

**Appendix I. Grading Scheme and Criteria for Inclusion of Citations, for Information for Providers to Share with Male Patients and Parents Regarding Male Circumcision and the Prevention of HIV Infection, Sexually Transmitted Infections, and other Health Outcomes**

<b>Strength of Recommendation</b>	<b>Level of Evidence for Recommendation</b>
A: Strong recommendation for the statement - Directly based on Level Ia or 1b evidence	Ia - Evidence from meta-analysis of randomized controlled trials (RCTs)
A: Strong recommendation for the statement - Directly based on Level Ia or 1b evidence	Ib - Evidence from meta-analysis of RCT(s) + at least one observational study or case control study OR Evidence from at least one RCT
B: Moderate recommendation for the statement - Directly based on Level IIa or IIb or IIc evidence	IIa - Evidence from meta-analysis of observational studies or case-control studies; and surveillance data
B: Moderate recommendation for the statement - Directly based on Level IIa or IIb or IIc evidence	IIb - Evidence from at least one observational study or case control study, or surveillance data or a systematic literature review that includes calculation resulting in summary statistics for outcomes. Also includes evidence from mathematical modeling studies.
B: Moderate recommendation for the statement - Directly based on Level IIa or IIb or IIc evidence	IIc - Evidence from a systematic literature review (without meta-analysis)
C: Optional recommendation for the statement - Directly based on Level IIIa or IIIb evidence	IIIa - Evidence from at least one case report
C: Optional recommendation for the statement - Directly based on Level IIIa or IIIb evidence	IIIb - Expert opinion or literature review
We developed the following inclusion criteria for the studies that were cited for the recommendations:	
<b>INCLUSION CRITERIA</b>	
INCLUSION CRITERION 1: Presented highest level of evidence for each outcome unless results from a lower level of evidence provided data for a different population (African vs other countries, including U.S.) or subpopulation (e.g. HIV positive vs. HIV negative). In the latter case, both levels of evidence were presented.	
INCLUSION CRITERION 2: When there was more than one meta-analysis for the same outcome, we included all meta-analyses in the evidence table unless all the citations in an older meta-analysis were included in a newer meta-analysis and the newer meta-analysis had additional citations. In the latter situation, we did not include the older meta-analysis in the grading table	
INCLUSION CRITERION 3: For studies that included results for the overall population <u>and</u> for subpopulations, we did not present results for the overall population to avoid duplication of representation of subpopulations in the results.	

<p><b>INCLUSION CRITERION 4:</b> If a study was included in a meta-analysis, we provided results from the meta-analysis, rather than the individual study</p>	
<p><b>PROCESS FOR GRADING EVIDENCE ASSOCIATED WITH EACH RECOMMENDATION:</b> A panel of 6 reviewers graded the evidence. Two independent reviewers reviewed evidence associated with each recommendation and after discussion by the panel of reviewers, a final consensus grade was assigned to each citation. These grades appear in Appendix II. For each citation, study methodology, outcome, effect of circumcision on the outcome, geographic location of the study and study population, and other comments are listed and a grade is provided. We limited our review process to the citations with the highest grade for each outcome, however, in some instances, citations with a lower level of evidence were also graded to provide more in-depth information for different populations. If more than one outcome is included in a single recommendation, separate citations are provided and rated for each outcome.</p>	
<p><b>NOTE:</b> Self-evident statements were not rated(see statements below)</p>	
<p><b>Statement 1:</b> "MSM may choose to be circumcised despite i.e. the lack of definitive evidence of circumcision decreasing the risk for the insertive anal sex partner of acquiring HIV infection, but male circumcision involves potential risks (see Adverse Events section of Box 1) and costs."</p>	
<p><b>Statement 2:</b> "However, current risks for either HIV or other non-HIV STIs may not remain constant in the future and the future risk for any individual neonate child, or adolescent cannot be definitively defined at the time that a circumcision decision is made."</p>	
<p><b>Statement 3:</b> "Those who enjoy the sensation of the foreskin during sexual relations will no longer experience that sensation." (after circumcision)</p>	

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
1	<b>Informational Item #1. Consideration of factors associated with decision making</b>							
2	Health benefits and risks of elective neonatal, adolescent, or adult medically performed male circumcision should be considered in consultation with medical providers while taking into account factors associated with decision-making around male circumcision, including religion, societal norms and social customs, hygiene, aesthetic preference, and ethical considerations.	American Academy of Pediatrics Task Force on Circumcision. Circumcision Policy Statement. Pediatrics. 2012;130(3):e756-785	Expert opinion	Not applicable	Not applicable		CIIIb	
3		American Urological Association. Circumcision. 2012; <a href="http://www.auanet.org/about/policy-statements/circumcision.cfm">http://www.auanet.org/about/policy-statements/circumcision.cfm</a> . Accessed October 24, 2015.	Expert opinion	Not applicable	Not applicable		CIIIb	
4	<b>Informational Item #2. Providing information to sexually active adolescent and adult males regardless of circumcision status</b>							
5	All sexually active adolescent and adult males should consider using other proven HIV and STI risk-reduction strategies such as reducing the number of partners, correct and consistent use of male latex condoms, and HIV preexposure or postexposure prophylaxis.	Workowski KA, Bolan GA, CDC. Sexually transmitted diseases treatment guidelines, 2015. MMWR 2015;64(RR-03):1-137.	Expert opinion	Not applicable	Not applicable		CIIIb	
6		Centers for Disease Control and Prevention, US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States - 2014—a clinical practice guideline. <a href="http://www.cdc.gov/hiv/pdf/PEPguidelines2014.pdf">http://www.cdc.gov/hiv/pdf/PEPguidelines2014.pdf</a> .	Expert opinion	Not applicable	Not applicable		CIIIb	
7		Dominguez KL, Smith DK, Thomas V, Crepaz N., Lang KS, Heneine W, McNicholl J, Reid L, Freelon B, Nesheim S, Huang Y-L(A) Huang, and Weidle P.J. Updated Guidelines for Antiretroviral Postexposure Prophylaxis after Sexual, Injection Drug Use, or Other Nonoccupational Exposure to HIV—United States, 2016—from the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. <a href="http://stacks.cdc.gov/view/odc/38856">http://stacks.cdc.gov/view/odc/38856</a>	Expert opinion	Not applicable	Not applicable		CIIIb	
8	<b>Information Item #3. Counseling uncircumcised sexually active adolescent and adult males</b>							
9	Prior to providing information about medically performed male circumcision, uncircumcised sexually active adolescent and adult males should be assessed to determine their HIV risk behaviors, HIV infection status, and the gender of their sexual partner(s).16	Adimora AA, Schoenbach VJ, Martinson FE, et al. Heterosexually transmitted HIV infection among African Americans in North Carolina. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2006;41(5):616-623.	Population-based case-control study	HIV acquisition	Not applicable	United States (North Carolina) Heterosexual black adults, aged 18-61 years	BIIb	Multivariate analysis confirmed strong associations of HIV infection with less than high school education, history of crack use, increased partner number, and a recent partner who injected drugs or smoked crack. Among case subjects who denied high-risk behavior such as partnerships with persons who injected drugs or smoked crack, risk for HIV infection was associated with < high school education, recent concern about personal hunger, and a sexual partner having had concurrent sexual partnerships outside their relationship with the respondent.
10	<b>3A. Counseling uncircumcised adolescent and adult males who are heterosexually and bisexually active (i.e., men who have sex with women)</b>							
11	<b>3A-1. An assessment of the patient's risk of acquiring HIV through heterosexual sex should be conducted:</b>							
12	Providers should review the patient's HIV risk behavior	Centers for Disease Control and Prevention, US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States - 2014—a clinical practice guideline. <a href="http://www.cdc.gov/hiv/pdf/PEPguidelines2014.pdf">http://www.cdc.gov/hiv/pdf/PEPguidelines2014.pdf</a> .	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
13		Workowski KA, Bolan GA, CDC. Sexually transmitted diseases treatment guidelines, 2015. MMWR 2015;64(RR-03):1-137.	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
14	Providers should assess condom use practices, consistency of use, and barriers to use.	Centers for Disease Control and Prevention, US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States - 2014—a clinical practice guideline. <a href="http://www.cdc.gov/hiv/pdf/PEPguidelines2014.pdf">http://www.cdc.gov/hiv/pdf/PEPguidelines2014.pdf</a> .	Expert opinion	Not applicable	Not applicable	United States	CIIIb	

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
15	Providers should inform heterosexually and bisexually active adolescent and adult males that males at high risk of HIV exposure during heterosexual sex include HIV-uninfected males in sexual relationships with: • An HIV-infected woman (i.e., in an HIV discordant couple); • One or more females who are at high risk for HIV (this includes commercial sex workers, females who inject drugs, and females in defined geographic locations with a prevalence of HIV >1.0%); • Multiple female partners.	Centers for Disease Control and Prevention, US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States - 2014—a clinical practice guideline. <a href="http://www.cdc.gov/hiv/pdf/PrEPguidelines2014.pdf">http://www.cdc.gov/hiv/pdf/PrEPguidelines2014.pdf</a> .	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
		Branson BM, Handsfield HH, Lampe MA, et al. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. <i>MMWR</i> 2006;55(RR-14):1-17	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
16	<b>3A-2. Regardless of their assessed risks as assessed in 3A-1, all uncircumcised adolescent and adult males who engage in heterosexual sex should be informed about the significant, but partial, efficacy of male circumcision in reducing the risk of acquiring HIV and some STIs through heterosexual sex, as well as the potential harms of male circumcision.</b>							
17	o Men and male adolescents being provided information about male circumcision should be told that (see Box 1):							
18	Male circumcision reduces, but does not eliminate, the risk of acquiring HIV and some STIs during penile-vaginal sex. In clinical trials, medically performed male circumcision reduced the incidence of <b>genital ulcer disease (GUD)</b> by 48% and the prevalence by 47%, reduced the prevalence of <b>HR-HPV</b> by 23 - 47%, and reduced the incidence of <b>syphilis</b> by 42% among circumcised men.	See below	See below	See below	See below	See below	See below	See below
19		Siegfried N, Muller M, Deeks J, Volmink J. Male circumcision for prevention of heterosexual acquisition of HIV in men (review). <i>Cochrane database of systematic reviews</i> . 2009;15(2):CD003362.	Meta-analysis of 3 RCTs	HIV incidence (acquisition)	Decrease	Uganda, South Africa, Kenya Heterosexual adult males	Ala	The overall relative risk reduction of acquiring HIV was 50% at 12 months and 54% at 21 or 24 months following circumcision
20		Byakika-Tusime J. Circumcision and HIV Infection: Assessment of Causality. <i>AIDS Behav</i> . 2008;12(6):835-841.	Meta-analysis of 13 studies Analysis limited to 10 observations studies (6 cohort studies, 1 nested case-control study, 3 case control studies)	HIV incidence (acquisition)	Decrease	Observational studies: United States, BIIa India, Kenya, Malawi, Cote d'Ivoire, Sengal, Tanzania Heterosexual adult males		61% reduced risk of HIV infection among circumcised men (aRR 0.39, 95% CI 0.27-0.56)
21		Lei JH, Liu LR, Wei Q, et al. Circumcision status and risk of HIV acquisition during heterosexual intercourse for both males and females: a meta-analysis. <i>PLOS ONE</i> . 2015;10(5):e0125436	Meta-analysis of 9 studies related to female-to-male transmission (3 RCTs and 6 prospective cohort studies) Analysis limited to 6 prospective cohort studies	HIV incidence (acquisition)	Decrease	Prospective Cohort Studies: Kenya, Uganda, India Heterosexual adult males	BIIa	Male circumcision was associated with 70% reduction in the risk for HIV acquisition (pooled adjusted risk ratio [aRR] 0.40, 95% CI 0.31–0.53)
22		Telzak EE, Chiasson MA, Bevier PJ, Stoneburner RL, Castro KG, Jaffe HW. HIV-1 seroconversion in patients with and without genital ulcer disease. A prospective study. <i>Ann Intern Med</i> . 1993;119(12):1181-1186.	Prospective cohort study	HIV incidence (acquisition)	Decrease (univariate analysis) No decrease (multiple logistic regression analysis)	United States (STD Clinic) Heterosexual adult males	BIIb	On univariate analysis, HIV-1 seroconversion was associated with not being circumcised (RR 4.1 P -value 0.04). In a multiple logistic regression analysis which included all hypothesized risk factors, circumcision status was not predictive of HIV seroconversion (aOR 3.5 95% CI 0.8, 15.8)
23		Mehta SD, Moses S, Parker CB, Agot K, Maclean I, Bailey RC. Circumcision status and incident herpes simplex virus type 2 infection, genital ulcer disease, and HIV infection. <i>AIDS</i> . 2012;26(9):1141-1149.	RCT	GUD incidence (acquisition)	Reduced	Kenya Heterosexual adult males	Alb	Circumcision was associated with a reduction in GUD (RR 0.52, 95% CI 0.37–0.73)
24		Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. <i>Lancet</i> . 2007;369(9562):657-666.	RCT	GUD prevalence	Reduced	Uganda Heterosexual adult males	Alb	Circumcision was also associated with a reduction in GUD (PRR 0.53, 95% CI 0.43–0.64)

