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Population-based Cancer Screening

Measurement of Coordination and Continuity of Care

KEY WORDS

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Colorectal cancer
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Background: European guidelines for the quality of screening programs for breast and colorectal cancer describe process, structure, and outcome indicators. However, none of them specifically evaluate coordination and continuity of care during the cancer screening process. **Objectives:** The aim of this study was to identify and adapt care quality indicators related to the coordination and continuity of the cancer screening process to assess nursing care in cancer screening programs. **Methods:** The indicators proposed in this study were selected in 2 phases. The first consisted of a literature review, and the second was made by consensus of an expert group. An electronic literature search was conducted, through June 2016. From a total of 225 articles retrieved, 14 studies met inclusion criteria, and these 14 documents were delivered to the group of experts for evaluation and to propose a final list of agreed-upon indicators. **Results:** The group of experts selected 7 indicators: adequacy and waiting time derivation of participants, delivery and availability of the report of the process, understanding professionals involved in the process, and satisfaction and understanding of participants. **Conclusions:** These indicators should help identify areas for improvement and measure the outcome of coordination and continuity of care. **Implications for Practice:** The results provided a common set of indicators to evaluate the coordination and continuity of care for cancer screening and to

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consequently assess the contribution of nursing care in cancer screening programs. The identification and adaptation of these quality indicators will help to identify areas for improvement and measure the effect of coordination and continuity of care.

Cancer screening aims to detect disease early to reduce morbidity and mortality from cancer and/or increase the quality of life of individuals affected by this condition.¹ There are different types of screening, each with specific aims, including mass screening (population based) and case finding screening (opportunistic). Population-based screening involves a screening test that is offered systematically to all individuals in the defined target group. In addition, population-based screening is an organized process that is integrated with the health system, in which all process activities are planned, coordinated, monitored, and evaluated within a framework of continuous quality improvement, while ensuring the principles of efficiency and equity.² In contrast, opportunistic screening can be offered during contact between members of the target population and their physician in primary care or other healthcare settings.³

Many countries are developing conceptual frameworks for monitoring, measuring, and managing the performance of their health systems to ensure their effectiveness, equity, efficiency, and quality. Healthcare quality is a core dimension of health system performance for which reliable standardized indicators have become increasingly available. In 2006, the Organization for Economic Co-operation and Development released a common conceptual framework for health system performance, within which the core quality dimension was envisaged as a nested matrix, including an initial list of candidate indicators under the vertical dimensions of effectiveness, safety, responsiveness/patient-centeredness, utilization, and cost/expenditure.^{4,5} Effectiveness, safety, and responsiveness/patient-centeredness are the core quality dimensions; in essence, these factors are the core attributes of healthcare that increase the likelihood of desired outcomes. Access arguably involves elements of all of the dimensions of healthcare system performance including cost/expenditure, utilization, and quality.⁶

Cancer care occurs on a continuum from prevention to treatment for survival or end-of-life care; part of this continuum is the screening process. The treatment path is not linear, and patients vary in the phases they experience and the time spent in each of them. The characteristics of the Organization for Economic Co-operation and Development framework fit perfectly with the cancer continuum and, consequently, with the screening process. In addition, this framework is the best fit for the healthcare services in Catalonia (Spain), which are organized as a national health service with universal population coverage and include preventive services. In addition to national health service coverage, 25% of the population is enrolled in voluntary private health insurance, leading to double coverage.^{7,8}

In cancer screening programs, it is important to perform adequate quality control to analyze the expected balance between the beneficial and adverse effects for the population included in the screening process. This quality control system demands a thorough evaluation of the entire process and its

outcomes, as well as obtaining feedback from the assessment by the participants and professionals involved.^{9,10} The evaluation of a screening program should be an activity inherent to the screening process. It should never be construed as a control system but as a system that allows the analysis and gathering of information about what we do and how we do it and, if necessary, identifies areas to improve, change, or properly use. Quality assurance encompasses activities intended to assure and improve quality at all levels of the screening process to maximize benefits and cost-effectiveness while minimizing harm. The concept includes the assessment or evaluation of quality, identification of problems or shortcomings in the delivery of care, design of activities to overcome these deficiencies, and follow-up monitoring to ensure the effectiveness of corrective steps.

Population-based programs are monitored and allow this evaluation, but opportunistic programs do not implement this monitoring. Although some maintenance organizations have established systems that include many of the dimensions of national systems found elsewhere, opportunistic screening depends on encounters in which a patient or a provider recommends cancer screening during a healthcare visit. Assessing the quality of care across systems requires the development of common data elements.^{11,12} These common data elements include information on tests and procedures ordered and performed, cancer outcomes, and characteristics empirically associated with the screening process (eg, patient sociodemographics and healthcare coverage, provider specialty, and patient volume).

Indicators are one of the basic elements of the assessment, allowing us to evaluate the means (structure), actions (processes), and outcomes. The use of indicators is a breakthrough in management because it allows discovering relevant aspects of care, making comparisons, proposing objectives, and promoting a culture of evaluation and improvement of care.¹³

In this context, the first European guidelines were developed in the early 1990s for the quality of screening programs for breast cancer and in 2010 for colorectal cancer. The aim of these guidelines was to establish evidence-based recommendations for the quality assurance best practices to be followed by European population-based cancer screening programs. To achieve this objective, core of key indicators were identified for evaluating screening programs. Population-based programs for the early detection of colorectal and breast cancer, implemented in Spain, follow European guidelines.^{14,15} The Ministry of Health of Spain, together with autonomous communities and several scientific societies, has defined a basic common portfolio of public services for screenings, including population-based screening programs for breast, colorectal, and cervical cancers. Whereas breast cancer screening is performed in approximately 100% of the territory, colorectal cancer screening is still under implementation and is expanding in most autonomous communities.¹⁶

