



Inequalities in cervical cancer screening for women with or without a regular consulting in primary care for gynaecological health, in Paris, France

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ABSTRACT

Objectives. To describe the individual characteristics associated with the absence of cervical smear (CCST); to investigate the role of residential neighbourhood, particularly practitioner density; and to explore changes in individual and contextual determinants after taking regular consulting in primary care for gynaecological health (RCGH) into account.

Methods. Data: 1843 adult women from the SIRS survey conducted in 2005 in the Paris metropolitan area. Multilevel logistic regressions analysed factors associated with never-screening.

Results. 10% of the women had never undergone CCST. Being single, less educated, of foreign origin, with no children, and without health insurance, having never worked, having never undergone a serious health problem and/or having nobody in their circle with cancer were associated with no CCST. Once adjusted on individual characteristics, living in a middle- (OR = 1.95; IC = 1.05–3.62) or in a lower-class neighbourhood (OR = 2.31; IC = 1.26–4.25) was associated with increased risks of never-screening, but neighbourhood physician density was not. Interactions were found between socioeconomic status and RCGH. Individual- and neighbourhood-level associations with CCST were different for women with or without an RCGH.

Conclusion. This study analysed individual and contextual inequalities in CCST practice in the Paris metropolitan area. To benefit from an RCGH did not seem to reduce all the social inequalities in CCST practice.

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Background

Cervix uteri cancer (CUC) is the third most frequent cancer in the world, with about 530,000 new cases diagnosed and approximately 275,000 related deaths in 2008 (IARC, 2008). In France, Pap smear has become widespread since the 1970s, and over the last 30 years the incidence of CUC has steadily declined, with, in 2005, 3068 new cases detected and 1067 deaths from this cancer (Belot et al., 2008). The French guidelines, targeted at women between 25 and 65 years of age, recommend that they undergo cervical cancer screening test (CCST) every three years, after two normal Pap smears one year apart (ANAES, 2002; FGOLF, 1990). In this country, CCST is done in a gynaecological primary care frame that may be realized by general practitioners (GPs) or by gynaecologists (who practice as primary care providers for women health), even if the majority of CCST are performed by

gynaecologists. However a substantial proportion of women do not undergo this test (Guilbert and Gautier, 2006), which is, in France, mostly patient-driven (HAS, 2010). Individual characteristics, such as age, not being married (Cabeza et al., 2007; Calle et al., 1993; Hewitt et al., 2004), not having a regular source of health care (Sambamoorthi and McAlpine, 2003), a lack of health insurance and a fatalistic attitude (Behbakht et al., 2004), a low educational level and a low socioeconomic status (Borras et al., 1999; Sambamoorthi and McAlpine, 2003; Segnan, 1997) are generally associated with low screening participation rates or with not having been screened recently.

In addition, geographical inequalities in the distribution of CCST practices have been described (Baker and Middleton, 2003). A number of studies have analysed the role of the life context in individual cervical screening behaviour. They suggest that, independently of individual risk factors, the residential context may play a role in CCST participation, since living in a neighbourhood with a low average income (Datta et al., 2006; Kreuger et al., 1999) or with a lower average educational level (Coughlin et al., 2006) have been associated with a lower (or delayed) participation. One study observed that living in a county with a higher number of physicians was associated with increased CCST adherence (Benjamins et al., 2004), and another found that the primary care supply modifies the association usually noted between rural residency and CCST adherence (Coughlin et al., 2008).

Abbreviations: CUC, Cervix uteri cancer; CCST, Cervical cancer screening test; GPs, General practitioners; RCGH, Regular consulting in primary care for gynaecological health; SES, Socioeconomic status.

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Objectives

The first objective of this study was to examine certain demographic, socioeconomic and health-related individual characteristics potentially associated with having never undergone CCST in Paris metropolitan area – in particular migration origin, which has rarely been, if ever, studied in France. Our second objective was to examine if the physician density and/or the socioeconomic type of the neighbourhood of residence have an effect on cervical screening participation, after controlling for individual factors. Finally, we sought to explore whether taking into account women's regular consulting in primary care for gynaecological health modifies the determinants associated with never-screening.

Materials and methods

Study sample

The SIRS (French acronym for Health, Inequalities and Social Ruptures) survey was conducted in the fall of 2005 among a representative sample of the adult French-speaking population in the Paris metropolitan area. It employed a stratified multistage cluster sampling procedure, over-representing the poorer neighbourhoods (census blocks). Its design, methods and sample representativeness have been reported previously (Renahy et al., 2008; Vallée et al., 2010).

