Iceland is a country with great natural beauty (Figure 1). Although it is small and relatively isolated (Figure 2), its cardiologists are starting to have international impact. The country has just 24 cardiologists, but with only 300,000 inhabitants, it has one of the highest ratios of specialists-to-population in the world. Most of these cardiologists are trained in the United States or Europe, since specialist training is not available in Iceland. Medical school training takes 6 years in Iceland, and this is followed by 2 years of house officer training as junior hospital staff. Then, at around 30 years of age, junior doctors go abroad for 5 to 10 years of specialist training.

For the past 3 years, doctors have been able to complete the first year or two of internal medicine in Iceland before going abroad. “This leaves a gap in the range of doctors we have,” says Dr Karl Andersen, who is associate professor in the Faculty of Medicine at the University of Iceland in Reykjavik, and chief of the risk assessment clinic at the Icelandic Heart Association. “The result is that cardiologists have to take a larger part of the clinical workload that junior doctors would otherwise be doing.”

But there are no plans to introduce cardiologist training in Iceland. Dr Andersen says, “We see it as a very positive thing, even if it’s tough, because we gather experience from both sides of the Atlantic.” The majority of students return, despite the competition to get one of the limited numbers of positions at the University Hospital in Iceland.

In the past, the geographical isolation of Iceland created problems for research, but with the Internet, air travel, and a growth in international connections, the number of articles published by researchers in Iceland has rapidly increased. Research is carried out and articles are produced by the Medical Faculty of the University of Iceland, the Icelandic Cardiac Association, deCODE Genetics, and the Icelandic Heart Association. Two examples of the work being done include the first study using gene-tailored therapy, and the use of C-reactive protein as a predictor of coronary events.1

“There is a steady increase in the number of papers that are having an impact internationally, and we are very happy with this,” says Dr Andersen. He adds, “I think it is not just the Internet and the computer technology, but it’s also the fact that we have a very high level of education among cardiologists in the country. Between 40% and 50% of all cardiologists have a PhD.”
Being isolated has not had a negative impact on funding for research. There are good opportunities for funding from abroad and increasing opportunities from within Iceland.

And the level of treatment opportunities is very high, says Dr Andersen. About 650 percutaneous coronary interventions (PCIs) are performed each year, which is among the highest per capita in Europe, and just behind the United States. In addition, each year there are 120 coronary bypass operations, 1550 diagnostic coronary angiograms, and 130 new pacemaker implantations.

The stent rate is between 80% and 90% for PCIs. Of these, 15% are drug-eluting stents. Dr Andersen comments, “The drug-eluting stent rate is relatively low in Iceland compared to many centres.” He speculates that this is because the rate of diabetes is relatively low in Iceland and the complication rate in those with diabetes is lower than in the rest of Europe. There are also cost restraints.

The success of these treatments is clear. Figures from the Icelandic Heart Association, taken from the Reykjavik Heart Study (a population-based study of all individuals in the greater Reykjavik area who were born between 1907 and 1935), show that the incidence rate of myocardial infarction (MI) decreased by 55% in men and 51% in women in the period 1981 to 2002. The mortality rate for MI dropped 69% in men and 56% in women over the same period.

The in-hospital 30-day mortality rate for MI decreased from 8.7% in 2003 to 6.7% in 2004 and 5.7% in 2005. “We were very surprised when we saw these figures,” says Dr Andersen. However, he thinks they are due to the 24-hour PCI service that began on weekdays in 2002 and expanded to 24 hours a day, 7 days a week, in 2003. “We like to think this has improved the treatment and prognosis of patients with MI,” he says.

Dr Andersen points out that Reykjavik is the optimal size for this type of service because it has enough patients to keep the service going, and on-call staff can get to the hospital in 15 minutes and start the procedure 15 minutes later.

He says that being a small country is more of a benefit than a problem. Two-thirds of the population live in the Reykjavik area, which has the main hospital. And, weather permitting, unstable patients can be transported by helicopter to this hospital within 3 hours from any part of Iceland.

Another benefit is the mix of education and experiences of doctors returning to Iceland after studying in the United States and Europe. Dr Andersen says Iceland is developing a treatment model somewhere between those of Scandinavia and the United States. “We’re trying to take bits from both sides and develop something that gives us good results,” he says.

Jennifer Taylor is a freelance medical writer.

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**Viewpoint: Gabriel P. Krestin, MD**

Dr Gabriel Krestin is professor of radiology at the Erasmus Medical Centre, University of Rotterdam. He talked to Philippa Pigache about whether noninvasive cardiac imaging is likely to be a source of conflict or cooperation.

Noninvasive cardiac imaging is of intense interest to both cardiologists and radiologists. Cardiac imaging is regarded as the “Holy Grail” of noninvasive imaging. The 4D image of the beating heart — in 3 spatial dimensions plus a temporal one — is the quest of both cardiologists and radiologists. Like the Grail, it symbolises something rare, precious, and almost unobtainable. Unlike the Grail, however, it is almost within our grasp, thanks to unprecedented technical developments in recent years.

