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**Performance of Mammography Screening in The National  
Breast Cancer Screening Program:  
A Retrospective Cohort Study**

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# Acknowledgement

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## Executive Summary


Globally, more women are being diagnosed with and dying from breast cancer. To combat breast cancer, WHO recommends earlier detection and access to treatment at an early stage. The Ministry of Health (MoH) introduced free mammogram screening for breast cancer for women aged 40 and above and for younger women at high risk of breast cancer in 2008-2009 in the West Bank and in 2010 in the Gaza Strip. To evaluate national screening mammography, we tracked abnormal screening results in 2011 for health outcomes. Data were pooled from mammogram registries in the 12 district primary health care clinics in the West Bank; the MoH clinic in the Gaza Strip; Cancer and Death registries at the Palestinian Health Information Centre (PHIC); the Referral Department of MoH; interviews with all mammography technicians and supervisors; MoH doctors/radiologists who read the mammogram films; and follow up calls to all women with abnormal screening results not found in either registry.

Using a two year follow-up window from the time of the mammography, we examined the performance of the screening program in several ways:

- The challenges faced by mammography technicians;
- The rates of cancer detection (number of cancers detected per 1000 screening mammographs);
- False-positive rates (number of women with abnormal screening results without breast cancer divided by the total number of cases with abnormal screening results);
- The timeliness of abnormal screening and diagnostic follow up (time to read the mammogram films);
- The types of cancer detected;
- The completeness of cancer registries of notified cancer cases in the West Bank and the Gaza Strip.

In the West Bank, there was shortage of films, especially of the larger size. There was also a shortage of physicians/radiologists that led to delays in reading mammography films; the service varied between 1-60 days. There was inconsistency in the screening mammography program in the twelve districts in terms of outreach; clinical breast examinations; referrals; time taken to read the mammogram films; giving the mammogram films back to the screened women; the follow-up of screened women;





the existence of screening mammography guidelines and guidelines for referrals of suspected cancer cases; and storage of patients' files. Only two clinics kept patient files (own initiative); the others kept the mammography reports for normal cases in one file, and suspected cases in another file.

Four out of the 12 mammography clinics are located in old buildings with poor ventilation and lacks hygiene: in Nablus, Salfit, Tulkarem and Tubas. A lack of preventive maintenance resulted in frequent breakdowns of mammography machines in many clinics and interrupts the screening program. In most districts, the follow up of women with abnormal screening results was inadequate, primarily due to poor communication between primary and secondary health care providers as there was no feedback on women referred for diagnosis.

Of the 6746 women screened, 6.2% (417/6746) cases of cancer were suspected. About one third (136/417) of the suspected cases were diagnostic (for women with signs and symptoms). Of the remaining women with suspected cancer (281 screening cases), 14.6% (41/281) were diagnosed with breast cancer. Assuming the remaining 6610 (6746 total screened subtracting the 136 diagnostic cases) screened women were asymptomatic, the rate of detection by mammography was 6.2 per 1000 (41/6610). Of the 41 diagnosed cases, only 21 (21/41=51%) were found in the cancer registry, with the stage of the cancer stated in only one case. The absence of stage of cancer in 20 out of the 21 diagnosed cases found at the Cancer Registry prevented us from examining the impact of screening on women's morbidity.

In the Gaza Strip, there is only one mammography machine. They maintained patient files and the mammogram films were read the following day. Guidelines existed for screening mammography and for referrals of suspected breast cancer cases. Of the 699 women screened, 2.4% (17/699) were suspected cases. Four of the 17 suspected cases were confirmed to have breast cancer. The rate of detection by mammography was 5.7 per 1000 (4/699). Of the four confirmed cases, three were found at the cancer registry and one case was found in the referral department.

In conclusion, this is an important initiative despite its very limited resources. Further support is required in the following areas:

- To develop screening mammography protocols for referrals of suspected cancer cases;
- To improve infrastructure;

- To review medical records and mammography registry;
- To train existing practitioners and additional physicians/radiologists to speed up the process of reading results;
- To extract diagnostic cases from primary health care for timely referral to secondary health care facilities;
- To improve the completeness and quality of the Cancer Registry by better communications between surgeons, oncologists and pathologists to determine the stage of cancer;
- To ensure that cases of cancer are notified;
- To improve the public education component in the current national screening program in line with WHO recommendations on appropriate widespread coverage of high-risk groups.<sup>1</sup>

## I. Background

Breast cancer is the second most common cancer in the world, and by far the most frequent cancer among women with an estimated 1.67 million new cancer cases in 2012 (25% of all cancers)<sup>2</sup>. The incidence of breast cancer is increasing in most regions of the world; between 2008 and 2012, breast cancer rates increased by more than 20% and the mortality rate increased 14% over the same period to 522,000 deaths in 2012. Incidence rates remain highest in more developed regions, but mortality is relatively much higher in less developed countries due to a lack of early detection and access to treatment facilities.<sup>3</sup> In Western Europe, the incidence of breast cancer is more than 90 new cases per 100,000 women annually, compared with 30 per 100,000 in Eastern Africa. Yet, breast cancer mortality rates in these two regions are almost identical at about 15/100,000.<sup>4</sup>

The most common types of breast cancer are ductal carcinoma and lobular carcinoma. Invasive breast cancer occurs when breast cancer spreads from the location where it starts in the breast ducts or lobules to surrounding normal tissue.<sup>5</sup> Women at risk of breast cancer include those with a personal history of breast cancer; a family history of breast cancer; received radiation treatments to chest as a child or young adult;

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1 Koroltchouk V, Stanley K, Stjernswørd J. The Control of Breast Cancer: A World Health Organization Perspective. *Cancer*. 1990 65: 2803-10


2 [http://globocan.iarc.fr/Pages/fact\\_sheets\\_cancer.aspx](http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx)

3 [http://globocan.iarc.fr/Pages/fact\\_sheets\\_cancer.aspx](http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx)

