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SIGNATURE Articles

Evidence and Ethics on: Circumcision

Newborn circumcision is a highly sensitive topic that evokes strong emotions in many people. We hope that the information in this article leads to mutually respectful conversations between those with diverse perspectives on circumcision. We understand that your own personal experiences and beliefs will inform how you take in this information, and we invite you to consider your emotional response and potential reaction to triggers when reading this article. Please visit our FAQ page (evidencebasedbirth.com/circumcisionfaqs) for answers to common questions.

Written by Rebecca Dekker, PhD, RN and Anna Bertone, MPH on July 19, 2019.

Male circumcision is defined as the partial or total surgical removal of the foreskin (also called *prepuce*), which is specialized tissue that covers the head (or *glans*) of the penis.

The practice of circumcision has ancient origins, and continues today around the world for various religious and cultural reasons. Less commonly, circumcision is sometimes done for health-related reasons.

The United States (U.S.) is unusual in that the vast majority of newborn circumcisions performed in the country are done for non-religious reasons (WHO/UNAIDS, 2007). In the U.S., the overall rate of newborn circumcision is on the decline, but circumcision is still the most frequent procedure performed on children during hospital stays—more than 10 times as common as any other pediatric surgical procedure, and the only surgical procedure that is regularly performed without any urgent medical need on healthy infants (Witt et al., 2014). Circumcision is so familiar and routine in U.S. culture that many parents and care providers scarcely even think of it as a surgical procedure, viewing it instead as one of several relatively minor newborn medical procedures performed at the hospital before discharge.

DISCLAIMER: Nothing in this article shall be construed as advice from a healthcare provider (i.e. midwife, nurse, nurse practitioner, doctor or physician assistant). This article is strictly intended to provide general information regarding its subject-matter and may not apply to you as an individual. It is not a substitute for your own healthcare provider's medical care or advice and should not be relied upon by you other than upon the advice of your treating provider. If you need someone to examine you or discuss your pregnancy or baby's health, see a midwife, nurse practitioner, or doctor.

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Circumcision is also known as the world's most controversial surgery (Gollaher, 2000) . As journalist Roger Collier put it in part one of an interesting six-part series on circumcision published in the Journal of the Canadian Medical Association:

"Imagine you were given the task of concocting a controversial topic from scratch. You would probably throw in some religion, add a dash of politics and, to really spice things up, include a heaping portion of sex. To help generate heated debate, you could also sprinkle a few human rights issues on it. Next stir in a whole pot of health claims — some sound, some spurious (just to keep things interesting). Oh, and it couldn't hurt to somehow work helpless babies into the mix to get parents all riled up. Well, you don't need to create that topic. It already exists. It's called circumcision."

Opinions on newborn circumcision are diverse and often emotionally charged. Those in favor of routine circumcision generally believe it should be kept available as a parental choice in light of possible health benefits. This view holds that the prepuce has negligible value (the tissue wouldn't be missed) and circumcision is a simple procedure ("a little snip") that may even reduce the risk of the child acquiring and spreading certain diseases later in life . At the extreme, some researchers even believe that newborn circumcision should be widely promoted as a public health measure; for example, Brian Morris, Professor Emeritus at The University of Sydney, Australia, advocates that infant circumcision should be "made compulsory" (Morris, 2009).

On the other hand, there are people who view the prepuce as having sexual value as well as serving various physiologic functions. They argue that circumcision is a traumatic experience for the infant, as well as a violation of the child's right to bodily integrity (removing significant tissue from an intact sexual organ without consent). They further argue that the touted health benefits of circumcision are infrequent, minor or outweighed by surgical risks or other harms, and since these benefits can be achieved non-surgically—through ordinary hygiene, vaccinations, and safe sex practices—they do not justify involuntary genital surgery. In fact, when we announced that we were going to cover this topic, we heard from many people angry that we are even talking about the evidence on circumcision. They expressed concern that talking about circumcision as a health-related decision for parents normalizes an unethical practice and ignores the right of children to avoid medically unnecessary surgery on a private part of their body, regardless of parental preference.

In this article, we explore the research evidence as well as the ethical debate around routine circumcisions performed on healthy newborn males.

Why are we including the ethics as well as the evidence in this article?

The focus of our blog is "*Evidence* Based Birth®." So why are we discussing the ethics along with the medical evidence on circumcision?

We believe a discussion about this particular topic cannot take place without ethical context. Routine male newborn circumcision is the irreversible, surgical removal of tissue from the sexual organ of a healthy minor. It goes without saying that there are ethical questions about removing or altering any minor's genital tissue, regardless of whether or not there is research examining purported medical benefits.

Medical ethics is also called *bioethics*: "bio" (from the Greek word for "life") and "ethics" (the discipline concerned with what is morally good and bad, right and wrong). So, bioethics is the study of ethics as it relates to living beings.

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The major principles of bioethics include (McCormick, 2013):

- **Respect for autonomy**—The right to exercise one's *autonomy* means that the patient has a right to informed consent and refusal for medical procedures. With pre-autonomous children, the authority to make medical decisions usually lies with the child's parents, who have a duty of care toward the child. This duty involves seeking to promote the child's long-term best interests, including the child's interest in future bodily autonomy (i.e., the ability to make informed decisions about one's own body). This exercise of parental authority is called *proxy consent*. Medical providers have an ethical and legal duty to advocate for a child when they believe a parent's decisions are clearly not in a child's long-term best interest and should be challenged. Another approach to respecting the autonomy of an infant is to consider what the infant would choose for himself if he were competent.
- **Nonmaleficence**—*Nonmaleficence* means "do no harm." Care providers should not intentionally cause harm or injury to the patient. In the course of caring for patients, there are situations in which some harm is unavoidable, but there is a net benefit (greater good) for the patient. In these situations, the autonomous patient must weigh the potential benefits and risks of a proposed treatment and make an informed decision in light of their preferences and values. In the case of children with a medical condition that requires intervention, parents usually have this authority, with certain limitations (e.g., parents do not have a right to choose a treatment that will cause significant net harm to the child when there are less harmful alternatives).
- **Beneficence**— *Beneficence* means "do good." Care providers have a duty to benefit the patient and take steps to prevent and remove (sources of) harm from the patient.
- **Justice**—*Justice* means that health care resources should be distributed fairly in society. When there is not enough of something to distribute it *equally* (give the same share to everyone), fair means distributing resources *equitably* (put resources where they are most needed). The principle of justice also refers to everyone having an equal opportunity for health; health care should not be based on sex, race, religion, etc.

We'll revisit these principles later on in the article when we discuss bioethics as it relates to circumcision.

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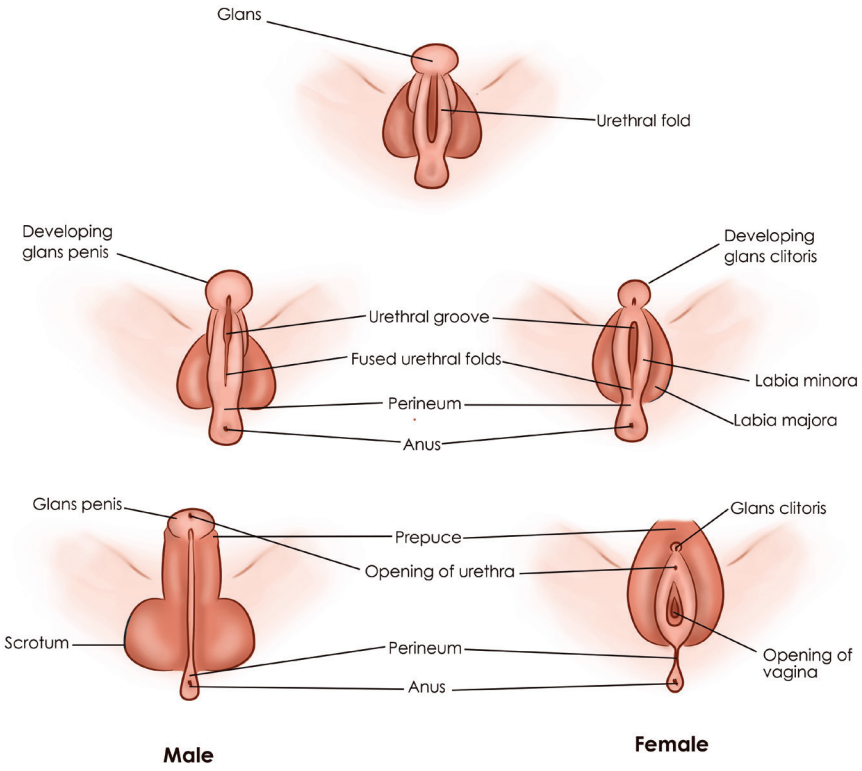
The prepuce in human anatomy

Development of the sexual organs

Human embryos start out with the same sex-neutral genital structure and then go on to develop more stereotypically male or female genitals through a process called *sexual differentiation* (Betts et al., 2018). In males, embryonic cells normally develop into a *glans penis* covered by protective tissue called the *male prepuce*, or foreskin, which covers the head of the penis when it is flaccid (not erect). Similarly, the equivalent embryonic cells in females develop into a *glans clitoris* covered by the *female prepuce*, better known as the clitoral hood.



It's important to point out that sex is a spectrum—not binary. Some people are born *intersex*, in which differences in sexual development mean that they do not fall neatly into a male or female category (Ainsworth, 2015). In some cases, the prepuce covers the person's "ambiguous" cliteropenis, thereby eliminating the distinction between "penile foreskin" and "clitoral hood." This Evidence Based Birth® article applies to circumcision on typical male infants, not procedures on intersex children, although there are common bioethical themes around performing genital surgery on children. In addition, EBB recognizes that people who are trans, non-binary, and gender nonconforming can also be personally affected by penile circumcision.

Newborn males are normally born with their prepuce fused to their glans penis by a membrane. This tissue connection is normal at birth, making it so that the prepuce cannot be *retracted*, or pulled back from the glans. A study of 100 newborns found that less than 5% could fully retract their prepuce (Gairdner, 1949). If left intact (uncircumcised), the prepuce usually becomes less attached and more retractable over childhood and adolescence. By 10 years of age, more than 50% of boys can completely retract their prepuce (Kayaba et al., 1996), and by 17 years of age, less than 1% of boys will be unable to retract their prepuce with gentle manipulation (Oster, 1968).

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In this article, we use the term *intact* instead of *uncircumcised*, since referring to a penis as uncircumcised suggests that circumcision is the normal or default state and the absence of circumcision is an abnormal or alternative state (compare to "unlabiaplastied," which would not be used to describe a girl's surgically unmodified vulva) (Wallace, 2015).

Functions of the prepuce

The prepuce is a normal part of the body's genitals, common to males and females, human and non-human primates, and all mammals. Where the innermost layer and the outermost layer of the prepuce meet is called a *mucocutaneous junction*, or a boundary between typical skin and moist, fluid-secreting tissue (mucosa). In this way, it is similar to the nose, lips, eyelids, and labia minora (inner folds at the opening of the vagina). The prepuce is nerve-laden tissue that, in males, covers and protects the glans penis and the male urinary opening from irritation, such as soiled diapers or tight clothing (Cold and Taylor, 1999).

In newborns, removing the prepuce through circumcision exposes the head of the penis to urine and bowel movements in the diaper. After wound healing and during later development, the glans penis is exposed to air and to friction from clothing. As a result, the circumcised penis goes through a process called *keratinization*, which changes the skin on the glans penis from shiny, smooth, and moist to dry and slightly more toughened, or callused.

In an intact adult male, the average prepuce is around 37 square centimeters of skin (about the size of a credit card), but varies considerably between men (Kigozi et al., 2009). When an intact man's penis is flaccid (not erect), his prepuce covers his glans penis, so the head of his penis is at least partially hidden. However, during erection, the prepuce retracts back along the shaft exposing the glans, and the intact penis looks nearly identical to a circumcised penis with the exception of a band of pleated tissue gathered behind the glans.

Later in this article, we'll discuss the limited research available on circumcision and sexual function, as well as discuss the bioethics of removing the prepuce.

Care of the intact penis

Care of the intact penis is simple. It can be washed with water during the infant's bath (non-irritating soapy water may also be used). The main thing to remember is that when the prepuce is still attached to the glans, **it should never be retracted, or pulled back toward the abdomen by force** (for example, during a bath or a medical check-up). Forced retraction can cause pain, tearing and bleeding (Dave et al., 2017).

There is no need to wash beneath the prepuce until it is more easily retractable later in childhood or adolescence. In fact, the natural buildup of oils and old skin cells beneath the prepuce (called *smegma*), along with occasional erections, helps the prepuce to gradually separate from the glans until it is fully retractable. The white substance called smegma that builds up in moist folds of genital tissue is normal for males and females (where it can build up between the labia and around the hood of the clitoris) and can be wiped away with washing.

Once a boy discovers (on his own) that he can pull his prepuce back, he can be taught to clean the area between the prepuce and the glans as part of a regular bathing or showering routine. Simply pull back the prepuce gently and rinse underneath with water (National Health Service, 2018, How to Keep a Penis Clean.)

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Where did circumcision come from?

Ancient origins

Experts do not agree on the origins of circumcision, other than that it predates written history. Scholars think that circumcision is probably one of humankind's most ancient rituals! We know from Egyptian mummies and wall paintings that circumcision goes back at least as far as ancient Egypt. It is possible that the practice came about in different cultures for different reasons.

