PREDICTING FUTURE NEED OF RESOURCES FOR ADENOMA SURVEILLANCE FROM A POPULATION-BASED COLORECTAL CANCER SCREENING PROGRAM THROUGH DISCRETE EVENT SIMULATION

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BACKGROUND AND OBJECTIVES

Recent European guidelines recommend colorectal cancer screening of average-risk population. Besides colorectal cancer, adenomas, which deserve surveillance through colonoscopy, are found. This has led to the design of "High risk clinics". Our objective was to estimate the resources needed (in terms of demand of colonoscopies, visits and genetic tests) to undergo the recommended surveillance of adenomas found under a population-based colorectal cancer screening program.

METHODS

A previous discrete-event simulation representing a colorectal cancer screening program for a target population of 100,000 women and men aged 50 to 69 years was used to account for resources at the surveillance phase after screening. The underlying conceptual model was based on the European Guidelines for both the screening process and surveillance after adenoma removal. Screening consisted in fecal immunochemical test (FIT) offered biennially and colonoscopy for positives. When adenomas are found the resources needed were the following: genetic tests for polyposis; high-complexity colonoscopies for high-risk adenomas and polyposis, non-complex colonoscopies for intermediate-risk adenomas; visits with gastroenterologists for high-risk adenomas and polyposis and with a general practitioner for intermediate-risk adenomas. Parameters were estimated from the Colorectal Cancer Screening Program of Barcelona and surveillance colonoscopy results from the literature (Winawer et al. N Engl J Med 1993, 328:901–6). A 20-year horizon starting in 2015 was simulated. The model included the population ageing. Results were rescaled to the population of the whole territory (Catalonia, 1.7 million target population).

Figure 1: Conceptual model of the screening process.

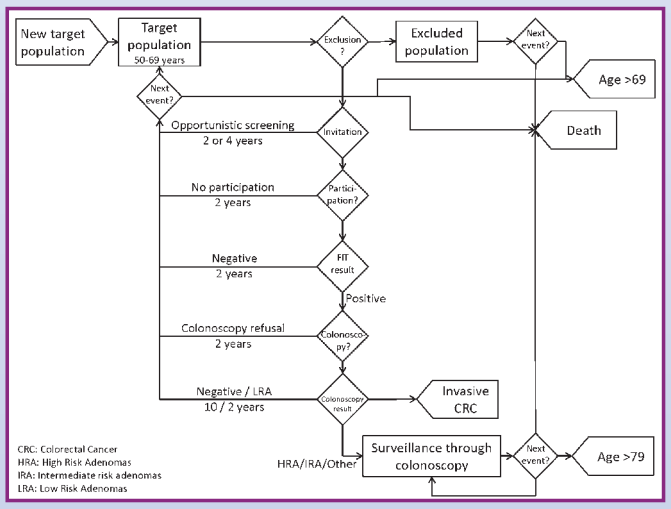
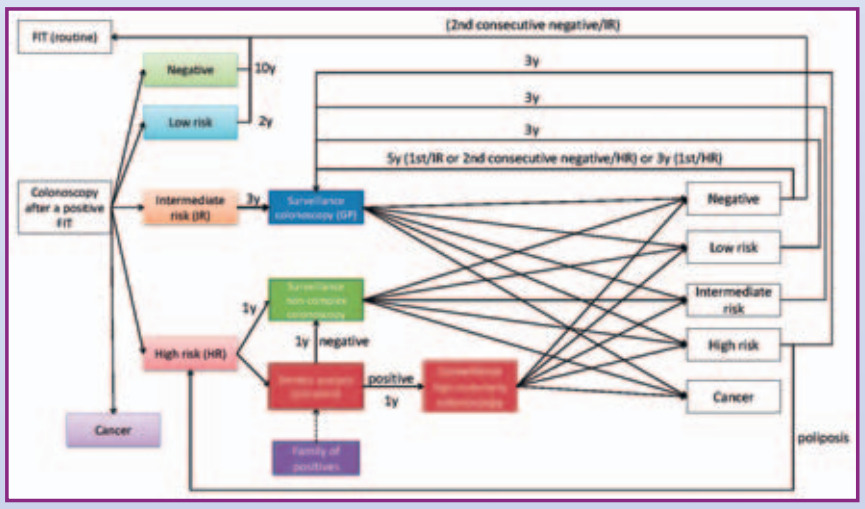


Figure 2: Conceptual model of surveillance of adenomas.



