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Cervical Intraepithelial Neoplasia in the Public Health System of Bahia, Brazil: A Descriptive Time-Series Study (2014-2023)

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Abstract

Introduction

Cervical cancer remains a major public health problem in Northeast Brazil, but the grades of histologically confirmed precursor lesions recorded in the Cancer Information System (SISCAN) have not been described for Bahia. We aimed to describe the distribution of cervical intraepithelial neoplasia (CIN) grades 1, 2, and 3 in the public health system of Bahia, Brazil, in 2014-2023 and the change in the proportion of CIN 3 after full SISCAN implementation (2017-2023), and, secondarily, the age distribution and the share of women aged 15-24 years within each grade.

Methods

This descriptive time-series study used publicly available aggregated SISCAN data from the Department of Informatics of the Brazilian Unified Health System (DATASUS). Histopathological examinations with CIN 1, 2, or 3 in women aged 15-74 years residing in Bahia were included; the unit of analysis was the examination. The proportion of CIN 3 in 2017-2023 was analyzed with quasi-binomial segmented logistic regression, using cytology examinations as denominators and a sensitivity analysis restricted to the first diagnostic specimen.

Results

A total of 9,355 CIN examinations, 2,990 (32.0%) were CIN 1, 2,072 (22.1%) CIN 2, and 4,293 (45.9%) CIN 3. The proportion of CIN 3 was 40.6% in 2017-2019 and 50.3% in 2020-2023 (odds ratio (OR) 1.48, 95% confidence interval (CI) 1.30-1.68), with no underlying annual trend once the 2020 level change was considered. This change was driven mainly by fewer CIN 1 examinations (9.5 to 6.7 per 10,000 cytology examinations; CIN 3, 10.5 to 12.1) and persisted in the sensitivity analysis. Women aged 25-44 years accounted for 71.6% of CIN 3 examinations. The share of women aged 15-24 years decreased among CIN 1 and CIN 2 examinations (Bonferroni-adjusted $p<0.001$ and $p=0.045$), but their share of cytology examinations also fell (16.0% to 11.7%), and relative to cytology volume the declines were not statistically significant.

Conclusions

CIN 3 was the most frequent grade among histologically confirmed precursor lesions in the public health system of Bahia, and its proportion was higher from 2020 onward, mainly because fewer CIN 1 lesions were recorded. The decline in CIN 1 and CIN 2 among young women paralleled a decline in their screening and is hypothesis-generating: it may partly reflect HPV vaccination, but reduced screening of women under 25 years is at least as plausible. Individual-level data are needed to separate these explanations.

Categories: Obstetrics/Gynecology, Oncology, Epidemiology/Public Health
Keywords: brazil, cervical intraepithelial neoplasia, early detection of cancer, hpv vaccines, papillomavirus infections, time-series studies, uterine cervical neoplasms

Introduction

Cervical cancer is the fourth most common cancer among women worldwide, with approximately 660,000 new cases and 350,000 deaths in 2022, most of them in low- and middle-income countries [1]. In Brazil, for 2023-2025, the National Cancer Institute (INCA) estimated 17,010 new cases per year nationwide, making it the second most common cancer among women in the Northeast region, with approximately 1,160 new cases per year in the state of Bahia [2]. Persistent infection with oncogenic types of human papillomavirus (HPV), the most prevalent sexually transmitted infection worldwide, is detected in virtually all cervical

cancers [3,4], and more than 80% of sexually active women are estimated to acquire HPV at some point in their lives [5]. Most infections clear spontaneously, but persistent infections may remain latent for years before precursor lesions develop.

Cervical carcinogenesis occurs predominantly in the transformation zone, where physiological squamous metaplasia at the squamocolumnar junction creates a cell population susceptible to HPV-induced transformation. Persistent infection may lead to progressive intraepithelial dysplasia and, eventually, to invasive carcinoma with metastatic potential [4,6]. Histologically, these precursor abnormalities are graded according to the cervical intraepithelial neoplasia (CIN) system introduced by Richart, which describes a continuum of CIN 1, 2, and 3 with an increasing risk of progression to invasive cancer [6,7]. More recently, the Lower Anogenital Squamous Terminology (LAST) project of the College of American Pathologists and the American Society for Colposcopy and Cervical Pathology proposed a two-tier terminology, in which CIN 1 corresponds to a low-grade squamous intraepithelial lesion (LSIL) and CIN 2 and 3 to a high-grade squamous intraepithelial lesion (HSIL) [8]. The three-tier CIN system remains in use in Brazilian pathology reports and in the national information systems [9].

