Prioritization of Patients with Abnormal Breast Findings in the *Alerta Rosa* Navigation Program to Reduce Diagnostic Delays

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Disclosures of potential conflicts of interest may be found at the end of this article.

Key Words. Breast cancer • Triage • Health system delays • Navigation • Mexico

ABSTRACT

Introduction. In Mexico, there are considerable health system delays in the diagnosis and treatment initiation of women with breast cancer. *Alerta Rosa* is a navigation program in Nuevo Leon that aims to reduce barriers that impede the timely management of these patients.

Patients and Methods. Since December 2017, women who registered to receive medical evaluations by *Alerta Rosa* were stratified based on their clinical characteristics into three priority groups ("Red," "Yellow," and "Green"). According to the category assigned, patients were scheduled imaging studies and medical appointments with breast specialists on a preferential basis.

Results. Up until December 2019, 561 patients were scheduled for medical evaluations. Of them, 59% were classified as "Red," 25% "Yellow," and 16% "Green" priority. The median time from stratification to first medical evaluation was 4, 6, and 7 days, respectively ($p = .003$). Excluding those who had a prior breast cancer diagnosis, 21 patients were diagnosed by *Alerta Rosa*, with the initial "Red" priority classification demonstrating a sensitivity of 95% (95% confidence interval [CI], 75.1%–99.9%) and specificity of 42% (95% CI, 37.1%–47.1%) for breast cancer. The median time elapsed from initial patient contact to diagnosis and treatment initiation was 16 days and 39 days, respectively. The majority (72%) of patients were diagnosed at an early stage (0–II).

Conclusion. This patient prioritization system adequately identified women with different probabilities of having breast cancer. Efforts to replicate similar triage systems in resource-constrained settings where screening programs are ineffective could prove to be beneficial in reducing diagnostic intervals and achieving early-stage diagnoses. *The Oncologist* 2020;25:1–8

Implications for Practice: Low- and middle-income countries such as Mexico currently lack the infrastructure to achieve effective breast cancer screening and guarantee prompt access to health care when required. To reduce the disease burden in such settings, strategies targeting early detection are urgently needed. Patient navigation programs aid in the reduction of health system intervals and optimize the use of available resources. This article presents the introduction of a triage system based on initial patient concern. Appointment prioritization proved to be successful at reducing health system intervals and achieving early-stage diagnoses by overcoming barriers that impede early access to quality medical care.

INTRODUCTION

Breast cancer (BC) is the second most common malignancy worldwide and the leading cause of cancer-related deaths in women [1]. Despite significant scientific and clinical advances, the annual incidence of BC continues to rise. This is particularly challenging in low- to middle-income countries, where the mortality-to-incidence ratio is high in comparison with developed nations [2]. The main factors contributing to the high disease burden in such settings include ineffective screening strategies, barriers that impede early access to specialized health care, and inadequate quality of care [3, 4].

In Mexico, most patients with BC present with locally advanced or metastatic disease [5]. Such late presentation

has been associated with both patient and provider delays, with the latter being predominantly linked to health system intervals [6]. A study performed in four public institutions in Mexico City reported that the median time from detection of a breast problem by the patient and BC treatment initiation was 7 months, with the longest delay occurring between the first medical evaluation and diagnosis confirmation (4 months) [6]. These prolonged health system intervals have been partly attributed to the fragmentation of Mexico's public health system and the lack of established referral pathways [3].

Thus, development of strategies focused on reducing delays in BC management is urgently needed to achieve early-stage diagnoses and consequently improve patient outcomes. One such strategy is patient navigation, a coordinated patient-centered model that challenges barriers to health care access and has proven to reduce health system intervals in various settings [7, 8]. Despite the known efficacy of this strategy, there are still no widely adopted interinstitutional navigation programs in Mexico, where their application could prove to be advantageous [9].

Alerta Rosa is a navigation program active in Nuevo Leon, Mexico, that aims to reduce delays in BC diagnosis and treatment irrespective of health care coverage. Specifically, its objective is to shorten the system delays that can be influenced through patient navigation (i.e., time to first medical evaluation, breast biopsy, and diagnosis). The program was created by *Médicos e Investigadores en la Lucha contra el Cáncer de Mama*, a nongovernmental organization (NGO) focused on overcoming the challenges that impede early BC detection and improving the quality of life of vulnerable populations [10].

