

# No evidence that breast cancer occurs at higher rates among young Arab women

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## Abstract

**Background:** Breast cancer is often thought to occur at a younger age among Arab women based on the mean or median age at diagnosis, or the proportion of women diagnosed with breast cancer at a young age.

**Objective:** To compare age-specific breast cancer incidence rates among women from selected Arab countries with selected high- and middle-income countries.

**Methods:** We examined population-based, age-specific, national or regional breast cancer incidence data for 2008–2012 and 2013–2017 from Australia, Brazil, Canada, Germany, Japan, United Kingdom, and United States of America, and compared them with data from Algeria, Bahrain, Jordan, Kuwait, Morocco, Qatar, and Saudi Arabia.

**Results:** Breast cancer incidence among young women in the selected Arab countries was comparable to, or even lower than, the selected high- and middle-income countries. In contrast to the continued increase in rates observed in the high- and middle-income countries, the rates tended to plateau or decrease among older Arab women. Age-standardized incidence rates were lower than crude rates in the Arab countries.

**Conclusion:** We found no evidence that Arab women are at higher risk of developing breast cancer at a younger age. The high number of cases among them was probably due to the younger population structure. These findings are important for refining breast cancer screening policies in the region.

Keywords: breast cancer, Arab women, high- and middle-income, age-standardized incidence rate

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## Background

Globally, breast cancer is the most prevalent form of cancer amongst females (1). Concurrently, the burden of cancer in Arab countries is increasing because of rapid population growth, population aging and associated environmental risk factors. In recent decades, breast cancer prognoses have improved significantly, with early-stage diagnosis and access to modern treatments resulting in 5-year survival probability exceeding 90% in many regions (1,2). However, metastatic breast cancer continues to have poor prognosis (1,2), leading to widespread public health campaigns designed to raise awareness of early signs and symptoms, as well as promote screening.

It is often mentioned in literature that breast cancer occurs at a younger age among Arab women (8-16), leading to the conclusion that it behaves more aggressively in this population (17). The supporting metrics typically use mean or median age at diagnosis, or the proportion of cases diagnosed before age 50. These data are sometimes derived from clinical records not population-based cancer registries, which may not be representative of the age distribution of the cancer population (17-19).

Screening guidelines in Arab countries recommend that women begin regular mammography screenings from 40 years of age and above (3–6); 10 years earlier than in the United States of America and Canada (7).

Similar claims were made regarding breast cancer rates in countries with young population structures such as India, Iran, and Pakistan (20-22). Evidence from randomized control trials suggest that mammography is most effective when women are screened from 50 to 69 years of age (23,24). Screening at younger ages (less than 45 years of age) can lead to unnecessary biopsies and over-diagnosed cases (23,24).

Our primary objective was to compare age-specific incidence rates for breast cancer from national cancer registries in Arab and non-Arab countries to challenge this age-related cancer claim.

## Methods

We extracted age-specific breast cancer incidence rates from the editorial reports of the 11th and 12th editions of Cancer Incidence in Five Continents (CI-5 XI and XII) (25,26) for selected Arab countries that had national or regional population-based cancer registries, including Algeria (Sétif), Bahrain, Jordan, Kuwait, Morocco (Casablanca),

Qatar, and Saudi Arabia (Riyadh). We extracted the most complete and updated cancer datasets available (2008–2012 and 2013–2017) for inclusion in our study. Data from the included registries had undergone extensive quality checks before inclusion in CI-5 and are therefore deemed high-quality registries.

Age-specific incidence rates were calculated as the number of new cases diagnosed in a given calendar period (2008–2012 or 2013–2017), using 5-year age groupings divided by the number of person-years at risk in each age group and calendar period. These were then multiplied by 100 000 to generate incidence rates per 100 000. The following formula was used for age specific incidence:

$$105 (d_i / y_i)$$

Where the subscript  $i$  denotes the age group,  $d_i$  is the number of cases in age group  $i$ ,  $y_i$  is the number of person-years at risk in age group  $i$ .

