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Cervical cancer screening among homeless women in the Greater Paris Area (France): results of the ENFAMS survey

Cécile Vuillermoz¹, Stéphanie Vandentorren^{1,2}, Mathilde Roze¹, Claire Rondet^{1,3}, Pierre Chauvin¹

Affiliations

1. Sorbonne Universités, UPMC Univ Paris 06, INSERM, Institut Pierre Louis d'épidémiologie et de Santé Publique (IPLESP UMRS 1136), F75012, Paris, France

2. Department of the Inter-Regional Epidemiological Authority, French Institute for Public Health Surveillance, Saint-Maurice, France

3. Department of General Practice, School of Medicine, Sorbonne Universités, UPMC Univ Paris 06, Paris, France

Corresponding author: Cécile Vuillermoz, Inserm-UPMC, 27, rue de Chaligny, 75012 Paris, FRANCE, cecile.vuillermoz@inserm.fr, Tél : +(33)6 62 07 23 67.

Conflict of Interest

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ABSTRACT

Objectives

Little is known about the prevalence of cervical cancer screening (CCS) and its correlates among homeless women in France. The objectives of this study were to determine the prevalence of women who had never been screened for cervical cancer and to identify the associated factors.

Methods

This cross-sectional study was based on data collected in the ENFAMS survey, which was conducted in 2013 among 764 sheltered homeless mothers in the Greater Paris Area. Robust Poisson regression models were used to estimate the association between no lifetime CCS and certain sociodemographic and health-related factors (selected from the Behavioral Model of Vulnerable Populations). Analyses were performed separately for women with and without a regular gynaecological follow-up (RGF).

Results

The proportion of never-screeners was 33% among the women with an RGF versus 64% among those without an RGF ($p<0.001$). Among the latter, never having been screened for CCS was associated mainly with socioeconomic conditions, the length of time lived in France, a history of delivery in France, and the duration of homelessness. In those with an RGF, the factors were mainly poor health service utilisation and language difficulties.

Conclusion

This first quantitative study of CCS among homeless women in the Greater Paris Area points to the need for it to be proposed and performed more systematically in primary care. Every contact between this hard-to-reach population and health services should be an opportunity to check their screening status and to ensure that those in need actually undergo a Pap test.

Keywords : homelessness ; cervical cancer ; screening ; Behavioral Model of Vulnerable Populations

INTRODUCTION

Since the implementation of cytological screening tests in the 1970s, the incidence of and mortality rates from cervical cancer have declined in most European countries (Mathew and George, 2009; Vaccarella et al., 2013). A lack of cervical cancer screening (CCS) is strongly associated with the development of invasive cervical cancer (Leyden et al., 2005). Many studies and reports have identified strong disparities in CCS coverage in the general population. In France, there were an estimated 3,000 new cases and 1,000 deaths from cervical cancer in 2012. Although national recommendations have been issued since 1990 (which recommend a CCS test every 3 years after two normal tests one year apart) (Fédération des Gynécologue et Obstétriciens de Langue Française, 1990), only 10% of women in the recommended age range (25-65 years) have a Pap test at the recommended frequency, 50% have delayed screening or have never been screened, and 40% are overscreened, resulting in a national coverage rate that has stagnated at 57% (from 2003 to 2008) (Haute Autorité de Santé (HAS), 2010). In the French-speaking general population in the Greater Paris area 8% of concerned women had never been screened for cervical cancer in 2010 (Rondet et al., 2014). Multiple factors associated with an increased risk of no lifetime screening have been reported, such as socio-economic status and origin (Vallée et al., 2010; Grillo et al., 2012; Rondet et al., 2014), but it has never been studied among homeless women in France.

Over the last decade, women with children have been the fastest growing segment of the homeless population in France. This is due to the dramatic increase in the number of homeless families (Guyavarch and Le Méner, 2010). Between 2001 (Brousse, 2006) and 2012 (Yaouancq et al., 2013), the absolute number of French-speaking homeless adults increased by almost 50%, 25% of whom had young children living with them. In the Greater Paris Area (a region of 849 km² with 7.0 million inhabitants), emergency social services have sheltered more people with families than lone individuals.

Previous studies of health and healthcare in homeless families revealed that women's physical and mental health status was cause for concern (Hwang et al., 2005). They are particularly more likely to have HIV/AIDS, sexually transmitted infections or gynaecological problems (Beijer et al., 2012). Studies of CCS in homeless women in the United States (Chau et al., 2002; Hogenmiller et al., 2007; Bharel et al., 2009) indicate that they are at greater risk for infection by the human papilloma virus (HPV) and for developing an invasive cancer (Long et al., 1998). In addition, homeless women encounter many barriers to accessing health services (such as cost, language, transportation and discrimination) (Kushel et al.,

2001; Stein et al., 2007; Teruya et al., 2010). Compared to homeless men, women face an additional problem: the services targeting the homeless population were designed mainly for men and may not be properly suited to women's needs (Lewis et al., 2003).

Faced with this population's invisibility, both in the public space and in French routine health statistics and health surveys, the *Observatoire du Samusocial de Paris* conducted a multipurpose health and social survey among sheltered families in the Greater Paris Area in the winter of 2013 (Vandentorren et al., 2015). Using those data, we sought to determine the proportion of homeless women who had undergone CCS, the time since their last test, and the factors associated with no lifetime CCS.