European guidelines on cancer screening quality recommend that screening teams should be multidisciplinary and

include nurses.^{14,15} A study conducted with professionals involved in population-based cancer screening in Spain reported that 83% of the cancer screening units include a nurse.¹⁷ The same study also found that almost 67% of nursing activities (16/24) in population-based cancer screening include promoting coordination and continuity of care during cancer screening.¹⁵ Participants of cancer screening programs are cared for by various professionals and different levels of care, which can make coordination difficult. Thus, the concepts of coordination and continuity of care become greatly important. There are a number of care coordination strategies at various levels across the care continuum, and a defined role of nursing can be a strategy that contributes to coordinating care. Healthcare coordination involves all services related to healthcare, regardless of where they are received, so that these services are synchronized and a common goal is reached without creating conflicts.^{18,19} Continuity of care, in turn, is the result of coordination from the viewpoint of the patient; it is defined as the degree of coherence and unity of experiences in the care received by the patient over time.^{20,21}

Objective

European guidelines for the quality of screening programs for breast and colorectal cancer, as well as more local reference documents, describe process, structure, and outcome indicators. However, none of them specifically evaluate coordination and continuity of care during the cancer screening process. Therefore, it is important to add indicators that would differentiate whether care has been provided in a coordinated and continuing manner. In this study, we identify and adapt care quality indicators related to the coordination and continuity of the cancer screening process to assess nursing care in cancer screening programs.

■ Methodology

The indicators proposed in this study were selected in 2 phases. The first phase consisted of a literature review, and the second was composed of an expert consensus process.

Phase 1: Literature Review

A search was conducted in PubMed using the keywords “continuity,” “coordination,” “indicators,” “screening,” “nurs*,” “patient navigat*,” and “evaluation” to discover all related documents published until June 2016. Four search strategies were used, as shown in Figure 1.

Using these different search strategies, 214 articles were found, as shown in Figure 1. Different Webpages were also consulted to discover guidelines and working articles to ensure that the right material on the subject was selected. Through this search, 11 more documents were selected. The resulting 225 documents were included if they met all inclusion criteria: (1) studies that measured continuity or coordination, (2) studies that measured 1 or more outcomes of continuity or coordina-

tion, (3) studies of any design, and (4) studies in English or Spanish.

In the first stage of the review, a detailed double-blinded assessment of titles and abstracts was performed by 2 independent reviewers to determine whether each item met the predetermined requirements for inclusion. After this phase, 79 documents were selected (Figure 1).

Later, the full text of the potentially eligible references was evaluated to determine whether they met the inclusion criteria for review, and 14 were selected. These 14 documents were delivered to the group of experts for evaluation.^{22–35}

GROUP OF EXPERTS

The group was composed of 9 professionals, who prepared the list. Five were experts in cancer screening, two were experts in quality indicators, and two were experts in nursing care. All had more than 5 years of experience in their field.

Phase 2: Internal Consensus

The objectives of this phase were to review the indicators obtained from the literature review, propose a final list of agreed-upon indicators, and subsequently adapt them to the cancer screening program. It was determined that the indicators should be relevant, concrete, objective, valid, sensitive, specific, and efficient to achieve a consensus on the indicators.³⁵ The group extracted 118 indicators from these 14 documents. At the first meeting, 118 indicators obtained from the literature review were reviewed, and 54 were removed because they did not measure continuity or coordination. At the second meeting, the expert group excluded duplicates and those studies that were not feasible or not relevant. Finally, 7 indicators were excluded because they were not adaptable to a cancer screening program.

Dimensions Analyzed

After the key performance indicators were selected, they were classified according to the dimension of coordination or continuity of care to which they belonged. On the basis of the definition of Starfield¹⁸ and Terraza Núñez et al,¹⁹ coordination consists of clinical management coordination and informational coordination. Clinical management coordination refers to coordination between the professionals and services involved in the care of cancer screening participants. Informational coordination refers to the transfer and use of participant clinical information, which is necessary to coordinate activities between providers.

The classification proposed by Reid et al²⁰ was used for continuity of care. Continuity of care includes the following types: informational continuity, management continuity, and relational continuity. Informational continuity is the perception of the information held by different levels of care and its transfer. Clinical management continuity is the perception by the participant that the care received is coordinated, complementary, and not duplicated. Relational continuity is the

