The Royal Australasian
College of Physicians

CIRCUMCISION OF INFANT MALES

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EXECUTIVE SUMMARY

The Paediatrics & Child Health Division, The Royal Australasian College of Physicians (RACP) has prepared this statement on circumcision of infant boys for doctors and to assist parents who are considering having this procedure undertaken on their male children.

Circumcision of males has been undertaken for religious and cultural reasons for many thousands of years and it remains an important ritual in some religious and cultural groups. In Australia and New Zealand, the circumcision rate has fallen in recent years and it is estimated that currently 10-20% of newborn male infants are circumcised.

Recently there has been renewed debate regarding both the potential health benefits and the ethical and human rights issues relating to infant male circumcision.

Circumcision is generally a safe procedure but there are risks of minor complications and some rare but serious complications.

The most important conditions where benefits may result from circumcision are recurrent urinary tract infections in children; and Human Immunodeficiency Virus (HIV) plus some other sexually transmitted infections in adults from populations with a high prevalence of these conditions; cancer of the penis in men with a history of phimosis, and cancer of the cervix in women whose partners engage in sexual practices known to increase the risk of Human Papilloma Virus (HPV) infection. The protection against Sexually Transmitted Infections (STIs) and HIV is less clear-cut in Australia and New Zealand than in high prevalence countries.

Ethical and human rights concerns have been raised regarding elective infant male circumcision because it is recognised that the foreskin has a functional role, the operation is non-therapeutic and the infant is unable to consent.

After reviewing the currently available evidence, the RACP believes that the frequency of diseases modifiable by circumcision, the level of protection offered by circumcision and the complication rates of circumcision do not warrant routine infant circumcision in Australia and New Zealand. However it is reasonable for parents to weigh the benefits and risks of circumcision and to make the decision whether or not to circumcise their sons.

When parents request a circumcision for their child the medical attendant is obliged to provide accurate unbiased and up to date information on the risks and benefits of the procedure. Parental choice should be respected.

When the operation is to be performed it should be undertaken in a safe, child-friendly environment by an appropriately trained competent practitioner, capable of dealing with the complications, and using appropriate analgesia.

INTRODUCTION

The practice of circumcision in the male refers to the surgical removal of the foreskin of the penis. This policy relates to the implications of and indications for infant male circumcision. It does not relate to cases where there is a clear clinical need for intervention, nor directly to adult male circumcision. The policy is provided as a guide to professionals when assisting parents in decision-making, and as a resource for parents. The child's best interests are to be maintained at all times. The policy has been developed after a review and evaluation of the medical and scientific literature and evidence. The level and quality of the evidence utilised to come to the conclusions in this document is summarised in the text, according to the Scottish Intercollegiate Guidelines Network (SIGN) grading system for recommendations in evidence-based guidelines (Appendix 1).[1-3]

The decision to circumcise or not to circumcise involves weighing up potential harms and potential benefits. The potential benefits include connectedness for particular socio-cultural groups and decreased risk of some diseases. The potential harms include contravention of individual rights, loss of choice, loss of function, procedural and psychological complications.

ORIGINS & HISTORY

Knowledge of the origins of circumcision has been lost and is disputed.[4] Some time after it was first practised circumcision became an important ritual in the Jewish and Muslim faiths.[5] In the Jewish faith circumcision is typically undertaken on the eighth day of life, while in the Muslim tradition there is no clearly prescribed age.[6]

Circumcision or a ritual variant such as sub-incision (slitting of the ventral part of the prepuce and urethra) was widely, but not uniformly practised by Australian Aborigines, as a mark of transition from childhood to adulthood. [7, 8] Supra-incision (slitting of the dorsal prepuce) is believed to have been practised by Polynesian groups, but is thought to have been disappearing from Maori culture by the time of European contact with Maori peoples.[9, 10]

Medically sanctioned circumcision of male infants and boys arose in Britain and the United States in the late nineteenth century, initially for control of masturbation, with a range of benefits proposed for the procedure.[11-13] In Britain, circumcision was concentrated in middle and upper income groups and hence was not done in more than about 35 per cent of boys at its peak in the 1920s. Australia and New Zealand adopted circumcision after Britain, but the practice became more widespread and lasted longer. Routine circumcision progressively declined from British medical practice from the 1940s.[6] In Australia, circumcision peaked at 85% prevalence in the 1950s and has declined since to between 10 and 20%.[6, 14] A recent telephone survey reported that 32% of Australian men less than 30 years of age were circumcised.[15] In New Zealand, the rate has declined further.[16] Internationally, circumcision rates vary widely.[6, 17] In the United States approximately 65% of male infants are estimated to undergo circumcision, and approximately half this number in Canada.[6, 18] Circumcision is relatively uncommon in South America, Central America, Asia and most of Europe.[6] South Korea deserves mention.[19] Until the Korean War, circumcision was rare. Following the extended

occupation by US troops, about 50% of adolescent and adult males now choose circumcision. However, neonatal circumcision remains rare. Circumcision is performed after puberty and is seen as a choice to be made by young adult males.

ANATOMY OF THE FORESKIN

The foreskin is a fold of penile skin which overlaps the glans penis.[20] It first appears at eight weeks of fetal life and soon grows forward over the glans penis. By 16 weeks it covers the glans. At this stage the epidermis of the under-surface of the foreskin is continuous with the epidermis covering the glans. Both consist of squamous epithelium. The foreskin (prepuce) and glans penis enclose a potential cleft, the preputial sac. A preputial space is then formed by a process of desquamation, and the prepuce increasingly separates from the glans. At the time of birth this process is incomplete in the vast majority of boys, and the foreskin is non-retractable. Complete separation of the foreskin occurs in most boys by the time of puberty.[20]

FUNCTIONS OF THE FORESKIN

The foreskin has two main functions. Firstly it exists to protect the glans penis. Secondly the foreskin is a primary sensory part of the penis, containing some of the most sensitive areas of the penis.[21] The effects of circumcision on sexual sensation however are not clear, with reports of both enhanced and diminished sexual pleasure following the procedure in adults and little awareness of advantage or disadvantage in those circumcised in infancy.[22, 23] Two recent African studies reported no evidence of sexual disadvantage or dysfunction after adult circumcision.[24, 25] An Australian study of homosexual men reported that circumcision status did not affect their sexual experience.[26]

CARE OF THE FORESKIN

It is normal for the inner surface of the foreskin to be fused to the glans in newborn males. It is also normal for the foreskin to be too narrow to retract (phimosis). Loosening of the foreskin and separation from the glans occurs gradually during childhood. Normal manipulation in young boys plays a part in this process. By five years of age, most boys are able to retract their foreskin partially, though some adhesions are usually present. Most boys can fully retract their foreskin by puberty.[20] The foreskin requires no special care during infancy. It should be left alone. Attempts to forcibly retract it are painful, often injure the foreskin, and can lead to scarring and phimosis. The foreskin can be retracted while bathing, at any age during childhood, as far as is comfortable, by the boy or his parents. Some or all of the glans and the inner-surface of the foreskin will usually be visible and can be cleaned with water along with the rest of the body.

It is important for young adult males to ensure that they do not have phimosis, because this can go unrecognised and represents a risk factor for a number of disorders.

CONTRAINDICATIONS TO NEWBORN AND INFANT CIRCUMCISION

There are a small number of contraindications to newborn and infant circumcisions:

- Hypospadias and other congenital anomalies of the penis, e.g. epispadias
- Chordee (ventral angulation of the penis)
- Buried penis
- Sick and unstable infants
- Jaundice
- Personal or family history of a bleeding disorder
- Inadequate expertise and facilities.

TECHNIQUE OF CIRCUMCISION

There are many methods of circumcision used throughout the world. In general terms, the steps of circumcision involve:

- Freeing the foreskin from the glans
- Excising the foreskin
- Providing haemostasis
- Facilitating wound healing.