METHODS

Study sample

This study was based on data collected during the ENFAMS (a French acronym for "homeless families and children") survey, the first statistical survey of homeless families conducted in France (Vandentorren et al., 2015). The reference population consisted of adults, accompanied by at least one child under 13 years of age, living in social hotels, emergency centres, centres for asylum-seekers and long-term rehabilitation centres. The sampling design for the ENFAMS survey included three levels of sampling: shelters, families (the single parent or one of the two parents was interviewed, who was a woman in 95.4% of the cases), and one child in every family.

The final sample consisted of 801 families, which were interviewed face-to-face in seventeen languages by an interviewer and a psychologist. The interviewer collected a large array of data on their demographics, socioeconomic status, living conditions, health conditions and health service utilisation.

Subsample analysis and outcomes

Among the total number of women interviewed (N1=764), we performed an analysis of the subsample of those aged 25 to 65 years, the target range in the French CCS recommendations (N2=641). They were asked two questions: "Have you ever had a Pap test?" and, if the answer was 'yes', "When was your most recent one?". For the multivariate analysis, our outcome was never having had a Pap test.

Conceptual model

We used the Behavioral Model of Vulnerable Populations (BMVP) as a conceptual framework to select a set of relevant cofactors (Aday and Andersen, 1974; Gelberg et al., 2000; Stein et al., 2007). This model

includes traditional factors and specific vulnerabilities relating to homelessness. It hypothesises that health service utilisation is a function of predisposing, enabling and need factors. Predisposing factors are characteristics that predispose an individual to access health services, enabling factors are the factors that enhance or limit the individual's ability use these services, should the need arise, and need factors include the immediate cause of health service utilisation.

Independent variables

Predisposing factors. In this study, the general predisposing factors were demographics, such as age and country of birth (in or outside of France), the level of education (none, primary, secondary or tertiary), occupational status, couple status and the number of children. The specific vulnerable predisposing factors concerned immigration (administrative status and the length of time lived in France), homelessness (the duration of homelessness, the type of housing at the time of the study, and the number of moves per year since the first period of homelessness), victimisation (a history of excision or physical or sexual violence) and substance abuse (smoking and alcohol use).

Enabling factors. The enabling factors were financial resources and healthcare utilisation. Income was divided into two categories: below or above the median value in the study population (i.e., 211 €/CU per month). Social benefits included all types of financial assistance (for the unemployed, the disabled, asylum-seekers and parents). As for the variables pertaining to healthcare utilisation, we used data on health insurance (yes/no), a physician visit during the previous year (yes/no), contraception, and previous breast cancer screening (yes/no). The vulnerable enabling factors concerned language (difficulties understanding, speaking, reading or writing French), transportation (having or not having a car and having or not having difficulties using public transportation), mobility out of the Paris area (had left the area for more than a day at least once during the previous year) and having given birth in France (at least once versus never). We also considered four variables pertaining to social networks: contact with family and friends (contact with family or friends less or more than once by telephone, SMS, Internet or mail), invitations from friends or family members to a party or a family celebration during the previous year (at least once versus never), relatives living in the Paris area, and feelings of trust (towards at least one person versus none).

Need factors. The traditional need factors were perceived general, physical and mental health status and having reported a history of at least one serious health problem. The vulnerable need factors were

depression and food insecurity. The presence of depression was determined from the responses to the CIDI (Composite International Diagnostic Interview) questionnaire (Kessler and Üstün, 2004). Food insecurity was assessed by the French version of the Household Food Security Module questionnaire (Radimer and Radimer, 2002).

Statistical analyses

All the descriptive prevalences and proportions were weighted inversely to each participant's inclusion probability in accordance with the sampling design. The comparisons between proportions were performed using the chi-square test with a p-threshold < 0.05 . We examined factors associated with no lifetime CCS separately for women with and without a regular gynaecological follow-up (RGF) because of a significant interaction ($p < 0.001$). First, we fitted a robust Poisson regression model to each group of BMVP factors (traditional predisposing, vulnerable predisposing, traditional enabling, vulnerable enabling, traditional need and vulnerable need). We then included all the variables previously selected at $p = 0.20$ in a final model and backward-selected them manually.

RESULTS

Population characteristics

The total number of women in homeless families in the Greater Paris Area was estimated at 9,883 ($CI_{95\%}[9,560-10,207]$). These N1 women were 34 years old on average. Most of them had been born in Africa (66.0%) and had at least a secondary level of education (76.0%). One-third of them were single, and they had an average of two children living with them. Only 21.8% were employed, and their average monthly income was 319 euros per consumption unit. On average, they had been homeless for 3 years (range: 0-19), and they moved three times a year (range: 0-36). The rest of the analysis was performed for N3=508 women with complete data (among the N2=641 in the target age range).

Differences between the women with and without a regular gynaecological follow-up

The characteristics of the women with and without an RGF were different. Those without an RGF were less educated (25.3% had a primary or lower level of education vs. 12.3% of those with an RGF; $p = 0.007$) and were less often living in a couple relationship (45.9% vs. 60.1%; $p = 0.017$) (Table 1). They had been homeless for a shorter period of time (52.4% had been homeless for less than 2 years vs. 36.0%; $p = 0.0146$) and more often were living in social hotels (77.6% vs. 61.4%; $p < 0.001$) and less often in long-

term rehabilitation shelters (11.7% vs. 27.3%; $p<0.001$). They more often had been victims of physical or sexual assault (16.1% vs. 4.1%; $p<0.001$) and were more likely not to have health insurance (15.8% vs. 8.3%; $p=0.049$) and not to have had a medical visit (20.1% vs. 9.9%; $p=0.015$) or a mammogram (85.0% vs. 68.4%; $p<0.001$) during the previous year (Table 2). Difficulties in French were also more prevalent in this group (62.4% vs. 46.4%; $p=0.011$).