The results of *Alerta Rosa* during its first year of operation have been previously published [11]. From January to December 2017, a total of 656 women contacted the program in search of orientation concerning breast pathology. Overall, 446 medical evaluations were scheduled, and 309 (69%) patients did attend their appointments. Of them, 22 were diagnosed with BC, with the majority being detected in early stages, as 14% were stage I and 45% stage II. *Alerta Rosa*'s objective of reducing the health system intervals was achieved, with a median time from alert activation to treatment initiation of 33 days.

Since Mexican women who are diagnosed with BC tend to present with breast symptoms [12–14], a triage system based on the patient's initial concern was created for *Alerta Rosa*. The objective of establishing priority groups was to offer prompt medical evaluations for women with symptoms suggestive of BC or imaging studies whose Breast Imaging, Reporting, and Data System (BI-RADS) score does not rule out malignancy (i.e., BI-RADS 3–5). We hypothesized that by scheduling early appointments for patients with a high probability of BC, diagnosis and referral to the corresponding health care affiliation unit for treatment initiation could be further optimized. The triage system's design was based on the most common presentations of BC in our program's experience and capacity to evaluate patients within achievable time intervals. This prioritization system could serve as an example for interested centers in similar settings to adapt this concept based on their population characteristics, health care system saturation, and available resources.

MATERIALS AND METHODS

Description of *Alerta Rosa*

Alerta Rosa reaches out to patients via mass media campaigns (television, radio, print media) and social networking sites (Facebook, Twitter, Instagram), as well as through collaborations with NGOs and Mexican companies that promote early BC detection. The program's target population comprises women with breast symptoms or abnormal imaging studies in whom BC is a possibility. Upon contacting *Alerta Rosa* via a call center, the patient activates an "alert" based on her initial concern, which is recorded by a navigator who schedules medical evaluations as necessary. Women requiring a mammography and/or a breast ultrasound are referred to independent radiology clinics that have digital mammography systems and radiologists specialized in breast imaging. Furthermore, medical appointments are scheduled with qualified breast surgeons. These services are offered in five participating centers at a preferential price (imaging studies: $10–$62 U.S.D.; medical appointment with a breast surgeon: $10–$31 U.S.D.; percutaneous breast biopsy: $96–$257 U.S.D.). If BC is diagnosed, patients are referred by the navigator to a tertiary care unit according to their health care affiliation for prompt treatment initiation. Additional activities performed by the navigator include referral to a social worker if financial limitations are reported, addressing doubts about the services offered, verification of patient attendance by contacting the associated centers, reaching out to no-shows with the goal of rescheduling, offering biennial or annual follow-up based on the results of the medical evaluations, and active communication with patients diagnosed with BC to record their trajectory. *Alerta Rosa* also contributes educational resources such as informational brochures and videos targeted for patients as well as the general population.