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
25		Albero G, Castellsague X, Giuliano AR, Bosch FX. Male circumcision and genital human papillomavirus: a systematic review and meta-analysis. Sex Transm Dis. 2012;39(2):104-113	Systematic review and meta-analysis of 21 studies (16 of 21 studies studied HR-HPV prevalence including 2 RCTs, 14 observational studies [8 cross-sectional studies, 1 case control study, and 5 cohort studies]) Analysis restricted to RCTs	High risk - HPV prevalence	Reduced	RCT: South Africa, Uganda Observational studies: Brazil, South Korea, United States, Mexico, Mexico, Canada, Heterosexual adult males	Ala	Pooled RCTs: OR 0.67, 95% CI 0.54 - 0.82
26		Albero G, Castellsague X, Giuliano AR, Bosch FX. Male circumcision and genital human papillomavirus: a systematic review and meta-analysis. Sex Transm Dis. 2012;39(2):104-113	Systematic review and meta-analysis of 21 studies (16 of 21 studies studied HR-HPV prevalence including 2 RCTs, 14 observational studies [8 cross-sectional studies, 1 case control study, and 5 cohort studies]) Analysis restricted to observational studies	High risk - HPV prevalence	Reduced	Observational studies: Brazil, South Korea, United States, Mexico, Mexico, Canada, Heterosexual adult males	BIIa	Pooled observational studies: OR 0.57, 95% CI 0.42 - 0.77
27		Larke N, Thomas SL, Dos Santos Silva I, Weiss HA. Male circumcision and human papillomavirus infection in men: a systematic review and meta-analysis. J Infect Dis. 2011;204(9):1375-1390.	Systematic review and meta-analysis of 23 papers (19 of 23 papers studied HR-HPV prevalence in HIV-negative men (2 RCTs, 1 cohort study, 16 cross sectional studies; 3 papers studied HR-HPV prevalence in HIV-positive men (3 RCTs) Results restricted to RCTs	High risk - HPV prevalence	Reduced	RCTs: South Africa, Uganda	Alb	Pooled RCTs: OR 0.53, 95% CI 0.42-0.67
28		Larke N, Thomas SL, Dos Santos Silva I, Weiss HA. Male circumcision and human papillomavirus infection in men: a systematic review and meta-analysis. J Infect Dis. 2011;204(9):1375-1390.	Systematic review and meta-analysis of 23 papers (19 of 23 papers studied HR-HPV prevalence in HIV-negative men (2 RCTs, 17 observational studies [1 cohort study, 16 cross sectional studies]; 3 papers studied HR-HPV prevalence in HIV-positive men (3 RCTs) Results restricted to observational studies	High risk - HPV prevalence	Reduced	Observational Studies: France, United States, Netherlands, Spain, Colombia, Brazil, Thailand, Philippines, Brazil, Mexico, South Africa, Kenya, Canada, South Korea, Denmark Heterosexual adult male	BIIa	Pooled observational studies: OR 0.58, 95% CI 0.44-0.77
29		Homfray V, Tanton C, Miller RF, et al. Male Circumcision and STI Acquisition in Britain: Evidence from a National Probability Sample Survey. PLOS ONE. 2015;10(6):e0130396.	Case-control study	Prevalence of HR-HPV in urine	Reduced	Great Britain Heterosexual adult males	BIIb	In the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3) in Britain, circumcised men were less likely than uncircumcised men to have any HPV-type (aOR 0.26 [95% CI = 0.13-0.50]), high-risk-HPV (aOR 0.14 [95% CI = 0.05-0.40]), and possible high-risk-HPV (aOR 0.24 [95% CI = 0.06-0.94]) detected in their urine.
30		Albero G, Villa LL, Lazcano-Ponce E, et al. Male circumcision and prevalence of genital human papillomavirus infection in men: a multinational study. BMC Infect Dis. 2013;13:18.	Cross-sectional study	Prevalence of HR-HPV	No difference	Brazil, Mexico, United States Heterosexual adult males	BIIb	In a multi-national study (Brazil, Mexico, and U.S.), no significant association aPR 0.95, 95% CI 0.87-1.03
31		Canadas MP, Darwich L, Videla S, et al. Circumcision and penile human papillomavirus prevalence in human immunodeficiency virus-infected men: heterosexual and men who have sex with men. Clin Microbiol Infect. 2013;19(7):611-616.	Cross-sectional study Results restricted to HIV-positive heterosexual adult males	Any HR-HPV prevalence	No change	Spain HIV-positive heterosexual adult males	BIIb	aOR 0.9, 95% CI 0.3-2.6
32		Pintye J, Baeten JM, Manhart LE, et al. Association between male circumcision and incidence of syphilis in men and women: a prospective study in HIV-1 serodiscordant heterosexual African couples. Lancet Glob Health. 2014;2(11):e664-671.	Prospective study nested in PrEP RCT Results restricted to HIV-positive heterosexual men	Syphilis incidence	Decrease	Kenya and Uganda HIV-positive heterosexual adult males in HIV-discordant relationships in PrEP RCT	BIIb	During a median of 2.75 years of prospective follow-up of 4,716 HIV-1 serodiscordant Kenyan and Ugandan couples in an RCT of preexposure prophylaxis, male circumcision was associated with reductions in incident syphilis of 62% in HIV-infected men (aHR 0.38 [95% CI = 0.18-0.81]).
33		Pintye J, Baeten JM, Manhart LE, et al. Association between male circumcision and incidence of syphilis in men and women: a prospective study in HIV-1 serodiscordant heterosexual African couples. Lancet Glob Health. 2014;2(11):e664-671.	Prospective study nested in PrEP RCT Results restricted to HIV-negative heterosexual men	Syphilis incidence	No change	Kenya and Uganda HIV-negative heterosexual adult males in HIV-discordant relationships in PrEP RCT	BIIb	During a median of 2.75 years of prospective follow-up of 4,716 HIV-1 serodiscordant Kenyan and Ugandan couples in an RCT of pre-exposure prophylaxis, male circumcision was not associated with a significant reduction in incident syphilis (aHR 0.64 [95% CI = 0.36-1.11])

Row no.	Informational Item/Supporting statement for each informational item	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
34	Mehta SD, Moses S, Parker CB, Agot K, Macean I, Bailey RC. Circumcision status and incident herpes simplex virus type 2 infection, genital ulcer disease, and HIV infection. AIDS. 2012;26(9):1141-1149.	RCT	Incident syphilis	No difference	Kenya Heterosexual adult males	Alb	In the Kenya trial, incident syphilis did not differ by circumcision status in this trial: 0.4/100 person-years (circumcised men) versus 0.3/100 person-years (uncircumcised men) (RR 1.23 [95% CI 0.41–3.65]).
35	Tobian AA, Serwadda D, Quinn TC, et al. Male circumcision for the prevention of HSV-2 and HPV infections and syphilis. N Engl J Med. 2009;360(13):1296-1309.	RCT	Incident syphilis	No difference	Uganda Heterosexual adult males	Alb	In the Uganda RCT of male circumcision, syphilis was detected in 50 of 2,083 subjects (2.4%) in the intervention group, compared with 45 of 2,143 subjects (2.1%) in the control group (crude HR 1.14 [95% CI = 0.77–1.75, P = 0.50]; aHR 1.10 [95% CI = 0.75–1.65, P = 0.44]).
36	Male circumcision has not been shown to reduce the risk of HIV during receptive anal sex and there have been no studies to assess the impact of circumcision on risk of HIV acquisition during oral sex. Male circumcision has not been shown to reduce the risk of STIs during oral or anal sex.	Wiysonge CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 7 observational studies (4 cross-sectional studies, 1 case-control study, 2 prospective cohorts) Results limited to MSM reporting a mainly or exclusively insertive role in anal sex	Acquisition of HIV Decrease	Locations: United States, Canada, South Africa, Scotland, Peru, Ecuador MSM who practice mainly or exclusively insertive anal sex	Bila	The results were statistically significant among men reporting an insertive role (OR 0.27, 95% CI 0.17–0.44)
37	Wiysonge CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 3 observational studies (2 cross-sectional studies, 1 prospective cohort study) Results limited to MSM reporting a mainly or exclusively receptive role in anal sex	Acquisition of HIV No change	Locations: United States, Peru, Ecuador MSM who practice mainly or exclusively receptive anal sex	Bila	The results were not significant among men reporting a receptive role (OR 1.20, 95% CI 0.63–2.29)	
38	Wiysonge CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 20 observational studies (13 cross-sectional studies, 6 prospective cohort, 1 case-control study) Results including MSM regardless of primary role in anal sex (insertive or receptive)	Acquisition of HIV No change	Locations: United States, Canada, Puerto Rico, Peru, Ecuador, Jamaica, Dominican Republic, Brazil, Australia, India, Taiwan, South Africa, Scotland, England/Wales MSM regardless of primary role in anal sex	Bila	The results were not statistically significant among men regardless of primary role in anal sex (OR 0.86, 95% CI 0.7-1.06)	
39	Wiysonge CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 8 observational studies (5 cross-sectional studies, 3 prospective cohort studies)	Acquisition of syphilis No change	Locations: United States, Peru, Ecuador, Australia MSM regardless of primary role in anal sex	Bila	The results were not significant among men regardless of primary role in anal sex (OR 0.96, 95% CI 0.82-1.13)	
40	Wiysonge CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 5 observational studies (3 Prospective cohort studies, 2 cross-sectional studies)	Acquisition of HSV-2 No change	Locations: United States, Peru, Ecuador, Australia MSM regardless of primary role in anal sex	Bila	The results were not significant among men regardless of primary role in anal sex (OR 0.86, 95% CI 0.62-1.21)	
41	Patel P., Borkow C.B., Brooks J.T., Lasry A., Lansky A. & Mermin J. (2014) Estimating per-act HIV transmission risk: a systematic review, AIDS, 28(10), 1509-1519	Estimates of per-act HIV transmission risk based on review of the literature	HIV acquisition Not applicable	Estimated based on literature search from various countries	Bilb	Due to limitations of the currently literature and of previous estimates on the risk of HIV related to oral sex, CDC authors while it is biologically plausible that HIV transmission can occur via oral sex, CDC is unable to provide a precise numeric estimate.	
42	Male circumcision has not been shown to reduce the risk of HIV transmission to female partners. However, in clinical trials, medically performed male circumcision reduced the incidence of syphilis by 59%, and reduced the prevalence of GUD by 22%, HR-HPV by 22%, T. vaginalis by 45%, and bacterial vaginosis by 40% among female partners.	Weiss HA, Hanks CA, Dickson K. Male circumcision and risk of HIV infection in women: a systematic review and meta-analysis. Lancet Infect Dis. 2009;9:669-677.	Systematic review and random effects meta-analysis (1 RCT and 6 longitudinal analyses)	HIV acquisition No difference	RCT: Uganda Longitudinal studies: 14 sites in east and southern Africa; Uganda; Zimbabwe, Tanzania	Alb	A systematic review and meta-analysis of the evidence for a direct effect of male circumcision on the risk of women becoming infected with HIV identified 19 epidemiological analyses from 11 study populations. The meta-analysis of data from the 1 RCT and 6 longitudinal analyses showed little evidence that male circumcision directly affects the risk of HIV acquisition in women (RR 0.80 [95% CI = 0.53–1.36]).
43	Lei JH, Liu LR, Wei Q, et al. Circumcision status and risk of HIV acquisition during heterosexual intercourse for both males and females: a meta-analysis. PLOS ONE. 2015;10(5):e0125436	Meta-analysis of 5 studies, including 1 RCT and 4 prospective cohort studies Analysis limited to 1 RCT and 2 prospective cohort studies of discordant couples (did not include 2 prospective cohort studies with males partners of unknown status)	HIV incidence (acquisition) No difference	RCT: Uganda Prospective Cohort Studies: Uganda Heterosexual adult females	Alb	Male circumcision was associated with no significant change in the risk for HIV acquisition (pooled adjusted risk ratio [aRR] 0.68, 95% CI 0.40-1.15)	
44	Wawer M, Makumbi F, Kigozi G, et al. Circumcision in HIV-infected men and its effect on HIV transmission to female partners in Rakai, Uganda: a randomised controlled trial. Lancet. 2009;374:229-237.	RCT	HIV acquisition No difference	Uganda Heterosexual females	Alb	In Rakai, Uganda, 18% of women in the intervention group where male partners underwent medical male circumcision acquired HIV infection and 12% of women in the control group whose male partners did not undergo medical male circumcision acquired HIV during follow-up (HR 1.58 [95% CI = 0.68–3.66]).	