The methods can be categorised as:

a) Procedures used in the first few weeks of life

- Freehand, assisted with a guided cutting device e.g. Mogen clamp
- Assisted with a haemostatic device e.g. Plastibell, Gomco.[27, 28]

b) Proceduresused in older infants, children and adults

- Sleeve technique or assisted with a haemostatic device e.g. Plastibell, Gomco clamp.[27-29]

The procedures utilised in the first few weeks of life do not involve a formal surgical wound closure and depend for success on secondary wound healing. Those used subsequently involve a formal wound closure and therefore faster healing. Plastibell circumcision in the first few weeks of life has the advantage of being cheaper than a formal circumcision under general anaesthetic later in life.[30] (Level 2).

COMPLICATIONS OF CIRCUMCISION

Most complications of circumcision are minor, but some can be severe. The overall reported rate of complications after circumcision is variable, but depending on the situation in which it is performed and the precise definition of complication, the complication rate is generally believed to be between one and four percent.[17, 31, 32] A recent systematic review reported a median complication rate of 1.5%, with a range of 0-16%.[33] The most frequent acute problem is haemorrhage, which may indicate an underlying vitamin K deficiency or haemophilia. The risk of postoperative bleeding after Plastibell circumcision is reported to be as high as 3%, but is generally thought to occur at a rate of about

0.8%.[17, 28, 33] (Level 2++) More extensive complications including fistula formation have occasionally been reported after Plastibell use.[34] Infection is usually minor but uncommonly septicaemia and meningitis may occur and rarely these complications may lead to death, even in modern times in modern health systems.[17, 35]

Freehand circumcision and the various techniques have uncommonly resulted in penile amputation.[36-38] Mono-polar diathermy and adrenaline have also been reported to cause serious complications and should be used with caution.[36, 39] Inadvertent urethral damage and fistula formation and loss of excessive amounts of skin are other uncommon, acute complications.[40-42] Longer term complications include meatal stenosis, secondary phimosis, secondary chordee, cutaneous tags, poor cosmetic appearance and psychological trauma.[42, 43] Children with prominent pre-pubic fat may have a concealed penis following surgery, but this tends to resolve at puberty.[44] Some men strongly resent having been circumcised as infants.[45] There has been increasing interest in this problem, evidenced by the number of surgical and non-surgical techniques for recreation of the foreskin.[46, 47]

ANALGESIA

Infant circumcision without analgesia is unacceptable practice in Australia and New Zealand. Analgesic options include general anaesthesia, nerve block, topical anaesthetic and sucrose.

There are now consensus statements on the prevention and management of pain in the newborn which should be used to guide the clinical approach to analgesia for circumcision.[48-50] These statements emphasise that newborns may experience a greater sensitivity to pain compared with older age groups, such pain may have long-term consequences, and a lack of behavioural response (for example lack of crying) does not necessarily indicate absence of pain. In Sweden the law requires effective pain control for all circumcisions.[51] Painful neonatal experiences do have long-term consequences, even if not rooted in conscious memory. Taddio reported that circumcised boys had greater pain and cry during routine immunisation at 4-6 months of age than uncircumcised boys and pain scores were again higher if circumcision was unaccompanied by analgesia compared with those receiving topical anaesthesia.[52, 53] Sucrose was reported to be modestly effective in comparison with placebo in relieving minor procedural pain in neonates by Stevens.[54, 55] (Level 1+) However, Brady-Fryer did not note any benefit from sucrose or oral analgesia, possibly because of lack of evidence about the appropriate dose.[56] (Level 1+). Eutectic Mixture of Local Anesthetics (EMLA) was reported to be superior to placebo, however **dorsal penile nerve block (DPNB) is superior to both sucrose and EMLA and is considered the analgesia of choice for newborn circumcision**, but does require some special training for its effective application and avoidance of complications.[56-58] (Level 1+) Penile block and caudal block provide equal post-operative analgesia in older children undergoing circumcision under general anaesthesia.[59] (Level 1)

THE ROLE OF CIRCUMCISION IN PREVENTING DISEASE

Recent studies have found that circumcision may provide relative benefits including the potential prevention of UTIs (urinary tract infections) in infancy. Among adults in developing countries where the prevalence of sexually transmitted disease is high, circumcision reduces the risk of HIV/AIDS, syphilis and chancroid. In developed countries, circumcision may decrease the lifetime risk of penile cancer in men and cervical cancer in women among high-risk populations later in life. Despite these potential benefits, evidence must be placed in the context of study settings, local prevalence rates, timing of circumcision and cultural and religious beliefs. It should also be highlighted that circumcision provides only partial protection from the above conditions and there is a need for proper hygiene of the penis. Safe sexual practices are still essential and should not be replaced by circumcision.

Any potential benefits of circumcision must be weighed against the risks associated with circumcision.

URINARY TRACT INFECTION

Urinary tract infection (UTI) occurs in up to 4% of boys, predominately in the first year of life, and in 11% of girls.[60] UTI generally causes an acute febrile illness in boys, with 25% of boys with UTI hospitalised and receiving parenteral antibiotics. Pyelonephritis occurs in 80% of febrile infants and young boys with UTIs, and permanent kidney damage is present in about 5%. There is an association between UTIs and chronic renal disease but UTI, in the absence of congenital hypoplasia or dysplasia, has not been proven to result in chronic renal failure or hypertension. About 1 in 20,000 children with a history of UTI will develop end-stage kidney disease.[61]

UTI is more common among uncircumcised boys, especially those with underlying renal tract anomalies.[62, 63] A systematic review combining results from 12 randomised controlled trials, cohort studies, and case-control studies investigating the association of circumcision and UTI concluded that circumcision reduces the risk of UTI by 10-fold.[64] A more recent meta-analysis of 18 studies of the prevalence of UTI confirmed the greater rates of UTI in uncircumcised boys.[65] (Level 2++) Nevertheless, 111 circumcisions would be required to prevent one UTI because of the low baseline risk of UTI, and only boys at high risk of recurrent UTI would benefit from newborn circumcision. Recurrence of UTI has been found to occur in up to 35% of boys who are diagnosed with UTI in the first year of life; however, most repeated infections occur after one year of age (up to 12%) and boys with greater than two recurrent UTIs generally have underlying urinary tract abnormalities such as vesicoureteric reflux (VUR) and obstructive uropathy.[61, 64, 66, 67] In these cases, authors of the systematic review suggested that circumcision should be considered, as they estimated that only 11 circumcisions would be required in boys with recurrent UTI and four in boys with high grade VUR to prevent one UTI.[64] (Level 2++). Evidence of a benefit of circumcision in preventing urinary tract infection beyond early childhood is limited because the prevalence of UTI decreases quite dramatically in both circumcised and uncircumcised boys after the first month of life, because there are limited studies including older children and because the morbidity associated with UTI is less severe as children get older.[66]

SEXUALLY TRANSMITTED INFECTIONS

There has been conflicting evidence regarding the association between circumcision and sexually transmitted infections (STI) based on the type of research study, the specific STI and the population and setting in which the study was undertaken. Research findings from three population-based random surveys of men performed in Australia, the US and Britain have shown relatively consistent results and no difference in the proportion of circumcised and uncircumcised men reporting ever being diagnosed with any STI, bacterial STI, or viral STI; and no association between circumcision and gonorrhoea, genital chlamydia, syphilis, non-specific urethritis, genital herpes, genital warts, or trichomonas.[15, 68, 69] (Level 2+) A longitudinal study conducted among men up to 25 years of age in Christchurch, New Zealand reported that circumcision was protective against STI in general.[70] (Level 2+) These findings were at variance with a similar sized study of a cohort born in Dunedin, New Zealand five years earlier. In this study serological evidence of HSV2 infection (the commonest cause of genital herpes) to age 26 years and self reported STIs to age 32 were not different in the circumcised and uncircumcised.[71, 72] These findings suggest that circumcision status does not make a significant difference when the prevalence of STI is relatively low in the general population, as in Australia and New Zealand.