Cohort

All patients who contacted *Alerta Rosa* from December 2017 to December 2019 were included in this study. Upon first contact, the navigator registered the means by which the patient heard of the program, contact information, sociodemographic data, the concern leading to the alert activation, and if the patient had previous imaging studies or if she had received attention for the presenting concern in another institution. For all patients who scheduled and attended their *Alerta Rosa* evaluations, the date and findings of their corresponding imaging studies, appointments and biopsies were collected. If BC was diagnosed, the following data were documented: date of results' disclosure, disease stage, tumor subtype, date of first appointment in the referral unit, and type and date of initial treatment. In the case of nonattendance to any of the programmed evaluations, the reason was asked and reported.
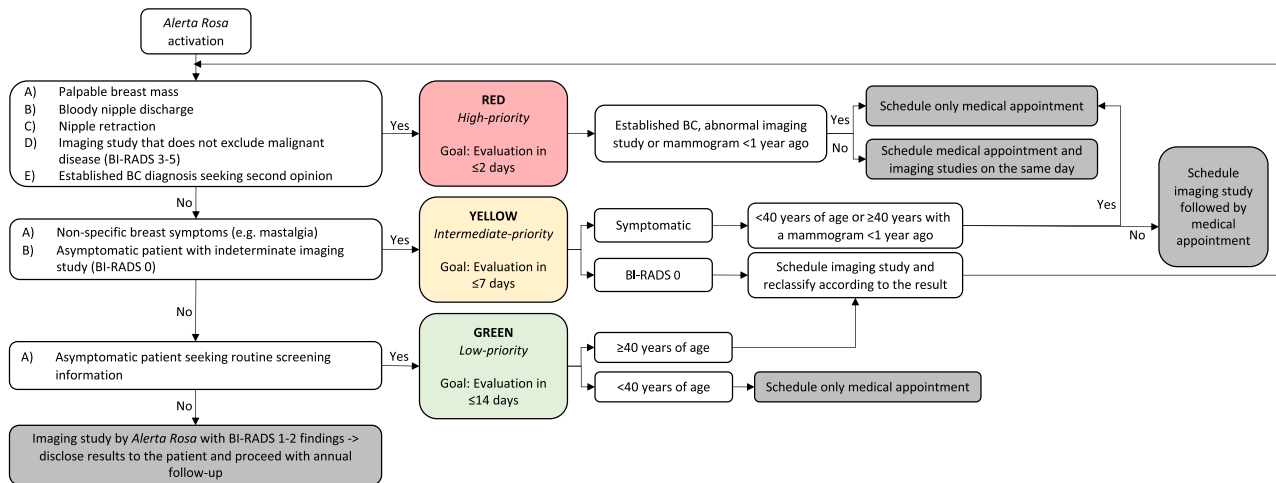
Figure 1. Triage system designed for the *Alerta Rosa* breast cancer navigation program.
Abbreviations: BC, breast cancer; BI-RADS, Breast Imaging, Reporting, and Data System.

Prioritization System

With the objective of reducing health system intervals, a triage system based on the patient's initial concern was launched starting December 2017. As shown in Figure 1, women who were interested in pursuing medical evaluations by *Alerta Rosa* were stratified into one of the following three priority groups: (a) Patients with suspicious symptoms (i.e., palpable mass, nipple retraction or bloody discharge), abnormal imaging studies (i.e., BI-RADS 3–5), or an established BC diagnosis were determined as high priority ("Red"); (b) those with nonspecific symptoms (e.g., mastalgia) or indeterminate imaging studies (BI-RADS 0) were considered intermediate priority ("Yellow"); and (c) asymptomatic women seeking routine screening information were classified as low priority ("Green"). The criteria for each priority group were based on the findings of *Alerta Rosa*'s first year of operation, during which 86% of patients diagnosed with BC presented with symptoms [11]. Of note, a patient with a BI-RADS score of 3 was classified as "Red" because external studies are often suboptimal; as reported in our previous experience, a 42% discrepancy was found between the BI-RADS scores of external studies and those performed at the program's associated radiology clinics [11].

As illustrated in Figure 1, the navigator scheduled patients to one of the following initial assessment plans based on the priority group assigned: (a) A medical appointment and imaging studies on the same day; (b) imaging studies followed by a medical appointment shortly thereafter; (c) only a medical appointment; or (d) only imaging studies with posterior reclassification based on the result. On the other hand, if a patient was only interested in receiving orientation upon first contact with the navigator but did not wish to proceed with medical attention by the program, the motive was recorded, and no assignment to a priority group was made.

Statistical Analysis

This exploratory analysis aims to report *Alerta Rosa*'s results at the detection of BC and time intervals after the assignment of patients into priority groups. The triage system's sensitivity and specificity for BC detection was evaluated using the number of patients per category in whom BC was later confirmed by a breast biopsy as true positives and the total number of patients who attended an evaluation and did not receive a BC diagnosis as true negatives.

The following definitions were used to calculate the health system intervals: (a) time to first medical evaluation: days from alert activation to imaging studies or medical appointment with a specialist, whichever occurred first; (b) time to diagnosis: days from alert activation to breast biopsy result disclosure with the patient; and (c) time to treatment initiation: days from alert activation to first treatment modality (i.e., surgery or chemotherapy) at the tertiary care unit.

Descriptive analysis was undertaken for quantitative and qualitative variables. The test for independent medians was performed to compare the time to first medical evaluation in the different priority groups. The statistical analysis of the collected data was performed using the program IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY).