Expanding early detection and prevention programs remains a challenge for low- and middle-income countries, where cervical cancer incidence follows a clear socioeconomic gradient and is concentrated in socially vulnerable populations [10,11]. Successful prevention depends on both vaccination coverage and adherence to screening. However, vaccination is costly for many health systems, and HPV vaccines are prophylactic rather than therapeutic, offering no benefit for infections that are already established [12,13]. Screening of adult women therefore remains essential for decades after vaccine introduction. In countries that started vaccinating adolescent girls around 2008, marked population-level reductions in CIN and invasive cancer are now documented in vaccinated cohorts [14-17], whereas in Brazil, where vaccination started in 2014 [18], these effects are only beginning to be expected.

In 2020, the World Health Organization (WHO) launched a global strategy to eliminate cervical cancer as a public health problem, based on high vaccination coverage, screening with high-performance tests, and treatment of precursor lesions [19]. Monitoring progress requires regional data on the precursor lesions identified by screening programs. To our knowledge, however, the distribution of histologically confirmed CIN grades recorded in SISCAN has not been described for Bahia, a state with a high burden of cervical cancer [2].

The primary objective of this study was to describe the distribution of histologically confirmed CIN 1, 2, and 3 in the public health system of Bahia, Brazil, in 2014-2023, using counts of histopathological examinations recorded in SISCAN, and to assess the change in the proportion of CIN 3 after full SISCAN implementation (2017-2023). Secondary objectives were to describe the age distribution of each grade and, as an exploratory, hypothesis-generating analysis, to examine changes in the share of women aged 15-24 years within each grade after the introduction of HPV vaccination in 2014.

Materials And Methods

Study design and data source

This was a descriptive time-series study of aggregated, publicly available data. Data were obtained from the Department of Informatics of the Brazilian Unified Health System (DATASUS), which hosts the Cancer Information System (SISCAN), the national system for recording cervical and breast cancer screening and diagnostic tests performed in the public health network. SISCAN replaced the former Cervical Cancer Information System (SISCOLO) and was implemented progressively from 2013 onward [20]. Histopathology data were extracted in May 2024 from the TabNet file "SISCAN - Histo do colo - por local de residência - Bahia" (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), with year of competence as the row variable, age group as the column variable, the measures CIN I, CIN II, and CIN III, and age groups 15-19 to 70-74 years selected. A re-extraction in October 2026 reproduced all counts except one additional CIN 2 examination in 2023 (420 vs. 419), consistent with late registration; the original extraction was kept. Cytology counts were extracted in October 2026 from the corresponding file (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/cito_colo_residba.def) with the same selections. The data are publicly available, which allows the analysis to be fully reproduced, and reporting follows the RECORD statement [21].

Population and variables

We included all histopathological examinations of women aged 15 to 74 years residing in Bahia, performed in the public health network from 2014 to 2023, with a diagnosis of CIN. The unit of analysis was the examination: one woman may contribute more than one examination (for example, a biopsy followed by an excisional specimen), and repeated examinations of the same woman cannot be identified in the aggregated data. Lesions were classified according to the SISCAN categories CIN 1 (mild dysplasia), CIN 2 (moderate dysplasia), and CIN 3 (severe dysplasia or carcinoma in situ, recorded as a single category) [9]; in the LAST terminology, CIN 1 corresponds to LSIL and CIN 2 and 3 to HSIL [8]. The variables were year of competence (the month in which the examination was recorded in SISCAN), age group (15-24, 25-34, 35-44, 45-54, 55-

64, and 65-74 years), and type of specimen (biopsy, excision of the transformation zone in a see-and-treat approach, excision after a previous biopsy, conization, or other). Age-specific percentages were calculated among records with age recorded; two records (one CIN 1 in 2023 and one CIN 2 in 2022) had no age consistent with the yearly total.