There is very little evidence for any of the theories of the ancient origins of circumcision, but following is a partial list of those theories:

- A mark of belonging to a certain social group, akin to a tattoo or body piercing (Dunsmuir and Gordon, 1999)
- To punish prisoners of war, based on historical accounts of genital amputations after battle such as described here (https://bit.ly/2YdZ1OZ) about Pharaoh Merneptah, here (https://bit.ly/2y8kpKH) in section 48 of this translated Egyptian text, and here (https://bit.ly/2Gspcvh) in 1 Samuel 18:25-27 (Raveenthiran, 2018; Dunsmuir and Gordon, 1999)
- A tribal rite of passage into manhood, also representing new adult responsibilities and permission to begin having sexual intercourse (such ceremonies (https://bit.ly/2SHGqJR) still take place in some tribal societies today) (Cox and Morris, 2018; Doyle, 2005)
- To improve personal hygiene when regular bathing was impractical and/or as a purification ritual (Mwashambwa et al., 2013; Doyle, 2005)
- A way for authority figures to demonstrate their power (Dunsmuir and Gordon, 1999)
- A test of bravery and pain endurance (still important in some tribal societies today) (Doyle, 2005)
- A blood sacrifice (Mwashambwa et al., 2013; Dunsmuir and Gordon, 1999)
- A way of accentuating masculinity of males by removing the female elements of the genitalia (the foreskin was thought to be similar to the labia in females) in the same way that the masculine element in females (considered to be the clitoris) was removed to accentuate their femininity (Gollaher, 2000)
- To marginalize women by excluding them from an important ritual and thus prevent them from assuming leadership roles within the community (Hoffman, 1996; Gollaher, 2000)

Circumcision is also performed as a religious rite. Observant Jewish parents have carried out the ritual for more than 3,000 years in a ceremony called *Brit milah (or Bris)*. According to Genesis 17: 9-14, Abraham received divine instruction to circumcise himself, all male members of his household, his descendants and slaves on the eighth day after birth. Although some U.S. Jews do not consider themselves religious (about 1 in 5 according to a Pew Research Center survey), they "may identify as Jewish on the basis of ancestry, ethnicity or culture." In these cases, circumcision might be characterized as a cultural or ethnic practice rather than a strictly religious one (Brusa and Barilan, 2009; Earp et al., 2017). Finally, a small number of Jews do not practice circumcision as a religious rite, adopting an alternative birth ritual such as *Brit shalom* (a naming ceremony) containing the symbolic elements of a traditional *Bris*, but without circumcision.

Most male circumcisions around the world are performed in Muslim communities (roughly two-thirds of all circumcisions) (WHO/UNAIDS, 2007). For Muslims, circumcision is not mentioned in the Qur'an, but Prophet Muhammad recommended it in his teachings and the sayings of Muhammad (*hadith*) became the basis for Islamic law and practice. Islam also draws from the Old Testament as a source of authority and honors Abraham as a guide and model for the people (Gollaher, 2000). For most Muslims, circumcision is a given; however, Islamic scholars disagree over whether the ritual is a required part of the faith or just recommended (Dabbagh, 2017).

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Some Christians also practice circumcision; however, the New Testament specifically states that non-Jewish Christians do not need to be circumcised: "*For in Christ Jesus neither circumcision nor uncircumcision has any value. The only thing that counts is faith expressing itself through love*" (Galatians 5:6, New International Version). So, among Christians, circumcision is usually done for cultural rather than scriptural reasons (see below).

Modern non-religious circumcision

According to David Gollaher, author of *Circumcision: A History of the World's Most Controversial Surgery*, we can trace the origins of routine, non-religious circumcision on healthy newborn males back to the U.S. in the 1870s. At that time, Dr. Lewis A. Sayre, a leading orthopedic surgeon in New York, future president of the American Medical Association and founder of the *Journal of the American Medical Association*, developed a theory that circumcision could cure many types of paralysis and hip-joint disease by "quieting the nervous system." He believed that the prepuce agitated the nervous system and circumcision was a means of "relieving the irritated and imprisoned penis." At the time, *reflex neurosis theory* attributed many health problems to "irritation." Sayre and many other doctors also recommended *clitoridectomy* (the removal of the external part of the clitoris) to treat genital irritation thought to cause female "nervousness."

Circumcision's first modern medical advocates were U.S. and British medical professionals who believed Sayre's claims that circumcision could cure diseases. Soon after, other physicians began to argue that preventing disease is even better than curing disease, and they insisted that circumcision would benefit any male and even society at large.

Early physicians claimed wide-ranging benefits from circumcision—that it could prevent or "cure" impotence, phimosis, sexually transmitted diseases, seizure disorders, bed-wetting, homosexuality, paralysis, masturbation, and more (Darby, 2003). As we'll discuss, there is limited supporting evidence for a couple of these early claims, but most were completely unfounded.

Also around 1890, germ theory of disease (which linked microscopic bacteria to infectious diseases) caused the public to greatly fear germs. Genitals were thought to be especially dirty and many came to believe that circumcision was necessary to keep the penis clean. The intact or "uncircumcised" penis came to be associated with recent immigrants, people of color, and the poor. These groups were accused of lacking culture, hygiene, manners, and intelligence and were called uncivilized. There were also overtly racist proposals to forcibly circumcise Black males. For example, the prominent physician Peter Charles Remondino, vice president of the California Medical Society, accused Black boys and men of being inherently promiscuous and advocated that circumcision is an "efficient remedy" for this behavior (Remondino, 1894).

During this time period, midwives rarely performed circumcisions, so a circumcised newborn was also a status symbol of having given birth with a physician in hospital.

While modern circumcision began in part for perceived hygienic benefits and social class distinction, medical historians argue that one of the main reasons circumcision became routine in the nineteenth century was because of a major effort to stop masturbation. At the time, many people feared that masturbation was a cause of both mental and physical illness (Darby, 2003). Since masturbation with an intact penis involves moving the prepuce back and forth over the glans for stimulation, removing the prepuce seemed like a way to prevent masturbation, or at least make it less desirable. So, circumcision was done as a preventive measure, treatment, and punishment for masturbation as well as for the "moral" benefit of the child (Gollaher, 2000).

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John Harvey Kellogg, M.D., the founder of Kellogg's Corn Flakes®, was a leader in the anti-masturbation movement (Kellogg, 1881). Dr. Kellogg advised that children should be watched at all times, night and day, for fear that they might "defile themselves" if left alone. To prevent and treat masturbation, he recommended several strategies: bandages, tying the hands, electrical shock therapy, caging the genitals, and especially circumcision, as this "remedy [is] almost always successful in small boys."

Kellogg wrote:

'*The operation should be performed by a surgeon without administering an anesthetic, as the brief pain attending the operation will have a salutary effect upon the mind, especially if it be connected with the idea of punishment, as it may well be in some cases.*'

According to the following quote, Kellogg may have even invented his dry breakfast cereals as a substitute for other breakfast foods that might be dangerously "stimulating," in hopes that cereal would help curb masturbation!

"Eat fruits, grains, and vegetables. There is a rich variety of these kinds of food, and they are wholesome and unstimulating. Graham flour, oatmeal, and ripe fruit are the indispensables of a dietary for those who are suffering from sexual excesses." (Kellogg, 1881)

So, why did circumcision become widely popular in U.S. culture but fall in popularity among the British? In his book, Gollaher explains that Britain was in a serious economic recession in the 1940s after World War II. The government-funded National Health Service (NHS) was established to provide affordable healthcare in times of scarcity. Every medical procedure was subjected to careful study so as not to waste precious resources. In 1949, Douglas Gairdner, a respected English pediatrician, published a paper critiquing the practice and confirming the wisdom of the 1948 NHS decision to stop covering the costs of routine circumcision. Soon after, circumcision was largely abandoned and never became embedded in British culture the way it has in U.S. culture.

Why do parents choose non-religious circumcision today?

Most people today are not aware that non-religious circumcision became popular in the U.S. in large part as a way of reducing male masturbation (as satirically depicted in this video (https://bit.ly/1ltlSPw) released by College Humor). Instead, modern parents who choose non-religious circumcision for their sons do so for a variety of reasons, such as concerns about hygiene and social norms. In the U.S., some parents may choose circumcision because it is a procedure that their care providers routinely offer to them, so it is seen as the default choice.

We were able to find three recent survey studies on why parents choose circumcision.

In Canada, researchers surveyed parents attending prenatal classes about their single most important reason for supporting or not supporting circumcision for their child (Rediger and Muller, 2013).

The 143 parents that supported circumcision cited hygiene (51%), prevention of infection or cancer (15%), father is circumcised (8%), personal preference (8%), religion (6%), doctor advises it (4%), looks better (2%), it just seems right (2%), to look like other boys (1%), and other reasons (2%).

The 92 parents in the study that did not support circumcision gave their main reason to be that it is not medically necessary (54%), concerns about infection or bleeding (14%), father is intact (10%), it hurts too much (10%), baby has no input in the decision (7%), and intact looks better (5%).

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Although only 8% of supportive parents listed the father being circumcised as their single most important reason for supporting the procedure, 41% listed it as one of several reasons. In a data analysis of the survey responses, the researchers found that the father's circumcision status was a significant predictor of whether or not parents supported circumcision for their child. If the father of the expected baby was circumcised, 82% were in favor of circumcision for their child. When the father of the expected baby was not circumcised, only 15% desired circumcision. The researchers concluded that the circumcision status of the father is the most important influence on parents' plans to pursue or avoid circumcision for their child.

A U.S. survey of 200 parents in Texas also found that the circumcision status of the father was the most highly *correlated* or connected factor with regard to the infant also being circumcised (Spense et al., 2015). This study didn't ask parents about their reasons, but they compared the groups and found that intact infants were more likely to be Hispanic, with Medicaid insurance, and Catholic.

Another 2015 U.S. study by Sardi and Livingston surveyed 60 parents and expecting parents of boys who chose or planned to choose circumcision. Overall, they found that the parents' responses fell into two main categories of beliefs, health-related and personal/cultural, and most parents gave a mixture of beliefs from these categories to support their decision.

The analysis showed that perceived health benefits were closely tied to cultural beliefs supporting circumcision. This means that parents' beliefs about potential health benefits from circumcision are greatly influenced by their cultural beliefs about the practice. Scholars who study social norms have theorized that norms affect the way individuals understand information, so that an individual's behavior is "weighted in favor of the predominant social norm" (Waldeck, 2004). Therefore, if newborn circumcision is perceived as socially normal, then an individual is more likely to exaggerate the significance of health benefits and diminish risks, or vice versa if newborn circumcision is perceived as socially abnormal.

Given that there was so little recent research on this topic, we looked for information in other types of media about why parents may choose non-religious circumcision. In a podcast episode on the topic published by Medical Ethics, a group of 3 parents discussed why they chose circumcision. A man said, "I didn't give it any thought at all when my son was born. It's what everybody did. It happened." A woman said, "I didn't want to have him circumcised. I worried about causing my baby pain. And he [the father] wanted his son to be circumcised because he was circumcised. And so, I made him go watch it and he said that it was awful and that he almost threw up." Another man on the episode said, "I'm circumcised and my son is circumcised…the pro side is you look like your dad and so you don't feel different. Of course, there are many other ways in which you don't look like your dad… but that is one argument. It's cultural identification… So, you're 'in the group' when you get it done."

Using a search on Google for "Why I chose circumcision for my son," a variety of mom blog results were found, all from the U.S. Some of the bloggers explained why they chose circumcision, and others explained why they chose not to circumcise. It was interesting that, even when parents felt uncertain about their decision, they frequently listed perceived medical benefits as a justification for choosing circumcision. For example, one blogger (https://bit.ly/2Yxg2YJ) cited the American Academy of Pediatrics' (AAP) 2012 statement that "the benefits of newborn male circumcision outweigh the risks." This blogger contrasted male circumcision with *female circumcision*, a practice we'll discuss in more detail later on, which she labeled "a barbaric, scientifically unsound practice." Another blogger (https://bit.ly/2MbI59f) stated, "there is a rather lengthy list of studies that support the medical benefits of circumcision," and again cited the AAP, as well as the U.S. Centers for Disease Control (CDC).

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Another blogger (https://bit.ly/2YjGeSe) on Parenting.com said, "We respected both sides of the argument, but the medical evidence supporting the use of circumcision to prevent sexually transmitted diseases (STDs) and penile cancer, and to reduce urinary tract infections (UTIs) compelled us. We were finally persuaded when the World Health Organization and UNAIDS issued a joint statement in 2007 supporting the link between male circumcision and HIV prevention. Suddenly we felt that we were making a decision that could not only protect the health of our child, but could save his life. We spoke with the pediatrician we'd chosen and our OB/GYN, who would be performing the surgery, and both agreed with our position."

Clearly, in addition to social norms, perceptions about research evidence may also factor into parents' decision making about routine male newborn circumcision in the U.S. We will explore this research in depth later on.

Worries about teasing or bullying

A common reason that parents in the U.S. give doctors for wanting circumcision is that their child may be teased (or even bullied) later in life if their penis is not circumcised, especially in regions like the Midwestern U.S. where circumcision is still common (Alexander et al., 2015).

We only found one study on the topic of teasing/bullying about penile appearance. Researchers surveyed 290 undergraduate men at the University of Iowa about penile teasing during middle and high school (Alexander et al., 2015). Most of the men in the study were circumcised (251 circumcised men versus 39 intact men), and the majority of participants reported being naked often in a locker room. Of all the men in the study, 10% reported that they had been teased about their penis and 47% reported that they had seen someone else get teased about their penis at some point in the locker room.

Penis size was the reason most often identified by those who were personally teased (75%) or witnessed teasing (83%). Aside from size, the participants reported that 24% of the teasing they witnessed in the locker room was about being intact instead of circumcised. When the authors compared the rates of personally experiencing penile teasing in the intact group versus the circumcised group, they found no difference in the rates of experiencing teasing between the groups. While this study only included a small sample of intact men (39 men), the findings are still informative because nearly half of the 290 total participants were able to report on teasing that they had witnessed, and they reported that locker room teasing was far more related to penile size than penile appearance.

As we'll discuss next, whether it's a circumcised or an intact penis that gets teased for a "funny appearance" in the locker room depends on where you live, even within the U.S.!

How common is circumcision around the world?

Another statement that we hear from parents in the U.S. is that "I want my son to look like everyone else." Parents may be surprised to learn that most men around the world are not circumcised, as well as that there has been a decline in male newborn circumcision rates in the U.S.

Circumcision rates vary widely between and within countries, but the true rates are not clear and can only be estimated. The World Health Organization published a report in which it estimated that 30-33% of the world's males aged 15 years or older are circumcised (WHO/UNAIDS, 2007). Of these circumcised men, about 69% are Muslim, 1% are Jewish, and 30% are circumcised for non-religious reasons. Of the men circumcised for non-religious reasons, 43% are in the U.S., and 57% are in every other country combined.

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Another way to look at it is that only about 10% of the world's males are circumcised for non-religious reasons, and more of those men live in the U.S. than in any other single country.

A more recent review by Morris et al. (2016) estimated the global prevalence of circumcision to be slightly higher, about 38%. However, this may be an overestimate as he assumes that the circumcision rate in China, the most populated country in the world, is 14% (a high estimate). The rates of circumcised men in each country range widely, for example: about 99.8% of men in Afghanistan are circumcised, 92% in the Philippines, 91% in Kenya, 71% in the U.S., 11% in Germany, 9% in Japan, 6% in Switzerland, 3% in Italy, 0.9% in Ireland, and 0.1% in Iceland and Puerto Rico (Morris et al., 2016). A striking example of what a strong influence culture has on circumcision rates is North and South Korea. Only 0.1% of men are circumcised in N. Korea but 77% of men are circumcised in S. Korea (which seems to have picked up the practice from the U.S. military during its occupation after the Korean war) (Kim et al., 1999).

