



## Social Deprivation and Its Relationship with Primary Care Referrals to Secondary Care in Colorectal Patients: An Observational Study

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### Abstract

**Objectives:** To determine the relationship between referral from primary to secondary care in colorectal patients based on social deprivation category and to examine the effect of Faecal Immunochemical Tests (FIT) on GP referrals.

**Design:** Observational study using data from colorectal clinic referrals examining social deprivation category and rate of referral over a two year period between 2012 and 2014.

The relationship between patient age and referral rates and the use of the FIT by GPs and rates of referral across all socioeconomic categories and ages was also examined.

**Participants:** 8,402 patients referred from primary care to colorectal clinic were included in the initial study between 2012 and 2014 and 3250 patients were included in the post FIT analysis between January 2016 and September 2016.

**Results:** Referral rates for those in the most affluent social category were higher compared to those in the most socially deprived areas. Regardless of social deprivation category older patients were more likely to be referred to secondary care.

Following introduction of FIT, GP referral numbers to secondary care were increased amongst all patient ages and social deprivation categories.

**Conclusion:** Inequalities were demonstrated in rates of referral from primary care to colorectal clinic between those patients from the most affluent and most deprived areas.

After introduction of FIT, rates of referral from primary to secondary care were increased amongst all ages and social deprivation categories.

### Introduction

The primary aim of the UK National Health Service is to provide universal healthcare to all patients in need, irrespective of their social characteristics. Despite this, inequalities in healthcare exist. Healthcare inequality contributes to thousands of unnecessary premature deaths in Scotland each year [1]. Men from the most socially deprived areas can expect nearly 24 fewer years spent in good health [1].

Within the NHS, general practitioners play a pivotal role in controlling access to specialist care, and so factors explaining variations in referral rates have long been a focus of attention. Although socially disadvantaged, older people (>74 years), and women are more likely to consult their general practitioner [2]. The more socially advantaged, men, and younger people (<65 years) are more likely to be referred to secondary care [2].

The effectiveness of reforms such as the NHS cancer plan and national service frameworks in reducing inequalities in health partly depends on the ability of all patients to access high quality specialist care without delay [3].

It is unclear whether inequalities occur once patients are within the secondary sector or at the point of entry to specialist care.

The aim of this study was to understand the extent to which factors related to the patient, general practitioner, and general practitioner's practice explain the wide variations in referral rates (ranging

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from twofold to twentyfold) that have been reported [3].

FIT for haemoglobin is specific for intact human haemoglobin and its degradation products. Faecal Haemoglobin (Fhb) concentrations rise as the severity of underlying colorectal neoplasia increases [4]. Fhb can be measured from a single sample of faeces collected at home. Our groups have previously demonstrated the value of FIT in assessing patients for referral to secondary care and consideration of colonoscopy [4]. Undetectable Fhb in samples proved a good 'rule-out' test for significant bowel disease; cancer was excluded and high risk adenomas were rare. FIT has since been included in the colorectal specialist referral pathway.

This study aims to examine the extent to which referral to colorectal clinic from primary care varied with patient age, social deprivation and to what extent the introduction of FIT has had on the referral process.

## Materials and Methods

All primary care patient referrals from NHS Tayside to the colorectal service in Ninewells Hospital between 2012 and 2014 were included in this analysis. Patients under the age of 15 were excluded from the study.

Data on participant age, sex and postcode were recorded centrally. Deprivation category was calculated using population weighted Scottish Index of Multiple Deprivation 2012 (SIMD) quintiles. SIMD is an index of relative deprivation combining multiple detailed indicators across seven domains. The overall index is a weighted rank for each of these domains, income (28%), employment (28%), health (14%), education, skills and training (14%), geographical access to facilities (9%), crime (5%) and housing (2%). Based on this weighted rank, the 6,505 data-zones in Scotland are ranked in order of deprivation. Each data-zone represents a small geographical area containing around 750 people and can be identified by postcode. Quintiles of deprivation were used to assign individuals a relative deprivation category based on their postcode at the time of invitation with the first quintile representing the most deprived and the fifth quintile, the least deprived.

The rates of referral by age group and for each social deprivation category were calculated and results were analyzed.

FIT was introduced as part of the colorectal referral pathway in December 2015. GPs wishing to refer to the colorectal pathway are advised to complete a colorectal bundle as part of the referral. This includes an anaemia screen, creatinine and electrolytes and a FIT. An undetectable Fhb is advised to exclude significant colorectal pathology. GP referrals to secondary care across all social deprivation categories between January 2016 and September 2016 (following introduction of FIT) were compared to a historical 9 month period prior to introduction of FIT to determine if there was a reduction or change in referral rates.

