

# Distribution of Cancer and Cancer Screening and Treatment Services in Lagos: A 10-Year Review of Hospital Records

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**PURPOSE** In Lagos State, Nigeria, the population distribution of cancers is poorly described because studies are conducted at a few tertiary hospitals. Therefore, this study aims to map all health facilities where cancer screening takes place and describe the cases of cancer screened for and treated.

**METHODS** A cross-sectional survey to identify facilities involved in screening and management of cancers was performed followed by extraction of data on individual cases of cancer screened for and treated at these facilities from 2011 to 2020. All health care facilities in the state were visited, and the survey was performed using standardized national tools modified to capture additional information on cancer screening and treatment. Data analysis was performed using STATA version 14 and R version 3.6.3.

**RESULTS** Cervical cancer was the commonest cancer, accounting for 55% of 2,420 cancers screened, followed by breast (41%), prostate (4%), and colorectal cancers (0.2%). Of the 7,682 cancers treated among Lagos residents, the top five were breast (45%), colorectal (8%), cervical (8%), prostate (5%), and ovarian (4%). The female:male ratio of cancer cases was 3:1. The peak age for cancer among females and males was in the 40- to 49-year age group and 60- to 69-year age group, respectively. The Ikorodu local government area had the highest rate of reported cancer per million population.

**CONCLUSION** Cancer screening is poor with a significant gap in screening for breast cancer since it is the commonest cancer in the state. The findings indicate the urgent need for the establishment of organized screening programs for the predominant cancers in the state and the prioritization of cancer research that addresses key policy and program questions.

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## BACKGROUND

The GLOBOCAN 2020 estimates show that the burden of cancer is rising and is projected to rise much faster in developing countries.<sup>1</sup> The total number of new cases in Nigeria in 2020 was 124,815, of which 51,398 occurred in males with prostate cancer as the commonest at 29.8% and 73,417 occurred in females with breast cancer being the commonest at 38.7%, followed by cancer of the cervix at 16.4%.<sup>2</sup> Excluding nonmelanoma skin cancer, the top five most frequent cancers in males were prostate, colorectal, non-Hodgkin lymphoma, liver, and leukemia. In females, the top five were breast, cervical, non-Hodgkin lymphoma, ovarian, and colorectal. There were an estimated 78,889 cancer deaths with 34,200 in males and 44,699 in females.

Despite the rising burden of cancers in Africa, the availability of cancer screening and treatment services

is limited.<sup>3</sup> Recognition of the implications of this situation has led to global efforts to implement cancer control plans at national and state levels, aiming to decrease cancer incidence, morbidity, and death rates and to enhance the quality of life of people living with cancer. These cancer control plans target a delineated population through the systematic implementation of evidence-based interventions for prevention, early detection, diagnosis, treatment, and palliative care.<sup>4-6</sup>

Population-based cancer studies or registries are critical and vital because they are core components in the control strategy for cancer. The impact of cancer screening and specific interventions can be evaluated, and information from the registries can inform the formulation of policies and strategies for control and management of cancers.<sup>7,8</sup>

Nigeria has developed a national system of cancer registries that consists of 13 population-based and 20 hospital-based cancer registries.<sup>9,10</sup> However, in

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## CONTEXT

### Key Objective

What can policy makers and service planners learn from the distribution of cancer screening services, cancer treatment services, and cancer cases in the Lagos State?

### Knowledge Generated

Cancer screening and treatment services are limited with cervical cancer as the main priority for screening. Breast cancer stands out as the predominant cancer by occurring more than five times as frequently as colorectal, cervical, and prostate cancers, which are the next commonest cancers.

### Relevance

The availability and utilization of cancer services as well as the epidemiology of cancer point to an urgent need for organized cancer screening services with breast cancer among women as the first priority.

the Lagos State, which has an estimated population of more than 24 million people and is reportedly the fifth largest economy in Africa,<sup>11,12</sup> there are three hospital-based cancer registries but no population-based cancer registry.<sup>10</sup> Therefore, the availability of population-based data to inform policy and programming statewide is limited. Furthermore, the cancer registries focus on diagnosis and treatment of cancer and do not provide information about cancer screening, which is also important for decision making.

This study was undertaken to describe the availability and distribution of cancer screening and treatment services and cancers screened for and treated in the Lagos State, Nigeria. The findings will be used to inform policies, planning, and programming related to the prevention and control of cancers in the Lagos State.

## METHODS

### Study design and setting

This was a cross-sectional survey to identify health facilities involved in screening and management of cancers in the Lagos State and to gather information about the cancer types seen at these facilities.

### Study population and sampling

All health care facilities in the state were visited, and a survey tool is used to identify facilities within the state offering cancer screening and management services. There was no sample size as all facilities involved in the screening and management of cancers were identified and all available data related to the cancers they have screened for and/or managed were collected.

### Data collection

Data collection occurred in two phases.

