

1 **Survival of patients with invasive cervical cancer in French Guiana from 2003**
2 **to 2008**

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3 **Keywords**

4 Cervical cancer

5 French Guiana

6 Cox model

7 Survival

8

9 **Synopsis**

10 The stage at diagnosis is the main factor influencing the prognosis, showing that early
11 detection is crucial to increase cervical cancer survival.

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13 **859 words**

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1

2 **INTRODUCTION**

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4 In women, cervical cancer is the second most frequent cancer and represents the
5 third cause of death by cancer in the world. In French Guiana, a French overseas
6 territory of South America, the age-standardized incidence rate of cervical cancer in
7 is four times higher than in France and the mortality rate 5.5 times higher. Those
8 rates are close to those in the neighbouring countries: Brazil and Suriname, despite a
9 higher Gross Domestic Product (GDP) per capita [1].

10

11 In this vast Amazonian French territory, difficulties to access the health care system,
12 notably in the remote areas, poverty, the early age of sexual relations and the lack of
13 screening are possible determinants of those high incidence and mortality rates.

14

15 The present study aimed at analyzing the overall survival of women diagnosed with
16 cervical cancer between 2003 and 2008 and at describing its prognostic factors.

17

18 **MATERIALS AND METHODS**

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20 Data were collected from the Cancer Registry of French Guiana. Patients with
21 invasive cervical cancer diagnosed between 2003 and 2008 with histological
22 confirmation were included in our study. Participants gave written informed consent
23 to the Cancer Registry to collect and use data. On July 1st 2012, the patient's vital
24 status was checked, using different ways: the Inserm database (CépiDC) which

1 compiles data from death certificates; the DIM (Department of Medical Information);
2 and referent doctors.

3 The following variables were analyzed: age at diagnosis (<44 years, 45-64 and >65
4 years), date of diagnosis, place of birth (foreign country or French department), place
5 of residence (coastal area versus interior, and zone versus rural zone), mode of
6 diagnosis (following screening or following symptoms), tumor staging at the time of
7 diagnosis (according to the International Federation of Gynecology and Obstetrics
8 (FIGO) staging system), HIV serological status, tumor histological type, study period
9 (2003 to 2005 and 2006 to 2008), date of last contact, and vital status at this date.

10

11 Data were analyzed with Stata¹² software. Kaplan-Meier curves were used to analyze
12 overall survival and survival by stage and age. The survival was analyzed using a
13 Cox model. The failure event was death from cervical cancer and the survival time
14 was defined as the time between the date of diagnosis and the date of the last
15 contact or death. According to the literature and to physiology, age is associated with
16 prognosis, therefore was included in the final model.

17

18 The study was approved by the CEEI (Comité d'Evaluation Ethique de l'Inserm), an
19 Ethics Committee on Research: Process n°12-080 (IRB00003888 FWA00005831).

20

21 **RESULTS**

22

23 One hundred thirty five women were included in our study. The median age was 49
24 years old. Fourteen patients were HIV positive. Eighty eight percent were living on
25 the coast. Fifty eight percent were born in a foreign country. Only 4.4% patients

1 presented adenocarcinoma, all the others had squamous cell carcinoma. Twenty
2 seven percent of patients were screened, others were diagnosed because of
3 symptoms. The tumor stage at the time of diagnosis was advanced, with 44% of
4 women at stage III or IV.

5

6 Forty seven patients died because of the cervical cancer. The median follow-up was
7 32.7 months (intervals 1st-3rd quartile = 11.9-60.6). The overall survival at 1, 3 and 5-
8 years was respectively 85% (Confidence Interval 95% (CI) = 77-90), 65% (CI = 56-
9 73) and 58% (CI = 48-67). Figure 1 shows the Kaplan Meier survival curves by stage.

10

11 After multivariate analysis, only one variable was associated with survival: the tumor
12 stage at diagnosis ($p < 0.001$). The risk of death was about three times higher if the
13 patient was diagnosed at stage III (Hazard Ratio (HR) = 2.83, CI = 1.18-6.74) and
14 7.69 times higher if diagnosed at stage IV (CI = 3.13-18.91), the reference stage
15 being stage I. At stage II, the increased risk of death was not statistically significant
16 (HR = 2.27, CI = 0.76-6.76). Table 1 presents the multivariate analysis.

