MAYO CLINIC

REVIEW

Circumcision Rates in the United States: Rising or Falling? What Effect Might the New Affirmative Pediatric Policy Statement Have?

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Abstract

The objective of this review was to assess the trend in the US male circumcision rate and the impact that the affirmative 2012 American Academy of Pediatrics policy statement might have on neonatal circumcision practice. We searched PubMed for the term *circumcision* to retrieve relevant articles. This review was prompted by a recent report by the Centers for Disease Control and Prevention that found a slight increase, from 79% to 81%, in the prevalence of circumcision in males aged 14 to 59 years during the past decade. There were racial and ethnic disparities, with prevalence rising to 91% in white, 76% in black, and 44% in Hispanic males. Because data on neonatal circumcision are equivocal, we undertook a critical analysis of hospital discharge data. After correction for underreporting, we found that the percentage had declined from 83% in the 1960s to 77% by 2010. A risk-benefit analysis of conditions that neonatal circumcision protects against revealed that benefits exceed risks by at least 100 to 1 and that over their lifetime, half of uncircumcised males will require treatment for a medical condition associated with retention of the foreskin. Other analyses show that neonatal male circumcision is cost-effective for disease prevention. The benefits of circumcision begin in the neonatal period by protection against infections that can damage the pediatric kidney. Given the substantial risk of adverse conditions and disease, some argue that failure to circumcise a baby boy may be unethical because it diminishes his right to good health. There is no long-term adverse effect of neonatal circumcision on sexual function or pleasure. The affirmative 2012 American Academy of Pediatrics policy supports parental education about, access to, and insurance and Medicaid coverage for elective infant circumcision. As with vaccination, circumcision of newborn boys should be part of public health policies. Campaigns should prioritize population subgroups with lower circumcision prevalence and a higher burden of diseases that can be ameliorated by circumcision.

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The present article examines the trend in male circumcision in the United States, contemporary issues, and what these might mean for the future of circumcision practice in this country. The publications referenced were selected for relevance from among the first author's (B.J.M.) collection of more than 3000 on the topic of male circumcision that had been retrieved using the search term *circumcision* from weekly PubMed alerts between January 1999 and December 2013 and from Current Contents between January 1988 and December 1998. All the articles were filed under the subcategories of rates, policy, ethics, risks, and each of the medical conditions that male circumcision affects.

WHAT THE LATEST RATES DATA SHOW

The review was triggered by a recent report by the Centers for Disease Control and Prevention (CDC) on the prevalence of circumcision among males aged 14 to 59 years in the United States.[1] The CDC data were obtained from the National Health and Nutrition Examination Surveys (NHANESs) for 2005 to 2010, in which interviews were administered to a nationally representative sample of 6294 males. The CDC researchers estimated total circumcision prevalence to be 80.5% (Table 1). Racial differences were apparent: Prevalence was 90.8% in non-Hispanic white, 75.7% in non-Hispanic black, and 44.0% in Mexican American males. The recent figures are higher than in the CDC's previous report based on NHANES data for 1999 to 2004[2] (Table 1).

Because these data are for males aged 14 to 59 years—and most circumcisions in the United States take place during the neonatal period—they largely reflect past practice. What happened

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ARTICLE HIGHLIGHTS

- There has been a rise in circumcisions in men to 81% during the past decade.
- The rise has occurred in white (91%), black (76%), and Hispanic (44%) males.
- Corrected hospital discharge data show a fall in national neonatal circumcision prevalence of 6 percentage points to 77%.
- The fall in infant circumcisions is concomitant with demographic changes, most notably the increase in the proportion of Hispanic people (traditionally noncircumcising) in Western states but also the withdrawal of Medicaid coverage in 18 states.
- A risk-benefit analysis shows that benefits vastly exceed risks.
- Ethical and legal considerations support the right of male minors to protection from disease by parents consenting to their circumcision.
- The affirmative policy of the American Academy of Pediatrics should logically result in an increase in infant circumcisions in the United States and in reintroduction of access to Medicaid funding for poor families.

in the 1950s through the 1990s may not be what is happening today.