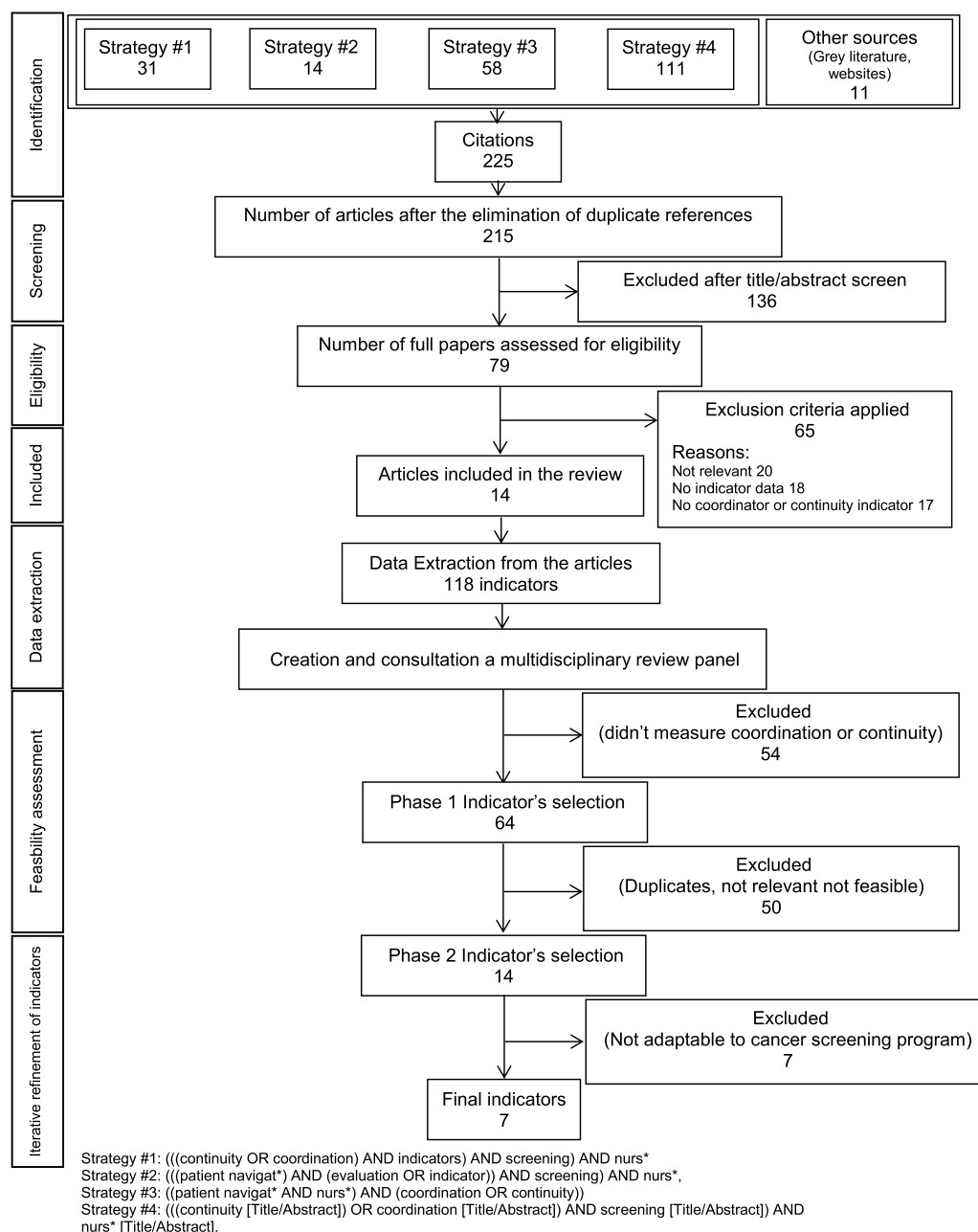


Figure 1 ■ Flowchart of the literature review process and indicator selection process.

perception by the participant of the relationship established with the professionals involved in the screening process.³⁶

Indicator Characteristics

After the indicators were identified and classified, each was described, stating whether it was a structure, a process, or an outcome indicator.³⁷

For each indicator, the following items were specified³⁷:

- Formula: mathematical expression used to quantify the indicator
- Explanation of terms: clarification of any term that may be ambiguous or open to different interpretations in the formula

- Population: description of the specific group measured by the indicator
- Source of information: source or location of the information or data necessary to quantify the indicator
- Guiding standard: desirable level of indicator performance. This item was defined as the guiding standard because these indicators have never been measured in this area; therefore, indicator standards used in other areas were applied.

Ethical Considerations

The study protocol was approved by the clinical research and ethics committee of Bellvitge University Hospital (PR124/14),

and all parties involved followed the ethical requirements of the Spanish Organic Law on Protection of Personal Data (15/1999 December 13).

■ Results

This study identified indicators to measure coordination and continuity of care in cancer screening because previous studies had reported that nursing activities were mainly involved in the promotion of these 2 aspects.

According to the expert consensus process, 7 possible indicators were selected and adapted from the 14 indicators. Table 1 shows the indicators selected, detailing their type and dimension. Regarding the type of indicator, of the seven so obtained, five are considered process indicators, and the other two are considered outcome indicators.

Regarding the dimension, 4 indicators relate to coordination of care (two to clinical management coordination and two to informational coordination), and 3 indicators relate to continuity of care (one to clinical management continuity, one to informational continuity, and one to relational continuity).

The final list of indicators selected is depicted in Table 2. This table lists and describes the characteristics of each of these 7 indicators.

Figure 2 shows these indicators within the cancer screening process.

■ Discussion

The results of this study provided a common set of indicators to evaluate the coordination and continuity of care for cancer screening and to consequently assess the contribution of nursing care in cancer screening programs. The identification and adaptation of these quality indicators will help to identify areas for improvement and measure the effect of coordination and continuity of care; in addition, they may also be used as a tool to guide efforts to improve quality. Measurement of the processes and outcomes of care is an essential component of efforts to improve the quality of patient care.

The evidence available and theoretical background suggest that coordination of care is one of the areas of organizational

practice that has a direct, significant impact on health outcomes, costs, and patient satisfaction.³⁹ In particular, coordination of care may avoid the duplication of tests, visits, and treatments; inappropriate referrals; medical or prescription errors; inconsistencies in care plans; and misdiagnosis (quality of care)—all with a direct effect on access to services and continuity of care.^{40,41}

In this regard and to improve the coordination of care, different strategies have been implemented in recent decades to manage the care of patients who require close collaboration between different levels of care, and case management is one of the most widespread of these strategies.³⁸ Case management is an advanced nursing practice that is aimed at the population presenting (or likely to present) complexity in the process and requiring continuity of care.⁴² The nurse, from a cross-sectional perspective, integrates input from other professionals, services, and resources to promote the autonomy of the individual. The nurse works together with the various professionals of the screening process involved in the care of the participant, provides additional value, and integrates the collective contributions.³⁸ To achieve this coordination among professionals, the transmission of information becomes essential to produce continuity of care,³⁸ which is why the selected indicators are aimed at evaluating the transmission of information during the screening process.