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
45		Pintye J, Baeten JM, Manhart LE, et al. Association between male circumcision and incidence of syphilis in men and women: a prospective study in HIV-1 serodiscordant heterosexual African couples. <i>Lancet Glob Health.</i> 2014;2(11):e664-671.	Prospective cohort study (nested in RCT) Results restricted to HIV-negative women	Syphilis acquisition (incidence)	Decrease	Uganda and Kenya HIV-negative adult females in serodiscordant relationships enrolled in RCT of HIV PrEP	Bilb	Male circumcision was associated with reductions in incident syphilis of 75% in HIV-negative women (aHR 0.25 [95% CI = 0.08-0.76]), and 48% reduction in HIV-positive women (aHR 0.52 [95% CI = 0.27-0.97])
46		Pintye J, Baeten JM, Manhart LE, et al. Association between male circumcision and incidence of syphilis in men and women: a prospective study in HIV-1 serodiscordant heterosexual African couples. <i>Lancet Glob Health.</i> 2014;2(11):e664-671.	Prospective cohort study (nested in RCT) Results restricted to HIV-positive women	Syphilis acquisition (incidence)	Decrease	Uganda and Kenya HIV-positive adult females in serodiscordant relationships enrolled in RCT of HIV PrEP	Bilb	Male circumcision was associated with reductions in incident syphilis of 48% in HIV-positive women (aHR 0.52 [95% CI = 0.27-0.97])
47		Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. <i>Am J Obstet Gynecol.</i> 2009;200(1):42 e41-47	RCT	GUD prevalence	Decrease	Uganda Heterosexual females	Alb	Male circumcision was also associated with a reduction in GUD in heterosexual female partners (adjusted prevalence rate ratio (aPRR) 0.78, 95% CI 0.61-0.99)
48		Davis MA, Gray RH, Grabowski MK, et al. Male circumcision decreases high-risk human papillomavirus viral load in female partners: a randomized trial in Rakai, Uganda. <i>Int J Cancer.</i> 2013;133(5):1247-1252.	RCT	HR-HPV prevalence	Decrease	Uganda Women (female sex partners of men enrolled in RCT of male circumcision) 24-month follow-up	Alb	Female sex partners of circumcised men enrolled in clinical trial of male circumcision had lower HR-HPV prevalence compared to female sex partners of uncircumcised men. (PRR 0.78, 95% CI 0.65-0.94)
49		Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. <i>Am J Obstet Gynecol.</i> 2009;200(1):42 e41-47.	RCT	Trichomoniasis (T. vaginalis) prevalence	Decrease	Uganda Women (female sexual partners of males enrolled in study) 12-month follow-up	Alb	Male circumcision was associated with a 45% decrease in prevalence of T. vaginalis in female heterosexual partners (aPRR 0.55, 95% CI 0.34-0.89)
50		Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. <i>Am J Obstet Gynecol.</i> 2009;200(1):42 e41-47.	RCT	Bacterial vaginosis (BV) prevalence	Decrease	Heterosexual women (female sexual partners of males enrolled in study) 12-month follow-up	Alb	Female heterosexual sex partners of circumcised men experienced 40% lower BV prevalence compared to female partners of uncircumcised men (aPRR 0.60, 95% CI 0.38-0.9417)
51	Male circumcision has also been shown to reduce the risk of urinary tract infections in males aged 0-1 years by 90%, males aged 1-16 years by 85%, and males aged >16 years by 71%.	Morris BJ, Wiswell TE. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. <i>J Urol.</i> 2013;189(6):2118-2124.	Systematic review and meta-analysis of 22 studies (1 RCT, 21 observational [6 cohort, 11 case-control, 1 cross-sectional, 1 retrospective cross-sectional case note review, 1 retrospective analysis, 1 retrospective cohort])	UTI	Decrease	Countries: United States, Australia, Korea, Canada, Turkey, Iran males in 4 age groups: 0-1 yr 1-16 yr >16 yrs lifetime	Alb	The estimated risk of urinary tract infections (UTIs) in uncircumcised males aged 0-1 year is 1.26% (uncircumcised), 0.127% (circumcised) calculation: 1.26%-0.127% = 1.133%; 1.133%/1.26% = 0.899 = 90% reduction from uncircumcised risk aged 1-16 years is 2.68%(uncircumcised), 0.409% (circumcised) calculation: 2.68%-0.409% = 2.271%; 2.271%/2.68% = 0.847 = 85% reduction from uncircumcised risk aged >16 years is 28.2% (uncircumcised), 8.3% (circumcised) calculation: 28.2% - 8.26% = 19.94%; 19.94%/28.2% = 0.707 = 71% reduction from uncircumcised risk over a lifetime is 32.1% (uncircumcised), 8.8% (circumcised); 32.1% - 8.8% = 23.3%; 23.3%/32.1%=0.726 = 73% reduction from uncircumcised risk
52	During adulthood, males not circumcised prior to age 10 years are more likely than men circumcised prior to age 10 years to experience invasive penile cancer.	Daling JR, Madeleine MM, Johnson LG, et al. Penile cancer: importance of circumcision, human papillomavirus and smoking in situ and invasive disease. <i>International journal of cancer. Journal international du cancer.</i> 2005;116(4):606-616.	Case-control study	invasive penile cancer in situ penile cancer	Decrease	United States Cases: men with either invasive or in situ penile cancer controls: men without invasive or in situ penile cancer	Bilb	In a population-based case-control study, the authors found that men not circumcised during childhood were at increased risk of invasive (OR 2.3 [95% CI = 1.3-4.1]), but not <i>in situ</i> (OR 1.1 [95% CI = 0.6-1.8]) penile carcinoma. Among uncircumcised men, phimosis was strongly associated with invasive penile cancer (OR 11.4 [95% CI = 5.0-25.9])
53		Schoen EJ. The relationship between circumcision and cancer of the penis. <i>CA Cancer J Clin.</i> 1991;41(5):306-309	Retrospective observational study	Invasive penile cancer	Decrease	United States Men with invasive penile cancer	Bilb	In a retrospective review of 5 studies with 592 cases of invasive penile cancer in the United States, none of the cases were in men who had been circumcised in infancy.
54		Schoen EJ, Oehrli M, Colby CJ, Machin G. The highly protective effect of newborn circumcision against invasive penile cancer. <i>Pediatrics.</i> 2000;105(3)	Retrospective observational study	Invasive penile cancer	Decrease	United States Men diagnosed with invasive penile cancer of penile cancer in situ who were members of Kaiser Permanente of Northern California during 1954-1997.	Bilb	Of 89 cases of invasive penile cancer, 98% were in uncircumcised men; of 118 cases of carcinoma in situ, 84% were in uncircumcised men.
55	After circumcision, men should not have sex until their health care provider has documented wound healing.	Wawer M, Makumbi F, Kigozi G, et al. Circumcision in HIV-infected men and its effect on HIV transmission to female partners in Rakai, Uganda: a randomised controlled trial. <i>Lancet.</i> 2009;374:229-237.	Case control study nested within RCT	HIV acquisition in relation to timing of resumption of sexual relations	Not applicable, however, HIV acquisition was increased with early resumption of sexual relations after male circumcision	Uganda Heterosexual female partners of HIV-infected men	Bilb	Early resumption of sexual relations following male circumcision was significantly associated with higher risk for HIV acquisition among female participants, with a rate ratio versus control of 3.50 (95% CI = 1.14-10.76). Among couples in the immediate male circumcision arm who delayed resumption of sex until after wound healing, there was no significant difference in HIV incidence relative to uncircumcised controls (rate ratio 1.2 [95% CI = 0.39-3.73]).
56		Tobian AA, Kigozi G, Marucci J, et al. HIV shedding from male circumcision wounds in HIV-infected men: a prospective cohort study. <i>PLoS Med.</i> 2015;12(4):e1001820.	Prospective cohort	HIV shedding	Not applicable, however, HIV shedding was elevated compared to baseline during 1-3 weeks after male circumcision and decreased by 6 weeks	Uganda Recently circumcised HIV-infected men	Bilb	In a study of HIV shedding from male circumcision wounds in Rakai among 223 HIV-infected men, 95 compared to baseline, the proportion of men shedding increased significantly after male circumcision at 1 week (prevalence rate ratio [PRR] 1.87 [95% CI = 1.12-2.14]), 2 weeks [PRR 3.16 [95% CI = 1.94-5.13]], and 3 weeks [PRR 1.98 [95% CI = 1.19-3.28]], decreased by 6 weeks [PRR 0.27 [95% CI = 0.09-0.83]], and continued to be suppressed at 12 weeks [PRR 0.19 [95% CI = 0.06-0.64]]. Detectable HIV shedding was positively correlated with HIV plasma viral load > 50,000 copies/ml compared with plasma viral load < 400, having unhealed wounds compared with having healed wounds, and not receiving antiretroviral HIV therapy compared with having undetectable plasma viral load related to receiving antiretroviral HIV therapy.

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
57	Male circumcision reduces the risk of men acquiring HIV and other STIs during penile-vaginal sex, but no definitive statements can be made about whether male circumcision reduces the risk of MSM acquiring HIV and other STIs during penile-anal sex.	Wiyongse CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 20 observational studies (13 cross-sectional studies, 6 prospective cohort, 1 case-control study) Results including MSM regardless of primary role in anal sex (insertive or receptive)	Acquisition of HIV	No change	Locations: United States, Canada, Puerto Rico, Peru, Ecuador, Jamaica, Dominican Republic, Brazil, Australia, India, Taiwan, South Africa, Scotland, England/Wales MSM regardless of primary role in anal sex	BIIa	The results were not statistically significant among men regardless of primary role in anal sex (OR 0.86, 95% CI 0.7-1.06)
58		Wiyongse CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 7 observational studies (4 cross-sectional studies, 1 case-control study, 2 prospective cohorts) Results limited to MSM reporting a mainly or exclusively insertive role in anal sex	Acquisition of HIV	Decrease	Locations: United States, Canada, South Africa, Scotland, Peru, Ecuador MSM who practice mainly or exclusively insertive anal sex	BIIa	The results were statistically significant among men reporting an insertive role (OR 0.27, 95% CI 0.17-0.44)
59		Wiyongse CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 3 observational studies (2 cross-sectional studies, 1 prospective cohort study) Results limited to MSM reporting a mainly or exclusively receptive role in anal sex	Acquisition of HIV	No change	Locations: United States, Peru, Ecuador MSM who practice mainly or exclusively receptive anal sex	BIIa	The results were not significant among men reporting a receptive role (OR 1.20, 95% CI 0.63-2.29)
60		Wiyongse CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 8 observational studies (5 cross-sectional studies, 3 prospective cohort studies).	Acquisition of syphilis	No change	Locations: United States, Peru, Ecuador, Australia MSM regardless of primary role in anal sex	BIIa	The results were not significant among men regardless of primary role in anal sex (OR 0.96, 95% CI 0.82-1.13)
61		Wiyongse CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 5 observational studies (3 Prospective cohort studies, 2 cross-sectional studies)	Acquisition of HSV-2	No change	Locations: United States, Peru, Ecuador, Australia MSM regardless of primary role in anal sex	BIIa	The results were not significant among men regardless of primary role in anal sex (OR 0.86, 95% CI 0.62-1.21)
62		See evidence in section on HIV and other STD acquisition among heterosexual adult males (Row numbers 19-41)						
63	Results from data pooled across several observational studies indicate that among MSM who practice mainly or exclusively insertive anal sex, circumcision was associated with a decreased risk of acquiring a new HIV infection for the insertive partner, however, clinical trials have not included the numbers of MSM necessary to make a definitive conclusion.	Wiyongse CS, Kongnyuy EJ, Shey M, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2011(6):CD007496.	Systematic review and meta-analysis of 7 observational studies (4 cross-sectional studies, 1 case-control study, 2 prospective cohorts) Results limited to MSM reporting a mainly or exclusively insertive role in anal sex	Acquisition of HIV among men who have sex with men who practice mainly or exclusively insertive anal sex	Decrease	MSM	BIIa	The results were statistically significant among 3,465 men in 7 studies reporting an insertive role (OR 0.27 [95% CI = 0.17-0.44, I <sup>2</sup> = 0%]).
64	It is biologically plausible that MSM who practice mainly insertive anal sex may experience a reduction in the risk for acquiring HIV and STIs like that among heterosexuals in clinical trials during penile-vaginal sex; among men who practice mainly or exclusively receptive anal sex, male circumcision does not provide a biologically plausible benefit for a similar reduction in risk.	Kilmarx P, Kretsinger K, Millet G. Considerations in the role of male circumcision in the prevention of HIV transmission in the U.S.A. HV Ther 2009, 3(3):241-254	Literature review/expert opinion	HIV	Decrease	MSM	CIIIb	
65		Sullivan PS, Kilmarx PH, Peleman TA, Taylor AW, Nakashima AK, Kamb ML, et al. (2007) Male Circumcision for Prevention of HIV Transmission: What the New Data Mean for HIV Prevention in the United States. PLoS Med 4(7): e223.	Literature review/expert opinion	HIV		MSM	CIIIb	In a vaccine preparedness cohort of MSM followed from 1995 to 1997, circumcision was significantly associated with a decreased risk for HIV seroconversion (aOR = 0.5; 95% CI 0.3-0.9), controlling for number of male sex partners and unprotected sex with an HIV-positive partner [19]. In a cross-sectional survey of gay men in Seattle in the early 1990s, circumcision was associated with decreased odds of prevalent HIV infection (aOR = 0.5; 95% CI 0.25-1.0) [20]. While falling short of the quality of data from a randomized intervention trial, these limited data suggest that circumcised MSM in the US may have decreased risk of HIV infection. However, it is possible that the noted associations in these two observational studies were related to uncontrolled bias. A small cross-sectional study of Australian MSM found no association between circumcision status and risk of HIV infection, when stratifying by insertive and receptive roles [21].

