

Lorna Gibson SRS Scholarship Report

European Congress of Radiology 2015

I would like to thank the Scottish Radiological Society for generously supporting my visit to the European Congress of Radiology (ECR) during March 2015. I was able to attend educational sessions on emergency radiology aimed at registrars, and of particular interest to me, multiple sessions related to population-based imaging.

My interest in population-based imaging stems from my work on a systematic review of the prevalence and types of incidental findings on body magnetic resonance imaging (MRI), which led to the development of a PhD proposal on the epidemiology and impact of incidental findings detected on the UK Biobank imaging study. The UK Biobank (www.ukbiobank.ac.uk) will be the world's largest multi-modal imaging study, and plans to perform brain, cardiac and abdominal MRI in 100,000 of its healthy participants. I wished to learn more about the current state of healthy, population-based and disease-specific imaging cohorts around the world, to hear about current thinking on some of the methodological, logistical and ethical issues facing these types of studies, and to meet researchers working on both the UK Biobank, and other European cohorts during the congress in order to inform my future PhD work.

Several initiatives have attempted to collate information on completed and ongoing biobanks. Dr Hans-Ulrich Kauczor, who chairs the European Society of Radiology's Research Committee, summarised the work of the European Society of Radiology Working Group on Imaging Biobanks, which will soon be published in *Insights in to Imaging*. The Working Group has attempted to document all existing sources of imaging data, from both disease-specific patient cohorts and population-based studies, and this summary will be an important resource to direct imaging researchers to relevant biobanks in order to ask epidemiological questions relating to risk factors for diseases, or to develop normal reference values or imaging biomarkers of disease.

Several speakers also described current large European imaging cohort studies in more depth. The German National Cohort have currently imaged approximately 800 participants with whole-body MRI at multiple centres around Germany, and so far the prevalence of serious incidental findings is approximately 10%. I discussed this with the presenter, Dr Fabian Bamberg, as the impact of incidental findings detected during large imaging studies on participants and health services likely relates to the final diagnoses, and many of these findings may well turn out to be benign. We discussed the need for more evidence to inform the management of incidental findings, and how such data could be generated by the ongoing UK Biobank and German National Cohort studies.

Dr Langner described the clinical and imaging data routinely collected by German trauma centres, and the collaborative efforts of the German Röntgen Society and the German Society of Trauma to develop a centralised national biobank which could store and

provide access to these data for researchers. Similarly, in Scotland, clinical and imaging data are generated for each trauma patient during routine clinical care, and these data are used for audit purposes. However, in contrast to the current work in Germany, there are no plans to develop a national Scottish trauma clinical and imaging biobank for research.

Population and disease-based imaging cohorts face methodological and ethical issues. Dr Kauczor discussed the need for large studies to acquire images using different scanners located at multiple sites, which introduces variability, despite best efforts to standardise imaging acquisition protocols and post-processing methods. These sources of variation may affect researchers' abilities to develop, standardise and validate potential imaging biomarkers of disease in future. Regarding ethical issues, Dr Reinold Schmücker discussed the concept that feedback of incidental findings compromises the integrity of research by influencing the behaviour and access to health care of those participants, thus systematically biasing the sample. I had not considered this before, however given the estimated prevalence of incidental findings, for example, on brain imaging, is in the magnitude of 1-2% (Morris 2009), and those requiring action will be fewer, I think the risk of incidental findings seriously jeopardising the integrity of a study is likely to be low.

I also took the opportunity to hear Dr Alexander Bankier describe the development of the Fleischner guidelines for the management of incidentally detected lung nodules, as there is a general paucity of evidence to inform the management of incidental findings in general, and I wished to learn more about the evidence behind this specific finding. Dr Bankier focussed on describing the limitations of the guidelines, in particular, the inter- and intra-rater observer agreement on size measurements of nodules is poor, and discrepant size measurement may result in differences in management in two-thirds of cases. In addition, stratification of a patient's risk of malignancy is based only on smoking status, and does not take in to account other potential risk factors including gender, environment, family or personal history, therefore the identification of high-risk patients is limited.

Dr Bankier also showed that the vast majority of the evidence which informed the development of the guidelines was low or moderate quality. With the increasing use of CT imaging during clinical practice, there is a real need for robust data on the risk of different types of lung nodules developing in to malignancy, and how this relates to patient characteristics and the timeframe required for follow-up. Without such data, we risk inappropriately deploying limited NHS resources in a cost-ineffective manner, without benefiting patients, and possibly causing them harm.

My visit to the European Congress of Radiology was thought-provoking, inspiring, and enabled me to meet the researchers who are at the forefront of European population-based imaging, and tackling the methodological and ethical issues generated by this type of research. I am again extremely grateful to the Scottish Radiological Society for their generous support which enabled me to make the most of the educational, scientific and networking opportunities presented by this conference.

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References

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