Screening participation rates

We determined that 56.9% ($CI_{95\%}[52.4-61.4]$) of the homeless women were never-screeners, with a significant difference between the women who reported having an RGF (33.3% ($CI_{95\%}[23.3-43.2]$) and those who reported not having an RGF (64.2% ($CI_{95\%}[58.0-70.4]$). Of the screeners, 11.5% ($CI_{95\%}[5.8-17.2]$) had their last Pap test more than 3 years before the survey (Figure 1). The proportions were also significantly different according to their RGF status: 4.2% ($CI_{95\%}[0.1-8.3]$) and 15.5% ($CI_{95\%}[7.4-23.5]$), respectively ($p=0.005$).

Factors associated with no lifetime cervical cancer screening

Univariate analysis

In the women without an RGF, no lifetime CCS was significantly associated with some predisposing factors such as a low level of education, being unemployed and alcohol abuse (see Table 1) and some enabling factors (no physician visit during the previous year, no invitation from friends or family during the previous year, difficulties in French, and not having a car; see Table 2). No need factors were associated with no lifetime cervical cancer screening (Table 3). The factors associated with a p -value < 0.20 for the multivariate analysis were age, the length of time lived in France, the duration of homelessness, social benefits, health insurance, mobility out of the Paris area, and having given birth in France. In the women with an RGF, the predisposing factors significantly associated with no lifetime CCS were age and the country of birth (Table 1). The enabling factors associated with no lifetime CCS were a low monthly income, not having health insurance, no physician visit during the previous year, being a never-screener for breast cancer, and difficulties in French (Table 2). The need factors associated with no lifetime CCS were poor (or very poor) mental health status and food insecurity (Table 3).

Multivariate analysis

After adjustment for age, among the women without an RGF, those who had never been screened for cervical cancer had more often a low level of education (with a dose-response trend, although it was not

significant; $p=0.597$) and were more often unemployed or in one or more of the following situations: had lived in France for less than a quarter of their lives, had been homeless for less than 2 years, or had a history of excessive alcohol consumption (predisposing factors; see Table 4). They more often had not seen a physician during the previous year (but also slightly more often had health insurance), more often had not been invited by friends or family during the previous year and/or had never given birth in France (enabling factors).

In the women with an RGF (Table 4), the predisposing factors associated with no lifetime CCS were age > 45 years, not being a French citizen and a history of excessive alcohol consumption. The enabling factors were not having health insurance, no physician visit during the previous year, never having been screened for breast cancer and having difficulties in French. The only need factor associated with no lifetime CCS was poor mental health status.

DISCUSSION

More than half of the homeless women in the Greater Paris Area who were interviewed in our study had never been screened. Since only sheltered women with children had been sampled, our results cannot be extrapolated to women living on the street and/or who do not have any children with them. Some studies indicate that the absence of screening practices may even be higher in this population (Nyamathi et al., 2000; Boxwala et al., 2010).

In comparison, in the French-speaking general population in the same area in 2010, only 8% of women had never been screened for cervical cancer (Rondet et al., 2014). In 2013, a non-governmental medical organisation, Doctors of the World, conducted a survey in France among 203 socially excluded women who visited their free clinics and reported that 70% of them had never been screened (Médecins du Monde, 2013). In the United States, studies on homeless women found that 10 to 50% of them had never been screened (Weinreb et al., 2002; Chau et al., 2002; Lewis et al., 2003; Bharel et al., 2009).

Consistently with previous French studies, having or not having a regular gynaecological health follow-up in primary care influences the risk of being a never-screener (Grillo et al., 2012). In our study, the proportion of never-screeners was almost twice as high in women without an RGF. Clearly, although we believe that “gynaecological health” refers to genital health for most women (and even those with the

poorest health literacy), we do not know exactly what “regular” means. However, improving access to women’s healthcare is probably the best way to increase CCS coverage among these women.

In our study, the characteristics of the women with an RGF differed from those of women without an RGF. A previous French qualitative study among homeless women in the Paris area in 2005 described profiles of gynaecological healthcare (Brunet et al., 2005). It found that homeless women who did not avail themselves of gynaecological health services used other health services less in general, that pregnancy was often the only reason they had ever seen a gynaecologist, and that a history of sexual violence was a strong barrier to gynaecological consultations. In this connection, in our study, the women without an RGF reported a history of physical or sexual abuse four times more often than those with an RGF. It is noteworthy that the women without an RGF had been homeless for a shorter period of time than those with an RGF. It can be hypothesised that recently homeless women have other urgent priorities than preventive care and that, over time, some of them re-engage in preventive behaviours.

The barriers to CCS identified in this study among the women without a regular gynaecological follow-up were consistent with the literature on homeless women (Weinreb et al., 1998; Long et al., 1998; Weinreb et al., 2002; Chau et al., 2002; Bharel et al., 2009) and were mainly associated with socioeconomic conditions (education level and occupational status) (Lewis et al., 2003). Interestingly, we observed that the homeless women who had never given birth in France were also more likely to be never-screeners, since a Pap test is part of the first routine, mandatory and free prenatal check-up, if one was not performed recently. Two factors were associated in an unexpected direction: excessive alcohol consumption and not having health insurance seemed to “protect” women from being never-screeners. We attempted to explain these unexpected findings by testing certain interactions (e.g., with immigration status or the duration of homelessness), but none of them was significant, probably because of the small size (N=383) of this subsample of women without an RGF. We cannot explain these results, but we did note that, inversely, associations were observed in the expected direction in the other stratum (women with an RGF).