A questionnaire containing numerous demographic, social and health-related questions was administered face-to-face during home visits. For this paper, the variable of interest was never having had a CCST, as self-reported by women.

Individual-level variables

Although CCST is recommended, in France, only for women from 25 to 65 years of age, we decided to consider four age groups, including ≤ 24 because the European Union Council recommends that CCST be started at age 20 (European Union Council, 2003) and, actually, younger women also avail themselves of this screening test in France (Dupont, 2008). As for 'migration origin', we constructed a variable that distinguishes three groups, by combining the nationality of the women and those of their parents: French women born to two French parents, French women born to at least one parent with foreign nationality, and women with a foreign nationality.

As to respondents' socioeconomic status (SES) we considered their educational level, monthly household income per consumption unit (in two classes according to its median value), socio-occupational category (in 5 classes: never-active women; upper white collar; middle and lower white collar; blue collar; saleswomen, craftswomen and managers grouped together) and health insurance status (Chevreul et al., 2010). This one was divided into four classes regrouping women 1) whose health expenses were the best reimbursed, by the Social Security and a voluntary supplemental health insurance plan; 2) who had free access to health care reserved for the poor; 3) with only common basic Social Security (without any supplementary insurance); and 4) who stated that they did not have any health insurance at all at the time of the survey.

In the SIRS survey, the respondents were also asked about their health and health care, beliefs and experiences. Four questions were selected for our analysis: 1) Are you regularly consulting in primary care for your gynaecological health (RCGH)?; 2) Have you ever had a serious health problem?; 3) Does anyone in your circle have cancer?; and 4) Would you prefer to be informed about having cancer at the latest possible moment? Reasons not to have done a CCST were also asked, as a closed, multiple choice question.

Neighbourhood-level variables

The typology of the residential neighbourhoods used in this paper characterized neighbourhood socioeconomic profile. It has been developed previously (Préteceille, 2003), based on the socio-occupational data (employment status and occupational position) from the 1999 census and classified into three categories: upper-class, middle-class and lower-class neighbourhoods (Vallée et al., 2011).

To quantify the health care supply, we summed up the number of GPs and gynaecologists per 100,000 inhabitants (both numbers being obtained from

the French Bureau of Statistics). This density, which ranged from 16 to 188/100,000 inhabitants, was divided into tertiles (Vallée et al., 2010).

Statistical methods

We used χ^2 tests to compare frequency distributions of independent variables according to having had reported at least one CCST, or not. All individual independent variables were introduced into a multilevel logistic regression model and then backward selected (Table 2, model 1). Then, we tested separately the two neighbourhood variables, after adjustment on the previously selected individual ones (Table 2, models 2a and 2b). Finally, since we observed statistical interactions between RCGH and migration origin, educational level, income or health insurance status, we computed estimates of models 1, 2a and 2b for women with or without RCGH separately (Table 3). Multilevel analyses were conducted using 'xtmelogit' command in STATA10 software. Intraclass correlations (ICC) were computed using 'xtmrho' module (Kroll, 2010).

Results

The final SIRS sample consisted of 3023 persons, including 1843 women. Of these women, 12 had never undergone CCST because they had had a hysterectomy, and three others did not answer. They were excluded from the analyses.

Individual characteristics associated with never-screening

The vast majority of the women had had at least one CCST in their lifetime, but 9.7% of them had not. The latter were significantly younger, with no children, no stable relationship at the time of the survey, foreigners or French born to at least one foreign parent (Table 1). They also had a lower SES and most of them lived in middle- or lower-class neighbourhoods. The highest proportions of never-screener were among those with free health care for low-income individuals or those who did not have any voluntary supplemental insurance. Only 3.8% of the women with RCGH stated that they had never had a CCST, versus 29% of the others ($p < 0.001$). Never-screener were also more frequent among the women who declared they had not a serious health problem, who had nobody in their circle with cancer, or who stated that if they had cancer they would prefer to know this as late as possible.

The two reasons given most often for never having had a CCST were the feeling that this test is not necessary or needed and/or that everything was all right (70.2%), and the fact that nobody had ever proposed it to them (51.8%). Next followed: do not like this examination (18%), do not have time or have other preoccupations (7.7%), economic reasons (4.8%), do not know where to do it (3%), and do fear results (1.8%).

Table 2 shows results of multilevel logistic regression without taking RCGH into account: except for income, all considered individual characteristics were significantly associated with never-screening.