Row no.	Informational Item/Supporting statement for each informational item	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
66		Zuckerman RA, Whittington WL, Celum CL, et al. Higher concentration of HIV RNA in rectal mucosa secretions than in blood and seminal plasma, among men who have sex with men, independent of antiretroviral therapy. The Journal of infectious diseases. 2004;190(1):156-161.	Cross-sectional study. Mixed-effects models estimated the effect of factors on HIV shedding.	HIV acquisition	Not applicable	United States, Peru HIV-infected MSM who were either naive for antiretroviral therapy (ART) or had been receiving a stable ART regimen for 30 days before enrollment.	BIIa The relative risk of HIV infection per sex act may be higher for insertive penile-anal sex than for penile-vaginal sex due to higher HIV RNA concentrations in rectal secretions relative to vaginal or cervical secretions
67		Vittinghoff E, Douglas J, Judson F, McKirnan D, MacQueen K, Buchbinder SP. Per-contact risk of human immunodeficiency virus transmission between male sexual partners. American journal of epidemiology. 1999;150(3):306-311.	Prospective study	HIV acquisition	Not applicable	High-risk, HIV-uninfected homosexual and bisexual men	BIIb The risk of HIV acquisition among MSM engaging in penile-anal sex is, however, greater for the anal receptive partner than for the insertive partner. The estimated per-contact risk of acquiring HIV: Unprotected receptive anal intercourse when partner known to be HIV-positive: 0.82 %, 95%CI 0.24%-, 2.76% Unprotected receptive anal intercourse when partner had unknown HIV status: 0.27 %, 95% CI 0.06%-0.49% Unprotected insertive anal and receptive oral sex with HIV-positive: 0.06% , 95% CI 0.02-0.19 Unprotected insertive anal and receptive oral sex when partner had unknown HIV status: 0.04%, 95% CI 0.01-0.17
68	<b>Informational Item #4. Counseling parents of male newborns, children, or adolescents</b>						
69	Health benefits and risks of elective neonatal, pediatric, or adolescent male circumcision should be considered in consultation with medical providers. Ideally, discussions about neonatal circumcision should occur prior to the birth of the child. Ultimately, whether to circumcise a male neonate or child is a decision made by parents or guardians on behalf of their newborn son or dependent child.	Task Force on Circumcision. Male Circumcision. Pediatrics Sep 2012, 130 (3) e756-e785	Literature review/expert opinion	Not applicable	Not applicable	United States	CIIIb
70	When providing information to parents about male circumcision for an adolescent minor, the adolescent should be included in the decision-making process about undergoing elective male circumcision. When counseling an adolescent inquiring about male circumcision, parents should be engaged in the discussion, unless the adolescent is legally emancipated. Minors may be deemed emancipated, giving them sole authority to make health care decisions on their own behalf under certain circumstances, which vary by state law, for example, if the minor 1) lives independently and is self-supporting, 2) is married, 3) is pregnant or a parent, 4) is in the military, or 5) is declared emancipated by a court as defined in the mature minor section.	Ford C, English A, Sigman G. Confidential health care for adolescents: position paper for the Society for Adolescent Medicine. J Adolesc Health 2004;35(2):160-7.	Expert opinion	Not applicable	Not applicable	Adolescents	CIIIb
		Rosenbaum S, Abramson S, MacTaggart P. Health information law in the context of minors. Pediatrics. 2009;123 Suppl 2:S116-121.	Expert opinion	Not applicable	Not applicable	Adolescents	CIIIb
71	<b>4-A. Parents and guardians should be informed about the medical benefits and risks of neonatal, pediatric, or adolescent medically performed male circumcision (see Box 1):</b>	See two rows above					
72	o During infancy, circumcised infants are less likely than uncircumcised infants to experience urinary tract infections (UTIs);	Morris BJ, Wiswell TE. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. J Urol. 2013;189(6):2118-2124.	Systematic review and meta-analysis (22 studies (1 RCT, 21 observational))	UTI	Decrease	Countries: United States, Australia, Korea, Canada, Turkey, Iran Males in 3 age groups: 0-1 yr 1-16 yr >16 yrs	Alb In a meta-analysis including 22 studies and over 336,000 males, the relative risk for UTI was higher for uncircumcised boys compared with circumcised boys in all 3 age groups studied: 0-1 year (RR 6.6 [95% CI = 3.3-13.2]); 1-16 years (RR 6.6 [95% CI = 3.3-13.2]), and > 16 years (RR 3.4 [95% CI = 0.9-12.7]).
73		Shaikh N, Morone NE, Bost JE, Farrell MH. Prevalence of urinary tract infection in childhood - a meta-analysis. Pediatr Infect Dis J. 2008;27(4):302-308.	Meta-analysis of 14 observational UTI studies (7 prospective cohort studies, 5 retrospective cohort studies, 1 cross-sectional study, 1 multicenter prospective cross-sectional study) results limited to studies including infants	UTI	Decrease	Mainly United States, but also including Taiwan, Australia, and United Kingdom Infant males	BIIa An estimated 7% of infant males presenting with fever in outpatient clinics and emergency rooms had UTIs, including 20% of uncircumcised febrile infants and 2% of circumcised febrile infants aged younger than 3 months of age. The pooled prevalence of UTI in infants presenting with fever in outpatient clinics and emergency departments was 7.0% (95% CI = 5.5-8.4), but was as high as 20.1% (95% CI = 16.8-23.4) among febrile uncircumcised males aged < 3 months compared with 2.4% (95% CI = 1.4-3.5) among febrile circumcised males aged < 3 months.
74		Singh-Grewal D, Macdessi J, Craig J. Circumcision for the prevention of urinary tract infection in boys: a systematic review of randomised trials and observational studies. Archives of disease in childhood. 2005;90(8):853-858.	meta-analysis of 12 studies (including 1 RCT and 11 observational studies [4 cohort studies, and 7 case-control studies])	UTI	Decrease	Countries: Mainly United States; Turkey, Canada, Australia >400,000 children	Alb Male circumcision was associated with a significantly reduced risk of UTI (OR 0.13 [95% CI = 0.08-0.20, P < 0.001]).

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
75	an estimated 7% of infant males presenting with fever in outpatient clinics and emergency rooms had UTIs, including 20% of uncircumcised febrile infants and 2% of circumcised febrile infants aged younger than 3 months of age.	Shaikh N, Morone NE, Bost JE, Farrell MH. Prevalence of urinary tract infection in childhood - A meta-analysis. <i>Pediatr Infect Dis J</i> . 2008;27(4):302-308.	Meta-analysis of 14 observational studies (7 prospective cohort studies, 5 retrospective cohort studies, 1 cross-sectional study, 1 multicenter prospective cross-sectional study)	UTI	Decrease	Countries: Mainly United States; Taiwan Infant males	Alb	An estimated 7% of infant males presenting with fever in outpatient clinics and emergency rooms had UTIs, including 20% of uncircumcised febrile infants and 2% of circumcised febrile infants aged younger than 3 months of age.
76	o An estimated 32% of uncircumcised males compared with 9% of circumcised males will experience a UTI in their lifetime, suggesting that circumcision is associated with a 23% absolute decreased lifetime risk of UTI.21	Morris BJ, Wiswell TE. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. <i>J Urol</i> . 2013;189(6):2118-2124.	Systematic review and meta-analysis 22 studies (1 RCT, 21 observational)	UTI	Decrease	Countries: United States, Australia, Korea, Canada, Turkey, Iran Males in 4 age groups: 0-4 yr 1-16 yr >16 yrs over a lifetime	Alb	Based on this meta-analysis, it is estimated that a 23.3% higher proportion of uncircumcised males (32.1% [95% CI = 15.6-49.8]) experience a UTI in their lifetime compared with circumcised males (8.8% [95% CI = 4.15-13.2]) (RR 3.7 [95% CI = 1.2-11.8])
77	Although most UTIs are treatable, serious complications may occur when UTIs are not diagnosed, recurrent, difficult to treat, or left untreated. Such complications may include sepsis, pyelonephritis, and renal scarring and have been associated with an increased risk for long-term consequences, including hypertension, build-up of kidney waste products (uremia), and end-stage renal disease.	Jacobson SH, Eklof O, Eriksson CG, Lins LE, Tidgren B, Winberg J. Development of hypertension and uraemia after pyelonephritis in childhood: 27 year follow up. <i>BMJ</i> . 1989;299(6701):703-706	Retrospective cohort study	Serious complications of UTI	Not applicable	Sweden Patients with non-obstructive focal scarring identified from a retrospective review of intravenous urograms performed in childhood during 1951-1967	Bilb	
78	An estimated 14% of uncircumcised boys compared with 6% of circumcised boys experienced balanitis, irritation, adhesions, phimosis or paraphimosis, suggesting that circumcision is associated with an 8% absolute decreased risk of these conditions.22	Herzog LW, Alvarez SR. The frequency of foreskin problems in uncircumcised children. <i>American Journal of Diseases of Children</i> . 1986;140(3):254-256.	Retrospective survey	Foreskin complications	Decrease	United States Uncircumcised children in two primary care clinics serving an inner-city population.	Bilb	
79	During adulthood, the prevalence of invasive penile cancer is lower in males circumcised prior to 10 years of age (6%) compared with males not circumcised prior to 10 years of age (12%).	Daling JR, Madeleine MM, Johnson LG, et al. Penile cancer: importance of circumcision, human papillomavirus and smoking in situ and invasive disease. <i>International journal of cancer. Journal international du cancer</i> . 2005;116(4):606-616.	Case-control study	invasive penile cancer in situ penile cancer	Decrease	Cases: men 18-74 years old diagnosed with invasive or in situ penile cancer, regardless of histologic type, between January 1, 1979, and December 31, 1998, and whose primary residence was in one of the 13 counties of western Washington included in the Cancer Surveillance System. Controls: men with a working telephone number, who resided in a noninstitutional setting, who had the ability to communicate in English and who had no history of penile cancer.	Bilb	In a population-based case-control study, the authors found that men not circumcised during childhood were at increased risk of invasive (OR 2.3 [95% CI = 1.3-4.1]), but not in situ (OR 1.1 [95% CI = 0.6-1.8]) penile carcinoma. Among uncircumcised men, phimosis was strongly associated with invasive penile cancer (OR 11.4 [95% CI = 5.0-25.9])
80		Schoen E, Colby C, Ray G. Newborn circumcision decreases incidence and costs of urinary tract infections during the first year of life. <i>Pediatrics</i> . 2000;105(4):789-793.	Retrospective observational study	Invasive penile cancer (IPC) or carcinoma <i>in situ</i> (CIS)	Decrease	United States Patients diagnosed with IPC or CIS from 1954 through 1997 while these patients were members of the Kaiser Permanente Medical Care Program of Northern California (KP)	Bilb	In a retrospective analysis of 89 cases of invasive penile cancer diagnosed from 1954 through 1997, 98% were in uncircumcised men; of 118 cases of carcinoma <i>in situ</i> , 84% were in uncircumcised men.168
81		Schoen EJ. The relationship between circumcision and cancer of the penis. <i>CA Cancer J Clin</i> . 1991;41(5):306-309	Retrospective observational study	Invasive penile cancer	Decrease	United States Men with invasive penile cancer	Bilb	In a retrospective review of 5 studies with 592 cases of invasive penile cancer in the United States, none of the cases were in men who had been circumcised in infancy.
82		Schoen E, Oerthli M, Machin G. The Highly Protective Effect of Newborn Circumcision Against Invasive Penile Cancer. <i>Pediatrics</i> 2000;105(3):e36	Retrospective observational study	Invasive penile cancer	Decrease	United States Men diagnosed with invasive penile cancer of penile cancer <i>in situ</i> who were members of Kaiser Permanente of Northern California during 1954-1997.	Bilb	Of 89 cases of invasive penile cancer, 98% were in uncircumcised men; of 118 cases of carcinoma <i>in situ</i> , 84% were in uncircumcised men.
83	Other anticipated health benefits derive in part from future prevention of HIV and some STIs acquired through heterosexual sex.	Sansom SL, Prabhu VS, Hutchinson AB, et al. Cost-effectiveness of newborn circumcision in reducing lifetime HIV risk among U.S. males. <i>PLOS ONE</i> . 2010;5(1):e8723	Modeling based on surveillance data	HIV infection	Decrease	United States	Bilb	