The nurse, as a member of the multidisciplinary team of cancer screening programs, should play a key role in improving the quality of care during cancer screening—providing coordination and continuity of care.⁴²

This study is one of the first in the field of population-based cancer screening programs that proposes a conceptual framework for evaluating quality of care and indicators to measure the performance of the entire process. The collection of data to create the indicators involves an administrative burden for population-based programs and professionals. Therefore, great care has been applied in the selection of the required data, considering the effort involved in calculating each of the indicators. The key performance indicators of the population-based cancer programs are periodically recorded, monitored, and evaluated, and the cost of this evaluation is included in the budget of the cancer screening program. However, adding and monitoring new indicators require additional costs that need to be taken into account.

Notably, the availability of data in the health system, including information on the outcomes of nursing care, would

✱ **Table 1 • Quality Indicators of the Coordination and Continuity of Care**

Dimension	#	Indicator Name	Type
Coordination of care			
Management coordination	❶	Adequacy of the referral of the target population from the screening program participants to different health services	Process
	❷	Waiting time for a referral to other health services	Process
Informational coordination	❸	Reporting of the participants' screening results	Process
	❹	Understanding of the screening program by the professionals involved in the process	Process
Continuity of care			
Management continuity	❺	Participants' satisfaction with the cancer screening process	Outcome
Informational continuity	❻	Delivery of the screening process report to the participants	Outcome
Relational continuity	❼	Participants' understanding of the information regarding the screening program	Process

 **Table 2 • Description of the Indicators**

❶ Adequacy of the referral of the target population from the screening program to different health services

To ensure the continuity and quality of care, it is important to measure the extent to which participants are being referred, following the criteria established in the clinical practice guidelines or protocols.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. participants who meet the criteria for follow-up in the referral units because of a higher-than-average risk of breast or colorectal cancer <hr/> Total no. participants referred	Percentage of participants referred from the breast or colorectal cancer screening program to the following units: - Genetic counseling units - Primary care (general practitioners) These participants meet the referral criteria because of a higher-than-average risk of breast or colorectal cancer, according to a multidisciplinary clinical protocol based on evidence.	Participants in the breast or colorectal cancer screening sample program. Sample size should be calculated to estimate the population parameter with a 95% confidence interval, precision ± 3 percent units.	Medical history or records in a structured clinical and administrative database	Eighty percent of the participants who were referred should meet the follow-up criteria of the referral units.

Footnote: derivation criteria for individuals with higher-than-average risk.

Moderate risk:

Breast cancer: First-degree relatives of people affected by cancer in families with the following: (1) a diagnosis of breast cancer between the ages of 31 and 50 y, (2) 2 first-degree relatives given a diagnosis of breast cancer between the ages of 51 and 59 y, and (3) a case of bilateral breast cancer at older than 40 y. Colorectal cancer: (1) 1 first-degree relative with colorectal cancer diagnosed before 60 y and (2) 2 first-degree relatives with colorectal cancer diagnosed at any age.

High risk:

Breast cancer: (1) 3 or more first-degree relatives affected by breast and/or ovary cancer, (2) 2 cases of first- or second-degree relatives (2 cases of ovarian cancer or 1 case of breast cancer and 1 case of ovarian cancer or 1 case of breast cancer in a man and another case of breast/ovarian cancer or 2 cases of breast cancer in children younger than 50 y or 1 case of bilateral breast cancer and 1 case of breast cancer [one younger than 50 y]), (3) breast cancer diagnosed before the age of 30 y, (4) breast and ovarian cancer in the same patient, and (5) bilateral breast cancer diagnosed before the age of 40 y. Colorectal cancer: (1) colon or rectum cancer diagnosed before the age of 50 y; (2) 2 diagnoses in the same individual; (3) 2 or more diagnoses of colon, rectum, or endometrial cancer among first- or second-degree relatives; (4) a case of colon or rectal cancer and another tumor of the spectrum corresponding to Lynch syndrome (endometrium, ovary, gastric, pancreas, ureter and/or renal pelvis, biliary tract, small intestine, brain tumor, sebaceous adenomas, or keratoacanthomas) diagnosed before the age of 50 y; and (5) colorectal cancer and 2 first- or second-degree relatives with a tumor associated with Lynch syndrome (regardless of age).


❷ Waiting time for a referral to other health services

Delayed referral to the appropriate health service can contribute to a worsening prognosis and increase the anxiety of the participants. Referrals with a higher-than-average risk of breast or colorectal cancer according to the criteria stated by the screening program are sent to the following units because they require more frequent controls:

- Referred to genetic counseling units, those with a high or familial risk.
- Referred to primary care, those with moderate risk.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. participants whose interval between risk classification and communication of the referral is ≤ 7 days <hr/> Total no. participants referred	Risk classification: time when the participant communicates the family and/or personal history to us, which allows us to classify the case into a population of higher-than-average risk of breast or colorectal cancer. Interval: number of calendar days between the date of contact and communication of the referral to the participant.	Participants in the breast or colorectal cancer screening program. Sample size should be calculated to estimate the population parameter with 95% confidence interval, precision ± 3 percent units.	Medical history or records in a structured clinical and administrative database.	Eighty percent of the participants should experience a time interval of ≤ 7 d

(continues)