In the U.S., an estimated 71% of adult men are circumcised, but the current rate of routine newborn circumcision is much lower and research suggests that the rate continues to decline. The Centers for Disease Control (CDC) published a report in 2013 tracking trends in male newborn circumcision from 1979 to 2010 (Owings et al., 2013). The overall rate of U.S. newborn circumcision before hospital discharge fell from 65% to 58% over the 32-year period.

So, as of 2010, only 58% of newborn males in the U.S. were being circumcised in the hospital before discharge. Given the downward trend, it's possible that the number has fallen more since then (the CDC has not yet reported data from 2011-2019). Now, the CDC data only capture circumcisions done in hospitals immediately after birth, not the minority of circumcisions done after hospital discharge (e.g., religious ritual circumcisions or outpatient procedures), so the total rate of newborn circumcision is somewhat higher than the hospital rate. Researchers debate what the total rate of newborn circumcision would be if you include those that occur after hospital discharge. However, there is general agreement that the overall rate of U.S. newborn circumcision is declining.

There is an interesting amount of geographic variation in newborn circumcision rates in the U.S. that occur before hospital discharge (Owings et al., 2013). The Midwestern states have the highest regional rate with a high of 83% in 1998 and a low of 69% in 2009. The Western U.S. states have the lowest rate of routine circumcision in the U.S., with a high of 64% in 1979 and a low of 31% in 2003. This means that as of 2003, seven out of ten male babies in the Western U.S. are not circumcised in the hospital after birth. Circumcision has become so rare in some Western states, that some hospitals no longer offer the procedure because there is no demand for it (Personal communication, attendees at AWHONN conference, 2019).

U.S. insurance coverage for newborn circumcision varies among public and private insurance policies. As of 2015, Medicaid has discontinued coverage in 18 states (Warner et al., 2015).

The circumcision procedure

In a typical hospital circumcision procedure, the baby being circumcised is placed on his back in a holding device with his arms and legs restrained (https://bit.ly/2y7mZki) (Caldwell et al., 2018). The skin around the baby's penis is cleaned and pain medication is applied around his penis as a cream or injected. We'll go into more details about pain treatments with the procedure later on in the article.

There are several different devices that providers use to circumcise a baby's penis, including the Gomco clamp (https://stan.md/2LG8KvI), the Mogen clamp (https://stan.md/2LGk5eZ), and the Plastibell ring device (https://stan.md/2YhtXOd), **WARNING:** these links take you to graphic videos of real circumcisions published by Stanford Medicine for educational purposes.

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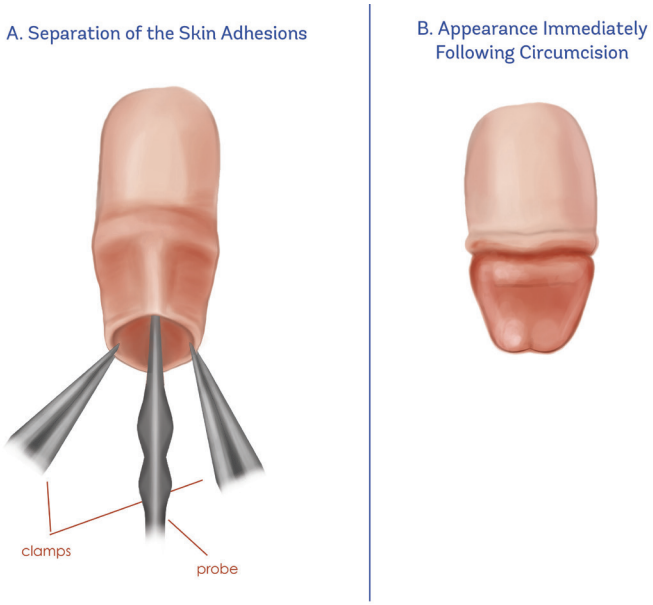
We do not cover the research on each of these techniques in this article, but UpToDate guidance for clinicians states that none of these three circumcision techniques is clearly superior to the others (Caldwell et al., 2018). However, the Mogen clamp has a key disadvantage in that it does not directly protect the glans penis while the prepuce is being cut during the procedure. In fact, the company that manufactures the Mogen clamp in the U.S. went bankrupt following two multimillion dollar judgments (https://on-ajc.com/2Z7F5i0) after accidental penile amputations.

With all three of these techniques, the baby's prepuce is first pulled out beyond his glans penis and a surgical tool is used to "sweep" around between his prepuce and his glans to tear apart the shared membrane. Remember, newborn males are usually born with their prepuce fused to their glans, so skin adhesions have to be torn in order to separate their prepuce from their glans. When healthy adult males elect circumcision, there is no need to break tissue adhesions, which means that this particular step—which can be painful for the baby even with anesthesia applied (Brady-Fryer et al., 2004)—is not needed.



After the baby's prepuce has been separated from his glans, the provider uses one of the three techniques. The provider either removes the baby's prepuce during the procedure with the Gomco clamp or the Mogen clamp, or they send the baby home with the Plastibell ring device tied tightly around his prepuce to cut off circulation.

If the Plastibell ring device is used, the plastic ring and dead prepuce tissue usually fall off within several days to a week. If the ring doesn't fall off on its own, the provider uses a ring cutter to remove the plastic ring and dead tissue from the baby's circumcised penis. Regardless of which technique is used, multiple layers of nerve- and blood vessel-laden tissue are removed during the circumcision.

The procedure takes about 15 to 30 minutes from preparation to completion (Baskin, 2019). To stop the bleeding, the provider covers the baby's wound in a dressing (gauze) and applies pressure. Parents are instructed to replace the baby's lubricated dressing with every diaper change for 24 hours. They are told to clean the baby's wound with warm water and a cotton ball daily. After 24 hours, the lubricant is applied directly to the baby's wound (without gauze) with each diaper change for the next three weeks, and within a few days a scab will form (Baskin, 2019).

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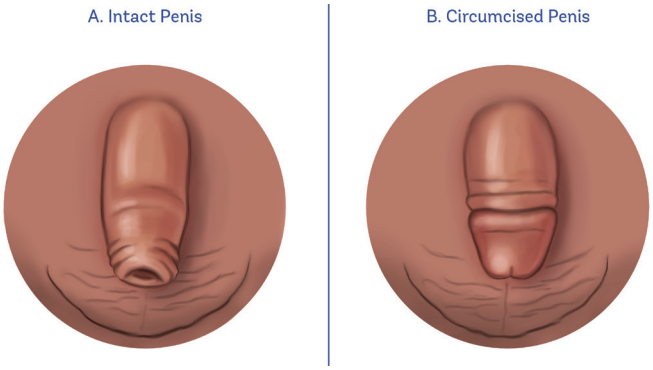

What is the evidence on circumcision to prevent infection or disease?

Despite growing ethical concerns in recent years, researchers have carried out many studies examining the medical effects of male circumcision. In the following sections, we will discuss the evidence from these studies—first those that looked at circumcision to reduce the risk of infection or disease, and then those that looked at potential health risks from the procedure. We will conclude by discussing circumcision in an ethical context.

Cultural Bias in the Medical Research

As we conducted our literature review, it became clear that most researchers based in the United States, where the majority of medical research is done, took the cultural and ethical acceptability of male circumcision for granted. Accordingly, the explicit goal of most studies was to 'verify' the perceived benefits of the surgery. This research approach contrasts sharply with U.S.-funded studies on female genital cutting (FGC) practices throughout Africa, the Middle East, and parts of Southeast Asia. As we'll discuss, some types of FGC are much more invasive than male circumcision and have devastating health consequences, and other types are much less invasive (a "prick" without tissue loss), but all types of FGC have been defined as unethical mutilations by the World Health Organization (Darby, 2016).

Indeed, the Western research community on male newborn circumcision seems, as a whole, to be biased towards emphasizing benefits to newborn male circumcision, while downplaying risks or harms. This bias may even be quite personal, down to the circumcision status of the researcher conducting or interpreting the research. In a survey of 572 doctors, Muller (2010) found that "although most respondents stated that they based their decisions on medical evidence, the circumcision status of, especially, the male respondents played a huge role in whether they were in support of circumcisions or not. Another factor that had an influence was the circumcision status of the respondents' sons."

On a wider scale, if a research community consists of a majority of circumcised men (or circumcising parents), it may simply view the practice as normal or expected. This kind of bias can in turn influence what variables are studied, how the studies are carried out, and even whether or not potential harms or risks are studied at all (Earp and Shaw, 2017). As Darby (2016) notes: *since no official body is interested in researching the harm and long term adverse consequences of [male circumcision] definitive knowledge in this area remains elusive*.

To gather the evidence included here, we conducted a search on PubMed for research on male circumcision in English from within the last 10 years. For each subtopic, we focused on the highest level of evidence available. For example, whenever possible, we reported results from meta-analyses that pooled evidence from multiple studies; however, we also considered the quality of the included studies in the meta-analyses. We reviewed the most recent publications on the topic, as well as every practice guideline from around the world that we could locate in English. The reference sections of each study and our reviewers sometimes led us to other work that has been influential.

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Limitations of the research

One of the main problems with the research on the proposed benefits of the routine male circumcision of healthy newborns is that much of the research comes from contexts in which circumcision was performed on males during adulthood. For example, there have been several randomized controlled trials (RCTs) on HIV infection after adult male circumcision in Africa, but those men were also provided with individualized counseling on safe sex practices and free access to condoms—which wouldn't be possible with newborn circumcision in Africa or elsewhere. So, even within the same geographic region (Sub-Saharan Africa), the study findings aren't generalizable to newborns because the intervention isn't the same.

In our search, we went back to the beginning of the medical research on circumcision and found that routine newborn circumcision became widely promoted by medical professionals without ever being tested first in randomized controlled trials. There was never any requirement to randomly assign newborns to routine circumcision or no circumcision before recommending the surgical procedure as beneficial. Still today, none of the proposed benefits are supported by data from a randomized controlled trial of healthy newborns assigned to routine circumcision or no circumcision. And it's unlikely a trial of this sort will ever take place because of the ethical questions and because few parents would want their newborns to participate.

Therefore, any research on the proposed benefits of circumcision that involves healthy newborns who were circumcised is observational. For example, there have been several observational studies and reviews looking at the effectiveness of routine newborn circumcision to prevent UTIs in infancy, but these studies only provide limited evidence of an association between circumcision and protection from UTIs. Because observational studies are not randomized, we cannot rule out that other factors may be at least partially responsible for the observed effects of circumcision. For example, preterm infants with low birth weight may be more likely to get a UTI *and* more likely to be intact (if they were considered too fragile for the circumcision surgery after birth), and this would show an increase in UTIs among intact infants (Van Howe, 2005).

Below we've listed a table summarizing the research on each proposed benefit, along with whether or not a non-invasive alternative to circumcision is available. Listing alternatives is important, because circumcision is often presented as having benefits, without discussing potential alternatives. But informed consent (including proxy consent) requires knowing not only the benefits and risks of a proposed intervention, but also the benefits and risks of any feasible alternatives, including no intervention.

Whenever possible, we will present the GRADE recommendations from the Canadian Urological Association. The GRADE system is a common way of rating the quality (or certainty) of the evidence in a review (Dave et al., 2017). Overall, the research on proposed benefits from newborn male circumcision amounts to a *weak* recommendation for practice. Continue reading below the table for references and a more extensive look at each proposed benefit.

Finally, throughout this entire section on the medical evidence, please be aware that the research on circumcision is still so contested that we are nowhere close to a scientific consensus on the evidence (Collier, 2011).

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Table 1: Summary of Research on Main Proposed Benefits of Newborn Male Circumcision

Proposed benefit	Randomized trials on healthy *newborns* not yet experiencing these medical problems	Non-invasive method of prevention or treatment available	Absolute risk of this problem occurring	GRADE ranking of evidence	GRADE strength of recommendation for this particular benefit
Prevents UTI in males	None on healthy newborns	Yes, ways to reduce risk of UTIs include breastfeeding, healthy bathroom habits, avoid constipation, healthy diet, avoiding irritants, and minimizing antibiotic use UTIs are treated with oral antibiotics	UTIs occur in about 8% of girls and 2% of intact boys before the age of seven A review found that under one year of age, when risk of UTI is greatest for males, 1.38% of intact males got a UTI versus 0.14% of circumcised males About 111 circumcisions would be needed to prevent a single (treatable) UTI in infancy	*Low quality*	*Weak*
Prevents future problems with phimosis and inflammation	None, the research is on treatments for boys with physician-diagnosed phimosis	Yes, wait for the prepuce to become retractable on its own, as it normally does in more than 50% of intact boys by 10 years of age (99% by 17 years). If it does not, or causes discomfort, a topical steroid cream and gentle stretching can be used. If these treatments do not resolve the problem, dorsal slit surgery to widen the opening of the prepuce, or partial/total circumcision can be done. Ways to reduce risk of inflammation of the glans penis (balanitis) include good hygiene, avoiding irritants such as soap, and safe sex practices in adulthood. Inflammation is treated with medicated ointments.	Normal phimosis usually resolves with age: only about 1% of intact boys still have phimosis at age 17. True pathologic phimosis that requires medical or surgical treatment affects about 0.6% of boys between 5 and 14 years of age. The risk of phimosis as a complication following circumcision is also about 1%, which occurs when the scar tissue covers the glans Balanitis (inflammation) is higher in circumcised boys while in diapers, and more common in intact men later in life	*Moderate to high quality* evidence that one or more courses of topical steroids are the first-line treatment for problems with phimosis	*Strong evidence* to use one or more courses of topical steroids to treat problems with phimosis before surgery is medically indicated
Prevents HIV	None, there are data from randomized trials on adult *men* in Africa	Yes, condoms, abstinence, mutual monogamy with an uninfected partner, and using antiretroviral therapy to treat HIV+ individuals and their partners can decrease the risk of HIV transmission Treatment with antiretroviral therapy can eliminate risk of transmission according to a very high quality large study recently published in the Lancet. Although HIV treatments are available, they can be expensive, cause side effects, and can't cure HIV.	In the randomized trials on men in Africa, the absolute risk of the men getting infected with HIV from a positive female partner over 21 or 24 months was about 1% for the circumcised men versus just under 3% for the intact men In the U.S., the CDC estimates that the lifetime risk of getting HIV for men who only have sex with women is much lower (1 in 473). The number jumps to 1 in 6 for men who have sex with men.	*High quality*	*Strong*; however, there is no evidence that these studies can be applied to newborns or other areas of the world, such as the U.S. or Canada. It is also controversial whether circumcision should be promoted to prevent HIV transmission in Africa over less invasive public health measures.

