

# Template for submissions to the Strategic Review of Health and Medical Research

*Please include your name and contact details*

Associate Professor Mark Hedger, President, Society for Reproductive Biology, Monash Institute of Medical Research, 27-31 Wright Street, Clayton, Victoria 3168

## **Submission summary:**

This submission is made on behalf of the Society for Reproductive Biology (SRB), which is the peak body representing reproductive scientists in Australia ([www.srb.org.au](http://www.srb.org.au)).

Consequently, this submission addresses matters related specifically to reproductive research, biotechnology and reproductive health. The main points to be highlighted are:

It has repeatedly been demonstrated that investment in research leading to novel treatments or preventative measures repays itself many times over, and conversely, failure to support health research has considerable long-term financial and societal costs.

Medical research is best managed and funded by competitive and peer-reviewed basic and clinical research, to ensure the highest quality research outcomes.

A well-trained and adequately resourced medical research sector is necessary to deal with health issues that are peculiar to Australia, such as indigenous health, including reproductive health.

Reproductive disorders are a major cause of illness and lost productivity in Australia, with considerable financial costs for the health care sector. Many of these disorders remain poorly understood due to insufficient research prioritisation.

Translation of basic research in reproductive biology into clinical outcomes requires real communication between users (patients, health professionals, hospitals etc) and scientists, both basic and clinical.

Funding for basic medical research must be preserved, as today's clinical solutions can quickly become obsolete tomorrow.

## **Please use the following questions to structure your submission:**

### **1. Why is it in Australia's interest to have a viable, internationally competitive health and medical research sector?**

In general, a well-trained and adequately resourced medical research sector is necessary to deal with health issues that are peculiar to Australia, such as indigenous health, and to evaluate, interpret and facilitate rapid adoption of international-based research. A productive, innovative, internationally competitive medical research sector is a hallmark of a sophisticated, modern society. It directly and indirectly establishes the standard of medical health of a society, which is directly related to the prosperity and happiness of its population. It has repeatedly been demonstrated that investment in research leading to novel treatments or preventative measures repays itself many times over, and conversely, failure to adequately support health research has considerable long-term financial and societal costs.

Within reproductive medicine, there exist many health challenges, as outlined under point 3 below. In the past, Australian researchers have contributed to, and in many cases led, crucial advances in reproductive biology and medicine, such as assisted reproduction, prenatal diagnosis of disease, and stem cell biology and therapies. As a result,

developments in this field have always been rapidly accepted and adopted within Australia, and specific issues peculiar to the Australian setting have been addressed at the same time or even ahead of international initiatives. Reproductive health exists hand in glove with the Commonwealth National Health priorities: a Healthy Start to Life and Aging Well and Productively. Reproductive health is vital to national prosperity as it underpins future population demographic planning and workforce productivity across all human health issues.

## **2. How might health and medical research be best managed and funded in Australia?**

The SRB believes that medical research is best managed and funded by competitive and peer-reviewed research, to ensure the highest quality research is undertaken. Targeted research, while it undeniably has its place, is frequently less efficient and subject to distortion by vested interests. Over-application of research priorities set by government or the broad community can subvert research efficacy, as researchers are best placed to predict and react to future trends and challenges. Naturally, government and the community should have an important say in how medical research funds are allocated and spent, but this should be done under the guidance of expert advice, that can be provided by an active, engaged and productive medical research sector. While philanthropy and industry engagement and support are also essential, as the costs of development of new treatments and therapies frequently exceed the capacity of the public sector to support, government management funding at the National level is necessary to ensure the continued existence of a well-trained, flexible and resourced medical research work-force. Uncertainty and inconsistency causes great damage to this work-force. Industry is often good at recognising research applications, and may be better able to diversify and absorb research that does not pay off, but picking winners in medical applications is difficult and broad support for basic research is essential. This means that rewarding success and directing funding towards proven teams is important, but always must be offset by ensuring that young researchers are supported to ensure the future of the sector.

## **3. What are the health and medical research strategic directions and priorities and how might we meet them?**

Reproductive disorders are a major cause of illness and lost productivity in Australia, with considerable financial costs for the health care sector. Many of these disorders remain poorly understood due to insufficient research prioritisation (note that this is not an exhaustive list):

- One in seven Australian couples is infertile, with both male and female factors responsible. Many cases remain unexplained and untreatable, and 3% of babies in Australia are now born with the assistance of reproductive technologies. Assisted reproductive technologies have low success rates and are a considerable financial burden for couples and the health care system. Better understanding of the underlying causes of infertility is needed to prevent and treat this common condition.
- Heavy uterine bleeding affects 10-30% of menstruating women and increases up to 50% in women approaching menopause. This is a significant social, medical and public health issue for women with major economic implications for women in the workplace (cost of investigation alone, around \$6M per year).