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
		Kacker S, Frick KD, Gaydos CA, Tobian AAR. Costs and effectiveness of neonatal male circumcision. Arch Pediatr Adolesc Med. 2012;166(10):910-918.	Mathematical modeling study	HIV infection	Decrease	United States	B1b	
84	Eight percent of annual HIV diagnoses in the United States are among males with infection attributed to heterosexual contact.	Centers for Disease Control and Prevention. HIV Surveillance Report, 2014. 2015; 26. <a href="http://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2014-vol-26.pdf">http://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2014-vol-26.pdf</a> .	Surveillance	HIV diagnoses	Not applicable	United States Males with HIV infection attributed to heterosexual contact	B1b	
85	STIs are very common, with human papilloma virus (HPV) infection of the anus or genitals occurring in many sexually active persons, although HPV vaccination is highly effective against many serotypes.	Satterwhite CL, Torrone E, Meites E, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. Sex Transm Dis. 2013;40(3):187-193	Cross-sectional analysis of NHANES data	STD incidence and prevalence	Not applicable	United States Adolescents and adults	B1b	
		Workowski KA, Bolan GA, CDC. Sexually transmitted diseases treatment guidelines, 2015. MMWR 2015;64(RR-03):1-137.	Expert opinion	Not applicable	Not applicable	United States	C1Ib	
86	o Considerations for the timing of male circumcision:							
87	• Neonatal male circumcision is safer, less expensive, and heals more rapidly than circumcision performed on older boys, adolescent males, and men.	Hart-Cooper GD, Tao G, Stock JA, Hoover KW. Circumcision of privately insured males aged 0 to 18 years in the United States. Pediatrics. 2014;134(5):950-956	Cross-sectional study	Not applicable	Not applicable	United States	B1b	Based on an analysis of MarketScan claims data from 2010, the average payment for circumcisions covered by private insurance was \$285 for neonatal circumcision and \$1,885 for postneonatal circumcision
		Schoen EJ, Colby CJ, To TT. Cost analysis of neonatal circumcision in a large health maintenance organization. J Urol. 2006;175(3 Pt 1):1111-1115	Mathematical modeling study	Cost	Decrease	United States Neonates	B1b	
		Gutwein LG, Alvarez JF, Gutwein JL, Kays DW, Islam S. Allocation of healthcare dollars: analysis of nonneonatal circumcisions in Florida. Am Surg. 2013;79(9):865-869.	Mathematical modeling study	Cost	Decrease	United States Neonates	B1b	
		Ortenberg J, Roth CC. Projected financial impact of noncoverage of elective circumcision by Louisiana Medicaid in boys 0 to 5 years old. J Urol. 2013;190(4 Suppl):1540-1544.	Mathematical modeling study	Cost	Decrease	United States Neonates	B1b	
		American Academy of Pediatrics Task Force on Circumcision. Circumcision policy statement. Pediatrics. 2012;130(3):e756-785.	Expert opinion	Cost	Decrease	United States Neonates	C1Ib	
		World Health Organization, Johns Hopkins Program for International Education in Gynecology and Obstetrics. Manual for Male Circumcision under Local Anaesthesia. Version 2.5B. 2007. <a href="http://www.who.int/hiv/pub/malecircumcision/who_mc_local_anaesthesia.pdf">http://www.who.int/hiv/pub/malecircumcision/who_mc_local_anaesthesia.pdf</a> . Accessed July, 2015.	Expert opinion	Not applicable	Not applicable	Global	C1Ib	
88		El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Klimax PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	Adverse events		United States Males in U.S. medical settings	B1b	When estimated by age group, the incidence of probable AEs was 0.40%, 9.06%, and 5.31% for males aged < 1 year, 1–9 years, and ≥ 10 years, respectively. The incidence of AEs was 10–20-fold higher for males in older age groups compared with infants.
89		WHO. UNAIDS 2010. Neonatal and child male circumcision: A global review. <a href="http://www.circolist.com/considering/neonatal_child_MC_UNAIDS.pdf">www.circolist.com/considering/neonatal_child_MC_UNAIDS.pdf</a> (Accessed May 28, 2015).	Expert opinion	Wound healing	Not applicable	Neonates adults	C1Ib	
90		Morris BJ, Waskett JH, Banerjee J, Wamai RG, Tobian AA, Gray RH, Balis SA, Bailey RC, Klausner JD, Willcourt RJ, et al. A 'snip' in time: what is the best age to circumcise? BMC Pediatr. 2012;12:20.	Expert opinion	Wound healing	Not applicable	Neonates adults	C1Ib	
91	• Most of the health benefits of male circumcision occur after sexual debut (i.e. after becoming sexually active).	Sansom SL, Prabhu VS, Hutchinson AB, et al. Cost-effectiveness of newborn circumcision in reducing lifetime HIV risk among U.S. males. PLOS ONE. 2010;5(1):e8723.	Modeling based on surveillance data	HIV	Reduced	United States Males	B1b	
92	• Male circumcision can also be conducted in adulthood when the individual can make the decision for himself. However, male circumcision after sexual debut could result in missed opportunities for: -HIV and STI prevention during the window period between sexual debut and circumcision -Prevention of UTIs during infancy.	Rennie S, Muula AS, Westreich D. Male circumcision and HIV prevention: ethical, medical and public health tradeoffs in low-income countries. J Med Ethics. 2007;33(6):357-361.	Expert opinion	HIV	Reduced	Low Income Countries	C1Ib	
93		Pettifor AE, Rees HV, Kleinschmidt I, et al. Young people's sexual health in South Africa: HIV prevalence and sexual behaviors from a nationally representative household survey. AIDS. 2005;19(14):1525-1534.	Cross-sectional study	HIV	Not applicable	South Africa 15–24 year old men and women	B1b	

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
94		Shaikh N, Morone NE, Bost JE, Farrell MH. Prevalence of urinary tract infection in childhood: a meta-analysis. <i>Pediatr Infect Dis J</i> . 2008;27(4):302-308.	Meta-analysis of 14 observational studies Meta-analysis of 14 observational studies (7 prospective cohort studies, 5 retrospective cohort studies, 1 cross-sectional study, 1 multicenter prospective cross-sectional study)	UTI	Decrease	Countries: mainly United States; Taiwan Infant males	BIIa	In a meta-analysis of 18 studies and 22,919 children mainly from the United States, the pooled prevalence of UTI in infants presenting with fever in outpatient clinics and emergency departments was 7.0% (95% CI = 5.5–8.4), but was as high as 20.1% (95% CI = 16.8–23.4) among febrile uncircumcised males aged < 3 months compared with 2.4% (95% CI = 1.4–3.5) among febrile circumcised males aged < 3 months and with 7.8% (95% CI = 6.6–8.9) among both febrile and afebrile older children aged < 19 years
95	o Complications of medically performed male circumcision in the United States are typically uncommon and easily managed. Severe complications are rare in all age groups and occur in 0.23% of all circumcised males overall.	El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. <i>JAMA Pediatr</i> . 2014;168(7):625-634.	Retrospective cohort study	Adverse events	Increase or Decrease	United States Males in U.S. medical settings	BIIb	Approximately 0.4% of male newborns in the first year of life experienced an adverse event associated with circumcision. Severe complications are rare in all age groups and rates of potentially serious male circumcision adverse events range from 0.8 per million male circumcisions for stricture of male genital organs to 703.2 per million male circumcision for repair of incomplete circumcision.
96		Knill AJ, Palmer LS, Palmer JS. Complications of circumcision. <i>The Scientific World Journal</i> . 2011;11:2458-2468.	Literature review	complications related to circumcision	Not applicable	Global literature Infants	CIIIb	*Most complications are minor and can be managed easily.*
97	• Among newborns and children aged 1- 9 years, most frequently reported complications include bleeding and inflammation of the penis or incomplete wound healing or adhesions requiring corrective procedures. Complications occur in 0.2% of infants aged ≤ 1 month, 0.4% of infants aged < 1 year, and approximately 9% in children aged 1 – 9 years.	El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. <i>JAMA Pediatr</i> . 2014;168(7):625-634.	Retrospective cohort study	Adverse events	Increase or Decrease	United States Males in U.S. medical settings	BIIb	
		Christakis DA, Harvey E, Zerr DM, Feudtner C, Wright JA, Connell FA. A trade-off analysis of routine newborn circumcision. <i>Pediatrics</i> . 2000;105(1 Pt 3):246-249.	Retrospective cohort study	Adverse Events	Not applicable	United States Neonates	BIIb	
		Wiswell TE, Geschke DW. Risks from circumcision during the first month of life compared with those for uncircumcised boys.[see comment]. <i>Pediatrics</i> . 1989;83(6):1011-1015.	Retrospective cohort study	Adverse Events	Not applicable	United States Neonates	BIIb	
		Gee WF, Ansell JS. Neonatal circumcision: a ten-year overview: with comparison of the Gomco clamp and the Plastibell device. <i>Pediatrics</i> . 1976;58(6):824-827.	Retrospective cohort study	Adverse Events	Not applicable	United States Neonates	BIIb	
98	• Among persons aged 10 years and older, the most frequently reported complications include those complications reported in younger children as well as wounds of the penis. Complications occur in approximately 5% of persons in this age group. <sup>27</sup> There are not specific data about the frequency of complications in the adolescent age group (13 - 18 years).	El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. <i>JAMA Pediatr</i> . 2014;168(7):625-634.	Retrospective cohort study	Adverse events	Increase or Decrease	United States Males in U.S. medical settings	BIIb	
99	o The American Academy of Pediatrics Taskforce on Circumcision states that the health benefits of newborn male circumcision outweigh the risks and that the benefits of newborn male circumcision justify access to this procedure for families who choose it.	American Academy of Pediatrics Task Force on Circumcision. Circumcision Policy Statement. <i>Pediatrics</i> . 2012;130(3):e756-785.	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
100		American Academy of Pediatrics Task Force on Circumcision. Circumcision Policy Statement. <i>Pediatrics</i> . 2012;130(3):e756-785.	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
101	<b>4-B. Medically performed neonatal, pediatric, or adolescent male circumcision should be done by trained clinicians using appropriate (or standard) infection control, analgesia, and anesthetic practices.</b>	American Academy of Pediatrics Task Force on Circumcision. Male circumcision. <i>Pediatrics</i> . 2012;130(3):e756-785.	Expert opinion	Not applicable	Not applicable	United States	CIIIb	
102	Box 1: Health Benefits and Risks of Elective Medically Performed Male Circumcision							
103	• <b>Health benefits of elective male circumcision in adults and adolescents:</b>							
104	o Male circumcision reduces the risk of acquiring HIV infection through penile-vaginal sex by 50% - 60%, as demonstrated in 3 well-conducted clinical trials among adult men living in sub-Saharan Africa.	Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. <i>PLoS Med</i> . 2005;2(11):e298.	RCT	HIV incidence (acquisition)	Decrease	Adolescents	AIb	