Although the screening rate was higher among the women with a RGF, a third of them were never-screeners. Reporting biases are possible in such declarative data, but the investigators systematically explained the Pap test in lay terms (“A pap is a small sample taken by scraping at the back of the vagina during a gynaecological exam”). The factors associated with never-screening might enable us to

understand why these women with a RGF had never been screened for cervical cancer. The barriers were mainly migration origin, exclusion from the healthcare system and health-related behaviours. These barriers are consistent with the literature concerning the general population (Akers et al., 2007; Grillo et al., 2012).

Our study has some limitations apart from the recall and reporting biases mentioned above in connection with self-reported data. First, we did not collect any information about the women's knowledge and attitudes about CCS. Such information would have provided explanations for the never-screening. Second, because of the small sample size and the vast heterogeneity of the women's origins (more than 60 countries of birth were reported), we were unable to investigate these origins or cultural factors much further. Lastly, the causal ordering between predisposing, enabling and need factors cannot be demonstrated in this study because of its cross-sectional design. On the other hand, the main strengths of the ENFAMS survey were its sampling design, which guaranteed its representativeness, its multilingualism, which made it possible – for the first time in France – to collect data from non-French-speaking homeless women, the large set of data collected, and the use of a conceptual model to help in the modeling strategy.

Our results argue for a more systematic proposal and performance of CCS in primary care. Indeed, 82% of the women in the target age range had visited a physician at least once during the previous year, yet 53% of them were still never-screeners, not to mention, once again, the fact that a third of the women with an RGF were never-screeners as well. This means that there had been many lost opportunities during these women's primary care visits and it reveals the failure of the primary health care system to offer proper medical preventive care to the homeless women population. Since homeless women are regularly relocated from shelter to shelter (depending on the facilities' availability and on homeless flow management in a chronically underresourced region), primary care professionals must be more informed and aware that every contact with health services should be an opportunity to check their screening status and to ensure that those due for one actually have a Pap test.

Of course, providing a Pap test is not the end of the story. Many studies have documented that low-income women do not understand the results and consequently do not obtain the necessary follow-up and treatment for their abnormal Pap test (Engelstad et al., 2001; Quinlivan et al., 2004; Coker et al., 2006). However, to our knowledge, none of those studies specifically considered homeless women. Further

286 studies on the linkage to care among homeless women with detected abnormalities are needed to ensure
287 that they enjoy equal access to care, even in countries like France, where financial barriers are not an
288 issue (at least theoretically) in cancer healthcare.
289

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299 **Table 1 - Predisposing factors and no lifetime cervical cancer screening among homeless women with or without**
 300 **a regular gynaecological follow-up in the Greater Paris Area, France, 2013.**

