Preventive Medicine 55 (2012) 488–492

Contents lists available at SciVerse ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

# Improving participation in colorectal cancer screening: Targets for action

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ARTICLE INFO

Available online 21 August 2012

*Keywords:*
General practice
Screening
Colorectal cancer
Multilevel modeling
Public health policy

## ABSTRACT

*Objective.* Our aim was to determine whether physician-related factors influenced patient participation in colorectal cancer (CRC) screening programs and to identify patient characteristics associated with lower participation in order to facilitate the development of targeted actions to improve participation.

*Method.* A retrospective cohort study was conducted in a French department during its first CRC screening campaign from June 2007 to May 2010. Data for 157,766 patients followed by 903 general practitioners (GPs) were analyzed. Patient participation was assessed using multilevel logistic modeling.

*Results.* The overall participation rate was 30% (95% confidence interval [95% CI], 29.8–30.2) and varied across the 903 GPs from 0% to 75.5% (median, 30; interquartile range, 24–35). Inter-GP variance explained only 5.5% of the participation rate variance. Participation was significantly lower in males (odds ratio [OR], 0.79; 95% CI, 0.78–0.91), the youngest age group (55–59 years, OR, 0.61; 95% CI, 0.58–0.63), and patients living in socioeconomically deprived areas (OR, 0.82; 95% CI, 0.77–0.87).

*Conclusion.* Targeted actions to improve CRC screening participation should focus on patients younger than 60 years, males, and individuals living in deprived areas. Actions to enhance the influence of GPs on patient participation should be directed to the overall population of GPs.

## Introduction

Colorectal cancer (CRC) ranks second among all cancers in terms of incidence and mortality in both men and women in Europe (Ferlay et al., 2010) and also constitutes a heavy economic burden (Chevreul, 2010). Although new technologies have improved diagnosis and treatment, early detection remains the key to reducing morbidity and mortality. A meta-analysis of trials of biennial CRC screening using the fecal occult blood test (FOBT) demonstrated a 15% relative reduction in CRC mortality (relative risk [RR], 0.85; 95% confidence interval [95% CI], 0.78–0.92) (Hewitson et al., 2008). As a result, most European countries have instituted population-based FOBT screening programs (Zavoral et al., 2009). A high level of participation in a screening program must be achieved and maintained to ensure clinical and cost effectiveness (Pignone et al., 2002). Participation rates vary widely across Europe (20%–52% in 2009) (Zavoral et al., 2009) and are generally considered insufficient when compared to the European guidelines for quality assurance in colorectal cancer screening that set a 45 to 65% participation rate (Segnan et al., 2010).

In France, a pilot FOBT campaign was started in 2002 and expanded into a national population-based program in 2009. Local organizations coordinate the program and send mailed invitations to individuals aged 50–74 years to visit their general practitioners (GPs) for a free FOBT kit and explanation of the screening program and test procedure. Two mailed reminders are sent to those who do not respond, with the second including an FOBT kit, instructions, and a pre-paid return envelope. The objective is a 50% participation rate (Grünfeld, 2009). The pilot campaign covering 21 departments achieved 42% participation (Goulard et al., 2008).

Factors affecting participation may be related to the patients or to the physicians (Subramanian et al., 2004). Regardless of their specific role in the screening program, GP involvement has been shown to improve patient participation (Federici et al., 2006; Ferreira et al., 2005; Myers et al., 2007; Nguyen-Oghalai and Wu, 2009). Several studies suggest that GP beliefs and practices regarding CRC screening may vary widely (Damery et al., 2010; Klabunde et al., 2003; Subramanian et al., 2004). While patient characteristics affecting willingness to participate

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http://dx.doi.org/10.1016/j.ypmed.2012.08.004

in screening programs have been widely studied (Frederiksen et al., 2010; Pornet et al., 2010; Subramanian et al., 2004; Weller et al., 2007), to our knowledge no study has simultaneously evaluated the potential impact of both patient and GP characteristics on participation in a CRC screening program.

Our objective was to investigate whether actions targeting specific GP and patient populations could improve CRC screening participation. We therefore quantified the heterogeneity of GP average practices in influencing patient participation and identified GP and patient characteristics associated with lower participation. We modeled the probability of patient participation using a multilevel approach to differentiate sources of variability related to patients and GPs while simultaneously taking into account some of the characteristics of these two groups.

## Methods

This retrospective cohort study was conducted in the Val-de-Marne department, a predominantly urban suburb of Paris with a population of 1.3 million (2% of the French population) that launched its CRC screening campaign in June 2007.