4 *ibid*

5 <http://www.cancer.gov/cancertopics/types/breast>





obesity; started periods below the age of 12 or began menopause at an older age; have never been pregnant; have their first child after the age of 35; taking hormone replacement therapy for menopause, and older age.<sup>6,7</sup> Incidence increases with age and the probability of a woman developing breast cancer in her forties is 1 in 69; in her fifties is 1 in 38; and in her sixties is 1 in 27.<sup>8</sup>

## **I.A. Burden of breast cancer in Palestine**

Based on the MoH Annual Report 2013,<sup>9</sup> non-communicable diseases are among the five top leading causes of death and cancer was ranked the second. In 2012, the incidence of cancer in the West Bank was 64.2 per 100,000, while in the Gaza Strip, the incidence of cancer was 63 per 100,000.<sup>10</sup> Breast cancer ranked first among deaths from cancer among women in both the West Bank and the Gaza Strip, where 22% (95/437) and 27% (82/306) respectively of cancer deaths were due to breast cancer.

## **I.B Mammography screening**

A cornerstone of breast cancer control is early detection to improve breast cancer outcomes and survival.<sup>11</sup> Diagnostic mammograms are used to check for breast cancer after a lump, discharge or other sign or symptom of the disease has been discovered, while screening mammograms are used to check for breast cancer in women who have no signs or symptoms of the disease. Screening mammography is used to detect breast cancer in the pre-clinical stage, thereby reducing disease-associated morbidity and mortality.

Potential harm from screening mammography may result from false-negative results (when mammograms appear normal even though breast cancer is present; screening mammograms miss about 20% of breast cancers that are present at the time of screening, mostly because of high breast density); false-positive results (occur when radiologists decide mammograms are abnormal, but no cancer is actually present), overtreatment, and radiation exposure. Screening mammograms can detect cancers

6 Mayo clinic.<http://www.mayoclinic.com/health/breast-cancer/DS00328/DSECTION=risk-factors>

7 World Health Organization.<http://www.who.int/cancer/detection/breastcancer/en/index1.html>

8 Ries LAG, Harkins D, Krapcho M, Mariotto A, Miller BA, Feuer EJ, et al. National Cancer Institute; Bethesda, MD: [June 2009]. SEER cancer statistics review, 1975-2003. Available at [http://seer.cancer.gov/csr/1975\\_2003/](http://seer.cancer.gov/csr/1975_2003/)

9 State of Palestine, Ministry of Health. Health Annual Report Palestine 2012.

10 Palestinian Health Information Center/Ministry of Health. Gaza Strip.

11 World Health Organization.<http://www.who.int/cancer/detection/breastcancer/en/>



and cases of ductal carcinoma in situ (DCIS). These are non-invasive tumours in which abnormal cells that may become cancerous build up in the lining of breast ducts and require treatment. However, they can also find cancers and cases of DCIS that will never cause symptoms or threaten a woman's life, leading to "over-diagnosis" of breast cancer. Of all breast cancers detected by screening mammograms, up to 54% are estimated to be the result of over-diagnosis. Treatment of the latter cancers and cases of DCIS is unnecessary and leads to "overtreatment." Overtreatment exposes women unnecessarily to the adverse effects associated with cancer therapy.<sup>12</sup>

The question whether breast cancer screening does more harm than good has been debated extensively. In a meta-analysis of 11 randomized trials, the relative risk of breast cancer mortality for women invited to screening compared with controls was 0.80 (95% CI 0.73-0.89), which is a relative risk reduction of 20%.<sup>13</sup> Based on another review study of seven clinical trials, if we assume that screening reduces breast cancer mortality by 15% and that over-diagnosis and overtreatment is at 30%, it means that for every 2000 women invited for screening throughout 10 years, one will avoid dying of breast cancer and 10 healthy women who would not have been diagnosed without screening will be treated unnecessarily. Furthermore, more than 200 women will experience significant psychological distress, including anxiety and uncertainty for years, as a result of a false-positive finding.

In Sweden, findings from a retrospective study of the impact of screening on breast cancer mortality following thirteen years of the introduction of screening mammography found that breast cancer mortality decreased by 16% in women aged between 40-69 years.<sup>14</sup> However, at least part of the observed reduction in mortality is due to improved treatment. In Norway, the availability of screening mammography from 1986 to 2005 for women aged 50 to 69 years was associated with a reduction in the death rate from breast cancer, but the screening itself accounted for only about a third of the total reduction (7.2 deaths per 100,000 person-years).<sup>15</sup>

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12 National Institute of Health.<http://www.cancer.gov/cancertopics/factsheet/detection/mammograms>

13 <http://www.ncbi.nlm.nih.gov/pubmed/23117178>

14 Haukka J, Byrnes G, Boniol M, Autier P, (2011). Trends in Breast Cancer Mortality in Sweden Before and After Implementation of Mammography Screening. PLoS ONE 6(9): e22422. doi:10.1371/journal.pone.0022422

15 Kalager M, Zelen M, Langmark Fy and Adami H-O. Effect of Screening Mammography on Breast-Cancer Mortality in Norway. New England Journal of Medicine 363:1203-1210.





In a review study of the incidence of advanced breast cancer in areas where screening mammography had taken place for at least seven years with minimum participation of 60% and where population based registration of advanced breast cancer existed, trends in the incidence of advanced breast cancer did not support a substantial role for screening in the decrease in mortality.<sup>16</sup> In another review study of the relationship between tumour sizes and stages and the reported effects on breast cancer mortality with and without screening in trials and observational studies, the average tumour sizes in all the trials suggested only a 12% reduction in breast cancer mortality, which agrees with the 10% reported in the most reliable trials. Recent studies of tumour sizes and stages show that screening has not lowered the rate of advanced cancers. Similar findings were published from recent observational studies of breast cancer mortality that failed to find an effect of screening.<sup>17</sup>

### **I.C. MoH National Screening Mammography Program**

In 2008-2009, the MoH in the West Bank introduced the free mammogram screening for breast cancer for women aged 40 and above and for younger women at high risk of breast cancer in the 12 districts. Women between the age of 40-50 were to be screened every other year and once a year for those over the age of 50. In 2010, the MoH in the Gaza Strip started free screening mammography with one mammography machine in Gaza city. In Gaza, women who attended for screening fell into three categories: the screening group from the general population, but mostly teachers; those with symptoms (diagnostic group); and new female employees as part of a medical examination.

