounselors routinely on female condoms with..., n (%)			
Women in general***	635 (78)	370 (62)	1005 (71)
Female teenagers***	403 (50)	372 (62)	775 (55)
HIV-positive women***	761 (93)	400 (67)	1161 (82)
Married women***	573 (70)	358 (60)	931 (66)
Unmarried women***	658 (81)	385 (64)	1,043 (74)

Formatted: Space After: 6 pt, Don't add space between paragraphs of the same style

Formatted: Centered

Formatted: Left

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Women using hormonal contraception	529 (65)	380 (64)	909 (65)
Among all providers, counsels routinely on male condoms with..., n (%)			
Women in general***	652 (80)	542 (90)	1194 (84)
Female teenagers***	448 (56)	565 (94)	1013 (72)
HIV-positive women	786 (97)	578 (96)	1,364 (96)
Married women***	610 (75)	514 (85)	1,124 (79)
Unmarried women***	683 (85)	554 (92)	1,237 (88)
Women using hormonal contraception***	537 (66)	535 (90)	1,072 (76)
Believes female condoms appropriate contraception for women at risk of HIV infection, n (%)***	800 (98)	503 (84)	1303 (92)
Believes female condoms appropriate contraception for HIV-positive women, n (%)***	794 (97)	519 (87)	1,313 (93)
Routinely talks to female patients about pregnancy and HIV/STI prevention in same visit, n (%)	718 (88)	536 (90)	1254 (89)
Believes there is a need for more female barrier methods for HIV/STI prevention, scale 1-10, n (%)			
High (9-10)	537 (67)	412 (70)	949 (68)
Medium-High (7-8)	140 (17)	102 (17)	242 (17)
Medium (5-6)	72 (9)	45 (8)	117 (8)
Medium-Low (3-4)	23 (3)	7 (1)	30 (2)
Low (1-2)	35 (4)	23 (4)	58 (4)
Would like training on condoms, n (%)			
<u>Female condoms***</u>	<u>112 (14)</u>	<u>165 (28)</u>	<u>277 (20)</u>
<u>Male condoms***</u>	<u>56 (7)</u>	<u>109 (18)</u>	<u>165 (12)</u>

Formatted Table

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

*p≤0.05 **p≤0.010 ***p≤0.001

For peer review only

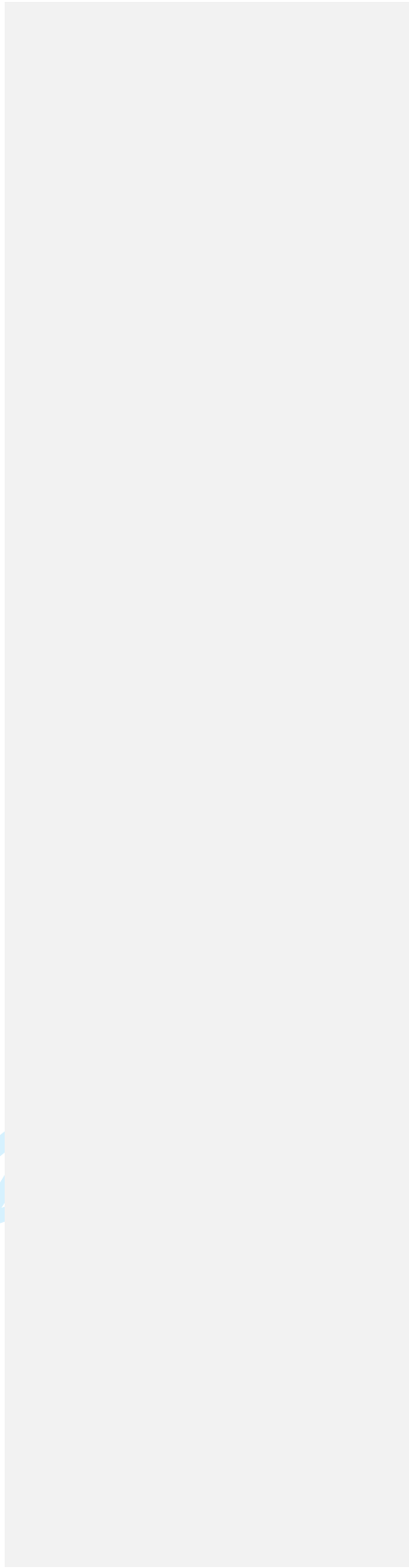


TABLE 3: Condom Counseling of Female Patients among Providers in South Africa and Zimbabwe: Odds Ratios from Multivariable Logistic Regression

