RADIATION DOSE LEVELS IN DIGITAL MAMMOGRAPHY: A RETROSPECTIVE REVIEW IN A SOUTH AMERICAN IMAGING CENTRE

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INTRODUCTION
Each year, millions of women in Latin America have a screening mammogram. This may reduce the risk of dying from breast cancer by up to 50% (Allgood et al, 2008; Puliti et al, 2008; Otto et al, 2010). Although radiation doses at mammography are much lower than the doses for which cancer induction is directly observed (Preston et al, 2002), screening a large population on a regular basis has the potential to harm. It has been shown that the risk of tumour induction is proportional to the dose of radiation absorbed in the breast (Boice et al, 1979; Land, 1980; Land et al, 1980; Howe and McLaughlin, 1996; Little et al, 2008; Henderson et al, 2010).

MATERIALS AND METHODS
All patients presenting for screening mammography during a period of six months at our imaging centre were reviewed in this study, for which the institutional review committee granted approval and waived the requirement for informed consent document of patients. A total of 2492 images acquired from 623 patients with a Siemens Mammomat Inspiration digital mammography system were included. In our clinical practice, only women of 40 years or older are eligible for screening. Women below 40 years old are screened under exceptional circumstances. The MGD per examination was 2.88±0.05 mGy, the average compressed breast thickness was 64.3±0.5 mm, and the average compression force was 10.1±0.4 dN. 31% of the cases were patients with breast prosthesis present. 12% percent of the cases required more than the four normal views to cover all breast tissue. When extra views were included, the MGD per subject was 3.85±0.06 mGy. A dose reference level DRL value of 1.64 mGy has been established by calculating the 95th percentile of the average MGD for compressed thicknesses ranging from 55 mm to 64 mm (see figure).

RESULTS
Parameters influencing mean glandular dose (MGD) in digital mammography (FFDM). (a) MGD vs. breastthickness. (b) MGD vs. volumetric breast density. (c) MGD vs. compression force. (d) MGD vs. compression pressure; pressure is calculated by compression force divided by the breast contact area. (e) MGD vs. HVL. (f) MGD vs. mAs.

CONCLUSIONS
Our results show that demographic factors including mean breast thickness and breast prosthesis affect MGD of patients in our country region. Finally, our findings show a small increase of radiation dose to the breast by digital mammography due to the average breast thickness of our patients. The radiation risks of mammography screening between age 40 and 74 were predicted to be negligible.