

## A case for cystic fibrosis carrier testing in the general population

Belinda J McClaren, Sylvia A Metcalfe, David J Amor, MaryAnne Aitken and John Massie

**TO THE EDITOR:** As a family history of cystic fibrosis (CF) is uncommon among children diagnosed by newborn screening, offering carrier testing in the general population is warranted

Cystic fibrosis is the most common severe autosomal recessive genetic condition in children. The carrier frequency in populations of Northern European ancestry is one in 25 and the incidence of CF in Victoria, Australia is 1 in 2874.<sup>1</sup> There is no cure for CF, but advances in management have improved life expectancy. A question about a family history of CF is often asked as part of preconception or prenatal care in populations in which CF is more prevalent. However, anecdotally, most parents of a baby with CF do not report a family history and the diagnosis is unexpected. Carrier testing would provide information that may be used by couples to make reproductive decisions, such as prenatal and preimplantation genetic diagnosis of a fetus or embryo, respectively. Australia, the United Kingdom, other European countries, and all states in the United States now offer newborn screening for CF. Apart from records of affected older siblings,<sup>1</sup> there are no clinical data for the existence of a family history of CF among children diagnosed with CF through newborn screening.

We audited the family pedigrees, collected soon after diagnosis, of all children born in Victoria in 2000–2004 who were diagnosed

with CF through newborn screening. From the extended pedigrees of 82 children, we identified five families with a family history of CF. In two pedigrees, the children were first cousins; in another two pedigrees, the children were first cousins once removed; and in one pedigree, the children were second cousins. There were no families in which older siblings had been previously diagnosed with CF, but in two families the diagnosis triggered further examination of older siblings who were subsequently diagnosed.

These empirical findings that most babies with CF (77/82; 94%) are born to families with no family history of CF support clinical observations. Although inquiry about a family history of CF is necessary as part of prenatal or preconception care, this is not sufficient. Even when a family history is known, most relatives do not undertake carrier testing. For example, in an audit of cascade carrier testing after a diagnosis of CF through newborn screening, only 11.8% of eligible (non-parent) relatives were tested.<sup>2</sup> Not surprisingly, a family history-based approach to offering carrier testing will not provide the vast majority of couples with the opportunity to learn their carrier status and make informed reproductive decisions. Therefore, in addition to newborn screening to diagnose affected babies, CF carrier screening in the general population (of individuals with a risk of one in 25)<sup>3</sup> is needed.

**Belinda J McClaren**, Research Officer<sup>1</sup>

**Sylvia A Metcalfe**, Group Leader<sup>1</sup>

**David J Amor**, Director<sup>2</sup>

**MaryAnne Aitken**, Group Leader<sup>3</sup>

**John Massie**, Respiratory Physician<sup>4</sup>

1 Genetics Education and Health Research, Murdoch Childrens Research Institute, Melbourne, VIC.

2 Victorian Clinical Genetics Service, Genetic Health Services Victoria, Melbourne, VIC.

3 Research Strategy, Murdoch Childrens Research Institute, Melbourne, VIC.

4 Royal Children's Hospital, Melbourne, Melbourne, VIC.

[belinda.mcclaren@mcri.edu.au](mailto:belinda.mcclaren@mcri.edu.au)

1 Massie RJ, Olsen M, Glazner J, et al. Newborn screening for cystic fibrosis in Victoria: 10 years' experience (1989–1998). *Med J Aust* 2000; 172: 584–587.

2 McClaren BJ, Metcalfe SA, Aitken M, et al. Uptake of cystic fibrosis carrier testing in families after diagnosis through newborn screening. *Eur J Hum Genet* 2010; 18: 1084–1089.

3 Massie J, Petrou V, Forbes R, et al. Population-based carrier screening for cystic fibrosis in Victoria: the first three years experience. *Aust N Z J Obstet Gynaecol* 2009; 49: 484–489. □