## **II. Study Objectives**

The overall objective of the study is to examine the performance of the national mammography screening programs in the West Bank and the Gaza Strip. The specific objectives are as follows:

1. To examine the challenges faced by mammography technicians, supervisors and doctors/radiologists who read the mammogram films;

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<sup>16</sup> Autier P, Bouillon I, Bouillon I, Middleton R, Middleton R, Dore JF, Dore JF, Hery C, Hery C, Zheng T, Zheng T, Gavin A and Gavin A: Advanced breast cancer incidence following population-based mammographic screening.

<sup>17</sup> Gotzsche PC, Jorgensen KJ, Jorgensen KJ, Zahl P-H, Zahl PH, Machlen J and Machlen J: Why mammography screening has not lived up to expectations from the randomised trials.

2. To examine cancer detection rates;
3. To examine false-positive rates;
4. To examine the timeliness of responses to abnormal screening and diagnostic follow up;
5. To examine the stages of cancers detected by screening;
6. To examine the quality and completeness of Cancer Registries in the West Bank and Gaza Strip.

### **III. Methodology**

This study was carried out in partnership with MoH General Directorate of Primary Health Care and Palestinian Health Information Centres (PHIC) in the West Bank and Gaza Strip between January and September 2013. Using a two year follow-up window from the time of mammography, we examined the performance of the screening program by tracking cases with abnormal screening results in 2011. Data were collected from mammogram registries at the 12 district primary health care clinics in the West Bank and the MoH clinic in the Gaza Strip; cancer and death registries at the (PHIC) in the West Bank and the Gaza Strip; the Referral Department of MoH; interviews with 15 mammography technicians, 12 supervisors, and three MoH doctors who read the mammogram films; in addition to follow up calls to women with abnormal screening results not found in either registries.

#### **III.A Outcome measures**


*Cancer detection rates:* number of cancers detected per 1000 screened women.

*False- positive rates:* number of women with abnormal screening results without breast cancer divided by the total number of cases with abnormal screening results.

*Timeliness of abnormal screening and diagnostic follow up:* time needed to read the mammogram films.

*Stages of cancers detected:* based on the stage of cancer indicated in the cancer registries.





*Completeness of Cancer Registry:* the percentage of screened cases diagnosed in the Cancer Registries (diagnosed cases found in the cancer registry divided by the total number of diagnosed cases among those with abnormal screening results in 2011).

*Quality of Cancer Registry:* The stage of cancer identified as a notified diagnosed case to determine the type of cancers detected by mammography screening.

*Challenges faced by mammography technicians, supervisors and doctors who read the mammogram films:* A structured questionnaire (Annex I) was used for mammography technicians in addition to interviews with supervisors and doctors to examine challenges in the National Mammography Screening Program in terms of workload; availability of mammogram films of different sizes; the functioning of the mammogram machine; presence of mammography screening guidelines and guidelines for referrals; and follow up on women with abnormal screening results.

### **III.B. Data collection**

#### ***In the West Bank***

- From the mammogram registries in the district primary health care clinics, district nurses/mammography technicians identified cases with abnormal screening results in 2011.
- Using patients' IDs, a staff from the cancer registry at PHIC searched for cases with suspected breast cancer in the Cancer Registry and in the Death Registry.
- Supervisors from each district called the women with abnormal screening results who were not found in either registries (see the chart next page).

