of patients did not receive any hormonal therapy. Median time duration between 1st and 2nd malignancy was 12 years in patients who received adjuvant tamoxifen in contrast to 6 months in patients who did not.

Conclusion: seventy five percent patients were metachronous and 62.5% were sporadic. Strong family history and premenopausal status are high risk factors. Hormonal manipualtion associated with low risk of contralateral breast cancer. These studies may also help monitor treatments effects of radiotherapy,chemotherapy and tamoxifen therapy. Treatment effects should continue to be monitored, and future guidelines should be provided for long term surveillance of surviving cancer patients.

158 Poster

The Correlation Between Recall Rate and Cancer Detection in Mammographic Screening

S. Hofvind[1], R. Kaaresen[2], S. Sebuødegård[3], E.A. Schnell[3], P. Skaane[4]. *[1]Cancer Registry of Norway, Research Dept, Oslo, Norway; [2]Cancer Registry of Norway, Registry Dept, Oslo, Norway; [3]Cancer Registry of Norway, Screening Dept, Oslo, Norway; [4]Oslo University Hospital Ullevaal, Radiology, Oslo, Norway*

Background: Positive screening mammograms leading to recalls for further assessment with negative result, is considered to be harmful in mammographic screening. The aim of our study was to analyze whether there are any correlation between recall rate and the rate of screen-detected and interval cancer in the Norwegian Breast Cancer Screening Program (NBCSP).

Materials and Methods: About 2 million mammography screening tests, 72.000 recalls and 13.000 breast cancer cases, including Ductal Carcinoma In Situ, constituted the basis for this study. The NBCSP was gradually implemented for women aged 50−69 years old in the period 1996–2005. The regression coefficient (t-value for the slope) and the R^2 between the rates of recall and cancer detection in 16 areas in the NBCSP were estimated by a two-way t-test to identify correlation between the covariates.

Results: The recall rate was 4.9% for prevalent and 2.6% for subsequent screens. The rate of screen-detected cancer (DCIS and invasive) was 0.64% and 0.53% for prevalent and subsequent screens, respectively. The interval cancer rate was 18.5 per 10.000 screens. The rate of screen-detected breast cancer increased by increasing recall rate for prevalent ($t=3.40$, $p = 0.001$, $R^2=0.13$) and subsequent screening tests ($t=6.83$, $p < 0.001$, $R^2=0.44$). The recall rate did not show any correlation with the interval cancer rate ($t= -0.679$, $p = 0.500$, $R^2=0.010$).

Conclusion: The recall rate shows a statistically significant positive correlation with the rate of screen-detected cancers in the NBCSP. The interval cancer rate, however, does not show any statistical significant correlation with recall rate. It thus seems that a higher recall rate did not succeed in detecting the fast growing tumors leading to interval cancer.

159 Poster

Surgical Procedures in Screen-detected Cancer by Tumor Size, Grade and Calendar Time

S. Hofvind[1], P. Skaane[2], E.A. Schnell[3], S. Sebuødegård[3], R. Kaaresen[4]. *[1]Cancer Registry of Norway, Research Dept, Oslo, Norway; [2]Oslo University Hospital Ullevaal, Radiology, Oslo, Norway; [3]Cancer Registry of Norway, Screening Dept, Oslo, Norway; [4]Cancer Registry of Norway, Registry Dept, Oslo, Norway*

Background: Screening mammography has led to an increasing incidence of breast cancer and subsequently more women undergo surgery for the disease. We wanted to investigate the use of mastectomy by calendar time in women diagnosed with screen-detected breast cancer with different size and grading.

Materials and Methods: About 2 million mammography screening tests, and 10.000 screen-detected breast cancer cases, including Ductal Carcinoma In Situ (DCIS), constituted the basis for this study. The NBCSP was gradually implemented for women aged 50−69 years old in the period 1996–2005 and the number of hospitals offering breast surgery decreased from about 60 to 18. The rate of mastectomy versus breast conservation therapy was studied by percentage distribution through the study period.