**Phase 1—Mapping of the facilities in the Lagos State that offered any form of screening and/or management of cancers.** The state monitoring and evaluation officers were recruited and trained to administer a questionnaire in every health facility within their local government and local council development area. The questionnaire was based on the

Federal Ministry of Health's Nigeria Health Facility Register Data Collection Form for Hospitals and Clinics, which was modified to include cancer services and cancer specialists. Geocoordinates of facilities were collected using the location services of smartphones/tablets. A health facility was considered publicly owned if managed by government (federal, state, or local government). Otherwise, it was privately owned. There is a list of government facilities, and ownership was also obtained on-site.

**Phase 2—Collection of retrospective data on cancers in the State.** All the facilities that reported offering both or either screening and/or management of cancers were visited a second time to extract data from January 2011 or later, depending on the date of commencement of operations of that facility, using the cancer surveillance tool.

**Data management, analysis, dissemination, and use.** The survey instruments used were created in KoboToolbox data repository where the data collectors uploaded the data collected and abstracted from all health facilities. The data were cleaned and edited for errors before analysis. Data were analyzed using STATA statistical software version 14 (StataCorp LLC, College Station, TX) and R version 3.6.3 (Free Software Foundation, Boston, MA), and maps were produced using QGIS version 3.18 (OSGEO, Beaverton, OR).

Percentages were computed for facilities screening for and/or managing any cancer and specific cancers with disaggregation by the local government and sector (public and private). Maps showing the location of health facilities that provide cancer services were prepared.

The frequency of all cancers and specific cancer types was computed and disaggregated by age, sex, sector, and local government. Trends over time were also computed. The projected population of each local government area of Lagos for each year from 2011 to 2020 was used to compute the number of cancer cases per 1,000,000 population.

### Ethical considerations

Confidentiality was maintained as patients' records and information were entered on encrypted and password-

protected devices. Identifiers or numbers were assigned to each patient's record and used in place of names. Approval to collect information was obtained from the Lagos State Ministry of Health, Alausa, Lagos, and ethical approval for the study was obtained from the Institution Review Board of the Nigerian Institute of Medical Research (IRB-21-022).

## RESULTS

A total of 2,154 health facilities were identified during the mapping exercise, of which 2,002 (92.9%) were operational. A significant proportion of facilities (82%) were privately owned, whereas 18% were public facilities. Among public facilities, 90% were primary health care level facilities, 8% were secondary facilities, and 2% were tertiary facilities.

### Health Facilities That Provide Cancer Services

A total of 447 health facilities surveyed indicated that they provided one or more cancer services. However, in follow-up visits to the facilities, data could only be retrieved from 104 health facilities for cancer screening and from 12 health facilities for cancer treatment.

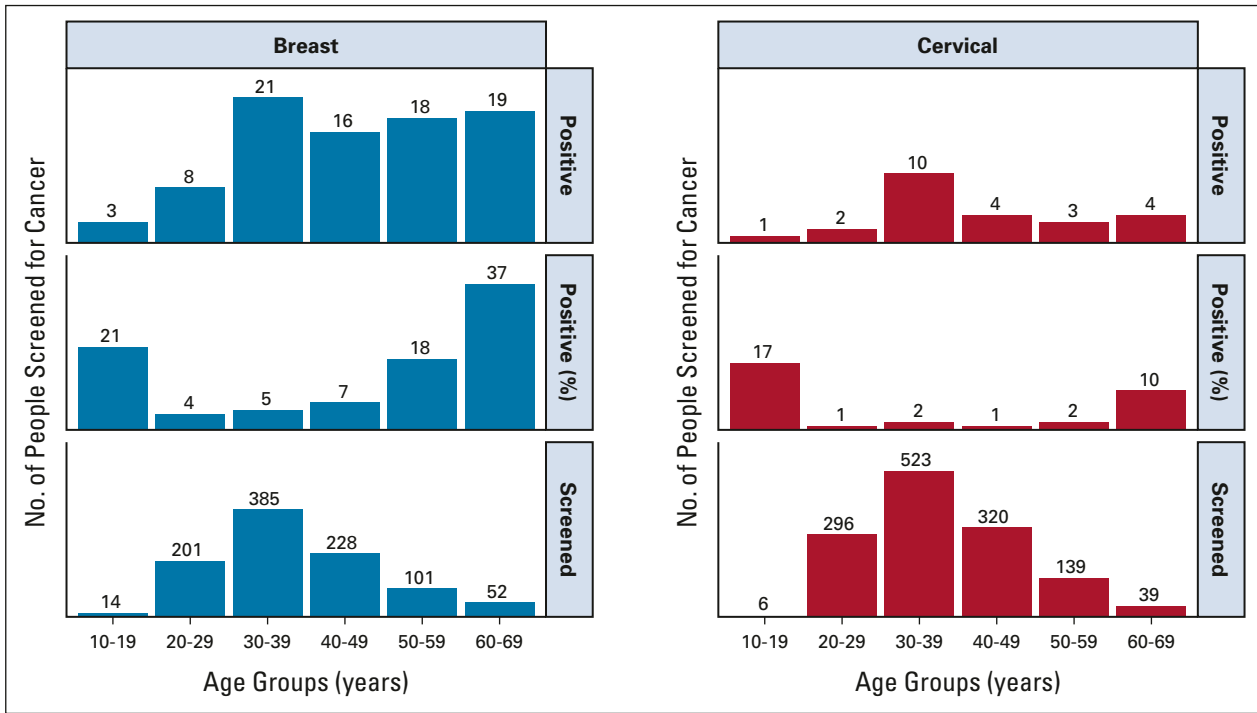
During the period from 2011 to 2020, 104 health facilities were screened for one or more of the following cancers: breast, cervix, colorectal, and prostate distribution across 14 local government areas, whereas nine health facilities provided data on cancer treatment (Fig 1). However, in the first 6 months of the year 2021, 150 health facilities provided data on people who were screened for cancer (mostly cervical cancer) and these facilities were distributed across all 20 Local Government Areas (LGAs), whereas two facilities had data on cancer treatment for the first time. One facility that had cancer treatment data did not have dates.