	Freq. N=508 (%)	Regular Gynaecological Follow-up								<i>p- value for no RGF versus RGF</i>
		No (N=383)				Yes (N=125)				
		Freq (%)	No CCS (%)	PR	95% CI	Freq. (%)	No CCS (%)	PR	95% CI	
Traditional Predisposing Factors										
Age					0.062				<0.001	0.804
25-29	27.1	28.2	73.5	1.10	[1.02-1.17]	23.4	59.8	1.21	[1.03-1.42]	
30-34	30.3	29.5	59.2	Ref.		33.0	37.9	Ref.		
35-44	37.5	37.5	61.1	1.02	[0.94-1.11]	37.5	18.1	0.87	[0.75-1.02]	
45 or older	5.1	4.8	65.5	1.03	[0.89-1.20]	6.1	0.0	0.77	[0.66-0.90]	
Country of birth					0.509				<0.001	0.801
Outside of France	94.6	94.7	65.0	1.03	[0.94-1.14]	94.2	35.3	1.25	[1.10-1.42]	
France	5.4	5.3	50.5	Ref.		5.8	0.0	Ref.		
Level of education					<0.001				0.157	0.014
None	8.9	10.2	92.0	1.43	[1.29-1.58]	4.6	54.2	1.28	[0.95-1.74]	
Primary	13.4	15.1	79.8	1.33	[1.19-1.48]	7.7	53.5	1.26	[0.97-1.63]	
Secondary	60.4	56.5	64.0	1.20	[1.09-1.33]	73.5	32.6	1.06	[0.90-1.25]	
Tertiary	17.2	18.1	36.2	Ref.		14.2	18.9	Ref.		
Occupational status					0.015				0.710	0.797
Employed	21.9	22.9	48.4	Ref.		18.7	18.0	Ref.		
Unemployed	32.1	31.5	73.9	1.16	[1.05-1.28]	34.2	30.0	1.07	[0.91-1.26]	
Student or retiree	46.0	45.6	65.5	1.09	[0.99-1.20]	47.1	41.7	1.04	[0.86-1.22]	
Couple status					0.368				0.910	0.049
Living in a couple relationship	49.1	45.9	67.9	Ref.		60.1	35.8	Ref.		
In a couple relationship but not living together	16.3	17.8	62.1	0.98	[0.90-1.06]	11.4	41.1	1.02	[0.84-1.23]	
Not in a couple relationship	34.6	36.4	60.6	0.95	[0.89-1.02]	28.5	24.8	0.97	[0.85-1.11]	
Number of children										
Fewer than 3	75.8	76.6	62.8	Ref.	0.553	73.2	31.5	Ref.	0.557	0.548
3 or more	24.2	23.4	69.0	1.03	[0.95-1.12]	26.8	38.0	1.05	[0.89-1.23]	
Vulnerable Predisposing Factors										
Administrative status					0.503				0.107	0.663
French citizen	8.4	8.5	58.6	Ref.		7.9	0.0	Ref.		
Legal resident status	57.6	58.5	60.3	0.95	[0.81-1.11]	37.9	36.0	1.27	[1-1.61]	
Undocumented	34.0	32.9	72.6	0.99	[0.84-1.17]	54.3	36.3	1.26	[1-1.58]	
Length of time lived in France					0.052				0.692	0.561
A quarter of life or less	73.7	74.4	69.5	1.10	[1.00-1.22]	71.3	38.6	1.04	[0.85-1.27]	
More than a quarter of life	26.3	25.6	48.8	Ref.		28.7	20.1	Ref.		
Duration of homelessness					0.151				0.922	0.015
2 years or less	48.6	52.4	71.0	1.06	[0.98-1.15]	36.0	28.0	1.01	[0.83-1.23]	
More than 2 years	51.4	47.6	56.8	Ref.		64.0	36.3	Ref.		
Type of housing					0.939				0.289	<0.001
Social hotel	73.9	77.6	65.1	1.02	[0.88-1.18]	61.4	39.3	1.13	[0.95-1.34]	
Centre for asylum-seekers	4.7	5.0	65.5	1.03	[0.88-1.21]	3.7	13.5	0.97	[0.75-1.26]	
Emergency housing centre	6.1	5.6	66.5	1.00	[0.84-1.18]	7.7	39.8	1.17	[0.96-1.44]	
Long-term rehabilitation centre	15.3	11.7	56.6	Ref.		27.3	20.7	Ref.		
Number of moves per year					0.493				0.375	0.390
Less than 4	79.7	78.7	61.2	Ref.		83.2	34.8	Ref.		
4 or more	20.3	21.3	75.6	1.03	[0.95-1.11]	16.8	25.6	0.91	[0.74-1.12]	
History of excision					0.433				0.279	0.052
Yes	21.5	19.2	66.5	1.03	[0.95-1.13]	29.1	45.9	1.10	[0.93-1.3]	
No	78.5	80.8	63.7	Ref.		70.9	28.1	Ref.		
History of physical or sexual violence					0.747				0.081	<0.001
Yes	13.4	16.1	63.3	0.99	[0.90-1.08]	4.1	19.5	0.80	[0.63-1.03]	
No	86.6	83.9	64.4	Ref.		95.9	33.9	Ref.		
Smoking status					0.578				0.111	0.405

Smoker	9.5	10.2	49.4	0.96	[0.82-1.11]	7.1	10.8	0.82	[0.64-1.05]	
Nonsmoker	90.5	89.8	65.9	Ref.		92.9	35.0	Ref.		
History of excessive alcohol consumption					0.015				0.118	0.406
Yes	6.0	6.5	34.6	0.84	[0.72-0.97]	4.3	30.0	1.20	[0.96-1.50]	
No	94.0	93.5	66.3	Ref.		95.7	33.4	Ref.		

301

302 Table 2 - Enabling factors and no lifetime cervical cancer screening among homeless women with or without a
 303 regular gynaecological follow-up in the Greater Paris Area, France, 2013.