Estimates of prevalence of neonatal circumcision generally rely on hospital discharge data.[3] Such figures are taken from records of procedures performed during the neonatal hospital stay. However, few studies have investigated the reliability of hospital discharge data as an estimate of neonatal circumcision prevalence; those that have done so have found a substantial discrepancy. A survey in Maryland found that the prevalence was 75.3% based on hospital discharge data but 82.3% based on a postpartum survey.[4] An earlier study in Atlanta found that circumcision was recorded for only 84.3% of boys who had received a circumcision.[5] In referring to their sample in July 1985, the authors stated, "If we had relied solely on [summary information in the medical record, usually found on the face sheet] we would have estimated that the circumcision rate for that period was 75.3% rather than 89.3%."[5,p.414]

These previous comparisons have been of local samples only. To better ascertain recent trends nationally, we considered it instructive to critically compare the new NHANES findings with National Hospital Discharge Survey (NHDS) data for 1979 to 2010 as reported recently by the CDC.[3] The present evaluation, therefore, updates the comparison of NHANES and NHDS data by Waskett in 2007.[6] That study was limited by having only 1980s births available for comparison. The present analysis is, therefore, more informative.

We show in Table 2 the prevalence of circumcision in the NHANES and NHDS samples for comparable birth years. It is readily apparent that NHANES data show a substantially higher prevalence of circumcision than suggested by the NHDS figures. The recent NHDS analysis did note in the first paragraph, however, that their figures "do not include circumcisions performed outside the hospital setting [...] or those performed at any age following discharge from the birth hospitalization."[3] The present article refers to nonhospital and postdischarge circumcisions as "unrecorded circumcisions." The number of these can be estimated by comparison of NHDS data with NHANES data, where the latter records circumcisions performed at any time and any location.

Our calculation involved the following formula: $a = i + u(1 - i)$, where a is the prevalence from NHANES data for men and boys aged 14 to 59 years (which, for convenience, is referred to as "adult circumcisions" for the purpose of this article), i is the prevalence in infancy as captured by NHDS data, and u represents unrecorded circumcisions. Thus, u can be obtained from values for a and i using simple algebra, ie, $u = (a - i) / (-i + 1)$. An explanation of the rationale for this formula appears in the Supplemental Appendix (available online at http://www.mayoclinicproceedings.org). Values for these unrecorded circumcisions are shown in Table 2, alongside the percentage of males deemed by raw NHDS data to be uncircumcised and the percentage who were actually found to

TABLE 1. Comparison of Total Circumcision Prevalence in Men and Boys Aged 14 to 59 Years in 2005 to 2010[1] Compared With 1999 to 2004[2a]

Race/ethnicity	Prevalence (% [95% CI]) 1999-2004	2005-2010	Change (%)
Overall	79 (77-80)	80.5 (78.4-82.5)	+2.5
Non-Hispanic white	88 (87-90)	90.8 (89.1-92.6)	+3.4
Non-Hispanic black	73 (69-77)	75.7 (72.0-79.4)	+4.1
Mexican American	42 (43-57)	44.0 (41.0-46.9)	+4.8

[a]Note that data for 1999 to 2004 were published by the Centers for Disease Control and Prevention as whole numbers,[2] whereas data for 2005 to 2010 were published to 1 decimal point.[1]

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TABLE 2. Comparison of NHANES[1] and NHDS[3] Circumcision Prevalence Data for Comparable Birth Years

	Prevalence (%)		
Birth years	NHANES	NHDS	Unrecorded
1970-1979	82.0	64.5	49.3
1980-1989	79.8	61.2	47.9
1990-1996	76.2	60.9	39.1

NHANES = National Health and Nutrition Examination Survey; NHDS = National Hospital Discharge Survey.

be circumcised according to the NHANESs of adults and older boys.

The percentage of unrecorded circumcisions is similar across the 3 groups of birth years. The figure is somewhat smaller for the most recent birth years (1990-1996). This finding may be the result of a random fluctuation or a downward trend, or it may reflect the fact that this cohort includes males as young as 14 years, who have had less time in which to be circumcised, although circumcision later in childhood is much less common than during the neonatal period. Using data from the local studies in Maryland[4] and Atlanta[5] discussed previously herein, we calculate that unrecorded circumcisions in these studies were 28.3% and 56.7%, respectively, ie, they were comparable with those in Table 2 for national data.

We found the mean percentage of unrecorded circumcisions in Table 2 to be 45.4%. On the basis of this figure, we provide in Table 3 predictions for the prevalence of adult circumcision in males born between 1997 and 2010. Although we found that there has been a decline in the prevalence of circumcision from the peak of 83.3% in 1960 to 1969,[1] the decline is comparatively small, having fallen only 6.1 percentage points from the 1960 to 1969 birth cohort to the 2010 birth cohort (ie, 83.3 − 77.2 = 6.1).