Analysis period

Annual counts of CIN were very low in 2014-2016 (40 to 104 examinations per year), although SISCAN already recorded 200,000 to 424,000 cytology examinations per year in Bahia: the ratio of histopathological CIN examinations to cytology examinations was 0.9 to 3.7 per 10,000 in 2014-2016 and 19.8 to 34.9 per 10,000 from 2017 onward. We therefore considered 2014-2016 as the implementation period of the SISCAN histopathology module and restricted the inferential analyses to 2017-2023. This cut-off was defined after inspecting the annual counts and was not pre-specified.

Statistical analysis

The database was built and analyzed using IBM SPSS Statistics for Windows, Version 28.0 (Released 2021; IBM Corp., Armonk, NY, USA). Normality was assessed with descriptive statistics and the Shapiro-Wilk test. Categorical variables were expressed as absolute and relative frequencies, n (%), and continuous variables with asymmetric distribution as median and interquartile range (IQR). Annual counts of the three CIN grades were compared using the Friedman test, with years as blocks. The temporal trend in the proportion of CIN 3 among all CIN diagnoses was assessed using the chi-square test for linear trend (linear-by-linear association), both for the entire period and for 2017-2023, after full implementation of SISCAN. In an exploratory analysis, the same test was used to assess the trend in the share of women aged 15 to 24 years within each CIN grade in 2017-2023. By 2023, this age group included most of the cohorts eligible for HPV vaccination since 2014 (girls aged 9 to 13 years in any year from 2014 onward) [18]. The significance level was set at 5%.

Ethical considerations

This study used anonymized, aggregate secondary data in the public domain, which are freely accessible. In accordance with Resolution No. 510/2016 of the Brazilian National Health Council, review by a research ethics committee was not required. As an ecological study, its findings are subject to the ecological fallacy and should not be extrapolated to individuals.

Results

A total of 9,355 histopathological examinations with a diagnosis of CIN were recorded in the period: CIN 1, 2,990 (32.0%); CIN 2, 2,072 (22.1%); and CIN 3, 4,293 (45.9%) (Table *1*). Annual counts were low between 2014 and 2016 (40 to 104 examinations per year) and exceeded 1,000 per year from 2017 onward. After a peak of 1,664 examinations in 2019, the number fell to 1,026 in 2020 (-38.3%) and recovered to 1,676 in 2023. CIN 3 was the most frequent grade in every year, followed by CIN 1 and then CIN 2.

Year	CIN 1, n (%)	CIN 2, n (%)	CIN 3, n (%)	Total
2014	24 (32.9)	12 (16.4)	37 (50.7)	73
2015	37 (35.6)	17 (16.3)	50 (48.1)	104
2016	10 (25.0)	8 (20.0)	22 (55.0)	40
2017	403 (37.3)	242 (22.4)	435 (40.3)	1,080
2018	554 (36.9)	361 (24.1)	585 (39.0)	1,500
2019	603 (36.2)	357 (21.5)	704 (42.3)	1,664
2020	329 (32.1)	202 (19.7)	495 (48.2)	1,026
2021	270 (26.5)	197 (19.4)	550 (54.1)	1,017
2022	336 (28.6)	257 (21.9)	582 (49.5)	1,175
2023	424 (25.3)	419 (25.0)	833 (49.7)	1,676
Total	2,990 (32.0)	2,072 (22.1)	4,293 (45.9)	9,355

TABLE 1: Distribution of cervical intraepithelial neoplasia (CIN) grades by year, Bahia, Brazil, 2014-2023

Percentages are calculated within each year (row).

