cians, and since enrofloxacin, a related quinolone, was licensed for use in food producing animals in 1994. An antibiotic which could be of crucial importance in the management of some patients must be used with discretion by clinicians and veterinarians to ensure its continued usefulness.

Large national epidemics begin small. Killelea *et al* are not the first to describe how the PHLS's laboratory surveillance of salmonellas has been well ahead in speedily identifying the source of outbreaks in Britain and elsewhere.⁴⁻⁶⁻⁸ Their paper, and the paper by Shohat *et al*, reminds us that there is a free market in salmonellosis; that international cooperation is essential; that identification and control depends on universal, not selective, surveillance and detailed typing of isolates including molecular methods; and that the PHLS's laboratory surveillance of salmonellosis is second to none.

JOHN COWDEN
Consultant epidemiologist

Scottish Centre for Infection and Environmental Health,
Ruchill Hospital,
Glasgow G20 9NB

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Reproductive and sexual health in adolescents with cystic fibrosis

Needs research—and skilled communication by health professionals

Advances in therapeutic technologies have created a new generation of adolescents with chronic disease and disability. Once uniformly considered a fatal disease of infancy and childhood, cystic fibrosis is now considered a life limiting disease of adults, and median survival is at least to the fourth decade in most developed countries. In this changing context, it is timely to reflect on the significance of sexual and reproductive health in young people with chronic disease and the challenge this presents to their health care professionals.

Infertility in men with cystic fibrosis was first reported almost three decades ago, as survival through adolescence began to increase.¹⁻³ We now know that almost all males with the disease are infertile due to abnormal development of the mesonephric portion of the reproductive tract. Recent reproductive developments have focused on the aetiology of male infertility⁴⁻⁵ and new therapeutic technologies such as microepididymal sperm aspiration.⁶⁻⁷ However, there are still large gaps in our understanding of male infertility. For example, we do not know when is the best time to discuss reproductive health with patients, what is the ideal content of such discussions, or the impact that infertility may have on their sexuality. The few published studies simply show that adolescent males have a strikingly poor understanding of the effect of cystic fibrosis on their reproductive health.⁸⁻⁹

Women with cystic fibrosis fare even worse in terms of the lack of even the most basic information about the effect of the disease on their fertility. But the increasing numbers of pregnancies in women with cystic fibrosis is forcing a reassessment of the long held notion that there are abnormalities in the female genital tract that are specific to cystic fibrosis and which cause infertility, a belief based on the results of a single study of three women.¹⁰ The risk of pregnancy is also now being reassessed using epidemiologically sound studies rather than descriptive reports. While it is true that, until recently, few centres had enough adult women with cystic fibrosis to be able to perform controlled studies, there is less excuse for our failure to recognise common problems such as the high risk of vulvovaginal candidiasis in women taking long term antibiotics.¹¹ Inadequate integration of primary and specialty

health care for these young women, a problem generic to people with chronic illness,¹² is only part of the explanation.

Reproductive health issues are often poorly communicated or even ignored when dealing with young people,¹³⁻¹⁴ especially in those with a chronic disease like cystic fibrosis¹⁵ where the attention and expertise of health professionals is focused on stabilising the disease and on survival. Like other health care professionals,¹⁶ physicians specialising in cystic fibrosis describe embarrassment when talking about reproductive health issues,¹⁷ which is hardly surprising given their lack of training in this area. Such training is as pertinent for specialists (in both paediatric and adult domains) as it is for primary care practitioners. While physicians may think that involving general practitioners or multidisciplinary teams will make it more likely that reproductive health is discussed (as if the ability to discuss these issues arises spontaneously), there is no evidence to support this belief.

All adolescents find aspects of sexuality confusing, embarrassing, or worrying. But those with chronic disease face additional stresses that may affect their psychosexual health. These may include questionable fertility in survivors of cancer; the difficulties of negotiating intimate relationships in patients with significant body scars or physical anomalies such as an ileostomy, those who must perform intermittent catheterisation, and those with cerebral palsy or who are regular wheelchair users; and difficulties informing a partner of future infertility for those with Turner's syndrome and cystic fibrosis.

Adolescents and young adults with chronic disease and disability deserve health care professionals who are knowledgeable and skilled in generic adolescent health care. They deserve more extensive research about their sexual and reproductive health needs and to have health practitioners with strong communication skills. Care of the disease is absolutely necessary but of itself it is not sufficient if we wish to achieve success in terms of quality as well as length of life.