RESULTS

Alerta Rosa Activation

A total of 1,043 alerts were activated, of which 1,038 (99.5%) corresponded to women and 5 (0.5%) to men. The median age was 45 years (range, 8–89). Overall, 634 (61%) reported breast symptoms, 249 (24%) were asymptomatic and 160 (15%) did not specify. The means by which 922 patients heard of *Alerta Rosa* were registered; the most common were Facebook/Internet (30%) and word of mouth (28%). The majority of the alerts were activated by the patient herself (60%), followed by a family member (14%) and close contacts (7%). A total of 482 (46%) patients activated an alert yet decided not to pursue medical evaluations by *Alerta Rosa*; of them, 121 were seeking general orientation, 55 had scheduled appointments with other physicians, 52 reported financial limitations, 50 travel difficulties, 22 complicated schedules, and the rest did not respond.
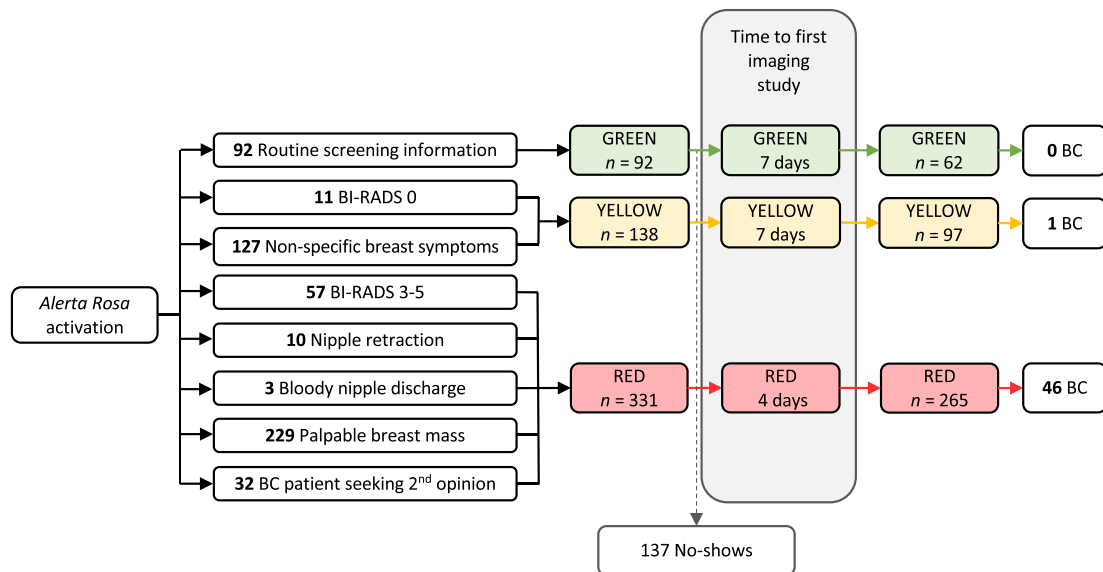
Figure 2. *Alerta Rosa* activations, triage, and time from initial contact to first imaging study. Of the total number of patients who attended a medical evaluation, breast cancer was confirmed in 1 patient from the intermediate-priority category ("Yellow") and 46 from the high-priority category ("Red"). Of those detected in the "Red" category, 20 corresponded to new breast cancer diagnoses, and 26 were previously diagnosed patients seeking a second opinion.
Abbreviations: BC, breast cancer; BI-RADS, Breast Imaging, Reporting, and Data System.

Overall, 561 patients were scheduled for an evaluation (i.e., imaging study, medical appointment, or both), of which 424 (76%) attended. One hundred thirty-seven (24%) of the scheduled patients were no-shows, of whom 16 responded they did not attend due to personal reasons, 5 due to financial limitations, and 5 due to travel difficulties, whereas the remaining either abstained or could not be further contacted.

Triage System

Of the 561 patients who scheduled medical evaluations, 369 (66%) reported breast symptoms, 92 (16%) sought routine screening information, 68 (12%) had an indeterminate/abnormal imaging study, and 32 (6%) were seeking a second opinion for a prior BC diagnosis. Per the priority groups' criteria, 331 (59%) of patients were classified as "Red," 138 (25%) as "Yellow," and 92 (16%) as "Green" (Fig. 2).

The median time from alert activation to first medical evaluation was 4 days for patients in the "Red" group, 6 days for "Yellow," and 7 days for "Green" ($p = .002$), as shown in Table 1.