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

In 2017-2023, the proportion of CIN 3 was stable in 2017-2019 (40.3%, 39.0%, and 42.3%), increased in 2020-2021 (48.2% and 54.1%), and remained close to 50% in 2022-2023 (Figure *1*). In the segmented model, there was no underlying annual trend (OR 1.01, 95% CI 0.94-1.08), whereas the proportion was higher from 2020 onward (OR for the level change 1.42, 95% CI 1.07-1.89). Overall, the proportion of CIN 3 was 40.6% in 2017-2019 and 50.3% in 2020-2023 (OR 1.48, 95% CI 1.30-1.68), and the proportion of CIN 2+ (HSIL) rose from 63.2% to 72.2% (Table *2*). Relative to cytology volume, CIN 1 examinations decreased from 9.5 to 6.7 per 10,000 cytology examinations and CIN 2 from 5.9 to 5.3, whereas CIN 3 increased from 10.5 to 12.1 per 10,000 (Table *2*). The higher proportion of CIN 3 therefore reflected mainly fewer CIN 1 examinations.

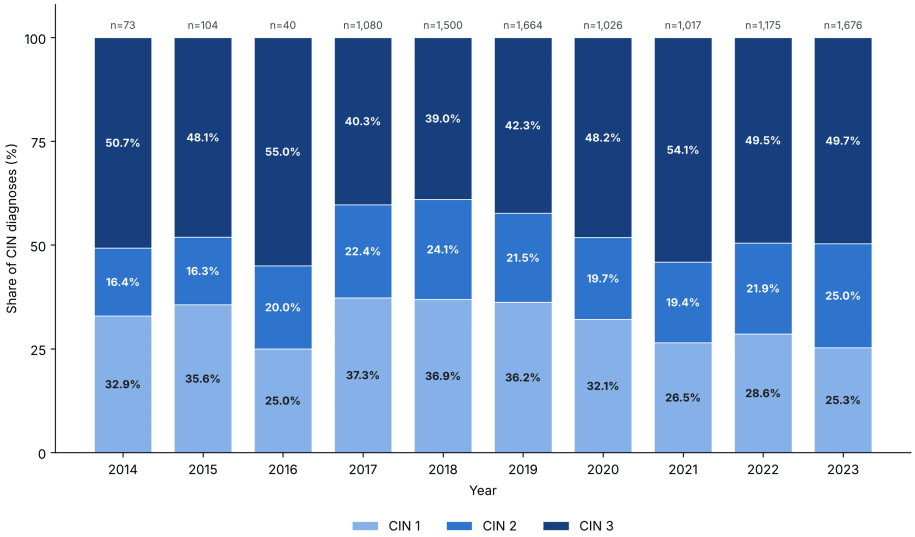


FIGURE 1: Annual distribution (%) of cervical intraepithelial neoplasia (CIN) grades, Bahia, Brazil, 2014-2023

Labels inside the bars show the share of each CIN grade; n is the total number of CIN diagnoses in each year.

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

Measure	2017-2019	2020-2023	OR or RR (95% CI)
CIN examinations, n	4,244	4,894	Not applicable
Cytology examinations, n	1,640,523	2,031,376	Not applicable
CIN 3, % of CIN examinations	40.6	50.3	OR 1.48 (1.30-1.68)
CIN 2+ (HSIL), % of CIN examinations	63.2	72.2	OR 1.51 (1.29-1.77)
CIN 3, % (first diagnostic specimen)	30.6	40.5	OR 1.54 (1.32-1.79)
CIN 1 per 10,000 cytology examinations	9.5	6.7	RR 0.70 (0.49-1.01)
CIN 2 per 10,000 cytology examinations	5.9	5.3	RR 0.90 (0.66-1.23)
CIN 3 per 10,000 cytology examinations	10.5	12.1	RR 1.15 (0.87-1.53)

TABLE 2: Proportion of CIN grades and CIN examinations per 10,000 cytology examinations before and after 2020, Bahia, Brazil, 2017-2023

CIN: cervical intraepithelial neoplasia; CIN 2+: CIN 2 and CIN 3 (HSIL); OR: odds ratio (quasi-binomial logistic regression); RR: rate ratio (quasi-Poisson regression with cytology examinations as offset); CI: confidence interval. First diagnostic specimen: biopsies and see-and-treat excisions. In the segmented model, the annual OR for CIN 3 was 1.01 (95% CI 0.94-1.08) and the OR for the level change in 2020 was 1.42 (95% CI 1.07-1.89).