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Proposed benefit	Randomized trials on healthy *newborns* not yet experiencing these medical problems	Non-invasive method of prevention or treatment available	Absolute risk of this problem occurring	GRADE ranking of evidence	GRADE strength of recommendation for this particular benefit
Prevents HPV	None, there are data from randomized trials on adult *men* in Africa	Yes, condoms, HPV vaccine, abstinence, or mutual monogamy with an uninfected partner There is currently no treatment for HPV and the virus typically goes away on its own. Treatment focuses on removing genital warts and preventing cancers.	The CDC estimates that 80% of people will get an HPV infection in their lifetime, but in most cases it goes away on its own and does not cause health problems	*Moderate quality*	*Weak*
Prevents HSV (genital herpes)	None, there are data from randomized trials on adult *men* in Africa	Yes, abstinence or mutual monogamy with an uninfected partner; consistent condom-use provides the same (low) level of protection as circumcision There is currently no cure for herpes. Antiviral medications can prevent or shorten outbreaks and reduce the risk of transmission to partners. Vaccines are in clinical trials.	8% of men aged 14 to 49 were infected with HSV-2 in the U.S. in 2015-2016	*Moderate quality*	*Weak*
Penile cancer	None	Most penile cancer is linked to HPV. You can reduce risks by preventing and treating sexually transmitted infections, practicing good hygiene, not smoking, and treating phimosis that persists into adulthood. Penile cancer can generally be detected early by observation and is treated with surgery and other cancer treatments	Penile cancer is very rare (less than 1 man in 100,000) and makes up less than 1% of cancer diagnosed in men in the U.S. According to the AAFP, 300,000 circumcisions would need to be done to prevent one case of penile cancer.	*Low quality*	*Weak*

Urinary tract infections (UTIs)

Regarding the use of male newborn circumcision to prevent UTIs in children, the GRADE system found that the evidence is low quality and any strength of recommending circumcision for routine practice is weak (Dave et al., 2017).

The strength of the recommendation for practice is considered to be stronger in situations involving newborns with actual medical problems. Both the Canadian and American Urological Associations recommend that the option of circumcision should be discussed with parents as a surgical treatment for males with an abnormal urinary tract who are more at risk for complications from repeated UTIs (Awais et al., 2015). However, this recommendation is based primarily on expert opinion.

UTIs occur in about 8% of girls and 2% of intact boys before the age seven (Hellström et al., 1991). They occur more frequently among girls because their urethra (the tube that carries urine out of the body) is shorter. The infection is treatable with oral antibiotics and usually resolves without complications.

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However, in rare instances (usually among people with abnormal urinary tracts predisposing them to illness from UTIs), UTIs can lead to severe infection and kidney problems (Jagannath et al., 2012).

Medical providers often advise parents and guardians that circumcision helps prevent UTIs in male children (CDC, 2018). The theory is that bacteria are less likely to grow on the keratinized (dry, tougher) skin of the circumcised glans penis (Dave et al., 2017).

The authors of the most recent Cochrane review on this topic were not able to identify any randomized trials on the use of routine newborn male circumcision to prevent UTIs (Jagannath et al., 2012). We also searched but did not find any RCTs on the effects of routine circumcision on risk of UTI among healthy newborns. Therefore, the only research we have on this topic comes from observational studies.

In a 2008 meta-analysis and review, researchers combined the results from 14 studies involving children with fevers who were less than 2 years of age, including data on their rates of UTI (Shaikh et al., 2008). This was the first study to combine data that examined rates of UTI based on circumcision status and other factors that could potentially affect UTI risk. Overall, 7% of the children with fevers had a UTI. Four of the included studies contributed data on UTI rates by circumcision status among boys less than 3 months of age. Out of all of the children presenting with a fever, the rate of UTI was highest among intact boys under the age of 3 months (20%) followed by girls aged 6 to 12 months (8%). In contrast, circumcised boys under 3 months of age had one of the lowest rates of UTI (2%).

In this same review, one study looked at UTI and circumcision status in boys with a fever who were 6 to 12 months of age and found that the rate of UTI in intact versus circumcised boys was 7.3% and 0.3%, respectively. Another study looked at UTI by race and found an overall higher rate of UTI among boys of Hispanic descent. The authors think this could be because Hispanic males are more likely to be intact. The higher rate of UTIs detected in intact boys may also be related to more frequent testing for UTIs in this population (they're tested more frequently because of the medical literature suggesting that intact boys are more likely to have UTIs). The rate of UTI among all males in the review decreased with age starting at around 6 to 12 months, regardless of circumcision status.

An earlier systematic review by Singh-Grewal et al. (2005) included 12 studies with data on over 400,000 males, most of whom were less than one year of age. They found that UTIs were uncommon among males regardless of their circumcision status—1.38% of intact males got a UTI versus 0.14% of circumcised males. The authors discuss how increased UTIs among intact males might be due to more bacteria around the prepuce (more colonization); however, they also mention that increased colonization may have led to more false positive results among intact males, potentially overestimating their rate of UTI. About 111 circumcisions would need to be done in order to prevent one episode of UTI, which the authors concluded does not justify routine circumcision for all male infants.

In 2013, Morris and Wiswell combined data from 22 studies in the first meta-analysis to estimate the lifetime risk of UTI in circumcised versus intact males. They found that, in every age group, the risk of UTI was higher among intact males: 10 times higher among babies less than 1 year, 7 times higher among boys aged 1 to 16 years, and 3 times higher among men over 16. They estimated that 32% of intact males experience at least one UTI in their lifetime compared with 9% of circumcised males. For perspective, half of all women will experience at least one UTI during their lifetime (Foxman, 2002). Morris and Wiswell estimate that 4 to 5 male newborn circumcisions would prevent one UTI over a lifetime. However, we would caution that the lifetime risk estimate from this study is not reliable, since the estimate for men over 16 years of age was based on a single small study of young men attending an STD clinic. In this study, 20% of the men were bisexual or gay and all of the men were experiencing urinary symptoms. So this group is not representative of the general male population. To calculate a

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lifetime estimate of UTI, the risk of UTI for circumcised versus intact men in this study was applied to men later in life, when UTIs become more common because of prostate gland enlargement (https://mayocl.in/2G54Vdd) regardless of circumcision status, which may be an inappropriate generalization.

Phimosis and balanitis (inflammation)

The GRADE of the evidence for using one or more courses of topical steroids instead of circumcision as a first-line treatment for problems with phimosis is *moderate to high quality* (Dave et al., 2017). There is *strong* evidence to use one or more courses of topical steroids to treat problems with phimosis before any surgery is medically indicated.

Normal penile development in young boys usually involves adhesions between the inner foreskin and glans. This normal development may also involve tightness at the opening of the prepuce that can make the prepuce unretractable until that tightness resolves over time (Cold and Taylor, 1999). Recall that about 50% of intact boys can retract their prepuce by 10 years of age (Kayaba et al., 1996), and 99% can fully retract by age 17 (Hayashi et al., 2011).

On the other hand, true pathologic phimosis that requires treatment only affects about 0.6% of boys between 5 and 14 years of age (Shankar and Rickwood, 1999). The usual cause of pathologic phimosis is a skin condition called *male genital (penis) lichen sclerosus* (https://bit.ly/2JQmxxu) or *balanitis xerotica obliterans*. This condition causes tightening of genital tissue that decreases tissue elasticity. Circumcision early in life appears to protect against this rare condition.

Scarring at the end of the prepuce from repeated inflammations (often linked to poor hygiene) can also cause pathologic phimosis. Inflammation or skin irritation of the glans penis is called *balanitis* (https://bit.ly/2LH2QtY) (Dave et al., 2017). Both circumcised and intact males can experience balanitis–good hygiene is the most important prevention. Balanitis occurs more often in circumcised boys while in diapers (Van Howe, 1997), and is more common in intact males later in life (Köhn et al., 1999). Other risk factors include being diabetic, having a Body Mass Index (BMI) over 35-40, having a compromised immune system, sexually transmitted infections, fungal infections, chemical irritants (e.g., spermicides, soaps, laundry detergents), allergic reaction (e.g. condom latex), and trauma (e.g., zipper injury) (Wray and Khetarpal, 2019). Inflammation is treated with medicated ointments specific to the cause of the inflammation (e.g., anti-fungal cream if the balanitis is caused by an overgrowth of yeast).

Unfortunately, doctors are not always trained enough to distinguish between these two types of phimosis—one that is normal development and usually resolves on its own, and the other that is an actual medical problem that requires medical or surgical treatment, and this leads to needless referrals to urologists for circumcisions (Shahid, 2012).

Newborn male circumcision (when there are no complications) is thought to prevent potential future problems with phimosis by surgically removing the prepuce before any problems can occur. Unfortunately, one of the potential complications of newborn male circumcision is a tightening of the circumcision scar tissue over the glans. The phimosis that results from circumcision has been shown to occur in about 1% of boys, while the rate of persistent phimosis in intact adult males is between 0.5% and 1% (Blalock et al., 2003; Kidger et al., 2012; Oster, 1968). Thus, one of the purported benefits of circumcision is that the risk of experiencing future problems with phimosis has been avoided, but it can bring with it an equal risk of phimosis as a complication following the procedure.

In the majority of cases, problems with phimosis in intact boys can be treated with noninvasive means. Our PubMed search for the latest research on phimosis and circumcision turned up two recent meta-analyses on using topical steroids to treat phimosis (Moreno et al., 2014; Liu et al., 2016). A

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Cochrane review by Moreno et al. (2014) included 12 studies with 1,395 intact boys who had physician-diagnosed phimosis. Importantly, many of the children in this meta-analysis were still in infancy and early childhood when they were diagnosed with phimosis in need of medical intervention. So, most of these young participants probably had normal penile development that was improperly diagnosed as pathologic phimosis. The researchers compared treatment with a steroid cream versus a placebo cream or no treatment for 4 to 8 weeks. Most of the studies also recommended gentle stretching of the prepuce for both the treatment and placebo groups.

Eight of the included studies reported on whether phimosis was completely cured in the steroid group versus the placebo group. By the end of the observation period, about 63% of the boys who received steroid cream were completely cured of their phimosis versus 18% of the boys who received the placebo. There were no reported adverse effects. This Cochrane review gave the evidence on topical steroid creams for phimosis a *low quality* rating, because the included studies found mixed results and had unclear risk of bias. However, the authors concluded that the findings still have implications for practice, since steroid creams seem to be a safe and effective alternative to surgery to treat phimosis in intact boys and men.

The meta-analysis by Liu et al. (2016) had similar findings—they found that steroid treatment was preferable to placebo for phimosis.

It's also important to mention that complete circumcision is not the only option when steroid creams do not work to treat phimosis. A *dorsal slit preputioplasty* (using plastic surgical techniques) can widen the prepuce and treat the phimosis without removing tissue, or a partial circumcision can remove only enough tissue to make retraction possible (Informed Health, Germany, 2018; Arora et al., 2016).

Human immunodeficiency virus (HIV)

For adult men living in Sub-Saharan Africa, the GRADE of the evidence for circumcision leading to a decreased risk of HIV infection is *high quality* and there is a *strong* recommendation for practice (Dave et al., 2017).

However, there is no evidence that these studies can be applied to newborns or other areas of the world, such as the U.S. or Canada. Of the studies published to date, none have found a link between circumcisions performed on infants or circumcisions performed in North America and lower risk of heterosexually transmitted HIV. In the U.S. and Canada, the rates of HIV are much lower than in Sub-Saharan Africa. Also, the burden of HIV in the U.S. falls heavily on men who have sex with men and people who use intravenous (IV) drugs, and less so on male-female sexual contact (Dave et al., 2017; HIV.gov 2018). It's also important to consider that circumcision does not provide complete protection for men who have sex with infected female partners. Even with a reduced risk, it is essential that circumcised men still follow safe sex practices in order to avoid sexually transmitted diseases. These same safe sex practices can also help prevent HIV infection among intact males.

Several theories have been proposed to explain how circumcision might lower the risk of getting HIV; however, these are theories, not conclusive research findings (Sharma et al., 2018):

- It could be that circumcision reduces the risk of genital ulcerative diseases, such as genital herpes and syphilis, thus indirectly lowering the risk of HIV, since the open sores allow infection with HIV that would not have occurred with intact skin
- Circumcision might work more directly by removing certain cells that line the prepuce and can be targeted by HIV

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- Intact males have more delicate genital tissue (less keratinized or toughened) compared to circumcised males; so micro tears might act as ports of entry for the virus.
- The warm, moist environment beneath the prepuce might trap HIV-infected fluids and allow the virus to survive.

We found five meta-analyses that focused on male circumcision and HIV from within the last ten years. All of the randomized trials were carried out with adult men, but the participants' age at the time of their circumcision varied between the observational studies.

Two Cochrane meta-analyses have looked at the evidence on this topic. One review looked at HIV risk among men who have sex with women, and the other looked at HIV risk among men who have sex with men (Siegfried et al., 2009; Wiysonge et al., 2011). The meta-analysis on men who have sex with men could not find any randomized trials to include, but included 21 observational studies with more than 70,000 participants. Overall, they did not find any evidence that circumcision status lowers HIV risk among men who have sex with men.

The meta-analysis on men who have sex with women pooled the results from three large randomized trials conducted in South Africa (Auvert et al., 2005), Uganda (Gray et al., 2007), and Kenya (Bailey et al., 2007). Combined, there were more than 11,000 male participants from the general population in these studies. In two of the trials, the men were between 18 and 24 years old, and in one of the trials they were between 15 and 49 years old. Only HIV-negative men at the time of enrollment were included in the analysis. Total follow up time was planned for 21 months in one of the trials and 24 months in the other two—however, all three of the trials were stopped early after early results showed significant HIV protection from circumcision.

The researchers used a method called *time-to-event-analysis* to include the results from everyone who completed the trial and some of the observation time for those who did not finish the trial. They found that the *relative risk* of getting HIV (comparing the risk in one group to the other) was 54% less at 21 or 24 months for the circumcised men versus the intact men. The *absolute risk* (the actual chance of getting infected with HIV over 21 or 24 months) was about 1% for the circumcised men versus just under 3% for the intact men. Based on those figures, the authors estimate that circumcising 56 men in sub-Saharan Africa would prevent about 17 HIV infections over two years per 1,000 men in the population.