Age-standardized incidence rates were calculated by direct standardization using the Segi World Standard Population (27) formula:

$$\sum_i d_i w_i / y_i$$

Where  $W_i$  is the number of individuals in (or the weight of) age group  $i$  in the world standard population (25).

We chose to compare age-specific breast cancer incidence for Arab women who were younger than 50 years with the same age group in high- and middle-income countries such as Canada, the United Kingdom, and the United States of America. We included Brazil, a middle-income country without a national breast cancer screening programme. We included Australia and Japan as high-income countries with diverse geographies, but age pyramids that more closely resemble high-income countries. From this collated data, we compared crude and age-standardized incidence rates.

As we only used anonymous secondary aggregate data for analysis, we were not required to seek informed consent from participants in compliance with ethics review boards.

## Results

Our results indicate that age-specific breast cancer incidence rates for women younger than 50 years were generally lower in Arab than non-Arab countries, although some similarities were found. For example, in 2008–2012, we found similar rates for Algeria, United Kingdom and USA (115.7, 118.1 and 116.5 per 100 000 women per year, respectively), and Jordan and Brazil (94.7 and 90.6 per 100 000 women per year, respectively) for women aged 45–49. In high income countries including Australia, Canada, Germany, the United Kingdom, and the United States of America, age-specific rates increased sharply with age (Figure 1). In contrast, in our selected Arab countries, these rates increased slightly or plateaued in the 50–65-year-old age cohort before decreasing.

Crude incidence rates for breast cancer were lower in our selected Arab countries, with up to 5-fold differences between Jordan and the United Kingdom in 2008–2012, and 4-fold between Kuwait and the United States of America in 2013–2017. Age-standardized incidence rates were similar among Arab countries, ranging from 44.7 in Algeria to 50.3 in Saudi Arabia during 2008–2012, and from 53 in Kuwait to 67.7 in Bahrain during 2013–2017. Differences in age-standardized rates between Arab and non-Arab countries were less pronounced than crude rates, with rates in the United Kingdom and Germany being approximately double those of Algeria and Morocco (Table 1, Figure 2).

## Discussion

We found that age-specific breast cancer rates among young women in Arab countries are either the same or less than the comparative countries. Differences in breast cancer incidences among young Arab women are wide, with rates in the 40–44-year age group in Kuwait and Saudi Arabia being less than half of Algeria and Bahrain.

After adjusting for differences in population age structure, countries in the Middle East and East Asia continued to show a lower median age at breast cancer diagnosis than Western countries. However, the differences in median age decreased following adjustment. This reduction was largely attributed to higher detection rates among older populations in Europe and North America, where screening programmes are more prevalent, shifting the median age of diagnosis toward older age groups (28).

We assert that it is important to disseminate information to women of all age groups about the benefits of self-examination or other early forms of detection in addition to seeking medical advice if they notice any symptoms (30). Given the relatively high proportion of women still presenting with advanced stages of breast cancer in many Arab countries, downstaging (early detection) may provide the highest cost-benefit for these women (31). Clinical breast examination is a very useful screening tool in settings where many women present with large tumours (20). Equally important is assuring timely access to stage-appropriate breast cancer treatments.

A review of 28 studies from Arab countries with young age pyramids found lower median and mean age at breast cancer diagnosis, which was attributed to the younger age structure compared to Western countries (17). However, the included data did not allow examination of age-specific rates. Higher incidence rates of breast cancer in older, screening eligible women in high- and middle-income countries may also be partly due to overdiagnosis, which is estimated to account for up to 11% of breast cancer diagnoses (24). The less pronounced increase in age-specific breast cancer rates among older age groups in Arab countries, than the high- and middle-income countries, may reflect true differences in risk. These differences could be attributed to varying