Based on the information previously herein, we show in the Figure the overall prevalence of circumcision in the United States from the late 1940s to 2010.

Earlier NHDS data to the year 2000 found an increase in neonatal circumcision from 48.3% of newborns in 1988 to 1991 to 61.1% in 1997 to 2000 ($P<.0001$).[9] These rates came from a study of 4,657,402 newborn male hospitalizations from the Nationwide Inpatient Sample that identified newborns who underwent circumcision during a 13-year period using *International Classification of Diseases, Ninth Revision* procedure codes. A 2011 CDC report based on NHDS statistics found, however, a decrease from 62.5% in 1999 to 56.9% in 2008.[10]

TABLE 3. Projected Adult Prevalence of Circumcision

	Prevalence (%)	
Birth years	NHDS	Adult
1997-1999	62.5	79.5
2000-2009	58.0	77.1
2010	58.3	77.2

NHDS = National Hospital Discharge Survey.

Thus, despite the 2013 CDC report based on NHANES data for 2005 to 2010 having shown that circumcision prevalence has risen marginally in all racial groups, the present analysis reveals a 6 percentage point fall in the overall prevalence of newborn circumcision in recent times. The main reason is most likely the much faster increase in the Hispanic population,[11] the

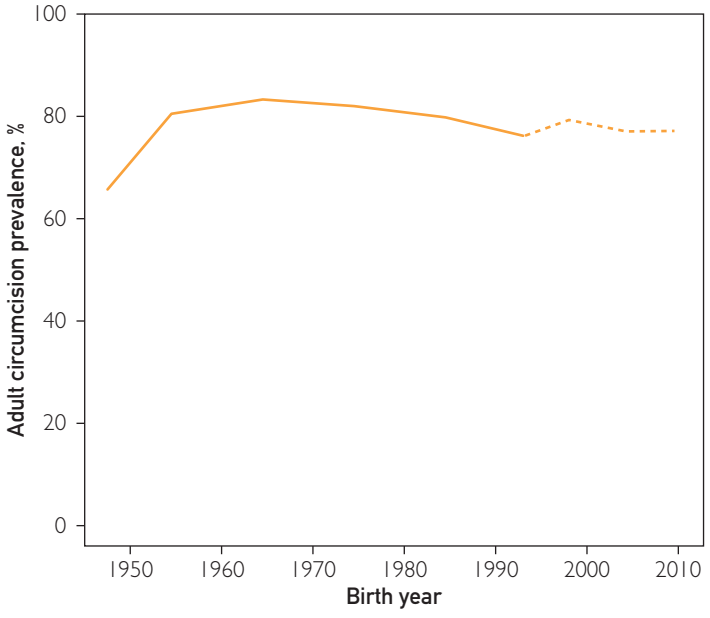

FIGURE. Prevalence of adult circumcision in the United States during the past 6 decades (1948-2010).[1,2,7,8] The solid line represents documented prevalence among adults; dashed line, our predictions (see the text for how this was derived).

ethnic group having the lowest circumcision prevalence. The burgeoning Hispanic population in the West accounts for most of the decrease in national prevalence.[3] Because Hispanic and black individuals are overrepresented in poorer demographics, the withdrawal of Medicaid funding for elective circumcision in 18 states is of concern to public health,[12,13] as was also expressed by the authors of the CDC's recent report.[1] After controlling for other factors, states with Medicaid coverage had hospital circumcision rates 24 percentage points higher than states without such coverage.[12]

PEDIATRIC RECOMMENDATION

Circumcision rates may have been influenced, in part, by the periodic reports from the American Academy of Pediatrics (AAP). These reports have changed slowly from negative in the 1970s to neutral in 1999 to positive in 2012.[14] It will be interesting to see what impact the recent change in recommendations by the AAP will have on national circumcision rates. The AAP report found (1) that the benefits of infant male circumcision exceed the risks; (2) that parents are entitled to factually correct, nonbiased information about benefits and risks; (3) that access to circumcision should be provided for families who choose it; (4) that effective pain management and sterile technique should be used; and (5) that third-party reimbursement is warranted. The AAP's policy was developed by ethicists, epidemiologists, and clinical experts, assisted by the CDC, the American Academy of Family Physicians, and the American College of Obstetrics and Gynecology. The AAP policy graded the quality of the research that the Task Force cited and concluded, "Evaluation of current evidence indicates that the health benefits of newborn male circumcision outweigh the risks, and the benefits of newborn male circumcision justify access to this procedure for those families who choose it."[14,p.e756,e757,e778] It is not prescriptive. Instead, it states, "Parents should weigh the health benefits and risks in light of their own religious, cultural, and personal preferences, as the medical benefits alone may not outweigh these other considerations for individual families." Thus, it retains the balance of rights and responsibilities between the individual child, the child's parents, and society at large. The AAP's 2012 report might be regarded as close to a recommendation as might be possible in the present era of autonomy, where even vaccinations can be refused by parents for their children.

