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Health check-ups for the French under-consuming agricultural population: A pilot evaluation of the *Instants santé MSA* program

Bilans de santé pour la population agricole sous-consommante française : évaluation pilote du programme des Instants santé *de la MSA*

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ABSTRACT

Background. – The social protection scheme in charge of farmers and agricultural employees (MSA) in France has developed a two-step health promotion program with a nurse appointment followed by a consultation with a doctor of the participant's choosing to reach its under-consuming beneficiaries and enroll them back into a care pathway. Our objective was to carry out a pilot evaluation of this program.
Methods. – The evaluation was carried out on the population invited during the second semester of 2017 using data from the program's service providers (date of invitation, of nurse appointment…), regional MSA bodies (consultation voucher), and reimbursement data (other care consumption). Participation rates were calculated overall and by participant characteristics. Medical needs were identified during the nurse appointment and new care pathways were assessed using reimbursement data. Multivariable regression models identified factors associated with participation.
Results. – 2366 beneficiaries were included in the analysis. 1559 (65.89%) were men and mean age was 52.41 (standard deviation = 14.86). 409 (17.29%) attended the nurse appointment. There was a significant increase in participation with age, in farmers vs. employees (odds ratio = 1.905, 95% confidence interval = 1.393 −2.604), and in people living in the most disadvantaged areas (odds ratio = 1.579, 95% confidence interval=1.079−2.312). Participation to the consultation following the nurse appointment was high (62.35% −73.11%). 87.53% of participants had at least one medical need, and new care pathways were more frequent among those who had attended the nurse appointment (55.50% vs. 34.80%, $p < 0.0001$).
Conclusions. – This pilot evaluation shows promising results which need to be confirmed with a national evaluation of the program and longer-term evidence.

Mots-clés:
Promotion de la santé
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disparités d'accès aux soins
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RÉSUMÉ

Position du problème. – La Mutualité Sociale Agricole (MSA) a mis en place un programme de prévention et promotion de la santé à destination de ses adhérents sous-consommants. Il inclut un premier rendez-vous comprenant un entretien infirmier personnalisé et une consultation de prévention réalisée par un médecin désigné par l'adhérent. Notre objectif était de réaliser une première évaluation pilote de ce programme.
Méthodes. – L'évaluation a porté sur la population invitée pendant le deuxième semestre 2017 et a utilisé des données des prestataires chargés de la mise en place du programme (date d'invitation, date de l'entretien infirmier…), des données des caisses régionales de la MSA (bon de consultation) et des données de

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remboursement pour la consommation de soins. Les taux de participation ont été calculés globalement et en fonction des caractéristiques des participants. Les besoins médicaux ont été identifiés pendant l'entretien infirmier, et l'instauration de nouvelles prises en charge a été évaluée par des actes traceurs dans les données de remboursement. Des modèles de régression multivariés ont identifié les facteurs associés à la participation au programme.

Résultats. – 2366 adhérents ont été inclus dans l'analyse. 1559 (65,89 %) étaient des hommes, et l'âge moyen était de 52,41 ans (écart type = 14,86). 409 (17,29 %) se sont rendus à l'entretien infirmier. La participation augmentait avec l'âge, était plus élevée chez les exploitants que les salariés (odds ratio = 1,905, intervalle de confiance à 95 % = 1,393–2,604), et chez les personnes habitant dans des communes défavorisées (odds ratio = 1,579, intervalle de confiance à 95 % = 1,079–2,312). La participation à la consultation de prévention était élevée chez les personnes s'étant rendues à l'entretien infirmier (entre 62,35 % et 73,11 %). 87,53 % des participants avaient au moins un besoin médical et les instaurations de nouvelles prises en charge étaient plus fréquentes chez les adhérents qui s'étaient rendus à l'entretien infirmier (55,50 % vs. 34,80 %, $p < 0{,}0001$).

Conclusions. – Les résultats de cette évaluation pilote semblent prometteurs mais nécessitent d'être confirmés au niveau national et sur une durée plus longue.

1. Background

Studies have shown that agricultural populations in developed countries are in better health than the general population, in part thanks to lower rates of smoking and smoking-related diseases [1–3]. However, the reverse has also been observed, with an increased risk of cardiovascular diseases reported in some studies [4,5]. Due to occupational exposures, this population is also at higher risk of certain types of cancers, neurological diseases, respiratory symptoms, etc. [4,6–13]. Recently, concerns regarding their mental health have also been raised, with high rates of suicide in this population [14–16].