Disparities between neighbourhoods of residence

The empty model revealed significant variance between neighbourhoods ($V_{oj} = 0.46$; $IC = 0.23-0.93$), which indicates that there were important spatial disparities in CCST adherence between the surveyed census blocks (Fig. 1). Then, 67% of this variance was explained by the introduction of the individual characteristics, which divided the ICC by 3 (Table 2, model 1). Variance further decreased by 40% (and ICC by 50%) when the socioeconomic type of the residential neighbourhood was introduced into model 2a. After adjustment for individual characteristics, women living in middle- and lower-class neighbourhoods were more likely to have never had a CCST, but we found no significant association with the neighbourhood physician density (model 2b).

Table 1

Prevalence of no CCST^a in lifetime according to individual and neighbourhood characteristics of women (and p value for comparison with the prevalence of any CCST), Paris metropolitan area, France, 2005 (n = 1828).

| | | Total number | % of no CCST ^a | P-value no CCST versus CCST ^a |
|---|---|--------------|---------------------------|--|
| <i>Individual characteristics</i> | | | | |
| Age group | 18 to 24 | 132 | 43.2 | <.0001 |
| | 25 to 44 | 764 | 7.7 | |
| | 45 to 65 | 623 | 3.0 | |
| | 66 and over | 309 | 13.9 | |
| Was in a stable relationship | Yes | 1192 | 6.5 | <.0001 |
| | No | 636 | 15.9 | |
| Parental status | Had children | 1334 | 6.1 | <.0001 |
| | Had never had children | 494 | 19.4 | |
| Migration origin | French, born to French parents | 1212 | 6.4 | <.0001 |
| | French, born to at least one foreign parent | 365 | 11.8 | |
| | Foreigner | 251 | 22.7 | |
| Educational level attained | Tertiary | 810 | 7.2 | 0.0004 |
| | Secondary | 779 | 10.6 | |
| | None or primary | 239 | 15.5 | |
| Socio-occupational category | Upper white collar | 334 | 3.3 | <.0001 |
| | Craftswomen, saleswomen, managers | 46 | 8.7 | |
| | Middle and Lower white collar | 1157 | 7.0 | |
| | Blue collar | 107 | 15.9 | |
| | Had never worked | 184 | 35.3 | |
| Per capita monthly household income | ≤ 1600 euros | 1049 | 13.6 | <.0001 |
| | > 1600 euros | 779 | 4.5 | |
| Health insurance status | Social Security + voluntary insurance | 1468 | 7.5 | <.0001 |
| | Free health care for low-income individuals | 136 | 14.7 | |
| | Social security only | 213 | 20.2 | |
| | None | 11 | 45.4 | |
| Regular consulting in primary care for gynaecological health | Yes | 1397 | 3.8 | <.0001 |
| | No | 431 | 29.0 | |
| Had a serious health problem | Yes | 1439 | 8.3 | <.0001 |
| | No | 389 | 15.7 | |
| Someone among woman circle with cancer | Yes | 1249 | 6.3 | <.0001 |
| | No | 579 | 17.1 | |
| Would prefer to be informed about having cancer at the latest possible moment | Definitely yes | 188 | 13.3 | 0.0005 |
| | Maybe yes/maybe not | 424 | 13.6 | |
| | Definitely not | 1216 | 7.8 | |
| <i>Neighbourhood characteristics</i> | | | | |
| Socioeconomic typology of residential neighbourhood | Upper-class | 511 | 5.1 | <.0001 |
| | Middle-class | 605 | 9.1 | |
| | Lower-class | 712 | 13.6 | |
| Density of general practitioners and gynaecologists | High | 566 | 12.2 | 0.055 |
| | Intermediate | 623 | 9.0 | |
| | Low | 639 | 8.3 | |

^a CCST: Cervical cancer screening test.

Differences between women with or without RCGH

Results in Table 3 show that the characteristics associated with never-screening were different between women with and without RCGH. They were a foreign origin (foreigners being at higher risk than French women born to foreign parent(s)) and a low educational level; and being foreigner, not having had a serious health problem, knowing nobody in her own circle with cancer, respectively. In both cases, the strengths of the association were particularly high. Do not having children nor being in a stable relationship were also predictors for both women's groups. Due to small numbers, this stratified analysis showed no significant association with any of our neighbourhood characteristics but, after adjustment for individual characteristics, women without RCGH living in the lower-class neighbourhoods were more likely to be never-screeners. ICC variations followed the same trends that in the non-stratified analysis, even if their values were different in the stratified models due to differences in outcome prevalence (Chaix et al., 2004).

Discussion

Consistently with previous French studies (Guilbert and Gautier, 2006), this population-based survey confirms that participation in

cervical cancer screening is widespread in the Paris metropolitan area but it outlined also important demographic and socioeconomic inequalities.