RISK-BENEFIT

The AAP Task Force did not conduct a risk-benefit analysis. Because it considered the literature only to 2010, it did not capture risk-benefit analyses published in 2012.[15,16] Table 4 provides an updated risk-benefit analysis drawing on literature cited in the latter studies and in the AAP report[14] and on data in more recent reviews and meta-analyses. This analysis shows that over the lifetime,

TABLE 4. Comprehensive Risk-Benefit Analysis of Infant Male Circumcision[a]

Condition	Fold increase in risk (95% CI)	Rating of evidence[b]	Percentage affected	Reference, year
Risks of not circumcising[c]				
Urinary tract infection: age 0-1 y	9.9 (7.5-13)	1++	1.3[d]	Morris and Wiswell,[17] 2013
Urinary tract infection: age 1-16 y	6.6 (3.3-13)	1++	2.7[d]	Morris and Wiswell,[17] 2013
Urinary tract infection: age >16 y	3.4 (0.92-50)	1+	28[d]	Morris and Wiswell,[17] 2013
Urinary tract infection: lifetime	3.6 (1.8-5.7)	1+	32[d]	Morris and Wiswell,[17] 2013
Pyelonephritis (infants)	10	2+	0.6[d]	Zorc et al,[18] 2005; Rushton and Majd,[19] 1992; Rushton,[20] 1997; Elder,[21] 2007
With concurrent bacteremia	20	2+	0.1[d]	Zorc et al,[18] 2005; Rushton and Majd,[19] 1992; Rushton,[20] 1997; Elder,[21] 2007
Hypertension in early adulthood	—	2—	0.1[d]	Jacobson et al,[22] 1989
End-stage renal disease in early adult	—	2—	0.06[d]	Jacobson et al,[22] 1989
Candidiasis	2.5 (1.7-3.7)	2+	10[d]	Richters et al,[23] 2006
Prostate cancer	1.2-2	2+	2-10[d]	Wright et al,[24] 2012; Morris et al,[25] 2007; Morris et al,[26] 2011; Morris and Waskett,[27] 2012

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TABLE 4. Continued

Condition	Fold increase in risk (95% CI)	Rating of evidence[b]	Percentage affected	Reference, year
Risks of not circumcising[c], continued				
Balanitis	3.1 (1.9-5.0)	1+	10[d]	Morris et al,[16] 2012
Phimosis	100	1++	10[d]	Morris,[28] 2007
High-risk HPV infection	1.5 (1.1-2.0)	1++	6[d]	Tobian et al,[29] 2009; Auvert et al,[30] 2009
	2.7 (1.2-6.3)	1+	10[d]	Morris et al,[26] 2012; Castellsagué et al,[31] 2002; Miralles-Guri et al,[32] 2009; Albero et al,[33] 2012
Herpes simplex virus type 2	1.4 (1.0-2.5)	1++	4[d]	Tobian et al,[29] 2009; Sobngwi-Tambekou et al,[34] 2009; Tobian et al,[35] 2009
	1.1 (1.0-1.3)	1−	1[d]	Weiss et al,[36] 2006
Genital ulcer disease	2.0 (1.4-2.3)	1+	2[d]	Gray et al,[37] 2009
Trichomonas vaginalis	1.9 (1.0-3.6)	1+	0.5[d]	Sobngwi-Tambekou et al,[38] 2009
Mycoplasma genitalium	1.8 (1.0-3.4)	1++	1[d]	Mehta et al,[39] 2012
Chancroid	0.1-1.1	1++	Low[d]	Weiss et al,[36] 2006
Syphilis	1.9 (1.2-2.9)	2+	Low[d]	Weiss et al,[36] 2006
HIV (acquired heterosexually)	2.4 (1.8-3.2)	1++	0.3[d]	Siegfried et al,[40] 2009; Weiss et al,[41] 2008; Sansom et al,[42] 2010; Morris et al,[43] 2012
Penile cancer (lifetime)	>20	1++	0.1[d]	American Academy of Pediatrics,[14] 2012; Morris et al,[26] 2011
In female partner				
Cervical cancer	2.4 (1.3-4.3)	2++	NA	Castellsagué et al,[31] 2002; Bosch et al,[44] 2009
Chlamydia trachomatis	5.6 (1.7-20)	2+	NA	Castellsagué et al,[45] 2005
Herpes simplex virus type 2	2.2 (1.4-3.6)	2+	NA	Cherpes et al,[46] 2003
Trichomonas vaginalis	1.9 (1.0-10)	1++	NA	Gray et al,[47] 2009
Bacterial vaginosis	1.7 (1.1-2.6)	1++	NA	Gray et al,[47] 2009
Risks associated with neonatal circumcision[e]				
Local bruising at the site of injection of local anesthetic (if dorsal penile nerve block used)	NA	NA	25[f]	NA
Infection, local	NA	NA	0.2[f]	NA
Infection, systemic	NA	NA	0.02[f]	NA
Excessive bleeding	NA	NA	0.1[f]	NA
Need for repeat surgery (if skin bridges or too little prepuce is removed)	NA	NA	0.1[f]	NA
Loss of penis	NA	NA	0.0001[f]	NA
Death	NA	NA	0.00001[f]	NA
Loss of penile sensitivity	NA	NA	0[f]	NA