### Screening for Cancer in the Lagos State

From 2011 to 2020, cervical cancer was the commonest cancer screened for in the Lagos State accounting for 55% of 2,420 cancer screening performed. This is followed by breast cancer (41%), prostate cancer (4%), and colorectal cancer (0.2%). However, cervical cancer had the lowest positivity rate, whereas breast cancer contributed the largest number of positive screens (Fig 2). Colorectal and prostate cancers had high positive screen rates but very low numbers. More than 80% of people screened for cancer



**FIG 1.** Geospatial distribution of 104 health facilities that screened cancer in the Lagos State and the nine facilities that treated cancer in the Lagos State from 2011 to 2020.



**FIG 2.** Number of people with positive screens, percentage with positive screens, and number screened for breast and cervical cancers by the age group from 2011 to 2020 in the Lagos State.

were age < 50 years; however, people age 50 years and above had higher positive screen rates.

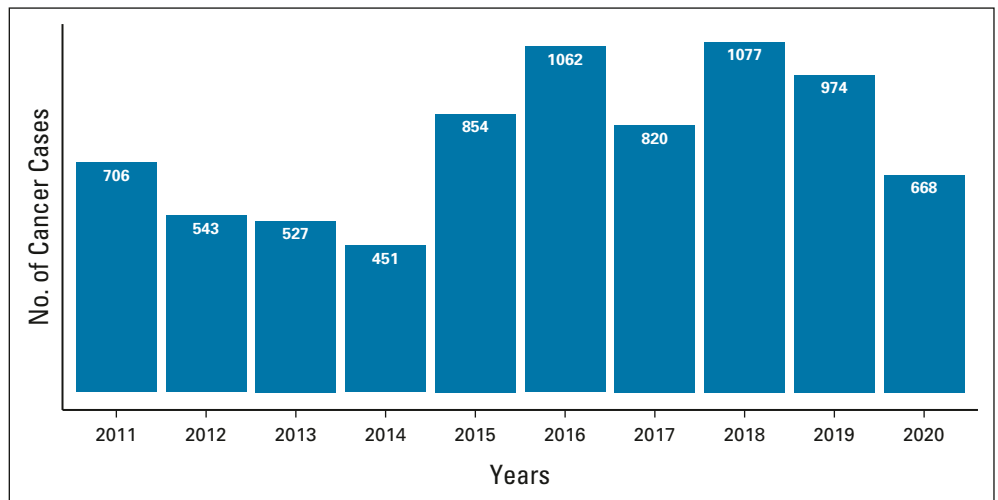
From January to June 2021, the number of people screened for cervical cancer was more than 10 times higher than the number screened in the 10-year period from 2011 to 2020. During this period in 2021, cervical cancer accounted for 97.8% of 16,185 cancer screening performed followed by breast cancer (1.9%) and prostate cancer (0.3%). This is because of a statewide donor-supported screening program for cervical cancer. The number of people screened for breast and prostate

cancers remained slightly higher but similar to the annual performance in 2020. In the first 6 months of 2021, the rate of positive screens for cervical cancer was slightly higher among women who were age < 50 years.

**Cancer Cases in the Lagos State**

A total of 9,822 cases of cancer were diagnosed from January 2011 to December 2020 in the Lagos State. Residents of the Lagos State accounted for 7,682 (78%) cases of cancer diagnosed, whereas nonresidents accounted for 1,597 (16%) cases. However, the state of residence was not specified for 543 (6%) patients.