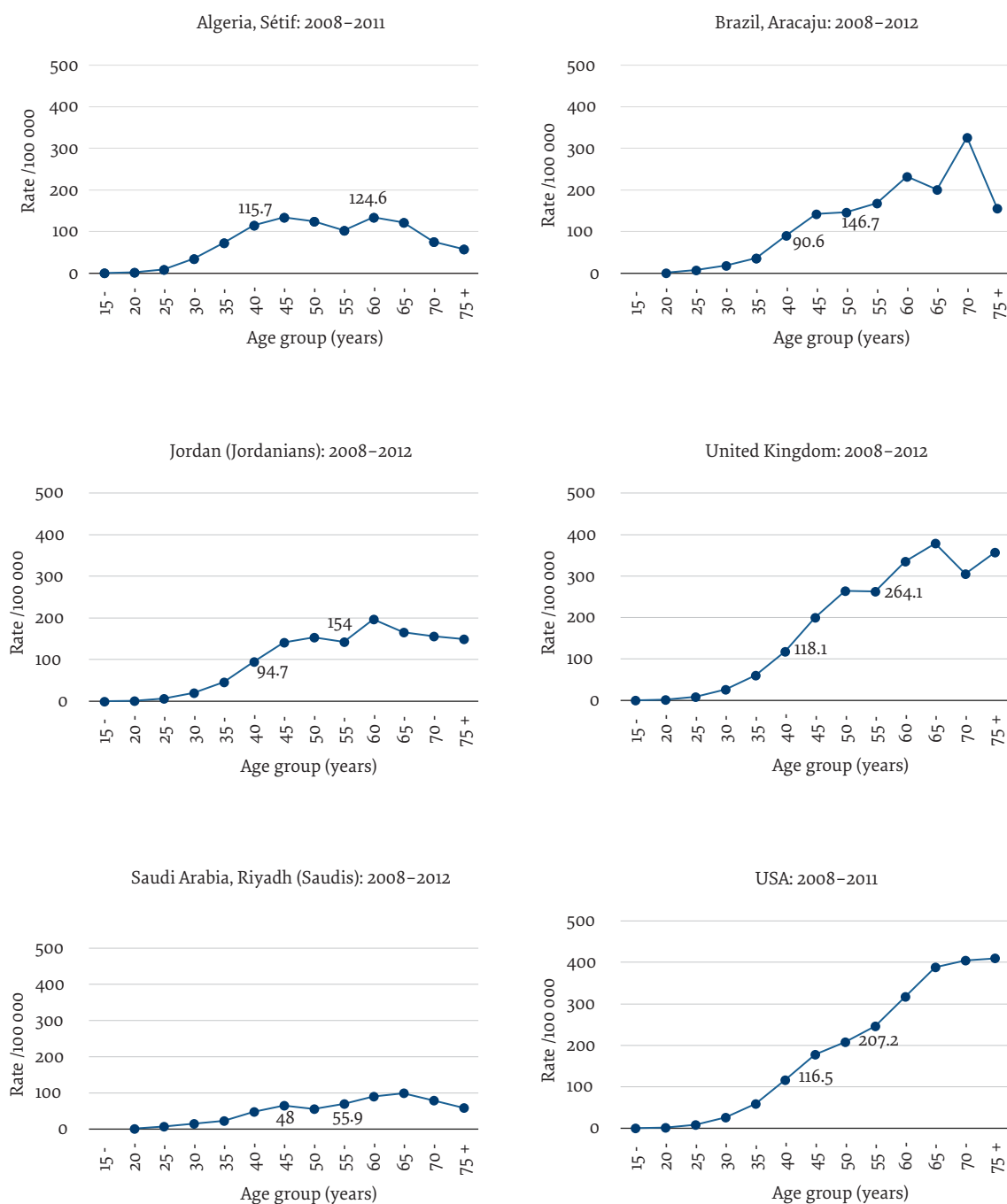
environmental and reproductive factors experienced by older cohorts in Arab countries, when compared to young women in Arab countries and older women in high-income countries.

