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**Title: Screening for cervical cancer in French Guiana: screening rates from 2006 to 2011**

**Titre: Dépistage du cancer du col de l'utérus en Guyane: taux de couverture du dépistage entre 2006 et 2011.**

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**Abstract**

In French Guiana, the age-standardized incidence rate of cervical cancer is four times higher than in France and the mortality rate 5.5 times higher. A survival study revealed that stage at diagnosis was the main factor influencing the prognosis, showing that early detection is crucial to increase cervical cancer survival. The present study aimed at evaluating the cervical cancer screening rate between 2006 and 2011 by age and for 3-years period in French Guiana.

All pap smears realised in French Guiana were analysed in two laboratories allowing exhaustive review of screening data.

The screening rate was estimated at about 54% from 2006 to 2011, with a statistical difference between coastal and rural area (56.3% versus 18.7%).

Although the methodological difference did not allow comparisons with mainland France, these results could be used to evaluate the impact of organised cervical cancer screening by the French Guiana Association for Organized Screening of Cancers implemented in French Guiana since 2012.

**Résumé**

En Guyane, l'incidence du cancer du col de l'utérus est quatre fois plus élevée qu'en métropole, et la mortalité 5.5 fois plus élevée. Dans ce vaste département recouvert à plus de 90% de forêt amazonienne, les difficultés d'accès aux soins, l'âge précoce au premier rapport et le manque de dépistage sont de possibles facteurs explicatifs. Une première étude a montré que le diagnostic tardif était le principal facteur impactant la survie. Un diagnostic précoce - par frottis cervico-vaginal tous les 3 ans de 25 à 64 ans selon les recommandations nationales - est donc crucial pour améliorer la survie. L'objectif de cette étude est d'évaluer le taux de couverture de dépistage par frottis en Guyane entre 2006 et 2011 ainsi que l'activité de réalisation de frottis et le taux de cancers dépistés.

Tous les frottis cervico-vaginaux réalisés en Guyane sont analysés dans seulement deux laboratoires d'anatomie pathologique, ce qui permet une analyse exhaustive des données de dépistage de ce département. La date de naissance, la date de réalisation du frottis, l'adresse de la patiente ou celle du prescripteur (selon les laboratoires) ainsi que la date de réalisation du précédent frottis ont été recueillis.

Le taux de couverture de dépistage a été évalué à 54% entre 2006 et 2011, avec une différence significative entre le littoral et l'intérieur de la Guyane (56.3% versus 18.7%). L'activité de réalisation de frottis était de 23.5 à 25.8 frottis pour 100 femmes-année. Le taux de diagnostic de cancer était de 191.8/100 000 femmes-année, soit un cancer cervical diagnostiqué pour 521 personnes dépistées.

Bien que le taux de couverture de dépistage en Guyane ne semble pas très différent de la métropole, nous ne pouvons réaliser de comparaison statistique du fait de la différence de méthodologie utilisée. Le taux de diagnostic de cancer était de 6 à 12 fois plus élevé qu'en métropole, confirmant l'importance du dépistage par frottis en Guyane. Des efforts de dépistage doivent être réalisés notamment dans l'intérieur de la Guyane, où le taux de dépistage est plus faible. Cet état des lieux du dépistage entre 2006 et 2011 pourra permettre d'évaluer l'impact de la campagne organisée de dépistage du cancer du col mise en place en 2012 par l'Association Guyanaise du Dépistage Organisé des Cancers (AGDOC).

**Mots clés:**

Dépistage, cancer, col de l'utérus, Guyane, frottis cervico-vaginal

**Key words :**

Screening, cervical cancer, French Guiana, pap-smear

## Introduction

In women, cervical cancer is the second most frequent cancer and represents the third cause of death by cancer in the world (8). In French Guiana, a French overseas territory of South America, the age-standardized incidence rate of cervical cancer is four times higher than in France and the mortality rate 5.5 times higher.

In this vast Amazonian French territory, difficulties to access the health care system, notably in the remote areas, poverty, the early age of sexual relations and the lack of screening are possible determinants of the high incidence and mortality rates. A survival study in this population revealed that stage at diagnosis was the main factor influencing the prognosis, showing that early detection is crucial to increase cervical cancer survival (5). The gold standard for screening is the Papanicolaou cervical smear (Pap smear). In France, a pap smear is recommended for each women from 25 to 65 years old each three years (10). According to the National Cancer Institute in France (INCa), organized screening decreases the incidence and mortality of cervical cancer down to 80% in screened women (11). In French Guiana, lack of medical doctors and socio-economic precariousness could be associated with underscreening. The French Guiana Association for Organized Screening of Cancers (AGDOC) set up organized screening for cervical cancer in French Guiana since 2012. Quantifying screening in French Guiana before this intervention will be useful to guide and evaluate it.