[a]HIV = human immunodeficiency virus; HPV = human papillomavirus; NA = not applicable.

[b]Rating of evidence was based on the Scottish Intercollegiate Guidelines Network grading system for evidence-based guidelines[48]: high-quality meta-analyses, systematic reviews of randomized controlled trials (RCTs), or RCTs with very low risk of bias (1++); well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with low risk of bias (1+); meta-analyses, systematic reviews of RCTs, or RCTs with high risk of bias (1−); high-quality systematic reviews of case-control or cohort studies or high-quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal (2++); well-conducted case-control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal (2+); and case-control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal (2−); reports with lower ratings, such as case reports and case series (3) and expert opinion (4), were not considered.

[c]These data show that the risk to an uncircumcised male of developing a condition requiring medical attention during their lifetime is approximately 1 in 2. Values shown are mostly based on statistics for the United States unless RCT data were available from other countries. State-of-the-art reviews are shown where possible rather than individual studies. Information on sexually transmitted infections applies to those acquired in heterosexual males.

[d]The percentage of uncircumcised affected is the inverse of the number needed to treat value, which is the approximate number of males who need to be circumcised to prevent 1 case of each condition associated with lack of circumcision.

[e]These data show that risk of an easily treatable condition is approximately 1 in 200 and of a serious complication is 1 in 5000. Estimates are taken from American Academy of Pediatrics,[14] 2012; Wiswell and Geschke,[49] 1989; and Ben Chaim et al,[50] 2005.

[f]Percentage affected is the inverse of the number needed to harm value, which is the approximate number of males who need to be circumcised to see one of each particular (mostly minor) adverse effect. The item "local bruising" is not included in the overall calculation of easily treatable risks because this phenomenon disappears naturally without any medical intervention.

benefits exceed risks by at least 100 to 1. If one considers the seriousness of some conditions that circumcision protects against, the benefit would actually be much greater. Based on risk-benefit considerations, neonatal circumcision might rationally be considered in the same light as childhood vaccination.

ACCESS AND FUNDING

In most states, Medicaid covers infant male circumcision for the poor. The CDC report criticized the lack of Medicaid coverage for elective circumcision in 18 states.[1] The CDC authors estimated that there were 3.5 million uncircumcised men and boys potentially at risk for heterosexually acquired human immunodeficiency virus (HIV), 48.3% of whom lacked health insurance. It is the poor within minorities, principally black and Hispanic, who present the highest disease burden from lack of circumcision. With this and private health insurance coverage in mind, the AAP guidelines state that the preventive and public health benefits associated with newborn male circumcision warrant third-party reimbursement of the procedure.[14] Their statement reinforces calls for a reevaluation by these 18 states of parental access to and funding for elective circumcision, which has been regarded as a "health parity right of the poor."[12,13,51]