Row no.	Informational Item/Supporting statement for each informational item	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments	
105		Bailey RC, Moses S, Parker CB, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. <i>Lancet</i> . 2007;369(9562):643-656.	RCT	HIV incidence (acquisition)	Decrease	Alb		
106		Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. <i>Lancet</i> . 2007;369(9562):657-666.	RCT	HIV incidence (acquisition)	Decrease	Alb		
107	o In clinical trials involving heterosexual males living in sub-Saharan Africa, male circumcision reduces the risk of some sexually transmitted infections.	See below						
		Mehta SD, Moses S, Parker CB, Agot K, Maclean I, Bailey RC. Circumcision status and incident herpes simplex virus type 2 infection, genital ulcer disease, and HIV infection. <i>AIDS</i> . 2012;26(9):1141-1149.	RCT	GUD incidence	Decrease	Kenya (24-month follow-up) Heterosexual males	Alb	RR 0.52, 95% CI 0.37-0.73
		Tobian AA, Serwadda D, Quinn TC, et al. Male circumcision for the prevention of HSV-2 and HPV infections and syphilis. <i>N Engl J Med</i> . 2009;360(13):1298-1309	RCT	HSV-2 incidence	Decrease	Uganda (24-month follow-up) Heterosexual males	Alb	aHR 0.72, 95% CI 0.56-0.92
		Sobngwi-Tambekou J, Taljaard D, Lissouba P, et al. Effect of HSV-2 serostatus on acquisition of HIV by young men: results of a longitudinal study in Orange Farm, South Africa. <i>J Infect Dis</i> . 2009;199(7):958-964.	RCT	HSV-2 seroincidence	Decrease	South Africa (21-month follow-up) Heterosexual males	Alb	IRR 0.55, 95% CI 0.32-0.949 (AT analysis) Note: When men who crossed over from control arm to intervention arm were included in the case arm in the analysis, the circumcision effect changed from "no difference" (in the intention-to-treat analysis, to "decrease" (as treated analysis) See below.
		Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis</i> . 2010;201(10):1455-1462	RCT	incidence of multiple HR-HPV genotypes	Decrease	Uganda (24-month follow-up) Heterosexual HIV-positive men	Alb	RR 0.4, 95% CI 0.19-0.84
		Senkomago V, Backes DM, Hudgens MG, et al. Acquisition and persistence of human papillomavirus 16 (HPV-16) and HPV-18 among men with high-HPV viral load infections in a circumcision trial in Kisumu, Kenya. <i>J Infect Dis</i> . 2015;211(5):811-820.	RCT	Incidence of a single HR-HPV genotype (HPV-18)	Decrease	Kenya (6-month follow-up) Heterosexual men	Alb	HR 0.34, 95% CI 0.21-0.5413
		Sobngwi-Tambekou J, Taljaard D, Nieuwoudt M, Lissouba P, Puren A, Auvert B. Male circumcision and Neisseria gonorrhoeae, Chlamydia trachomatis and Trichomonas vaginalis: observations after a randomised controlled trial for HIV prevention. <i>Sex Transm Infect</i> . 2009;85(2):116-120.	Nested Observational Study within RCT	STD incidence and prevalence	Decrease	sub-Saharan Africa Heterosexual men and women	Blb	
108	• Male circumcision reduces the risk of circumcised men acquiring new infections of: • Genital ulcer disease (GUD) (by 48%) • Herpes simplex virus type-2 (HSV-2) (by 28% - 45%) • Oncogenic types of human papilloma virus (HPV) (by 24% - 47%) • Syphilis (by 42%)	Mehta SD, Moses S, Parker CB, Agot K, Maclean I, Bailey RC. Circumcision status and incident herpes simplex virus type 2 infection, genital ulcer disease, and HIV infection. <i>AIDS</i> . 2012;26(9):1141-1149.	RCT	GUD incidence	Decrease	Kenya (24-month follow-up) Heterosexual males	Alb	RR 0.52, 95% CI 0.37-0.73
109		Tobian AA, Serwadda D, Quinn TC, et al. Male circumcision for the prevention of HSV-2 and HPV infections and syphilis. <i>N Engl J Med</i> . 2009;360(13):1298-1309	RCT	HSV-2 incidence	Decrease	Uganda (24-month follow-up) Heterosexual males	Alb	aHR 0.72, 95% CI 0.56-0.92
110		Sobngwi-Tambekou J, Taljaard D, Lissouba P, et al. Effect of HSV-2 serostatus on acquisition of HIV by young men: results of a longitudinal study in Orange Farm, South Africa. <i>J Infect Dis</i> . 2009;199(7):958-964.	RCT	HSV-2 seroincidence	Decrease	South Africa (21-month follow-up) Heterosexual males	Alb	IRR 0.55, 95% CI 0.32-0.949 (AT analysis) Note: When men who crossed over from control arm to intervention arm were included in the case arm in the analysis, the circumcision effect changed from "no difference" (in the intention-to-treat analysis, to "decrease" (as treated analysis) See below.
111		Sobngwi-Tambekou J, Taljaard D, Lissouba P, et al. Effect of HSV-2 serostatus on acquisition of HIV by young men: results of a longitudinal study in Orange Farm, South Africa. <i>J Infect Dis</i> . 2009;199(7):958-964.	RCT	HSV-2 seroincidence	No difference	South Africa (21-month follow-up) Heterosexual males	Alb	IRR 0.66, 95% CI 0.39-1.12 (ITT analysis)
112		Mehta SD, Moses S, Parker CB, Agot K, Maclean I, Bailey RC. Circumcision status and incident herpes simplex virus type 2 infection, genital ulcer disease, and HIV infection. <i>AIDS</i> . 2012;26(9):1141-1149.	RCT	HSV-2 incidence	No difference	Kenya (24-month follow-up) Heterosexual males	Alb	RR 0.94, 95% CI 0.70-1.25 (did not include results from 72-month follow-up of same study in grading table)
113		Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis</i> . 2010;201(10):1455-1462	RCT	incidence of multiple HR-HPV genotypes	Decrease	Uganda (24-month follow-up) Heterosexual HIV-positive men	Alb	RR 0.4, 95% CI 0.19-0.84

Row no.	Informational Item/Supporting statement for each informational item	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
114	Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1455-1462	RCT	incidence of HR-HPV genotypes (overall)	Decrease	Uganda (24-month follow-up) Heterosexual HIV-negative men	Alb	RR 0.67, 95% CI 0.51-0.89
115	Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1455-1462	RCT	incidence of multiple HR-HPV genotypes	Decrease	Uganda (24-month follow-up) Heterosexual HIV-negative men	Alb	RR 0.45, 95% CI 0.28-0.73
116	Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1455-1462	RCT	incidence of HR-HPV genotypes (overall)	No difference	Uganda (24-month follow-up) Heterosexual HIV-positive males	Alb	RR 0.74, 95% CI 0.54-1.01
117	Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1455-1462	RCT	incidence of single HR-HPV genotypes	No difference	Uganda (24-month follow-up) Heterosexual HIV-positive males	Alb	RR 1.00, 95% CI 0.65-1.53
118	Gray RH, Serwadda D, Kong X, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1455-1462	RCT	incidence of single HR-HPV genotypes	No difference	Uganda (24-month follow-up) Heterosexual HIV-negative men	Alb	RR 0.89, 95% CI 0.60-1.30
119	Senkomago V, Backes DM, Hudgens MG, et al. Acquisition and persistence of human papillomavirus 16 (HPV-16) and HPV-18 among men with high-HPV viral load infections in a circumcision trial in Kisumu, Kenya. <i>J Infect Dis.</i> 2015;211(5):811-820.	RCT	Incidence of single HR-HPV genotype (HPV-16)	Decrease	Kenya (6-month follow-up) Heterosexual men	Alb	HR 0.32, 95% CI 0.20-0.4913
120	Senkomago V, Backes DM, Hudgens MG, et al. Acquisition and persistence of human papillomavirus 16 (HPV-16) and HPV-18 among men with high-HPV viral load infections in a circumcision trial in Kisumu, Kenya. <i>J Infect Dis.</i> 2015;211(5):811-820.	RCT	Incidence of a single HR-HPV genotype (HPV-18)	Decrease	Kenya (6-month follow-up) Heterosexual men	Alb	HR 0.34, 95% CI 0.21-0.5413
125	Male circumcision reduces the risk of circumcised men having existing infections of: • GUD (by 47%) • Oncogenic types of HPV (by 25% - 47%) • T. vaginalis (by 53%) • M. genitalium (by 46%)						
126	Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. <i>Lancet.</i> 2007;369(9562):657-666.	RCT	GUD prevalence	Reduced	Uganda Heterosexual men	Alb	PRR 0.53, 95% CI 0.43-0.64
127	Albero G, Castellsague X, Giuliano AR, Bosch FX. Male circumcision and genital human papillomavirus: a systematic review and meta-analysis. <i>Sex Transm Dis.</i> 2012;39(2):104-113	Systematic review and meta-analysis of 21 studies (16 of 21 studies studied HR-HPV prevalence including 2 RCTs, 8 cross-sectional studies, 1 case control study, and 5 cohort studies)	High risk - HPV prevalence	Reduced	RCT: South Africa, Uganda Observational studies: Brazil, South Korea, United States, Mexico, Mexico, Canada, Heterosexual adult males	Pooled RCTs: Ala Pooled studies other than RCTs: Bila	Pooled RCTs: (OR 0.67, 95% CI 0.54 - 0.82) Pooled studies other than RCTs [14 studies]: (OR 0.57, 95% CI 0.42 - 0.77)
128	Larke N, Thomas SL, Dos Santos Silva I, Weiss HA. Male circumcision and human papillomavirus infection in men: a systematic review and meta-analysis. <i>J Infect Dis.</i> 2011;204(9):1375-1390.	Systematic review and meta-analysis of 23 papers (19 of 23 papers studied HR-HPV prevalence in HIV-negative men (2 RCTs, 1 cohort study, 16 cross-sectional studies; 3 papers studied HR-HPV prevalence in HIV-positive men (3 RCTs)	High risk - HPV prevalence	Reduced	RCT: South Africa, Uganda Observational studies: Brazil, South Korea, United States, Mexico, Mexico, Canada, Heterosexual adult males	Pooled RCTs: Ala Pooled studies other than RCTs: Bila	Pooled RCTs: OR 0.53, 95% CI 0.42-0.67 Pooled observational studies: OR 0.58 (95% CI 0.44-0.77)
129	Tobian AA, Serwadda D, Quinn TC, et al. Male circumcision for the prevention of HSV-2 and HPV infections and syphilis. <i>N Engl J Med.</i> 2009;360(13):1298-1309	RCT	High risk - HPV prevalence	Reduced		Alb	In Uganda (24-month follow-up), among men who were HIV-negative and HSV-2 negative at baseline: aRR 0.65, 95% CI 0.46 - 0.90