The present observational and retrospective study aimed at evaluating the screening rate of cervical cancer between 2006 and 2011 by age, place of location and for 3-years period in French Guiana, the pap smear activity, and the invasive cancer rate.

## Method

All pap smears realised in French Guiana were analysed in two laboratories. The lab in the Public Hospital of Cayenne received smears from its own structure and from all health centers except two. The private lab of Abbeville, in mainland France, received smears from private practices, from hospitals of Saint Laurent du Maroni and Kourou, and from two health centers (Apatou and Grand Santi). All person having had a pap-smear in French Guiana between 2006 and 2011 processed in Abbeville lab or in Cayenne Hospital, whatever the age where included in the study.

The anonymized databases were collected in those two labs after information of women. Posters had been previously placed in all structures doing pap smears in French Guiana, explaining that some of the data concerning all those tests realized between 2006 and 2011 would be used for statistical analysis: date of birth of the patient, date of pap smear, place of location, date of previous smear, personnal identification (ID) number and prescribing doctor's address. If the person was opposed to this, she could contact the coordinator of the study.

To estimate the screening rate of cervical cancer, only the first pap smear for each women for a 3-years period must be counted. For that we used two different variables: the ID number for data from Cayenne Hospital; and the existence, and if so, the date of an anterior pap smear for data from Abbeville lab. As we could not match the data between the two databases, we hypothesized that women always consult in the same place for a pap smear.

Two 3-years periods were studied: 2006 to 2008 and 2009 to 2011.

The difference of the screening rate between locations was evaluated for the 2009-2011 period using the location of the pap-smear prescriber for data from Abbeville lab and the address of the patient for data from Cayenne Hospital. In fact patient address was not available for data from the Abbeville lab. Location was divided between coastal areas (from Cayenne to Saint Laurent du Maroni) and rural areas (all the interior of French Guiana). This arbitrary division, often used in local studies, is based on the existence of roads and the proximity of one of the three hospital of French Guiana. The comparison of the two rates was realized with direct standardisation based on French Guiana population.

Population data by age, gender, and place of location were issued of the National French Institute of Statistic and Economical Studies (Insee). Those data were available for years 2003, 2008, and 2012. Estimations of the target population for each period have been made using population progression rates between each year.

The screening rate was defined by the number of women in an age group having at least one pap smear in a 3-years period divided by the number of women of the same age during this period.

The pap smear activity was defined by the number of pap smears performed in women of 25 to 64 years of age divided by the number of women of the same age by year.

The invasive cervical cancer rate represented the number of invasive cervical cancer cases diagnosed for 100 000 women screened. Data on invasive cancer were collected from the Cancer Registry of French Guiana, created in 2005 and officially certified by the Comité National des Registres (CNR) in 2010 (15). Given that those data were not available for the period 2009-2011 at the time of the study, this rate was calculated only for the 2006-2008 period.

**Results**

In French Guiana, 91 458 pap-smear were conducted from 2006 to 2011, 93% of which were analysed at the Abbeville lab.

The screening rate of cervical cancer was 54.6 % (Confidence Interval 95% (CI) = 54.2-55.1) in 2006-2008 and 53.7% (CI 95% = 53.3-54.1) in 2009-2011, as presented in table I. This rate was maximum for women from 30 to 44 years old – 56.9% to 60.6% – then decreased progressively after 45 years old, whatever the period, as presented in figure 1.

Location was missing for 35% of women having had a pap-smear analyzed in Cayenne Hospital while 100% of the location of the prescribing doctor was available for data from Abbeville lab. As most of pap-smears were analysed in Abbeville, only 2.1% of patient did not had any location or location of the prescribing doctor.

In the costal area, the crude screening rate for the 2009-2011 period was 56.3% (CI 95% = 55.8-56.8) versus 18.7% (18.2-19.2) in the rural area. After direct standardization, the comparison of the two screening rates (60.6% versus 17.7%) appeared statistically significant. Those results are presented in table II.

The number of pap-smear realized in French Guiana increased progressively from 13 784 to 16 171 by year from 2006 to 2009, then stabilized to 16 000. The pap smear activity varied from 23.5 to 25.8 pap smears for 100 women-years, as shown in figure 2.