	Freq. N=508 (%)	Regular Gynaecological Follow-up								p- value for no RGF versus RGF
		No (N=383)				Yes (N=125)				
		Freq. (%)	No CCS (%)	PR	95% CI	Freq (%)	No CCS (%)	PR	95% CI	
Traditional Enabling Factors										
Monthly income per consumption unit					0.338				0.042	0.480
Less than 211 euros	46.6	45.6	72.0	1.05	[0.95-1.15]	49.7	39.5	1.17	[1.01-1.37]	
More than 211 euros	53.4	54.4	57.7	Ref.		50.3	27.1	Ref.		
Social benefits during the previous year					0.059				0.168	0.627
None	64.0	63.3	75.1	1.08	[1.00-1.18]	66.2	36.0	0.89	[0.76-1.05]	
One or more	36.0	36.7	57.9	Ref.		33.8	31.9	Ref.		
Health insurance					0.081				0.015	0.049
No	15.8	18.0	67.2	0.93	[0.85-1.01]	8.3	72.1	1.28	[1.05-1.57]	
Yes	84.2	82.0	63.6	Ref.		91.7	29.8	Ref.		
Physician visit during the previous year					<0.001				0.005	0.015
Yes	82.2	79.9	59.9	Ref.		90.1	30.1	Ref.		
No	17.8	20.1	81.5	1.13	[1.06-1.21]	9.9	61.8	1.31	[1.08-1.57]	
Contraception					0.430				0.550	0.203
Yes	41.1	60.8	61.3	Ref.		47.7	34.3	Ref.		
No	58.9	39.2	66.1	1.03	[0.96-1.11]	52.3	32.4	0.96	[0.85-1.09]	
Mammogram					0.246				<0.001	<0.001
Yes	18.8	15.0	54.3	Ref.		31.6	16.6	Ref.		
No	81.2	85.0	66.0	1.06	[0.96-1.16]	68.4	41.0	1.24	[1.09-1.40]	
Vulnerable Enabling Factors										
Difficulties in French					<0.001				0.005	0.011
Yes	58.8	62.4	72.5	1.11	[1.04-1.19]	46.4	47.5	1.21	[1.06-1.38]	
No	41.2	37.6	50.5	Ref.		53.6	20.9	Ref.		
Had a car					0.050				0.547	0.460
Yes	11.4	11.9	42.1	Ref.		9.4	19.7	Ref.		
No	88.6	88.1	67.2	1.15	[1.00-1.33]	90.6	34.7	1.06	[0.87-1.29]	
Difficulties with public transportation					0.313				0.113	0.577
Yes	37.6	36.6	71.2	1.03	[0.97-1.09]	40.7	39.2	1.11	[0.97-1.27]	
No	62.4	63.4	60.2	Ref.		59.3	29.2	Ref.		
Mobility out of the Paris area					0.088				0.082	0.980
Yes	21.7	21.5	47.2	Ref.		21.7	42.2	Ref.		
No	78.4	78.5	68.9	1.08	[0.99-1.18]	78.3	30.8	0.88	[0.76-1.02]	
History of delivery in France					0.122				0.153	0.985
At least 1 delivery in France	74.5	74.5	60.2	Ref.		74.4	34.6	Ref.		
No deliveries in France	25.5	25.5	76.0	1.05	[0.99-1.11]	25.6	29.5	0.91	[0.80-1.04]	
Contact with family and friends					0.952				0.089	0.978
Less than 1 contact in a 3-day period	73.6	73.6	66.0	1.00	[0.93-1.07]	73.7	40.2	1.14	[0.98-1.32]	
More than 1 contact in a 3-day period	26.4	26.4	59.3	Ref.		26.3	13.7	Ref.		
Invited by friends or family to a party or a family celebration during the previous year					0.040				0.493	0.481
No	40.9	41.9	77.4	1.08	[1.00-1.17]	37.3	35.6	0.96	[0.85-1.08]	
At least once	59.1	58.1	54.7	Ref.		62.7	31.9	Ref.		
Family living in the Paris area					0.454				0.120	0.693
Yes	45.8	46.3	58.7	Ref.		44.0	21.5	Ref.		
No	54.2	53.7	69.0	1.03	[0.96-1.10]	56.0	42.5	1.10	[0.98-1.24]	
Trust in at least one person					0.294				0.061	0.102
Yes	69.0	66.7	61.0	Ref.		77.0	30.2	Ref.		
No	31.0	33.3	70.7	1.04	[0.97-1.11]	23.0	43.7	1.15	[0.99-1.34]	

304 **Table 3 - Need factors and no lifetime cervical cancer screening among homeless women with or without a**
 305 **regular gynaecological follow-up in the Greater Paris Area, France, 2013.**

	Freq. N=508 (%)	Regular Gynaecological Follow-up								<i>p-value for no RGF versus RGF</i>
		No (N=383)				Yes (N=125)				
		Freq (%)	No CCS (%)	PR	95% CI	Freq (%)	no CCS (%)	PR	95% CI	
Traditional Need Factors										
History of at least one serious health problem					0.362				0.355	0.268
Yes	31.6	30.0	61.1	0.96	[0.88-1.05]	36.9	27.2	0.93	[0.79-1.09]	
No	68.4	70.0	65.6	Ref.		63.1	36.8	Ref.		
General health status					0.215				0.416	0.979
Very good, good or average	88.1	88.1	63.3	Ref.		88.2	30.4	Ref.		
Poor or very Poor	11.9	11.9	71.2	1.08	[0.96-1.23]	11.8	54.9	0.87	[0.63-1.21]	
Physical health status					0.605				0.127	0.608
Very good, good or average	89.7	90.1	64.3	Ref.		88.3	29.8	Ref.		
Poor or very poor	10.3	9.9	63.5	0.96	[0.82-1.12]	11.7	59.2	1.23	[0.94-1.59]	
Mental health status					0.863				0.006	0.269
Very good, good or average	76.8	78.1	63.8	Ref.		72.2	24.5	Ref.		
Poor or very poor	23.2	21.9	65.9	1.01	[0.92-1.11]	27.8	56.2	1.25	[1.07-1.47]	
Vulnerable Need Factors										
Food insecurity					0.873				0.012	0.367
Security or low insecurity	52.4	53.6	64.1	Ref.		51.7	21.1	Ref.		
Medium or severe insecurity	47.6	46.4	64.3	1.01	[0.94-1.07]	48.3	46.3	1.21	[1.04-1.40]	
Depression					0.479				0.698	0.412
Yes	29.3	30.5	61.2	0.97	[0.90-1.05]	25.4	30.9	0.97	[0.81-1.15]	
No	70.7	69.5	65.5	Ref.		74.6	34.1	Ref.		

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Table 4 – Multivariate analysis of the predisposing, enabling and need factors associated with no lifetime cervical cancer screening among homeless women with or without a regular gynaecological follow-up in the Greater Paris Area, France, 2013.