## Study Procedure in the West Bank

Clinic registry at MoH mammogram clinics



A list of suspected cases of breast cancer and those referred for biopsy



Checked their IDs at the PHIC Cancer Registry



The IDs were there



The IDs were not there



Asked for Cancer notification forms

Check in death registry



The women were registered as dead

*Ask for the death notification forms*



Checked underlying cause of death



Not



Called women



Checked the quality and completeness of Cancer Registry data



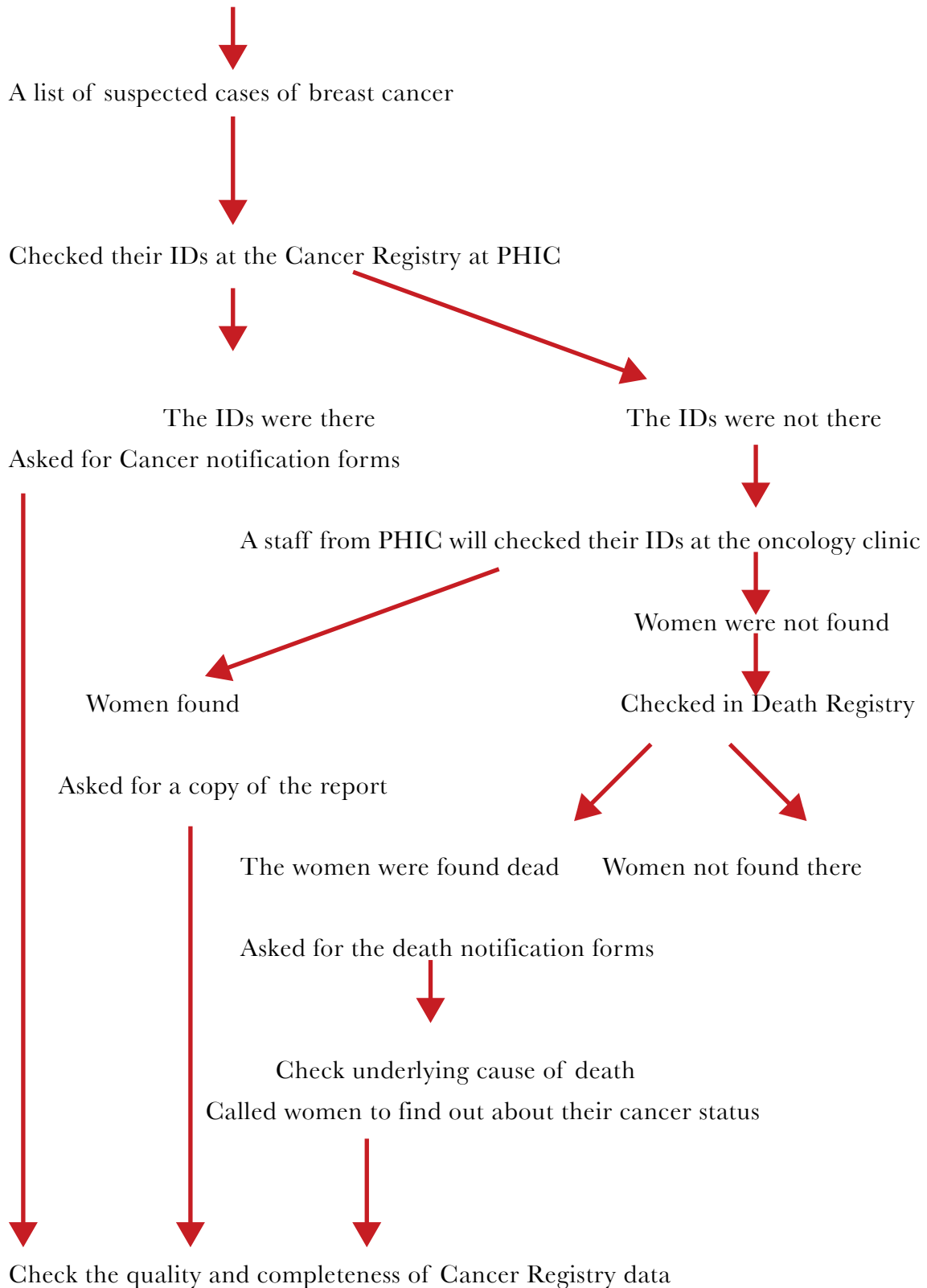


### ***In the Gaza Strip***

- From the mammogram registry in the primary health care clinic in Gaza city, the Director of the Cancer Registry at PHIC collected the IDs of all women with abnormal screening results in 2011.
- Using patients' IDs, staff from the cancer registry at PHIC searched for all women with abnormal screening results in the cancer registry, in the oncology clinic, and in the PHIC Death Registry.
- Women with suspected breast cancer who were not found in either Registry, nor in the oncology clinic, were followed up with a phone interview (see the chart next page).

## Study Procedure in the Gaza Strip

Clinic registry at MoH mammogram clinics (PHC)



## Protection of human subjects

Data were collected by reproductive health nurses/ Mother and Child Health (MCH) supervisors and mammography technicians. The mammography technicians/supervisors called the women who were not found in either registries. To protect confidentiality, MoH employees collected the data and supervisors called women for follow up. Once data were collected and verified, it was de-identified and given to the study Principle Investigator for analysis. Recruited technicians and supervisors received training in human subject protection prior to the data collection. The Helsinki Human Subject Protection Committee approved the study on February 2013.

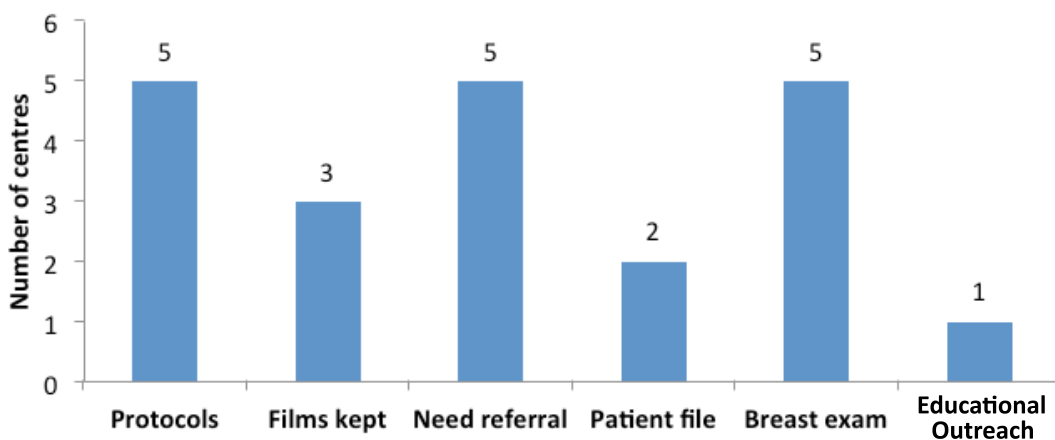
## Study Findings

### I. Challenges faced by mammography technicians, supervisors and doctors who read mammogram films.

#### I.A. West Bank

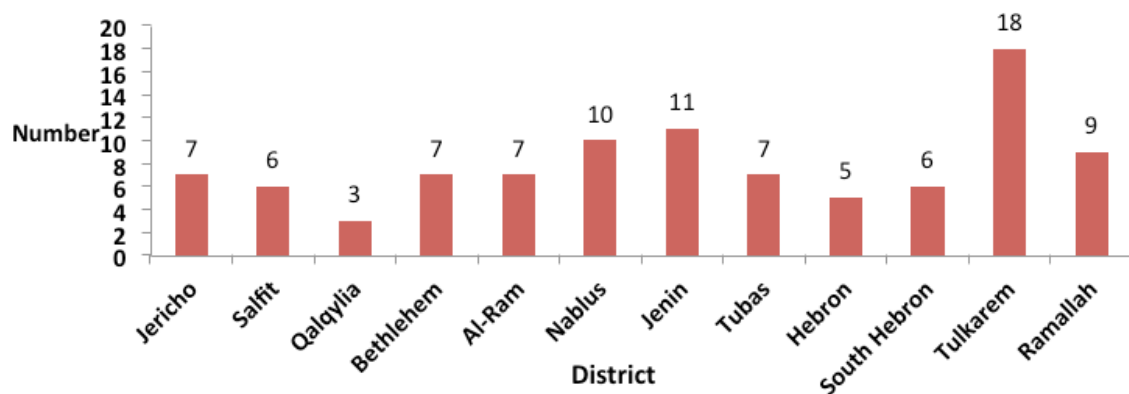
At the time of data collection, only 5 of the 12 clinics had mammography screening guidelines and only one clinic conducted health education outreach to invite women for screening (Figure 1).