Routine Condom Counseling (usually/always)	FEMALE condoms OR [95% CI]	MALE condoms OR [95% CI]
Country		
Zimbabwe (reference)	—	—
South Africa	0.48*** [.35 .68]	2.39*** [1.57 3.65]
Age (years)	1.02*** [1.02 1.05]	1.01 [1.00 1.03]
Provider type		
Physician (reference)	—	—
Nurse	5.41*** [3.26 8.98]	2.60** [1.47 4.58]
Trained in HIV Prevention	0.90 [.62 1.05]	1.35 [.87 2.08]
Trained in Family Planning	0.98 [.71 1.35]	1.02 [.70 1.51]
Facility Type		
Hospital (reference)	—	—
Clinic	0.88 [.61 1.25]	1.21 [.76 1.94]
Location		
Rural (reference)	—	—
Urban	0.85 [.61 1.25]	1.42 [0.93 2.14]
Most/all patients at HIV risk	1.21 [0.92 1.59]	1.58** [1.12 2.22]
Chi square (8 degrees of freedom)	96.08	70.24
N	1,324	1,328

*p ≤ 0.05 ** p ≤ 0.010 ***p ≤ 0.001

OR Odds Ratio

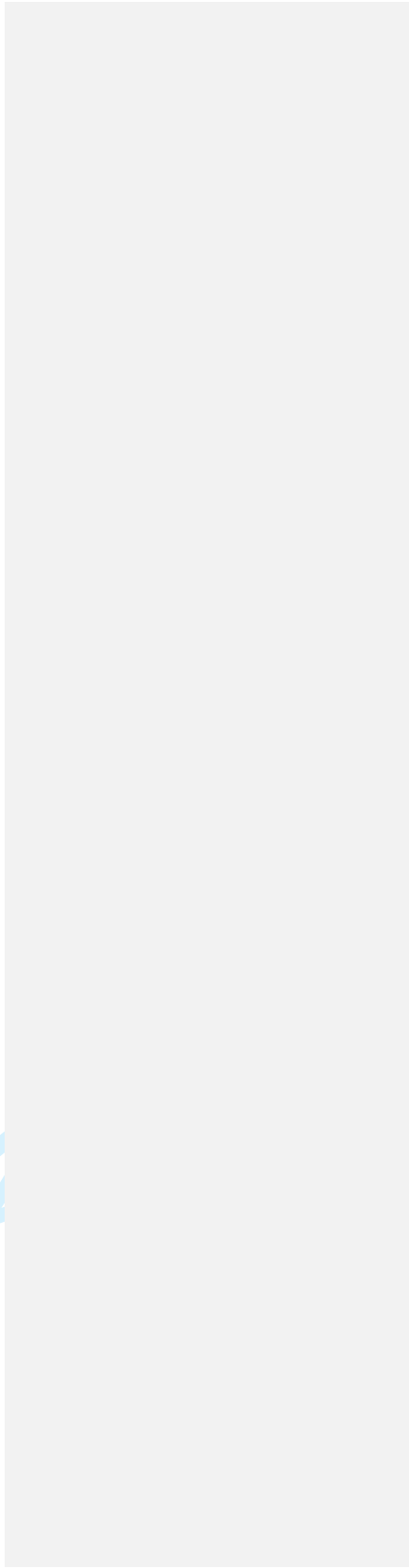
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Acknowledgements

We gratefully acknowledge the National Institute of Child Health and Human Development for support of this study, NIH/NICHD R01 HD046027. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH. We are thankful for our field staff and the thoughtful contributions of our study participants.