The most recent meta-analysis on this topic, published by Sharma et al. in 2018, combined 49 studies from around the world (nearly 200,000 people) on men who have sex with men, as well as men who have sex with women. Only three of the studies were randomized, controlled trials (6% of total meta-analysis participants), and these were the three trials conducted on men in sub-Saharan Africa.

The researchers found that circumcised men were 42% less likely to get HIV compared to intact men. They divided the men by sexual preference and found that the risk of HIV was reduced by 20% for men who have sex with men, and 72% for men who have sex with women.

However, when the meta-analysis looked only at the observational studies conducted in the U.S., there was no evidence that circumcision offered protection against HIV, suggesting that there might be differences in the effectiveness of circumcision against HIV in different regions. In other words, circumcision may only have a significant impact on a man's risk of getting HIV in a region with especially high rates of female-to-male sexually transmitted HIV infection.

Similarly, a different analysis of over 100 studies evaluating the impact of circumcision status on HIV found that studies of high-risk populations (as opposed to general populations not at high-risk for HIV) had a significantly stronger link between being intact and being HIV-infected (Van Howe, 2015). In other

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words, a man's circumcision status doesn't appear to impact his HIV-risk if he is in a population with low rates of HIV. In addition, in general populations with low rates of circumcision, circumcision status did not show a significant impact on HIV-risk. For example, the Dutch have a low rate of circumcision, and they also have a low prevalence of HIV/AIDS. As such, behavioral factors appear to play a far more important role in risk of HIV than circumcision status.

Lei et al. (2015) published the next most recent meta-analysis. In this study, researchers combined 15 studies on HIV transmission by circumcision status among men who have sex with women. Four of the included studies were randomized trials: the three large randomized trials of men in sub-Saharan Africa, and one randomized trial of women in Uganda with HIV positive male partners. Lei et al. found that circumcision was linked to a 70% reduced risk of HIV among men. However, circumcision status did not lower the risk of women getting HIV from their male partners. In fact, the one RCT on male-to-female transmission of HIV showed that women were more than 3 times as likely to get HIV from a circumcised male partner if they resumed sex before the wound had completely healed, compared to women with intact HIV positive partners (Wawer et al., 2009). The authors of the meta-analysis concluded that male circumcision helps to protect men from getting HIV from an infected female partner, but not the other way around.

The conclusion by Lei et al. (2015) was consistent with a previous meta-analysis performed by Weiss et al. in 2009 that also found no direct benefit of male circumcision for reducing risk of HIV among female partners.

The three African RCTs that give us the best evidence on circumcision and risk of HIV have several limitations. First, stopping all of the trials early meant that many people did not complete the trials. It is standard practice to stop trials early for significant benefits, and the researchers accounted for this in their analysis; however, the general practice of stopping trials early because of benefits has been linked to overestimating the benefits when the number of events is small, as it is in these trials (Montori et al., 2005). So it's possible that the size of the protective effect of circumcision may be overestimated. On the other hand, all three of the trials found a remarkably similar protective effect, which strengthens the evidence that adult male circumcision does reduce the risk of getting HIV from infected female partners. Follow-up studies have found that the protective effect of male circumcision against HIV continues with time (Auvert et al., 2013; Gray et al., 2012; Mehta et al., 2013).

These trials resulted in high-profile support (Bill Clinton and Bill Gates referred to the data), large donations from philanthropists (the Bill & Melinda Gates Foundation gave $50 million in 2009) and led to mass circumcision programs in several African countries (Collier, 2012). However, these studies have also been accused of multiple biases and other problems. In 2011, Boyle and Hill accused the trials of "methodological, ethical and legal concerns" and Van Howe and Storms made the case that "the circumcision solution in Africa will increase the risk of HIV infection."

Supporters of the studies replied that the "criticisms of African trials fail to withstand scrutiny: male circumcision does prevent HIV infection" and responded to what they called "misleading claims that male circumcision will increase HIV infections in Africa" (Wamai et al., 2012; Morris et al., 2011). The complexity of this debate is outside the scope of our review article on newborn circumcision, but if you're interested, we encourage you to read the cited publications that highlight the opposing views surrounding the methodology of these three African RCTs on adult male circumcision.

Even if everyone accepted the evidence that adult circumcision in Sub-Saharan Africa truly does lower a man's risk of getting HIV from an infected female partner, there are still concerns with promoting genital surgery as a public health measure in developing countries:

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- In the real world, the surgical procedure might be carried out in traditional ceremonies or substandard clinics instead of an aseptic clinical setting, resulting in dangerous complications (Siegfried et al., 2009)
- HIV positive men might infect more female partners if they get circumcised and have sex before the wound has fully healed, as was observed in the randomized trial of male-to-female transmission in Uganda (Wawer et al., 2009)
- Performing circumcisions on HIV positive men would expose health care workers to the virus, but refusing to do circumcisions on HIV positive men would risk stigmatizing them
- Since the publication of the RCTs, treatment-as-prevention and pre-exposure prophylaxis with antiretroviral therapy have joined condom use as less invasive approaches to addressing the HIV pandemic in Africa that may also be more effective and less expensive
- Finally, another concern is that groups in Africa that support the practice of female circumcision (https://bit.ly/2LAwb6t) (which the World Health Organization calls *female genital mutilation*) might use the promotion of male circumcision to try and defend or conduct studies on potential health benefits from their cultural practice (Auvert et al., 2005). According to people opposed to male circumcision (some of whom refer to it with the parallel term *male genital mutilation*) it, too, should be internationally condemned. We'll discuss this further on.

Human papillomavirus (HPV)

The current evidence shows a modest decrease in having HPV infection with circumcision; the GRADE is *moderate quality* and the strength of the recommendation for practice is *weak*. It is likely that HPV vaccination and safe sex practices (e.g., condom use) are more effective than circumcision at preventing HPV infection (Dave et al., 2017).

HPV is the most common sexually transmitted viral infection in the world, although rates have fallen since the introduction of the HPV vaccine (Aung et al., 2018). Some types of HPV cause genital warts and other types can cause cervical cancer (the second most common cancer among women in the world), as well as penile and anal cancer in men (Zhu et al., 2017).

We found six meta-analyses that focused on circumcision status and HPV.

The most recent meta-analysis, by Zhu et al. (2017), included 39 studies involving more than 12,000 circumcised men and more than 12,000 intact men. Out of these, 24 studies (including 5 randomized trials from Africa) examined the link between circumcision status and rates of HPV. HPV-positive rates among circumcised and intact men in the studies ranged from 2% to 78% and 7% to 81%, respectively. When they pooled the data, there was no significant difference between intact men and circumcised men when it came to acquiring a new infection or in the ability to clear the infection. Prevalence of HPV was higher in intact men; however, the quality of the meta-analysis is weak because the studies were very *heterogeneous*, or mixed. Of the 24 studies, 10 showed lower HPV prevalence with circumcision, 1 showed higher HPV prevalence with circumcision, and 13 showed no effect.

Albero et al. (2012) combined data from 21 studies (14 observational studies and two randomized, controlled trials from Africa). Overall, circumcised men had lower odds of being HPV positive. The combined data from the two RCTs also showed that circumcised men were 33% less likely to have HPV infections with high-risk strains of the virus. The authors concluded that circumcision might help to lower the burden of HPV-associated diseases, especially in countries where HPV vaccination and cervical cancer screening are not available.

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The earlier meta-analyses by Larke et al. (2011a) and Bosch et al. (2009) also found lower odds of HPV prevalence with circumcision.

Two meta-analyses by Van Howe (2007, 2013) reported serious methodological problems with most of the published studies on HPV and circumcision status. When statistical techniques were applied to adjust for various biases, there was no statistically significant increase in risk of HPV infection in intact men.

The largest prospective study of genital HPV infection in 4,033 healthy men found no difference in how frequently they acquired HPV or cleared their HPV infection between intact and circumcised men (Albero et al., 2014).

Herpes Simplex Virus (HSV)

The GRADE quality of the evidence for adult circumcision leading to a decreased risk of getting HSV infection is *moderate-quality* and the GRADE strength of the recommendation for practice is *weak*. There is not enough evidence to show that male newborn circumcision can prevent circumcised males and their sexual partners later in life from getting STIs that cause genital ulcers, such as HSV (Dave et al., 2017). The evidence on circumcision protecting against genital herpes is still conflicting; some studies have found no evidence of an effect and others have found a low level of protection with circumcision (Mehta et al., 2012; Tobian et al., 2009).

There is weak evidence from men participating in two RCTs of adult circumcision in Uganda that circumcised men had a 30% lower risk of getting herpes simplex virus type-2 (HSV-2) over two years of follow-up compared to the intact men (Tobian et al., 2009). However, as we discussed with HIV-risk, these trial findings are not generalizable to newborns or to countries with a lower prevalence of HSV-2 infection. In Uganda, the prevalence of HSV-2 infection is 34% among men aged 15-49 years, while only 8% of men are infected with HSV-2 in the U.S, as reported by the CDC (https://bit.ly/2nEBynP).

Consistent condom use also provides 30% protection from HSV-2, because herpes virus shedding can occur in areas not covered by the condom (Martin et al., 2009). One way to look at it is that both circumcision and condom use are not very effective strategies to prevent genital herpes. The only really effective ways to avoid genital herpes are to abstain from sexual contact or to be in a mutually monogamous relationship with a partner who is known to be uninfected.

Other Sexually Transmitted Infections (STIs)

There is no evidence to conclude that male circumcision protects against gonorrhea, chlamydia, or trichomonas (Dave et al., 2017). These STIs were studied in the African RCTs and they did not find significant evidence that circumcision was protective.

Intact men may be at greater risk for genital infections that involved ulcers (genital herpes, syphilis, chancroid), while circumcised men may be at greater risk for genital infections that involve a discharge (chlamydia, gonorrhea, inflammation of the urethra). One systematic review and meta-analysis concluded that because the discharge infections are more common, overall, the risk of developing an STI of any kind is statistically significantly greater in circumcised men (Van Howe, 2013).

Since the evidence on using adult male circumcision (not to mention *newborn* circumcision) to prevent non-HIV, non-HPV, and non-HSV STIs is still so conflicting, we will not be covering this evidence in detail.

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Penile cancer

Circumcision appears to offer some protection against rare penile cancer, but the GRADE of the evidence is *low quality* and the strength of the recommendation for practice is *weak* (Dave et al., 2017).

Penile cancer (https://bit.ly/2LFx9kL) is extremely rare. It's the 24th most common cancer among men and occurs in less than 1 man in every 100,000. It's even less common than male breast cancer (https://bit.ly/2pjEElH). According to the American Academy of Family Physicians (AAFP), 300,000 circumcisions would need to be done to prevent one case of penile cancer. The average age that men are diagnosed with penile cancer is about 68. Research suggests that there is a link between some types of infections and cancer. For example, HPV DNA has been found in cervical cancer and about half of the cases of penile cancer.

We found one recent meta-analysis that focused on circumcision status and penile cancer.

In a meta-analysis of eight studies on invasive penile cancer, Larke et al. (2011b) showed that childhood circumcision (<18 years of age) was protective. However, the authors think that the protective effect of circumcision might in fact be due to eliminating the risk of phimosis that persists into adulthood, since there was no evidence of a benefit when the data was restricted to men with no history of phimosis problems. Phimosis that extends into adulthood is one of the strongest risk factors for penile cancer since it can cause repeated inflammations, so removing the risk of phimosis with circumcision also reduces the risk of penile cancer. However, as we discussed, persistent phimosis is rare and there are non-invasive treatment options. Other risk factors for penile cancer include HPV infection, poor penile hygiene, and smoking.

What are the potential health risks from circumcision?

Like any surgical procedure, there is a risk of complications with newborn circumcision. We'll cover the potential short-term risks for the baby, as well as potential risks for circumcised men later in life.

Complications that can occur during and soon after circumcision

The true rate of complications after newborn circumcision is not known. Part of the reason for this is that researchers are focused on finding the potential benefits from circumcision (e.g., protection from HIV), not the potential harms. For example, bleeding complications are one of the most common risks from circumcision, but there is almost no research on this topic (Litwiller et al., 2017).

When observational studies on circumcision-related complications are combined, most of the data comes from large hospital-based studies that look back at medical records to estimate how often bad outcomes occurred (Weiss et al., 2010). These retrospective studies tend to greatly underestimate the true rate of complications because they only capture the poor outcomes that occur before hospital discharge (Frisch and Earp, 2018). Prospective studies (that follow circumcised males over a period of time) provide more useful data. However, surprisingly few studies have assessed the rate of complications a few months to years after routine newborn circumcision. Out of 16 prospective studies on newborn circumcision included in a review by Weiss et al. (2010), only two followed infants for a whole year. The accuracy of the data on poor outcomes following circumcision may also be impacted by the unwillingness of practitioners to report their complications. The fact that we have limited research on risks and complications would be important to include in informed consent discussions with parents.

In 2010, Weiss et al. carried out a systematic review on poor outcomes after circumcision in childhood. This review included 52 studies in 21 countries. Out of these 52 studies, 16 were prospective studies

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of infant circumcision from 12 countries, mostly using the Plastibell device. The researchers found that complication rates ranged from 0-16%, with most around 2%. The most common early complications were pain, bleeding, swelling, and cosmetic concerns about the amount of skin removed.

The range of serious adverse events was 0% to 2%, with most rates closer to 0%. Most of the prospective studies reported no serious adverse events, but three studies (one from Canada and two from Nigeria) reported that 1% to 2% of the babies had a serious complication. In the Canadian study of 100 newborns, there was one baby with a severe infection requiring antibiotics, and one baby with a severe meatal ulcer (a painful sore on the opening of the urethra). The serious complications in the Nigerian studies included three babies with cuts to the urethra, two babies with amputation of the glans penis (where the head of the penis was amputated), and one baby with a buried penis (https://bit.ly/2YhmJtI)—so much skin was removed, that the scar tissue pulled the remaining skin forward, hiding the penis in the folds of the skin.

The Weiss et al. review also included ten retrospective studies on newborn circumcision that looked back at hospital records. As to be expected, the estimated frequency of complications was lower than with the prospective studies, probably due to underreporting. Five of the studies found rates of complications <0.6% and four studies found rates of complications between 2% to 4%. Very few serious events were reported (<0.2%), except in one U.S. study where three babies (1.3%) required repeat surgery to revise the circumcision.