Some of these techniques are already available as part of the clinical armoury of diagnostic decision-making: coronary calcium scoring, functional examination in congenital heart disease and left ventricular failure, studies of myocardial viability, and even that most elusive of goals, noninvasive coronary angiography (CA).

More advanced applications lurk around the corner, poised to enter the clinical arena: the assessment of total coronary plaque load, the characterisation of coronary plaque composition, the detection of vulnerable plaque, not to mention combined functional and metabolic examinations. These exciting achievements have advanced the frontiers of noninvasive diagnosis for cardiac disease and taken radiologists onto the turf of their colleagues, the cardiologists. Is this a friendly development, or is there a risk of fierce territorial battles ahead?

This imaging activity represents considerable revenues. Using the mean incidence of catheter CA in Europe (see Figure), combined with the average cost of the procedure, this alone represents a potential annual revenue of €3.5 billion for European cardiologists. This is the sort of income that colleagues may well compete over, should noninvasive imaging ultimately replace the more invasive, catheter-based approach.

Physicians in general prefer to present a unified face; nevertheless, signs of conflict have appeared. Michael J. Wolk, MD, FACC, past president of the American College of Cardiology, says in the American Journal of Cardiology, “The fight for imaging services affects every one of us, and it is a fight that will take considerable resources and commitment to eventually win. And we will win.”

A quick search of Medline confirms this claim. In the past 10 years (1995-2005), the number of papers published on cardiac imaging has doubled. But the number of papers from nonradiologists has doubled twice as much again. In the United States, the trend for radiological self-referral —
when a cardiologist or other clinician refers a patient for a diagnostic procedure, which he carries out himself — is increasing, driven partly by a defensive need to avoid medical negligence litigation. The trend has also become noticeable in Germany and other European countries.

The cardiac imaging section, which is part of both the radiology and the cardiology departments. All members of the clinical and the research faculty are jointly appointed as part of both specialist departments.

The section is headed by a jointly appointed professor of cardio-radiology who is a cardiologist trained in cardiac imaging. Only the equipment and technical personnel are exclusively from the radiology department.

Although Erasmus Medical Centre is a nonprofit making organisation, all examinations are reimbursed, per case, to radiology at cost price. And, importantly, all scientific output — scientific papers and PhD theses — appear under a double affiliation.

The cardiac imaging section must be doing something right. Since its inception at Erasmus Medical Centre in 2001, its members have produced 67 peer-reviewed publications and 5 PhD theses. It has successively implemented the most recent technologies in computerised tomography (CT) and MRI — 4-, 16-, and 64-slice CT and various 1.5 and 3 Tesla MR systems — and has performed 1200 CT CA examinations. There have been 800 functional or viability cardiac MRI studies and 400 MRIs for congenital heart disease.

In the words of Joerg F. Debatin, MD, MBA, medical director of the University Hospital, Hamburg Eppendorf, Germany; “Teamwork is essential for realising the potential of a growing market.”

Dr Krestin delivered the Peter Mansfield Honorary Lecture at the European Congress of Radiology in Vienna in March. In addition to his position at Erasmus MC, he is president of the European Society of Magnetic Resonance in Medicine and Biology and chair of the Research Committee of the European Association of Radiology. He is visiting associate professor of radiology at Stanford University in Stanford, Calif, and a member of 11 editorial boards. Philippa Pigache is a medical science writer.

References

The opinions expressed in Circulation: European Perspectives in Cardiology are not necessarily those of the editors or of the American Heart Association.
stages. In the first stage, a representative sample from the target population was selected for analysis from the 2003 to 2004 data. In the second stage data from 2005 to 2006 will be examined, and the third stage will involve the 2007 to 2008 data.

The parameters registered are AH prevalence (percentage of patients with blood pressure (BP) >140/90 mm Hg and/or taking antihypertensive medications), stage, and risk: AH awareness, treatment, and treatment effectiveness (Figure 1); gender, age, education, smoking status, alcohol consumption; heart rate, weight, height, and total cholesterol; associated diabetes mellitus (DM), left ventricular hypertrophy (LVH), coronary heart disease (CHD), cerebrovascular pathology, kidney disease, hypertensive retinopathy, and other pathologies.

According to AH monitoring data from 2004, AH remains an important health problem in Russia. To address this issue, the Russian National Cardiology Society issued guidelines for AH prevention, detection and treatment in 2000, and these were revised in 2004. Numerous research and education programs for health professionals and the general public have been initiated. A system of AH epidemiology dynamic control is functioning in 34 Russian regions. The data collected have offered an opportunity for improving the assessment of AH prevalence and shown the need for subsequent medical management of affected patients.

At the moment, information on the vital status of the first survey participants is being collected. We have already embarked on the second stage of the programme with the survey of the data from the period 2005–2006.

Dr Shalnova, Dr Deev, and Dr Oganov are, respectively, deputy director, head of the biostatistics laboratory, and director of the State Research Centre for Preventive Medicine in Moscow.

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Figure 1. Arterial hypertension: Awareness, treatment, and treatment effectiveness results from the 2004 data.

Figure 2. Arterial hypertension prevalence in Russia: results from the 1994 national sample survey and 2004 monitoring survey compared.