Imaging Studies

A total of 224 mammograms and 373 ultrasounds were performed on patients who did not disclose a prior imaging study. BI-RADS scores 4 and 5 were obtained in 32 (14%) and 47 (13%), respectively. Prior to contacting the program, 108 patients who attended a medical appointment had a mammography performed at another institution. After the assessment by an *Alerta Rosa* specialist, 16 of these patients were asked to repeat the mammography in one of the associated radiology centers, as the quality of the external images was suboptimal. Of these, the BI-RADS score changed in 14 (88%) after evaluation by radiologists specialized in breast imaging. The most common mammography reclassification

Table 1. Median time (in days) from alert activation to first imaging study, medical appointment, and first medical evaluation in *Alerta Rosa* per priority group

	Green	Yellow	Red	*p* value
Imaging study	7	7	4	.014
Medical appointment	10	7	5	.006
First medical evaluation	7	6	4	.002

was from BI-RADS 3 to BI-RADS 2 in three (19%) patients. Similarly, 86 patients had a previous ultrasound, of which 28 were repeated as part of our program and 59% were reclassified. It is noteworthy that in the group of patients whose BI-RADS score by ultrasound changed, three BC diagnoses were posteriorly confirmed; the reclassifications of these patients were (a) BI-RADS 0 to 5, (b) BI-RADS 4a to 5, and (c) BI-RADS 3 to 4b (Table 2).

Medical Appointment

A total of 266 patients attended a medical appointment with one of the breast surgeons at *Alerta Rosa*. One hundred twenty-four (46%) reported having previously received medical attention for their presenting concern by another physician; the reason that led 99 of these patients to contact our program was registered, with the most common being interest in a second opinion (44%), recommendation by a contact (29%), and desire for a short interval to medical evaluation (17%). Likewise, the status of affiliation to a health care system was disclosed by 245 of the patients, and the results were as follows: Mexican Institute of Social Security, 54%; Popular Health Insurance, 25%; Institute for Social Security and Services for State Workers, 5%; private insurance, 5%; and no affiliation, 11%.

Table 2. BI-RADS score reclassification in patients with a prior imaging study from another institution and an *Alerta Rosa* imaging study

Previous study score	*Alerta Rosa* score	Mammography (n = 16), n (%)	Ultrasound (n = 28), n (%)
BI-RADS 0	No change	0 (0)	0 (0)
	BI-RADS 2	2 (50)	0 (0)
	BI-RADS 3	1 (25)	0 (0)
	BI-RADS 4a	1 (25)	0 (0)
	BI-RADS 5	0 (0)	1 (100)
BI-RADS 2	No change	1 (50)	2 (67)
	BI-RADS 3	0 (0)	0 (0)
	BI-RADS 4a	1 (50)	1 (33)
BI-RADS 3	BI-RADS 0	0 (0)	1 (8)
	BI-RADS 2	3 (75)	3 (25)
	No change	1 (50)	5 (42)
	BI-RADS 4a	0 (0)	1 (8)
	BI-RADS4b	0 (0)	1 (8)
	BI-RADS 5	0 (0)	1 (8)
BI-RADS 4a	BI-RADS 2	1 (50)	2 (25)
	BI-RADS 3	1 (50)	2 (25)
	No change	0 (0)	3 (38)
	BI-RADS 5	0 (0)	1 (13)
BI-RADS 4b	BI-RADS 3	1 (50)	0 (0)
	BI-RADS 4a	0 (0)	1 (50)
	No change	0 (0)	1 (50)
	BI-RADS 4c	1 (50)	0 (0)
BI-RADS 4c	BI-RADS 3	1 (50)	0 (0)
	BI-RADS 4b	1 (50)	0 (0)

Abbreviation: BI-RADS, Breast Imaging, Reporting, and Data System.

Table 3. Proportion of patients who attended their medical evaluations and were diagnosed with breast cancer according to their initial concern upon alert activation

Priority group Initial concern upon alert activation	Medical evaluations, n (%)	Breast cancer diagnoses, n (%)
Green (n = 62): Asymptomatic women seeking routine screening information	62 (15)	0 (0)
Yellow (n = 97):		
Indeterminate image studies (BI-RADS 0)	8 (2)	0 (0)
Nonspecific symptoms (e.g. mastalgia)	89 (21)	1 (2)
Red (n = 265):		
Imaging study does not rule out malignancy (BI-RADS 3–5)	52 (12)	4 (9)
Nipple retraction	8 (2)	1 (2)
Bloody discharge	3 (1)	0 (0)
Palpable mass	176 (41)	15 (32)
Established breast cancer diagnosis seeking 2nd opinion	26 (6)	26 (55)
Total, n	424	47

Abbreviation: BI-RADS, Breast Imaging, Reporting, and Data System.