17

18 **DISCUSSION**

19

20 No study has ever assessed the survival of women with invasive cervical cancer in
21 French Guiana. The present study showed that survival was lower than in France,
22 where survival at 5-years was 70% (CI = 69-72) [2]. This could have resulted from
23 difficult socioeconomic conditions (which have been associated with poor prognosis)
24 in French Guiana where the GDP per capita is half that in France.

25

1 As observed elsewhere [3], the tumor stage at diagnosis was the only factor
2 associated with the survival in our survey.

3
4 All other studied variables were not statistically associated with prognosis. The place
5 of birth and address didn't impact the survival although health professionals in
6 French Guiana noticed difficulties in access to care for people living in remote areas.
7 Although adenocarcinoma have been associated with poor prognosis [4], they were
8 not in our study. This might result from the small number of patients affected with this
9 type of cancer.

10
11 The present study involved a relatively low number of patients leading to imprecise
12 results with large confidence intervals.

13
14 However, this study was the first study conducted in French Guiana on the survival of
15 women with an invasive cervical cancer. It showed that early detection through
16 prevention programs is crucial to increase cervical cancer survival. The
17 implementation of an organized cervical cancer screening in French Guiana would be
18 expected to have an impact on mortality.

19

20 **Acknowledgments**

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23 **Disclosure of Potential Conflicts of Interest**

24 No potential conflicts of interest were disclosed.

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14 Figure 1: Kaplan Meier survival curves by stage of women with cervical invasive
15 cancer in French Guiana, 2003-2008

1 Table 1: Survival of patients with invasive cervical cancer: univariate and multivariate
 2 analysis using a Cox model. French Guiana, 2003-2008.

	n (%)	Univariate analysis		Multivariate analysis	
		Crude HR ^a [CI 95%]	<i>p</i> ^b	Adjusted HR ^c [CI 95%]	<i>p</i> ^b
Socio-demographic characteristics					
Geographical location					
Interior	16 (11.8)	1	0.511		
Coastal	119 (88.2)	0.74 [0.31-1.74]			
Area type					
Rural area	19 (14.1)	1	0.793		
Urban area	116 (85.9)	1.08 [0.57-2.06]			
Age					
<45	48 (35.6)	1	0.122	1	
45-64	56 (41.5)	1.63 [0.79-3.33]		1.05 [0.49-2.26]	0.894
>65	31 (22.9)	2.17 [1.02-4.64]		1.10 [0.47-2.55]	0.827
Place of birth					
France	57 (42.2)	1	0.726		
foreign country	78 (57.8)	0.90 [0.51-1.60]			
Medical data					
Mode of diagnosis					
Screening	35 (25.9)	1	0.021		
Symptom	98 (72.6)	2.73 [1.16-6.45]			
nn ^d	2 (1.5)	8 (0.94-67.99)			
Tumor stage at diagnosis					
Stage 1	56 (41.5)	1	<0.001	1	
Stage 2	18 (13.3)	1.93 [0.70-5.30]		2.27 [0.76-6.76]	0.139
Stage 3	32 (23.7)	2.71 [1.19-6.18]		2.83 [1.18-6.74]	0.019
Stage 4	26 (19.3)	6.67 [3.06-14.5]		7.69 [3.13-18.91]	<0.001
nn ^d	3 (2.2)	6 e-15 [0]		4.41 e-17 [0]	1
Histological type					
Squamous cell carcinoma	129 (95.6)	1	0.059		
Adenocarcinoma	6 (4.4)	1.61 e-15 [0]			
Study period					
2003-2005	73 (54.1)	1	0.775		
2006-2008	62 (45.9)	1.09 [0.61-1.94]			

a Hazard Ratio

b obtained from the likelihood ratio test

c the Cox model was stratified on "HIV status" because this variable doesn't respect the proportional hazard hypothesis

d "not notified"

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