Being a foreigner or being of foreign origin were risk factors for never-screening, as observed in previous studies (De Alba et al., 2005) but never in France, with a strong gradient which persisted after adjustment for SES. It may be explained in terms of a lack of information, a low health literacy, and/or the persistence of body and health-related norms prevalent in the cultures or countries of origin. Such hypotheses remain scarcely studied in France even if it is known that immigrants have a lower recourse to healthcare, including to prevention (Dourgnon et al., 2009). The women who had never been in the workforce were also more likely to be never-screeners. This could be interpreted in terms of a lack of autonomy, social interactions and/or information, on the part of these women, the vast majority of whom were housewives.

We asked the women whether, if they had cancer, they would prefer to know this at the latest possible moment. A negative answer was associated with lower risk of never-screening. Fatalistic attitudes have been already observed as predictors of never screening (Behbakht et al., 2004). As for health issues, individuals generally express an optimistic bias, i.e. believe that their current health status will be the same in the future (Ackerson and Preston, 2009;

Table 2
Individual and neighbourhood characteristics associated with no CCST*, multilevel logistic regression, Paris metropolitan area, France, 2005.

| | Empty model | Model 1 | Model 2a | Model 2b |
|--|-------------|--------------------------|--------------------------|--------------------------|
| | | Adjusted OR** (95% CI) | Adjusted OR** (95% CI) | Adjusted OR** (95% CI) |
| <i>Individual characteristics</i> | | | | |
| Age^{a,a,a} | | | | |
| 18 to 24 | – | 7.08 (3.20–15.65) | 6.87 (3.11–15.20) | 6.97 (3.15–15.44) |
| 25 to 44 | – | 2.00 (1.07–3.71) | 1.90 (1.02–3.53) | 1.97 (1.06–3.66) |
| 45 to 65 | – | Ref. | Ref. | Ref. |
| 66 and over | – | 4.41 (2.34–8.31) | 4.81 (2.55–9.06) | 4.45 (2.36–8.39) |
| Was in a stable relationship^{a,a,a} | | | | |
| Yes | – | Ref. | Ref. | Ref. |
| No | – | 3.09 (2.05–4.64) | 3.03 (2.02–4.56) | 3.07 (2.04–4.62) |
| Parental status^{a,a,a} | | | | |
| Had children | – | Ref. | Ref. | Ref. |
| Had never had children | – | 3.78 (2.35–6.09) | 4.00 (2.48–6.43) | 3.81 (2.37–6.14) |
| Migration origin^{a,a,a} | | | | |
| French, born to French parents | – | Ref. | Ref. | Ref. |
| French, born to at least one foreign parent | – | 1.81 (1.10–2.97) | 1.72 (1.05–2.82) | 1.81 (1.10–2.97) |
| Foreigner | – | 3.85 (2.22–6.68) | 3.90 (2.25–6.76) | 3.85 (2.22–6.68) |
| Educational level attained^{c,ns,c} | | | | |
| Tertiary | – | Ref. | Ref. | Ref. |
| Secondary | – | 1.66 (1.03–2.68) | 1.54 (0.95–2.49) | 1.63 (1.01–2.64) |
| Primary or less | – | 2.09 (1.05–4.15) | 1.85 (0.93–3.67) | 2.02 (1.01–4.03) |
| Socio-occupational category^{b,b,b} | | | | |
| Upper white collar | – | Ref. | Ref. | Ref. |
| Craftswomen, saleswomen, managers | – | 1.44 (0.36–5.67) | 1.33 (0.33–5.26) | 1.43 (0.36–5.65) |
| Middle and Lower white collar | – | 1.18 (0.56–2.48) | 1.01 (0.47–2.14) | 1.16 (0.55–2.45) |
| Blue collar | – | 2.02 (0.77–5.30) | 1.61 (0.61–4.28) | 1.96 (0.74–5.18) |
| Had never worked | – | 3.51 (1.51–8.15) | 3.03 (1.29–7.10) | 3.46 (1.49–8.04) |
| Health insurance status^{c,c,c} | | | | |
| Social Security + voluntary insurance | – | Ref. | Ref. | Ref. |
| Free health care for low-income individuals | – | 0.69 (0.34–1.39) | 0.69 (0.34–1.39) | 0.69 (0.34–1.39) |
| Social Security only | – | 1.50 (0.90–2.49) | 1.46 (0.88–2.41) | 1.49 (0.90–2.47) |
| None | – | 5.04 (1.16–21.86) | 5.16 (1.18–22.54) | 4.85 (1.12–21.05) |
| Had a serious health problem^{c,c,c} | | | | |
| Yes | – | Ref. | Ref. | Ref. |
| No | – | 1.73 (1.10–2.70) | 1.70 (1.08–2.66) | 1.71 (1.09–2.68) |
| Someone among woman circle with cancer^{b,b,b} | | | | |
| Yes | – | Ref. | Ref. | Ref. |
| No | – | 1.81 (1.21–2.69) | 1.75 (1.18–2.61) | 1.79 (1.20–2.67) |
| Would prefer to be informed about having cancer at the latest possible moment^{c,c,c} | | | | |
| Definitely yes | – | 1.01 (0.54–1.89) | 1.00 (0.54–1.86) | 1.00 (0.53–1.86) |
| Maybe yes/maybe not | – | Ref. | Ref. | Ref. |
| Definitely not | – | 0.61 (0.39–0.94) | 0.60 (0.39–0.94) | 0.60 (0.38–0.93) |
| <i>Neighbourhood characteristics</i> | | | | |
| Socioeconomic typology of residential neighbourhood^c | | | | |
| Upper-class | – | – | Ref. | – |
| Middle-class | – | – | 1.95 (1.05–3.62) | – |
| Lower-class | – | – | 2.31 (1.26–4.25) | – |
| Density of general practitioners and gynaecologists^{ns} | | | | |
| High | – | – | – | Ref. |
| Intermediate | – | – | – | 1.43 (0.82–2.50) |
| Low | – | – | – | 1.55 (0.88–2.71) |
| Between-area variation (standard error) | 0.46 (0.16) | 0.16 (0.12) | 0.09 (0.10) | 0.15 (0.11) |
| Intraclass correlation (ICC) | 0.12 | 0.04 | 0.02 | 0.04 |