By contrast, a systematic review and meta-analysis of 26 research studies found circumcised men to have a reduced risk of syphilis and a lower association rate with genital herpes and chancroid. These studies were performed principally in African countries (20/26 studies) and among men at higher risk of STI (16/26) (Level 2-). An assessment and summary review of research studies of additional STI highlighted that male circumcision was protective against gonorrhoea, but that there was no association or inconclusive evidence of an effect of circumcision on genital herpes, genital warts and chlamydial, non-gonococcal or other types of urethritis.[73, 74] (Level 2-) Circumcision appears not to decrease the risk of STIs for men who have sex with men.[75]

Recent follow-up of adult circumcision in Africa has confirmed the protective effect of circumcision against acquisition of HPV and HSV infections.[76-79] (Level 1) There were lower rates of other infections in these studies as well, including chlamydia and trichomonas in some studies, but lack of evidence of protection in others.[80]

One study covering six non-African countries found that women with invasive cervical cancer who had circumcised partners were 6 times less likely to be seropositive for chlamydial infection than the partners of uncircumcised men.[81] (Level 2+) A recent African study demonstrated decreased rates of trichomonal infection, bacterial vaginosis and genital ulceration.[79, 82-84] (Level 1)

These findings indicate that adult circumcision confers a protective benefit against STIs to males, in high-risk populations.

HIV/AIDS

Three recent randomised trials conducted in South Africa, Uganda and Kenya, all countries with high prevalence of HIV, reported benefit of adult male circumcision in reducing HIV incidence in men, with circumcision halving the risk of adult males contracting HIV through heterosexual intercourse.[80, 85, 86] (Level 1+) Prior to these

results, a comprehensive assessment and systematic review of 37 observational studies undertaken in 2005 also showed a consistent association between male circumcision and prevention of HIV.[87, 88] A further systematic review has now been undertaken confirming these results.[89] (Level 1+) A population survey conducted in South Africa however failed to show benefit of circumcision in prevention of acquisition of HIV.[90] In addition there has been recent criticism of early cessation of clinical trials because of clear therapeutic benefit because of the tendency for this practice to over-emphasise benefit.[91] Nevertheless United Nations agencies emphasise that male circumcision should be considered as a part of a comprehensive prevention package in Africa, but that warn it does not provide complete protection against HIV.[92] (Level 1+) A systematic review published in 2008 was equivocal about the protective benefits of circumcision in protecting men who have sex with men from HIV transmission, but recommended further evaluation.[93] A Ugandan study showed that adult male circumcision did not reduce the acquisition of HIV by the female sexual partners of HIV infected, circumcised men, and suggested an increased risk of HIV acquisition in these women.[94] (Level 2)

It is still not clear that the findings from African studies, where the predominant mode of HIV transmission is heterosexual intercourse, can be extrapolated to Australia and New Zealand or other western countries, which have much lower rates of HIV infection and where the predominant mode of transmission is penile-anal sex among men.[93, 95] A recent Australian report provides some information on this issue. A longitudinal study of 1427 initially HIV-negative homosexual Australian men showed that in the 53 who later seroconverted circumcision status was not identified as a relevant factor.[75] However among those with a preference for the insertive role in anal intercourse, being circumcised was associated with a reduction in risk of HIV seroconversion.

HPV AND CERVICAL CANCER

Human papillomavirus (HPV) causes genital warts in men and women, and has been most commonly linked with cancer of the cervix, with up to 99% of cases attributed to infection by oncogenic HPV genotypes. HPV infection prevalence rates vary between 13% and 52% among men. Circumcision has been shown to protect against HPV infection in a number of studies.[96-98] (Level 2+) A case control study of cervical cancer limited to women who only ever had one male partner, found that overall there was no association between circumcision status and cervical cancer. When the analysis was limited to men who had five or more partners and sex with prostitutes, circumcision did appear to reduce cancer risk in these women.[96] (Level 2+)

The introduction of HPV vaccination is expected to dramatically reduce the incidence of HPV infection and cervical cancer. The role of these vaccines in decreasing risks of HPV infection is now well established.[99, 100] It has been acknowledged that effective implementation of the HPV vaccines may lead to the virtual eradication of cervical cancer.[101] There have been calls for the extension of immunisation programs to boys, to aid in containing their risks as well.[102, 103]

PENILE CANCER & PROSTATE CANCER

Cancer of the penis is extremely rare with an incidence of 1 in 250,000 Australian men.[104, 105] The increased risk of cancer of the penis in uncircumcised men is strongly associated with phimosis. A number of other factors including genital warts, smoking, past sexually transmitted diseases, sexual relationship outside marriage, multiple sexual partners, poor genital hygiene, previous genital conditions, penile rash (lasting longer than 1 month) or penile tear have all been identified as risk factors.[106-109] (Level 2+) A Danish study has shown decreasing prevalence of penile carcinoma from 1.15 per 100,000 person years in 1943-7 to 0.8 per 100,000 person years in 1988-90 and given the low and constant circumcision rates (2.3%), researchers have attributed the fall to improved sanitary installations and associated penile hygiene.[110]

Prostate cancer is the most common cancer diagnosed among Australian men with an incidence of 1 in 700.[104] Several reports have suggested a link between circumcision and a lower risk of prostate cancer.[111, 112] This association has not been consistent and more recent reviews have failed to confirm it.[113-115] (Level 2+)

SUMMARY OF PROTECTIVE BENEFITS OF CIRCUMCISION

Circumcision provides some benefit in preventing UTI in boys, particularly in those with underlying anatomical anomalies of the urogenital tract.

In low prevalence populations such as Australia and New Zealand circumcision does not provide significant protection against STIs and HIV, and is less effective than safe sex practices.

Circumcision decreases the risk of penile cancer probably by preventing phimosis. Circumcision may offer protection against development of cervical cancer in high risk populations, but is overshadowed as a protective measure by HPV vaccines. Circumcision has not been demonstrated to decrease the risks of prostate cancer.

LEGAL STATUS OF INFANT CIRCUMCISION

Circumcision of males is legal in Australia, New Zealand, the UK, USA and Canada. However, routine neonatal circumcision has been declared unlawful in South Africa, Sweden (except on religious grounds) and Finland.

New Zealand health practitioners who perform the procedure are covered by a number of laws and regulations. Circumcision is defined as a restricted activity under the Health Practitioners Competency Assurance Act *(2003).*[116] This means that the procedure is only to be performed by a medical practitioner. The legal acceptance in Australia & New Zealand is based on clearly established rights of parents to make decisions about medical treatment for their children. Society may however decide to place limitations on the scope of such parental choices if significant harm results from such choices.

A legal convention applying to the best interest of children is *Article 3* of the United Nations Convention on the Rights of the Child.[117] This international treaty has been ratified by Australia and New Zealand. Article 3 requires that, in all actions concerning children, the best interests of the child shall be the primary consideration. This is consistent with New Zealand and Australian legislation.

The British Medical Association's statement on the Law and Ethics of Male Circumcision states that "if it was shown that circumcision where there is no clinical need is prejudicial to a child's health and well being it is likely that a legal challenge on human rights ground would be successful. Indeed if damage to health was proven there may be obligations on the State to proscribe it".[118]

Some jurisdictions recommend that a decision to circumcise an infant should be agreed to by both parents.