The larger differences between Arab and non-Arab countries per crude versus age-standardized incidence rates reflect differences in population age structure (Figure 3). The selected Arab countries have large young populations due to high fertility rates, which is the primary driver of the lower mean age at diagnosis for Arab women. We found that unstandardized (crude) and age-standardized breast cancer incidence rates are

lower in Arab countries. Although data from contributing registries have undergone quality checks, there may still be some under-reporting of cancer incidence. Breast cancer rates may be lower among older women in Arab countries due to distinct differences in underlying risk factors. Although fertility rates are gradually declining, they remain relatively high, offering some protective effects. Alcohol consumption—widely recognized as a key risk factor for breast cancer—is remarkably low among Arab women (29), further reducing risk. Additionally, underdiagnosis may contribute to artificially low rates

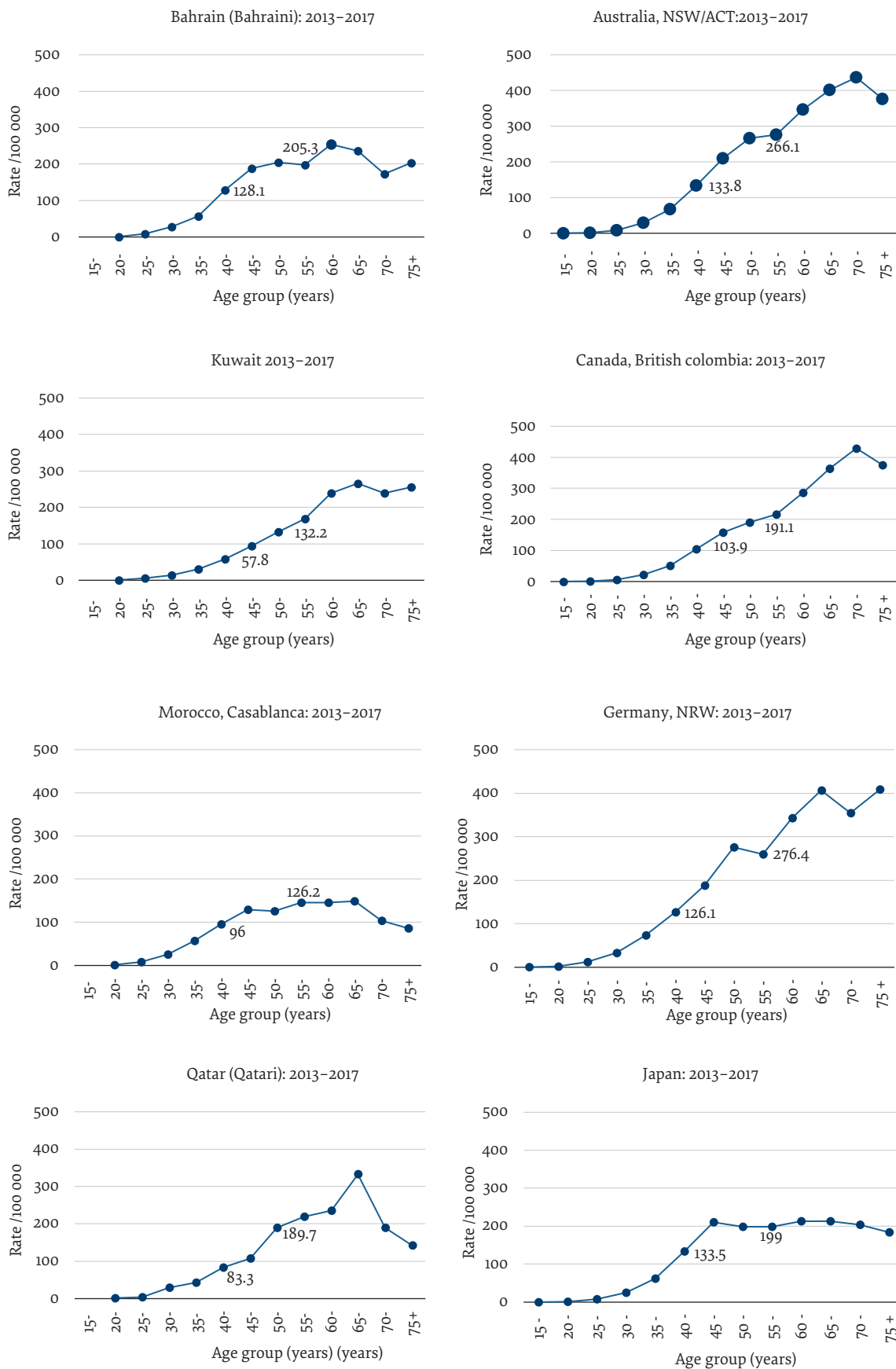
**Figure 1 Age-specific incidence rates (per 100 000) for breast cancer diagnosed in selected Arab and non-Arab countries**