At the time of alert activation, 120 (45%) of 266 patients who were seen by the specialist reported a palpable mass, nipple retraction, or bloody nipple discharge, for which they were assigned to the "Red" priority group. Information regarding the physical exam was recorded for 110 (92%) of these high-priority patients, reporting that 77 (70%) did have an abnormal finding, whereas 33 (30%) had a normal exam despite their initial concern. On the other hand, of 125 (47%) patients who reported no symptoms ("Green") or nonspecific symptoms ("Yellow"), the physical exam data were recorded for 120 (96%), reporting that 33 (28%) presented abnormal findings that had not been detected by the patient herself. The remaining 21 (8%) women who attended a medical appointment were seeking a second opinion for a prior BC diagnosis. Physical exam data were available for 16 (76%) of them, confirming a palpable abnormality in 12 (75%).

Biopsies and BC Diagnoses

Based on the findings of the imaging studies and medical appointments, 64 ultrasound-guided percutaneous breast biopsies were performed by *Alerta Rosa*. Forty-one (64%) had benign results, whereas 23 (36%) demonstrated the presence of malignant disease. Of the biopsies with malignant results, two were performed in patients who had undergone a recent biopsy at another institution and were seeking a second opinion for their BC diagnosis. Excluding those with a prior diagnosis, 20 of 239 patients from the "Red" group received a BC diagnosis (8.4%), 1 of 97 patients from the "Yellow" group (1%), and none from the "Green" group (Table 3). Therefore, the "Red" category achieved a sensitivity of 95.2% (95% confidence interval [CI], 76.2%–99.9%) and specificity of 41.9% (95% CI, 36.9%–47.1%) for BC.

For the 21 patients who received a BC diagnosis by *Alerta Rosa*, the median age was 52 years (range: 28–74). The majority reported a symptom when activating the alert (91%), and 11 of them (52%) had attended an evaluation with another physician prior to contacting the program. Staging was available for 18 patients: 5.6% were classified as stage 0, 16.7% stage I, 50% stage II, 16.7% stage III, and 11% stage IV. Follow-up data from the referral unit were available in 19 patients, with neoadjuvant chemotherapy (57%) and surgery (33%) as the favored initial treatment strategies. Overall, the time interval from alert activation to BC diagnosis and treatment initiation was 16 days and 39 days, respectively (Fig. 3).

Discussion

In resource-constrained settings, the main factors contributing to high mortality from BC are the shortage of qualified
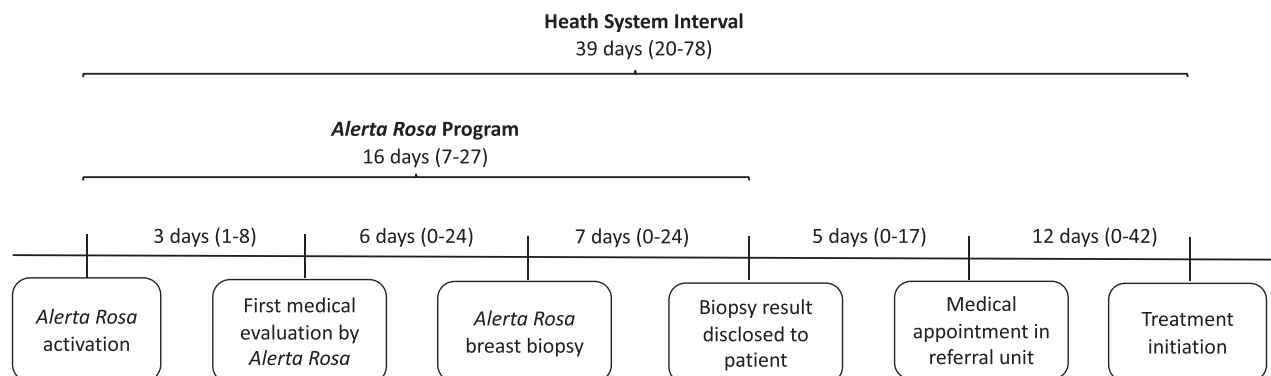
Heath System Interval
39 days (20-78)