ETHICAL CONSIDERATIONS OF NEONATAL CIRCUMCISION

Circumcision of infant males is a medical procedure. The ethics of this medical procedure fall within the ethical framework which applies to all medical procedures performed on children. This framework has 3 main principles: (1) Focus on the child, and their needs and interests; (2) minimisation of harm to the child (including prevention of avoidable/unnecessary harm); (3) recognition of the child's parents as the decision-makers for the child (on the basis that this best promotes the child's interests and well-being). The standard ethical position is that parents have the right and obligation to make medical decisions for their child – a right which can only be taken away from parents if their decision is significantly detrimental to the child. The standard ethical obligations of doctors are to act in the child's best interests, not cause excessive or avoidable suffering to a child, and provide the child's parents with information so that they are able to make a fully informed decision about their child's health care. A basic ethical requirement for performing a medical procedure on a child is that it can reasonably be expected to produce more benefits than burdens (in the long term) for the child.

Parental reasons for wanting infant male circumcision fall broadly into three categories: (1) health, (2) hygiene and appearance, and (3) religio-cultural reasons. Depending on their reasons, parents are aiming to secure different types of benefits for their child: physical health (medical) benefits, and/or psychosocial benefits of various kinds. The physical health benefits for a male of being circumcised (e.g. reduced risk of HIV infection) could largely be obtained by deferring circumcision to a much later age. The psychosocial benefits that parents seek, including full inclusion and participation in a religious or cultural community, or fitting in with family and social group norms, often cannot be obtained unless circumcision is done in the newborn period, as required by the religious or cultural customs.

Since circumcision involves physical risks which are undertaken for the sake of psychosocial benefits or debatable medical benefit to the child, the ethical question is whether it is ethically justifiable to allow parents to make this decision for their child – or is it a parental decision which ought to be overridden because it is detrimental to the interests of the child?

There are analogous situations where parents decide on medical procedures for a child that involve physical risk to the child, and where the intended benefits are primarily psychosocial. Cosmetic procedures are an obvious example – e.g. removal of skin lesions, pinning of ears, re-shaping of the skull. The psychosocial benefits (fitting in, not being subject to ridicule or exclusion) are often regarded as clearly worth the physical risks of the procedure. Obtaining bone marrow from one child for transplant to a sibling is another clear example of seeking psychosocial benefits (i.e. survival of a sibling) at the risk of physical distress and harm. Thus infant male circumcision is not ethically unique. Physical risk to children is sometimes tolerated for the sake of psychosocial benefit to them. For infant male circumcision, the issue is whether the risk/benefit ratio is within reasonable bounds, and hence able to be left to the discretion of parents.

Some of the risks of circumcision are low in frequency but high in impact (death, loss of penis); others are higher in frequency but much lower in impact (infection, which can be treated quickly and effectively, with no lasting ill-effects). Low impact risks, when they are readily correctable, do not carry great ethical significance. Evaluation of the significance of high-impact low-frequency risks is ethically contentious and variable between individuals. Some are more risk averse than others. However, a statistical risk of death is not generally regarded as an absolute barrier. Most patients and most people in general accept the very low probability of death as a risk they are willing to take in pursuit of medical benefits, lifestyle, recreation, employment, and so on. The benefits of circumcision (or disadvantages of non-circumcision) are not readily assessable by doctors (unless they happen to belong to the same religious or social community as the parents), as they depend upon the role of circumcision within that community.

This suggests that parents are in principle better placed than doctors to weigh up the risks and benefits of circumcision for male infants. It is ethically appropriate for the decision about infant male circumcision to be left in parents' hands, with the proviso that the decision may be overridden in individual cases where circumcision poses greater than average physical risks to the child (for example, because of concurrent morbidities). To deny parents the option to choose circumcision for their male infant would be to judge that it is clearly detrimental to a child's overall well being and interests in all circumstances.

Parents will need comprehensive, accurate information about the procedure (including options for how, when and by whom it might be performed), the risks, and how these could be minimised or managed if they occur. The information to be provided legitimately includes the opinion or recommendation of the doctor. Doctors who have a conscientious objection to performing infant male circumcision should make this known and refer parents to another doctor.

The option of leaving circumcision until later, when the boy is old enough to make a decision for himself does need to be raised with parents and considered. This option has recently been recommended by the Royal Dutch Medical Association.[119] The ethical merit of this option is that it seeks to respect the child's physical integrity, and capacity for autonomy by leaving the options open for him to make his own autonomous choice in the future. However, deferring the decision may not always be the best option. As noted earlier, the psychosocial benefits of circumcision (e.g. full inclusion in a religious community) may only be obtained if circumcision is done in infancy. Waiting until the boy is twelve years old or more (i.e. old enough to make his own decision) may mean losing benefits that circumcision was intended to produce.

Children may grow up to disagree with decisions that parents have made for them when they were young. This cannot always be prevented or avoided. Some decisions have to be made at the time. The later disagreement of the child does not show that the parents' decision at the time was unethical or wrong. Parents and doctors have to decide the basis of their own evaluations of benefits and burdens, being aware that they are making predictions and that nothing is guaranteed. A boy circumcised as an infant may deeply resent this when he grows older; he may want what he cannot have – not to have been circumcised. But it is also possible that a boy not circumcised as an infant (so that he can make his own decision later), may also deeply resent this. He may also want what he cannot now have – to have been circumcised as a baby.

SUMMARY OF LEGAL & ETHICAL ISSUES

In New Zealand and Australia at the present time, newborn and infant male circumcision is legal and generally considered an ethical procedure, if performed with informed parental consent and by a competent practitioner with provision of adequate analgesia. In the absence of evidence of risk of substantial harm, informed parental choice should be respected. 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. Neonatal male circumcisions may be performed by non-medical operators in Australia or by doctors who are not paediatric surgeons or urologists in Australia and New Zealand. The College should advocate for proper standards, training and supervision of all operators. Doctors advising parents have an ethical duty to present clear and unbiased information, and to direct parents to competent operators when they choose to proceed.

Appendix 1

Scottish Intercollegiate Guidelines Network (SIGN) grading system for recommendations in evidence based guidelines

Levels of evidence

1++ High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

1+ Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1 Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2++ High quality systematic reviews of case-control or cohort studies; *or* high quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal

2+ Well conducted case-control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal

2 Case -control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal

3 Non-analytic studies, e.g. case reports, case series

4 Expert opinion

Source: Harbour R, Miller J for the Scottish Intercollegiate Guidelines Network Grading Review Group. A new system for grading recommendations in evidence based guidelines. BMJ 2001;323:334-336. http://www.bmj.com/cgi/content/full/323/7308/334

Appendix 2

SUMMARY STATEMENTS OF OTHER PROFESSIONAL BODIES

Canadian Paediatric Society (CPS)[120]
Canadian Medical Association Journal 1996; 154(6): 769-780. A review of literature on circumcision was undertaken by the Fetus and Newborn Committee of the Canadian Paediatric Society, with extensive discussion over a 24 month period weighing up strength of evidence to assess whether the health of boys and men was improved by neonatal circumcision. It looked at cost-effectiveness in preventing penile problems and associated urinary tract conditions. The CPS concluded that while there is evidence that circumcision results in an approximately 12 fold reduction in the incidence of UTI during infancy, evaluation of alternative methods of preventing UTI in infancy is required. There is inadequate information to recommend circumcision as a public health measure to prevent HIV transmission and reduce the incidence of penile cancer. Such an even balance exists overall for the evidence of the benefits and harms of circumcision and as such, evidence does not support recommending circumcision routinely in newborns. The position of the CPS is unchanged from that taken in 1982. The final recommendation was that circumcision of newborns should not be routinely performed.

American Academy of Pediatrics (AAP)[121]
Task Force on Circumcision Policy Statement Pediatrics Vol 103(3) 686-93 Mar 1999
Over the past several decades, the AAP has published numerous policy statements on neonatal circumcision of the male infant. From its 1971 manual, to the 1975 and 1983 revisions, the Academy concluded that there was no absolute medical indication for routine circumcision. Due to new research on circumcision status and UTI and sexually transmitted disease, the Academy concluded that newborn male circumcision has potential medical benefits and advantages as well as disadvantages and risks. The Task Force decided it was therefore necessary to re-evaluate and analyse the recent research and literature, adopting an evidence-based approach. They concluded that where there are potential benefits and risks, and yet the procedure is not essential to the current well being of a child, the parents should determine what is in the best interest of the child. In order to assist all parents in making an informed choice, accurate and unbiased information should be given, as well as an opportunity to discuss this decision. Where the decision has been made to circumcise, procedural analgesia should be provided, and performed only on those infants who are stable and healthy. Existing scientific evidence, although demonstrating potential benefits is not sufficient to recommend routine neonatal circumcision.