(a) 2008–2012



**Figure 1** Age-specific incidence rates (per 100 000) for breast cancer diagnosed in selected Arab and non-Arab countries (concluded)

**(b) 2013–2017**



Precise age-specific incidence rates are provided for the 40–44 and 50–54 age groups  
 NSW/ACT: New South Wales/Australian Capital Territory; BC: British Columbia; NRW: North Rhine-Westphalia

among older women dealing with other health issues and competing causes of death.

Despite the lack of evidence to support the difference in the risk of developing breast cancer at a younger age, it remains a fact that a larger burden of the disease in Arab countries occurs among younger women than among the aging populations. It is therefore important to focus on informing women of all ages of the benefits of seeking immediate medical attention during the early onset of symptoms, and for health authorities to develop appropriate strategies for early detection of breast cancer among these women (30). Given the limited resources and relatively high proportion of women still presenting at advanced stage (despite some improvements) in many Arab countries, downstaging may provide the highest cost-benefit balance in the short-term (31). Clinical breast examination may also be a useful tool for screening in low-resource settings where many women currently present with large tumours (20). Of equal importance is ensuring timely access to stage-appropriate treatment for all women.

### Strengths and limitations of the study

In this study, we present age-specific incidence rates from national population-based cancer registries, assessed in a uniform and systematic manner. Although several other Arab countries have population-based cancer registries (32), many either did not contribute to CI-5 or did not meet the inclusion criteria. Routinely published incidence reports typically do not include age-specific rates and, therefore, could not be used in this comparison. We aimed to achieve the broadest representation of

**Table 1 Crude and age-standardized incidence rates for breast cancer, Arab and non-Arab countries, 2008–2012, 2013–2017**

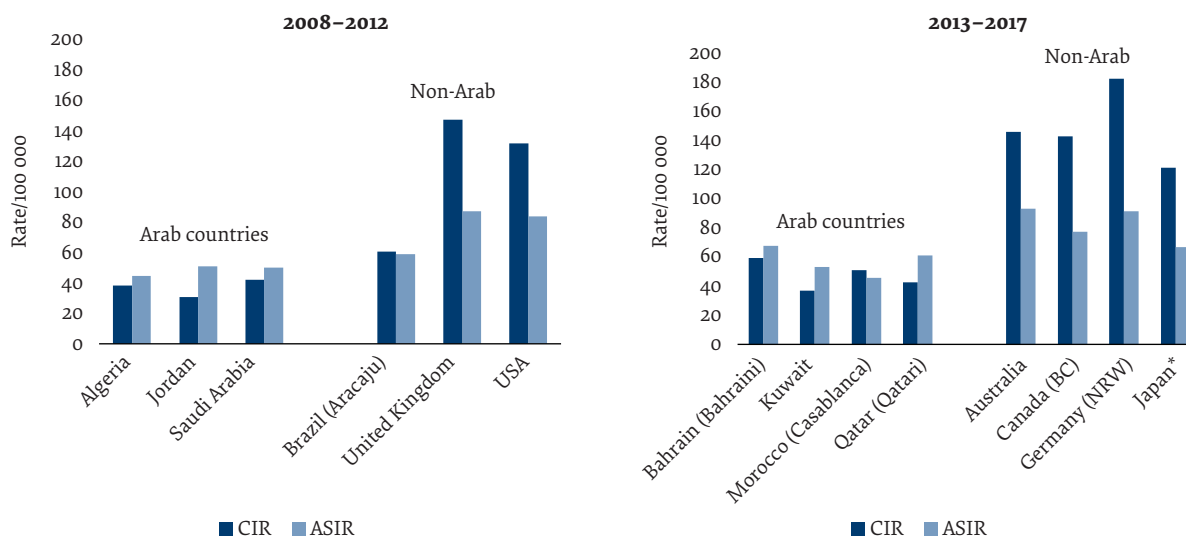
Country	Crude rate	Age standardized rate
<b>Algeria</b>	<b>38.4</b>	<b>44.7</b>
Australia (NSW, ACT)	145.9	93.2
<b>Bahrain</b>	<b>59.3</b>	<b>67.7</b>
Brazil (Aracaju)	60.7	58.8
Canada (British Columbia)	142.6	77.2
Germany	182.4	91.5
Japan	121.2	66.8
<b>Jordan</b>	<b>30.6</b>	<b>51.0</b>
<b>Kuwait</b>	<b>36.7</b>	<b>53.0</b>
<b>Morocco</b>	<b>51.1</b>	<b>45.5</b>
<b>Qatar</b>	<b>42.5</b>	<b>61.2</b>
<b>Saudia Arabia (Riyadh)</b>	<b>42.1</b>	<b>50.3</b>
United Kingdom	147.6	87.4
United States of America	132.0	83.8