 **Table 2 • Description of the Indicators, Continued**

③ Reporting of the participants' screening results

Complete clinical documentation allows better monitoring of participants by the professionals involved in their care and improved communication among professionals and care services or centers.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. full reports, updated in the established time interval and included in health system records	<p>A complete and updated report contains the following information:</p> <ul style="list-style-type: none"> - Breast or colorectal cancer screening test results - Diagnostic test results - Follow-up recommendations - Breast or colorectal cancer screening program contact information <p>Completed screening process: all the necessary information have been obtained to close the process, whether from the screening test or diagnostic test results.</p> <p>Once this process is complete, the report should be available within 4 wk.</p>	<p>Breast or colorectal cancer screening program participants.</p> <p>Sample size should be calculated to estimate the population parameter with 95% confidence interval, precision ± 3 percent units.</p>	<p>Medical history or records in a structured clinical and administrative database</p>	<p>Eighty percent of the closed cases should have a complete and updated report in the health records system.</p>
No. participants who completed the breast or colorectal cancer screening process				

Footnote: classification and follow-up of cancer screening
 Breast cancer screening results: normal findings (for which follow-up at 2 y is recommended) or positive results (abnormal findings requiring a recall for immediate further assessment to exclude malignancy).¹⁴
 Fecal occult blood test results: no blood in feces (for which follow-up at 2 y is recommended) or positive (blood presence requiring colonoscopy).
 Diagnostic follow-up procedure (colonoscopy) result (after a positive screening test): normal (follow-up at 10 y), low-risk adenoma (follow-up at 2 or 10 y, depends on the age), intermediate-risk adenomas (follow-up at 3 y), high-risk adenomas (follow-up at 1 y).


④ Understanding of the screening program by the professionals involved in the process

Comprehension of the information by the professionals involved in the screening process is a way to measure quality, ensuring process continuity in these programs. The complexity of the health services makes it necessary to analyze whether the professionals understand the care process and the information received.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. professionals who scored $\geq 7/10$ on the questionnaire regarding understanding the information received about the program	<p>The questionnaire on understanding should include the following:</p> <ol style="list-style-type: none"> 1. criteria for participation in the breast or colorectal cancer screening program 2. procedures for the breast or colorectal cancer screening and diagnostic test 3. monitoring to be performed after the diagnostic test 4. breast or colorectal cancer screening program health services 	<p>Professionals involved in the breast or colorectal cancer screening process.</p> <p>Sample size should be calculated to estimate the population parameter with 95% confidence interval, precision ± 3 percent units.</p>	<p>Ad hoc questionnaire aimed at professionals involved in the screening process, to be administered. In the case of detecting improvement areas, measures will be designed, implemented, and evaluated in 2 y. In the case of obtaining results without possibility of improvement, the evaluation will be repeated in 5 y.</p>	<p>Percentage of professionals who score ≥ 7. Acceptable: 75% Desirable: 100%</p>
No. professionals surveyed				

Footnote: professionals involved in the screening program are as follows:
 Breast cancer screening such as radiologist and radiology technicians. Colorectal cancer screening such as endoscopists, general practitioner, and pharmacists.

(continues)

 **Table 2 • Description of the Indicators, Continued**

⑤ Participants' satisfaction with the cancer screening process

Measuring satisfaction with the care provided in the program, as perceived by participants, is the outcome measure most commonly used in the field of health management. This outcome measure complements the usual measures in breast or colorectal cancer screening programs.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. participants who scored 7 or more points on the questionnaire about their satisfaction with the breast or colorectal cancer screening process	The satisfaction of participants will be measured via a questionnaire with a minimum score of 0 and a maximum score of 10. The questionnaire will contain various items, including the following:	The participants in the breast or colorectal cancer screening program Sample size should be calculated to estimate the population parameter with 95% confidence interval, precision ± 3 percent units.	Ad hoc questionnaire addressed to program participants. In the case of detecting improvement areas, measures will be designed, implemented, and evaluated in 2 y. In the case of obtaining results without possibility of improvement, the evaluation will be repeated in 5 y.	Percentage of participants who scored the program as ≥ 7 . Acceptable: 75% Desirable: 100%
No. participants surveyed in the program	<ol style="list-style-type: none"> overall satisfaction with the care provided in the program satisfaction with the information received in the program perception of coordination among the professionals involved in the screening process perception of communication among the professionals involved in the screening process perception of the waiting times 			

⑥ Delivery of the screening process report to the participants

The delivery of adequate and timely information to the participants contributes to the transmission of information between levels of care and serves as reinforcement to inform the participants about their screening process. The report ensures continuity of care and is an excellent instrument for health education and for reducing patient anxiety.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. participants who answered that they received the screening process report	In the questionnaire regarding participant satisfaction, a question will be added to determine whether they received the screening process report. The report may have been delivered by postal mail, by electronic mail, or in person and must be delivered at the end of the process.	The participants in the breast or colorectal cancer screening program. Parameters to consider for calculating the sample: 95% confidence interval, ± 3 percent units, and a population percentage of approximately 50%.	Ad hoc questionnaire aimed at professionals involved in the screening process, to be administered. In the case of detecting improvement areas, measures will be designed, implemented, and evaluated in 2 y. In the case of obtaining results without possibility of improvement, the evaluation will be repeated in 5 y.	Percentage of participants who answered that they received the screening process report. Acceptable: 75% Desirable: 100%
No. participants surveyed	End of the process: all the necessary information have been obtained to close the process, whether from the screening test or diagnostic test results. Once this process is complete, the report should be delivered within 4 wk.			

Footnote: The time required to close a process depends on the results obtained in the screening and/or diagnostic process. Therefore, for the completion of the questionnaire, we will wait 4 wk after the result in those cases that obtain a negative result in the screening test and 8wk for all other cases.

