

# The state of affairs of the public sector mammography service in the Free State Pprovince of South Africa

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## Abstract

**Background:** The Cancer Association of South Africa stated that breast health services in South Africa were “fragmented and not comprehensive.” The aim of study was to investigate the current state of public sector mammography in the Free State, and to recommend a way forward.

**Method:** A retrospective review of data was performed. Data on all female patients who received mammograms at Universitas Academic Hospital, Bloemfontein, South Africa from April 2008 to March 2010 were evaluated, as well as data on patients diagnosed with breast cancer during this period. A comparison was made between the number of mammograms performed and the number of breast cancer diagnoses during these two years at the hospital. A literature review of screening protocols and burden of disease was also carried out.

**Results:** A complete mammography service breakdown occurred during June 2009. During service breakdown, an average reduction of 72% was observed in the number of mammograms performed monthly, while a reduction of 41% in breast cancer diagnoses occurred. However, breast cancer has a lower burden of disease compared to many other diseases in South Africa. Effective management of breast cancer has a much greater impact on patient outcomes than screening, and should receive priority.

**Conclusion:** Breast health services, specifically mammography, are very limited in the Free State. However, priority may be given to other disease with a greater burden. Breast health care should initially focus on effective management of breast cancer.

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## Introduction

In February 2008, the Cancer Association of South Africa (CANSA) stated that breast health services in South Africa were “fragmented and not comprehensive.”<sup>1</sup> According to their position statement on breast cancer, factors contributing to the situation included, among others, (i) the fact that breast cancer and breast health are not regarded as public health priorities, (ii) inconsistency in provincial service delivery, (iii) the lack of accurate breast cancer statistics and a population-based cancer registry, and (iv) limited finances to maintain, upgrade and procure infrastructure and equipment.

Breast carcinoma is the most common malignancy in the South African female population, with a cumulative lifetime risk (0-74 years) of one in every 29 females.<sup>2,3</sup> Advanced breast cancer has a five-year survival rate of only 13-20%.<sup>4,5</sup> Mammography is a proven, sensitive screening examination to detect early breast cancer.<sup>6-8</sup>

The aim of this study was to describe the current state of public sector mammography and the histological diagnosis of breast cancer in the Free State province, in the light of the statement made by CANSA, and to suggest a way forward for using mammography in the diagnosis of breast cancer in the province.

## Method

A retrospective review of data was performed. In particular, we investigated the total number of mammograms that were performed by the Department of Diagnostic Radiology at the Universitas Academic Hospital, Bloemfontein, South Africa, from April 2008 up to March 2010, as this was the only mammography service provider for public sector patients in central South Africa. Public service patients that were outsourced to the private sector for mammography were also included.

The Phillips iSite PACS (Picture Archiving and Communication System) and the MediTech HIS (Health Care

Information System) were used to collect information. The number of mammograms that were outsourced by the Free State Department of Health to the private sector from July 2009 was also counted. These data were obtained from the diagnostic radiology departmental records. We investigated the breast cancer histological diagnoses made by the Department of Anatomical Pathology at the Universitas Academic Hospital from April 2008 to March 2010. A SNOMED search on the DISA system, which is the Department of Anatomical Pathology's record system, was performed. All specimens that included breast tissue and were sent to anatomical pathology during the above-mentioned period were taken into account.

All specimens with a diagnosis of "carcinoma" or "malignancy" of the breast tissue based on histological investigations were counted, excluding "carcinoma in situ". The Department of Anatomical Pathology provides a service to the Free State, Northern Cape and North West provinces. Patients from the North West were excluded, as they did not make use of the Universitas Hospital mammogram service. Patients from the Northern Cape and Free State were included, as the mammogram unit at the Universitas Hospital was the only unit in the public sector available to them. Breast cancer diagnoses were also counted according to age groups.

A review of the literature was also performed, regarding breast cancer incidence, diagnosis, burden and costs.

Ethics approval to conduct the investigation was granted by the Ethics Committee of the Faculty of Health Sciences, University of the Free State.

## Results

A mean of 119 mammograms were performed per month at the Universitas Academic Hospital from April 2008 to May 2009. In June 2009, the mammography service at Universitas Academic and National Regional Hospitals in Bloemfontein irreversibly ceased. At the time of the study, replacement of the service had not materialised, for various reasons. Since

then, a limited number of public patient mammograms have been outsourced to the private sector. A mean of 33 per month were outsourced to private practices while the mammogram unit was not functioning. This resulted in an average reduction of 72% or 86 mammograms per month.