**FIG 3.** Trends in the number of cancer cases diagnosed among Lagos residents.



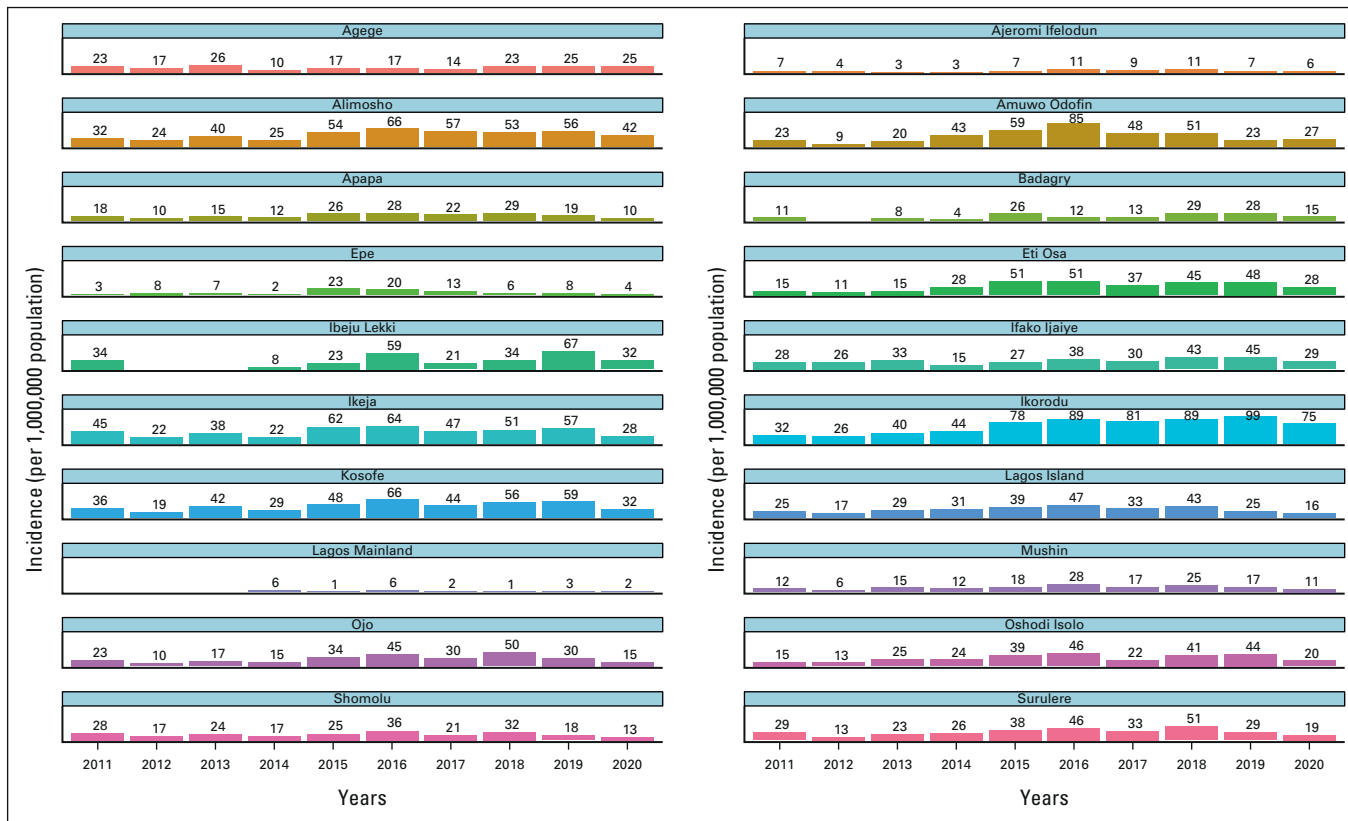


FIG 4. Trends in cancer cases per million population by LGA from 2011 to 2020.

The number of cancer cases diagnosed annually among Lagos residents increased in the period 2015-2020 compared with 2011-2014 (Fig 3), and of the 7,682 cases of cancer among Lagos residents, 76% (5,817) occurred in females and 24% (1,865) occurred among males.

The highest number of reported cancer cases was reported from Alimosho LGA for both males and females followed by

Ikorodu and Kosofe LGAs (Fig 4). However, when the population is taken into consideration, Ikorodu had the highest rate of reported cancer per million population. The distribution of the top 10 cancers diagnosed in Lagos is shown in Table 1. Breast cancer is predominant cancer among females followed by cancer of the cervix, colorectal cancer, ovary, and uterus, whereas prostate cancer is the most prevalent cancer among males. Others are cancers of the colon/rectum, ENT, liver, and skin. Among females, the top five cancers vary by age before stabilizing among women age 50 years and above, whereas among males, colorectal cancer is the commonest cancer in the 20- to 59-year age group and from age 60 years, prostate cancer becomes the commonest cancer (Fig 5).

The top five cancers among females have all increased over time (Fig 6), whereas among males, only colorectal, liver, and prostate cancers increased in the second half of the decade.

Among females, 75% of cancers occurred among persons who were either professionals or services and sales workers compared with 56% among males (Table 2).

**DISCUSSION**

This study shows that the availability of cancer screening or treatment services in the Lagos State is limited as only 5% of health facilities provided cancer screening or treatment services. Poor documentation and archiving of patient

TABLE 1. Top 10 Cancers Among Residents of the Lagos State Disaggregated by Sex From 2011 to 2021

Cancer	Female		Male	
	No.	%	Cancer	No. %
Breast	3,459	59.5	Prostate	365 19.6
Cervix	593	10.2	Colorectal	331 17.7
Colorectal	312	5.4	Ear, nose, and throat	173 9.3
Ovary	264	4.5	Liver	95 5.1
Uterus	187	3.2	Skin	77 4.1
Ear, nose, and throat	79	1.4	Bones	71 3.8
Pancreas	74	1.3	Breast	59 3.2
Liver	69	1.2	Not otherwise specified	59 3.2
Skin	64	1.1	Mouth	58 3.1
Mouth	63	1.1	Gastric	56 3.0
Unknown primary site	65	1.1	Unknown primary site	96 5.1