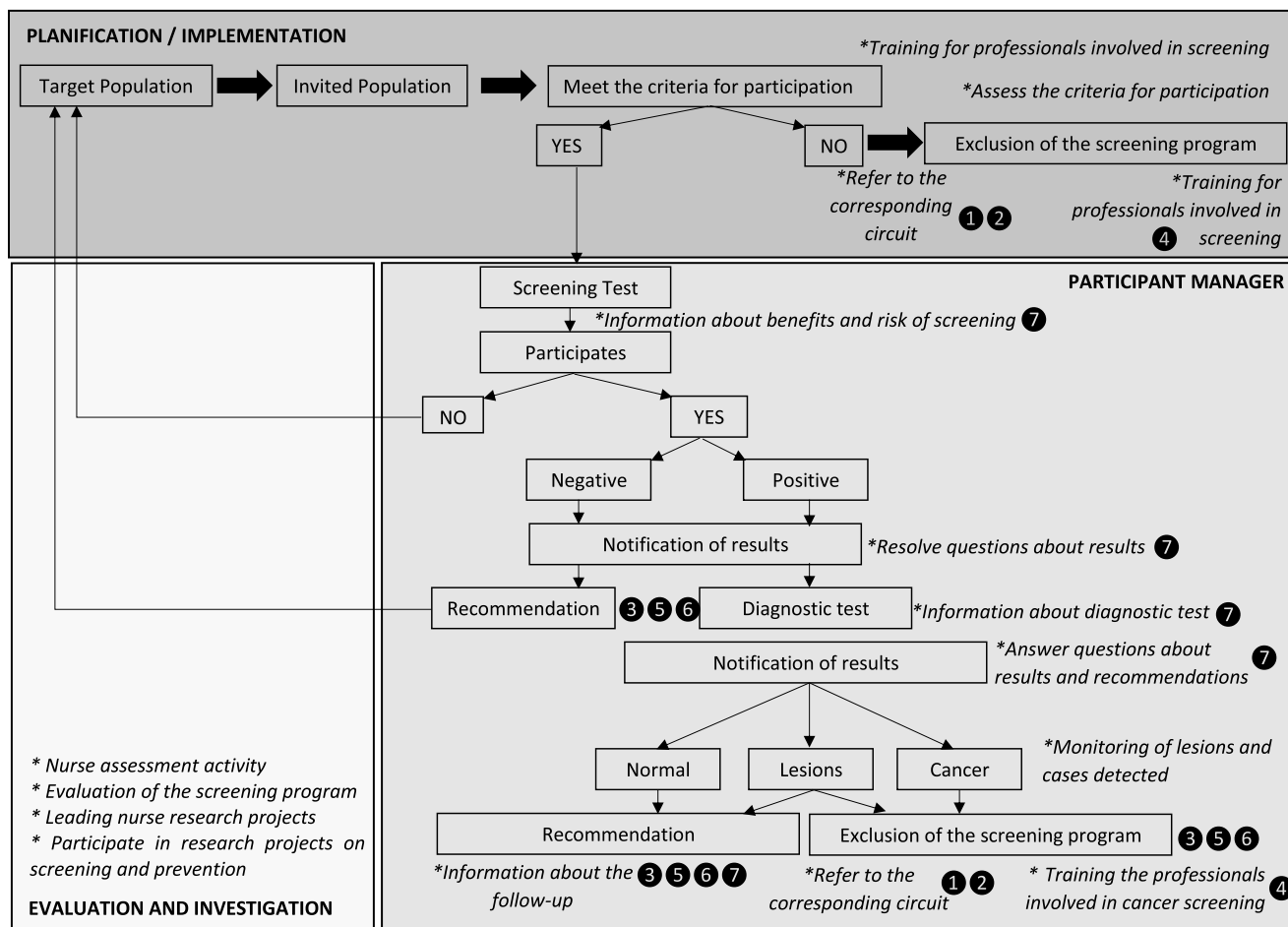
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Table 2 • Description of the Indicators, Continued

⑦ Participant understanding of the information regarding the cancer screening program.

Comprehension of the information received is a way of measuring quality. The complexity of the health services and care activities makes it necessary to analyze whether participants understand the care process and the information received.

Formula	Explanation of Terms	Population	Source of Information	Guiding Standard ³⁸
No. participants who scored $\geq 7/10$ on the questionnaire regarding the understanding of the information received in the program	The questionnaire on understanding should include the following: 1. perceived cancer risk of the participants 2. importance of preventive strategies 3. benefits and risks of early detection 4. diagnostic test procedure	The participants in the breast or colorectal cancer screening program. Sample size should be calculated to estimate the population parameter with 95% confidence interval, precision ± 3 percent units.	Ad hoc questionnaire addressed to program participants to be administered. In the case of detecting improvement areas, measures will be designed, implemented, and evaluated in 2 y. In the case of obtaining results without possibility of improvement, the evaluation will be repeated in 5 y.	Percentage of participants who scored ≥ 7 . Acceptable: 75% Desirable: 100%
No. participants surveyed				



* Activities and areas of action of the cancer screening nurse.

Indicators selected: ① Adequacy of the referral of the screening program participants to other health circuits ② Waiting time for a referral to other health circuits ③ Reporting of the participants' screening results ④ Understanding of the screening program by the professionals involved in the process ⑤ Participants' satisfaction with the screening process ⑥ Delivery of the screening process report to the participant ⑦ Participants' understanding of the information regarding the screening program

Figure 2 ■ Flowchart of the cancer screening program and indicators of the coordination and continuity of care.

provide valuable and complementary information to current indicators of cancer screening programs. A set of indicators to monitor nursing care would be an essential management tool that would give an overview of all the care provided in cancer screening. The monitoring of cancer screening indicators is intended to be a quality improvement tool, not a report card; it is important to focus on its role of uncovering opportunities and best practices because this will facilitate data collection and the collaboration of all the professionals involved. This knowledge can help establish efficient health policies and, at the same time, encourage the participation of nurses in the planning of cancer screening programs. Ensuring that patients receive only the most beneficial care (and not more care than necessary) can have positive implications for the quality of care and sustainability of the health system.