Note: Arab countries are in bold font for comparison to non-Arab countries

Arab countries by including those featured in the last two CI-5 publications (XI and XII), which cover at least one country from North Africa, the Levant, and the Gulf Cooperation Council. However, the Gulf Cooperation Council countries were overrepresented due to their higher resource levels.

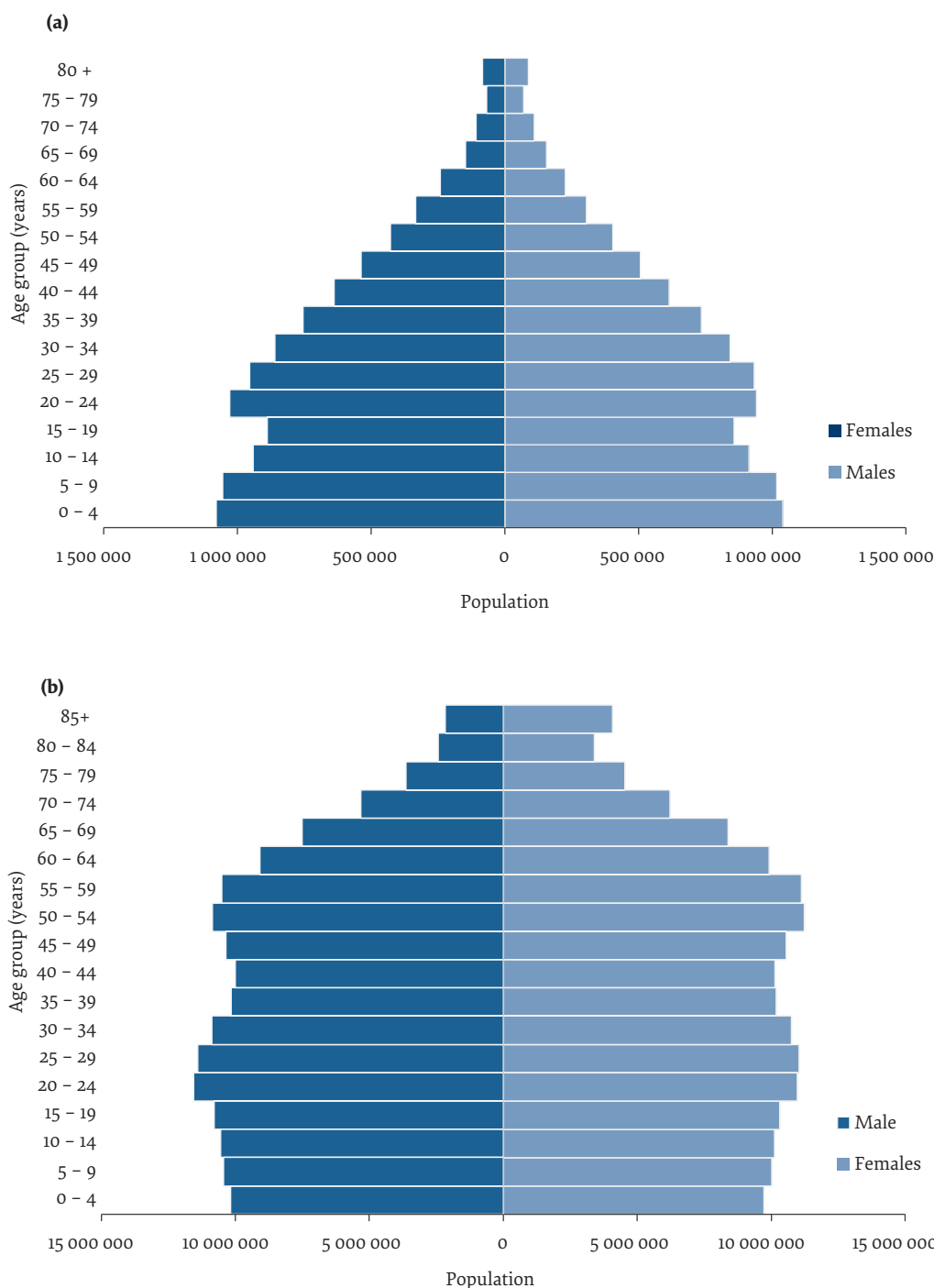
Caution is needed when interpreting the age-specific rates for some registries, as they represent a limited age