The number of breast cancer patients diagnosed from April 2008 to May 2009 was 145, with a mean of 10.4 cases per month. Between the months of June 2009 and March 2010, 66 breast cancer diagnoses were made, with a mean of 6.6 cases per month, showing a reduction of 38%. Figure 1 displays the number of mammograms performed and the number of histological breast cancer diagnoses for each month of the period April 2008 to March 2010. Table I shows the distribution of breast cancer among different age groups of patients, as well as the monthly means during the periods before and after the breakdown of services.

In two cases, the age of the patient, diagnosed with cancer in May 2008 and November 2008 respectively, was not known. The largest number of breast cancer diagnoses was made in the age group 40-49 years, representing 28.2% (60/215) of the total number of cases, followed by the group 50-59 years, representing 21.6% (46/215) of cases. Regrettably, data regarding the size and stage of the tumours diagnosed in these patients was not available.

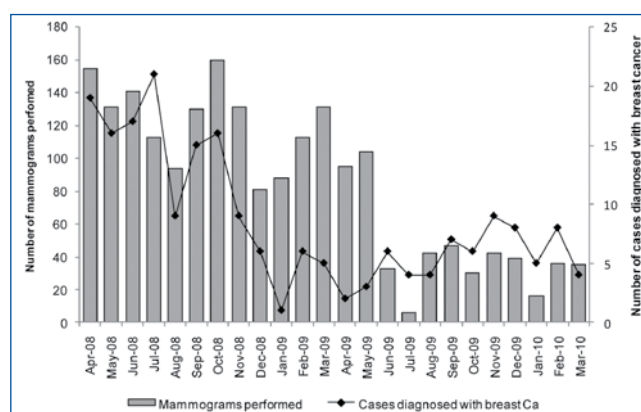


Figure 1: The distribution of mammograms performed and the histological diagnoses of breast cancer from April 2008 to March 2010

Table I: The age distribution at histological diagnosis of breast cancer April 2008-March 2010

Period	n	Age (years)							
		≤ 19	20-29	30-39	40-49	50-59	60-69	70-79	≥ 80
Total April 2008-June 2010	215	1	5	23	60	46	38	29	11
<b>April 2008-May 2009</b>									
Number of cases	149	0	3	15	46	31	28	17	7
Mean per month	10.6	0.0	0.2	1.1	3.3	2.2	2.0	1.2	0.5
<b>June 2009-March 2010</b>									
Number of cases	66	1	2	8	14	15	10	12	4
Mean per month	6.6	0.1	0.2	0.8	1.4	1.5	1.0	1.2	0.4
Percentage difference in monthly mean of breast cancer diagnoses	-38.0	-	4.8	-25.2	-57.4	-32.1	-50.0	-0.8	-20.0

## Discussion

Mammography has been shown to play an important role in early breast cancer diagnosis, detecting about 75% of cancers a year before they become clinically palpable.<sup>9</sup> Early diagnosis hugely impacts on the patient's treatment and prognosis.

During 2008, a public sector mammogram service was offered at both the Universitas Academic and the National Regional Hospitals. These two units provided a service to the whole of the Free State and Northern Cape provinces. As a result of technical failure, a complete breakdown of these services was experienced in June 2009. For various reasons, the units had not been repaired or replaced at the time of writing this article, in May 2010. This reflects the limited finances available to maintain, upgrade and procure infrastructure and equipment, as well as the fact that breast cancer and breast health are not currently regarded as public health priorities. (In January 2011, a new mammography unit was installed at Universitas Hospital, while the unit at the National Hospital was also being repaired.)

A reduction in the number of histological breast cancer diagnoses was also observed during the study period. We have no reason to believe that an actual reduction in the incidence of breast carcinoma occurred. However, the reduction was already observed from December 2008, before the mammography service breakdown. We therefore concede that a number of other factors, apart from the lack of mammography, most likely influenced the number of patients diagnosed with breast cancer.

These factors could include the following:

- A collapse of surgical services. As a result of financial constraints, stringent measures were put in place, which limited elective surgical procedures. This came into effect in November 2008, which might have influenced the earlier drop in breast cancer diagnoses.
- An inappropriate and ineffective referral system.
- Patients with undiagnosed breast cancer dying from other diseases.
- Limitations in the availability of pathology services.
- The accuracy of mammogram reading (not included in this study).

Despite not having the data available, it seems reasonable to postulate that patients with breast cancer diagnosed during the period of machine breakdown were most likely diagnosed at a later stage of the disease than when a full mammography service was available.

We also consulted the National Cancer Registry, which provides statistics on cancer in South Africa.<sup>3</sup> However, the most recent update available for the registry was performed in 2001, indicating the lack of an accurate national database and statistics. According to the registry, the age-standardised incidence rate for breast cancer among

females in South Africa in 2001 was 30.61 per 100 000. The cumulative lifetime (0-74 years) risk for developing breast cancer was one in every 29 females. The GLOBOCAN database was also consulted.<sup>2</sup> This database is published by the International Agency for Research on Cancer (IARC) and provides statistics on the incidence and mortality of 27 major cancers worldwide, including breast cancer in South Africa. Their most recent data were from 2008, with an age-standardised incidence rate of 41 per 100 000 among females in South Africa.