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def); histopathology accessed May 2024, cytology accessed October 2026.

In 2017-2023, 40.6% of CIN 3 examinations were biopsies, 9.3% see-and-treat excisions, 18.0% excisions after a previous biopsy, 30.8% conizations, and 1.2% other specimens. When the analysis was restricted to the first diagnostic specimen, the proportion of CIN 3 was lower but also increased, from 30.6% in 2017-2019 to 40.5% in 2020-2023 (OR 1.54, 95% CI 1.32-1.79); in this analysis, the increase was more gradual (annual OR 1.07, 95% CI 1.02-1.12; OR for the level change 1.21, 95% CI 0.99-1.48).

Examinations were concentrated in women aged 25 to 44 years, who accounted for 61.8% of CIN 1, 67.7% of CIN 2, and 71.6% of CIN 3 (Table *3*). The 35-44-year group was the most frequent for all three grades.

Women aged 15 to 24 years represented 10.6% of CIN 1 but only 4.2% of CIN 3. Age distribution differed significantly between grades ($\chi^2 = 158.2$, df = 10, $p<0.001$). Annual age distributions for each grade are presented in the Appendix.

Age group (years)	CIN 1, n (%)	CIN 2, n (%)	CIN 3, n (%)
15-24	317 (10.6)	176 (8.5)	182 (4.2)
25-34	877 (29.3)	693 (33.5)	1,424 (33.2)
35-44	970 (32.5)	710 (34.3)	1,651 (38.5)
45-54	534 (17.9)	329 (15.9)	619 (14.4)
55-64	230 (7.7)	113 (5.5)	320 (7.5)
65-74	61 (2.0)	50 (2.4)	97 (2.3)
Total with age recorded	2,989	2,071	4,293

TABLE 3: Age distribution of cervical intraepithelial neoplasia (CIN) diagnoses by grade, Bahia, Brazil, 2014-2023 (pooled)

Percentages are calculated within each grade (column), among records with age recorded. Age was not consistent with the yearly total for one CIN 1 record (2023) and one CIN 2 record (2022).

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

In the exploratory analysis restricted to 2017-2023, the share of women aged 15 to 24 years decreased significantly among CIN 1 diagnoses, from 12.2% in 2017 to 8.0% in 2023, with the lowest value in 2022 (6.0%), and among CIN 2 diagnoses, from 9.9% to 5.5%. No significant trend was observed for CIN 3, whose share in this age group remained between 3.1% and 5.0% (Table *4*).

Grade	2017	2018	2019	2020	2021	2022	2023	OR per year (95% CI)	Adjusted p
CIN 1	12.2	12.3	11.8	11.2	8.1	6.0	8.0	0.89 (0.84-0.95)	<0.001
CIN 2	9.9	8.9	10.4	8.9	10.7	7.0	5.5	0.92 (0.85-0.98)	0.045
CIN 3	4.4	5.0	4.7	4.6	3.6	3.1	4.3	0.96 (0.91-1.01)	0.44

TABLE 4: Share (%) of women aged 15 to 24 years among cervical intraepithelial neoplasia (CIN) diagnoses, by grade and year, Bahia, Brazil, 2017-2023

Values are the percentage of each year's CIN examinations of a given grade that occurred in women aged 15 to 24 years. OR per year from quasi-binomial logistic regression with year as a continuous variable; p-values are Bonferroni-corrected for three tests.

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

Discussion

In this series of 9,355 histopathological examinations from the public health system of Bahia, CIN 3 was the most frequent grade in every year. After full implementation of SISCAN, the proportion of CIN 3 was higher from 2020 onward, mainly because fewer CIN 1 examinations were recorded, and examinations were concentrated in women aged 25 to 44 years.

