

Screening couples for cystic fibrosis carrier status: why are we waiting?

One in 25 Australians carries a cystic fibrosis gene mutation, but most do not know it until they have an affected child

The technology for safe, cheap screening for the principal gene mutations responsible for cystic fibrosis has long been available. Nearly 10 years ago, the US National Institutes of Health recommended "testing for gene mutations that cause [cystic fibrosis] be offered as an option to all pregnant couples and those planning a pregnancy".¹ A similar recommendation has been made by a joint committee of the American College of Obstetricians and Gynaecologists and the American College of Medical Genetics.² In 1998, this Journal published an editorial emphasising the need for Australia to follow suit in promoting carrier screening for cystic fibrosis.³ There has been little response despite the fact that each year 70 babies are born in Australia with cystic fibrosis, almost all to parents with no family history.⁴

Cystic fibrosis is the most common severe autosomal recessive disease of childhood, with an incidence of 1 in 2500 and carrier frequency of 1 in 25. Clinical manifestations include progressive, irreversible suppurative lung disease and pancreatic exocrine insufficiency. Although most children with cystic fibrosis can expect to survive into adulthood, the daily therapies are rigorous, and there are many years of ill health. The median life expectancy is in the mid-30s, with end-stage lung disease the major cause of death. There is still no cure.

Most patients with cystic fibrosis are detected by newborn screening, using a biochemical test (for immunoreactive trypsinogen [IRT]) for all babies, followed by cystic fibrosis gene mutation analysis for those with a raised IRT level. Newborn screening facilitates the early diagnosis of cystic fibrosis and genetic counselling for affected families. Couples identified with an affected infant can choose prenatal testing using gene mutation analysis from a chorionic villus sample for subsequent pregnancies to ascertain the status of the fetus.

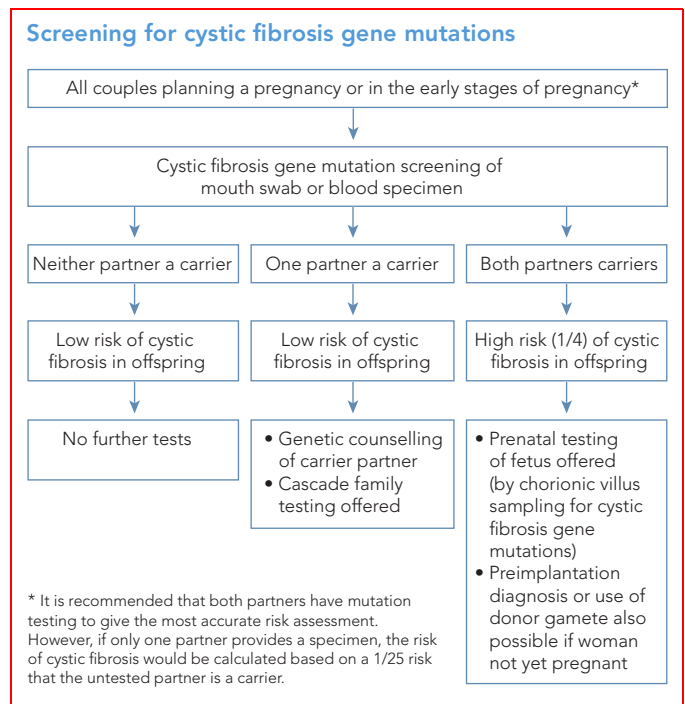
The genetic test used for diagnosis of cystic fibrosis and prenatal testing can also be used to identify carriers of a cystic fibrosis gene mutation. Testing for cystic fibrosis gene mutations is reliable, and, with a 12-mutation panel, nearly 85% of possible severe mutations can be detected. It can be performed using a painless cheek swab. However, testing for carrier status is generally not offered in Australia to couples without a family history, and most of those who carry a mutation do not know until an affected child is born. While we acknowledge the benefits of newborn screening, we believe it would be better to offer cystic fibrosis gene mutation screening to all couples, before they had their first baby with cystic fibrosis.

Prenatal screening for a variety of conditions is routine in Australia. All women have a full blood count early in pregnancy, and those who are iron replete with a low mean cell volume are tested for thalassaemia carrier status. The outcome is that it is now uncommon for babies to be born with thalassaemia. Prenatal screening for Down syndrome (using a combination of ultrasound examination and measurement of serum markers) has been offered since 1996, and more than two-thirds of pregnant women in Victoria participate in this screening. Populations with a high frequency of genetic conditions such as Tay-Sachs disease are also

offered prenatal or preconceptional screening. Paradoxically, the carrier frequency of cystic fibrosis in the general Australian population is almost the same as the carrier frequency of Tay-Sachs disease in the Ashkenazi Jewish population.⁵ Lack of awareness about cystic fibrosis no doubt contributes to the lack of community pressure to screen.