Respective significance for variable in models 1, 2a and 2b: ^ap<0.001; ^bp<0.01; ^cp<0.05; ^{ns}Not significant (p>0.05). OR are printed in bold if p<0.05.

* CCST: Cervical cancer screening test.

** OR = Odds ratio; 95% CI = 95% confidence interval; Ref = referent.

Weinstein, 1987). When they feel healthy, they may think that they do not need preventive examinations (Oscarsson et al., 2008) and that taking good care of themselves is sufficient to reduce the risk of cervical cancer (Ackerson et al., 2008). Thus, women may still underestimate their personal risk of cancer until they experience a serious health problem or learn that someone in their circle has cancer. This could explain why we observed that both of these variables were predictors of never-screening in our models, while the main reason given by the surveyed women for never-screening was the feeling that they did not need CCST.

Our study is consistent with the associations previously found between women's access to physicians or other usual sources of care and cervical screening attendance (De Alba et al., 2005; Sambamoorthi and McAlpine, 2003), and with social inequalities in CSST practice outlined among women visiting GPs in Paris metropolitan area (Rigal et al., 2011). An original result is the estimation of a different effect of SES on CCST practice depending on whether a woman is or is not regularly consulting in primary care for gynaecological health: being less educated was determinant of never-screening only among the first ones. Unexpectedly, we observed