Results: The percentage of mastectomy decreased steadily by calendar time for DCIS and invasive cancer. Mastectomy was performed in about 80% of the DCIS and invasive cancers >20 mm in 1996 while the rate was about 50% in 2009. For DCIS <10 mm, the percentage was below 20% during the entire study period while 60% of the women with invasive cancers <10 mm had mastectomy in 1996, decreasing to 20% in 2009. A trend toward an increasing proportion of mastectomy was observed the last three years of the study period, for tumors of all sizes. For DCIS grade 2 and 3, the rate of mastectomy decreased from 60% in 1996 to 40% in 2009. For invasive cancer, mastectomy was performed in 60−70% of all tumors in 1996, decreasing to 20% for grade 1, 30% for grade 2, and 40% for grade 3 tumors.

Conclusion: Mastectomy rates have gradually decreased for screen-detected breast tumors in all size and grade during the period 1996–2009. The trend toward increase the last three years should be closely followed as its rationale is uncertain.

160 Poster

Breast Cancer Clusters in Rio De Janeiro: Analysis the Existence of Spatial Dependence in the Mortality Rate for Female Population

M. Bello[1], C.L.T. Andrade[2]. *[1]Brazilian National Cancer Institute, Mastologia, Rio De Janero, Brazil; [2]National School of Public Health Sergio Arouca Oswaldo Cruz Foundation Brazil, Daps, Rio de Janeiro, Brazil*

Background: High female breast cancer mortality rates have been reported in the State of Rio de Janeiro, Brazil. The authors investigate whether the high breast cancer mortality is evenly spread over the Rio de Janeiro, in the sense that any observed clusters of deaths can be explained by chance alone, or whether there are clusters of statistical significance.

Objectives: To analyze the existence of spatial dependence in the mortality rate for female breast cancer in the State of Rio de Janeiro in the period 2001–2006 and possible explanatory variables.

Material and Methods: Analysis of the spatial correlation of mortality rate from breast cancer was performed in two triennium 2001 to 2003 and 2004 to 2006.

To evaluate the spatial dependence was calculated the Global Moran's Index and being used as explanatory variables: age, race, marital status, educational level, the average income for adult people from the main job (per municipality), the rate of mammography unit by municipality, the Municipal Human Development Index, the Firjan's Index Municipal Development, the percentage of population covered by private health insurance system, the average number of basic care medical visits and total spending per person, per year, on health by the municipal government.

It was used the method to establish the spatial mortality rate caused by female breast cancer and recognize the main aspects of this spatial variation.

Results: The spatial dependence was found in triennium 2001–2003 (Moran I statistic standard deviate = 1,7379, p = 0,0410) (figure 1), but the same result were not found during 2004–2006 (Moran I statistic standard deviate = 0,4450, p = 0,3281). The best variable that explains spatial clusters was 'the average income for adult people from the main job' and 'the rate of mammography unit by municipality'.

Conclusion: It was detected during 2001–2003 a spatial dependence in death rate by female breast cancer.

This result may be partly explained by average income per inhabitant (related to poverty) and the rate of mammography unit by municipality.

The use of spatial analysis could allow a better comprehension of geographical distribution of mortality rate caused by female breast cancer in Rio de Janeiro.

The procedure, step by step, used in this analysis showed consistent outcomes and compatible with those of the international literature.

The selection of more explicative variables, including clinical and biological variables, could enable identify more potential factors associated with this death rate, that can provide margins to new investigations as well as subsidize decisions which might help the decline of this rate.

161 Poster

Breast Cancer in Ethiopia: the Addis Ababa-Halle University Collaboration Project Studying Incidence, Mortality and Clinical Epidemiology

E.J. Kantelhardt[1], A. Fuehrer[1], E. Breitenstein[1], P. Zerche[1], P. Trocchi[2], A. Adamu[3], G. Tufa[4], A. Stang[2], C. Thomssen[1], S. Bogale[5]. *[1]Martin Luther University, Department of Gynecology, Halle/Saale, Germany; [2]Martin Luther University, Institute of Clinical Epidemiology, Halle/Saale, Germany; [3]Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia; [4]Addis Ababa University, Institute of Pathology, Addis Ababa, Ethiopia; [5]Addis Ababa University, Radiotherapy Center, Addis Ababa, Ethiopia*

Background: An increasing burden of non-communicable diseases in developing countries has so far only been marginally approached. Since 2010, more women die of breast cancer than due to pregnancy-related causes (maternal mortality). Our project is focussing on breast cancer in urban and rural settings in Ethiopia.