Royal College of Surgeons of England[122]
Statement from the British Association of Paediatric Surgeons, the Royal College of Nursing, the Royal College of Paediatrics and Child Health, The Royal College of Surgeons of England and the Royal College of Anaesthetists. The natural history of separation of the foreskin - thereby making it retractable is a process in development at birth and continues up to 3 years of age in 90% of boys, although can be well into childhood for a small proportion. The process is spontaneous without the need for manipulation. The one absolute indication for circumcision is pathological phimosis (non-retractable foreskin) which is unusual before five years of age. Those performing the

procedure should be trained in children's surgery, and the operation must be undertaken in an operating theatre or similar premises suitable for surgical procedures. Parents need to be made fully aware of the implications of this non-reversible operation, and the child should receive adequate pain relief during and after the procedure.

British Medical Association (BMA)[118]
The law and ethics of male circumcision – guidance for doctors. The guidance outlines good practice and safeguards which the BMA believes doctors should follow. It cites the British Association of Paediatric Surgeons' conclusion that there is rarely a clinical indication for circumcision, and doctors should be aware of this and reassure parents accordingly. Non-therapeutic circumcision is discussed in "ritualistic" terms, including circumstances where performed for religious reasons, to incorporate a child into a community, or where some want their sons to be like their fathers. The association has no policy on these issues, and a spectrum of views exists as to whether it is beneficial, neutral, harmful or even superfluous. The Association accepts the difficulty in formulating a policy where there is a lack of unambiguously clear and consistent data, and medical harms or benefits have not been unequivocally proven. Legal and ethical considerations are discussed, and male circumcision is generally assumed to be lawful provided that it is performed competently; it is believed to be in the child's best interests; and there is valid consent. The medical evidence about the health impact of male infant circumcision remains equivocal. Circumcision for medical purposes, where medical research has shown other techniques to be at least as effective and less invasive would be unethical and inappropriate.

American Urological Association[123]
The American Urological Association, Inc.® (AUA) believes that neonatal circumcision has potential medical benefits and advantages as well as disadvantages and risks. Neonatal circumcision is generally a safe procedure when performed by an experienced operator. There are immediate risks to circumcision such as bleeding, infection and penile injury, as well as complications recognised later that may include buried penis, meatal stenosis, skin bridges, chordee and poor cosmetic appearance. Some of these complications may require surgical correction. Nevertheless, when performed on healthy newborn infants as an elective procedure, the incidence of serious complications is extremely low. The minor complications are reported to be three percent.

Properly performed neonatal circumcision prevents phimosis, paraphimosis and balanoposthitis, and is associated with a decreased incidence of cancer of the penis among U.S. males. In addition, there is a connection between the foreskin and urinary tract infections in the neonate. For the first three to six months of life, the incidence of urinary tract infections is at least ten times higher in uncircumcised than circumcised boys. Evidence associating neonatal circumcision with reduced incidence of sexually transmitted diseases is conflicting. Circumcision may be required in a small number of uncircumcised boys when phimosis, paraphimosis or recurrent balanoposthitis occur and may be requested for ethnic and cultural reasons after the newborn period. Circumcision in these children usually requires general anaesthesia.

When circumcision is being discussed with parents and informed consent obtained, medical benefits and risks, and ethnic, cultural, religious and individual preferences should be considered. The risks and disadvantages of circumcision are encountered early whereas the advantages and benefits are prospective.

Three studies from African nations published in 2005 and 2007 provide convincing evidence that circumcision reduces by 50-60% the risk of transmitting the human immunodeficiency virus (HIV) to HIV negative men through sexual contact with HIV positive females. While the results of studies in African nations may not necessarily be extrapolated to men in the United States at risk for HIV infection, the American Urological Association recommends that circumcision should be presented as an option for health benefits. Circumcision should not be offered as the only strategy for HIV risk reduction. Other methods of HIV risk reduction, including safe sexual practices, should be emphasised.

World Health Organization (WHO)[5]
There is compelling evidence that male circumcision reduces the risk of heterosexually acquired HIV infection in men by approximately 60%. Three randomised controlled trials have shown that male circumcision provided by well trained health professionals in properly equipped settings is safe. WHO/UNAIDS recommendations emphasise that male circumcision should be considered an efficacious intervention for HIV prevention in countries and regions with heterosexual epidemics, high HIV and low male circumcision prevalence. Male circumcision provides only partial protection, and therefore should be only one element of a comprehensive HIV prevention package which includes: the provision of HIV testing and counselling services; treatment for sexually transmitted infections; the promotion of safer sex practices; the provision of male and female condoms and promotion of their correct and consistent use.

WHO is leading UN Agencies (UNAIDS, UNICEF and UNFPA) to set norms and standards, develop policy and programme guidance for safe male circumcision services and support countries to develop male circumcision policies and strategies within the context of a comprehensive HIV prevention strategy.

Royal Dutch Medical Association (a.k.a KNMG)[120]
Non-Therapeutic Circumcision of Male Minors *states that non-therapeutic circumcision of male minors is a violation of children's rights to autonomy and physical integrity. Contrary to popular belief, circumcision can cause complications – bleeding, infection, urethral stricture and panic attacks are particularly common. KNMG is therefore urging a strong policy of deterrence. KNMG is calling upon doctors to actively and insistently inform parents who are considering the procedure of the absence of medical benefits and the danger of complications. Insofar as there are medical benefits it is reasonable to put off circumcision until the age at which such a risk is relevant and the boy himself can decide about the intervention, or opt for any available alternatives.*

Appendix 3

Glossary

Chordee: Curvature of the penis due to scar tissue or abnormality of the corpora cavernosa (the blood containing tissue that supports an erection).
Dorsal: The back or upper surface.
Epispadias: A rare malformation of the penis in which the urethra ends in an opening on the upper aspect (the dorsum) of the penis.
Glans: The sensitive tip or "head" of the penis.
HIV/AIDS: Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome.
Hypospadias: A relatively common abnormality of the penis that appears as an abnormal opening of the penis (meatus) on the under side of the penis rather than at the end.
Meatus: Opening or passage.
Paraphimosis: A condition in which the foreskin, once pulled back behind the glans penis, cannot be brought down to its original position.
Phimosis: Narrowing of the foreskin opening, leading to an inability to retract the foreskin over the glans penis.
Urethra: The membranous tube through the body of the penis, through which urine is discharged from the bladder.
Urethritis: Inflammation of the urethra caused by infection.
Ventral: The anterior or lower-surface.

REFERENCES

[1] Atkins D, Best D, Briss P, Eccles M, Falck Ytter Y, Flottorp S, et al. Grading quality of evidence and strength of recommendations. BMJ. 2004;328(7454):1490.

[2] Atkins D, Briss P, Eccles M, Flottorp S, Guyatt G, Harbour R, et al. Systems for grading the quality of evidence and the strength of recommendations II: Pilot study of a new system. BMC Health Services Research. 2005;5(1):25.

[3] Harbour R, Miller J. A New System For Grading Recommendations In Evidence Based Guidelines. BMJ: British Medical Journal. 2001;323(7308):334-6.

[4] Zampieri N, Pianezzola E, Zampieri C. Male circumcision through the ages: the role of tradition. Acta Pædiatrica. 2008;97(9):1305-7.