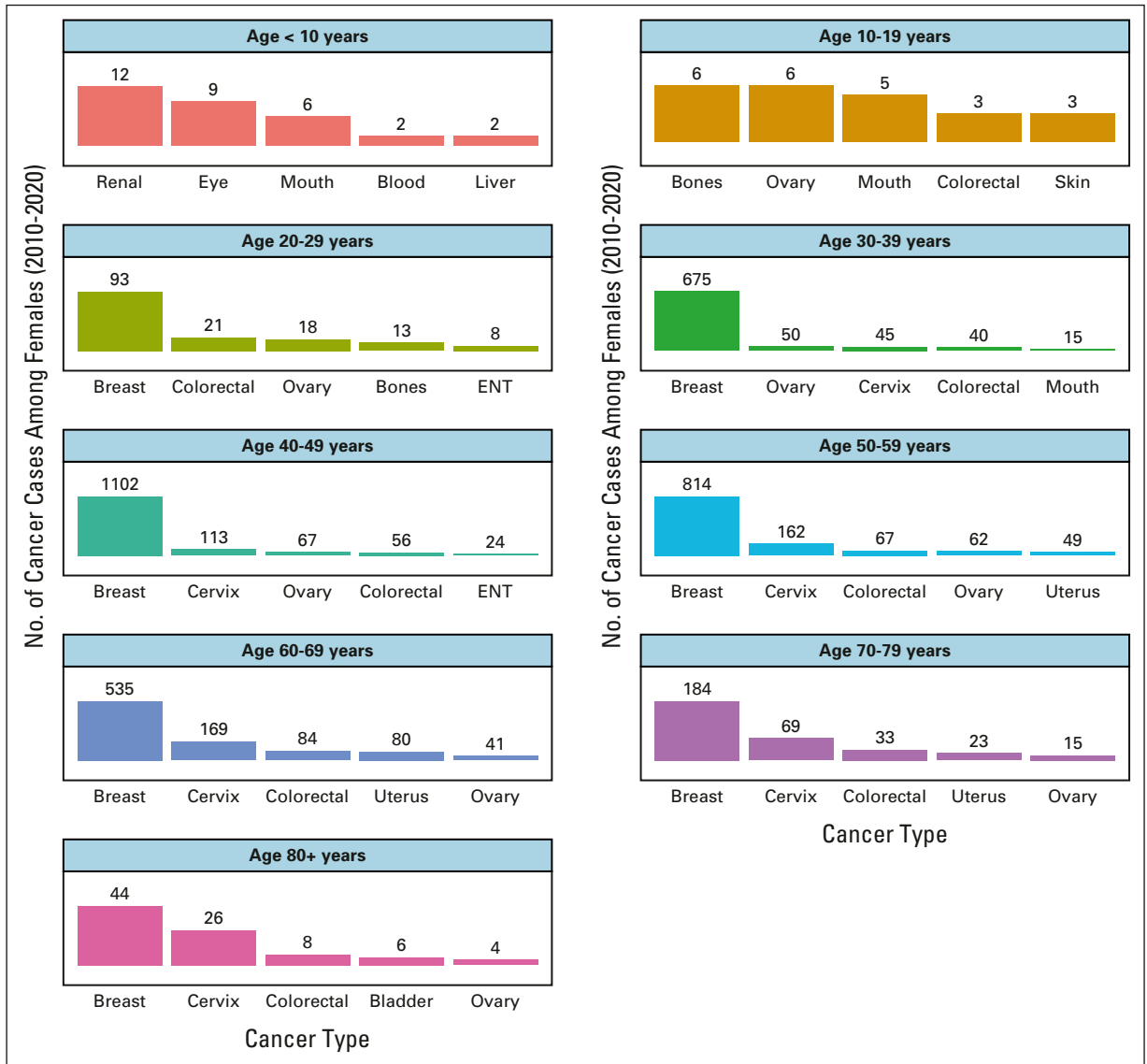


FIG 5. Top five cancers among females and males in each age group from 2011 to 2020. (continued on following page)

information and records might have contributed to this and the relatively low number of cancer cases reported since more than 300 health facilities had indicated that they provided cancer services but could not provide data to support the assertion. This loss of data is a critical concern as it could hinder optimal policy formulation, program planning, and resource allocation because of incomplete characterization of availability and distribution of cancer services.

Most of the health facility data on screening are recent from 2019 and may be due to growing interest in setting up screening programs by facilities or organizations. It is noteworthy that in the first 6 months of 2021, the number of people screened for cervical cancer was more than 10 times higher than the number screened in the 10-year period from

2011 to 2020. This was due to the introduction of an organized cervical cancer screening program by a nongovernmental organization. Furthermore, screening services became available in all local governments compared with 14 LGAs in 2020. Screening before 2020 appeared to be largely unorganized, and some were actually diagnostic, especially, for prostate and colorectal cancers, which had very high positivity rates after the supposed screening. The Ministry of Health organized special cancer screening clinics, but the records were not held at the health facilities. Thus, the number of people screened for cancer is likely to be higher than that reported in this study.