Data presented at the American Public Health Association annual meeting, Denver, 2010

For peer review only



REFERENCES

1. Kurth AE, Celum C, Baeten JM, et al. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 2011;**8**(1):62-72.
2. Vijayakumar G, Mabude Z, Smit J, et al. A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *Int J STD AIDS* 2006;**17**(10):652-9.
3. Abdool Karim Q, Abdool Karim S, Frohlich J, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010;**329**(5996):1168.
4. [CDC. CDC Issues Interim Guidance on Use of Medication to Prevent HIV Infection among Heterosexually Active Adults. 2012 \[cited 2012 December 05\]; Available from: <http://www.cdc.gov/nchhstp/newsroom/2012/PrEP-HeterosexualGuidance-PressRelease.html>. CDC- CDC Trial and Another Major Study Find PrEP Can Reduce Risk of HIV Infection among Heterosexuals. 2011 \[cited 2012 February 22\]; Available from: \[Error! Hyperlink reference not valid. http://www.cdc.gov/nchhstp/newsroom/PrEPHeterosexuals.html\]\(http://www.cdc.gov/nchhstp/newsroom/PrEPHeterosexuals.html\).](#)
5. UNAIDS. UNAIDS Outlook 2010. Switzerland: 2010.
6. Shisana O, Council HSR, Centre for AIDS Development R, et al. South African national HIV prevalence, incidence, behaviour and communication survey, 2008: A turning tide among teenagers?: HSRC Press; 2009.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

7. Zimbabwe National Statistics Agency, International ICF. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc., 2012.

8. Sedgh G, Hussain R, Bankole A, et al. Women with an unmet need for contraception in developing countries and their reasons for not using a method. Occasional Report 2007;**37**:5-40.

9. Department of Health, Medical Research Council, OrcMacro. South African Demographic and Health Survey 2003. Praetoria: Department of Health, 2007.

10. Peters A, Jansen W, van Driel F. The female condom: the international denial of a strong potential. Reprod Health Matters 2010;**18**(35):119-28.

11. CHANGE. Female Condoms and U.S. Foreign Assistance: An Unfinished Imperative for Women's Health. Washington, D.C.: Center for Health and Gender Equity, 2011.

[12. Reproductive Health Supplies Coalition. Female Condom Product Brief: Caucus on New and Underused Reproductive Health Technologies. Brussels, Belgium: Reproductive Health Supplies Coalition, 2012.](#)

[123](#). Mantell JE, Hoffman S, Weiss E, et al. The acceptability of the female condom: perspectives of family planning providers in New York City, South Africa, and Nigeria. J Urban Health 2001;**78**(4):658-68.

[134](#). Mung'ala L, Kilonzo N, Angala P, et al. Promoting female condoms in HIV voluntary counselling and testing centres in Kenya. Reprod Health Matters 2006;**14**(28):99-103.

Formatted: Not Highlight

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

15. [Kaler A. "It's some kind of women's empowerment": the ambiguity of the female condom as a marker of female empowerment. Soc Sci Med 2001;52\(5\):783-96.](#)

Formatted: Font: Bold

146. UNFPA. HIV Prevention Gains Momentum: Success in Female Condom Programming. New York: UNFPA, 2011.

17. [CHANGE. Female Condoms: Lessons from Zimbabwe. Washington, D.C.: Center for Health and Gender Equity, 2010.](#)

158. FHI. Female Condom Introduction in South Africa. Durham: 2007.

196. Republic of South Africa. COUNTRY PROGRESS REPORT ON THE DECLARATION OF COMMITMENT ON HIV/AIDS. Republic of South Africa, 2010.

1720. Harper C, Holt K, Nhemachena T, et al. Willingness of clinicians to integrate microbicides into HIV prevention practices in Southern Africa. AIDS Behav 2012:Published Online First: 1 January 2012. doi:10.1007/s10461-011-0109-6.

2148. Callegari L, Harper CC, van der Straten A, et al. Consistent condom use in married Zimbabwean women after a condom intervention. Sexually Transm Dis 2008;35(6):624-30.

22. [Mantell JE, Scheepers E, Abdool Karim Q. Introducing the female condom through the public health sector: Experiences from South Africa. AIDS Care 2000;12\(5\):589-601.](#)

Formatted: Font: Bold