**Figure 2 a/b Crude and age-standardized incidence rates for breast cancer diagnosed in (a) 2008–2012 and (b) 2013–2017 in 7 Arab countries (Algeria, Jordan, Saudi Arabia, Bahrain, Kuwait, Morocco, Qatar) and 7 selected comparison countries (Brazil, United Kingdom, United States of America, Australia, Canada, Germany, Japan)**



Japanese data reports from 2013–2015 only  
 BC: British Columbia; NRW: North Rhine Westphalia; CIR: Crude incidence rate; ASIR: Age-standardized incidence rate

**Figure 3 Population pyramid (average annual person-year) for (a) Kingdom of Saudi Arabia and (b) the United States of America, 2013–2017**



Data source: *Cancer Incidence in Five Continents XII*

range among relatively small populations (countries or regions). Monitoring trends over a longer period would provide a clearer picture of age patterns for breast cancer. Screening patterns may also influence the age distribution of breast cancer cases, as widespread screening can lead to diagnoses being made years earlier than they would have manifested symptomatically. This could lower the age at diagnosis and affect the comparability of age-specific rates between countries. However, guidelines in the United Kingdom, Canada, Brazil, and Germany do not recommend screening for women younger than 50 years

(33), therefore, we do not expect screening to significantly affect comparability at younger ages.

### Conclusion

Breast cancer attracts emotional and political attention and impacts many lives. Physicians frequently face the challenge of diagnosing women who present with advanced disease or are younger than the recommended age for mammography screening. While acknowledging the increasing burden of breast cancer in Arab countries

and the challenges physicians face in diagnosing young women for whom no satisfactory screening method exists to date, the age pattern of breast cancer among Arab women appears consistent with global trends. The lower mean or median age at diagnosis is largely a reflection of the younger population structure, rather than an increased age-specific risk. In other words, the high incidence of breast cancer among younger women is due to the large proportion of young women in these

countries. This distinction is essential when designing national cancer control programmes. As Arab countries undergo demographic transitions and their younger populations age, it will be crucial to expand diagnostic and treatment services to address the increasing burden of breast cancer in Arab countries.