This study is to be understood as a first step in the development of care-sensitive indicators in our practice. An internal consensus document has been created for our cancer screening program technical office, which serves as the starting point. However, more research and reviews of these outcomes are still required. Therefore, future studies should consider establishing a working group of experts in evaluation methods and another group for the analysis, monitoring, and planning of improvement in different areas to assess the validity and reliability of these indicators so they can be used in other screening programs, whether at the national or international level. Even so, the indicators of a screening program should not be considered fixed because, as scientific evidence changes and clinical practice guidelines are updated, indicators should adapt to changes via periodic reviews and adjustments.

The set of indicators presented in this study has certain limitations that must be considered. The most noteworthy is that the reliability of the outcomes is dependent on the reliability of the data sources.⁴³

Therefore, it should be recognized that a specific system for gathering and recording information regarding care in screening programs is essential to keep us aware (through defined key performance indicators) and to show the contribution that nursing professionals offer to participants in terms of health outcomes.

In conclusion, we believe that this study describes an important innovation because it identified key performance indicators from nursing activities in cancer screening aimed at promoting the coordination and continuity of care. The evaluation of the indicators is crucial for quality improvement and should allow the establishment of a measuring system common to all population-based cancer screening programs to allow the comparison of outcomes.

References

1. Brawley OW, Kramer BS. Cancer screening in theory and in practice. *J Clin Oncol*. 2005;23(2):293–300.
2. Working Group for the Screening Presentation of the Public Health Commission. Framework document on population screening. Presentation of population screening of the Public Health Commission. Document adopted by the 177th Public Health Commission. <http://www.msps.es/profesionales/saludPublica/prevPromocion/docs/Cribadopoblacional.pdf>. Accessed May 2, 2016.
3. Espinas JA, Aliste L, Fernandez E, Argimon JM, Tresserras R, Borras JM. Narrowing the equity gap: the impact of organized versus opportunistic cancer screening in Catalonia (Spain). *J Med Screen*. 2011;18(2):87–90.
4. Arah OA, Klazinga NS, Delnoij DM, ten Asbroek AH, Custers T. Conceptual frameworks for health systems performance: a quest for effectiveness, quality, and improvement. *Int J Qual Health Care*. 2003;15(5):377–398.
5. Carinci F, Van Gool K, Mainz J, et al. Towards actionable international comparisons of health system performance: expert revision of the OECD framework and quality indicators. *Int J Qual Health Care*. 2015;27(2):137–146.
6. Kelley E, Hurst J. *Health care quality indicators projects: Conceptual Framework Paper*. Paris: OECD Health Working Papers, No. 23, OECD Publishing; 2006.
7. Fusté J, Sécúli E, Brugulat P, Medina A, Juncà S. Public healthcare coverage versus double healthcare coverage: what are the differences? *Gac Sanit*. 2005;19(1):15–21.
8. Health Department. Catalonia Health Survey 2013: report of the main results. http://salutweb.gencat.cat/ca/el_departament/estadistiques_sanitaries/enquestes/enquesta_salut_catalunya.
9. Lyngé E, Törnberg S, von Karsa L, Segnan N, van Delden JJ. Determinants of successful implementation of population-based cancer screening programmes. *Eur J Cancer*. 2012;48(5):743–748.
10. Cerdá Mota T, Asuncion Elizaga N. Implementation and evaluation of population screening programs. García García AM, ed. *3rd. Monograph of the Spanish Society of Epidemiology*. Madrid, Spain: EMISA; 2006.
11. Beaber EF, Kim JJ, Schapira MM, et al. Unifying screening processes within the PROSPR consortium: a conceptual model for breast, cervical, and colorectal cancer screening. *J Natl Cancer Inst*. 2015;107:djv120.
12. García M. Addressing overuse and overdiagnosis in colorectal cancer screening for average-risk individuals. *Colorectal Cancer*. 2015;4(1):27–35.
13. Donabedian A. The quality of care. How can it be assessed? *JAMA*. 1988;260(12):1743–1748.
14. Perry N, Broeders M, de Wolf C, et al. *European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis*. 4th ed. Luxembourg: European.
15. Segnan N, Patnick J, von Karsa L (Eds). *European Guidelines for Quality Assurance in Colorectal Cancer Screening and Diagnosis*. 1st ed. Luxembourg: European Commission, Publications Office of the European Union; 2010.
16. Binefa G, García M, Peiró R, Molina-Barceló A, Ibáñez R. How to assess and reduce social inequalities in cancer screening programmes. *Gac Sanit*. 2016;30(3):232–234.
17. Benito L, Binefa G, Vidal C, et al. Identifying nursing activities in population-based colorectal and breast cancer screening programs in Spain: a Delphi study. *Collegian*. 2016. [Epub ahead of print].
18. Starfield B. Coordination of health care. In: Starfield B, ed. *Primary Care*. Barcelona, Spain: Masson; 2002:233–265.
19. Terraza Núñez R, Vargas Lorenzo I, Vázquez Navarrete ML. Coordination among healthcare levels: systematization of tools and measures. *Gac Sanit*. 2006;20(6):485–495.
20. Reid R, Haggerty J, McKendry R. *Defusing the confusion: concepts and measures of continuity of healthcare*. Ottawa, Ontario, Canada: Canadian Health Services Research Foundation; 2002.
21. Vargas I, Vázquez ML, Henao D, de Campos CC. *Implementation of Care Coordination Mechanisms in Integrated Health Services Networks (RISS, for Its Acronym in Spanish)*. Washington, DC: Pan American Health Organization (PAHO); 2012.
22. Calvet X, Panés J, Alfaro N, et al. Delphi consensus statement: quality indicators for inflammatory bowel disease comprehensive care units. *J Crohns Colitis*. 2014;8(3):240–251.
23. Van Herck P, De Smedt D, Annemans L, Remmen R, Rosenthal MB, Sermeus W. Systematic review: effects, design choices, and context of pay-for-performance in health care. *BMC Health Serv Res*. 2010;10:247.
24. van Riet Paap J, Vernooij-Dassen M, Dröes RM, et al. Consensus on quality indicators to assess the organization of palliative cancer and dementia care applicable across national healthcare systems and selected by international experts. *BMC Health Serv Res*. 2014;14:396.
25. Bell CM, Brener SS, Comrie R, Anderson GM, Bronskill SE. Quality measures for medication continuity in long-term care facilities, using a structured panel process. *Drugs Aging*. 2012;29(4):319–327.

