I am an Emergency Physician working in a busy Emergency Department like those doctors on the television show ER. There are no George Clooney lookalikes in my department though. But like all Emergency Departments, you do not need an appointment to be seen, and you can come and see us for just about anything at anytime. We are never closed and we never turn anyone away.

After nearly 20 years working as an emergency specialist, I remain humbled to the challenges brought on by diseases and injuries suffered by patients presenting to the department. However, patients do not actually come to us with a diagnosed disease or injury. They come to us with symptoms and signs and need us to then find the cause and provide the treatment. For instance, they might come to us with a headache, which may be severe, sudden and nothing like what they ever had before. Their GP surgery might be closed. They may have already taken pain medicine without effect in the preceding hours. For whatever reason, they are here now in emergency needing help for a severe headache.

While any type of pain or discomfort is challenging for all of us, my challenge as an Emergency Physician in the Emergency Department is to make certain I can find or exclude any potentially life or limb threatening condition. At the same time, I will provide treatment to relieve the pain and discomfort even before any diagnosis is made. Headache is a common reason for a patient to present to the Emergency Department. There are many possible causes, which are varied such as migraine or tension headache. Most emergency patients will get better with simple pain medication and a quiet place to rest. I tell patients that I expect their symptoms to improve with my treatment. Occasionally, when there is suspicion, I tell them there are three potentially serious causes I need to rule out before they can go home. These three are infection (known as meningitis), bleeding from subarachnoid haemorrhage, and a brain tumour. Let me stress that these are three uncommon causes of headache, and even though I see lots of patients with headaches, they rarely have one of these serious conditions.

So now I would like to tell you more about my special area of research interest, which is subarachnoid haemorrhage. In subarachnoid haemorrhage there is bleeding on the surface of the brain, so it is a type of stroke. The bleeding in subarachnoid haemorrhage results from the rupture of an aneurysm or small blowout of an artery in the brain. An aneurysm looks like a tiny balloon bulging from the side of an artery. It is a condition that some of us are born with. However, when the aneurysm ruptures, the blood from within the artery escapes onto the surface of the brain. In
subarachnoid haemorrhage, patients then usually complain of a sudden, severe headache, not infrequently described as “like being whacked across the back of the head”. The presence of an aneurysm is usually diagnosed by a CT scan of the brain. The condition usually requires surgery to prevent further bleeding. Despite treatment, about one-third of the victims of subarachnoid haemorrhage die, one-third survive with neurologically disabilities, and only one-third survive without neurological impairment.

The diagnosis of life threatening causes of headaches can be challenging. I do not want to, and you do not want me to, order a CT scan on everyone with a headache. This is because the vast majority of headaches are not life threatening and will simply improve with pain medication, so a CT scan is not indicated. Also CT scans are not without risks. Firstly, there is the risk of radiation exposure. This risk might be small for a single scan, but the radiation is additive if scanning is repeated, for example in someone with recurrent headaches. Secondly, there is the risk of allergic reactions to the dye or contrast injected into the vein needed for certain types of CT scans. Thirdly, there is the risk of kidney damage from the intravenous contrast if the patient has already got underlying kidney disease. Last but not least, there is the financial and time costs associated with ordering the scans. We do not order a scan “just in case”. We want to order a scan only when there is clinical suspicion of a life threatening condition. The challenge is to correctly pick which patient really needs a CT scan.

The majority of patients with a subarachnoid haemorrhage bleed will show up on a CT scan. A minority, less than 10%, may not show up on the CT scan because the amount of bleeding is too small. If there is still clinical suspicion of a subarachnoid haemorrhage despite a normal CT scan, a spinal tap or lumbar puncture is usually required to diagnose the subarachnoid haemorrhage. In a lumbar puncture, a skinny needle is passed into the lower back to collect a sample of the spinal fluid that surrounds the brain and the spinal cord. When there is bleeding on the surface of the brain, the blood tracks down the spinal fluid in the lower back, so finding blood in the spinal fluid is evidence of a subarachnoid haemorrhage. In theory, this process for making a diagnosis is simple enough. In practice, it can be challenging.

There is controversy over the best way to test the spinal fluid for blood. American doctors simply inspect the fluid with the naked eye. The British mandate an examination with a light-reading machine called a spectrophotometer. Moreover, the British will not perform any lumbar puncture until 12 hours after headache onset. They argue that blood or its breakdown products will not show up in the spinal fluid until 12 hours have elapsed. The Americans, however, will perform the lumbar puncture before 12 hours and argue if there is bleeding they want to know earlier. Here in Australia, our views are not so polarised like those on the opposite sides of the Atlantic. There are variations in what Australian doctors do, because there is no
clear-cut evidence one way or the other as to which approach is the correct one. Evidence to answer this question will come from research.

Researchers are continuing to find better ways to make an early diagnosis of subarachnoid haemorrhage. This may be in the form of a new test or combinations of existing tests in difference sequences. I am challenged to diagnose my patient with a serious headache such as from a subarachnoid haemorrhage. With or without Dr Doug Ross (a.k.a. George Clooney in ER), doctors in Emergency Departments across the world will overcome the challenges, rule out any life threatening conditions, and provide symptomatic relief. Then we can safely tell our patients exactly when they do or do not have a serious, that is potentially life-threatening, cause for their headache.