[5] WHO/UNAIDS. New data on male circumcision and HIV prevention: Policy and programme implications: conclusions and recommendations. UNAIDS. 2007.

[6] WHO/UNAIDS. Male circumcision: global trends and determinants of prevalence, safety and acceptability. 2008.

[7] Berndt R. Australian Aboriginal Religion: Leiden 1974.

[8] Pounder D. Ritual mutilation: Subincision of the penis among Australian Aborigines. American Journal of Forensic Medicine & Pathology. 1983;4(3):227-9.

[9] Buck P. The coming of the Maori New Plymouth New Zealand: Thomas Avery & Sons 1929.

[10] McGrath K, Young H. A review of circumcision in New Zealand. London and New York: Kluwer Academic and Plenum Press 2001.

[11] Barker-Benfield B. Sexual surgery in late-nineteenth-century America. Int J Health Serv. 1975;5(2):279-88.

[12] Darby R. A Surgical Temptation: The Demonization of the Foreskin and the Rise of Circumcision in Britain. Chicago: University of Chicago Press 2005.

[13] Hodges F. The anti- masturbation crusade in antebellum American medicine. J Sex Med. 2005;2:722-31.

[14] Spilsbury K, Semmens J, Wisniewski Z, Holman C. Routine circumcision practice in Western Australia. 1981-1999. ANZ J Surg. 2003;73:610-4.

[15] Richters J, Smith A, de Visser R, Grulich A, Rissel C. Circumcision in Australia: prevalence and effects on sexual health. Int J STD AIDS. 2006;17(8):547-54.

[16] Lawrenson R. Current practice of neonatal circumcision in the Waikato. N Z Med J. 1991;104(911):184-5.

[17] Cathcart P, Nuttall M, van der Meulen J, Emberton M, Kenny SE. Trends in paediatric circumcision and its complications in England between 1997 and 2003. British Journal of Surgery. 2006;93(7):885-90.

[18] Nelson CP, Dunn R, Wan J, Wei JT. The Increasing Incidence of Newborn Circumcision: Data from the Nationwide Inpatient Sample. The Journal of Urology. 2005;173(3):978-81.

[19] Pang M, Kim D. Extraordinarily high rates of male circumcision in South Korea: history and underlying causes. BJU International. 2002;89(1):48-54.

[20] Gairdner D. Fate of the Foreskin. Br Med J. 1949 December 24, 1949;2(4642):1433-7.

[21] Kim D, Pang MG. The effect of male circumcision on sexuality. BJU International. 2007;99(3):619-22.

[22] Fergusson D, Lawton J, Shannon F. Neonatal Circumcision and Penile Problems: An 8-Year Longitudinal Study. Pediatrics. 1988;81:537-41.

[23] Hammond T. A preliminary poll of men circumcised in infancy or childhood. BJU International. 1999;83(S1):85-92.
[24] Krieger JN, Mehta SD, Bailey RC, Agot K, Ndinya-Achola JO, Parker C, et al. Adult Male Circumcision: Effects on Sexual Function and Sexual Satisfaction in Kisumu, Kenya. Journal of Sexual Medicine. 2008;5(11):2610-22.
[25] Kigozi G, Watya S, Polis CB, Buwembo D, Kiggundu V, Wawer MJ, et al. The effect of male circumcision on sexual satisfaction and function, results from a randomized trial of male circumcision for human immunodeficiency virus prevention, Rakai, Uganda. BJU International. 2008;101(1):65-70.
[26] Mao L, Templeton DJ, Crawford J, Imrie J, Prestage GP, Grulich AE, et al. Does Circumcision Make a Difference to the Sexual Experience of Gay Men? Findings from the Health in Men (HIM) Cohort. Journal of Sexual Medicine. 2008;5(11):2557-61.
[27] Amir M, Raja M, Niaz W. Neonatal circumcision with Gomco clamp--a hospital-based retrospective study of 1000 cases. J Pak Med Assoc. 2000;50:224 - 7.
[28] Palit V, Menebhi D, Taylor I, Young M, Elmasry Y, Shah T. A unique service in UK delivering Plastibell (R) circumcision: review of 9-year results. Pediatric Surgery International. 2007;23:45 - 8.
[29] Jayanthi VR, Burns JE, Koff SA. Postneonatal Circumcision with Local Anesthesia: A cost-effective alternative. The Journal of Urology. 1999;161(4):1301-3.
[30] Schoen EJ, Colby CJ, To TT. Cost Analysis of Neonatal Circumcision in a Large Health Maintenance Organization. The Journal of Urology. 2006;175(3):1111-5.
[31] Metcalf T, Osborn L, Mariani E. Circumcision. A study of current practices. Clin Pediatr (Phila). 1983;22:575 - 9.
[32] Wiswell T, Geschke D. Risks from circumcision during the first month of life compared with those for uncircumcised boys. Pediatrics. 1989;83:1011 - 5.
[33] Weiss H, Larke N, Halperin D, Schenker I. Complications of circumcision in male neonates, infants and children: a systematic review. BMC Urology. 2010;10(1):2.
[34] Bode CO, Ikhisemojie S, Ademuyiwa AO. Penile injuries from proximal migration of the Plastibell circumcision ring. Journal of Pediatric Urology.6(1):23-7.
[35] Paediatric Death Review Committee. Circumcision: A minor procedure? . In: Office of the Chief Coroner of Ontario, ed. *Paediatr Child Health* 2007 April:311-2.
[36] Ben Chaim J, Livne P, Binyamini J, Hardak B, Ben-Meir D, Mor Y. Complications of circumcision in Israel: a one year multicenter survey. Isr Med Assoc J. 2005;7:368 - 70.
[37] Gluckman G, Stoller M, Jacobs M, Kogan B. Newborn penile glans amputation during circumcision and successful reattachment. J Urol. 1995;153:778 - 9.
[38] Silfen R, Hudson D, McCulley S. Penile Lengthening for Traumatic Penile Amputation Due to Ritual Circumcision: A Case Report. Annals of Plastic Surgery. March 2000;44(3):311-6,.
[39] Azmy A, Boddy SA, Ransley PG. Successful Reconstruction Following Circumcision with Diathermy. British Journal of Urology. 1985;57(5):587-8.
[40] Sylla C, Diao B, Diallo A, Fall P, Sankale A, Ba M. Complications of circumcision. Report of 63 cases. Prog Urol. 2003;13(2):266-72.
[41] Yazici M, Etensel B, Gürsoy H. A very late onset urethral fistula coexisting with skin bridge after neonatal circumcision: A case report. Journal of Pediatric Surgery. 2003;38(4):642-3.
[42] Ceylan K, Burhan K, Yilmaz Y, Can S, Kus A, Mustafa G. Severe complications of circumcision: An analysis of 48 cases. Journal of Pediatric Urology. 2007;3(1):32-5.