The expansion of screening in 2021 to all local government areas is of great benefit to the population but exclusively

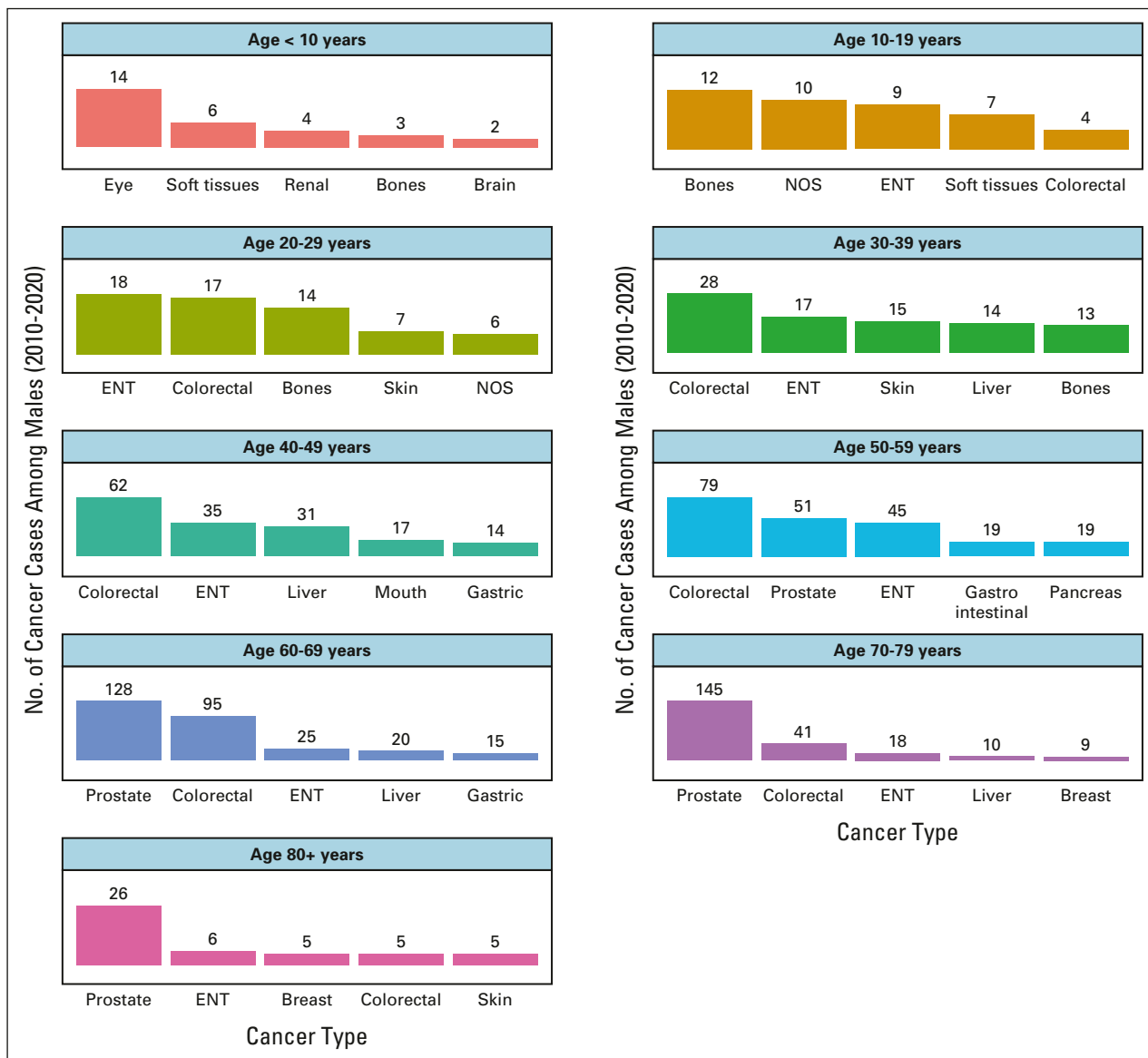


FIG 5. (Continued).

focused on cancer of the cervix despite the far larger contribution of breast and colorectal cancers. This is an example of the inadequate use of data for prioritization and allocation of resources. It also highlights the significance of donor interests in determining what interventions are available to the population.

More than 10% of cancers being treated in Lagos occurred among individuals who are not residents in Lagos. The percentage may be higher as some gave the address of a friend or relative with whom they were residing for the duration of the treatment. Unsurprisingly, the majority of patient's residents outside of Lagos were from the Ogun State, which is the only state that shares a border with the Lagos State. Nonresidents were twice likely to receive cancer care

from a private facility compared with residents. This may be indicative of a greater willingness to pay for private services. However, 80% of nonresidents received care at public facilities. This is probably indicative of the limited availability of cancer services in the private sector and costs.