Row no.	Informational Item/Supporting statement for each informational item	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments	
130		Serwadda D, Wawer MJ, Makumbi F, et al. Circumcision of HIV-infected men: effects on high-risk human papillomavirus infections in a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1463-1469	RCT	High risk - HPV prevalence	Reduced	Uganda HIV-positive heterosexual men	Alb	In Uganda (24-month follow-up), among HIV-positive men: RR 0.77, 95% CI 0.62-0.97
131		Serwadda D, Wawer MJ, Makumbi F, et al. Circumcision of HIV-infected men: effects on high-risk human papillomavirus infections in a randomized trial in Rakai, Uganda. <i>J Infect Dis.</i> 2010;201(10):1463-1469	RCT	Prevalence of multiple high risk - HPV subtypes	Reduced	Uganda HIV-positive heterosexual men	Alb	In Uganda (24-month follow-up) RR 0.53, 95% CI 0.33-0.83
132		Auvert B, Sobngwi-Tambekou J, Cutler E, et al. Effect of male circumcision on the prevalence of high-risk human papillomavirus in young men: results of a randomized controlled trial conducted in Orange Farm, South Africa. <i>J Infect Dis.</i> 2009;199(1):14-19	RCT	Urethral HR-HPV prevalence	Reduced	South Africa Uncircumcised males aged 18-24 years	Alb	In South Africa (21-month follow-up) ITT analysis: aPRR 0.68, 95% CI 0.52-0.89) AT analysis: aPRR 0.62, 95% CI 0.47-0.80)
133		Homfray V, Tanton C, Miller RF, et al. Male Circumcision and STI Acquisition in Britain: Evidence from a National Probability Sample Survey. <i>PLOS ONE.</i> 2015;10(6):e0130396.	Cross-sectional study	Prevalence of HR-HPV in urine	Reduced	Great Britain Heterosexual adult males aged 16-44 years	Bilb	In the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3) in Britain, circumcised men were less likely than uncircumcised men to have any HPV-type (aOR 0.26 [95% CI = 0.13-0.50]), high-risk-HPV (aOR 0.14 [95% CI = 0.05-0.40]), and possible high-risk-HPV (aOR 0.24 [95% CI = 0.06-0.94]) detected in their urine.
134		Canadas MP, Darwich L, Videla S, et al. Circumcision and penile human papillomavirus prevalence in human immunodeficiency virus-infected men: heterosexual and men who have sex with men. <i>Clin Microbiol Infect.</i> 2013;19(7):611-616.	Cross-sectional study	Prevalence of single HR-HPV (HPV-51)	Decrease	Spain HIV-positive heterosexual and MSM adult males	Bilb	Among 637 HIV-positive men in a cohort study in Barcelona, Spain, including 450 MSM, 187 heterosexuals, 143 circumcised men, and 494 uncircumcised men, prevalent HPV infection was not associated with circumcision status with the exception of decreased prevalence of HPV-51, a high-risk HPV subtype among circumcised compared with uncircumcised men (heterosexual and MSM combined) (1% vs 4%, OR 0.2 [95% CI = 0.10-0.90, P = 0.048]) (any HR-HPV type, OR 0.7, 95% CI 0.4-1.2)
135		Canadas MP, Darwich L, Videla S, et al. Circumcision and penile human papillomavirus prevalence in human immunodeficiency virus-infected men: heterosexual and men who have sex with men. <i>Clin Microbiol Infect.</i> 2013;19(7):611-616.	Cross-sectional study	Prevalence of any HR-HPV	Decrease	Spain HIV-positive heterosexual and MSM adult males	Bilb	Among 637 HIV-positive men in a cohort study in Barcelona, Spain, including 450 MSM, 187 heterosexuals, 143 circumcised men, and 494 uncircumcised men, prevalent HPV infection was not associated with circumcision status with the any high-risk HPV subtype among circumcised compared with uncircumcised men (heterosexual and MSM combined) (OR 0.7, 95% CI 0.4-1.2)
136		Canadas MP, Darwich L, Videla S, et al. Circumcision and penile human papillomavirus prevalence in human immunodeficiency virus-infected men: heterosexual and men who have sex with men. <i>Clin Microbiol Infect.</i> 2013;19(7):611-616.	Cross-sectional study	Prevalence of single HR-HPV (HPV-51)	Decrease	Spain HIV-positive heterosexual and MSM adult males	Bilb	Among 637 HIV-positive men in a cohort study in Barcelona, Spain, including 450 MSM, 187 heterosexuals, 143 circumcised men, and 494 uncircumcised men, prevalent HPV infection was not associated with circumcision status with the exception of decreased prevalence of HPV-51, a high-risk HPV subtype among circumcised compared with uncircumcised men (heterosexual and MSM combined) (1% vs 4%, OR 0.2 [95% CI = 0.10-0.90, P = 0.048]) (any HR-HPV type, OR 0.7, 95% CI 0.4-1.2)
137		Sobngwi-Tambekou J, Taljaard D, Nieuwoudt M, Lissouba P, Puren A, Auvert B. Male circumcision and Neisseria gonorrhoeae, Chlamydia trachomatis and Trichomonas vaginalis: observations after a randomised controlled trial for HIV prevention. <i>Sex Transm Infect.</i> 2009;85(2):116-120.	RCT As-Treated (AT) results	T. vaginalis prevalence	Decrease	South Africa (21-month follow-up) Heterosexual men	Alb	aOR 0.47, 95% CI 0.25-0.92 in AT analysis
138		Sobngwi-Tambekou J, Taljaard D, Nieuwoudt M, Lissouba P, Puren A, Auvert B. Male circumcision and Neisseria gonorrhoeae, Chlamydia trachomatis and Trichomonas vaginalis: observations after a randomised controlled trial for HIV prevention. <i>Sex Transm Infect.</i> 2009;85(2):116-120.	RCT Intention-to-treat (ITT) results	T. vaginalis prevalence	No change	South Africa (21-month follow-up) Heterosexual men	Alb	aOR 0.53, 95% CI 0.32-1.02 in ITT analysis
139		Mehta SD, Gaydos C, Maclean I, et al. The effect of medical male circumcision on urogenital Mycoplasma genitalium among men in Kisumu, Kenya. <i>Sex Transm Dis.</i> 2012;39(4):276-280	RCT	M. genitalium prevalence	Decrease	Kenya (6-month follow-up) Heterosexual men	Alb	aOR 0.54, 95% CI 0.29-0.9916
141	Male circumcision reduces the risk of the female partners of circumcised men having existing infections of: • GUD (by 22%) • Oncogenic types of HPV (by 22%) • T. vaginalis (by 45%) • Bacterial vaginosis (by 40%)	Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. <i>Am J Obstet Gynecol.</i> 2009;200(1):42 e41-47	RCT	GUD prevalence	Decrease	Uganda Heterosexual females	Alb	Male circumcision was also associated with a reduction in GUD in heterosexual female partners (adjusted prevalence rate ratio (aPRR) 0.78, 95% CI 0.61-0.99)
142		Davis MA, Gray RH, Grabowski MK, et al. Male circumcision decreases high-risk human papillomavirus viral load in female partners: a randomized trial in Rakai, Uganda. <i>Int J Cancer.</i> 2013;133(5):1247-1252.	RCT	HR-HPV prevalence	Decrease	Uganda Women (female sex partners of men enrolled in RCT of male circumcision) 24-month follow-up	Alb	Female sex partners of circumcised men enrolled in clinical trial of male circumcision had lower HR-HPV prevalence compared to female sex partners of uncircumcised men. (PRR 0.78, 95% CI 0.65-0.94)
143		Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. <i>Am J Obstet Gynecol.</i> 2009;200(1):42 e41-47.	RCT	Trichomoniasis (T. vaginalis) prevalence	Decrease	Uganda Women (female sex partners of males enrolled in study) 12-month follow-up	Alb	Male circumcision was associated with a 45% decrease in prevalence of T. vaginalis in female heterosexual partners (aPRR 0.55, 95% CI 0.34-0.89)
144		Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. <i>Am J Obstet Gynecol.</i> 2009;200(1):42 e41-47.	RCT	Bacterial vaginosis (BV) prevalence	Decrease	Heterosexual women (female sexual partners of males enrolled in study) 12-month follow-up	Alb	Female heterosexual sex partners of circumcised men experienced 40% lower BV prevalence compared to female partners of uncircumcised men (aPRR 0.60, 95% CI 0.38-0.9417)

Row no.	Informational Item/Supporting statement for each informational item	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
145	During adulthood, the prevalence of invasive penile cancer is lower in males circumcised prior to 10 years of age (6%) compared with males not circumcised prior to 10 years of age (12%)	Daling JR, Madeleine MM, Johnson LG, et al. Penile cancer: importance of circumcision, human papillomavirus and smoking in situ and invasive disease. International Journal of Cancer. Journal International du Cancer. 2005;116(4):606-616.	Case-control study	invasive penile cancer in situ penile cancer	Decrease	United States (Western Washington state)	B1b In a population-based case-control study, the authors found that men not circumcised during childhood were at increased risk of invasive (OR 2.3 [95% CI = 1.3–4.1]), but not in situ (OR 1.1 [95% CI = 0.6–1.8]) penile carcinoma. Among uncircumcised men, phimosis was strongly associated with invasive penile cancer (OR 11.4 [95% CI = 5.0–25.9])
148	• Adverse events and risks associated with elective male circumcision of adults:						
149	o The rate of adverse events, not including severe adverse events in persons aged 10 years and older is 5%, with pain, bleeding, infection and unsatisfactory post-surgical appearance most commonly reported.	El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Klimax PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	adverse events	Increase or Decrease	United States Males in medical settings	B1b
150	Severe and/or long-term complications have been reported, but they are so rare that rates of such complications have not been precisely established.	Wiswell T. Neonatal circumcision: a current appraisal. Focus and Opinion. Pediatr. 1995;1(2):93-99.	Literature review	complications related to circumcision	Not applicable	United States Males	C11b In a review article, data from a myriad of sources were compiled, including personal correspondence, to estimate the following rates of AEs per circumcisions performed in the United States: excessive bleeding requiring ligation, 1 per 4,000; bleeding requiring transfusion, 1 per 20,000; severe infection requiring parenteral antibiotics, 1 per 4,000; subsequent surgery (e.g., for skin bridges), 1 per 1,000; repair of traumatic injury, 1 per 15,000; and loss of entire penis, less than 1 per 1,000,000. There were 3 deaths due to male circumcision during 1954–1989.
151		El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Klimax PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	Severe complications	Increase or Decrease	United States Males in medical settings	B1b A study from a large longitudinal healthcare reimbursement dataset in the United States estimated the incidence rate difference (IRD) (subtracting out the background rate of AEs in uncircumcised newborns) for potential serious AEs to range from a low of 0.76 persons (95% CI = 0.10–5.43) with stricture of male genital organ PMMC to a high of 703.23 persons (95% CI = 659.22–750.18) with repair of incomplete circumcision PMMC.212 Four amputations of the penis (incidence = 3.87 per million) occurred in uncircumcised newborns and 3 partial amputations of the penis (incidence = 2.29 per million) circumcised newborns (IRD [circumcised–uncircumcised] = -1.58 [95% CI = 6.16–3.02]).
152		El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Klimax PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	Severe complications	Increase or Decrease	United States Males in medical settings	B1b *Nine AEs were significantly less likely to occur in circumcised infants compared with uncircumcised infants at P < .05. Circumcised newborn males had a higher risk for wounds, correctional procedures, inflammation, and bleeding compared with uncircumcised newborn males but had a lower risk for surgical procedures, penile disorders and gangrene, pneumothorax, and infections. Among the extremely rare but serious AEs occurring only among circumcised newborns (but once or none among uncircumcised newborns), we found 0 cases of complete amputation of penis, 1 case of stricture of male genital organs, 3 cases of partial amputation of penis, 4 cases of replantation of penis, and 16 cases of suture of artery.*
153	o On average, adult men who undergo circumcision generally report minimal or no change in sexual satisfaction or function.	Morris BJ, Krieger JN. Does male circumcision affect sexual function, sensitivity, or satisfaction? A systematic review. The journal of sexual medicine. 2013;10(11):2644-2657.	Systematic review. Used the Scottish Intercollegiate Guidelines Network grading system Results for: 2 high quality RCTs 11 high quality case-control or cohort studies 10 well conducted case-control or cohort studies	Sexual function, sensitivity, and satisfaction	No change (based on high quality studies)	Uncircumcised and circumcised men RCTs: Kenya, Uganda Case-control or cohort studies: United States, United Kingdom, Spain, The Netherlands, Turkey, Canada, Australia, Mexico	B1c Of the 36 publications, 2 were classified as high quality RCTs, and 34 were case-control or cohort studies. Of the 34 case-control or cohort studies, 11 were classified as high quality, 10 were classified as well-conducted, and 13 were classified as low quality. The results from <b>high quality RCTs and high quality or well-conducted case-control or cohort studies</b> indicated that circumcision was not associated with an overall compromise on "penile sensitivity, sexual arousal, sexual sensation, erectile function, premature ejaculation, ejaculatory latency, orgasm difficulties, sexual satisfaction, pleasure, or pain during penetration."
154		Morris BJ, Krieger JN. Does male circumcision affect sexual function, sensitivity, or satisfaction? A systematic review. The journal of sexual medicine. 2013;10(11):2644-2657.	Systematic review and meta-analysis. Used the Scottish Intercollegiate Guidelines Network grading system Results for: 2 high quality RCTs 11 high quality case control studies or cohort studies 10 well conducted case control studies or cohort studies 13 low quality case-control or cohort studies.	Sexual function, sensitivity, and satisfaction	No change (23 high quality or well conducted studies including 2 RCT, 11 High quality Case Control or cohort studies, 10 well-conducted case control or cohort studies) decrease (13 low quality case control or cohort studies)	Uncircumcised and circumcised men Case-control or cohort studies: S. Korea, United States, Malaysia, Denmark, Belgium, China, Slovenia	B1c A1b (23 high quality or well-conducted studies) B1c (13 low quality studies) Included at least 2 high quality RCTs and 34 case control studies or cohort studies (including 11 high quality, 10 well-conducted, 13 low quality). 13 studies were classified as low quality case-control or cohort studies. Ten of 13 low quality studies found compromises in ≥ 1 parameter(s); however, several critical flaws have been reported in at least 1 of these studies.
155		Tian Y, Liu W, Wang JZ, Wazir R, Yue X, Wang KJ. Effects of circumcision on male sexual functions: a systematic review and meta-analysis. Asian J Androl. 2013;15(5):662-666.	Systematic review and meta-analysis 10 studies: 2 RCTs 4 non-randomized trials 4 case-control studies	Sexual desire, dyspareunia, premature ejaculation, ejaculation latency time, erectile dysfunction, or orgasm difficulties	No change	RCTs: Kenya, Uganda Non-randomized trials: Turkey, United Kingdom, China Case-control studies: Denmark, Netherlands, Spain, United Kingdom, United States, Australia	Alb In another systematic review and meta-analysis including 10 studies and 9,317 circumcised men and 9,423 uncircumcised men, there were no significant associations between male circumcision and sexual desire, dyspareunia, premature ejaculation, ejaculation latency time, erectile dysfunction, or orgasm difficulties.
156	• Health benefits of neonatal male circumcision:						