The predominance of CIN 3 must be interpreted in light of how histopathology is requested within the Brazilian screening program. National guidelines recommend repeat cytology rather than immediate colposcopy for most women with low-grade cytological abnormalities, whereas high-grade abnormalities are referred directly to colposcopy and biopsy or excisional treatment [22]. Consequently, histopathological series are enriched for high-grade lesions, and low-grade lesions, many of which regress spontaneously, are under-represented [6,23]. In addition, more than half of CIN 3 examinations were excisional specimens, some of which may duplicate an earlier biopsy. A high proportion of CIN 3 therefore describes which women

undergo histopathology, not the stage at which disease is detected: CIN 3 is the target of screening, and the late outcome, invasive cancer, was not studied. The distinction between grades remains clinically relevant, because CIN 3 is the true cancer precursor: in a historical cohort of women with untreated CIN 3, about 31% developed invasive cancer within 30 years [24], whereas approximately half of CIN 2 lesions regress spontaneously within two years [25].

The temporal pattern of the series has two features. First, the very low counts recorded between 2014 and 2016, when hundreds of thousands of cytology examinations were already recorded each year, most likely reflect the progressive adoption of the SISCAN histopathology module, which replaced SISCOLO from 2013 onward [20], rather than a true change in disease occurrence. Second, the number of examinations fell by 38.3% in 2020, which coincides with the COVID-19 pandemic. Nationally, cervical cytology volumes in the public health system dropped by 44.6% in 2020 compared with 2019 [26]. The higher proportion of CIN 3 from 2020 onward is temporally associated with the pandemic and is compatible with prioritization of women with high-grade cytological abnormalities for colposcopy and fewer biopsies of low-grade lesions, but this design cannot establish its causes. The proportion did not return to pre-pandemic levels by 2023, and changes in referral, access to colposcopy, and pathology practice may also have contributed.

The age distribution is consistent with the natural history of the disease, in which precursor lesions peak in young and middle-aged adults and precede invasive cancer by a decade or more [4,6]. The concentration of CIN 3 between 25 and 44 years largely reflects the target population of screening defined by the national guidelines (25 to 64 years), and the small share of women under 25 years, especially among CIN 3, is consistent with the recommendation not to screen this age group [22].

The exploratory analysis showed a decrease in the share of women aged 15 to 24 years among CIN 1 and CIN 2 examinations, but not among CIN 3. Brazil introduced the quadrivalent HPV vaccine into its National Immunization Program in 2014 for girls aged 11 to 13 years and extended it to girls aged 9 to 11 years in 2015 [18]; by 2023, most women aged 15 to 22 years belonged to vaccine-eligible cohorts. In countries that started vaccination earlier, reductions appeared first among the youngest screened cohorts: in a systematic review and meta-analysis of 65 articles from 14 high-income countries, CIN 2+ decreased by 51% among screened girls aged 15 to 19 years and by 31% among women aged 20 to 24 years five to eight years after vaccine introduction [14], and longer follow-up has shown large reductions in CIN 3 and invasive cancer among women vaccinated in early adolescence [15-17]. However, several findings argue against attributing our results to vaccination. The share of cytology examinations performed in women aged 15 to 24 years fell from 16.0% to 11.7% over the same period, and relative to cytology volume in this age group, the declines were not statistically significant. Women under 25 years are not the target of screening, so those who undergo histopathology are a selected group. The decline in CIN 1 was concentrated in 2021-2022, coinciding with pandemic disruption rather than following a gradual post-vaccination pattern, and a falling share can also result from rising numbers of examinations in older women. In addition, the 15-24-year band includes unvaccinated cohorts, and no data on vaccination coverage were available. The finding is therefore hypothesis-generating and at least as compatible with better adherence to the recommendation not to screen women under 25 years [22]. Because current vaccines are not therapeutic [12,13], screening and treatment of precursor lesions will remain central to the WHO elimination strategy for the coming decades [19].

