

# Are Referrals for PETCT Imaging for Common Cancers Influenced by Socio-Economic Deprivation in the Greater Manchester and Cheshire Network?

Chatha H, Salam M, Mirza-Chaudry S, Khan S, Swindell R and Hulse PA.

Departments of Radiology, Nuclear Medicine & Medical Statistics and North West Cancer Intelligence Service, The Christie NHS Trust, Manchester, M20 4BX, UK

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## Introduction

PETCT (Positron emission tomography computed tomography) is a complex and expensive imaging technology used in the management of cancer patients. Since 2006, in the Greater Manchester and Cheshire Cancer Network (GMCCN, population 3.2 million) PETCT has been employed in the initial staging of lung and oesophageal cancer and the evaluation of suspected or established recurrent colorectal cancer.

Cancer morbidity is greater and survival is lower in areas of socio-economic deprivation. This could be, in part, due to poor access to diagnostic services including complex imaging such as PETCT. Deprivation index is a measure of poverty at the small area level and is derived from the following dimensions: income, employment, health and disability, education, skills and training, barriers to housing and services, living environment and crime. The deprivation index for each post code in GMCCN is known.

## Objective

To examine the relationship between socio-economic deprivation determined by post code of residence and the referral rate for PETCT for lung, colorectal and oesophageal cancer.

## Method

The number of new registrations for lung, colorectal and oesophageal cancer in GMCCN in the most recent year that data was available (2007) were obtained from the North West Cancer Intelligence Service.

The postcode of residence and consequently deprivation index for each registration were ascertained using GeoConvert database ([www.geoconvert.mimas.ac.uk](http://www.geoconvert.mimas.ac.uk)).

Registrations were ranked from the lowest to highest deprivation index and the median taken to represent the group (median rank deprivation index, MRDI).

Similarly, the number of referrals for PETCT for lung, colorectal and oesophageal cancer in GMCCN during April 2008 to March 2009 and April 2009 to March 2010 were obtained from the clinical database.

The post code of residence and deprivation index for each referral was obtained. Referrals were ranked from the lowest to highest deprivation index for each of the lung, colorectal and oesophageal cancer groups for 2008-09 and 2009-10 and the median taken to represent the group (MRDI).

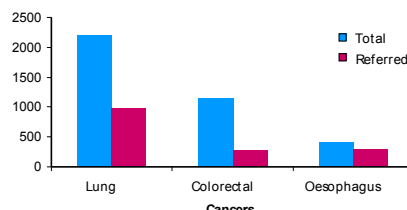
The assumption was made that the deprivation indices and number of referrals for lung, colorectal and oesophageal cancer for 2007 would not be significantly different than those for 2008-09 and 2009-10.

The MRDI for PETCT referrals for lung, colorectal and oesophageal cancer in 2008-09 and 2009-10 were compared with the MRDI for registrations for respective cancers using the Kruskal-Wallis test and employing Statistical Package for Social Sciences (SPSS).

## Results

Forty four per cent of lung, 72% of oesophagus and 23% of colorectal cancer registrations were referred for PET-CT (Figure 1).

Figure 1 Annual total cases of cancer in GMCCN vs. referrals for PETCT



The MRDI of PETCT referrals in 2008-09 and 2009-10 was significantly higher ( $p=0.022$ ) than the MRDI of new registrations for lung cancer (Figure 2), significantly lower ( $p=0.011$ ) for colorectal cancer (Figure 3) and there was no significant difference ( $p=0.374$ ) for oesophageal cancer (Figure 4).

Figure 2 Lung Cancer

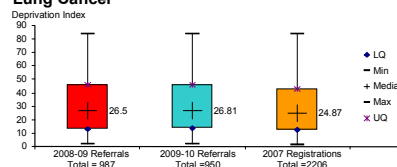


Figure 3 Colorectal Cancer

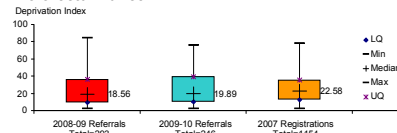
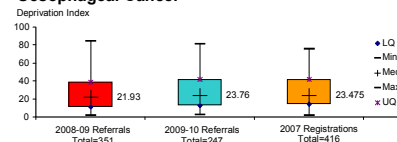


Figure 4 Oesophageal Cancer



This means that more deprived patients were more likely than less deprived patients to be referred for PETCT for staging lung cancer, less likely to be referred for PETCT for evaluating suspected or known recurrent colorectal cancer and were neither more nor less likely to be referred for PETCT for staging oesophageal cancer.

## Discussion

The finding that deprived patients were more likely to be referred for PETCT for lung cancer, a disease more common in poorer patients, is surprising and warrants further investigation.

It would be expected that less deprived patients with recurrent colorectal cancer would be more likely than more deprived patients to be referred for PETCT as more affluent patients tend to gain preferential access to secondary and tertiary healthcare.

The finding that referral for PETCT for patients with oesophageal cancer is not influenced by socio-economic deprivation is reassuring and implies equitable access to complex and expensive imaging for this disease.