Alerta Rosa **Program**
16 days (7-27)

3 days (1-8)	6 days (0-24)	7 days (0-24)	5 days (0-17)	12 days (0-42)

| *Alerta Rosa* activation | First medical evaluation by *Alerta Rosa* | *Alerta Rosa* breast biopsy | Biopsy result disclosed to patient | Medical appointment in referral unit | Treatment initiation |

Figure 3. Time intervals for medical attention shown as median (range).

health care professionals, low coverage of screening tests, predominance of low-quality imaging studies, and sociocultural barriers [3, 4]. Thus, the development of interventions directed at increasing patient access to health care systems with adequate infrastructure and qualified physicians is of utmost importance to eliminate medical errors, reduce delays to diagnosis, achieve the detection of early-stage presentations, and, consequently, reduce the high mortality rates from BC.

In particular, routine screening programs are not adequately adopted in Mexico. According to the Mexican National Health and Nutrition Survey of 2012, only 29.4% of women aged 50 to 69 years had a screening mammography performed in the previous 2 years [15]. Of note, there are 10 mammography units per million inhabitants in this country, of which only approximately 30% are digital systems [16, 17]. In addition, there is limited access to radiologists specialized in breast imaging, as it was reported in 2015 that approximately only 260 Mexican radiologists are exclusively dedicated to breast pathology [4, 18]. The combination of these factors acts as a significant barrier to achieve successful screening programs. Consequently, as recommended by the Breast Health Global Initiative, limited-resource countries that lack adequate infrastructure to carry routine screening programs, like Mexico, must first center their efforts on establishing early detection programs [19].

Navigation programs are patient-centered models that aim to overcome existing challenges to access specialized health care. In this type of model, a nurse navigator serves as a guide throughout the disease management [7]. It has been previously proven that navigation promotes the use of routine screening programs, reduces health system intervals, and improves patient outcomes [8, 20]. Particularly, patient navigation can reduce the interval to diagnosis following an abnormal imaging study [21–23] as well as the interval from diagnosis to treatment initiation [24]. Although the use of these programs has been limited in low- and middle-income countries, navigation models in Malaysia [25] and Brazil [26] have proven to be successful in improving health system intervals, and a program in Colombia [27] achieved better patient outcomes. In Mexico, *Alerta Rosa* is the first navigation program oriented at reducing BC intervals with results reported in the literature.

Alerta Rosa has been successful in the identification of patients with undiagnosed BC and the reduction of delays to diagnosis and treatment initiation in Nuevo Leon. Since December 2017, 5% of patients who attended a medical evaluation received a BC diagnosis by the program, with an interval from alert activation to diagnosis of 16 days. This is a significant reduction in comparison with previously reported intervals in public institutions in Mexico City, where the time from first medical evaluation to diagnosis ranged from 2 to 8 months [6, 14]. Additionally, the median time from alert activation to treatment initiation was 39 days. In a recent local analysis of mammography interpretation delays within a main referral public hospital that receives studies from multiple facilities, the median time from date of imaging study to return of results alone was 39 days [28]. This further demonstrates the necessity to prioritize diagnostic over screening imaging studies to avoid delaying the workup of cases suspicious of BC.

Alerta Rosa has achieved its objectives due to several components, primarily the following: (a) The alert is activated by the patient herself, independently of any screening program available to the general population; (b) the infrastructure and guidance offered by the navigator permits scheduling imaging studies and medical appointments either the same day or within a very short period of time; (c) the navigator is qualified to address patient concerns regarding BC, offers solutions to barriers that impede access to health care, and actively communicates with the involved physicians; (d) patients are directed to centers with low costs and high-quality services, given that participating radiology centers comprise radiologists specialized in breast imaging and appointments are scheduled with breast surgeons; (e) the program is available irrespective of health care affiliation, and activation is based on a phone call or Facebook message; and (f) direct referral to Nuevo Leon's different health care affiliation units is available, facilitating prompt evaluation and BC treatment initiation.