Reoperation is one of the more common risks from circumcision. Parents sometimes think that not enough skin was removed, and they are not satisfied with the appearance of the baby's penis after the procedure. Studies have reported rates of reoperation ranging from as low as 0.1% to as high as 4.5% (Talini et al., 2018). Some of the common reasons for reoperation are due to problems with how the tissue grows back together. During healing, the skin can form adhesions (scar tissue) on the glans penis. This can occur following 25% of newborn circumcisions (Van Howe, 1997). The risk of these complications after circumcision can be reduced with gentle retraction and barrier ointments until the wound has healed. Another potential problem, as discussed earlier, is phimosis following circumcision, in which the scar tissue covers the glans penis.

The largest retrospective study of complications after newborn circumcision looked at outcomes after about 1.4 million circumcisions in the U.S. during 2001 to 2010 (El Bcheraoui et al., 2014). The study relied on data from a health care reimbursement claims database that captured diagnoses and procedures billed to third parties. If a circumcision or a resulting bad outcome was not covered by a third-party payer, then it would not have been included in this analysis. Overall, they determined that the rate of complications is probably fewer than 1 in 200 babies. The most common complications were related to correctional procedures (stitches, reconstruction and repairs of the penis) and bleeding. Pain was not included as one of the complications in this study. This study has been criticized for assessing certain complications over too short of a follow-up window and relying on a type of database thought to underestimate the rate of complications (Frisch and Earp, 2018). As we will discuss, potential complications such as a narrowing of the urethral meatus (opening) can take many years for doctors and parents to detect.

Some babies are at increased risk of complications from circumcision. An observational study found that babies who had spent a few days in the NICU had more bleeding complications (22%) compared to babies admitted to the newborn nursery (10%) (Litwiller et al., 2017). The authors think this finding may be related to NICU babies having lower levels of vitamin K in their system by the time they are circumcised.

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There are several health problems that should be considered potential *contraindications*, or medical reasons to avoid newborn circumcision (Earp et al., 2018). A recent study looked back at a huge sample of hospital births in the U.S. between 2001-2010, in a database called the Nationwide Inpatient Sample (NIS). This study included almost ten million male newborns who were circumcised in the hospital within 30 days of birth. Among these, there were 200 deaths before hospital discharge, or 10.2 deaths per 500,000 newborn inpatient circumcisions. We can't tell from these data whether circumcision caused or contributed to these deaths. However, the authors did find an increased risk of death after circumcision among babies with certain health problems, including heart problems, blood clotting disorders, fluid and electrolyte disorders, and respiratory disorders. Certainly, the most vulnerable infants are at extra risk of complications from exposure to surgical procedures.

New research from the United Kingdom (U.K.) proposes that newborn circumcision might increase risk of SIDS, or *Sudden Infant Death Syndrome*, once called crib death (Elhaik, 2018). SIDS occurs when a seemingly healthy baby under one year of age dies unexpectedly in sleep, with no cause of death to be found. SIDS is the leading cause of infant death in many developed countries, and more common among males. The theory is that the trauma of a painful surgery adds to the infant's stress level, or *allostatic load*. The allostatic load hypothesis proposes that SIDS results from the combined load of all stressful exposures during pregnancy, birth, and after the birth.

The study from the U.K. included data on rates of SIDS and newborn male circumcision across 15 countries (including 40 U.S. states) and reported a strong correlation between newborn circumcision and SIDS. Thus, in places where newborn male circumcision rates are high, higher rates of SIDS occur, and vice versa. This type of evidence *does not* tell us if circumcision actually causes deaths from SIDS—but it means that we need more research on this topic. Researchers who are designing future studies on SIDS could consider circumcision among other potential risk factors that they are studying.

Recent Case Reports

We searched PubMed for case reports on complications from routine male newborn circumcision from within the last five years and found six results:

- A healthy term baby was circumcised on day 1 of life in Canada and developed ongoing bleeding at the incision site. He was diagnosed with hemophilia (a rare disorder in which the blood doesn't clot normally) even though there was no family history of bleeding disorders. The baby survived, but he developed acute severe anemia, which required two red blood cell transfusions. (Mense et al., 2018)
- A baby born at 38 weeks' gestation in the U.S. after an uncomplicated pregnancy developed unusually large bleeding after circumcision and was given several units of blood products. The patient was later diagnosed with a blood disorder called hemolytic uremic syndrome (HUS). He was discharged after two weeks with no mention of his condition beyond that time. (Ellington et al., 2017)
- A healthy baby in the U.S. was circumcised at 13 days of life using the Plastibell method. During a regular check-up at 34 days of life, the pediatrician noticed that the device had slipped to the base of the baby's penis. The case report documents a new technique of removing the ring using an umbilical cord clamp cutter. This baby was not harmed, but the report notes that movement of the Plastibell ring can potentially cause extensive tissue loss and death of cells in the glans penis. (Oshiro and Oshiro, 2017)
- Twins were born vaginally in the U.S. at 37 weeks' gestation and discharged without complications following circumcision with Plastibell devices. On day 5 of life, the parents brought in one of the twins with vomiting, diarrhea, and severe acute renal failure. His parents reported very little urine

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output over the last 24 hours. The Plastibell device was in place, however, the pediatric urologist noted a piece of tissue blocking the urinary opening. They moved the tissue and drained the bladder with a catheter. Tests revealed that the baby's bladder had ruptured from the device blocking urine output. The doctors operated on the baby's bladder and he recovered. The authors noted another report of bladder rupture after circumcision with the Plastibell device in a 5-year-old. (Dwyer et al., 2016)

- Two Danish boys (four weeks and four and a half months) experienced seizures and breathing problems as complications from local anesthesia used during circumcision. They both recovered with treatment. The authors stress that surgeons should be careful with calculating the maximum safe dose of local anesthesia for young children and should be prepared to treat complications. (Heiberg et al., 2015)
- A full-term healthy U.S. infant without a family history of bleeding disorders experienced prolonged bleeding after circumcision on day 1 of life. He was diagnosed with neonatal alloimmune thrombocytopenia (NAIT). He recovered with treatment and was discharged on day 3. This is another case of prolonged bleeding after circumcision presenting as the first symptom of an unknown bleeding disorder in the infant. (Baber et al., 2015)

Complications with newborn circumcision versus older male circumcision

Researchers who advocate for routine newborn circumcision point to infancy as the optimal time to circumcise. Morris et al. (2012), a staunch advocate of newborn circumcision, cites fewer complications with infants and points out that infant circumcisions are less expensive and can be done more quickly. In addition, the paper speculates that the wound heals faster in an infant, stitches are not required as often, and there is no need to take time off work or abstain from sex after the surgery. The authors go on to say, "A desirable feature of infant male circumcision is the surgical ease of performing a circumcision on an immobile newborn…facilitating the use of local anesthesia." However, those opposed to infant circumcision argue that the infant's immobility (due to being strapped into a restraining device, and being unable to defend itself) actually makes infant circumcision less desirable than circumcision on someone who can provide consent for the procedure.

Weiss et al. (2010) combined prospective studies and found that circumcisions done with children aged one or older are associated with more complications compared to newborn circumcision (6% versus 2%); however, many of the older boys in the studies were circumcised for medical reasons (unlike the newborns), and complications are more common after medically-indicated circumcisions. The three African randomized trials on adult circumcision and HIV found rates of complications ranging from 2% to 4%.

Critics of newborn circumcision argue that the absolute risk of complications is not very different between adults and newborns, so it's more ethical to wait until a man can decide for himself if he wants the procedure (Earp and Darby, 2017). In Africa, for example, those conducting well-funded public health campaigns to circumcise healthy men consider the rate of complications low enough to be acceptable.

Pain with circumcision

The surgical removal of the nerve-laden male prepuce is an invasive, painful procedure and requires pain treatment. Researchers have described that when there is inadequate pain treatment during circumcision, newborns can experience stress chemicals in the body, increased heart rate and breathing rate, decreased oxygen, skin turning red or blue, vomiting, increased crying, gagging/choking, and withdrawing (becoming less responsive to parents) (Brady-Fryer et al., 2004).

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In 2004, a Cochrane review and meta-analysis examined 35 randomized trials with nearly 2,000 newborns (Brady-Fryer et al., 2004). In these studies, researchers had compared pain treatments with placebo or no treatment, or compared two different pain treatments. Today, randomly assigning babies to no pain relief during a surgical procedure would not be considered ethical, although undertreating infant pain can still happen in practice. In these trials, researchers used a variety of ways to measure the baby's pain, including crying time, facial expression, sweating palms, heart rate, breathing rate, blood pressure, and levels of stress chemicals in blood or saliva. They found that *dorsal penile nerve block*, which involves injecting anesthetic to the base of the penis, was the most effective treatment. Anesthetic creams applied to the penis were more effective than placebo or no treatment, but less effective than the penile nerve block. None of the treatment options completely prevented noticeable pain in response to circumcision.

A systematic review by Perera et al. (2010) included two randomized trials that compared pain responses *after* routine newborn circumcision. One of the studies reported on the effect that circumcision had on a baby's subsequent pain response at vaccination (Taddio et al., 1997). This study included babies who were randomly assigned to an anesthetic cream (29 babies) or a placebo cream/no pain treatment (26 babies) during circumcision. The researchers also included 32 babies whose parents had chosen not to circumcise, to serve as a comparison group. A research assistant who was trained to measure infant pain response (facial expressions, crying) rated videotapes of the babies receiving vaccinations. The assistant was blinded to the baby's circumcision status. The infants who were circumcised without pain treatment showed the strongest pain responses to routine vaccinations during the first six months of life, followed by the babies who were circumcised with anesthetic cream. The intact babies showed the least amount of pain response to vaccination. The researchers theorized that painful events in early life (such as circumcision) may have long-lasting consequences on the child's behavior, and that the increased pain response to vaccination may represent an infant version of post-traumatic stress disorder.

The other randomized trial in the systematic review randomly assigned 29 babies to circumcision with acetaminophen (Tylenol) and 31 babies to circumcision with a placebo (no pain treatment) (Macke, 2001). The babies were all healthy, full-term and had experienced a spontaneous vaginal birth. A blinded observer reported increased pain response (crying and heart rate) in both groups with the circumcision, with no difference between groups. It was clear that both placebo and Tylenol were not effective in controlling pain during the operation. The babies in both groups experienced an increase in their heart rate (beats per minute) from about 130 during the first diaper change to 165 with the pain of circumcision. Similarly, babies in both groups cried on average for 70% of the procedure. However, after the circumcision, the treated babies showed significantly less pain response during a diaper change and were more alert and responsive to their mothers during a feeding session. The mothers of the treated babies were more responsive in return (more eye contact, changing expression) compared to the mothers of the untreated, withdrawn babies. The authors concluded that mother-infant interactions are reciprocal and may be harmed by untreated pain.

Given the findings of the previous study, it's possible that pain after circumcision could interfere with early breastfeeding. However, at this time, there is no strong evidence linking modern routine circumcisions to problems with breastfeeding. A large retrospective study in California found no significant link between the timing of newborn circumcision and the rate of exclusive breastfeeding over the first two weeks of life (Mondzelewski et al., 2016). Another large retrospective study from New Zealand found that rates of breastfeeding were similar for circumcised and intact children (Fergusson et al., 2008). More research is needed, especially from prospective studies that follow intact and circumcised infants from the first feeding after birth over many months to compare measures

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of breastfeeding between groups. It's possible that circumcision harms infant feeding when pain is vastly undertreated, as was seen in one small study of infants circumcised with Tylenol or placebo only (Howard et al., 1994), but has less of an impact when effective pain medications are used.

Amazingly, the fact that babies can experience pain like older children and adults is a relatively new idea. It wasn't until the late 1980s that doctors started routinely giving babies pain treatment during procedures—during newborn circumcision, and even during major surgery (de Lima et al., 1996). Therefore, if a man was circumcised as a newborn in the U.S. before the mid 1980s, he probably did not receive any pain medication at all during the procedure.

Now, practice guidelines recommend that all infants have pain medication during and after surgical procedures (AAP, 2016). According to the American Academy of Pediatrics (AAP), exposure to repeated painful events early in life is known to cause short- and long-term harm. The AAP therefore recommends that every health care facility caring for newborns should implement a pain-prevention program that includes strategies for minimizing the number of painful procedures performed. Ronald Goldman, Ph.D., is a critic of newborn circumcision and well-known psychological researcher in this field. He believes circumcision trauma in early life can lead to long-term psychological effects (https://bit.ly/32PA67D). He and other critics of newborn circumcision propose that since it is a painful surgery that is not medically necessary, it is a clear candidate for a procedure that should be used less frequently (Earp et al., 2018).

The bottom line is that although pain treatments are available, no treatment can completely eliminate pain during the procedure, and pain may continue afterwards as the wound heals.

Meatal stenosis

In males, the urethra is the tube that carries urine and semen out of the body. Around 7% to 20% of circumcised males develop a condition called meatal stenosis, which is where the opening of the urethra becomes abnormally narrow (Van Howe, 2006; Koenig et al., 2019). Circumcision is considered the most important cause of meatal stenosis; this condition rarely (if ever) occurs among intact males. The theory is that circumcision severs the major source of blood flow to the urethral opening and this lack of blood flow results in scarring and thus narrowing of the urethra. Another theory is that scarring results from exposure to irritants (e.g., urine and feces in the diaper). In some cases, the narrowing of the urethra can make it difficult for a boy to urinate and may cause his bladder to swell and not empty completely. There is some evidence that the risk can be reduced for circumcised boys by daily application of petroleum jelly to the glans penis for three months following circumcision (Mondal et al., 2013).

Meatal stenosis is thought to be one of the more common, under-reported complications from circumcision, since many cases with no or only mild symptoms may remain undiagnosed for a long time after the circumcision (Dave et al., 2017). According to UpToDate guidance for clinicians, doctors typically diagnose meatal stenosis in children during toilet training when parents report that a boy seems to be having trouble directing his urine stream into the toilet (Yiee et al., 2018). Boys with meatal stenosis will often push their penis between their legs to try and direct an upward or difficult-to-aim stream of urine into the toilet. Other signs are when boys take a long time to empty the bladder with a small stream of urine, or if the *meatus* (opening) appears visibly scarred and has a small diameter. Some boys with meatal stenosis will present with abdominal pain from swollen bladders.

In 2017, a systematic review and meta-analysis by Morris and Krieger included 27 observational studies with 350 cases of meatal stenosis in over 1.4 million males. They found that the risk of meatal stenosis in circumcised males was about 0.7%, or just under 1 in 100 circumcised males.