COST-BENEFIT

A cost-effectiveness study that considered only infant urinary tract infections and sexually transmitted infections (STIs) found that if male circumcision rates were to decrease to the levels of 10% typically seen in Europe, the additional direct medical costs in infancy and later for treatment of these among 10 annual birth cohorts would exceed $4.4 billion, even after accounting for the cost of the procedure (average, $291; range, $146-$437) and treatment of complications (average cost, $185 each [range, $130-$235]; prevalence, 0.4% [range, 0.2%-0.6%]).[52] Each forgone infant circumcision procedure was estimated to lead to an average of $407 in increased direct medical expenses per male and $43 per female.[52] This analysis did not consider other conditions, and neither did it consider the indirect costs. It seems logical then that this analysis might have greatly underestimated the true cost. The study adds to one by the CDC that found that neonatal male circumcision was cost-saving for HIV prevention, at least in black and Hispanic males, in whom HIV prevalence is highest.[42] An Australian analysis of genital cancer prevention found that neonatal circumcision provides at least partial cost savings for these.[53]

A study of a Medicaid birth cohort of 29,316 found that for every year of decreased circumcision due to Medicaid defunding there would be more than 100 additional HIV cases and $30 million in net medical costs as a result of these.[54] The cost to circumcise males in this birth cohort was $4,856,000. Modeling has found that cost savings initially generated by noncoverage of elective circumcisions by Medicaid in Louisiana[55] and Florida[56] was mitigated by increases in the rate and expense of medically indicated circumcisions. The Louisiana study considered only the costs of these for boys aged 0 to 5 years. Lifetime costs would represent a much greater financial impact on health care systems. The Florida study involved males aged 1 to 17 years undergoing circumcision between 2003 and 2008 and found that Medicaid defunding was followed by a 6-fold rise in publicly funded circumcisions (cost = $111.8 million).[56]

ETHICAL AND LEGAL ISSUES

Parents can legally authorize surgical procedures in the best interests of their children.[14,57-60] The AAP's ethics committee and others support this contention,[61,62] as does Article 14(2) of the United Nations Convention on the Rights of the Child (UNCRC) 44/25 of November 20, 1989.[63] Exceptions include failing to act in the interests of children and situations in which a medical procedure or withholding a medical procedure might cause serious harm. Because infant male circumcision is not prejudicial to the health of children but instead is beneficial, it also does not violate Article 24(3) of the UNCRC. This document does not refer to childhood male circumcision. If it did, then it is unlikely that the UNCRC would have as signatories almost all the Islamic states and Israel.[64] Article 24(1) of the UNCRC calls on parties to agree to "recognize the right of the child to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health. States Parties shall strive to ensure

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that no child is deprived of his or her right of access to such health care services."[63]

Although some argue that a child has a right to "bodily integrity" and, thus, that circumcision of boys should be banned, discouraged, or at least delayed until he can decide for himself,[65-67] others disagree[64,68-71] based on several reasons, some of which are discussed later herein. One author argues that being circumcised boosts autonomy more than constraining it.[72] Article 24(3) of the UNCRC seeks to abolish traditional practices prejudicial to the health of children.[63] Because infant male circumcision is not prejudicial to the health of children but rather is beneficial, it does not violate Article 24(3).[64] In fact, one commentator construed Article 24(3) as requiring circumcision.[64] He pointed out that the tradition in countries that abstain from circumcision can, in fact, be judged as being prejudicial to the health of children.[64] He used as an example the increased risk in sexually active minors of acquisition and transmission of potentially fatal oncogenic human papillomavirus genotypes and HIV.

Most parents care deeply for their children and try to do what is best for them. The AAP recommended development of unbiased educational material and that physicians routinely discuss the circumcision decision with parents early in a pregnancy. Fully informed parents might likely choose to have their baby boy circumcised.[73] It has been argued that parents who are opposed—even after being fully informed—would seem to place greater value on preserving the foreskin than in protecting their child against the harms, to the boy and his future sexual partners, of the uncircumcised state.[64] Nevertheless, some parents may refrain out of respect for cultural traditions or perhaps religion; others out of a philosophical position of opposing anything other than the natural state or the acceptance of the alternative views of opponents. Regardless, the decision of parents who refuse should be respected and accepted.