- Endometriosis is a chronic, debilitating gynaecologic condition, affecting 6-8% of women of reproductive age. It results in excessive menstrual pain, non-cyclic pelvic pain and infertility and severely affects the quality of the lives of sufferers.
- Endometrial cancer is the most common gynaecological cancer. Ovarian cancer is the most common cause of gynaecological cancer death. It is often diagnosed at a late stage when the cancer has spread beyond the ovary; such cases have a poor prognosis.
- Around 35% of Australian women eventually undergo hysterectomy for various reasons, and much of this could be prevented with better understanding of uterine disorders.
- There are various complications associated with pregnancy that can impact on the health and wellbeing of both the baby and mother. The most common complication is pre-eclampsia, affecting approximately 10% of pregnancies in Australia with symptoms including high maternal blood pressure and proteinuria. Pre-eclampsia and its complications are a leading cause of maternal and foetal death worldwide.
- It is now apparent that the long term health of each individual is heavily influenced by the peri-conceptual environment and developmental events from conception through embryo implantation and pregnancy. Thus to improve health outcomes of future generations, there is an urgent need to define the key events of healthy conception and pregnancy and to clarify the influence of environmental factors on this process, acting at the very earliest stages on egg and sperm and on the conceptus via the mother. These factors include the nutritional status of both mother and father and their social habits such as smoking. Furthermore, there is a clear influence of the environment, emphasised by our ever increasing knowledge of the toxicity of the world's environment, including harmful effects of widely-used domestic chemicals. In addition to immediate health issues, it is now well known that the long term health of each individual is strongly influenced by environmental factors from conception to birth. Understanding these influences is critical to the long term health of the Australian population.
- In terms of indigenous Australians, these issues are of particular relevance with conception occurring within a social environment that is far from conducive to the conception and development of healthy individuals.
- 1 in 3 males over the age of 40 report reproductive health problems with increasing numbers of males affected as they age. Male reproductive disorders are actually increasing world wide, with increasing incidence of male reproductive tract malformations such as hypospadias, cryptorchidism and testicular cancer. Semen quality (sperm number, motility and morphology) may also be declining. Environmental factors are implicated, but causes are not understood. Even today, 40% of all male infertility is idiopathic.
- Prostate cancer is a leading cause of Australian male deaths. While the cost burden to the health system for prostate cancer is significant, the burden estimated for benign prostate disease is estimated to be greater. Although Australian data is not available, in the US, with similar demography to Australia, the direct costs for benign prostate disease alone are of the same order as those for malignant disease (US\$1.1 billion per annum compared to US\$1.3 billion per annum respectively).
- Androgen deficiency affects about one in 200 males under 60 years of age. It is usually the result of genetic disorders, testicular damage and (rarely) a deficiency of pituitary hormones. It is likely that androgen deficiency is under-diagnosed in the community.

Ageing males also have increasing rates of androgen deficiency, as androgen levels peak around 30 years and slowly decline thereafter.

- The relationship between erectile dysfunction, lifestyle and conditions such as cardiovascular disease, diabetes and high blood pressure is not well known by the general public. Erectile dysfunction has been shown to be an early indicator of these conditions, prior to diagnosis.
- 5-10% of male factor infertility of known aetiology has a suspected inflammatory or autoimmune involvement: this approaches 50% in populations with marginal health care, such as indigenous populations. Reproductive tract infections (sexually-transmitted and otherwise) account for 3% of the global burden of ill-health among men worldwide (WHO estimate).
- 1% of men suffer from persistent ‘antibiotic-resistant’ scrotal or perineal pain, a debilitating and frequently intractable condition that almost certainly involves some form of idiopathic inflammation (“sterile” orchitis, epididymitis, vasitis, prostatitis).
- Finally, the major barrier to global health is probably over-population, which will increasingly limit the availability of nutrients and water, along with improvement of hygiene and access to medical services. There is a huge unmet need for contraception as detailed by the World Health Organisation. There have been no major new advances in contraception in the past 30 years, and in particular, there is a need for contraceptive methods that may also provide protection against infection. New contraceptives are badly needed, yet ethical issues in developed countries particularly the US, have resulted in the major pharmaceutical companies ceasing to fund any contraceptive development work. It is therefore incumbent upon governments in other developed countries to fill this important funding gap. There is still no effective, safe, reversible male contraceptive, and women continue to carry the major burden of responsibility for contraception, in Australia and worldwide.

The SRB maintains that the answer to most if not all of these problems is more research, better support for research, and better mechanisms for translation of research.

#### **4. How can we optimise translation of health and medical research into better health and wellbeing?**

Support for basic research is important, but translation requires real communication between end users (patients, health professionals, hospitals and community groups) and basic and clinical researchers. This is equally true for reproductive medicine. Currently, reproductive research and conversation is dominated by provision of assisted reproduction providers, who are providing an important health benefit, but tend to monopolise the agenda and divert the attention of government and the community away from other fundamental reproductive health issues. One solution to this problem may include direct financial incentives for basic scientists to actively engage with clinicians in areas of real unmet need, along with structures that can facilitate such engagement. This most certainly does not mean simply targeting research that has an immediate or even a short-term clinical outcomes, important as such research may be, as breakthroughs in basic research can often make today’s answers to problems redundant or obsolete tomorrow.