26. Bianchi V, Spitale A, Ortelli L, Mazzucchelli L, Bordoni A, QC3 CRC Working Group. Quality indicators of clinical cancer care (QC3) in colorectal cancer. *BMJ Open*. 2013;3(7).
27. Deem KC, Diaz-Ordaz EA, Shiner B. Identifying quality improvement opportunities in a universal newborn hearing screening program. *Pediatrics*. 2012;129(1):e157–e164.
28. Parra P, Calle JE, Ramon T, Peiró S, Meneu R. Quality indicators for hospitals in the national health system. Spanish Society for Care Quality. <http://www.calidadasistencial.es/images/gestion/biblioteca/335.pdf>. Accessed May 6, 2016.
29. Aller MB, Vázquez ML, Vargas H, et al. *Indicators Care Coordination Between Levels of Care. Work Document. Version in November 2012*. Barcelona, Spain: Consortium for Health and Social of Catalonia; 2012. http://www.consorcio.org/media/upload/pdf/documento-trabajo_indicadores-coordinacion-entre-niveles-de-atencion_1443707458.pdf. Accessed May 5, 2016.
30. Cobalea N, Contel JC, Ferrús L, et al. Indicators for evaluating nursing care. Committee for the Evaluation of Indicators. http://canalsalut.gencat.cat/web/.content/home_canal_salut/professionals/participacio/consells_de_les_professions_sanitaries/consell_professio_infermera_de_catalunya/documents/arxius/indicadors_avaluacio_cures_infermeresv4.pdf. Accessed May 6, 2016.
31. Spanish Society for Palliative Care (SECPAL, for its acronym in Spanish). Quality indicators in palliative care. Spanish Society for Palliative Care (SECPAL). <http://www.eutanasia.ws/hemeroteca/59.pdf>. Accessed May 5, 2016.
32. Wood L, Bjarnason GA, Black PC, et al. Using the Delphi technique to improve clinical outcomes through the development of quality indicators in renal cell carcinoma. *J Oncol Pract*. 2013;9(5):e262–e267.
33. Chapman K. Interim quality assurance guidelines for clinical nurse specialists in breast cancer screening. Fifth Edition NHS Cancer Screening Programmes NHSBSP Publication. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465698/nhsbsp29.pdf. Accessed May 7, 2016.
34. Serra-Sutton V, Barrionuevo L, Herdman M, Alomar S, Sanz L, Espallargues M. *Development of Indicators to Evaluate Colorectal Cancer Prevention Programs in High Risk Populations: Quality Plan for the National Health System of the Ministry of Health and Social Policy Ministry of Science and Innovation Reports of Health Technology Assessment, #AATRM 2009*. Barcelona, Spain: Agency for Health Technology Assessment and Research of Catalonia; 2010.
35. Wenger NS, Young RT. Quality indicators for continuity and coordination of care in vulnerable elders. *J Am Geriatr Soc*. 2007;55(suppl 2):S285–S292.
36. Haggerty J, Reid R, Freeman GK, Starfield BH, Adair CE, McKendry R. Continuity of care: a multidisciplinary review. *BMJ*. 2003;327:1219–1221.
37. Donabedian A. Evaluating the quality of medical care. *Milbank Mem Fund Q*. 1966;44(3):166–206.
38. Secretary of Strategy and Coordination, Nursing Management Directorate, Department of Health. *Case Management in Nursing Practice*. Barcelona, Spain: Catalonia's Government; 2010.
39. Øvretveit J. *Does Clinical Coordination Improve Quality and Save Money?* London, England: The Health Foundation; 2011.
40. World Health Organization. *The World Health Report: Health Systems Financing. The Path to Universal Coverage*. Geneva, Switzerland: World Health Organization; 2010.
41. Jódar-Solà G, Cadena-Andreu A, Parellada-Esquius N, Martínez-Roldán J. Continuity of care: the role of the liaison nurse. *Aten Prim*. 2005;36(10):558–562.
42. Sullivan A, Elliot S. Assessing the value of a cancer clinical nurse specialist. *Cancer Nurs Pract*. 2007;6(10):25–28.
43. Saura RM, Gimeno V, Blanco MC, et al. *Development of Process and Outcome Indicators and Evaluation of Cancer Care Practice. Madrid: Quality Plan for the National Health System Ministry of Health (Reports on Health Technology Assessment, #AATRM 2006/02)*. Madrid, Spain: Agency for Health Technology Assessment and Research of Catalonia; 2007.