Next, she saw a rheumatologist, who said, "Yes, well, you've obviously got a problem, but I don't know what it is."

She provided her general practitioner with some information about postpolio syndrome, but nothing came of it, and she has not been to see him since. "I was effectively dismissed," she said.

By this time she was having trouble getting up from a chair and was at her "lowest ebb." Her next attempt at finding help was to telephone the British Polio Fellowship, which she had belonged to as a child. She described her problems to a welfare officer and asked if she had heard any similar stories. The officer replied that she listened to the same story all day every day, and told Alice to pace her activities and learn to rest before the pain and fatigue set in.

The relief Alice felt from this one telephone call was tremendous. Having thought she needed to continue exercise to strengthen her muscles, she now stopped doing so much and found her muscles becoming stronger. She no longer had episodes of fatigue, as long as she rested a couple of times in the day. This acknowledgement of her symptoms and advice was all she had wanted from her doctor.

I interviewed Alice as part of my research for a PhD in medical sociology. She spoke in a gentle voice, softly laughing with surprise once or twice at the story she was telling. After the interview, I asked Alice if she had ever told anyone her story before, and she answered quietly, "No, never." She felt it had always been too difficult to explain, and she hadn't really wanted to. Even in 1958, when she had had polio, she felt it was something of a curiosity and a disease doctors knew little about. Because of the vaccine, the research into the complexities of polio that had accumulated in the 1940s and '50s had never been disseminated. Doctors expect weakness and visible atrophy in someone who has had polio, but not the muscle fatigue, pain, and fatigue that are also common. The knowledge that all cases of polio, including mild ones, involved widespread damage to the nervous system had been lost.¹

In parting, Alice said to me, "If one doctor changes his mind about postpolio syndrome from your research, I will be happy. We aren't dead yet." Although Alice has sorted her life out now, I felt everything could have been made a little bit easier for her.

1 Howard RS. Poliomyelitis and the postpolio syndrome. *BMJ* 2005;300:1314-8.

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Simulators

Doctors should learn in the same way that pilots do. They should train and test their skills in simulators. In that way they could make mistakes and climb a steep learning curve quickly without harming anyone—so it would be good for patients and doctors alike.

How many times over recent years have you heard something like this? Some feel that the analogy has been stretched too far and that doctors and pilots do completely different jobs and so cannot learn in the same way. But before we look at the drawbacks of simulators let's first consider their advantages.

Proponents of simulators damn learning by experience: they say that it is time consuming, dangerous, and expensive.¹ Learning with simulators is quicker and safer. Certainly simulators are effective at eliminating risk and allow the learner to learn through repeated failure and eventual success.¹ In simulations you can experience complications that would take you a lifetime of clinical practice to just see, never mind learn how to deal with. Thus, learning and experience can be accelerated. Simulations can also allow us to integrate our knowledge and skills more effectively than by reading a book or sitting in a lecture hall—these methods are best for gaining knowledge. Like many other e-learning experiences, online simulations satisfy the "Martini criteria"—you can do them any time or any place. They can also be a better way of assessing performance than written exams.

What, then, are the downsides of learning via simulations? Virtual reality can never be reality, and caring for a virtual patient on a computer can never be the same as caring for a patient sitting in front of you. So should we make simulators as close to real life as possible? Absolute realism is not always the best option. To learn about how to care for a patient with depression online, you don't need to drive to your virtual surgery in your virtual car—in fact, these can distract from the learning experience. Some simulators

can overwhelm the learner with information and cause them to throw up their hands and give up.

At BMJ Learning, we have found that we don't need to reproduce a virtual hospital to produce effective simulations. However, although too much emphasis on physical fidelity can be a distraction, psychological fidelity (that is, patients doing and saying things that are credible) is essential. For that reason, our simulations (which we call interactive case histories) involve patients with common conditions and common complications of these conditions. The simulations then train and test your skills on important aspects of these conditions such as diagnosis, treatment, and prognosis.

One of our newest case histories introduces you to a series of patients with abnormal liver function tests. The module's author, Anand Reddy, says that "a recent large population based study showed that apparently healthy people with liver function tests at the upper end of normal had markedly increased mortality from liver disease."² Another study showed that 8% of US citizens without overt liver disease have unexplained abnormalities of their liver function tests, possibly reflecting increased prevalence of fatty liver.³ To find out how best to care for patients with abnormal liver function tests just click on www.bmjlearning.com.

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- 1 Epic Group. White paper: Simulations and e-learning. www.epic.co.uk/content/resources/white_papers/sims.htm (accessed 19 May 2005).
- 2 Kim HC, Nam CM, Jee HS, Han KH, Oh DK. Normal serum aminotransferase concentration and risk of mortality from liver diseases: prospective cohort study. *BMJ* 2004;328:983-90.
- 3 Clark JM, Brancati FL, Diehl AM. The prevalence and etiology of elevated aminotransferase levels in the United States. *Am J Gastroenterol* 2003;98:960-7.