

the department's evaluation principally relied on a scientific review completed in May 2011 by the World Health Organization's International Agency for Research on Cancer (IARC), which concluded that cellphones and other wireless devices such as cordless phones and Wi-Fi transmitters are possibly — although not probably — carcinogenic.

"We're subject to the evidence base we have at this time," said McNamee, who coauthored two scientific reviews with scientists who have acknowledged accepting payments from industry and government in return for promoting

Hardell agrees. After reviewing the Rationale, Hardell described Health Canada's safety guidelines in an interview with *CMAJ* as "a disaster to public health" and based on a scientific analysis "unwilling or not competent to make evaluation of the current literature."

Miller says the Rationale overlooks numerous other important studies as well as Hardell's, including a recent study by Gaëlle Coureau, of Université Bordeaux Segalen, which concluded that it supports "previous findings concerning a possible association between heavy mobile phone use and brain

At Washington University in Seattle, Henry Lai, author of numerous studies indicating radiofrequency exposure appears to affect DNA damage and repair, described the Rationale to *CMAJ* as "simplistic and out-of-date" with "too much focus on dosimetry and theoretical calculations, at the expense of basic concepts of biology and health"

The Rationale, Lai adds "fails to take into account at least a couple of hundred papers published between 2009 and 2014 on the biological effects of radiofrequency radiation, such as changes in cellular and reproductive functions. Many of these studies show effects at exposure levels much lower than the [Safety Code 6] limits."

Although *CMAJ* was invited by Health Canada to interview McNamee before he testified to the committee, the invitation was withdrawn without explanation after he testified. In response to written questions submitted to McNamee by *CMAJ*, Health Canada emailed a statement on Apr. 30 explaining that "Departmental scientists considered all available peer-reviewed scientific studies when developing the exposure limits in the revised *Safety Code 6*."

Their review "employed a weight-of-evidence approach when evaluating possible health risks," the Department explained, while acknowledging it has elected not to publish McNamee's Rationale on its website devoted to *Safety Code 6*. "Health Canada's updated *Safety Code 6* makes Canada's limits among the most stringent science-based limits in the world," it added. — Paul Christopher Webster, Toronto, Ont.

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One expert says the guidelines are "a disaster to public health"

industry and government safety assurances (*J Toxicol Environ Health B* 2009;12:2004-7; *Int J Radiat Biol* 2005 81:189-203).

McNamee's reliance on the studies included in the IARC's four-year-old review as still the most pertinent evidence available was subsequently called into question during the health committee hearings by one of the IARC review's own authors.

Dr. Anthony Miller, a University of Toronto professor emeritus who served as scientific secretary for the IARC panel, says Hardell's new research "reinforces the evidence that radio frequency fields are not just a possible human carcinogen, but a probable human carcinogen."

Hardell's studies, Miller told the committee members, "would be impossible to ignore in regulatory approaches to such a hazard" had Health Canada carefully considered them.

tumours" (*Occup Environ Med* 2014;71: 514-22).

After reviewing the Rationale, Coureau told *CMAJ* its analysis of the epidemiological literature did not warrant discussion.

Hardell and Coureau are not the only authors of recent studies raising concerns about cellphone safety who take issue with McNamee's Rationale and *Safety Code 6*.

At McGill University in Montréal, Paul Héroux, author of a recent paper indicating extra-low-frequency magnetic fields alter cancer cells through metabolic restriction, describes the Rationale as a document that deliberately ignores all studies that call *Safety Code 6* into question (*Electromagn Biol Med* 2014;33:264-75). "The soul of science is to revise health protection when evidence undermines previous thinking and this review fails to do that."

Dr. David Sackett, a giant among giants (1934–2015)

On his first day of medical school, Philip Devereaux learned from a tutor that his academic advisor was Dr. David Sackett. "Who is he?" Devereaux recalls asking. The tutor told him that Sackett was a famous clinical epidemiologist. But Devereaux had no interest in clinical epidemiology; he

planned on returning home to Cape Breton and being a "real" doctor.

"My first thought was: how am I going to get rid of this guy and get a real advisor?" said Devereaux.

Then he met Sackett. And like so many other young physicians and researchers, his life was soon set on a whole new path. "He opened up my

eyes to a world I didn't even know existed," said Devereaux, now an assistant professor in the department of clinical epidemiology and biostatistics at McMaster University, a department founded by Sackett in 1967. "He was a giant among giants."