Limitations

This study has limitations. First, it is descriptive and based on aggregated data, so it does not allow inferences at the individual level. The unit of analysis was the examination: repeated examinations of the same woman cannot be identified, and excisions after a biopsy may duplicate an earlier diagnosis and inflate the proportion of CIN 3, although the main finding persisted when only the first diagnostic specimen was analyzed. Second, population denominators were not used; cytology volumes provide an approximate denominator but do not identify the women who were screened or referred. Third, SISCAN covers only the public health network, and its completeness may vary over time and across the 417 municipalities of Bahia, as illustrated by the low counts in 2014-2016, by a cluster of CIN 1 examinations among women aged 55 to 59 years from a single municipality in 2022 (Appendix), and by possible late registration of 2023 examinations; data were analyzed for the whole state, which may mask regional differences. Fourth, the 2017 cut-off was defined after inspecting the data. Fifth, the grading of CIN 1 and CIN 2 has limited inter-observer reproducibility, and pathology practice may have changed over time. Finally, the data do not include HPV genotyping, individual vaccination status, or vaccination coverage, and vaccine eligibility depends on birth cohort, which the 15-24-year band does not capture; the association between vaccine introduction and the decline among young women is therefore ecological and cannot be interpreted as causal.

Future directions

Future studies should estimate population-based rates of CIN, using census population estimates as denominators and stratifying by health region, and should link individual vaccination and screening records and analyze birth cohorts to distinguish changes in disease occurrence from changes in screening activity. As the first vaccinated cohorts reach the screening age from 2026 onward, such analyses will allow the impact

of HPV vaccination on high-grade precursor lesions in Bahia to be assessed [14,17].

Conclusions

Between 2014 and 2023, CIN 3 was the most frequent grade among histologically confirmed cervical precursor lesions recorded in the public health system of Bahia, accounting for 45.9% of examinations. After full implementation of SISCAN, the proportion of CIN 3 was higher from 2020 onward, temporally associated with the COVID-19 pandemic, mainly because fewer CIN 1 examinations were recorded. Examinations were concentrated in women aged 25 to 44 years. The share of young women among CIN 1 and CIN 2 examinations decreased after 2017, in parallel with a decline in cytology among women under 25 years; whether this partly reflects HPV vaccination remains a hypothesis to be tested with individual-level data. The implementation period and the recording cluster observed in this series also show the need to improve the completeness of SISCAN records to monitor progress toward cervical cancer elimination in Bahia.

Appendices

Appendix

Year	15-24	25-34	35-44	45-54	55-64	65-74	Total
2014	7 (29.2)	9 (37.5)	6 (25.0)	1 (4.2)	1 (4.2)	-	24
2015	7 (18.9)	13 (35.1)	8 (21.6)	6 (16.2)	3 (8.1)	-	37
2016	2 (20.0)	-	6 (60.0)	2 (20.0)	-	-	10
2017	49 (12.2)	133 (33.0)	145 (36.0)	48 (11.9)	21 (5.2)	7 (1.7)	403
2018	68 (12.3)	161 (29.1)	164 (29.6)	124 (22.4)	21 (3.8)	16 (2.9)	554
2019	71 (11.8)	187 (31.0)	193 (32.0)	104 (17.2)	34 (5.6)	14 (2.3)	603
2020	37 (11.2)	94 (28.6)	117 (35.6)	61 (18.5)	16 (4.9)	4 (1.2)	329
2021	22 (8.1)	88 (32.6)	96 (35.6)	43 (15.9)	14 (5.2)	7 (2.6)	270
2022	20 (6.0)	90 (26.8)	95 (28.3)	55 (16.4)	74 (22.0)	2 (0.6)	336
2023	34 (8.0)	102 (24.1)	140 (33.1)	90 (21.3)	46 (10.9)	11 (2.6)	423

TABLE 5: Age distribution of CIN 1 diagnoses by year, Bahia, Brazil, 2014-2023

Values are n (% of the year's age-recorded total). The 2023 total (423) is the sum of age groups; the yearly total in Table 1 is 424. In 2022, 47 of the 74 examinations at ages 55-64 were from residents of a single municipality (Vitória da Conquista), consistent with a local recording cluster; excluding them did not change the results.