## Statistical analysis

Associations between categorical variables were examined using  $\chi^2$  tests for linear trend unless otherwise specified. Univariate and multivariate analysis was carried out using binary logistical regression. A p-value of <0.05 was considered statistically significant. Statistical analysis was performed using SPSS software (SPSS Inc., Chicago, IL, USA).

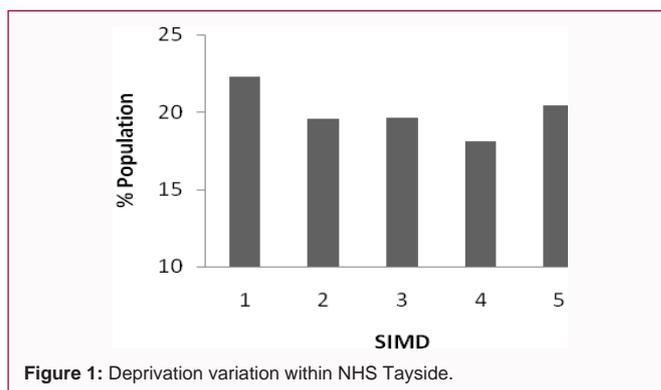


Figure 1: Deprivation variation within NHS Tayside.

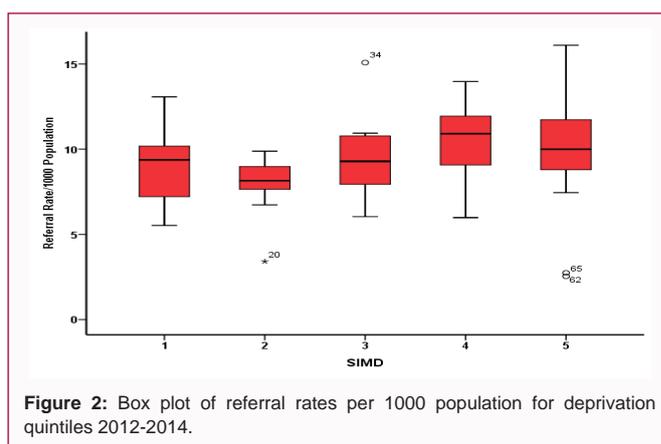


Figure 2: Box plot of referral rates per 1000 population for deprivation quintiles 2012-2014.

## Results

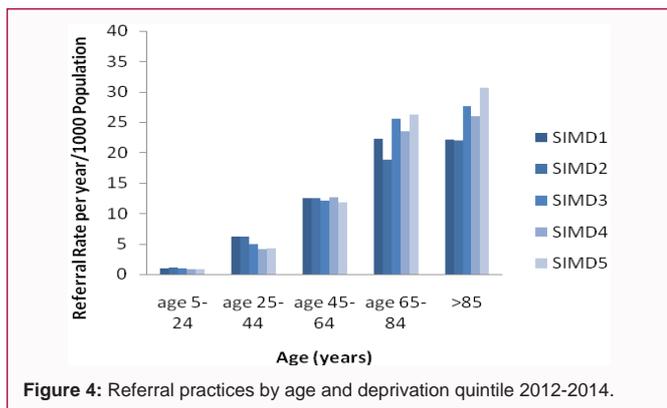
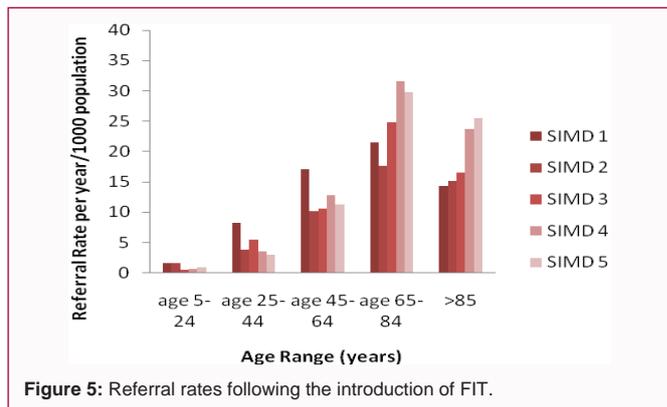
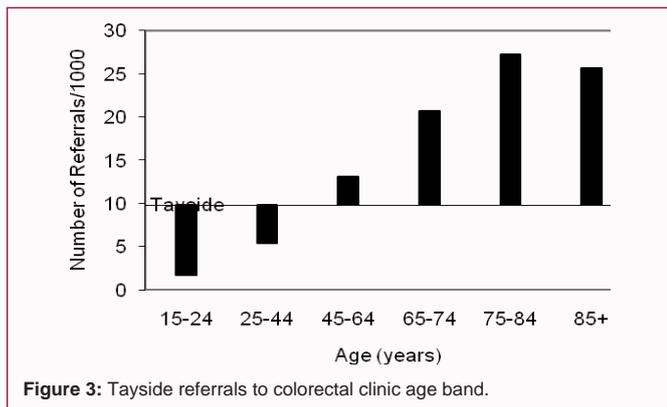
The referral practices of 66 Tayside GPs were examined. The overall practice population was 420,768 with a median deprivation score of 0.57 (0.31 to 0.86) (Figure 1). In total, 8402 patients were referred from primary care to colorectal clinic between 2012 and 2014. Referral rates were significantly lower from practices in more deprived areas (SIMD 1 and 2 vs. SIMD 4 and 5; mean referral rate/1000 population 10.26 vs. 8.49;  $p=0.034$ ; Figure 2). Despite this trend, no significant difference was observed between individual SIMD quintiles.