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Other researchers think that figure underestimates the true rate of meatal stenosis, as it is a delayed complication, typically surfacing three to five years after the procedure, and 99% of the data in the Morris and Krieger study was collected within six months following the circumcision (Van Howe, 2018). The largest study with long-term follow-up included over 1,000 circumcised boys in the U.S. and found a rate of meatal stenosis with symptoms in 7.3% of the boys over three years of age (Van Howe, 2006). Another study (Joudi et al., 2011) found that meatal stenosis might occur in up to 20% of circumcised boys when it is strictly defined as a meatal diameter of less than 5 French (a way to measure sizes of catheters); however, simply having a narrow meatal diameter may not be clinically relevant if the boy is not experiencing symptoms.

Loss of sexual function and sensitivity

The role of the male prepuce in sensation and sexual function is a subject of ongoing debate. It's well agreed upon that the prepuce has sensory nerves that are completely removed during circumcision. However, the main question is whether this loss of sensation actually leads to a decrease in a man's sexual pleasure later in life (Dave et al., 2017). In the U.K., the National Health Service (NHS) informs parents that the main risk of circumcision is reduced sensation or a permanent change in the sensitivity of their child's penis (NHS, 2018). They go on to say that circumcision shouldn't affect the child's ability to have a fulfilling sex life in the future, but that the loss of sensation is one of the reasons why they only recommend circumcision for medical problems.

In the U.S., recent guidelines from the Centers for Disease Control minimize the effect of sensation loss with circumcision (CDC, 2018). They say that on average, adult men who undergo circumcision generally report minimal or no change in sexual satisfaction or function. However, they do caution that those who enjoy the sensation of the prepuce during sexual relations will no longer experience that sensation.

The most recent meta-analysis on this topic included 12 studies (including two RCTs of adult male circumcision) with over 20,000 men (Yang et al., 2018). They only included studies that looked at premature ejaculation by circumcision status, but many of these studies also examined other sexual impacts of circumcision. Overall, the meta-analysis concluded that circumcision has no statistically significant impact on premature ejaculation or difficulty of orgasm. The circumcised men had a longer time from insertion to ejaculation, less erectile dysfunction, and less pain during sex. However, the authors explained that there were probably untreated prepuce-related problems in the intact men that caused pain during sex and may have contributed to these outcomes.

We found two studies that measured sensation of the penis—including the male prepuce—in sexually healthy men who were either circumcised as newborns or intact (Sorrells et al., 2007; Bossio et al., 2016).

The Sorrells et al. study assessed fine touch sensitivity of 19 locations on the penis. Participants included 91 circumcised men and 68 intact men. The region most sensitive to fine touch was the prepuce of intact men and the circumcision scar on the underside of the penis of circumcised men. They concluded that the most sensitive regions of the penis are those removed by circumcision—five locations on the intact penis that are removed during circumcision were more sensitive to fine-touch pressure than the most sensitive location of circumcised men (the scar on the underside of the penis). The highly sensitive nature of the prepuce is due to specialized nerves for fine touch sensation, such as *Meissner's corpuscles* (https://bit.ly/2K4onJM), which are also found in the fingertips (Cold and Taylor, 1999). They give that tickling sensation when you flex your hands and very lightly rub your fingertips together.

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Like Sorrells, Bossio et al. (2016) also found that the male prepuce is the part of the penis most sensitive to fine touch pressure. The prepuce was significantly more sensitive than any other site on the intact or circumcised male penis. However, in addition to fine touch pressure, Bossio also examined sensation to touch-pain, heat-pain, and warmth detection in 30 circumcised and 32 intact men. Pain thresholds (from touch or heat) were not statistically different between circumcised and intact men. When the prepuce of intact men was compared to the glans penis and the shaft of both intact and circumcised men, it was more sensitive to warmth than the glans penis but not the shaft of the penis. The authors speculate that the nerve fibers activated by pain and warmth are more linked to sexual pleasure than those activated by fine touch pressure. So, the two studies agree that the male prepuce is the most sensitive to fine touch pressure, but they disagree about how relevant they think this sensation is for sexual pleasure.

One large survey on penile sensitivity by circumcision status was conducted in Belgium on 1,059 intact and 310 circumcised men (mostly circumcised in childhood) (Bronselaer et al., 2013). Overall, the two groups significantly differed in their experience of sexual pleasure (greater among intact men) and discomfort/pain (greater among circumcised men). The authors concluded that circumcision led to a decrease in sensitivity, decreased sexual pleasure, lower orgasm intensity and more difficulty achieving orgasm, and more uncomfortable sensations (i.e. numbness, tingling).

Taylor et al. (1996) studied the genitals of 22 adult men after autopsy. He postulated that the 'ridged band,' or the band of pleated tissue that gathers behind an intact man's glans during erection, is especially important for sensation because it contains such a dense amount of Meissner's corpuscles. Tissue that is especially sensitive to sexual stimulation is called *erogenous* tissue.

We found one recent study on satisfaction with circumcision status. Bossio and Pukall (2018) surveyed 811 men from around the globe about their attitudes towards their circumcision status, body image, and sexual functioning. Of the men, 367 were circumcised as newborns, 107 were circumcised in childhood, 47 were circumcised in adulthood, and 290 were intact. Men who were circumcised as adults and intact men reported higher satisfaction with their status compared with those who were circumcised in infancy or childhood. Lower *satisfaction* with one's status (but not one's actual status) was linked to worse body image and sexual functioning. The authors speculate that choice plays an important role in how men feel about their circumcision status. The findings may also reflect how individuals are more prone to defend the consequences of their own decisions. Men's attitudes were highly variable within this sample, suggesting that men develop wide-ranging feelings about their circumcision status (which can't be predicted).

The bottom line is that circumcision does reduce penile sensitivity by removing sensitive tissue. Circumcision also changes sexual function—it removes the ability of the shaft to glide within its own naturally lubricated sleeve of skin. Furthermore, any sexual acts that involve the prepuce are necessarily precluded by its removal (Earp, 2016b).

However, the research evidence is conflicting on how important this loss of sensation and sexual function is to the sexual lives of men, and outcomes appear to be influenced by how individual men interpret their circumcision status. There is a lack of data on this topic that measures different types of sensations by circumcision status and collects qualitative (interview) data from men and their partners about which sensations are most relevant to their sexual pleasure. Future studies must distinguish men who were circumcised in infancy or early childhood from those circumcised as adults, since the timing could have different effects on penile sensation. In addition, it is important to consider that the value of different sexual sensations is highly individualized, so a favored sensation to one man may not be seen as valuable to other men in a study (Earp, 2016b).

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Discussion of the evidence in light of ethics and human rights

For this section of our review, we examined 86 articles in English on 'circumcision' and 'ethics' that were published within the last 10 years. Most of the search results focused on the ethics of female circumcision/female genital cutting/female genital mutilation and some focused on the rights of children born into religions that practice circumcision.

For the purposes of this Signature Article, we narrowed the results down to the 21 articles that discussed routine male newborn circumcision and grouped them according to whether the author's viewpoint suggested they found the practice to be unethical or ethically justified. Of these, 13 papers portrayed routine newborn male circumcision as unethical, 5 papers made the case that it is ethically justified, and 3 papers discussed both viewpoints. We summarized the main points from these papers below to show their diverse views on how circumcision relates to the bioethics principles that we introduced at the beginning of this article: respect for autonomy, nonmaleficence (do no harm), beneficence (do good), and justice.

View that routine newborn male circumcision is not ethical

The papers on ethics that we found opposing routine male infant circumcision came from authors in the U.S. (5), Germany (3), Australia (3), Italy (1), and Israel (1).

The majority view in recent bioethics research is that routine newborn male circumcision is not ethical because:

- Children have a basic right to bodily integrity
- It is an irreversible surgery on healthy minors who cannot give consent and parents do not have the authority to limit the infant's future right to provide his own fully informed consent to the procedure
- It causes unnecessary pain and trauma during the surgery and suffering as the wound heals
- There are both immediate post-surgical risks, as well as unknown risks beyond the immediate post-surgical period, which together may outweigh the benefits
- It deprives the male of tissue that naturally protects the glans and urinary opening
- It prohibits any sexual functions and sensations that involve the prepuce (i.e. the feeling intact men get from moving within their own sleeve of skin) and prevents any sensations transmitted by the missing nerve endings
- There are less invasive and more effective preventions and treatments available for many conditions it addresses (for example, condoms for HIV prevention and oral antibiotics to treat UTIs)
- There is a *double standard* (https://bit.ly/2Y7hmlB)—a rule that is unfairly applied to one group but not another—since society would consider it unethical to routinely remove healthy tissue from female infants' genitals even if there was evidence of health benefits. Today, there are large international efforts (with significant U.S. involvement) that aim to "protect all non-consenting persons, regardless of sex or gender, from medically unnecessary genital cutting" (The Brussels Collaboration on Bodily Integrity, 2019).

On this last point, we found frequent comparison of male circumcision and female genital cutting in the ethics literature (Earp, 2015; Johnsdotter, 2017). It would be impossible to share the main ethical argument around bodily integrity from our literature search without some discussion of this comparison.

Some researchers used the term "male genital mutilation" in place of male circumcision. But others find this comparison and choice of words extremely offensive. The language or terms people use to discuss genital surgery often reveals their beliefs about the ethics of the practice. For example, people who

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support female genital cutting usually prefer the term "female circumcision" since "mutilation" implies that the practice is wrong (Shahvisi and Earp, 2019; Earp, 2016a).

According to the World Health Organization (WHO), female genital cutting (FGC) is an ancient practice that is still common in parts of Africa and in some countries in the Middle East and Asia, as well as among migrants from these areas. Prevalence rates (https://bit.ly/2DRUlqM) are over 80% in eight African countries. It is usually conducted by older women in the communities on young girls between infancy and 15 years of age. The WHO says that reasons for the practice vary, but the most commonly cited reasons are because it is socially normal, beliefs that some types of FGC will protect virginity before marriage, the desire to reduce a woman's sexual drive, and cultural ideals of femininity, cleanliness, and beauty.

Some Islamic communities that practice FGC believe that it is a part of their faith. For example, in Malaysia, an interview study found that 99% of participants had undergone FGC and 88% believed that it was compulsory in Islam (Rashid and Iguchi, 2019). According to the people interviewed, the girls' genitals must be scratched to draw out a single drop of blood in order to fulfill the ritual. However, FGC is not mentioned in the Qur'an and many scholars refute the view that it is an Islamic religious practice.

The WHO classifies FGC into four major types (not classified by order of severity). Type 3, often referred to as *infibulation*, involves narrowing the vaginal opening with or without removal of the external part of the clitoris. Infibulation accounts for about 10% of all FGC and is the most severe form of FGC, with devastating health consequences. Infibulation causes many health problems including sexual pain, increased risk of complications during childbirth, menstrual problems, and urinary problems.

The other types of FGC range in severity. Type 4 includes any injury to the female genitalia for non-medical purposes, e.g. pricking, piercing, or scratching tissue. In some cases (Type 1a), FGC involves removal of the female prepuce, or clitoral hood (hoodectomy or clitoral unhooding).

Every type of female genital cutting is recognized internationally as a violation of the human rights of girls and women, even when it does not remove any tissue (i.e. a "prick") and even when it is "medicalized," or performed by health care providers in a clinical setting with anesthetics.

There are no known health benefits from FGC and significant harms. Researchers are not looking for any evidence of health benefits (a reduced risk of infection from removing the labia, for example) because it is not considered ethical to do so (Earp, 2017; Earp et al., 2017).

Of the papers that portrayed male circumcision as unethical, 12 out of 13 authors compared male circumcision to female genital cutting in such a way as to suggest that both practices are unethical. Even though some types of FGC are much more severe than male circumcision, the authors shared a view that all people have a common right to physical integrity, regardless of sex or gender, and regardless of the degree of cutting. One author called it a "moral hypocrisy or intellectual inconsistency" that there is total protection for females but no such protection for males, and claimed that people in the U.S. show a cultural bias favoring Western cultural practices over those of "other" cultures (Darby, 2016).

View that routine newborn male circumcision is ethical

The papers on ethics that we found supporting routine male infant circumcision as an ethically sound practice came from authors in the U.S. (3), Saudi Arabia (1), and Canada (1).

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Some of the reasons they gave for supporting the practice as ethical include:

- It confers a wide range of significant medical and public health benefits over a lifetime
- Its (known) benefits outweigh its (known) harms
- The procedure is minor and the risk of complications is low
- Injection of local anesthetic is safe and effective at reducing pain
- Autonomy is respected by allowing parents to decide in the best interests of their child
- Families have the right to practice their religious and cultural beliefs
- We live in a diverse society that must be tolerant of families who elect the procedure for cosmetic preference or family tradition/belonging
- Delaying the option until the age of consent misses some of the benefits of circumcision in early life (e.g., reduction in UTIs) and results in a higher rate of complications than when done in infancy

Please refer to the extensive sections above on the proposed medical benefits from circumcision for the basis of the view that routine newborn circumcision is a medically beneficial practice.

How does newborn male circumcision relate to the bioethics principles?

Autonomy in this case can be thought of as referring to the autonomy of the child or the autonomy of the child's parents. If we consider the autonomy of the child, non-therapeutic circumcision violates the principle of autonomy because infants cannot make informed decisions about their bodies. If we focus on the autonomy of the child's parents, then proxy consent is a way for them to exercise their autonomy to make medical decisions on behalf of their child. However, some ethicists argue that proxy consent is not valid for routine circumcision since it is not treatment for an existing medical problem. They argue that the ethical course of action would be to preserve the child's autonomy by leaving him intact, i.e. not removing part of his penis, and letting him decide for himself when he's older if he would like to modify his genitals.

The principle of *non-maleficence*, or "do no harm," dictates that a provider must not intentionally inflict harm on a patient. Some ethicists argue that circumcision violates this principle since it is an unnecessary surgery that causes injury to an otherwise healthy child and introduces the risk of surgical complications whether or not they occur (Svoboda, 2017). Others disagree and believe that circumcision results in a net benefit for the patient because of reduced risk of some health problems (Brady, 2016). However, there is an ethical distinction between a procedure that may be "medically beneficial" versus one that is clearly "medically necessary" (The Brussels Collaboration on Bodily Integrity, 2019). To further complicate matters, the health problems that circumcision may protect against can be prevented and/or treated through non-invasive means. Furthermore, some parents choose circumcision for social reasons, and in these cases the surgical procedure is done to the child more for cosmetic reasons or cultural ideals of cleanliness rather than out of health concerns. When children have actual medical problems that require surgical intervention, parents usually have the authority to decide what is necessary (what is for the greater good of the child). However, it's a different ethical situation when the child is healthy and not experiencing any medical problems.

