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June 27, 2019

Gavin St Pier Esq, Chief Minister, The States of Guernsey, Frossard House, Sir
Charles Frossard House, La Charroterie, GY1 1FH, Guernsey.

Dear Sir

Radiation exposure has long been a concern for the public, policy makers and health researchers. Beginning with radar during World War II, human exposure to radio-frequency radiation (RFR) and associated technologies has grown more than 100,000-fold. In 2011, the *International Agency for Research on Cancer* (IARC) reviewed the published literature and categorized RFR as a 'possible' (Group 2B) human carcinogen. A broad range of adverse human health effects associated with RFR have been reported since the IARC review, including brain cancer. In addition, two large-scale carcinogenicity studies in rodents exposed to levels of RFR that mimic lifetime human exposures have shown significantly increased rates of Schwannomas and malignant gliomas, as well as chromosomal DNA damage.

Of particular concern are the effects of RFR exposure on the developing brain in children. Compared with an adult male, a cell phone held against the head of a child exposes deeper brain structures to greater radiation doses per unit volume, and the young, thin skull's bone marrow absorbs a roughly 10-fold higher local dose. Recent reports also suggest that men who keep cell phones in their trouser pockets have significantly lower sperm counts and significantly impaired sperm motility and morphology, including mitochondrial DNA damage.

Based on the accumulated evidence, I believe that if IARC were to re-evaluate its 2011 classification of the human carcinogenicity of RFR, it would be categorized as Group 1, i.e. carcinogenic to humans. Thus, current knowledge provides justification for governments, public health authorities, and physicians/allied health professionals to support measures to reduce all exposures to RFR to as low as reasonably achievable, something we learnt was necessary for exposures to ionizing radiation (e.g. X-rays) many years ago.

The Telecom industry's fifth generation (5G) wireless service will require the placement of many small antennae/cell towers close to all recipients of the service,

because solid structures, rain and foliage block the associated millimeter wave RFR. 5G technology is being developed as it is also being deployed, with large arrays of directional, steerable antennae, operating at higher power than previous technologies. 5G is not stand-alone – it will operate and interface with other (including 3G and 4G) frequencies and modulations to enable diverse devices under continual development for the “internet of things,” driverless vehicles and more.

This novel 5G technology is being rolled out in several densely populated cities, although potential chronic health or environmental impacts have not been evaluated. The range and magnitude of potential impacts of 5G technology are under-researched, although important biological outcomes have been reported with the associated millimeter wavelength exposure to RFR. These include oxidative stress and altered gene expression, effects on skin and systemic effects such as on immune function, all of which highlight the need for research before population-wide continuous exposures occur. A moratorium on the roll-out of 5G is essential.

A handwritten signature in black ink, appearing to read 'A. B. Miller', with a small flourish at the end.

Anthony B. Miller, MD, FRCP. Professor Emeritus, Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada.

cc CICRA, Deputies of Guernsey, David Green

[The University of Toronto](#)

Dalla Lana School of Public Health

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Division(s)/Office

[Epidemiology Division](#)

[Office of Global Public Health Education & Training](#)

Position

Professor Emeritus

SGS Status

Member Emeritus

Appointment Status

Emeritus

Research Interests

- Epidemiology of Breast Cancer, and relationship to preclinical abnormalities
- Evaluation of Screening for Cancer (especially breast, cervix, colon, lung and prostate)
- Impact of nutrition, radiation (ionizing and electrical and magnetic fields) and occupation on cancer
- Environmental aspects of cancer etiology

- Control of cancer
- Non-communicable disease control

Education & Training History

B.A. (Cantab) (Pathology) 1952; M.B. (Cantab) 1956; B.Chir. (Cantab) 1955; M.R.C.P. (London) (Internal Medicine) 1964; M.F.C.M. (U.K.) (Community Medicine) 1972; F.R.C.P.(C) (Medical Science) 1972; Fellow, Faculty of Community Medicine (now Public Health), UK, 1977; Fellow, American College of Epidemiology, 1985; Fellow, Royal College of Physicians of London, England, 1987; National Health Scientist, Health and Welfare Canada, 1988-93; M.A. (Cantab), 2002; M.D. (Cantab), 2006.

Member of Scientific Staff, Medical Research Council, Tuberculosis and Chest Diseases Unit, Brompton Hospital, London, October 1962 – April 1971. Honorary Senior Lecturer, Institute of Diseases of the Chest, Brompton Hospital, London, January 1970 – April 1971.