There was an increased rate of referral from primary care to colorectal clinic in every social deprivation category with advancing patient years (Figure 3). Furthermore, the variation in referral practice by deprivation quintile became significantly wider in the older age groups (Figure 4 and 5).

Following the introduction of FIT in December 2015, 3,231 patients were referred from primary care to colorectal clinic between January 2016 and September 2016, during a similar time period but prior to introduction of the FIT 3,150 patients were referred.

Overall completion of FIT was 57.6% increasing from 33.8% in January to 67.8% in September. Patients from the lower deprivation categories SIMD 4 and SIMD 5 were more likely to be referred than those patients from higher deprivation category practices (SIMD 1 and SIMD 2). The referral numbers between January 2016 and September 2016 (after introduction of the FIT) from categories SIMD 1 and 2 (least affluent) was 1,230 and from SIMD 4 and 5 was 1,401 (most affluent).

As observed prior to the introduction of FIT to the referral pathway, patients across all socioeconomic categories were more



**Table 1:** Age ranges and total numbers of patients referred post introduction of FIT.

**Table 1A:**

Age Ranges (Years.)	Pre- FIT Referral Rate/1000	Post-FIT Referral Rate/1000	p
24-May	0.96	1.04	ns
25-44	5.03	4.69	ns
45-64	12.35	12.43	ns
65-84	23.18	24.7	ns
≥ 85	25.32	18.49	ns
SIMD 1	10.85	12.4	ns
SIMD 2	10.19	8.52	ns
SIMD 3	10.07	9.31	ns
SIMD 4	9.18	10.25	ns
SIMD 5	9.46	9.4	ns
<b>Overall</b>	<b>9.94</b>	<b>9.87</b>	ns

likely to be referred to colorectal clinic with advanced patient years with a peak in the 66 year to 75 year age group after which referral rates reduced (Table 1).

### Discussion

In this study of NHS Tayside GP practices carried out over a two-year period, a total of 8,402 patients were referred from primary care to the colorectal clinic in Ninewells Hospital Dundee. We found an association between patients’ socio-demographic characteristics and their likelihood of referral from primary care to colorectal clinic. This effect was magnified in elderly age groups.

Prior to the introduction of FIT those patients from a more affluent primary care practice were more likely to be referred to a specialist colorectal clinic than those from socially deprived areas. Proposed explanations for reduced referral rates from practices in socially deprived areas are that these practices tend to have higher workloads and the patients often have multiple, chronic and complex problems with health and social care [5]. In addition, those from the more affluent practices may have a higher GP to patient ratio than those from the least affluent practices. As a result this may lead general practitioners to exhibit different referral practices. Additionally, factors such as the type of GP contract agreed by general practitioners may be associated with both the deprivation of the population they serve and the likelihood of referral. Clear referral pathways for GPs are an attempt to standardize referrals across the population.

The introduction of FIT and appropriate guidance, provides GPs with the ability to perform a test accepted to exclude significant pathology warranting no further investigation. In the post-FIT analysis more patients from socially deprived areas were referred to colorectal clinic than prior to the introduction of the FIT, however

**Table 1B:**

	N (%)
Total referrals	3231
Completed FIT	1862 (57.6)
Not detected	1113 (60.1)
Detected	738 (39.9)
Detectable	543 (73.6)
>400	195 (26.4)
Spoilt	11 (0.6)

referral from less socially deprived practices was still higher.

The relationship between socioeconomic status and referral rates from primary to secondary care has been described previously [5]. Using referral rates for post-menopausal bleeding, hip pain and dyspepsia from a national database in England, the authors postulated that the geographical distribution of specialist services might have resulted in socially deprived areas having poor access to particular specialties. However, no such geographical discrepancies exist for the practices within this study as all practices in NHS Tayside are within a narrow geographical area and have access to the same colorectal service at Ninewells Hospital.