Based on the technicians' reports, an average of 3-18 screening tests were done daily, the highest number being in Tulkarem (Figure 2).



*Figure 1: Availability mammogram screening guidelines, films kept at the clinic, referral required, patient file, outreach, clinical breast exam, MoH, West Bank, 2011*





*Figure 2: Average number of screening tests per day, MoH, West Bank, 2011*

### **I.B. Gaza Strip**

At the time of data collection, no on-the-job training was given to the technicians and there was no health education material in the waiting room. There was no preventive maintenance of the mammography machine; on the last occasion it was out of order for five months.

## **II. Rates of cancer detection, false-positive cases, timeliness of abnormal screening and diagnostic follow up, and types of cancers detected**

### **West Bank**

#### **II.A Cancer detection rates**

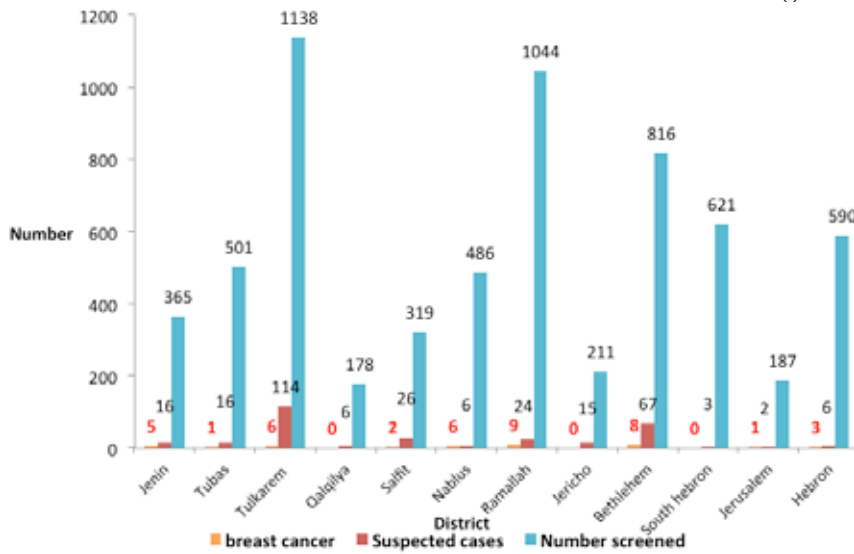
Of the 6746 screened women, 6.2% (417/6746) had abnormal screening results. About one third (136/417) of the suspected cases were diagnostic (for women with signs and symptoms). Of the remaining women with suspected cancer (281 screening cases), 14.6% (41/281) were diagnosed with breast cancer. Assuming the remaining 6610 women screened (total of 6746 screened subtracting the 136 diagnostic cases) were asymptomatic, the rate of detection by mammography was 6.2 per 1000 (41/6610). The detection rate is in concordance with other screening mammography programs in other countries.<sup>18</sup> There was significant variability in the number of screened women and detection rates by district (Figure 3). Rates of detection of breast cancer among screened women were from 0 per 1000 in Qalqilya,

<sup>18</sup> <http://www.breastscreen.health.wa.gov.au/~media/39CE23D915B24A699015590661D395AD.ashx>  
<http://www.patient.co.uk/doctor/breast-cancer-screening>

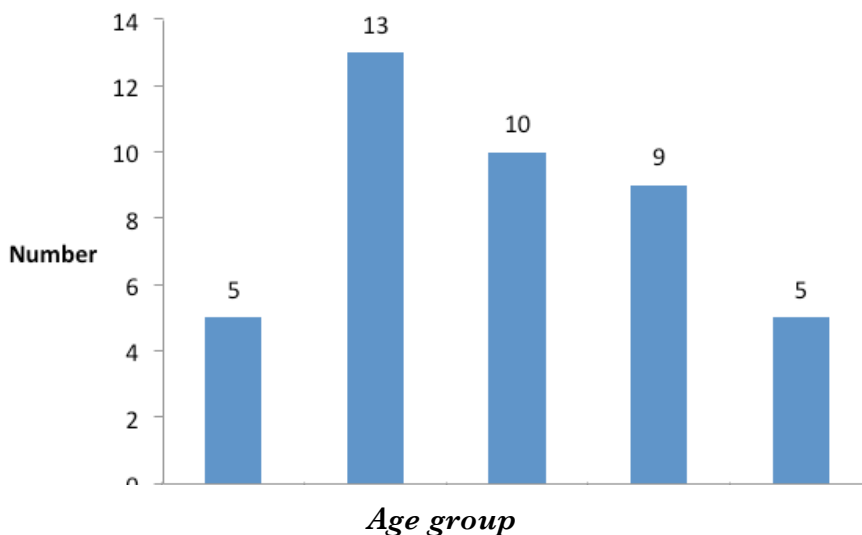


Jericho and south Hebron to 13.7 per 1000 in Jenin. Based on previous studies, the detection rate was 2.7 and 3.9 per 1000 in screened women aged 40-49 and 50-59 respectively.<sup>19</sup> The high detection rate of mammography screening may be explained by the possibility that not all screened cases in our study were asymptomatic.