Arguments by opponents start with the premise that circumcision of males has no benefits, only harms, or that the benefits only apply later in life when the male can make the circumcision decision for himself.[66,74] Table 4 shows that benefits apply in the early pediatric period and extend all the way through life to the geriatric period. Problems in uncircumcised elderly men, especially in nursing homes, are underrecognized and need more attention and research. Another claim is that circumcision diminishes sexual function, sensitivity, and pleasure.[67,74,75] A recent exhaustive systematic literature review[76] and a meta-analysis[77] found either no adverse effect or an improvement in these parameters as a result of circumcision.

Parents and physicians each have an ethical duty to the child to attempt to secure the child's best interest and well-being.[78] Because the benefits outweigh the risks and the procedure is safe (Table 4), circumcision might be seen in the same light as other interventions that parents must choose for their child. It is the duty of states to create conditions necessary for the fulfillment of rights to good health by facilitating the availability of interventions that are beneficial. Logically it can be argued that should include male circumcision.[79] Ethically, infant male circumcision seems to fall within the prerogative of parental decision making.[71] A landmark review a decade ago noted that most decisions made by parents for their children will likely have a more profound effect on them than the presence or absence of a foreskin.[80]

The timing of circumcision is crucial. Medical and practical considerations strongly favor the neonatal period (Table 4).[16] Surgical risk is, thereby, minimized and the accumulated health benefits are maximized.[14,16] If circumcision is not performed, one of the benefits potentially lost is protection against urinary tract infections that in infancy may lead to kidney damage (see the recent review by Morris and Wiswell[17]). Those who argue that circumcision can be delayed so that the boy can make up his own mind when older might not have considered that the operation on mature genitalia is not as simple as the surgery on a baby boy's penis. Delay may result in increased cost, a higher risk of complications, anesthesia risk if a general anesthetic is used (as is more likely), a longer healing time, a poorer cosmetic outcome should sutures be used, a requirement for temporary sexual abstinence, interference with education or employment, and loss of opportunity for, or delay in, the achievement of protection from STIs for those who become sexually active early and for those who ignore advice on abstinence, thereby exposing them to increased risk of STIs during the 6-week healing period.[14,16] Thus, it is

disingenuous to suggest that the procedure is comparable at both ages.[64] Furthermore, an adult cannot consent to his own infant circumcision.[64]

Many nations that condemn childhood male circumcision are not as quick to condemn other comparably invasive and dangerous procedures that have no medical benefit,[64] eg, cosmetic orthodontia, correction of harelip, surgery for tongue-tie, growth hormone injections for treatment of dwarfism, and removal of supernumerary digits.[64] Thus, as stated by Jacobs,[64] it seems odd that neonatal male circumcision is regarded by some as controversial.

As far as the law is concerned, there is a view that the legal system has no place interfering in medical practice when it is based on evidence except to ensure that professionals always act responsibly.

CONCLUSION

The latest data on male circumcision in the United States show a 2.5% overall increase in prevalence in males aged 14 to 59 years between 2000 and 2010. In contrast, there has been a downward trend in neonatal circumcisions, with the present analyses finding that the true extent of this decline is 6 percentage points. Given (1) the wide-ranging protection that neonatal circumcision affords against a diversity of medical conditions, some of which can be fatal; (2) the high benefit to risk ratio; (3) the data on cost-effectiveness; and (4) the affirmative AAP policy in 2012, in our view, it might be an appropriate time for governments, insurers, and the medical profession to act. When considered together with ethical and human rights arguments, neonatal circumcision should logically be strongly supported and encouraged as an important evidence-based intervention akin to childhood vaccination. We predict that states that currently no longer cover elective circumcision under Medicaid will restore provision of this procedure for those unable to afford it, especially because it will lead to considerable short- and long-term savings to government health budgets by reducing more expensive circumcisions for medical need later, where these often involve costly general anesthesia; it will also reduce the cost of treatment of the many foreskin-mediated conditions, infections, and cancers in males and their sexual partners that male circumcision affords varying degrees of protection against. We predict that future CDC surveys will find significant ongoing increases in the prevalence of circumcision in the United States.

SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at http://www.mayoclinicproceedings.org.

Abbreviations and Acronyms: **AAP** = American Academy of Pediatrics; **CDC** = Centers for Disease Control and Prevention; **HIV** = human immunodeficiency virus; **NHANES** = National Health and Nutrition Examination Surveys; **NHDS** = National Hospital Discharge Survey; **STI** = sexually transmitted infection; **UNCRC** = United Nations Convention on the Rights of the Child

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