Our results also demonstrate an increased rate of referral from primary care to colorectal clinic in every social deprivation category with advanced patient years. This finding of increased referrals to secondary care with advanced patient age is contrary to that found in

the study by Mc Bride et al. [5] this study demonstrated lower referral rates to secondary care with increasing patient age suggesting this variation might reflect the different symptomatology and diagnoses being assessed between the studies [5].

The higher rates of GP referral to secondary care in patients of advanced years was demonstrated across all socioeconomic categories. This pattern might reflect the fact that an increased number of older patients attend their general practitioner's than younger patients or that GPs are aware that the incidence of colorectal cancer is higher in patients of advanced age and therefore are more likely to refer older patients to colorectal clinic for further investigation [6].

We observed an increase in referrals to secondary care across the socioeconomic spectrum as a result of introduction of FIT. The observed increase in referrals is modest and this may reflect the GP's lack of familiarity with FIT as a component of the colorectal referral pathway given its recent introduction.

Following introduction of FIT, patients from socially deprived GP practices were more likely to be referred to colorectal clinic. This is undoubtedly an advantage of FIT as it may increase referral of patients who previously may not have been referred and potentially lead to an earlier diagnosis and appropriate curative treatment if colorectal cancer was diagnosed.

In addition, following the introduction of FIT, older patients across all socioeconomic categories remain more likely to be referred to colorectal clinic with a peak in those between the ages of 66 years and 75 years after which there is a slight reduction in referral rates (Table 1) [6]. Perhaps after age 76 years it is conceivable that some patients or their families do not wish any further investigation of symptoms or perhaps their co-morbidities might preclude operative management which might explain the reduction in referral rates.

The major strength of the study is the volume of patients in the study. A total of 8,402 patients, both male and female from age 15 years and above were included in the initial study and a total of 3,250 patients were included on the post FIT analysis study. This volume of patients permits conclusions to be drawn from the data. A limitation of this study however, is the assumption that because a patient is registered at a GP practice with a low deprivation category that they are from a socially disadvantaged background. This could introduce error into result analysis and influence conclusions drawn. An area for future analysis would be to assess influence of individual patient socioeconomic status with a GP practice on referral rates to secondary care.

## Conclusion

Patients in the most socially deprived practices have to date experienced a lower rate of referral to colorectal services than those in more affluent practices. The reasons for the reduced referral rates

are complex. Differences in referral rates may be explained by patient preference, comorbidity, characteristics of the general practitioner, or interactions between these factors. The inequalities in referral observed could lead to delays in investigation and treatment and ultimately poorer outcomes for patients.

Further research, including qualitative studies is required to understand the complex determinants of inequalities in referral from primary care.

Our results demonstrate that regardless of patient social deprivation category, patients were more likely to be referred to secondary care with advancing age.

In addition, following the introduction of FIT to the referral pathway, an increase in referrals of patients from primary to secondary care across all age groups and socioeconomic categories was observed. Older patients were more likely to be referred to colorectal clinic following FIT.

This study has demonstrated that following introduction of FIT, more patients from socially deprived areas were referred to specialist colorectal services than prior to the introduction of FIT. This finding is exciting and encouraging and could potentially lead to earlier diagnosis and curative treatment of colorectal cancer amongst patients of all age groups and socioeconomic classes and potentially address the disparity previously noted in colorectal referrals between those from more affluent backgrounds to those from socially deprived areas.

## References

1. Health Inequalities: What are they? How do we reduce them? Inequality Briefing 1. 2015.
2. Dixon A, Le Grand J, Henderson J, Murray R, Poteliakhoff E. Is the British National Health Service equitable? The evidence on socioeconomic differences in utilisation. *J Health Serv Res Policy*. 2007;12(2):104-9.
3. Department of Health. National service framework for older people. 2001.
4. Mowat C, Digby J, Strachan JA, Wilson R, Carey FA, Fraser CG, et al. Faecal haemoglobin and faecal calprotectin as indicators of bowel disease in patients presenting to primary care with bowel symptoms. *Gut*. 2016;65(9):1463-9.
5. McBride D, Hardoon S, Walters K, Gilmour S, Raine R. Explaining variation in referral from primary to secondary care: cohort study. *BMJ*. 2010;341:c6267.
6. Okamoto M, Shiratori Y, Yamaji Y, Kato J, Ikenoue T, Togo G, et al. Relationship between age and site of colorectal cancer based on colonoscopy findings. *Gastrointest Endosc*. 2002;55(4):548-51.