[43] Emsen I. Catastrophic Complication of the Circumcision That Carried Out With Local Anesthesia Contained Adrenaline. J Trauma. 2006;60(5):1150.
[44] Eroglu E, Bastian OW, Ozkan HC, Yorukalp OE, Goksel AK. Buried Penis After Newborn Circumcision. The Journal of Urology. 2009;181(4):1841-3.
[45] Goldman R. The psychological impact of circumcision. BJU International. 1999;83(S1):93-102.
[46] Goodwin W. Uncircumcision: A Technique For Plastic Reconstruction of a Prepuce After Circumcision. Journal of Urology 1990;144:1203-5.
[47] Greer DM, Mohl PC, Sheley KA. A technique for foreskin reconstruction and some preliminary results. Journal of Sex Research. 1982;18(4):324 - 30.
[48] Anand KJS, Aranda JV, Berde CB, Buckman S, Capparelli EV, Carlo WA, et al. Analgesia and anesthesia for neonates: Study design and ethical issues. Clinical Therapeutics. 2005;27(6):814-43.
[49] Larsson B, Gradin M, Lind V, Selander B. Swedish guidelines for prevention and treatment of pain in the newborn infant; 2003.
[50] Executive Summary - Management of Procedure-related Pain in Neonates. Journal of Paediatrics and Child Health. 2006;42(S1):S31-S2.
[51] Hofvander Y. New law on male circumcision in Sweden. The Lancet. 2002;359(9306):630-.
[52] Taddio A, Katz J, Ilersich AL, Koren G. Effect of neonatal circumcision on pain response during subsequent routine vaccination. The Lancet. 1997;349(9052):599-603.
[53] Taddio A, Pollock N, Gilbert-MacLeod C, Ohlsson K, Koren G. Combined Analgesia and Local Anesthesia to Minimize Pain During Circumcision. Arch Pediatr Adolesc Med. 2000 June 1, 2000;154(6):620-3.
[54] Stevens B, Yamada J, Ohlsson A. Sucrose for analgesia in newborn infants undergoing painful procedures. Cochrane Database of Systematic Reviews. 2010;CD001069(1).
[55] Stevens B, Ohlsson A, Yamada J. Sucrose for analgesia in newborn infants undergoing painful procedures. Cochrane Database. Syst Rev 2004(3):(CD001069).
[56] Brady-Fryer B, Wiebe N, Lander J. Pain relief for neonatal circumcision. Cochrane Database of Systematic Reviews. 2004;CD004217(3).
[57] Sandeman DJ, Dilley A. Ultrasound guided dorsal penile nerve block in children. Anaesthesia and Intensive Care. 2007;35(2):266-9.
[58] Cyna A, Middleton P. Caudal epidural block versus other methods of postoperative pain relief for circumcision in boys. Cochrane Database of Systematic Reviews. 2008;4(CD003005).
[59] Weksler N, Atias I, Klein M, Rosenztsveig V, Ovadia L, Gurman GM. Is penile block better than caudal epidural block for postcircumcision analgesia? Journal of Anesthesia. 2005;19(1):36-9.
[60] Coulthard MG, Lambert HJ, Keir MJ. Occurrence of Renal Scars in Children after Their First Referral for Urinary Tract Infection. BMJ: British Medical Journal. 1997;315(7113):918-9.
[61] Craig J. Urinary tract infection in children: investigation and management Mod Med Aust. 1998;4:16-29.
[62] Mukherjee S, Joshi A, Carroll D, Chandran H, Parashar K, McCarthy L. What is the effect of circumcision on risk of urinary tract infection in boys with posterior urethral valves? Journal of Pediatric Surgery. 2009;44(2):417-21.

[63] Shaikh N, Morone NE, Lopez J, Chianese J, Sangvai S, D'Amico F, et al. Does This Child Have a Urinary Tract Infection? JAMA. 2007 December 26, 2007;298(24):2895-904.
[64] Singh-Grewal D, Macdessi J, Craig J. Circumcision for the prevention of urinary tract infection in boys: a systematic review of randomised trials and observational studies. Archives of Disease in Childhood. 2005 August 1, 2005;90(8):853-8.
[65] Shaikh N, Morone N, Bost J, Farrell M. Prevalence of Urinary Tract Infection in Childhood: A Meta-Analysis Pediatr Infect DisJl 2008;27(4):302-8.
[66] Jantunen M, Siitonen A, Ala-Houhala M, Ashorn P, Fohr A, Koskimies O, et al. Predictive factors associated with significant urinary tract abnormalities in infants with pyelonephritis Pediatr Infect Dis J. 2001;20(6):597-601.
[67] Bonacorsi S, LefÈVre S, Clermont O, Houdouin V, Bourrillon A, Loirat C, et al. Escherichia Coli Strains Causing Urinary Tract Infection in Uncircumcised Infants Resemble Urosepsis-Like Adult Strains. The Journal of Urology. 2005;173(1):195-7.
[68] Diseker R, Peterman T, Kamb M, Kent C, Zenilman J, Douglas J, et al. Circumcision and STD in the United States: cross sectional and cohort analyses. Sex Transm Infect. 2000;76(6):474-9.
[69] Dave S, Johnson A, Fenton K, Mercer C, Erens B, Wellings K. Male circumcision in Britain: findings from a national probability sample survey. Sex Transm Infect. 2003;79:499-500.
[70] Fergusson DM, Boden JM, Horwood LJ. Circumcision Status and Risk of Sexually Transmitted Infection in Young Adult Males: An Analysis of a Longitudinal Birth Cohort. Pediatrics. 2006 November 1, 2006;118(5):1971-7.
[71] Dickson NP, van Roode T, Herbison P, Paul C. Circumcision and Risk of Sexually Transmitted Infections in a Birth Cohort. The Journal of Pediatrics. 2008;152(3):383-7.
[72] Dickson NP, Ryding J, van Roode T, Paul C, Herbison P, Dillner J, et al. Male Circumcision and Serologically Determined Human Papillomavirus Infection in a Birth Cohort. Cancer Epidemiology Biomarkers & Prevention. 2009 January 2009;18(1):177-83.
[73] Moses S, Bailey R, Ronald A. Male circumcision: assessment of health benefits and risks. Sex Transm Infect. 1998;74:368-73.
[74] Mehta SupriyaÂ D, Moses S, Agot K, Parker C, Ndinyaâ€Achola JeckoniahÂ O, Maclean I, et al. Adult Male Circumcision Does Not Reduce the Risk of Incident Neisseria gonorrhoeae, Chlamydia trachomatis, or Trichomonas vaginalis Infection: Results from a Randomized, Controlled Trial in Kenya. The Journal of Infectious Diseases. 2009;200(3):370-8.
[75] Templeton D, Jin F, Mao L, Prestage G, Donovan B, Imrie J, et al. Circumcision and risk of HIV infection in Australian homosexual men. AIDS. 13 November 2009;23(17):2347-51.
[76] Tobian AA, Ssempijja V, Kigozi G, Oliver AE, Serwadda D, Makumbi F, et al. Incident HIV and herpes simplex virus type 2 infection among men in Rakai, Uganda. AIDS. 2009;23(12):1589-94 10.097/QAD.0b013e32832d4042.
[77] Tobian AAR, Serwadda D, Quinn TC, Kigozi G, Gravitt PE, Laeyendecker O, et al. Male Circumcision for the Prevention of HSV-2 and HPV Infections and Syphilis. New England Journal of Medicine. 2009;360(13):1298-309.
[78] Tobian Aaron AR, Charvat B, Ssempijja V, Kigozi G, Serwadda D, Makumbi F, et al. Factors Associated with the Prevalence and Incidence of Herpes Simplex Virus Type 2 Infection among Men in Rakai, Uganda. The Journal of Infectious Diseases. 2009;199(7):945-9.