Factors	Regular Gynaecological Follow-up			
	No (N=383)		Yes (N=125)	
	PR	95% CI	PR	95% CI
Traditional Predisposing				
Age		0.140		<0.001
25-29	1.09	[1.01-1.17]	1.09	[0.96-1.25]
30-34	Ref.		Ref.	
35-44	1.03	[0.96-1.10]	0.91	[0.82-1.02]
45 or older	1.09	[0.95-1.26]	0.78	[0.69-0.87]
Level of education		<0.001		
None	1.44	[1.30-1.61]		
Primary	1.31	[1.17-1.47]		
Secondary	1.20	[1.08-1.32]		
Tertiary	Ref.			
Occupational status		0.011		
Employed	Ref.			
Unemployed	1.12	[1.02-1.23]		
Student or retiree	1.01	[0.92-1.10]		
Vulnerable Predisposing				
Administrative status				<0.001
French citizen			Ref.	
Legal resident status			1.34	[1.17-1.52]
Undocumented			1.26	[1.09-1.45]
Length of time lived in France		0.026		
A quarter of life or less	1.09	[1.01-1.18]		
More than a quarter of life	Ref.			
Duration of homelessness		0.019		
2 years or less	1.07	[1.01-1.13]		
More than 2 years	Ref.			
Lifetime history of excessive alcohol consumption		0.002		0.015
Yes	0.86	[0.78-0.95]	1.38	[1.07-1.80]
No	Ref.		Ref.	
Traditional Enabling				
Health insurance		0.016		<0.001
No	0.91	[0.84-0.98]	1.27	[1.10-1.45]
Yes	Ref.		Ref.	
Physician visit during the previous year		0.002		0.035
Yes	Ref.		Ref.	
No	1.10	[1.04-1.17]	1.21	[1.01-1.45]
Mammogram				0.002
Yes				
No			1.19	[1.07-1.33]
Vulnerable Enabling				
Invited by friends or family to a party or a family celebration during the previous year		0.015		
No	1.09	[1.02-1.17]		
At least once	Ref.			
Trust in at least one person				0.006
Yes			Ref.	
No			1.18	[1.05-1.33]
Difficulties in French				0.009
Yes			Ref.	
No			1.13	[1.03-1.23]
History of delivery in France		0.004		
At least 1 delivery in France	Ref.			
No deliveries in France	1.09	[1.03-1.16]		

<i>Traditional Need</i>		
Mental health status		<0.001
Very good, good or average	Ref.	
Poor or very poor	1.27	[1.13-1.41]

312 **Figure 1. Time since the last cervical cancer screen as at the day of the survey (among screeners).**

313

REFERENCES

- Aday LA, Andersen R (1974) A framework for the study of access to medical care. *Health Serv Res* 9:208–220.
- Akers AY, Newmann SJ, Smith JS (2007) Factors underlying disparities in cervical cancer incidence, screening, and treatment in the United States. *Curr Probl Cancer* 31:157–181. doi: 10.1016/j.currproblcancer.2007.01.001
- Beijer U, Wolf A, Fazel S (2012) Prevalence of tuberculosis, hepatitis C virus, and HIV in homeless people: a systematic review and meta-analysis. *Lancet Infect Dis* 12:859–870. doi: 10.1016/S1473-3099(12)70177-9
- Bharel M, Casey C, Wittenberg E (2009) Disparities in cancer screening: acceptance of Pap smears among homeless women. *J Womens Health* 2002 18:2011–2016. doi: 10.1089/jwh.2008.1111
- Boxwala FI, Bridgemohan A, Griffith DM, Soliman AS (2010) Factors associated with breast cancer screening in Asian Indian women in metro-Detroit. *J Immigr Minor Health Cent Minor Public Health* 12:534–543. doi: 10.1007/s10903-009-9277-0
- Brousse C (2006) Enquête sans domicile 2001, 1ère partie : Définition de la population sans-domicile et choix de ma méthode d'enquête.
- Brunet L, Carpentier S, Laporte A, Pourette D, Guillon B (2005) Féminité, accès aux soins, maternité, et risques vécus par les femmes en grande précarité. Une contribution à l'amélioration de leur santé gynécologique. Observatoire du samusocial de Paris
- Chau S, Chin M, Chang J, Luecha A, Cheng E, Schlesinger J, Rao V, et al (2002) Cancer Risk Behaviors and Screening Rates Among Homeless Adults in Los Angeles County. *Cancer Epidemiol Biomarkers Prev* 11:431–438.
- Coker AL, Bond SM, Pirisi LA (2006) Life stressors are an important reason for women discontinuing follow-up care for cervical neoplasia. *Cancer Epidemiol Biomark Prev Publ Am Assoc Cancer Res Cosponsored Am Soc Prev Oncol* 15:321–325. doi: 10.1158/1055-9965.EPI-05-0148
- Engelstad LP, Stewart SL, Nguyen BH, Bedeian KL, Rubin MM, Pasick RJ, Hiatt RA (2001) Abnormal Pap Smear Follow-Up in a High-Risk Population. *Cancer Epidemiol Biomarkers Prev* 10:1015–1020.
- Fédération des Gynécologue et Obstétriciens de Langue Française (1990) Conférence de consensus sur le dépistage du cancer du col utérin. Lille, pp 1–16
- Gelberg L, Andersen RM, Leake BD (2000) The Behavioral Model for Vulnerable Populations: application to medical care use and outcomes for homeless people. *Health Serv Res* 34:1273–1302.