Assistant Executive Director (Epidemiology), National Cancer Institute of Canada, April 1971-76; Director, National Cancer Institute of Canada Clinical Trials Group, Toronto, April 1971 – March 1980; Director, Epidemiology Unit, National Cancer Institute of Canada, Toronto, April 1971 – June 1986; Associate Clinical Professor, Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, April 1972 – June 1976; Associate Professor, Department of Preventive Medicine and Biostatistics, University of Toronto, June 1972 – June 1977; Professor, Department of Preventive Medicine and Biostatistics, University of Toronto, July 1977 – June 1997; Director, M.Sc./Ph.D. Programme in Epidemiology, Graduate Dept. of Community Health, University of Toronto, July 1986 – June 1991; Chairman, Department of Preventive Medicine and Biostatistics, University of Toronto, July 1992 – June 1996; Professor Emeritus, Dalla Lana School of Public Health, University of Toronto, August 2008-; Associate Director, Research, Dalla Lana School of Public Health, University of Toronto, January 2009-December, 2010.

Honours & Awards

First O Harold Warwick Prize (Eli Lilly-National Cancer Institute of Canada) for Leadership in Cancer Control, 1993.

Distinguished Achievement Award, American Society for Preventive Oncology, 1994.

Anthony B Miller Award for Excellence in Research Established, Graduate Department of Community Health, University of Toronto, 1997

Lilienfeld Award, American College of Epidemiology, Epidemiology Section American, Public Health Association, Canadian Society of Epidemiology and Biostatistics, 2001.

Medal of Honour, International Agency for Research on Cancer, Lyon, 2003.

First Geoffrey R. Howe Distinguished Contributions Award, Canadian Society of Epidemiology and Biostatistics, 2009

26th International Papillomavirus Conference Honour Award, 2010.

Current Research Projects

- 2007 – present – Canadian National Breast Screening Study – final analysis

Representative Publications

- Taylor KL, Luta G, Miller AB, Church TR, Kelly SP, Muenz LR, Davis KM, Dawson DL, Edmond S, Reding D, Mabie JE, Riley TL. Long-Term Disease-Specific Functioning Among Prostate Cancer Survivors and Noncancer Controls in the Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial. *J Clin Oncol* 2012, 10.1200/JCO.2011.41.2767.
- Miller AB, Baines CJ. The role of clinical breast examination and breast self-examination. *Prev. Med.* 2011; 53:118-120. doi:10.1016/j.ypmed.2011.05.001
- Johnson KC, Miller AB, Collishaw NE, Palmer JR, Hammond SK, Salmon AG, Cantor KP, Miller MD, Boyd NF, Millar J, Turcotte F. Active smoking and secondhand smoke increase breast cancer risk: the report of the Canadian Expert Panel on Tobacco Smoke and Breast Cancer Risk (2009). *Tobacco Control* 2011; 20:e2.doi:10.1136/tc.2010.035931
- Howlett RI, Miller AB, Pasut G, Mai V. Defining a strategy to evaluate cervical cancer prevention and early detection in the era of HPV vaccination. *Prev. Med* 2009; 48: 432-7.
- Hakama M, Auvinen A, Day NE, Miller AB. Sensitivity in cancer screening. *J Med Screen* 2007; 14:74-177.
- Miller AB, Altenburg H-P, Bueno de Mesquita B, et al. Fruits and vegetables and lung cancer: Findings from the European Prospective Investigation into Cancer and Nutrition. *Int J Cancer* 2004; 108:269-276.
- Miller AB, To T, Baines CJ, Wall C. The Canadian National Breast Screening Study-1: Breast cancer mortality after 11 to 16 years of follow-up. A randomized screening trial of mammography in women age 40 to 49 years. *Ann Intern Med* 2002; 137:305-312.
- Miller AB, Madalinska JB, Church T, et al. Review: Health-related quality of life and cost-effectiveness studies in the European randomised study of screening for prostate cancer and the U.S. Prostate, Lung, Colon and Ovary trial. *Eur J Cancer* 2001; 37:2154-2160.
- Miller AB, To T, Baines CJ, Wall C. Canadian National Breast Screening Study-2: 13-year results of a randomized trial in women age 50-59 years. *J Natl Cancer Inst* 2000;94:1490-1499.
- Miller AB, Nazeer S, Fonn S, et al. Report on consensus conference on cervical cancer screening and management. *Int J Cancer* 2000;86:440-447.

- Miller AB, To T, Agnew DA, Wall C, Green LM. Leukemia following occupational exposure to 60-Hz electric and magnetic fields among Ontario electric utility workers. *Am J Epidemiol* 1996;144:150-160.
- Miller, A.B., Howe, G.R., Sherman, G.J., et al. Mortality from breast cancer radiation during flurosopic examination in patients being treated for tuberculosis. *New Engl. J. Med.* 1989;321:1285-1289.
- Miller, A.B., Howe, G.R., Jain, M., Craib, K.J.P., Harrison, L. Food items and food groups as risk factors in a case-control study of diet and colo-rectal cancer. *Int. J. Cancer* 1983;32:155-161.
- Miller AB, Kelly A, Choi NW et al. A Study of Diet and Breast Cancer. *Am J Epidemiol* 1978: 107:499-509.