According to the Cancer Registry of French Guiana, 63 cases of invasive cervical cancer were diagnosed during the 2006-2008 period. Given that 32 849 women had a pap smear during this period, the invasive cervical cancer rate was 191.8 per 100 000 women screened. Therefore, one invasive cervical cancer was diagnosed for 521 women screened.

**Discussion**

In our study the screening rate of cervical cancer was estimated at about 54% in French Guiana between 2006 and 2011, the pap-smear activity varied from 23.5 to 25.8 pap-smear for 100 women-years and the invasive cancer incidence rate was 191.79 per 100 000 women screened.

In French Guiana, the French Social Security estimated the screening rate at 47.5% (CI 95% = 41.7-53.3) for the 2006-2008 period but this was done using a different method (10). Actually, this rate was estimated in a sample of 280 women from 25 to 65 years old affiliated to the general social security system and excluded pap smears performed in public hospital. Therefore that estimation was not representative of the general population of French Guiana where the weight of the beneficiaries of the AME (Aide médicale d'Etat, social security for precarious people) is 6 times higher than in France mainland and where people often look for care in public hospital.

In mainland France, the same methodology, based on people affiliated to general social security system, found a screening rate of 57% for the 2006-2008 period. But in telephone surveys by the National Institute of Prevention and Health Education (INPES) in 2010, 81.4% of women from 25 to 65 years old declared having had a pap smear in the last three years (12). However this kind of surveys could overestimate the screening rate because the most precarious persons have no fixed telephone line and surveyed people may have overdeclared screening practices because it was the socially desirable answer. The difference of methodology with those studies did not allow comparison with our results. We can just observe that the screening rate in French Guiana in our exhaustive methodology did not seem so different than in mainland France.

In South America several studies found higher screening rates than in French Guiana but were based on questionnaires. In the National Health and Demography Survey in Colombia, the screening rate of women aged from 25 to 69 years old was 76.5% in 2005 (14). In Florianopolis, south of Brazil, 86% of women from 20 to 59 years old declared having been screened the last three years (9). Closer to French Guiana, in Pernambuco (Brazil), the screening rate was 66.2% for women from 25 to 59 years old and 58% from 18 to 69 (1). But as in mainland France, those studies based on phone call questionnaires have biases and did not allow comparisons with our results.

In the present study, the screening rate decreased after 45 years of age. In the context of French Guiana, we can hypothesize that older women were not used to have a gynaecological exam, were not preoccupied by their health or did not know the benefits of the pap-smear. However, the same result was found in mainland France where the cultural and social context is very different (3,6). The median age at the time of diagnosis of cervical cancer in French Guiana being 49 years old, it is important to maintain a high screening rate after 45 (5). An evaluation by the French National Surveillance Institute (InVS) showed that organized screening improves the screening coverage particularly after 50 years of age in pilot departments in France (7).

According to the medical practitionners in French Guiana, the screening rate seemed to be different between the coastal and rural area. A first study showed that the age-standardised incidence rate of cervical cancer was lower in coastal area than in rural area (20.9/100 000 women-year versus 35.5/100 000) but the difference was not significant probably due to lack of statistical power (5). Thus although data to locate women were different for Abbeville lab and for Cayenne Hospital we tried to analyze the difference of screening rate between coastal and rural areas. We hypothesize that women consult near their location for a pap-smear so that the address of the prescribing doctor was an approximation of patient's address. Overall, the location was missing for only 2.1% of women and concerned just the lab in Cayenne Hospital, so women from the health centers (rural area) and Cayenne Hospital (coastal area). The screening rate was statistically different between the two areas, with a low screening rate in rural area even after direct standardisation. This difference could be explained by difficulties to reach health care system in rural areas, the lack of knowledge about cervical cancer and its screening, and the difficulties to accept this intimate examination for Maroon and Amerindian population, which are the main population in rural areas. Further studies are in progress to assess the HPV prevalence, the circulating HPV serotypes and the cytological lesions prevalence in the rural populations living on the Maroni and the Oyapock river.

The question of the HPV test should be considered in this French Guianese context. The self-administered vaginal sample by a woman offers an opportunity to improve screening coverage with a better acceptability, simplicity to use and seems to have a better sensitivity than cytology according to recent studies (4,2,13).

The pap smear activity in mainland France was 29.3 per 100 women from 25 to 65 years old in 2006 (10). In French Guiana, this rate was 24.3 per 100 women-years this same year. Even if this rate seemed to be lower in French Guiana, it might be due to an overscreening in mainland France: in fact many women and physicians perform pap smears every year or every two years despite national recommendations.