- 351 Grillo F, Vallée J, Chauvin P (2012) Inequalities in cervical cancer screening for
 352 women with or without a regular consulting in primary care for gynaecological
 353 health, in Paris, France. *Prev Med* 54:259–265. doi:
 354 10.1016/j.ypmed.2012.01.013
- 355 Guyavarch E, Le Méner E (2010) A Paris, de plus en plus de familles sans domicile.
 356 *Mag Feansea* (Automne):19–21.
- 357 Haute Autorité de Santé (HAS) (2010) État des lieux et recommandations pour le
 358 dépistage du cancer du col de l’utérus en France - Argumentaire. HAS
- 359 Hogenmiller JR, Atwood JR, Lindsey AM, Johnson DR, Hertzog M, Scott JC Jr (2007)
 360 Self-efficacy scale for Pap smear screening participation in sheltered women.
 361 *Nurs Res* 56:369–377. doi: 10.1097/01.NNR.0000299848.21935.8d
- 362 Hwang SW, Tolomiczenko G, Kouyoumdjian FG, Garner RE (2005) Interventions to
 363 Improve the Health of the Homeless: A Systematic Review. *Am J Prev Med*
 364 29:311–311.e75. doi: 10.1016/j.amepre.2005.06.017
- 365 Kessler RC, Üstün TB (2004) The World Mental Health (WMH) Survey Initiative
 366 Version of the World Health Organization (WHO) Composite International
 367 Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 13:93–121.
- 368 Kushel MB, Vittinghoff E, Haas JS (2001) Factors associated with the health care
 369 utilization of homeless persons. *JAMA J Am Med Assoc* 285:200–206.
- 370 Lewis JH, Andersen RM, Gelberg L (2003) Health care for homeless women. *J Gen*
 371 *Intern Med* 18:921–928.
- 372 Leyden WA, Manos MM, Geiger AM, Weinmann S, Mouchawar J, Bischoff K, Yood
 373 MU, et al (2005) Cervical cancer in women with comprehensive health care
 374 access: attributable factors in the screening process. *J Natl Cancer Inst* 97:675–
 375 683. doi: 10.1093/jnci/dji115
- 376 Long HL, Tulskey JP, Chambers DB, Alpers LS, Robertson MJ, Moss AR, Chesney MA
 377 (1998) Cancer screening in homeless women: attitudes and behaviors. *J Health*
 378 *Care Poor Underserved* 9:276–292.
- 379 Mathew A, George PS (2009) Trends in incidence and mortality rates of squamous cell
 380 carcinoma and adenocarcinoma of cervix--worldwide. *Asian Pac J Cancer Prev*
 381 *APJCP* 10:645–650.
- 382 Médecins du Monde (2013) Enquête “Contraception et prévention des cancers féminins
 383 chez les femmes en situation de précarité, en France.” Médecins du monde
- 384 Nyamathi AM, Leake B, Gelberg L (2000) Sheltered versus nonsheltered homeless
 385 women differences in health, behavior, victimization, and utilization of care. *J*
 386 *Gen Intern Med* 15:565–572.

- Quinlivan JA, Petersen RW, Davy M, Evans SF (2004) Abnormal pap smears in teenage mothers and the association with domestic violence, homelessness, and Chlamydia. *J Low Genit Tract Dis* 8:112–117.
- Radimer KL, Radimer KL (2002) Measurement of household food security in the USA and other industrialised countries. *Public Health Nutr* 5:859–864. doi: 10.1079/PHN2002385
- Rondet C, Lapostolle A, Soler M, Grillo F, Parizot I, Chauvin P (2014) Are Immigrants and Nationals Born to Immigrants at Higher Risk for Delayed or No Lifetime Breast and Cervical Cancer Screening? The Results from a Population-Based Survey in Paris Metropolitan Area in 2010. *PLoS ONE* 9:e87046. doi: 10.1371/journal.pone.0087046
- Stein JA, Andersen R, Gelberg L (2007) Applying the Gelberg-Andersen behavioral model for vulnerable populations to health services utilization in homeless women. *J Health Psychol* 12:791–804. doi: 10.1177/1359105307080612
- Teruya C, Longshore D, Andersen RM, Arangua L, Nyamathi A, Leake B, Gelberg L (2010) Health and health care disparities among homeless women. *Women Health* 50:719–736. doi: 10.1080/03630242.2010.532754
- Vaccarella S, Lortet-Tieulent J, Plummer M, Franceschi S, Bray F (2013) Worldwide trends in cervical cancer incidence: impact of screening against changes in disease risk factors. *Eur J Cancer Oxf Engl* 1990 49:3262–3273. doi: 10.1016/j.ejca.2013.04.024
- Vallée J, Cadot E, Grillo F, Parizot I, Chauvin P (2010) The combined effects of activity space and neighbourhood of residence on participation in preventive health-care activities: The case of cervical screening in the Paris metropolitan area (France). *Health Place* 16:838–852. doi: 10.1016/j.healthplace.2010.04.009
- Vandentorren S, Le Méner E, Oppenheim N, Arnaud A, Jangal C, Caum C, Vuillermoz C, et al (2015) Characteristics and health of homeless Families: the ENFAMS survey in the Paris region, France 2013. *Eur J Public Health*. doi: 10.1093/eurpub/ckv187
- Weinreb L, Goldberg R, Lessard D (2002) Pap smear testing among homeless and very low-income housed mothers. *J Health Care Poor Underserved* 13:141–150.
- Weinreb L, Goldberg R, Perloff J (1998) Health characteristics and medical service use patterns of sheltered homeless and low-income housed mothers. *J Gen Intern Med* 13:389–397.
- Yaouancq F, Lebrère A, Marpsat M, Régnier V, Legleye S, Quaglia M (2013) L'hébergement des sans-domicile en 2012. Des modes d'hébergement différents selon les situations familiales.