As shown in Figure 4, five of the 41 women diagnosed with breast cancer were below the age of 40. About 44% of women diagnosed with breast cancer were below the age of 50, which is in line with studies from Egypt and other Arab countries that indicate that 50% of breast cancers are seen in women below the age of 50 years.<sup>20</sup>



**Figure 3: Number of screened women, women with suspected cancer, and women diagnosed with cancer**



**Figure 4: Age distribution of screened women diagnosed with breast cancer**

19 Miller Ab Fau - Baines CJ, Baines CjFau - To T, To T Fau - Wall C and Wall C: Canadian National Breast Screening Study: 2. Breast cancer detection and death rates among women aged 50 to 59 years.

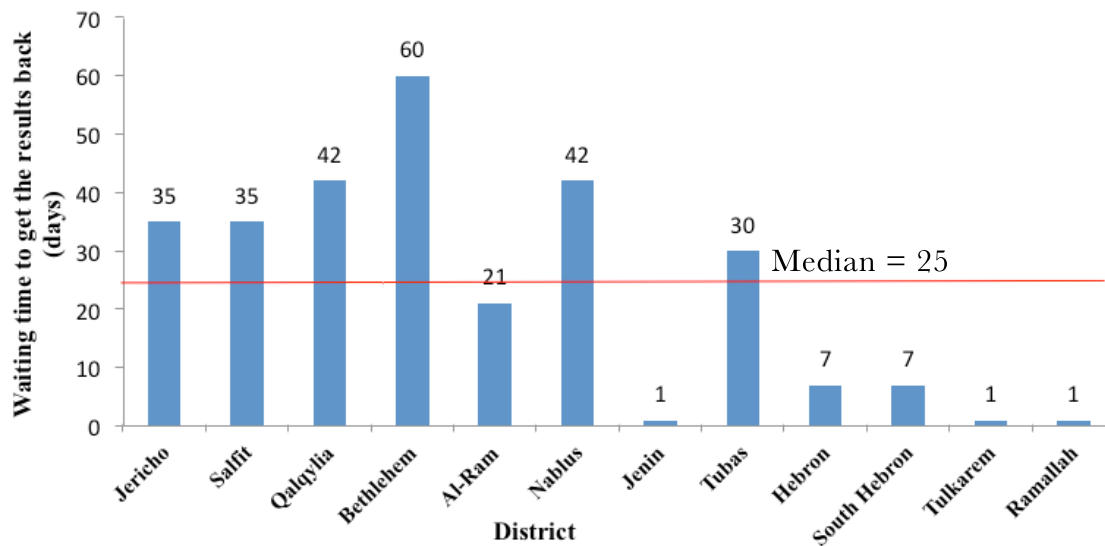
20 El Saghir NS. Responding to the challenges of breast cancer in Egypt and other Arab countries. J Egypt NatlCanc Inst.†2008 Dec;20(4):309-12

## II.B Rates of false-positive cases

The rate of false-positive cases among women with abnormal screening results was 85.4% (240/281). The rates of false-positive cases varied by district; from 0% in Nablus to 100% in Qalqyia, Jericho and South Hebron (Figure 3).

## II.C. Timeliness of abnormal screening and diagnostic follow up

Due to an insufficient number of doctors, there are only four doctors to read the mammogram films in the 12 districts; the median time to read the mammogram films was 25 days. The time required to read the mammogram films varied significantly by district, ranging from one day to 60 days (Figure 5)



*Figure 5: Waiting time for mammography report by district, MoH, West Bank, 2011*

## II.D. Stages of cancers detected

Among the 21 cases of cancer detected found in the cancer registry, only one has stage of cancer. As a result, we were unable examine if the breast cancers were detected at an early stage.

## II.E. Completeness of Cancer Registry

Of the 41 diagnosed cases, only 21 (21/41=51%) were found in the Cancer Registry.



## Gaza Strip

### **II.A Rate of detection of breast cancer**

In 2011, 699 women were screened and 17 suspected cases of cancer were detected. Four of the 17 suspected cases were confirmed to have breast cancer. The detection rate by mammography was 5.7 per 1000 (4/699).

### **II.B Rate of false-positive cases**

The rate of false-positive cases in the Gaza Strip was 76.5% (13/17).

### **II.C. Timeliness of abnormal screening and diagnostic follow up**

As there was only one mammography machine in the Gaza Strip, it took one day to read the mammogram film.

### **II.D. Stages of cancer detected**

Of the four cases of cancer detected in the abnormal screening results, three women were alive and one had died. Of the three cancers detected, two cases were at stage I and one case had an 'unknown' stage of cancer.

### **II.E. Completeness of cancer registry**

Of the four cases diagnosed, three were found in the Cancer Registry.<sup>21</sup>

## Study Limitations

We were unable to evaluate the effectiveness of mammography screening in terms of the stages of cancers detected due to incomplete information in the cancer registry. We only followed up women with abnormal screening results. Further study is needed in future to follow up women with negative screening results to examine the proportion of false-negative results.

## Study Conclusions

The national mammography screening program needs further support in the following areas:

- To develop screening mammography guidelines and guidelines for referrals of suspected cancer cases;
- To improve infrastructure;

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<sup>21</sup> The patient who had died was found in the Death Registry. According to the death notification form, the underlying cause of death was cardiovascular arrest and hypertension; there was no mention of breast cancer.

- To review medical records and mammography registry; need to review medical records for risk factors for breast cancer;
- To train existing practitioners and additional physicians/radiologists to speed up the process of reading results;
- To extract diagnostic cases from primary health care for timely referral to secondary health care facilities;
- To improve the completeness and quality of the cancer registry by better communications between surgeons, oncologists, and pathologists to determine the stage of cancer;
- To enforce cancer notification;
- To improve the public education component in the current national screening program in line with WHO recommendations on appropriate widespread coverage of high-risk groups. The large proportion of false-positive cases in most districts may indicate that the screening program is not reaching women at risk.

