Obesity in Ireland in 2008: What Radiological Equipment is Available to Image the Obese Patient?

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Abstract
Obesity is a global epidemic, responsible for 2000 premature deaths in Ireland each year. The extent of this epidemic was quantified by the National Taskforce on Obesity (NTOF), whose report, published in 2005, found that 39% of adults were overweight and 18% obese with obesity in adults predicted to increase by 1% per year. In light of the clear evidence that we, as a nation, are quite literally expanding, how well equipped are Irish hospitals and, in particular, radiology departments, to deal with patients of increasing size and weight? The purpose of this study was to quantify the weight limits and girth restrictions of the radiological equipment, in particular CT, MRI and fluoroscopy, in hospitals, both public and private, in Ireland in an attempt to answer this question.

Introduction
The Weight Management Service at St Columcilles Hospital in Loughlinstown, Dublin, employs an evidence-based, multidisciplinary approach to obesity management. It is the only government-funded service of this kind active in Ireland to date and as such, receives referrals from all over the country. A review of the average current weight of the patients attending this service, receiving multidisciplinary medical management, and weight at referral of those on the waiting list, provides good insight into the average weights of the current obese patient pool in Ireland.

Methods
A simple postal questionnaire, stamped envelope enclosed, personally addressed to the Radiology Services Manager of the radiology department of 40 hospitals in Ireland (31 public, 9 private) was sent out in January 2008. Each department was asked the weight limit and manufacturer of their CT, MRI and fluoroscopy table. The aperture diameter of each machine was supplied on request by three of the four main manufacturers involved Siemens, GE, Toshiba. A review of the database of patients who have presented to St Columcilles Weight Management service (from 2001-2008) was performed.

Results
34 departments replied, 8 private, 26 public, a response rate of 85%. The information obtained for the table weights was supplied by the Radiology Services Managers of the respective hospitals and therefore reflects the departmental protocol on the weight restrictions of the equipment available. No significant difference was seen between public and private sector. Regarding fluoroscopy equipment the average weight limit was 177kg. The maximum weight limit was 227kg with a maximum girth of 227kg. The maximum and average gantry diameter of CT machines in Ireland is 70cm. The average MRI scan weight limit was 172kg based on absolute maximum weight limits machines could tolerate. The highest weight limit given was 250kg. Similar to CT, gantry diameter varied little among manufacturers and currently is on average 60cm.

Discussion
Recognising these challenges, the industry is now developing machines with better capabilities for the obese patient. Table 1 illustrates the standard equipment available in Ireland now and the aperture and weight limits available for newer equipment. At least one centre in Ireland should have these new technologies so as the obese patient has the best options available and is not denied imaging and diagnosis due to their actual weight limit.

The average weight of the population attending and awaiting appointment at the Weight Management Service is 128kg and so the majority of these patients fall within the weight limits adhered to in the radiology departments in Ireland. However, one in ten of this patient group is over 160kg and is therefore reaching the weight limits of equipment currently available. Almost one in twenty are unsuitable for any cross sectional imaging or fluoroscopy. These are only the limitations imposed by weight alone and with the average BMI of 45 (and ranging up to BMI 86) of the patients waiting for and attending the service, it would seem that the girth restrictions above apply more frequently than the actual weight limit.

Conclusion
The average weight and girth of the patients waiting for and attending the Weight Management Service is 128kg and 177cm respectively. Of the 34 departments that replied to the postal questionnaire, one in ten were unsuitable for any cross sectional imaging or fluoroscopy. These are only the limitations imposed by weight alone and with the average BMI of 45 (and ranging up to BMI 86) of the patients waiting for and attending the service, it would seem that the girth restrictions above apply more frequently than the actual weight limit.

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