RESULTS

The expected number of genetic tests was 566, 617 and 654 for years 2015, 2024 and 2034, respectively.

Figure 3: Number of colonoscopies by year and type.

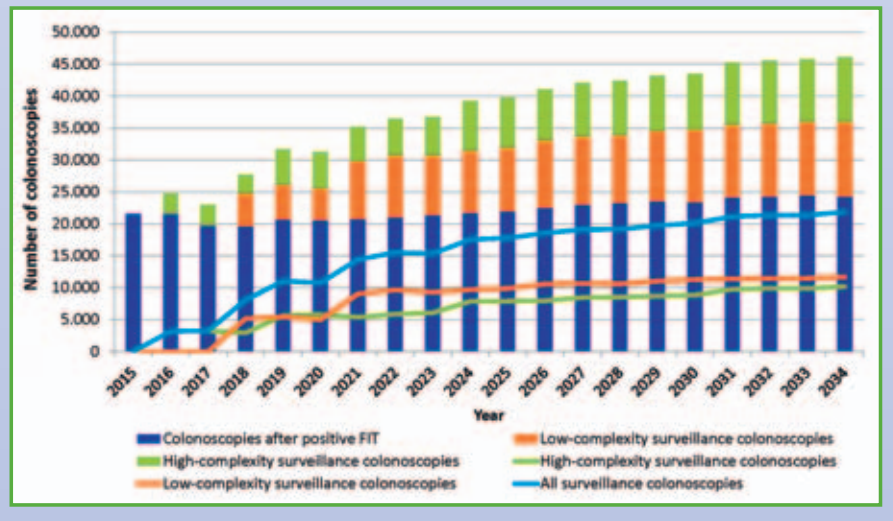
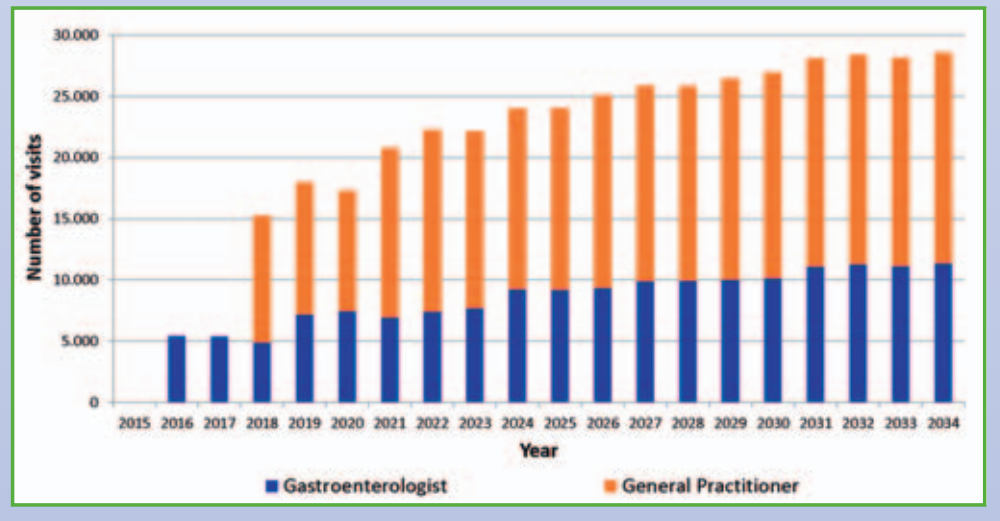


Figure 4: Number of visits to Gastroenterologists or General Practitioners, by year.



CONCLUSIONS

Implementing a population-based colorectal cancer screening program represents an increased demand of resources for the surveillance of intermediate and high-risk adenomas found under the program. Results of the simulation model provide a quantitative basis for future policy decisions on the concentration of High-risk clinics, the number of gastroenterologists required to perform the required colonoscopies and visits, and the resources needed, and also will allow distributing the resources geographically and predicting future need when the screening program is extended to all the territory.

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