## Study Recommendations

### I. West Bank

#### I.A. Primary Health Care

##### *Raise awareness and improve outreach*


A high priority of the World Health Organization (WHO) cancer control program is the outreach approach.<sup>22</sup> To improve outreach, it is crucial to increase awareness, address women's fears, and reach women at risk. WHO emphasizes the importance of appropriate widespread coverage of high-risk groups as opposed to repetitive screening of low-risk groups for screening to be effective. Breast cancer awareness campaigns are needed to emphasize the benefits of early detection by overcoming stigmas and spreading awareness of the scientific fact that breast cancer in its early stages can be cured. Campaigns should be directed towards women as well as husbands, who should be asked to encourage their wives to enrol in screening campaigns.<sup>23</sup>

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22 Koroltchouk V Fau - Stanley K, Stanley K Fau - Stjernsward J, Stjernsward J. The Control of Breast Cancer: A World Health Organization Perspective. *Cancer* 652803-2810, 1990.

23 El Saghir NS. Responding to the challenges of breast cancer in Egypt and other Arab countries. *J Egypt NatlCanc Inst.*†2008 Dec;20(4):309-12





*Ensure regular clinical breast examinations in addition to mammography screening*

Based on the National Cancer Institute recommendation, a high-quality mammogram and a clinical breast examination on a regular basis are the most effective methods of early detection. Some cancers cannot be detected by a mammogram, but may be found by a clinical breast examination.<sup>24</sup>

*Improve follow up of screened women*

To accurately measure the quality and impact of the breast cancer screening process, it is critical to ensure tracking of patients with abnormal mammography findings.

1. Review of women's files and mammography registries.

A review of current women's files is a crucial step in the overall task of prediction and precise disease diagnosis. Important data that should be part of the medical records are as follows:<sup>25</sup>

- history of pregnancies and childbirth;
- last date, type and result of previous individual cancer screening (mammography, pap smear etc.);
- family history of breast cancer;
- smoking history;
- medical history (i.e. steroids, blood pressure medication, anti-inflammatory medication etc.);
- frequent co-morbidities (type 2 diabetes, cardiovascular disease, and depression).

2. Better management of mammogram films

Clear guidelines are required as to whether the films should be given to the women screened or stored at the clinic. Assuming there is a location for storage in an adequately ventilated area, an archive system must be developed to facilitate the retrieval of films for follow up.

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24 National Institute Of Health.<http://www.cancer.gov/cancertopics/factsheet/detection/mammograms>

25 Golubnitschaja O Fau - Yeghiazaryan K, Yeghiazaryan K Fau - Costigliola V, Costigliola V Fau - Trog D, Trog D Fau - Braun M, Braun M Fau - Debald M, Debald M Fau - Kuhn W, et al. Risk assessment, disease prevention and personalised treatments in breast cancer: Is a clinically qualified integrative approach on the horizon?

### *Enhance management of cases with breast symptoms*

In most clinics reading mammography films, no priority was given to cases with existing symptoms. This may impact early detection and prognosis, especially in districts where there is a long wait for the mammography report and when women do not return to check the results. Therefore, it is crucial to extract cases with existing breast symptoms for timely referral to secondary health care facilities.


### *Improve infrastructure*

1. To renovate the mammography clinics in Nablus, Salbit, Jericho and Tubas.
2. To enforce on regular maintenance of mammography machines. According to the technicians' reports, there is no regular maintenance for old machines and service may be interrupted for several months when a machine breaks down.
3. To provide films of different sizes; many clinics complained of a shortage of large films and had to use small ones, leading to a risk that some parts of the breasts may not be scanned. In some clinics, there is a shortage of films and the technicians decided to save them purely for women with symptoms. This basically means that screening is no longer taking place.
4. To provide a comprehensive screening service that will ensure that women screened are not lost in the system and to achieve the objective of screening, which is early detection of breast cancer. In addition to mammography screening, we recommend additional ultrasound screening tests in MoH clinics. Based on technicians' reports, many women could not afford the expenses of having an ultrasound conducted outside the MoH, while many women were not followed up when referred for ultrasound. There is only one ultrasound screening service in Ramallah directorate.

### *Build capacity*

1. To train one or two MoH physicians in each district on mammography reading to reduce the waiting times for mammography reports.
2. To train one or two MoH physicians in each district on performing breast ultrasound examinations, assuming that the MoH can afford ultrasound screening in addition to the breast cancer mammography screening program.
3. To improve on-the-job training for mammography technicians. Based on statements by technicians who undertook training at Beit Jala hospital, there





was no follow up to their training or evaluation of their work. The training periods reported varied in length between 0-4 months. Many of the technicians interviewed requested more training and feedback on their work.

## **I.B. Secondary Health Care**

### *Build capacity*

To improve follow up of women screened positive (women with abnormal screening results), and to train one or two MoH hospital physicians in each district to perform needle biopsy.

### *Improve detection and management of breast cancer by pathologists and hospitals, through developing.*

1. Better communication between pathologists, oncologists and surgeons to determine the stage of cancer.
2. Guidelines for pathologists and ultrasound technicians to refer women to oncologists first rather than to surgeons to prevent an unnecessary mastectomy from being performed.
3. Legislation to enforce the notification of all cases of cancer.
4. Legislation to require that the cancer notification form is completed fully before being sent to PHIC.

## **II. Gaza Strip**

### *Improve infrastructure*

1. To provide additional mammography machines to cover all five districts in the Gaza Strip and enable national mammography screening. Under the present system, the target population is mainly made up of teachers and is confined to residents of Gaza city.
2. To enforce regular maintenance of the mammography machine. Based on the technician's report, there is no regular maintenance of old machines and the service is interrupted when the machine breaks down, which can last for up to five months.



*Build capacity*

To improve on-the-job training for mammography technicians. Based on technicians' reports, many received short training in mammography screening without followup and feedback on their performance and quality of images taken.