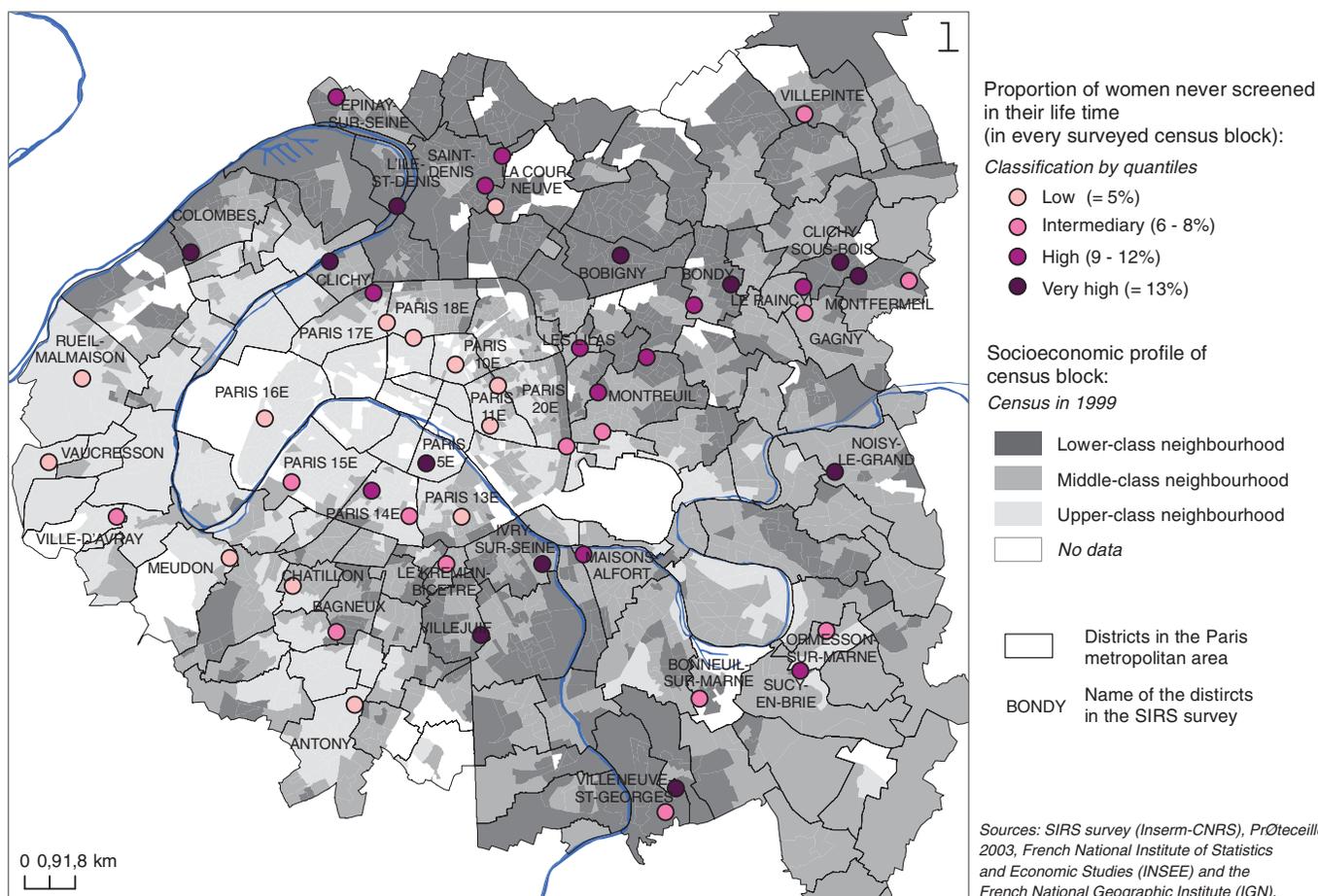


Fig. 1. Spatial disparities in cervical screening in the Paris metropolitan area in 2005. This figure contains a map of the Paris metropolitan area. The census blocks were represented using the socioeconomic profile created in 1999 by Edmond Prêteceille and classified into three categories: upper-class, middle-class and lower-class neighbourhoods. In the map is represented, for every surveyed census block, the proportion of women who declared they had never been screened in their lifetime (SIRS 2005).

that some of women with RCGH have never had any CCST (8.6% and 3.5% of women followed by a GP or a gynaecologist respectively, $p < 0.0001$). A part of this difference may be due to the fact that some of the GPs do not realize themselves CCST (addressing women to a gynaecologist or a laboratory) and may not verify whether that women have observed their prescription.

Primary care providers have an essential role in cervical screening adherence since they are in the front-line for providing correct information and counselling to women (Majeed et al., 1994), and dealing with women who may not properly understand the role of a cervical smear (Breitkopf et al., 2005) and who think that screening is useless in the absence of symptoms and/or who fear such an examination (Ackerson and Preston, 2009). From this perspective, our results are striking and somewhat worrisome as, in the women with RCGH, being less educated, being a foreigner, or French and born to foreign parents, were not only risk factors for never-screening, but as well, their respective strengths of association were even higher than those in the women who had no RCGH.

Naturally, since all our data are declarative in nature, our results may be tainted by classification or desirability biases. However, upon examining the substantial strengths of the estimated associations, we think that our results are meaningful and that they cannot be completely explained by such biases. Furthermore, many previous studies concluded that, if the self-reporting of CCST could lead to an overestimation of this practice, this overestimation was not different according to women's SES (Bowman et al., 1997; Mamoon et al., 2001).

These results – as well as the fact that 55.5% of the women with RCGH who indicated that they had never had a CCST reported that

nobody had ever proposed such a test to them – could be taken to mean that French primary care providers do not follow cancer screening recommendations as closely with these women and that the primary health-care system is thereby contributing to social inequalities in women's cancer prevention.