Used as an efficiency indicator, the invasive cervical cancer rate depends of the epidemiological context, the screening organization and its quality. In our study the invasive cervical rates was 191.8/100 000 while in France, this rate ranged from 15.8/100 000 to 30.8/100 000 women-years (mainland France) until 114.7/100 000 (Martinique)(10), so 6 to 12 times higher than in France mainland. But those rates were calculated with screening pap smears, while in French Guiana it was with all pap smears, including smears realised because of symptoms. And in that territory, 73% of women with cervical cancer have been diagnosed because of symptoms (5), which could partially explain the higher rate of invasive cervical cancer rate in French Guiana.

The fact that all pap smears performed in French Guiana were analysed in only two labs permitted to study exhaustive data, which avoids sampling bias. We hypothesized that women usually have pap smear at the same place but if this was not the case we could have counted the same woman twice (once in Abbeville lab, once in Cayenne Hospital lab), which could lead to an overestimation of the screening rate.

Although our study did not allow comparison with others, especially in mainland France, this exhaustive methodology could be used to evaluate the impact of organised cervical cancer screening by the AGDOC implemented in 2012 in French Guiana. Efforts could be done to improve screening access to the rural population which seemed to be most at risk. Organized screening also could permit to evaluate the quality of pap-smears, the concordance between cytology and histology and the follow-up of screened women. Mortality will mainly decrease with screening followed by health care. A good coordination between gynaecologist, general practionner, health center and hospital is necessary to fight cervical cancer in French Guiana.

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Conflits d'intérêts: aucun

Conflicts of interest: none

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**Table I: Screening rate of patients from 25 to 64 years old in French Guiana during 3-years periods from 2006 to 2011**
***Tableau I: Dépistage des patientes de 25 à 64 ans en Guyane par période de 3 ans***

| | Number of women of 25 to 64 years old screened | Population of women from 25 to 64 years old | Screening rate - % (IC 95%) |
|---|---|---|---|
| **2006-2008** | 26533 | 48579 | **54,6** (54,2-55,1) |
| **2009-2011** | 29293 | 54559 | **53,7** (53,3-54,1) |

**Table II: Screening rate of patients from 25 to 64 years old in coastal area versus rural area in French Guiana, 2009-2011 period**
***Tableau II: Dépistage des patientes de 25 à 64 ans sur le littoral versus intérieur de la Guyane, période 2009-2011***

| | Number of women of 25 to 64 years old screened[1] | Population of women from 25 to 64 years old | Crude screening rate - % (IC 95%) | Standardized screening rate |
|---|---|---|---|---|
| **Coastal area[2]** | 27692 | 49227 | **56,3** (55,8-56,8) | **60,6** (60,2-61,1) |
| **Rural area[3]** | 996 | 5332 | **18,7** (18,2-19,2) | **17,7** (16,7-18,7**)** |
| **CMF[4]** | | | | **3,6** (2,2-6) [5] |

[1] 605 missing data

[2] Cayenne, Rémire-Montjoly, Matoury, Montsinéry, Roura, Macouria, Kourou, Sinnamary, Iracoubo, Mana, Awala-Yalimapo, Saint Laurent du Maroni

[3] Saint Georges de l'Oyapock, Régina, Ouanary, Camopi, Apatou, Grand-Santi, Papaïchton, Maripasoula, Saint-Elie, Saül

[4] Comparative Morbidity Figure

[5] significant

**Figure 1: Screening rate by age by 3-years period from 2006 to 2011 in French Guiana**
***Figure 1: Taux de couverture de dépistage par classes d'âge entre 2006 et 2011, périodes de 3 ans***