**Funding:** None

**Competing interests:** None declared.

## Absence de preuve indiquant que le cancer du sein est plus fréquent chez les jeunes femmes arabes

### Résumé

**Contexte :** Il est souvent considéré que le cancer du sein survient à un âge plus jeune chez les femmes arabes, en se basant sur l'âge moyen ou médian au moment du diagnostic, ou sur la proportion de femmes chez qui le cancer du sein a été diagnostiqué alors qu'elles étaient jeunes.

**Objectif :** Comparer les taux d'incidence du cancer du sein en fonction de l'âge chez les femmes de certains pays arabes avec ceux observés dans des pays à revenu élevé ou intermédiaire.

**Méthodes :** Nous avons analysé les données nationales ou régionales sur l'incidence du cancer du sein, basées sur la population et en fonction de l'âge, pour les périodes 2008–2012 et 2013–2017 dans les pays suivants : Allemagne, Australie, Brésil, Canada, États-Unis d'Amérique, Japon et Royaume-Uni. Ces données ont été comparées avec celles provenant de l'Algérie, de l'Arabie saoudite, de Bahreïn, de la Jordanie, du Koweït, du Maroc et du Qatar.

**Résultats :** L'incidence du cancer du sein chez les jeunes femmes dans les pays arabes sélectionnés était comparable, voire inférieure, à celle des pays à revenu élevé ou intermédiaire sélectionnés. Contrairement à l'augmentation continue des taux observée dans les pays à revenu élevé et intermédiaire, les taux ont eu tendance à se stabiliser ou à diminuer chez les femmes plus âgées dans les pays arabes. Les taux d'incidence standardisés selon l'âge étaient inférieurs aux taux bruts dans ce groupe de pays.

**Conclusion :** Nous n'avons pu établir aucune preuve que les femmes arabes présentent un risque accru de développer un cancer du sein à un plus jeune âge. Le nombre élevé de cas observés dans ces pays était probablement dû à la structure de la population plus jeune. Ces constatations sont primordiales pour affiner les politiques de dépistage du cancer du sein dans la Région.

## لا دليل على إصابة النساء العربيات بسرطان الثدي في سن أصغر

إيمان الخلاوي، هدى الطوخي

### الخلاصة

**الخلفية:** لقد شاع الاعتقاد بأن النساء العربيات يتعرضن للإصابة بسرطان الثدي في سن أصغر من غيرهن، وذلك استناداً إلى متوسط عمر المصابات في الدول العربية سجلات سريرية، بدون الأخذ في الحسبان التركيبة السكانية الشاملة.

**الأهداف:** مقارنة معدلات الإصابة بسرطان الثدي بحسب السن بين نساء من بلدان عربية مختارة وبعض البلدان المرتفعة والمتوسطة الدخل.

**طرق البحث:** حللنا بيانات سكانية محددة الأعمار عن معدلات الإصابة بسرطان الثدي على المستوى الوطني أو الإقليمي في الفترة 2008–2012 والفترة 2013–2017 من أستراليا والبرازيل وكندا وألمانيا واليابان والمملكة المتحدة والولايات المتحدة الأمريكية، وقارناها ببيانات من الجزائر والبحرين والأردن والكويت والمغرب وقطر والمملكة العربية السعودية.

**النتائج:** كان معدل الإصابة بسرطان الثدي بين الشابات في البلدان العربية المختارة مماثلاً أو حتى أقل منه في البلدان المختارة ذات الدخل المرتفع والمتوسط. وعلى النقيض من الزيادة المستمرة الملحوظة في معدلات الإصابة في البلدان ذات الدخل المرتفع والمتوسط، تميل المعدلات إلى الثبات أو الانخفاض بين النساء العربيات الأكبر سناً. كما قد تؤثر ممارسات الكشف المبكر على هذه المعدلات.

**الاستنتاجات:** لا دليل على أن النساء العربيات أكثر عرضة لخطر الإصابة بسرطان الثدي في سن أصغر. وربما كان ارتفاع عدد الحالات بينهن راجعاً إلى التركيبة السكانية الأصغر سناً، ولهذا تبعت مهمة في سن توصيات الكشف المبكر.

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