[79] Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. PLoS Med. 2005;2:e298.
[80] Auvert B, Sobngwi-Tambekou J, Cutler E, Nieuwoudt M, Lissouba P, Puren A, et al. Effect of Male Circumcision on the Prevalence of High Risk Human Papillomavirus in Young Men: Results of a Randomized Controlled Trial Conducted in Orange Farm, South Africa. The Journal of Infectious Diseases. 2009;199(1):14-9.
[81] Castellsagué X, Peeling R, Franceschi S, de Sanjosé S, Smith J, Albero G, et al. IARC Multicenter Cervical Cancer Study Group Chlamydia trachomatis Infection in Female Partners of Circumcised and uncircumcised Adult Men. Am J Epidemiol. 2005;162(9):907-16.
[82] Turner A, Morrison C, Padian N, Kaufman J, Behets F, Salata R, et al. Male Circumcision and Women's Risk of Incident Chlamydial, Gonococcal, and Trichomonal Infections. Sexually Transmitted Diseases. 2008;35(7):689-95.
[83] Gray RH, Kigozi G, Serwadda D, Makumbi F, Nalugoda F, Watya S, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. American Journal of Obstetrics and Gynecology. 2009;200(1):42.e1-.e7.
[84] Cataldo M. Editorial: The Kindest Cut? Focus. 2007;22(6):2.
[85] Bailey RC, Moses S, Parker CB, Agot K, Maclean I, Krieger JN, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. The Lancet. 2007 2007/3/2/;369(9562):643-56.
[86] Gray R, Kigozi G, Serwadda D, Makumbi F, Watya S, Nalugoda F, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. Lancet. 2007;369:657 - 66.
[87] Siegfried N, Muller M, Deeks J, Volmink J, Egger M, Low N, et al. HIV and male circumcision--a systematic review with assessment of the quality of studies. The Lancet Infectious Diseases. 2005;5(3):165-73.
[88] Siegfried N, Muller M, Volmink J. Male circumcision for prevention of heterosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2003;3(CD003362).
[89] Siegfried N, Muller M, Deeks J, Volmink J. Male circumcision for prevention of heterosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2009; CD003362(2).
[90] Connolly C, Simbayi L, Shanmugam R, Nqeketo A. Male circumcision and its relationship to HIV infection in South Africa: Results from a national survey in 2002. South African Medical Journal. 2008;98(10):789-94.
[91] Bassler D, Briel M, Montori VM, Lane M, Glasziou P, Zhou Q, et al. Stopping Randomized Trials Early for Benefit and Estimation of Treatment Effects: Systematic Review and Meta-regression Analysis. JAMA. 2010 March 24, 2010;303(12):1180-7.
[92] World Health Organization. WHO and UNAIDS announce recommendations from expert consultation on male circumcision for HIV prevention. ***http://wwwwhoint/mediacentre/news/releases/2007/pr10/en/indexhtml***. Geneva 28 March 2007
[93] Millett GA, Flores SA, Marks G, Reed JB, Herbst JH. Circumcision Status and Risk of HIV and Sexually Transmitted Infections Among Men Who Have Sex With Men: A Meta-analysis. JAMA. 2008 October 8, 2008;300(14):1674-84.
[94] Wawer MJ, Makumbi F, Kigozi G, Serwadda D, Watya S, Nalugoda F, et al. Circumcision in HIV-infected men and its effect on HIV transmission to female

partners in Rakai, Uganda: a randomised controlled trial. The Lancet. 2009 2009/7/24/;374(9685):229-37.
[95] Xu X, Patel D, Dalton V, Pearlman M, Johnson T. Can routine neonatal circumcision help prevent human immunodeficiency virus transmission in the United States? Am J Mens Health. 2009;3(1):79-84.
[96] Castellsagué X, Bosch FX, Muñoz N, Meijer CJLM, Shah KV, de Sanjosé S, et al. Male Circumcision, Penile Human Papillomavirus Infection, and Cervical Cancer in Female Partners. New England Journal of Medicine. 2002;346(15):1105-12.
[97] Lajous M, Mueller N, Cruz-Valdéz A, Aguilar LV, Franceschi S, Hernández-Ávila M, et al. Determinants of Prevalence, Acquisition, and Persistence of Human Papillomavirus in Healthy Mexican Military Men. Cancer Epidemiology Biomarkers & Prevention. 2005 July 2005;14(7):1710-6.
[98] Svare E, Kjaer S, Worm A, Osterlind A, Meijer C, van den Brule A. Risk factors for genital HPV DNA in men resemble those found in women: a study of male attendees at a Danish STD clinic. Sex Transm Infect. 2002;78(3):215-8.
[99] Frazer I. Correlating immunity with protection for HPV infection. International Journal of Infectious Diseases. 2007;11(Supplement 2):S10-S6.
[100] Stanley M. HPV vaccines: are they the answer? Br Med Bull. 2008 December 1, 2008;88(1):59-74.
[101] Castellsagué X. Natural history and epidemiology of HPV infection and cervical cancer. Gynecologic Oncology. 2008;110(3, Supplement 2):S4-S7.
[102] Kubba T. Human papillomavirus vaccination in the United Kingdom: what about boys? Reproductive Health Matters. 2008;16(32):97-103.
[103] Ogilvie G, Remple V, Marra F. Intention of parents to have male children vaccinated with the human papillomavirus vaccine. Sex Transm Infect 2008;84(4):318-23.
[104] Australian Institute of Health and Welfare. Australasian Association of Cancer Registries. Cancer In Australia: an overview 2006. In: AIHW, ed. Canberra 2007.
[105] Hamid R, Shergil Il, Arya M, Patel H. Penile cancer: an overview. Hosp Med. 2002;63(13):718-21.
[106] Aynaud, Piron, Bijaoui, Casanova. Developmental factors of urethral human papillomavirus lesions: correlation with circumcision. BJU International. 1999;84(1):57-60.
[107] Maden C, Sherman KJ, Beckmann AM, Hislop TG, Teh C-Z, Ashley RL, et al. History of Circumcision, Medical Conditions, and Sexual Activity and Risk of Penile Cancer. J Natl Cancer Inst. 1993 January 6, 1993;85(1):19-24.
[108] Madsen BS, van den Brule AJC, Jensen HL, Wohlfahrt J, Frisch M. Risk Factors for Squamous Cell Carcinoma of the Penis—Population-Based Case-Control Study in Denmark. Cancer Epidemiology Biomarkers & Prevention. 2008 October 2008;17(10):2683-91.
[109] Tseng H-F, Morgenstern H, Mack T, Peters RK. Risk Factors for Penile Cancer: Results of a Population-Based Case-Control Study in Los Angeles County (United States). Cancer Causes & Control. 2001;12(3):267-77.
[110] Frisch M, Friis S, Kjær SK, Melbye M. Falling Incidence Of Penis Cancer In An Uncircumcised Population (Denmark 1943-90). BMJ: British Medical Journal. 1995;311(7018):1471.
[111] Ewings P, Bowie C. A case-control study of cancer of the prostate in Somerset and east Devon. Br J Cancer. 1996;74(4):661-6.
[112] Ravich A. Cancer of prostate; its relationship to circumcision. Acta Unio Int Contra Cancrum 1952(8):2.

[113] Hayes RB, Pottern LM, Strickler H, Rabkin C, Pope V, Swanson GM, et al. Sexual behaviour, STDs and risks for prostate cancer. Br J Cancer. 2000;82(3):718-25.
[114] Key T. Risk factors for prostate cancer. Cancer Surv. 1995;23:63-77.
[115] Oliver J, Oliver R, Ballard R. Influence of circumcision and sexual behaviour on PSA levels in patients attending a sexually transmitted disease (STD) clinic. Prostate Cancer Prostatic Dis. 2001;4(4):228-31.
[116] Ministry Of Health Government of New Zealand. Health Practitioners Competence Assurance Act 2003. In: Ministry Of Health, ed. Wellington 2003.
[117] United Nations. Convention on the Rights of the Child. Geneva; 1989.
[118] The Law and Ethics of Male Circumcision: Guidance for Doctors. Journal of Medical Ethics. 2004;30(3):259-63.
[119] Koninklijke Nederlandsche Maatschappij tot bevordering der Geneeskunst Non-therapeutic circumcision of male minors. 2010.
[120] Neonatal circumcision revisited. Fetus and Newborn Committee, Canadian Paediatric Society. CMAJ. 1996 March 15, 1996;154(6):769-80.
[121] Task Force on Circumcision. Circumcision Policy Statement. Pediatrics. 1999 March 1, 1999;103(3):686-93.
[122] The Royal College of Surgeons of England, The British Association of Paediatric Surgeons, The Royal College of Nursing, The Royal College of Paediatrics and Child Health, The Royal College of Anaesthetists. Male circumcision: Guidance For Healthcare Practitioners Royal College of Surgeons of England - Communications, 2000. 2000.
[123] American Urological Association. Circumcision. 2007.