SUSAN M SAWYER
Consultant in adolescent medicine and respiratory paediatrics
Centre for Adolescent Health,
Royal Children's Hospital,
Parkville, 3052 Victoria, Australia

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Dyslexia: a hundred years on

A verbal not a visual disorder, which responds to early intervention

The first case of developmental dyslexia was reported by Pringle-Morgan in the *BMJ* on 7 November 1896.¹ Pringle-Morgan, a general practitioner, and Hinshelwood, an ophthalmologist also writing at the turn of the century,² speculated that such difficulties with reading and writing were due to "congenital word blindness," and for many years the dominant view was that dyslexia was caused by visual processing deficiencies. There is still continuing interest in the role of visual factors in the aetiology of dyslexia, especially in low level impairments of the visual system.³⁻⁴ However, most research suggests that these are not its cause. The most widely accepted view today is that dyslexia is a verbal deficit⁵ and can be considered part of the continuum of language disorders. Indeed, converging evidence supports a specific theory, that dyslexic readers have phonological (speech) processing deficits.

Dyslexia tends to run in families, and the relatives of dyslexic readers often have other language problems. Dyslexia is more common in boys than girls, and there is strong evidence that it is heritable; the probability of a boy becoming dyslexic if his father is dyslexic can be as high as 50%; it is somewhat lower for a girl. Results of large scale twin studies suggest that sensitivity to speech sounds (as measured by tests of rhyming skill) shares genetic variance with phonological reading skills.⁶ Gene markers on chromosomes 1 and 15 have been identified in dyslexic families, and linkage on chromosome 6 in the region of the human leucocyte complex may explain an often reported association between dyslexia and autoimmune disease.⁷ There have also been advances in the neurobiology of dyslexia. Evidence on brain abnormalities has implicated the perisylvian regions, and post-mortem studies have revealed unusual symmetry of the plenum temperale with cortical dysplasia and scarring.⁸

Dyslexia is a developmental disorder that affects people of all ages, but its symptom profile changes with age. Studies of children at genetic risk of dyslexia have reported difficulties in speech production and grammatical expression at 30 months, followed by slower vocabulary acquisition during the preschool years, culminating in deficits in phonological awareness and alphabet knowledge in young schoolchildren.⁹ Parental reports of delayed speech and language among children with reading difficulties have been common in epidemiological studies.

The most comprehensive picture of dyslexia available is in children of school age.¹⁰ Although in most cases speech perceptual abilities are intact, dyslexic children have difficulty in reflecting on the sound structure of spoken words. Such phonological problems make it difficult to learn how the letters and sounds of printed words are related. Most dyslexic children have difficulty using a phonic approach to reading, and their spelling often fails to represent the sound structure of target words. Although dyslexic children overcome many of

their difficulties, in adulthood they experience subtle problems with phonological awareness and reading and writing skills. Functional brain imaging is beginning to elucidate why this is so; it has been shown that, when dyslexic adults perform rhyme judgment and verbal short term memory tasks, they activate only a subset of the brain regions usually involved. Plausibly, their phonological difficulties may be due to weak connectivity between anterior and posterior language areas of the left hemisphere.¹¹

Knowledge of the predictors of reading achievement and of dyslexia has led to innovations in methods of intervention. A pioneering study in Oxford showed that children who performed poorly on a phonological processing task before they went to school benefited significantly from a training programme in sound categorisation using rhyme and alliteration activities, particularly when it was combined with teaching of letter sounds.¹² Subsequently, it has been shown that training in phonological awareness combined with a structured reading intervention is an effective form of treatment for poor readers and produces greater gains than training in either reading or phonological awareness alone.¹³

Although the term dyslexia remains debated, there is good evidence that unexpected reading problems in children are caused by language deficiencies within the phonological domain. Children with reading difficulties report a variety of psychosomatic problems: complaints of headaches and difficulties in seeing are common. A detailed case and family history may uncover dyslexic difficulties, and the routine assessment of preschool children can usefully incorporate a test of knowledge of nursery rhymes and letters.¹⁴ Clinical experience shows that, with regard to dyslexia, it is a fallacy to "wait and see how the child develops." A delay at the start of learning to read can quickly develop into a considerable reading disorder if unattended.

MARGARET J SNOWLING
Professor

Department of Psychology,
University of York,
York YO1 5DD

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