Given the poor documentation, it is difficult to determine if the increase in the second half of the data was due to better documentation or retrieval of records for this period. However, the three facilities with cancer registries, of which the majority of data were extracted from all, showed an increase in the number of cancer cases in the second half of the decade. This increase is in agreement with the prediction that there would be a major increase in cancer incidence and mortality in developing countries.<sup>1</sup>

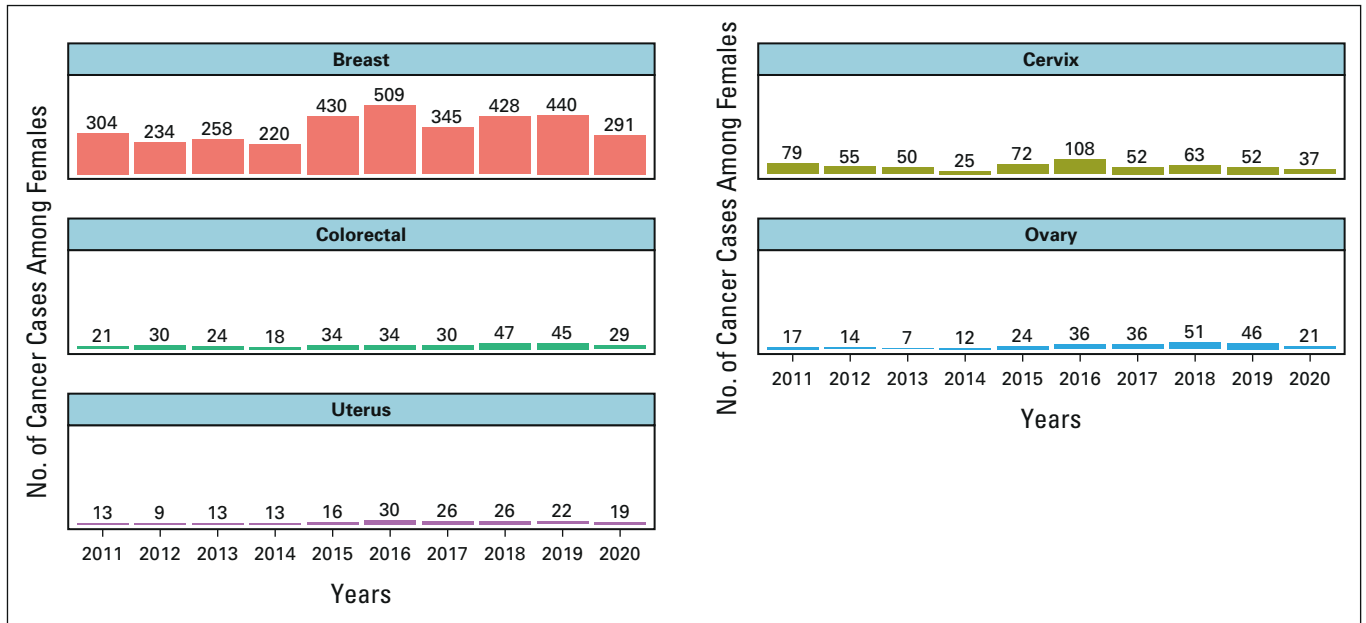


FIG 6. Trends in number of cases of top five cancers among females from 2011 to 2020.

The top five cancers among Lagos residents are breast, colorectal, cervical, prostate, and ovarian in descending order. This is slightly different from the national picture, with the top five being breast, prostate, cervical, colorectal, and non-Hodgkin lymphoma.<sup>2</sup> Differentiation by sex showed that the top five female cancers were breast, cervix, colorectal, ovary, and uterus, with breast cancer accounting for 60% of cancers, whereas among men, top five cancers were prostate, colorectal, liver, and skin with prostate

cancer accounting for 20%. The contribution of breast cancer is substantial as it is the main driver of the higher burden of cancer among women. Overall, the female-to-male ratio of cancer in the state is 3:1 but declines to 1.3:1 with the exclusion of breast cancer.

The treatment options are mainly surgery, chemotherapy, and radiotherapy depending on the availability of expertise and, for radiotherapy, equipment. Although health insurance now covers treatment of early stages of cancer, initial

TABLE 2. Occupation Groups of Patients With Cancer Disaggregated by Sex

Occupation Group	Female	Females, %	Male	Males, %	Total	Total, %
Professionals	2,510	43	728	39	3,238	42
Service and sales workers	1,856	32	309	17	2,165	28
Not specified	381	7	161	9	542	7
Retired	347	6	225	12	572	7
Government worker	226	4	86	5	312	4
Self-employed	155	3	123	7	278	4
Student	63	1	45	2	108	1
Craft and related trades workers	53	1	23	1	76	1
Elementary occupations	45	1	50	3	95	1
Skilled agricultural, forestry, and fishery workers	43	1	17	1	60	1
Managers	17	0	19	1	36	0
Clerical support workers	16	0	2	0	18	0
Unemployed	16	0	3	0	19	0
Armed forces occupations	6	0	14	1	20	0
Technicians and associate professionals	4	0	4	0	8	0
Plant and machine operators and assemblers	3	0	6	0	9	0
Others	76	1	50	3	126	2



capital outlays are needed to make the services readily available in the first place.

