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Managing Large-Scale Research Projects

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Over fifteen years ago, the Department of Epidemiology and Biostatistics of the Erasmus MC University Hospital, Rotterdam, established the Rotterdam Study, one of the world's largest ongoing population-based studies. The Rotterdam Study is a prospective, population-based study aimed at investigating chronic disease in the elderly. These diseases constitute a major societal burden, both in terms of monetary costs and suffering of patients and their relatives. The findings from the Rotterdam Study will undoubtedly contribute to improved prevention and treatment of chronic disease in the elderly. In this article, I will discuss the role of the radiology department in contributing to the success of this long-term research project, and how this is managed.

Imaging Brings Added Value

Using imaging, it is possible to identify the presence of structural and functional changes and disease before the onset of clinical symptoms. This presents major prospects for epidemiological research. Firstly, imaging characteristics that reflect disease-specific pathology - especially if measurable in an early phase - provide better outcome measures in etiologic studies of neurodegenerative and vascular disease. Secondly, imaging may allow early identification of people at risk for clinical disease that may benefit from preventive interventions.

Due to the ongoing Rotterdam Study and the available expertise obtained in pilot projects in both brain imaging and vascular imaging, the research environment at Erasmus MC was optimal to initiate a large-scale, prospective, population-based neuro-imaging and cardiovascular imaging study. In 2002 the Departments of Epidemiology and Biostatistics and Radiology of Erasmus MC therefore decided to collaborate by acquiring MR and Multislice CT (MSCT) images with state-of-the-art equipment from the participants in the Rotterdam Study.

My role in the study is as Project Leader for Radiology in both the MRI and MSCT aspects of the study. In order to fulfil my obligations, my clinical workload has been reduced, with half my working time spent on research.

To ensure high participation rates in the imaging portion of the study, a dedicated MR 1.5T scanner was installed in the suburb of Ommoord in connection with the existing research facilities. This set-up allows us to keep stringent quality control over upgrades, imaging procedures and maintenance changes and guarantees that the same scanner will be used for repeated imaging. Practical and financial issues precluded placement of a multislice CT scanner in Ommoord. Therefore, participants were invited to visit Erasmus MC, where a 16-row MSCT scanner was allocated for research purposes.

Challenges of Collaboration

Any collaboration between such a large number of departments involves inherent conflicts in terms of input, both financial and personnel-related, and output, such as credits. Participating departments realise that high-quality research can only be performed when all departments bring the best of their experience to the table. Therefore, a business plan was made in which the responsibilities, obligations and rights of the different research groups were formulated. One of the specifications of this plan means that PhD students from the different departments, including Radiology, are employed directly by the Rotterdam Study.

What is the Role of the Department of Radiology?

Our department contributes a state-of-the-art MRI and MSCT scanner that were installed under the guidance of our physicist and are operated by technicians appointed and trained by our department. Secondly, scan protocols were developed by CT and MRI physicists of the Department of

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Radiology. The development of MRI protocol was preceded by extensive discussion between the involved neuro-epidemiologist, radiologist, physicist and scientists of the image-processing department.

Our collective goal was to acquire imaging data that could provide extensive, high-quality information and insight on the aforementioned biomarkers of pre-clinical disease processes, and to ensure that imaging data were eligible for automated image processing. All of the image acquisition had to take place within 30 minutes. Also, a protocol was developed to prevent subjects with contra-indications for MRI-exams to participate in the MR imaging study. Lastly, procedures for the handling of incidental findings that may have important health consequences for the participants, were assessed.

Conclusion

In closure, it is my experience that large-scale research studies bring their own special challenges and demands for involved imaging professionals. In my opinion, the best and only approach is to enter into such a project with a spirit of teamwork and collaboration, in order to ensure the best possible blend of expertise and experience, and of course the most enlightening outcome. It remains to be seen where the results of this study can potentially lead healthcare in the future, but no doubt it will have consequences more farreaching than even present collaborators have envisioned.

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