*Raise awareness and expand outreach*

To expand outreach to increase awareness, address women's fears, and reach women at risk. Target women through awareness campaigns, not only teachers.



البروتوكولات

لا اعرف	لا	الى حد ما	نعم	
				١٤. هل لديك دلائل مكتوبة لإجراء تصوير الثدي الشعاعي (mammography screening) (guidelines) (امكانية المشاهدة وتزويدنا بنسخة)
				١٥. هل لديك دلائل ( Guidelines) لتحويل الحالات المتوقع اصابتها بسرطان الثدي ( امكانية المشاهدة وتزويدنا بنسخة)
١٦. اين تقوم بتحويل الحالات المتوقع اصابتها : O قسم الجراحة O قسم السرطان O مختبر (Histopathology) O غير ذلك.....				
	اذهب الى س ٢٣			١٧. هل تستلم تغذية راجعة عن الحالات المحولة
١٨. من يزودك بالتغذية الراجعة: O المريض O قسم الجراحة O قسم السرطان O مختبر (Histopathology) O غير ذلك.....				
				١٩. هل تعتقد أن التغذية الراجعة هامة
				٢٠. اذا كانت اجابة السؤال السابق نعم، لماذا؟
				٢١. هل تعتقد ان التغذية الراجعة دقيقة؟
				٢٢. كيف يتم الحصول على التغذية الراجعة: O بالهاتف O مكتوبه O من خلال متابعة الفني او احد افراد الطاقم.

## Annex I: Survey of mammography technicians

استمارة الفنيين العاملين في برنامج مسح سرطان الثدي بالأشعة (ماموغرام)

أولاً: البيانات الشخصية:

١. الجنس: <input type="radio"/> ذكر <input type="radio"/> أنثى
٢. العمر .....
٣. المستوى التعليمي: <input type="radio"/> أقل من بكالوريوس <input type="radio"/> بكالوريوس <input type="radio"/> أعلى من بكالوريوس
٤. التخصص: <input type="radio"/> طبيب <input type="radio"/> فني <input type="radio"/> ممرض <input type="radio"/> غير ذلك.....
٥. الوظيفة الحالية: <input type="radio"/> رئيس قسم <input type="radio"/> فني <input type="radio"/> غير ذلك .....
٦. عدد سنوات الخبرة في وزارة الصحة:.....
٧. عدد سنوات الخبرة في التصوير الشعاعي للثدي:.....
٨. هل تلقيت اي برامج تدريبية حول التصوير الشعاعي للثدي: <input type="radio"/> نعم <input type="radio"/> لا <input type="radio"/> لا أتذكر
٩. المدة الزمنية للتدريب..... مكان التدريب.....

ثانياً: القوى البشرية :

لا اعرف	لا	الى حد ما	نعم	
				١٠. هل تعتقد أن عدد الطاقم يعتبر كافي لعمل برنامج مسح الثدي الشعاعي
				١١. هل تحتاج الى تدريب لإجراء فحص الماموغرام
				١٢. ما نوع التدريب الذي تعتقد أنك تحتاجه:
				١٣. يوجد تعليم مستمر للموظفين لتطوير مهارتهم

عوامل مرتبطة بالنظام

لا اعرف	لا	الى حد ما	نعم	
				٢٣. هل جهاز الماموغرام يعمل بشكل جيد؟
				٢٤. هل سبق وتوقف الجهاز لفترة بسبب الاعطال؟
				٢٥. اذا سبق وتعطل الجهاز فكم الكدة الزمنية التي تعطلها؟
	اذهب الى س ٢٣			٢٦. هل يوجد صيانة دورية للجهاز؟
				٢٧. هل لديكم افلام من مختلف الأحجام؟
٢٨. هل يوجد نقص معين بأي نوع من الأفلام؟ <input type="radio"/> لا <input type="radio"/> نعم . اي نوع من الأفلام؟.....				
٢٩. هل يتم حفظ الأفلام في المركز <input type="radio"/> نعم اذا كانت الإجابة نعم كم الفترة الزمنية (.....) اذا كانت الإجابة لا: <input type="radio"/> لا <input type="radio"/> هل يتم اعطاءها للمريض بشكل روتيني <input type="radio"/> تعطى للمريض عند الطلب				
٣٠. أين يتم قراءة نتائج الماموغرام: <input type="radio"/> في المركز <input type="radio"/> في مكان اخر في المحافظة <input type="radio"/> ترسل الى محافظة أخرى				
٣١. من يقرأ نتائج الماموغرام: <input type="radio"/> اخصائي <input type="radio"/> فني <input type="radio"/> طبيب عام <input type="radio"/> غير ذلك.....				
٣٢. الاسباب المقلقة للنساء اللواتي يحضرن لفحص الماموغرام: ( ضع دائرة على كل ما ينطبق) <input type="radio"/> الخوف من المرض <input type="radio"/> الفحص اليدوي <input type="radio"/> الخوف من الوصمة <input type="radio"/> المكان غير مريح <input type="radio"/> وقت الإنتظار <input type="radio"/> الح والتجمل <input type="radio"/> الخوف من الألم <input type="radio"/> غير ذلك.....				
	اذهب الى ٤٠			٣٣. هل يوجد ايه مواد خاصة بالتنظيف الصحي في العيادة خاصة بسرطان الثدي
٣٤. اي نوع من مواد التنظيف الصحي متوفره في العيادة: <input type="radio"/> بروشور / نشرات/ كتيبات <input type="radio"/> بوسترات <input type="radio"/> مجله <input type="radio"/> فيديو <input type="radio"/> صوتيات <input type="radio"/> غير ذلك.....				
				٣٥. هل تعتقد أن النساء المراجعات للمركز يبدين اهتماما بمواد التنظيف الصحي في المركز.
٣٦. هل لديك ايه اقتراحات لتحسين خدمة الماموغرام:				