Materials and Methods: A collaboration between the Radiotherapy Center and Department of Public Health (University Addis Ababa/Ethiopia) and the Department of Gynecology and Institute of Clinical Epidemiology

(University Halle/Germany) has been established. Ethical approval was obtained.

1. Minimal incidence data on breast cancer from the urban setting is obtained from the pathologists' case registries since 2006 in Addis Ababa.
2. Details on clinical course of breast cancer are obtained from charts of the virtually only department in Ethiopia offering systemic therapy and radiotherapy (Radiotherapy Center Addis Ababa).
3. Data on minimum disease specific mortality of cancer in rural settings is obtained by a field survey using semi-structured interviews.

Results:

1. At University Hospital Tikur Anbessa 8–9000 specimen are analyzed per year. Since this is by far the largest pathologic Department in the country, a thorough picture of histologically proven breast and cervical cancer in Addis Ababa is given. Basic data on histology, tumor stage, age and origin of the patient is obtained.
2. At the Radiotherapy Center >1000 patients with breast cancer were registered 2006−10. About two thirds of the patients received endocrine therapy. Clinical and pathological data is obtained as well as information on therapy. Follow-up data is collected.
3. A modified version of the 'Indepth network's' verbal autopsy (VA) questionnaire is combined with the approach of sisterhood method to interview 2500 women in rural Ethiopia. In each interview general information about the respondent's sisters were gathered. In case one of them died within the last ten years, a VA was done to identify the cause of death. Distribution of communicable and non-communicable diseases within the 200 verbal autopsies (including female cancer) is analyzed.

Conclusions: Oncologic diseases are emerging also in countries with limited resources. To obtain basic data on the magnitude of the problem, we collect retrospective urban and rural data from hospital based information, pathologic registries and by structured interviews.

162 Poster

Implementation of a Digital Second Reading Center for Breast Cancer Screening Program in the French Community of Belgium

M. Candeur[1], T.H. de Foy[1], A. Vandenbroucke[1]. ***Background:*** *The screening program for breast cancer has started in June 2002 in the French Community of Belgium. The double reading of analog images was performed in a decentralized manner in five provincial coordination centers.*

The evolution of mammography units to digital has enforced changes in the operation of the program. In order to rationalize expenses and to centralize data, an unique Center of second reading has been created.

Material and Methods: The second reading Center is functional since September 2009. It has been equipped by a PACS allowing archiving of images in the original format DICOM and by a diagnosis console able to read mammograms produced by various types of equipment.

The database called 'Mammorias' (Mammography Radiology Information and Administrative System) is accessible, via a secured web interface, to all users (administrators, technologists, radiologists) with private and confidential usernames and passwords, allowing differential access to information.

The use of Mammorias by all partners in the program reduces significantly the risk of errors and allows the automatic management of multiple tasks previously performed manually (check of the consistency of reading reports, mail management . . .).

When performing the digital Mammotest, administrative data and contact information of referring physicians of participating women are registered in Mammorias.

Radiologists record the result of the first reading. The pictures are transferred to the second reading Center via a secured internet connection, by sFTP or VPN procedures.

The sFTP procedure (Secure File Transfer Protocol) is manageable through simple and free software that can be set up rapidly.

The VPN procedure (Virtual Private Network) allows bidirectional transfer of images in an automated way from PACS to PACS, and enable the first reading units downloading dynamic archives stored at the second reading Center.

Both procedures require an Internet connection of an ascending flow (upload) at least 512 Kbit/s.

A link between Mammorias and the PACS allows the second readers an automatic opening of radiological images and the medical record associated, in order to realize the double reading and to save the result.

Result letters, generated by Mammorias, are sent to referring physicians within maximum 5 days.

If the Mammotest requires further investigations, a copy of the mammogram is attached to the letter on a CD-ROM.

The results can also be transmitted electronically by a secured procedure.

Conclusion: Management of the screening program for breast cancer in the French Community of Belgium has been considerably improved, simplified and secured through the establishment of a unique digital second reading Center.