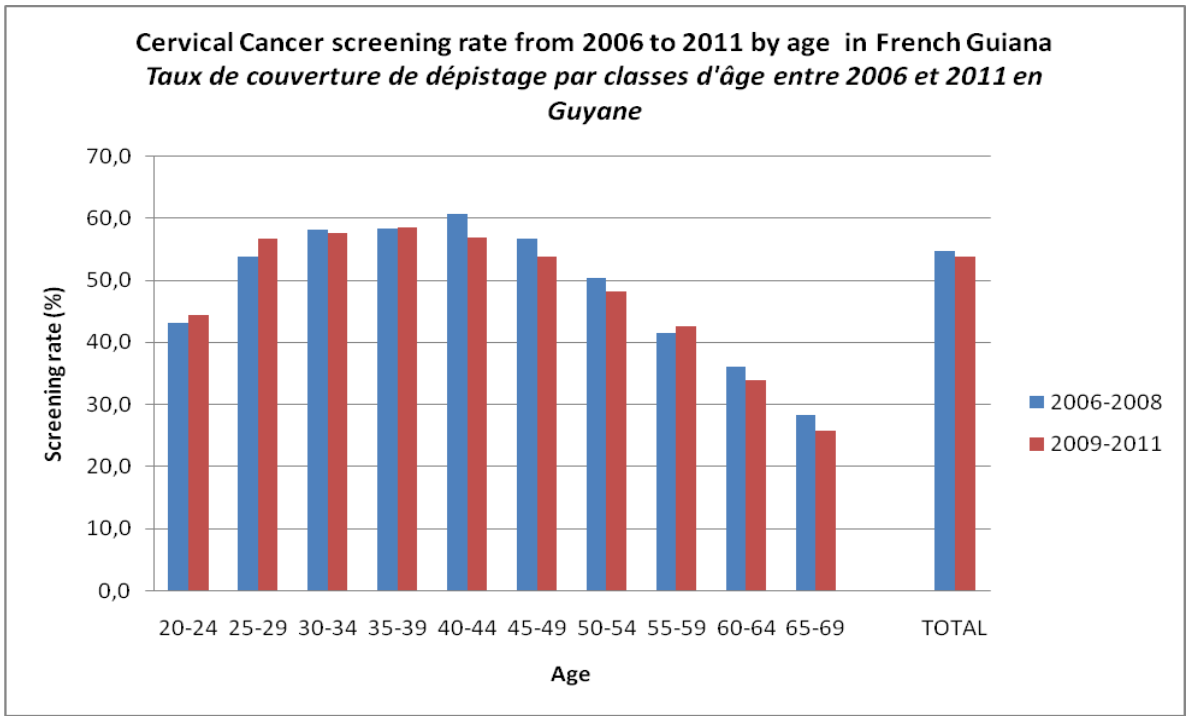

**Figure 2: Pap smear activity by year in French Guiana from 2006 to 2011 in women from 25 to 64 years old.**
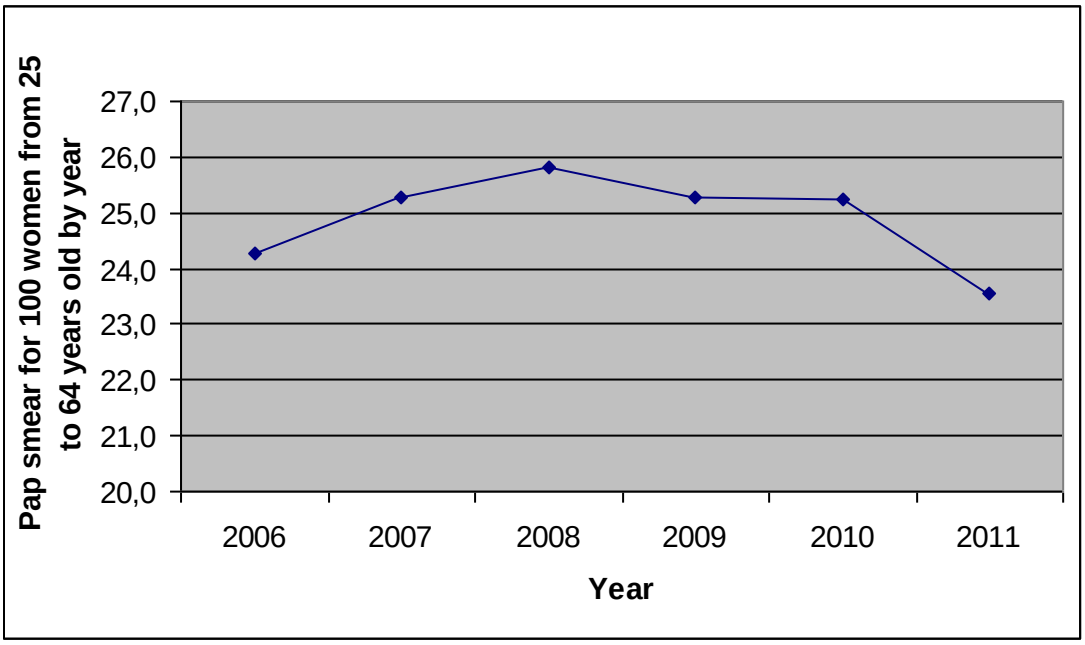
***Figure 2 : Activité de réalisation de frottis cervico-vaginal en Guyane entre 2006 et 2011 chez les femmes âgées de 25 à 64 ans***