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19 August 2020

Justice Edwin Cameron  
Dr. Margaret Ann Hamburg  
Expert Advisory Committee on Developing Global Standards for  
Governance and Oversight of Human Genome Editing  
World Health Organization  
Avenue Appia 20  
1211 Geneva, Switzerland

Dear Justice Cameron and Dr. Hamburg,

On behalf of the International Society for Stem Cell Research (ISSCR), I write to share our comments on the Human Genome Editing: A DRAFT Framework for Governance. The ISSCR is the leading professional organization of stem cell researchers and represents more than 4,000 members around the world. Our members are scientists, clinicians, ethicists, and educators dedicated to the responsible advancement of stem cell research and its translation to the clinic. We appreciate that the draft framework acknowledges the role of professional societies in overseeing the conduct of research. The ISSCR is committed to the self-regulation of science and provides [guidelines](#) that impose standards for all stages of stem cell research and its translation to the clinic. Our guidelines emphasize the integrity of the research enterprise, the primacy of patient welfare, and the rigorous development of safe and effective new treatments. As the WHO Expert Advisory Committee continues refining the draft framework, we encourage you to consider a few recommendations to ensure that genome editing technologies are adequately evaluated by regulators and proven safe and effective before being marketed to patients.

The premature commercialization of new therapies threatens the development of scientifically validated treatments and places unnecessary economic burdens on healthcare systems and the public. When new products are sold to patients before their effectiveness is thoroughly tested, government and private healthcare payers are often compelled to reimburse for the products without knowing whether they work, and physicians with inadequate expertise are left on their own to evaluate the safety and efficacy of products for individual patients. In the stem cell

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field, the premature commercialization of stem cell-based interventions has led to patients being [paralyzed](#) and [blinded](#). We encourage you to strengthen the governance framework by emphasizing the need to ensure that all new products are proven safe and effective.

We are concerned that the discussion regarding the degree of oversight as a fundamental choice in Section 2.1 of the framework may encourage regulators in some jurisdictions to adopt a “green light” approach for human genome editing technologies. Instead of presenting the degree of regulation as a choice, we urge the WHO to explicitly encourage regulators to limit the availability of new genome editing technologies until their safety and efficacy are demonstrated in well-regulated clinical trials. In the absence of internationally harmonized regulations for gene editing technologies, we fear that unscrupulous businesses will seek to profit from the premature commercialization of this technology in countries with weak regulatory systems. Until recently, inconsistent and ambiguous regulations in the stem cell field led to a proliferation of unscrupulous businesses prematurely marketing unproven “stem cell” interventions. Many regulators around the world are now seeking to curb these businesses, but they struggle with limited resources for enforcement. If regulators had responded more quickly in a harmonized manner, the insidious spread of these unscrupulous businesses could have been prevented.

With respect to somatic genome editing, the safety of patients and the effectiveness of medical products should be the fundamental goal of any regulatory system overseeing the development of new therapeutics. While the principles, values, and goals outlined in Part 3 of the framework are important ethical and regulatory considerations for somatic genome editing research and its translation to the clinic, they neglect to prioritize the safety and effectiveness of new therapies. The inclusion of a goal related to patient safety and the effectiveness of treatments would underscore the importance of this. We also encourage the WHO to emphasize patient safety and the efficacy of new treatments in the scenarios in Part 5 of the framework. These scenarios help illustrate the challenges that regulatory systems must overcome to adequately oversee genome editing research and its translation to the clinic. We appreciate the inclusion of a scenario regarding unscrupulous entrepreneurs and clinics (Section 5.3) to help regulators assess how well their systems curb unscrupulous businesses seeking to prematurely commercialize genome editing technologies.

With respect to germline and human embryo genome editing, editing in human embryos and gametes may result in heritable modifications that pose greater safety and ethical considerations than nonheritable somatic genome editing. The potential long-term risks of human embryo genome editing, including the potential consequences of genetic mosaicism and off-target effects, must be fully understood before any clinical applications are considered. Regulators must be able to accurately predict, detect, and evaluate both on- and off-target effects of heritable genome editing, and weigh the potential risks and benefits relative to other approaches for preventing or treating disease. We recommend expanding the guidance in Section 3.1 of the draft framework to urge regulators to develop

systems capable of understanding and mitigating these safety risks. Furthermore, we recommend adding guidance on the safety issues associated with human embryo genome editing in the heritable human genome editing scenarios (sections 5.5 and 5.6).

Thank you for considering our views on the draft governance framework for human genome editing. We hope the ISSCR can continue to serve as a resource for WHO on the development of standards and oversight for genome editing research. If the ISSCR can clarify any of these views or be of further assistance, please contact Eric Anthony, ISSCR's Director of Policy at [eanthony@isscr.org](mailto:eanthony@isscr.org).

Sincerely,

A handwritten signature in black ink, appearing to read "Christine Mummery", with a horizontal line extending from the end of the signature.

Christine Mummery  
President, ISSCR