Contrary to what was found in a previous study in the USA that considered county-level characteristics (Benjamins et al., 2004), here our outcome was not associated with neighbourhood physician density. With the exception of a minority of women with reduced mobility (Vallée et al., 2010), we can assume that overall, practitioner density and the daily mobility of women in the specific context of the Paris metropolitan area (with its large primary care supply and highly developed public transportation system) enable them to seek health care easily outside their neighbourhood of residence. We found that living in a middle-class or lower-class neighbourhood was associated with an increased risk of never-screening. This result may be interpreted in terms of social interactions among residents which, through the exchange of health behaviour norms and experiences in health-care utilisation, may influence people's medical prevention behaviours.

Our results argue that more-specific strategies have to be implemented, both at the individual and neighbourhood levels, involving primary care providers in order to optimize their practice, to improve cervical screening adherence and to reduce its social disparities.

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The authors do not report any potential conflicts of interest.

Table 3

Individual and neighbourhood characteristics associated with no CCST*, separately for women with and without a regular consulting in primary care for gynaecological health at the time of the survey, multilevel logistic regression, Paris metropolitan area 2005.

| | No regular consulting in primary care for gynaecological health | | | Regular consulting in primary care for gynaecological health | | |
|--|---|---------------------------------------|---------------------------------------|--|---------------------------------------|---------------------------------------|
| | Model 1 | Model 2a Adjusted OR** (95% CI) | Model 2b Adjusted OR** (95% CI) | Model 1 Adjusted OR** (95% CI) | Model 2a Adjusted OR** (95% CI) | Model 2b Adjusted OR** (95% CI) |
| <i>Individual characteristics</i> | | | | | | |
| Age ^{b,b,b; c,b,c} | | | | | | |
| 18 to 24 | 6.57 (1.94–22.21) | 6.24 (1.85–21.00) | 6.85 (2.02–23.21) | 9.52 (2.43–37.25) | 10.03 (2.56–39.28) | 9.42 (2.41–36.88) |
| 25 to 44 | 1.98 (0.82–4.77) | 1.71 (0.70–4.13) | 1.89 (0.78–4.55) | 2.57 (0.90–7.31) | 2.61 (0.91–7.45) | 2.48 (0.87–7.09) |
| 45 to 65 | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| 66 and over | 2.55 (1.12–5.78) | 2.71 (1.20–6.10) | 2.62 (1.16–5.94) | 1.55 (0.33–7.31) | 1.73 (0.36–8.19) | 1.55 (0.32–7.36) |
| Was in a stable relationship ^{c,c,c; b,b,b} | | | | | | |
| Yes | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| No | 1.93 (1.05–3.53) | 1.84 (1.00–3.35) | 1.90 (1.03–3.48) | 3.23 (1.56–6.65)^c | 3.27 (1.59–6.75) | 3.21 (1.55–6.65) |
| Parental status ^{a,a,a; c,c,c} | | | | | | |
| Had children | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| Had never had children | 5.01 (2.49–10.07) | 5.65 (2.80–11.39) | 5.13 (2.54–10.37) | 3.23 (1.33–7.81) | 3.25 (1.34–7.88) | 3.30 (1.35–8.07) |
| Migration origin ^{c,c,c; a,a,a} | | | | | | |
| French, born to French parents | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| French, born to at least one foreign parent | 1.18 (0.58–2.41) | 1.12 (0.55–2.29) | 1.22 (0.60–2.50) | 3.08 (1.21–7.81) | 3.00 (1.18–7.64) | 3.10 (1.22–7.85) |
| Foreigner | 2.92 (1.26–6.78) | 2.84 (1.23–6.55) | 2.99 (1.29–6.94) | 8.03 (3.10–20.78) | 7.89 (3.09–20.62) | 7.99 (3.07–20.73) |
| Educational level attained ^{ns,ns,ns; b,b,b} | | | | | | |
| Tertiary | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| Secondary | 1.82 (0.74–4.50) | 1.66 (0.67–4.09) | 1.70 (0.68–4.23) | 2.03 (0.50–8.13) | 2.06 (0.50–8.34) | 1.92 (0.47–7.80) |