Beneficence means "do good." When applied to non-therapeutic circumcision, this means that the benefits from the procedure should clearly outweigh its harms. Some researchers and medical groups in the U.S. believe they do. But, as we will discuss, the majority of medical groups that have issued practice guidelines on this topic have not found that the benefits outweigh the harms. This is especially true considering that the harms are largely unknown and it is difficult to assign a value to keeping a healthy sexual organ intact. Not a single medical group in the world believes that the potential medical benefits justify recommending circumcision for all male infants.

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The principle of *justice* holds that individuals should not experience discrimination in health care on the basis of sex, race, religion, etc. Interestingly, the dominant view in U.S. culture holds that routine male and intersex genital surgery is normal, appropriate, and even beneficial during infancy, but procedures to alter the female genitals—no matter how minor, and regardless of the reason—is foreign and a horrendous violation of a young girl's right to bodily integrity.

Brian Earp, Associate Director of the Yale-Hastings Program in Ethics and Health Policy at Yale University and The Hastings Center, explains his view that male circumcision of minors is so familiar in U.S. culture that it was "grandfathered in" to be perceived as an ethically sound practice, whereas new proposals to prevent future medical problems by removing tissue from healthy infants would never get ethical approval today.

Practice guidelines

There is wide disagreement among professional organizations in different countries about the benefits, risks, and ethics of circumcision—although all professional organizations that have studied the issue agree that circumcision should *not* be recommended for *all* newborns.

Among the rest of the world, the U.S. stands alone in terms of widespread professional preference for non-religious circumcision. For instance, the American Academy of Pediatrics' position statement (AAP, 2012) on newborn circumcision (now expired) concluded "the health benefits of newborn male circumcision outweigh the risks; furthermore, the benefits of newborn male circumcision justify access to this procedure for families who choose it."

However, the AAP adds, "the true incidence of complications after newborn circumcision is unknown, in part due to differing definitions of 'complication' and differing standards for determining the timing of when a complication has occurred (i.e., early or late)." They also say that "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."

Physicians from over a dozen countries (38 co-authors) published a rebuttal to the AAP statement in the *Pediatrics* journal, arguing that cultural bias can cause people from a circumcising nation to interpret the same evidence differently from non-circumcising nations.

The AAP opted not to reaffirm or revise their statement when it expired at the five-year mark, and has not released a statement since then.

Professional statements in the U.S. appear to be highly influenced by U.S. culture. For example:

- The American Academy of Family Physicians (2018) policy (https://bit.ly/2S1abEk) stated that the potential health benefits from circumcision justify it being a covered medical service by third-party payers, and that it should be an available service for parents who desire it. They recognize in their statement that the decision to circumcise a newborn is affected by parents' values and beliefs.
- The Centers for Disease Control's 2018 recommendations (https://bit.ly/2LG1v6C) stated that health care providers should counsel male patients and parents about the risks and benefits of circumcision. This counseling, they say, can include discussions of social, cultural, ethical, and religious factors. The CDC cited the AAP conclusion that the benefits of newborn circumcision outweigh the risks.
- The American Urological Association (2017) published a policy (https://bit.ly/32SGgnK) stating that there are both benefits and risks, and circumcision should be based on parental preference.

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In addition to the medical benefits and risks, they state that the ethnic, cultural, religious and individual preferences of the parents should be considered.

- The American College of Nurse Midwives (2017) position statement (https://bit.ly/2SHewxx) recognizes that midwives may provide newborn male circumcision as part of an expanded scope of practice. They affirm that the procedure should not be routinely recommended but they believe it should be considered on an individual basis (i.e. according to the parents' preferences).
- The American College of Obstetricians and Gynecologists published a patient education brochure (https://bit.ly/2FkIPlQ) in 2017. They describe male newborn circumcision as an elective surgical procedure and state that it is the parents' choice whether or not to have their son's penis circumcised.
- It's interesting to read U. S. professional statements on male circumcision and female genital cutting side by side to see how organizations view these as distinctly different practices. ACOG, AAFP, and ACNM all have position statements on female genital cutting. For example, ACNM affirms that midwives should not perform any type of genital cutting or pricking on females. It is their position that this would be "a gender-based human rights violation that threatens the basic rights of girls and women, including their rights to health, life, physical and sexual integrity, human dignity, self-determination, and freedom from torture, violence, and bodily harm."

Outside of the U.S., professional organizations have issued statements on male circumcision even though circumcisions are rarely performed for non-religious reasons in their countries:

- The National Health Service (https://bit.ly/32S3wST) in the U.K. (2018) says that it's rare for circumcision to be recommended for medical reasons in boys, because other less invasive and less risky treatments are usually available. As we mentioned, they cite the main risk of circumcision to be reduced sensation or a permanent change in the sensitivity of the child's penis.
- The Canadian Pediatric Society (https://bit.ly/2KJCXFj) (2018) states that they do not recommend routine newborn circumcision and that the ratio of risks to benefits is closely balanced. They say that it is a contentious issue in Canada, and most provinces only give parents the authority to order procedures that are medically necessary on behalf of minors. If a procedure is not medically necessary, the intervention should be deferred until the individual concerned is able to make their own choices. With newborn circumcision, medical necessity has not been established, although they state there are health benefits.
- The Canadian Urological Association (https://bit.ly/30P7rhg) (2017) evaluated the evidence on circumcision with the GRADE system, and we have included their assessment of the evidence in this article whenever available. Overall, they concluded that routine newborn circumcision is not medically justified.
- The Royal Australasian College of Physicians (https://bit.ly/2B3WWtX) (2010) says that routine infant circumcision is not recommended in Australia and New Zealand, although it is legal and generally considered an ethical procedure. However, they include that "informed parental consent should include the possibility that the ethical principle of autonomy may be better fulfilled by deferring the circumcision to adolescence with the young man consenting on his own behalf."
- The British Medical Association (https://bit.ly/2y9CUyD) (2019) cites "a wide spectrum of views" within their membership and "significant disagreement" about whether routine male circumcision is a beneficial, neutral or harmful procedure, and whether it should ever be done on a minor. The guidance suggests that doctors inform parents who are seeking circumcision for their son in the

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belief that it confers health benefits of "the lack of consensus amongst the profession over such benefits, and how great any potential benefits and harms are." When circumcision is done to treat medical problems, they state that the ethical course of action is to try to treat the problems with less invasive methods before resorting to surgery. Interestingly, they say that parental preference alone does not constitute sufficient grounds for performing newborn male circumcision. "It is the parents' responsibility to explain and justify requests for circumcision, in terms of the individual factors in relation to a particular child's best interests." In addition, doctors should only perform circumcisions on children if they can document in the medical record their reasons for believing it to be in the child's best interest, and doctors can refuse to perform a circumcision if they do not believe it is in the overall best interest of the child. *

* On the subject of refusing to perform circumcision, Doctors Opposing Circumcision (https://bit.ly/2JRHzM7) provides free legal advice to any medical professional struggling with whether or how to assert conscientious objection status for circumcision.

As you can see from this sampling of professional recommendations, the rest of the international community stands apart from the more favorable position on circumcision seen in the U.S.

In general, outside the U.S., it is thought that, although parents' preferences should be honored, the procedure does not offer obvious benefits over risks, so it should not be encouraged. To be clear, professional associations in the U.S. also do not consider circumcision to be medically necessary. However, these organizations are unique in promoting the practice as having more benefits than risks, and providers in the U.S. are unique in that they routinely offer circumcision to the parents of every male infant born in a hospital setting.

It's worth mentioning that the AAP task force did not follow objective criteria for assessing risks and benefits. In a commentary published in *Pediatrics*, Andrew Freedman (former AAP task force member) explains his view that parents choose circumcision for a wide variety of non-medical reasons (e.g., religion, culture, cosmetic preferences, family tradition) and that physicians have no authority to judge these nonmedical reasons (Freedman, 2016). He says "protecting this option was not an idle concern at a time when there are serious efforts in both the United States and Europe to ban the procedure outright." So it appears that the AAP task force was at least partially motivated by a desire to keep circumcision available as a parental choice when it published its 2012 statement about "benefits and risks."

The Royal Dutch Medical Association (KNMG) in the Netherlands has one of the strongest statements opposing circumcision. They adopted the position (https://bit.ly/30VGRDa) (2010) that doctors should actively discourage circumcision because it is unethical. They even raise the possibility of making circumcision without a medical indication illegal in the future, but mentioned that a prohibition might lead to circumcisions happening in unsafe conditions.

On an interesting side note, in 2010, the American Academy of Pediatrics had similar concerns with regard to keeping all forms of female genital cutting illegal, which led them to suggest doctors could perform a ritual "nick" or "pinprick on girls' genitals" to keep their families from sending them overseas for an even more invasive procedure in less safe conditions. They withdrew (https://cnn.it/2SE5ocW) this policy on female genital cutting a month later after public backlash.

So, depending on where you live, care providers will discourage, encourage, or take more of a neutral stance on newborn male circumcision. Even within countries, individual doctors vary in whether they promote or discourage the procedure.

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As far as we are aware, no country has yet made the practice illegal, although its legality has been disputed. In Germany in 2012, a regional judge in Cologne ruled that circumcision is already illegal under German law because it violates a boy's right to bodily integrity, which is outside of the bounds of lawful parental discretion and therefore is physical assault (Merkel and Putzke, 2013). The judgment drew harsh criticism from Jewish and Muslim communities. Facing the heat, the German legislature responded by enacting a special new statute protecting male circumcision.

Most recently, Iceland introduced a bill in 2018 (https://bit.ly/2CSSLkJ) that proposed a penalty of up to six years in prison for anyone who "removes part or all of (a child's) sexual organs" for non-medical reasons. It was dismissed in parliament after religious leaders spoke against the bill and people raised the issue that no such bill protects intersex children from cosmetic surgery on their genitals without their consent. Denmark is also considering a ban (https://nyti.ms/2JOU1fw) on circumcising boys. In the U.S., a citizen's ballot initiative to ban the non-therapeutic circumcision of minors in the city of San Francisco (https://abcn.ws/2OeGqCu) received enough signatures to appear on the ballot but pressure from pro-circumcision forces resulted in a local judge removing the initiative from the ballot.

Whenever the issue of banning circumcision is raised, it ignites a fierce controversy over human rights and parental religious freedom. At the other extreme, no country has yet recommended *universal* circumcision, or circumcising all newborns for health reasons.

Conclusion

In the U.S. and around the world, routine newborn circumcision is considered "non-therapeutic" (https://bit.ly/2Y0CQjY) or not medically necessary, since it does not treat or cure any existing disease. Survey data show that parents' decisions regarding routine circumcision are highly influenced by social/cultural factors, such as whether the father was circumcised or whether they perceive it to be culturally desirable, and less so by beliefs in medical benefits. Parents in the U.S. may not realize that most men around the world are not circumcised, and that there has been a decline in the rate of male newborn circumcision in the U.S., which was at 58% when last reported in 2010.

Authors in the field strongly disagree on what the available evidence means for practice. A few researchers advocate for circumcision as an important health practice for all males (Morris et al., 2017), while other researchers and ethicists argue that it is not appropriate to use partial genital removal in newborn males as a public health measure (Frisch and Earp, 2018).

After an extensive review of the literature, we've concluded that there is **no compelling evidence to justify routine male infant circumcision on medical grounds**:

- Most of the evidence for risks and benefits is still highly disputed in the research, and the GRADE strength of the recommendation for practice is mostly *weak*
- There are zero randomized trials on routine male newborn circumcision to support the proposed benefits
- The evidence from randomized trials on benefits for HIV, HPV, and HSV comes only from adult male circumcision in African countries. This evidence cannot be applied to newborn male circumcisions, nor can it be generalized to lower risk populations (e.g., men in countries with lower rates of female to male HIV transmission, lower rates of HSV, and access to the HPV vaccine)
- There is extremely limited evidence on the extent of the harms of circumcision; however, some experts in ethics, law and medicine make the case that the procedure itself is the harm because it violates the child's bodily integrity without an urgent medical indication and without the possibility of obtaining their consent, so there is no need to prove other harms (The Brussels Collaboration on Bodily Integrity, 2019).

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Parents in the U.S. may be offered routine circumcision in the hospital without having complete information on the ethical debate, risks, limitations of the research on proposed benefits, or alternatives. When information is offered, it may present the AAP view that "the health benefits outweigh the risks" without a global context to show this view is unique to U.S. culture. There is little to no information provided on the historical reason for the cultural preference for routine circumcision (i.e., it was thought to prevent masturbation, sexual deviance, and promiscuity), the mounting ethical debate around circumcision, or non-invasive alternatives for preventing or treating health problems such as urinary tract infections.

We encourage parents and health care professionals to critically think about the practice of circumcision, especially in the U.S., where the majority of routine circumcisions are carried out due to social pressure to conform, not necessarily for medical benefit. It is our sincere hope that the information in this article leads to mutually respectful conversations between those with diverse perspectives on circumcision.

Resources

- For a fascinating look at the history of circumcision, read "*Circumcision: A History Of The World's Most Controversial Surgery*" by David Gollaher (2000).
- We recognize that circumcision is an emotionally charged topic. We talked all about how to discuss hard topics in episode 87 of the Evidence Based Birth® Podcast. The episode contains an interview with Cristen Pascucci, an expert in communications, all about 'How to Disagree on Birth Topics - Respectfully!'
  - Podcast (iOS) here (https://apple.co/2MnTEub)
  - Podcast (Android) here (https://bit.ly/2ylw9tw)
  - Please visit our FAQ page (evidencebasedbirth.com/circumcisionfaqs) for answers to common questions.

Questions for Discussion

- What surprised you most in reading this article?
- What did you think about the history of circumcision?
- What emotions did you feel while reading this article?
- Was it surprising to see how different countries vary in their rates of male circumcision and their professional statements on the practice?
- What are your thoughts on the ethics of routine newborn male circumcision?
- Do you think parents choosing circumcision are typically presented with all of the information about the potential risks and benefits, the limitations of the research, and the ethical debate? Why or why not?

Disclosure Statement

The authors endeavored to leave personal opinions out of this article on circumcision and highlight the wide-ranging voices of experts in the medical and bioethics literature. Nevertheless, they acknowledge that it is possible that personal biases may have influenced their review of the literature to some extent. As a safeguard against bias in evaluating the medical research, they reported the GRADE recommendations from the Canadian Urological Association whenever available. From an ethical perspective, although the authors are skeptical about non-therapeutic surgical procedures on children, they entered the bioethics literature search with an attitude of curiosity and a desire to learn. The article was sent for peer-review to a variety of experts in the field, including researchers, clinicians who perform circumcisions, and clinicians who do not perform circumcisions. The authors report no professional partnerships with pro-circumcision or anti-circumcision activist organizations.

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