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
157	The estimated risk of urinary tract infections (UTIs) in uncircumcised males <ul style="list-style-type: none"> <li>aged 0-1 years is 1.3% (uncircumcised), 0.3% (circumcised)</li> <li>aged 1-16 years is 2.78% (uncircumcised), 0.4% (circumcised)</li> <li>aged &gt;16 years is 28.2% (uncircumcised), 8.3% (circumcised)</li> <li>over a lifetime is 32.1% (uncircumcised), 8.8% (circumcised)</li> </ul>	Morris BJ, Wiswell TE. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. J Urol. 2013;189(6):2118-2124.	Systematic review and meta-analysis 22 studies (1 RCT, 21 observational [6 cohort, 11 case-control, 1 cross-sectional, 1 retrospective cross-sectional case note review, 1 retrospective analysis, 1 retrospective cohort])	UTI	Decrease	Countries: United States, Australia, Korea, Canada, Turkey, Iran Males in 4 age groups: 0-1 yr 1-16 yr >16 yrs over a lifetime	Alb	
158	Male circumcision reduces the risk of UTIs in circumcised males <ul style="list-style-type: none"> <li>aged 0-1 years by 90%</li> <li>aged 1-16 years by 85%</li> <li>aged &gt;16 years by 71%</li> <li>over a lifetime by 23%</li> </ul>	Morris BJ, Wiswell TE. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. J Urol. 2013;189(6):2118-2124.	Systematic review and meta-analysis 22 studies (1 RCT, 21 observational [6 cohort, 11 case-control, 1 cross-sectional, 1 retrospective cross-sectional case note review, 1 retrospective analysis, 1 retrospective cohort])	UTI	Decrease	Countries: United States, Australia, Korea, Canada, Turkey, Iran Males in 4 age groups: 0-1 yr 1-16 yr >16 yrs over a lifetime	Alb	
159	o In the United States, the estimated lifetime risk of penile cancer for males is about 1 in 1,400 (0.07%) and that of prostate cancer is about 15%.	Wingo PA, Tong T, Bolden S. Cancer statistics, 1995. CA Cancer J Clin. 1995;45(1):8-30.	Surveillance, American Cancer Society	Penile Cancer	Not applicable	United States Males	Bib	The lifetime risk for a U.S. male of ever being diagnosed with penile cancer is 1 in 1,437.
		Howlader N, Noone AM, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2010. Bethesda, MD: National Cancer Institute;2012.	Surveillance	Prostate Cancer	Not applicable	United States Males	Bib	
160	Male circumcision prior to age 10 years reduces the risk of invasive penile carcinoma by 60% compared with lack of male circumcision prior to age 10 years and male circumcision prior to first sexual intercourse may reduce the risk of prostate cancer by 15% compared with lack of male circumcision after sexual debut (i.e., after becoming sexually active)	Daling JR, Madeleine MM, Johnson LG, et al. Penile cancer: importance of circumcision, human papillomavirus and smoking in situ and invasive disease. International Journal of Cancer. Journal International du Cancer. 2005;116(4):606-616.	Population-based case-control study	Invasive penile cancer Penile carcinoma in situ	Decrease (Invasive penile cancer) No decrease (penile cancer in situ)	United States (Western Washington State) Cases: 137 men diagnosed with in situ (n=75) or invasive penile cancer (n=62) between January 1, 1979, and December 31, 1998, and 671 control men identified through random digit dialing.	Bib	In a population-based case-control study, the authors found that men not circumcised during childhood were at increased risk of invasive (OR 2.3 [95% CI = 1.3-4.1]), but not in situ (OR 1.1 [95% CI = 0.6-1.8]) penile carcinoma. CALCULATION: men who were circumcised during childhood were at decreased risk of invasive penile carcinoma (OR 1/2.3=0.43 95% CI 1/4.1-1/1.3)= (OR 0.23, 95% CI 0.24-0.77); 1-0.23 = 0.77= 77% reduction in risk of invasive penile cancer associated with circumcision
161		Wright JL, Lin DW, Stanfor JL. Circumcision and the risk of prostate cancer. Cancer. 2012;118(18):4437-4443.	Pooled data from 2 population-based case-control studies	Prostate cancer	Decrease	United States Circumcised and uncircumcised men	Bib	Circumcision before first sexual intercourse was associated with a 15% reduction in risk of prostate cancer compared to that of uncircumcised men or those circumcised after first sexual intercourse in a combined analysis using pooled data from 1,754 cases and 1,645 controls from 2 population-based case-control studies; prevalence of prostate cancer for circumcised men and uncircumcised men was 64.9% and 69.0%, respectively (OR 0.85 [95% CI = 0.73-0.99]) Calculation: 1 - 0.85 = 0.15 = 15% reduction
162	<b>Adverse events and risks associated with neonatal, infant, and child male circumcision performed by clinicians:</b>							
163	The rates of reported adverse events, not including severe adverse events, are as follows <ul style="list-style-type: none"> <li>0.2% in infants aged ≤ 1 month</li> <li>0.4% in infants aged &lt; 12 months</li> <li>9.1% in children age 1 - 9 years</li> <li>5.3% in persons aged 10 years and older</li> </ul>	El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	Adverse Events	Variable (Increase or Decrease)	United States Males in U.S. medical settings	Bib	
164	o Most commonly reported complications among newborns and children aged 1 to 9 years: bleeding and inflammation of the penis or incomplete wound healing or adhesions requiring corrective procedures.	El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	Adverse Events	Variable (increase or decrease)	United States Circumcised newborn males compared with uncircumcised newborn males in U.S. medical settings	Bib	The highest incidence rate differences (IRDs) of AEs among circumcised newborn males compared to uncircumcised newborns included <b>incomplete circumcision or penile adhesions resulting in correctional procedures</b> [1,887 AE/million male circumcisions (PMMC)], [1] <b>bleeding</b> [998.24 AE/PMMC], [2] and <b>inflammation of the penis</b> [168.36 AE/PMMC]
165		El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	Adverse events	Variable (Increase or Decrease)	United States Circumcised boys aged 1-9 years compared with uncircumcised infant boys aged <1 year in U.S. medical settings	Bib	In comparing incidence rates of probable AEs between circumcised males aged 1-9 years and uncircumcised neonates aged < 1 year, the highest incidence rate differences (IRDs) included incomplete circumcision, penile adhesions, or other abnormalities resulting in correctional procedures [2,947 AE/PMMC][1], bleeding [8,398 AE/PMMC][2], and inflammation of the penis [6,421 AE/PMMC]
166	o The incidence of severe adverse events associated with male circumcision performed by clinicians, such as permanent disabilities, disfigurements, and death, is so low that rates have not been precisely established; these events have occurred, but are rare. Other major complications requiring intervention such as major bleeding, and severe infection, are uncommon.	Wiswell T. Neonatal circumcision: a current appraisal. Focus and Opinion. Pediatr. 1995;1(2):93-99.	Literature review	Severe adverse events including death	Not applicable		CIIB	
167		El Bcheraoui C, Zhang X, Cooper CS, Rose CE, Kilmarx PH, Chen RT. Rates of Adverse Events Associated With Male Circumcision in US Medical Settings, 2001 to 2010. JAMA Pediatr. 2014;168(7):625-634.	Retrospective cohort study	severe adverse events not including death	Variable (Increase or Decrease)	United States Males in U.S. medical settings	Bib	

Row no.	Informational Item/Supporting statement for each informational item	Study or reference	Study methodology (RCT, observational study, case control, expert opinion, etc.)	Outcome of interest (HIV/ STD, penile cancer, UTI, etc.)	Effect of circumcision on outcome of interest (increase, decrease, no change)	Population (location, risk behavior, gender, race/ethnicity, age group)	Grade-consensus	Comments
168	o Some men enjoy the sensation of the foreskin during sexual relations, and such a sensation will not be experienced after circumcision; however, the bulk of scientific evidence states that men on average, do not experience a loss of sexual pleasure or function because of circumcision.	Morris BJ, Krieger JN. Does male circumcision affect sexual function, sensitivity, or satisfaction? A systematic review. The journal of sexual medicine. 2013;10(11):2644-2657.	Systematic review Used the Scottish Intercollegiate Guidelines Network grading system Results for: 2 high quality RCTs 11 high quality case-control or cohort studies 10 well conducted case-control or cohort studies	sexual function, sensitivity, and satisfaction	No change (based on high quality studies)	Uncircumcised and circumcised men RCTs: Kenya, Uganda Case-control or cohort studies: United States, United Kingdom, Spain, The Netherlands, Turkey, Canada, Australia, Mexico	B1c	Of the 36 publications, 2 were classified as high quality RCTs, and 34 were case-control or cohort studies. Of the 34 case-control or cohort studies, 11 were classified as high quality, 10 were classified as well-conducted, and 13 were classified as low quality. The results from <b>high quality RCTs and high quality or well-conducted case-control or cohort studies</b> indicated that circumcision was not associated with an overall compromise on "penile sensitivity, sexual arousal, sexual sensation, erectile function, premature ejaculation, ejaculatory latency, orgasm difficulties, sexual satisfaction, pleasure, or pain during penetration."
169		Morris BJ, Krieger JN. Does male circumcision affect sexual function, sensitivity, or satisfaction? A systematic review. The journal of sexual medicine. 2013;10(11):2644-2657.	Systematic review Used the Scottish Intercollegiate Guidelines Network grading system Results for: 13 low quality case-control or cohort studies	sexual function, sensitivity, and satisfaction	Decrease	Uncircumcised and circumcised men Case-control or cohort studies: S. Korea, United States, Malaysia, Denmark, Belgium, China, Slovenia	B1c	13 studies were classified as low quality case-control or cohort studies. Ten of 13 low quality studies found compromises in $\geq 1$ parameter(s); however, several critical flaws have been reported in at least 1 of these studies
170		Tian Y, Liu W, Wang JZ, Wazir R, Yue X, Wang KJ. Effects of circumcision on male sexual functions: a systematic review and meta-analysis. Asian J Androl. 2013;15(5):662-666.	Systematic review and meta-analysis 10 studies: 2 RCTs 4 non-randomized trials 4 case-control studies	Sexual desire, dyspareunia, premature ejaculation, ejaculation latency time, erectile dysfunction, or orgasm difficulties	No change	RCTs: Kenya, Uganda Non-randomized trials: Turkey, United Kingdom, China Case-control studies: Denmark, Netherlands, Spain, United Kingdom, United States, Australia	Alb	In another systematic review and meta-analysis including 10 studies and 9,317 circumcised men and 9,423 uncircumcised men, there were no significant associations between male circumcision and sexual desire, dyspareunia, premature ejaculation, ejaculation latency time, erectile dysfunction, or orgasm difficulties.