| Primary or less | 0.82 (0.41–1.64) | 0.81 (0.40–1.62) | 0.82 (0.41–1.64) | 4.34 (1.74–10.81) | 4.36 (1.70–10.96) | 4.25 (1.70–10.60) |
| Socio-occupational category ^{ns,ns,ns; c,c,c} | | | | | | |
| Upper white collar | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| Craftswomen, saleswomen, managers | 2.97 (0.76–11.55) | 2.46 (0.63–9.60) | 2.89 (0.74–11.28) | 2.40 (0.53–10.76) | 2.21 (0.48–10.04) | 2.35 (0.52–10.62) |
| Middle and Lower white collar | 1.70 (0.28–10.19) | 1.68 (0.28–10.04) | 1.60 (0.26–9.78) | 0.96 (0.06–14.93) | 0.83 (0.05–13.17) | 0.98 (0.06–15.52) |
| Blue collar | 1.49 (0.50–4.42) | 1.22 (0.40–3.64) | 1.44 (0.48–4.30) | 0.57 (0.14–2.30) | 0.52 (0.12–2.14) | 0.55 (0.13–2.23) |
| Had never worked | 1.69 (0.43–6.55) | 1.34 (0.36–5.21) | 1.62 (0.41–6.36) | 1.77 (0.30–10.42) | 1.63 (0.27–9.76) | 1.68 (0.28–10.00) |
| Health insurance status ^{ns,ns,ns; ns,ns,ns} | | | | | | |
| Social Security + voluntary insurance | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| Free health care for low-income individuals | 0.40 (0.11–1.40) | 0.39 (0.11–1.37) | 0.39 (0.11–1.39) | 0.84 (0.30–2.31) | 0.87 (0.31–2.42) | 0.85 (0.30–2.37) |
| Social Security only | 1.29 (0.64–2.58) | 1.20 (0.60–2.40) | 1.29 (0.64–2.60) | 1.06 (0.40–2.81) | 1.09 (0.41–2.87) | 1.05 (0.39–2.81) |
| None | 8.74 (0.62–121.68) | 10.32 (0.76–140.13) | 7.96 (0.56–111.74) | 2.49 (0.20–30.69) | 2.37 (0.20–27.88) | 2.50 (0.20–30.88) |
| Had a serious health problem ^{b,b,b; ns,ns,ns} | | | | | | |
| Yes | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| No | 2.63 (1.24–5.57) | 2.71 (1.28–5.72) | 2.73 (1.27–5.85) | 1.56 (0.75–3.22) | 1.53 (0.74–3.17) | 1.55 (0.74–3.21) |
| Someone among woman circle with cancer ^{b,b,b; ns,ns,ns} | | | | | | |
| Yes | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| No | 2.20 (1.25–3.87) | 2.20 (1.25–3.85) | 2.13 (1.21–3.75) | 1.74 (0.82–3.67) | 1.68 (0.80–3.54) | 1.72 (0.81–3.64) |
| Would prefer to be informed about having cancer at the latest possible moment ^{ns,ns,ns; ns,ns,ns} | | | | | | |
| Definitely yes | 0.74 (0.32–1.71) | 0.73 (0.32–1.68) | 0.71 (0.30–1.66) | 0.92 (0.29–2.92) | 0.96 (0.30–3.05) | 0.90 (0.28–2.87) |
| Maybe yes/maybe not | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| Definitely not | 0.56 (0.30–1.05) | 0.55 (0.29–1.03) | 0.54 (0.28–1.02) | 0.57 (0.26–1.23) | 0.59 (0.27–1.26) | 0.57 (0.26–1.23) |
| <i>Neighbourhood characteristics</i> | | | | | | |
| Socioeconomic typology of residential neighbourhood ^{ns; ns} | | | | | | |
| Upper-class | – | Ref. | – | – | Ref. | – |
| Middle-class | – | 1.71 (0.74–3.94) | – | – | 1.41 (0.40–4.97) | – |
| Lower-class | – | 2.38 (1.07–5.29) | – | – | 2.21 (0.64–7.66) | – |
| Density of general practitioners and gynaecologists ^{ns; ns} | | | | | | |
| High | – | – | Ref. | – | – | Ref. |
| Intermediate | – | – | 1.56 (0.74–3.25) | – | – | 1.41 (0.46–4.29) |
| Low | – | – | 1.56 (0.74–3.27) | – | – | 1.10 (0.36–3.32) |
| Between-area variation (Standard error) | 0.12 (0.19) | 0.03 (0.17) | 0.11 (0.19) | 0.66 (0.44) | 0.59 (0.44) | 0.70 (0.46) |
| Intraclass correlation (ICC) | 0.03 | 0.01 | 0.03 | 0.16 | 0.15 | 0.17 |

Ref = Referent.

Respective significance for variable in models 1, 2a, and 2b: ^a p<0.001; ^b p<0.01; ^c p<0.05; ^{ns} Not significant (p<0.05). OR are printed in bold if p<0.05.

* CCST: Cervical cancer screening test.

** OR = Odds ratio; 95% CI = 95% confidence interval.

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Conflict of interest statement

The authors declare that there are no conflicts of interest.

Ethics approval

This cohort study was approved by France's privacy and personal data protection authority (Commission Nationale de l'Informatique et des Libertés [CNIL]).

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