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The challenge of reproduction

Reproductive health is fundamental to the social and economic development of communities and has been defined as “a state of complete physical, mental and social well-being, and not merely the absence of disease, in all matters relating to the reproductive system and to its functions and processes”.¹ It implies that people are able to have a satisfying and safe sex life, along with the capacity and freedom to reproduce if and when they wish.

Overall, sexual and reproductive ill-health accounts for at least one-fifth of the global burden of disease among women and one-seventh among men. Limitations for reproductive health include problems of infertility (which affects one in eight couples, with an equal contribution from the male and female partners), inadequacy of fertility-regulating methods and the high incidence of reproductive diseases including cancers.

Furthermore, reproductive processes are perilous. There are considerable consequences of less-than-optimal pregnancy: local environmental effects (including nutrition) on the very early embryo and the fetus within the womb can reverberate up to 50 years later in a propensity for heart disease, Type 2 diabetes mellitus and other adult ailments.² Some of the physical costs to a woman of bearing a child are also not apparent for decades: cells exchanged between the mother and the fetus during pregnancy can live on indefinitely, stimulating autoimmune and other diseases in the mother.³ Moreover, the underlying causes of more obvious disorders of pregnancy such as miscarriage, pre-eclampsia and pre-term birth are still not well understood.

Implementation of a “timely and effective birth control program” has been proposed as being among the “grand challenges in global health”.⁴ Differing needs for contraception by people of varying marital status, age and culture as well as the additional factors of usability, cost, access and protection from sexually transmitted infections are not currently being met. By 2020, 1.2 billion people worldwide, or 16 per cent of the world’s population, will be entering their childbearing years but current contraceptive techniques are not available to, or do not suit, many of these young people. Although there were spectacular results from the first contraceptive revolution, which followed introduction of the contraceptive pill in the early 1960s, the momentum has been lost and it is clear that a second contraceptive revolution is necessary to support the unmet needs of the world.⁵

Infertility is an increasing problem in our community, partly due to women leaving childbearing until later in their potential reproductive lives. The implications for human reproduction within an increasingly polluted environment are not clearly defined, but increased infertility is a likely outcome. Female infertility can arise from a number of disorders of the endocrine or reproductive systems, and is also associated with endometriosis and sexually transmitted infections; while male infertility may include both low sperm counts and poor quality sperm production. Although assisted reproductive technologies (ART) have provided assistance to many couples, success rates

are still limited and much anguish is suffered by couples unable to achieve a pregnancy and a healthy baby.

Reproductive health is also critical for animals. In Australia, survival of endangered species, control of feral animals and production of farm animals all require substantial understanding of their reproductive processes. Indeed, the competitiveness of rural industries in the long term is dependent on research that will increase productivity.

There is therefore an urgent need for understanding the basic biology of reproduction to guide treatments for infertility, pregnancy-related disorders and diseases of the reproductive tract, as well as aid in the development of new contraceptives, hormone replacements and methods for ART. The long-term health of our population depends on events during conception and early pregnancy that are still not well understood. Furthermore, principles and practices developed to combat problems of human fertility and infertility need to be applied more broadly to assist the continuation of endangered species, control of feral species and to improve production in farm animals.

The Society for Reproductive Biology is the Australasian society representing the discipline. Its goals are: to promote the advancement and dissemination of all aspects of basic and strategic science in reproduction, fertility and development, underpinning biomedicine and health, animal production, environment and conservation.

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