A successful prenatal screening program for cystic fibrosis has been pursued in Edinburgh for many years.⁶ This program uses a model of couple testing for carrier status with the offer of prenatal genetic testing of the fetus when both partners are carriers and has halved the incidence of cystic fibrosis in that community.⁷ Uptake of the service is 80%,⁶ similar to the uptake in a smaller Dutch study.⁸ In Victoria, 67% of couples with an infant with cystic fibrosis have used prenatal testing for subsequent pregnancies.⁹ Some families have opted for pre-implantation genetic diagnosis (with in-vitro fertilisation technology) to avoid pregnancy termination.

We advocate a cystic fibrosis screening program in which both parents are encouraged to be screened at the same time, which will give the most accurate risk assessment of the couple having a baby with cystic fibrosis (Box). Ideally, screening would be performed before conception, to allow the couple time to decide on the best reproductive option. In reality, many women do not present for pre-pregnancy assessment, so a screening model that allows prenatal testing of the couple should remain available. Furthermore, we advocate that both parents receive their individual carrier result to maximise the opportunities for cascade family



testing. Any program offering carrier screening needs to include genetic counselling for carrier couples, individual carriers and relatives of carriers who may also wish to be tested.

Extensive data clearly demonstrate the cost effectiveness of cystic fibrosis screening. The lifetime cost of care for a patient with the condition outweighs the cost of screening women of child-bearing age.^{10,11}

Cystic fibrosis carrier screening should be a federal initiative. Currently, the care of patients with cystic fibrosis and the newborn screening programs are state funded, and there is little incentive for a national program. A Medicare-rebatable test would allow universal access and encourage uptake. Surely, it is time to fund carrier screening for cystic fibrosis in Australia.

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A national sexually transmissible infections strategy: the need for an all-embracing approach

Specific priority actions and screening programs should target sexually active young people

The incidence of sexually transmitted infections (STIs) is increasing in many parts of the world including Australia,¹ and the release of the first Australian National Sexually Transmissible Infections Strategy to deal with STIs is timely.² Three very appropriate priority areas have been identified: Aboriginal and Torres Strait Islander sexual health, STIs in men who have sex with men, and control and prevention of infection with *Chlamydia trachomatis* among young people.

Given that an implementation plan is under development, it is timely to comment on the Strategy, pointing out its strengths and weaknesses, so as to ensure that an effective, comprehensive approach is implemented. Experience from the United Kingdom, where a national STI strategy was developed in 2001,³ suggests that this is the first stage of a long, difficult and contentious process to improve sexual health within the community. The control of STIs involves a range of activities. As well as research, surveillance, and adequate training and support of professional staff, it is essential that we not only increase access to health care (including screening, treatment and contact tracing), but that we also promote health and educate the young about sex.

While the Strategy satisfactorily covers surveillance, service provision and research, sex education and behavioural prevention are not adequately addressed, except with reference to gay and other homosexually active men. There are no specific priority actions focusing on sexually active young people, and a lack of

clarity with regard to the targeting of screening programs for young people.

The Australian Study of Health and Relationships, a recent survey of the sexual relationships and practices of 19 307 people aged between 16 and 59 years, showed that the median age of first intercourse among Australians aged between 16 and 19 was 16 years, and that the reporting of multiple sex partners was significantly associated with younger age and with identifying as bisexual or homosexual.^{4,5} As the authors noted: "This early onset of sexual activity indicates that it is important to ensure that all young people have information about contraception and disease prevention before they begin their sexual careers and not simply in their final years of schooling."⁵ Health promotion, including mandatory sex education, is essential for all young people, male as well as female, and those under as well as those over 16 years of age.

A study comparing sexual health outcomes in young people in the context of sex educational policies in the Netherlands, the United States, France and Australia found that in France and the Netherlands, where there is mandatory secondary school sex education, there are fewer STIs than in Australia and far fewer than in the US, where sex education is patchy.⁶ Increasing access to health care is not enough. There is also evidence that school-based education is likely to be more effective if it is sex positive, that is, if education does not focus solely on delaying or abstaining from sex.⁶ In the UK, where STI rates are at an all-time high, a survey of