A key factor for the program's success has been its high-quality imaging studies that are interpreted by experts, as this has helped guide patient prioritization. In addition, most studies are performed prior to the medical appointment, optimizing the time spent with the breast surgeon. It is noteworthy that 14.8% of the external mammography studies and 32.6% ultrasounds were considered suboptimal

and had to be repeated in one of the centers associated with *Alerta Rosa*, where the majority underwent a BI-RADS score reclassification. As all evaluations have been provided by specialists in breast pathology, additional appointments with general physicians or different specialties that tend to delay the referral process are avoided. This emphasizes the necessity of high-quality imaging units and evaluation by experts, as attempting to implement screening programs with low-quality studies threatens to saturate health systems by increasing the proportion of false positives or delaying the time to diagnosis even more by increasing false negative results.

The introduction of the triage system facilitated the identification and prioritization of patients in the "Red" category that required a prompt evaluation. According to the results of the median time to first medical evaluation per priority group, shorter intervals for the "Red" category in comparison with the other groups were achieved. Although 95% of BC cases diagnosed by the program were stratified as "Red," it is important to note that 59% of patients were originally assigned to this category. Therefore, the "Red" group had a high sensitivity but low specificity for BC. Even though the triage facilitated the prioritization of symptomatic women, this solution was partial and could be less efficacious in overly saturated health systems, as most patients met the high-priority criteria. It is noteworthy that none of the patients reported as asymptomatic and assigned to the "Green" priority group received a BC diagnosis, highlighting the importance of prioritizing symptomatic patients in Mexico.

One of the limitations observed during the analysis of our program's results was the notable number of patients who did not attend their scheduled evaluation. Although only a few reported a reason, we recognize that the distance of the participating centers, hours in which the services are available, and cost of receiving medical attention are limiting factors. Efforts are being made to achieve the inclusion of participating centers in various locations and at lower costs. Other challenges include the need to maximize the available resources and maintain active advertising campaigns that promote the use of the program. During 2018 and 2019, *Alerta Rosa*'s cost per patient was $57.90 U.S.D., which was covered by the NGO; this amount included the navigator's and program coordinator's salary, call center services, two breast surgeons' services, and the program's media campaigns.

Due to *Alerta Rosa*'s success in the prioritization of patients with abnormal breast findings, reduction of delays to diagnosis, and detection of cases at early stages, we propose the replication of a similar model in other resource-constrained settings. Our proposal is as follows:

1. Create a BC detection program with continuous advertising, inviting women with suspicious symptoms to activate an alert, especially those with a palpable mass.
2. Offer the services of a navigator who stratifies patients according to their clinical risk and schedules imaging studies and medical appointments with specialists, as appropriate. The navigator should maintain active communication with patients and offer solutions to barriers that may arise.
3. Prompt referral to a radiology center that performs high-quality diagnostic imaging studies (both mammography and ultrasound). The navigator should reclassify patients according to the results, schedule further appointments, and follow up with patients until treatment initiation. No-shows should be contacted and rescheduled.
   a. BI-RADS 4–5: Prompt performance of a diagnostic biopsy with subsequent medical evaluation by a specialist in breast pathology.
   b. BI-RADS 3: Refer to a gynecologist or family physician for a 6-month follow-up with imaging studies, with instruction to return to the program if there is evolution to BI-RADS 4 or 5.
   c. BI-RADS 1–2: Discharge from the program and offer follow-up with a routine screening program supervised by a gynecologist or family physician.
4. In cases of newly diagnosed BC, provide effective referrals to the corresponding health care affiliation units.

We recognize that the necessity for a multidisciplinary team composed of physicians specialized in breast pathology, and the maintenance of high-quality and continuous advertising can limit the replication of this system due to high operating costs. Furthermore, a thorough understanding of the setting where a similar model can be developed, including available resources and health care system infrastructure, is required to set feasible time interval goals for medical evaluations to avoid oversaturation. Additionally, the criteria defining the different priority groups can be adapted based on the characteristics and quality of care of each health care system.

CONCLUSION

Alerta Rosa is a navigation program in Nuevo Leon that successfully reduces the health system interval from initial contact to BC diagnosis. Introducing a triage system further facilitated the identification and prioritization of BC cases. The creation of similar navigation programs with patient prioritization criteria could prove to be beneficial in other resource-constrained settings to achieve early-stage diagnoses and, consequently, reduce the high mortality rate from this disease.

AUTHOR CONTRIBUTIONS

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