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

Year	15-24	25-34	35-44	45-54	55-64	65-74	Total
2014	-	5 (41.7)	3 (25.0)	4 (33.3)	-	-	12
2015	3 (17.6)	3 (17.6)	6 (35.3)	1 (5.9)	2 (11.8)	2 (11.8)	17
2016	-	2 (25.0)	5 (62.5)	1 (12.5)	-	-	8
2017	24 (9.9)	83 (34.3)	78 (32.2)	36 (14.9)	16 (6.6)	5 (2.1)	242
2018	32 (8.9)	130 (36.0)	110 (30.5)	64 (17.7)	13 (3.6)	12 (3.3)	361
2019	37 (10.4)	123 (34.5)	130 (36.4)	45 (12.6)	18 (5.0)	4 (1.1)	357
2020	18 (8.9)	67 (33.2)	77 (38.1)	26 (12.9)	12 (5.9)	2 (1.0)	202
2021	21 (10.7)	60 (30.5)	72 (36.5)	25 (12.7)	12 (6.1)	7 (3.6)	197
2022	18 (7.0)	81 (31.6)	86 (33.6)	45 (17.6)	17 (6.6)	9 (3.5)	256
2023	23 (5.5)	139 (33.2)	143 (34.1)	82 (19.6)	23 (5.5)	9 (2.1)	419

TABLE 6: Age distribution of CIN 2 diagnoses by year, Bahia, Brazil, 2014-2023

Values are n (% of the year's age-recorded total). The 2022 total (256) is the sum of the age groups; the yearly total in Table 1 is 257.

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

Year	15-24	25-34	35-44	45-54	55-64	65-74	Total
2014	1 (2.7)	15 (40.5)	13 (35.1)	-	5 (13.5)	3 (8.1)	37
2015	1 (2.0)	21 (42.0)	15 (30.0)	5 (10.0)	5 (10.0)	3 (6.0)	50
2016	2 (9.1)	10 (45.5)	5 (22.7)	3 (13.6)	1 (4.5)	1 (4.5)	22
2017	19 (4.4)	146 (33.6)	158 (36.3)	58 (13.3)	42 (9.7)	12 (2.8)	435
2018	29 (5.0)	211 (36.1)	208 (35.6)	80 (13.7)	42 (7.2)	15 (2.6)	585
2019	33 (4.7)	230 (32.7)	263 (37.4)	103 (14.6)	60 (8.5)	15 (2.1)	704
2020	23 (4.6)	175 (35.4)	191 (38.6)	65 (13.1)	31 (6.3)	10 (2.0)	495
2021	20 (3.6)	178 (32.4)	221 (40.2)	89 (16.2)	37 (6.7)	5 (0.9)	550
2022	18 (3.1)	176 (30.2)	255 (43.8)	78 (13.4)	37 (6.4)	18 (3.1)	582
2023	36 (4.3)	262 (31.5)	322 (38.7)	138 (16.6)	60 (7.2)	15 (1.8)	833

TABLE 7: Age distribution of CIN 3 diagnoses by year, Bahia, Brazil, 2014-2023

Values are n (% of the year's age-recorded total).

Source: DATASUS/SISCAN (http://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/histo_residba.def), accessed May 2024.

Year	Cytology, 15-74 years, n	Cytology, 15-24 years, n	15-24 years, %
2014	199,974	33,099	16.6
2015	326,128	53,305	16.3
2016	424,031	70,321	16.6
2017	484,406	77,385	16.0
2018	577,753	90,287	15.6
2019	578,364	88,325	15.3
2020	293,631	43,323	14.8
2021	513,877	69,381	13.5
2022	564,281	70,051	12.4
2023	659,587	76,936	11.7
Total	4,622,032	672,413	14.5

TABLE 8: Cytology examinations recorded in SISCAN among women aged 15 to 74 years and 15 to 24 years, Bahia, Brazil, 2014-2023

Values are the number of cervical cytology examinations by year of competence, among residents of Bahia.

Source: DATASUS/SISCAN (https://tabnet.datasus.gov.br/cgi/dhdat.exe?SISCAN/cito_colo_residba.def), accessed October 2026.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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extracted in May 2024 and cytology data in October 2026; the data are aggregated and de-identified. All data analyzed are reported in Tables 1-4 and Appendix Tables 5-8.

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