In addition, the centralization of the double reading and archiving of radiological images is of a major interest for evaluation and training of radiologists both 1st and 2nd readers.

163 Poster

A Subtype of Gene Expression with Claudin-low Features in Normal Breast Tissue and in Fibroadenomas

V.D. Haakensen[1], T. Lüders[2], M. Riis[2], A. Prat[3], C. Perou[3], V. Kristensen[4], A.L. Børresen-Dale[1], A. Helland[1]. *[1]Oslo University Hospital, Department of Genetics, Oslo, Norway; [2]Akershus University Hospital, Department of Clinical Molecular Biology, Lorenskog, Norway; [3]University of North Carolina at Chapel Hill, Dept of Epidemiology and Lineberger Comprehensive Cancer Center, Chapel Hill, USA; [4]Akershus University Hospital, Department of Clinical Molecular Biology, Lorenskog, Norway*

Background: Increased understanding of the variability in normal breast biology and benign breast disease will enable us to identify mechanisms of breast cancer initiation and the origin of different subtypes that can better predict breast cancer risk.

Material and Methods: Gene expression patterns in breast biopsies from 79 healthy women referred to breast diagnostic centers in Norway were explored by unsupervised hierarchical clustering and supervised analyses, such as gene set enrichment analysis (GSE) and gene ontology (GO) analysis and comparison with previously published genelists, and validated in independent datasets. Similar methods were used to analyze a dataset of 12 fibroadenomas collected in Akershus University Hospital, Norway and related to subtyping of breast carcinomas.

Results: Unsupervised hierarchical clustering of genome wide gene-expression data of the normal breast tissues identified two separate clusters, regardless of clustering algorithm and gene filtering used. Comparison of the expression profile of the two clusters with several published gene lists describing breast cells revealed that the samples in cluster 1 share characteristics with stromal cells and stem cells, and to a certain degree with mesenchymal cells and myoepithelial cells as well as the claudin-low intrinsic breast cancer subtype. A higher proportion of women belonging to cluster 1 have a family history of breast cancer and are nulliparous. The 11 fibroadenomas were subtyped and clustered unsupervised and GSE and GO analyses are ongoing and results will be presented.

Conclusion: We have identified distinct gene expression subtypes in whole biopsies from normal breasts and in fibroadenomas. The results are validated in separate datasets. Particularly interesting is the finding of a cluster with stromal, stem-cell like and claudin-low features. Further studies are needed to determine the specific cell contribution to the variation in the biology of normal breasts, how the clusters identified relate to breast cancer risk and their possible link to the origin of the different molecular subtypes of breast cancer.

164 Poster

Five-year Survival and Prognostic Factors in a Cohort of Breast Cancer Patients Treated in Brazilian National Cancer Institute, Rio De Janeiro, Brazil

M. Bello[1], E.C. Millen[1], P.A.O. Carmo[1], R.C. Motta[1], L.C.S. Thuler[2], A. Bergmann[2]. *[1]Brazilian National Cancer Institute, Mastologia, Rio de Janeiro, Brazil; [2]Brazilian National Cancer Institute, cedc, Rio de Janeiro, Brazil*

Background: This study estimates survival rates and its the main prognostic factors related, in women with breast cancer and submitted to local and systemic treatment in brazilian National Cancer Institute between 2001 to 2002.

Objectives: The purpose of this study was to analyze five-year survival and the main prognostic factors among women with breast cancer diagnosed from 2001 to 2002 that had undergone surgical treatment in the Brazilian National Cancer Institute (INCA).

Material and Methods: The survival curves were obtained in a hospital cohort of breast cancer with 1076 patients diagnosed and treated between 01/08/2001 and 01/12/2002, with median follow up time was 61 months (range 1 to 94 months) and mean patients age was 55,9 years (standard deviation 13,1). The Study variables were: age, marital status, tumor-related variables and the treatment-related variables. Survival functions were calculated by the Kaplan–Meier method.

Results: Among all patients, 23% performed neoadjuvant chemotherapy, 3% performed neoadjuvant hormone therapy and 2% performed neoadjuvant radiotherapy. A mastectomy was performed in 65%. In 84% of cases,