The proportional contribution of individual cancers varies between countries and between administrative areas and hospitals within the same country.<sup>1,13,14</sup> We found that among women in Lagos, the contribution of breast cancer (60%) was much higher than the national figure (39%), whereas among men, the contribution of prostate cancer (20%) was lower than the national figure (30%). This demonstrates the importance of determining the local epidemiology of cancers.

The large contribution of professionals and sales workers may be indicative of the proportional contribution of this group in the population of the state, indicative of an increased risk for cancer because of their lifestyle, and/or indicative of their financial ability to seek treatment. To address the issue of financial access, the Lagos State Government has included the treatment of early stages of breast, prostate, cervical, and colorectal cancers in the state health insurance package.<sup>15</sup> The package also covers the cost of screening for cancer of the cervix but not for breast, prostate, or colorectal cancer.

The highest number of reported cancer cases occurred among people living in Alimosho LGA, which has the largest population in the state. However, when the population is taken into consideration, Ikorodu had the highest rate of reported cancer per million population. This exemplifies the advantage of population-based cancer studies and registry, which enables a better understanding of the burden of

disease. Ikorodu is also an active commercial/energy center and national broadcasting gangway as the transmitters of the Federal Radio Corporation of Nigeria, Voice of Nigeria, and those of the State Broadcasting Corporation (Radio Lagos/Eko F.M. and LTV) are located there. Further studies on the relationship between environmental factors and cancer in the state are necessary.

In conclusion, the availability and organization of cancer services statewide are poor with inadequate consideration of the epidemiology of cancer in the state and each health facility operating independently. Inadequate documentation compromises the quality of data and, thus, the utility of the data for policy, programing, and allocation of resources. The absence of organized screening for breast cancer is a major gap as is the absence of screening for prostate and colorectal cancers.

We, therefore, recommend that organized screening programs for the predominant cancers in the state should be instituted starting with a comprehensive breast cancer screening program as an urgent priority. Staff at health facilities should be trained on cancer documentation, archiving, and retrieval of data to avoid data loss, and health facilities should establish systems for documentation, archiving, and retrieval of cancer data. The establishment of a hospital-based cancer registry at major facilities that offer cancer care should be mandatory.

These actions should be complemented by the development of a program of cancer research that addresses key policy and program questions.

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Open Payments is a public database containing information reported by companies about payments made to US-licensed physicians ([Open Payments](http://Open Payments)).

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**REFERENCES**

1. Sung H, Ferlay J, Siegel RL, et al: Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 71:209-249, 2021
2. The Global Cancer Observatory: Nigeria. International Agency for Research on Cancer, World Health Organization, 2021. <https://gco.iarc.fr/today/data/factsheets/populations/566-nigeria-fact-sheets.pdf>
3. Jemal A, Bray F, Forman D, et al: Cancer burden in Africa and opportunities for prevention. *Cancer* 118:4372-4384, 2012
4. World Health Assembly: Follow-Up to the Political Declaration of the High-Level Meeting of the General Assembly on the Prevention and Control of Non-Communicable Diseases. World Health Organization, Geneva, WHA66.10. 2013. [https://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R10-en.pdf?ua=1](https://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R10-en.pdf?ua=1)
5. World Health Organization: Global Action Plan for the Prevention and Control of NCDs 2013-2020, World Health Organization, Geneva, 2013. <https://www.who.int/publications-detail-redirect/9789241506236>
6. Romero Y, Trapani D, Johnson S, et al: National cancer control plans: A global analysis. *Lancet Oncol* 19:e546-e555, 2018
7. Bray F, Ferlay J, Soerjomataram I, et al: Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 68:394-424, 2018
8. Omonisi AE, Liu B, Parkin DM: Population-based cancer registration in sub-Saharan Africa: Its role in research and cancer control. *JCO Glob Oncol* 6:1721-1728, 2020
9. Jedy-Agba EE, Oga EA, Odutola M, et al: Developing national cancer registration in developing countries – Case study of the Nigerian national system of cancer registries. *Front Public Health* 3:186, 2015
10. Federal Ministry of Health Nigeria: Nigerian National System of Cancer Registries (NSCR). <https://nigeriancancerregistries.net/>
11. Lagos State Government: About Lagos. Lagos State Government Official Website. <https://lagosstate.gov.ng/about-lagos/>
12. Chinyem V: Lagos State GDP Hits \$131 Billion. *News of Nigeria*. August 3, 2015. <https://newsofnigeria.com/lagos-state-gdp-hits-131-billion/>
13. Calys-Tagoe BN, Yarney J, Kenu E, et al: Profile of cancer patients' seen at Korle Bu Teaching Hospital in Ghana (a cancer registry review). *BMC Res Notes* 7:577, 2014
14. Laryea DO, Awuah B, Amoako YA, et al: Cancer incidence in Ghana, 2012: Evidence from a population-based cancer registry. *BMC Cancer* 14:362, 2014
15. Lagos State Health Management Agency: ÌLERA ÈKÓ Plans – Ileraeko. <https://ileraeko.com/plans/>

