Episodes of ‘syncope’ or sudden fainting followed by a relatively speedy recovery make up approximately 1%–1.5% of all emergency department visits. The tests and diagnoses following these episodes can be extremely varied, making the effective evaluation and treatment of affected individuals difficult. Working closely with international colleagues, Professor Sheldon at the University of Calgary and founder of the Canadian Autonomics and Syncope Alliance, has studied syncope extensively for almost 30 years. This highly collaborative research has forged the way for the development of effective guidelines and improved diagnosis, management and treatment.

CAUSES OF SYNCOPE
Syncope episodes can be related to a wide range of biological factors or medical conditions. Vasovagal syncope, mediated by the autonomic nervous system, occurs when an individual’s heart rate and blood pressure react to either physiologic stresses or a particularly disturbing trigger, such as the sight of blood. It is the most common type of syncope, and research shows it has high remission rates. Investigating the frequency patterns of vasovagal syncope episodes in patients who experience recurring episodes (more than four a year), Sheldon and colleagues found these episodes tended to occur at random points in time, with a wide range of frequencies, from less than once a decade to more than monthly. Surprisingly, the tendency to faint stops abruptly in many people.

Syncope can also be part of other underlying medical conditions. These include postural tachycardia syndrome (POTS) characterised by frequent symptoms when standing, including light-headedness, tremor, weakness, exhaustion, and blurred vision, as well as an increased heart rate while shifting from a recumbent to standing position.

A common phenomenon
Syncope episodes are considerably common and a proportion of patients who experience them are admitted to hospital to undergo further assessment to ascertain whether the syncope is related to an underlying medical issue. In order to be exhaustive, tests and assessments need to target several different organ systems, employing different technologies. This process can be time consuming and often requires a substantial amount of resources.

Syncpe-related visits to the emergency service that are followed by non-fatal but severe outcomes are a minority and generally only half of these are found to have underlying cardiovascular causes. A recent study by Professor Sheldon and his colleagues analysed

The Symptom Score is now widely used clinically, resulting in a large reduction of health care utilisation and expenditure
SYNCOPE patients make up a large proportion of his clinical practice, when Professor Sheldon entered the field almost 30 years ago, very little was known about the condition at that time. To gain a better understanding, Professor Sheldon and his team turned to tilt table tests. This simple research tool ascertained the cause of fainting spells by tilting the patient at different angles (from 60 to 80 degrees), while monitoring heart rate and blood pressure. Although the tilt table became a recognised clinical diagnostic test, Sheldon and his team quickly acknowledged its limitations and embarked on a ten-year programme exploring effective ways to diagnose different syncope types.

Having first highlighted the need to reduce the inaccurate and unnecessary knowledge to diagnose syncope, by 2006 the collaborators developed a Symptom Score based on historical criteria of patients. This questionnaire detailed symptoms and past medical history, distinguishing vasovagal syncope from syncope of other causes. With its high specificity and sensitivity, the Symptom Score can correctly classify 90% of syncope patients. The Symptom Score is now widely used clinically, resulting in a large reduction of health care utilisation and expenditure. Symptom Scores have also enabled easy patient enrolment into randomised clinical trials and have been used in genetic studies of older patients and other studies with reproducible, objective criteria to guide best practice for diagnostic methods. More recently, the scores have proved invaluable for studies aimed at understanding the roles of placebo and patient–doctor interactions to improve patient outcomes. Professor Sheldon continues to be a strong advocate for the development of new standardised approaches to help doctors quickly and accurately identify the causes of syncope. This is illustrated by his recent participation in the development of an exhaustive guidelines for the evaluation and management of patients with syncope, published by the Heart Rhythm Society in 2016 and the American College of Cardiology / American Heart Association in 2017.

What initially sparked your interest in syncope?

I was fresh in practice in a hospital, miles from my basic science lab, and was swamped by syncope referrals, without a clue as to what to do. One night I was using a passmaker company brochure as a coffee coaster, and when I lifted up the mug there in a nice round circle were the words “syncope, tilt table test, Richard Sheldon.” A true ‘aha’ moment: a new tool, a new test, very little known, a large population, and a huge unmet clinical need. How could things go wrong?

What do you feel were some of the most important findings of syncope-related studies over the past decade or so?

There have been interesting themes that I think have pointed the way forward. The physiology of vasovagal syncope is becoming a little more clear, as several groups have shown that the first step in the pathophysiology of vasovagal syncope is the venous pooling, probably mainly in the abdominal splanchnic venous beds. This raises the slew of other questions about why syncope occurs at such idiosyncratic rates, and of course why some people faint and others don’t. There are few genetic studies but none are conclusive. Several lines of evidence now point to the existence of a syndrome characterised by complete heart block that has sensitivity and specificity to the vasovagal condition and much remains to be done. Two drugs (metoprolol and fludrocortisone) and permanent pacemakers show exciting promise as effective treatments. One of the most promising developments is the development of national and international networks of investigators aiming at making overall care for syncope more effective and more efficient. These are harnessing the multidisciplinary efforts of investigators in the UK, North America, and Europe.

What would you say should be the main goals of current and upcoming research into syncope?

We need to know the ultimate biological causes of syncope, develop targeted precision treatments, harness the role of the placebo, and prevent much of the unnecessary investigations and admissions.

How important is it for you to work with syncope patient groups?

It is important, pivotal and exhilarating. They have set our priorities and work closely with us, providing insights and checks, as we develop new trials and move the findings into new policy and practice. It is really quite a wonderful development.

What are your plans for future research and investigation?

We are finishing up three big studies aimed at understanding whether there is a genetic association with vasovagal syncope and three drug clinical trials. We are also setting up a large national and international network of centers of excellence (NCE), and therapeutic strategies for syncope.

What do you think are the most promising developments in the investigation and treatment of syncope, he has developed the Calgary Symphone Score, which resulted in a large reduction of health care utilisation and expenditure and is the world leader in randomised clinical trials of diagnostic and therapeutic strategies for syncope.

FUNDING

Networks of Centers of Excellence (NCE), Canada, Canadian Institutes of Health Research; Libin Cardiovascular Institute of Alberta

COLLABORATORS

Andrew Kranin, UBC, Vancouver; Carlos Morillo, & Satish Raj, UC, Calgary; Mary Runte, U Lethbridge, Alberta; Padma Kaul & Roorpillar Sandhu, U Alberta, Edmonton; Juan Guzman, McMaster U, Hamilton Ont; Venkatesh Thiruganasambanthamoorthy, U Ottawa, Ont; Monica Solbiati, Giorgio Costantino, Raffaello Furlan & Franca Baldi, U Milan; Matthew Reed, Edinburgh; Trusty Lobban MBB, London UK; Win Shen, Phoenix, Arizona

BIO

Dr Robert Sheldon, MD, PhD is a cardiac arrhythmia specialist and Professor of Cardiovascular Sciences and Medical Genetics at the University of Calgary. His research is focused on cardiovascular autonomic physiology and its disorders, including vasovagal syncope.

CONTACT

Professor Robert Sheldon Libin Cardiovascular Institute of Alberta University of Calgary Health Research Innovation Centre (HRIC) 3280 Hospital Drive NW Calgary, AB T2N 4Z6, Canada

e: Sheldon@ucalgary.ca
	T: +1 403-220-8191
	W: www.libin.ucalgary.ca/content/dr-robert-sheldon
	www.canot-cce.ca/
	www.healthymalliance.org/start/ce
	www.potuk.org/