Sackett, a pioneer in clinical epidemiology, died at age 80 on May 13. His

influence on the practice of medicine around the world was profound. He changed the way people thought about clinical trials, systematic reviews, medical education, research methods to evaluate new treatments, mentoring clinician-scientists and more.

“If I could use only one word, it would be ‘transforming.’ We are practising medicine differently today because of Dave,” said Dr. Holger Schünemann, chair of the department of clinical epidemiology and biostatistics at McMaster, in describing Sackett’s work. “He took a multidisciplinary approach in focusing on research designs, on how research is synthesized, how research is presented and how people are educated in using research at the bedside.”

Sackett is perhaps best known as the driving force behind evidence-based medicine. The best patient care is based on the best scientific evidence, he taught, and not on tradition, expert opinion, conventional wisdom or wishful thinking.

“There have always been great professors who ask tough questions about if something is in the scientific literature, but Dave and his colleagues put this on another scale,” said Dr. John Dirks, president and scientific director of the Gairdner Foundation, which awarded Sackett the Canada Gairdner Wightman Award in 2009. “Because of their advocacy and their example, they made [evidence-based medicine] a real foundation stone for clinical practice at large. It influenced government decision-making and public policy. The dividends were remarkable.”

According to Devereaux, the unique thing about Sackett was that, unlike many pioneers in health, he changed more than just one field of medicine. “He influenced nursing. He influenced pediatrics. He influenced surgery, psychiatry — across the board,” said Devereaux. “He had such a profound influence on modern medicine, and it’s a sad, sad loss.”

Like Devereaux, Dr. Peter Tugwell can clearly remember the first time he met Sackett — down to the minute, actually. It was July 1, 1975, 12:01 pm. Tugwell, who was planning to go on to practise rheumatology in British Columbia, had just arrived at McMas-

ter University to take clinical exams and looked lost on his way to lunch. Sackett was behind him and struck up a conversation. In short order, Sackett had another mentee, and another medical career was redirected.

“He persuaded me to give up the lotus land of British Columbia for the excitement of academic medicine at McMaster,” said Tugwell, now a senior scientist in the clinical epidemiology program at the Ottawa Hospital Research Institute.



McMaster University

Dr. David Sackett founded Canada’s first department of clinical epidemiology and biostatistics, at McMaster University in 1967.

Sackett is lauded for setting up Canada’s first department of clinical epidemiology and biostatistics at McMaster, but according to Tugwell he also deserves praise for discouraging the creation of another department. “He persuaded McMaster not to have an independent department of public health, because he was committed to the idea that epidemiology and the principles of epidemiology should be pervasive through every department, and you shouldn’t be able to say that it is the responsibility of the department of public health.”

This was not a conventional approach, which is not surprising in the least given the source of the idea, according to Tugwell. “He was always thinking outside the box. He had the most amazing way of reconceptualizing

complex problems, which is one of the marks of genius, which I think he is.”

It was not only his intellect, however, that attracted people to Sackett. That was but one of many traits that made him popular among those he took under his wing. “He was a wonderful mentor in terms of being a superb role model and in terms of critical thinking and kindness and skepticism and dedication and hard work and commitment, and he was great at bringing young people together and helping them work together,” said Dr. Gordon Guyatt, a distinguished professor in the department of clinical epidemiology and biostatistics at McMaster. “The other thing that he conveyed was that as hard as you work and as seriously as you take it, it should all be fun.”

This sense of fun showed itself when he turned work trips into road trips, complete with picnics, and when he learned how to drive a steam train in the United Kingdom, after moving there in 1994 to set up the Oxford Centre for Evidence-Based Medicine. “The amazing thing was that it wasn’t just about your career. He always tried to inject fun and enthusiasm into what we were doing,” said Dr. Sharon Straus, a scientist in the Li Ka Shing Knowledge Institute of St. Michael’s Hospital in Toronto, who trained under Sackett at Oxford.

Like others mentored by Sackett, Straus was struck by his genuine interest in helping young physicians develop their careers. “He said to me, ‘My job is to make sure you meet your goals and objectives, and I will facilitate that for you’,” said Straus. “Nobody had ever said that to me and it was very empowering. And he lived it. That’s exactly what he did. He didn’t do it for his career, because he already had a fantastic career. He just wanted to support young people.”

Straus learned many lessons from Sackett, including the importance of mentorship and supporting peers, but one thing in particular stands out. “Everything begins and ends with patients because, as clinicians, that’s where our questions come from and it’s such a privilege to be involved with patient care.” — Roger Collier, *CMAJ*

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