### *Data source*

The target population was patients aged 50–74 years at average risk of CRC between June 2007 and May 2010 and their GPs. We used data from the main statutory health insurance (SHI) program (*Caisse nationale d'assurance maladie des travailleurs salariés*), which covers 87% of the population. Data were not available for patients covered by other health insurance programs or whose GPs worked outside the study area. Additional data on patients and their participation status were obtained from the local organization that coordinated the program (*Association de Dépistage Organisé des Cancers dans le Val-de-Marne*, ADOC94). The first reminder was sent out seven months before data import on May 4, 2010, and we censored the screening data at the second reminder for all patients.

### *Study population*

From the SHI database, we first selected men and women aged 50–74 years living in the study area and registered with a GP practicing in the study area. We excluded individuals who were deceased, had moved outside the study area, had an unknown or wrong address, or had been screened on a date that preceded their invitation date. We also excluded patients who did not receive at least one reminder after failing to respond to the initial invitation. To obtain robust estimates using multilevel models, we confined our analysis to patients whose GPs had at least 10 patients included in the study population (Moineddin et al., 2007), i.e., to 157,766 patients followed by 903 GPs (Fig. 1). Finally, data were not available for 19 GPs, who were excluded along with their 1924 patients from the analysis of GP characteristics.

### *Variables*

#### *Study outcome: patient participation*

Participation in the colorectal cancer screening program was defined as a visit to the GP following the invitation. Therefore, participation includes completion of a FOBT within the study period or exclusion by the GP for medical reasons: high risk of CRC (i.e., personal or family history of CRC, Crohn's disease,

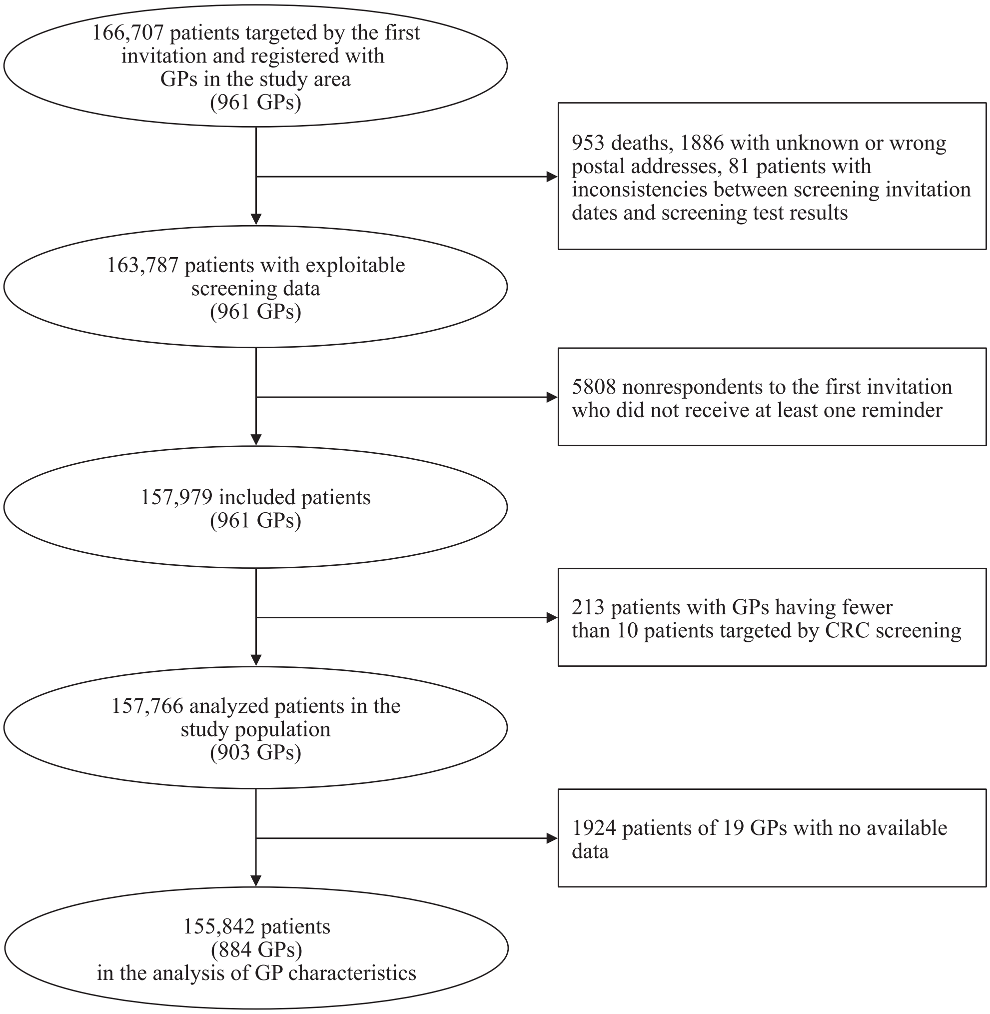

**Fig. 1.** Flow chart.