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## Health Tip

# Swimming-Induced Pulmonary Edema

## What it is, what you can do about it

by Theresa Wallace

**A**t about the 750-metre mark in the swim, I got tightness in my chest, shortness of breath and a gradual buildup of fluid in my lungs. I felt like I couldn't go on. It took me forever to finish the swim, and then I started coughing up pink frothy foam," says Katherine Calder-Becker, a 44-year-old triathlete with a swimming background, of her struggle with swimming-induced pulmonary edema (SIPE) in last summer's Ford Ironman USA Lake Placid.

Her friend Christine McKinty was volunteering at the race and was able to talk to Calder-Becker in the transition zone. Calder-Becker wanted to get on her bike but McKinty, who co-owns Somersault Promotions and has 17 years experience as a triathlon race director, told Calder-Becker to listen to the officials.

"Katherine had trained for years to get to this competition. Her family was all there. It was heartbreaking. I could hear what the doctor behind her was saying but she couldn't because she was in race mode. I told her it wasn't about the race anymore and she had to look at the bigger picture. Once she made the decision that continuing wasn't worth the risk, they put her on a gurney and her body just gave out," McKinty recalls.

This was Calder-Becker's second experience with SIPE, although she didn't have a name for her ailment yet. The first was in the Mooseman Half-Iron in New Hampshire the previous month. She'd managed to push through until the run, but ended up in an ambulance with an oxygen mask on her face. Follow-up tests revealed nothing wrong with her heart, lungs or blood. Calder-Becker and her doctor concluded she'd suffered from acid reflux.

After Lake Placid, Calder-Becker was referred to a cardiologist and sought out other triathletes who had similar race-day stories. "Katherine did a lot of legwork to research her condition, and she really reached out to the triathlon community," McKinty recalls.

Calder-Becker found a medical scientist in Texas and a doctor in Israel who are knowledgeable about SIPE, and she finally got a diagnosis.

### What it is

In lay terms, pulmonary edema is an abnormal accumulation of fluid in the air spaces of the lung. It occurs when the fluid part of the blood (plasma) crosses the lung capillary membranes into the air sacs. The capillary membranes normally diffuse gases like oxygen and carbon dioxide, but not fluid.

In SIPE, blood that is normally in the extremities is forced by water pressure and cold temperature into the central circulation, which increases the load on the heart. If emptying of the heart is slowed for any reason, pressure builds behind the lung capillary membranes and flooding of fluid across the membranes can occur.

Triathletes should not confuse SIPE with exercise-induced asthma or a panic attack in the water. Also, SIPE is not the same as cold urticaria, a rare allergy to cold that usually involves, depending on its severity, a headache, nausea, vomiting and hives or welts on the skin.

The pink frothy spit-up is the red flag – if you're coughing up blood or a pink frothy liquid, you are likely experiencing swimming-induced pulmonary edema.

### What causes SIPE

The few studies on SIPE have identified maximal exertion, immersion in water and overhydration as precipitating factors.

Since no studies have been done, it is impossible to know whether wetsuits are a predisposing factor or a protection against SIPE. There definitely seems to be a connection between SIPE and race-day conditions, including cold-water swimming and sudden extreme exertion.

"I weigh 125 pounds and so I like to hammer out the swim – I go hard to get out front and avoid the chaos of the mass start. But that also means I increase my heart rate and blood pressure rapidly right at the beginning of the race," admits Calder-Becker.

### What to do if you experience SIPE


If you develop SIPE in a triathlon swim, your alveolar capillaries are already injured. According to Charles Miller, a professor of clinical research at the University of Texas Medical School in Houston and a triathlete who has experienced SIPE, "You're unlikely to recover while you're still in the water, so get out right away. If you need assistance, signal a kayak. When you're out of the water, ask for medical attention. Supplemental oxygen or even a diuretic may be necessary."

A triathlete who experiences SIPE once may get it again. That's at least partly because damaged capillaries may not have completely healed before the next occurrence. Healing may take six months, maybe longer.

### Now for the good news

SIPE is a rare condition. And it's very treatable. Symptoms usually disappear within 24 or 48 hours once the conditions that created it – cold water and exertion – are removed.

Calder-Becker raced again last fall SIPE-free in the Demi Esprit Half-Iron in Montreal, but she's still searching for answers. "My doctor suggested I quit triathlons. But I don't want to give up the sport I love. And I want to raise awareness, because triathletes need to realize how serious SIPE is."

She is helping Israeli doctor Daniel Weiler-Ravell, a SIPE researcher, set up a registry to record incidents of SIPE in triathletes. To find out more about the registry, please contact Katherine Calder-Becker at [triathlonteam@gmail.com](mailto:triathlonteam@gmail.com). 

*Ottawa triathlete Theresa Wallace would like to thank Katherine Calder-Becker and Charles Miller for their help in the writing of this article.*