## The way forward

Currently there is no formal breast cancer screening programme implemented in the Free State or the rest of South Africa, and screening is largely opportunistic. Owing to limitations imposed by the lack of accurate and up-to-date data, recommendations will have to be based on international guidelines. The American Cancer Society currently recommends yearly mammograms in women from age 40.<sup>10</sup> A recent report from the United States Preventative Services Task Force (USPSTF) recommends against routine screening in the 40-49 years age group, with biennial screening for patients from age 50 to 74.<sup>11</sup> However, this has not been accepted universally.

If we were to follow the screening guidelines from the USPSTF and use the latest census data of the Free State, we can assume that there are a total of 219 600 females between the ages of 50 and 74 years in the province.<sup>12</sup> Excluding the medically insured population of (approximately 15%),<sup>13</sup> we will have approximately 186 660 females using public health services. Providing each of these women with a biennial mammogram will require an average of 7 777 mammograms per month in the Free State.

During the time of a full mammography service in our study, a mean of only 119 mammograms were done per month, indicating the severe shortage that exists compared to international guidelines. However, this was not part of a true screening programme, but rather symptomatic screening, in other words, mammograms for patients with symptoms and signs suspicious of breast cancer, such as lumps, pain, nipple discharge and change in breast size. These mammograms were performed at a rate of 11.5 mammograms per case of breast cancer diagnosed. When the incidence of breast cancer in South Africa of 41 per 100 000<sup>2</sup> and the 2010 mid-year population estimate data (1.46 million females in the Free State province)<sup>12</sup> are taken into consideration, a total of 600 cases of breast cancer should be expected in the Free State province per year. If the insured population of 15%<sup>13</sup> is once again excluded, about 510 cases of breast cancer may be diagnosed in the public health sector of the Free State province annually. Based on the rate of 11.5 mammograms performed for each case of breast cancer diagnosed, an estimated 5 869 mammograms per year, or 489 mammograms per month, will need to be performed to provide a symptomatic screening service to

the Free State population. This is still significantly less than the 7 777 mammograms per month for a true screening programme.

A recent study by Ahern and Shen investigated the cost-effectiveness of different breast cancer screening strategies.<sup>14</sup> They included not only the cost of the screening programme, but also all other costs related to diagnosis and treatment of breast cancer. The most cost-effective screening programme in their study was biennial mammograms and clinical breast examinations for female patients in the age group 40-79 years. The cost of this strategy was \$35 500 for every quality-adjusted life year (QALY) gained above treatment for breast cancer without any screening. However, this strategy only led to 0.0357 incremental QALYs (or 13 days) gained, compared to management without screening. Management of breast cancer without screening led to an overall 27.395 QALYs gained.<sup>14</sup> This indicates that while effective, breast cancer screening programmes come at a high cost, compared to breast cancer treatment without screening. However, one should remember the potential large gain, for the individual patient, with an early diagnosis of breast cancer.

According to the South African Medical Research Council, breast cancer is the second most common cause of malignancy-related death in the female population of South Africa, after cervical cancer.<sup>15</sup> However, it is only the 17<sup>th</sup> most common cause of death overall in the female population, constituting only 1.3% of all female deaths. The most common cause for female death in South Africa is human immunodeficiency virus (HIV)-related disease (27.8%), followed by stroke (8.2%) and ischaemic heart disease (6.7%).<sup>15</sup> This gives an indication of the burden of disease of breast cancer in South Africa and of a number of other diseases which would deserve priority in distribution of the health care budget.

These factors taken into consideration, in the setting of a limited public health budget, it will not be cost-effective to invest a large proportion of the budget into establishing a complete breast cancer screening programme. Attention should rather be given to diseases with a higher mortality rate, such as HIV, stroke and ischaemic heart disease. It would be more realistic to focus on improving care of patients with breast cancer, which has a large potential of QALYs gained compared to screening. This strategy would include diagnostic mammograms in patients with clinically suspicious disease, and aiming to perform 489 mammograms per month for symptomatic screening may be a more realistic goal. However, improvement of access to breast cancer surgery and oncotherapy should also be included as part of a comprehensive breast cancer management strategy.

## Conclusion

The results of our study were consistent with the CANSA statement regarding the fragmented and incomprehensive

nature of breast health services in South Africa. Mammography is a sensitive screening examination for the detection of early breast cancer, but implementing a complete screening programme will be very costly. This is especially true with a limited health budget, and other diseases placing a larger burden on the population. The initial focus of breast health should rather be on improving the management of patients already diagnosed with breast cancer.

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