Because of where they live or who they are, agricultural workers may face barriers in access to care. Indeed, on top of financial barriers, rural areas often have fewer health care services and people must travel further away to see a doctor or go to a hospital [17–19]. In addition, because agricultural work often relies on immigrant workers, both in the US and Europe [20–22], workers may not be able to orient themselves in the health care system.

In France, the *Mutualité Sociale Agricole* (MSA) is the social protection scheme in charge of managing the health, family, pension and occupational accident benefits of farmers and agricultural employees, and collecting social security contributions from companies. With 5.6 million beneficiaries, it is the second largest social protection scheme in France. The MSA is made up of a central body, 35 regional bodies that cover the entire French territory, and multiple local offices to meet with its beneficiaries where they live.

The MSA puts a major emphasis on prevention, which is integrated into its doctrine and pluri-annual strategy. In this context, it has developed the *Instants santé MSA* (health moments MSA) program for beneficiaries who have had no or few contacts with the healthcare system over a given time period (6 months to 2 years depending on their age). The program offers them health check-ups to identify undiagnosed or unmet needs in order to promote primary prevention and, when necessary, enroll them in a care pathway. Our objective was to carry out a pilot evaluation of the program.

2. Materials and methods

The pilot evaluation had three intermediary objectives : 1) To evaluate participation rates for each step of the program and identify the factors associated with said participation, 2) to describe participants' medical needs and assess the success of the program in enrolling them back into a care pathway, and 3) to assess participants' satisfaction.

2.1. *The* Instants santé MSA *program*

Instants santé MSA is an on-going program that targets MSA beneficiaries aged between 25 and 74 who have not seen a general practitioner (GP) or medical specialist (dentists excepted) for a given period of time which depends on the beneficiary's age (Table 1). The threshold for a given age group was determined based on the number of beneficiaries in that age group and their care consumption. The lowest threshold that still allowed for enough beneficiaries to be invited and therefore analyzed was selected. The under-consuming population is identified through reimbursed care databases for each of the 35 regional MSA bodies every five years, with a roll-out of invitations for one-fifth of said population each year. It is completely free-of-charge for all participants.

Targeted beneficiaries are first invited to participate to the program via postal mail. If they do not answer, a second letter is sent a month later or, if a phone number is available, they are called up to three times by the service provider.

The program consists of a two-step intervention: 1) a personalized appointment with a nurse at a specific location in the community, and 2) a prevention consultation with a doctor of the beneficiary's choosing. Beneficiaries may choose to participate only to the second step by asking to receive a consultation voucher.

In the full program, participants who have set up a nurse appointment are first sent a self-administered questionnaire to assess their risk factors and prevention needs. This helps guide the appointment with the nurse, which is standardized and also includes a clinical work-up (height, weight, blood pressure…), a blood test (complete blood count, lipid profile, blood glucose and creatinine) and, for current smokers wishing to quit, a motivational interview on smoking cessation. At the end of the consultation, the nurse provides the beneficiary with a written summary of their findings regarding the prevention needs identified in the beneficiary to liaise with his or her doctor along with the consultation voucher (corresponding to an amount of €46 instead of the usual €25 fee of a regular consultation). Group workshops on nutrition are also available on-site.

The beneficiary then makes an appointment with his or her doctor who prescribes the necessary tests or medications and/or addresses the patient to specific MSA actions dedicated to the patient's needs

Table 1
Care consumption criteria for an invitation to the *Instants santé MSA* program.

Age group	Invitation criteria
25–44 years	Fewer than 2 consultations with a general practitioner or medical specialist (dentists excepted) in the past 2 years
45–54 years	Fewer than 2 consultations with a general practitioner or medical specialist (dentists excepted) in the past year
55–64 years	Fewer than 3 consultations with a general practitioner or medical specialist (dentists excepted) in the past year
65–74 years	Fewer than 3 consultations with a general practitioner or medical specialist (dentists excepted) in the last 6 months

(nutrition and health workshops, older people workshops, therapeutic education, occupational health, social needs...).

The doctor then sends the voucher back to the regional MSA body in order to be paid for the consultation along with the summary of the consultation so that the patient may be contacted by the MSA for any specific needs. If no voucher has been sent back in the eight weeks following the nurse appointment, the beneficiary is contacted by phone to enquire about the consultation (whether it was done but the voucher was not used, whether an appointment has been made, or whether they do not wish to do it).

2.2. Population

The pilot evaluation was carried out on the population invited during the second half of 2017. A new targeting system for beneficiaries was implemented gradually during that year. As such, the evaluation only included beneficiaries from regional MSA bodies which had switched to the new system, and for whom care consumption was available.

2.3. Data sources

Three complementary data sources were used. The two service providers for the *Instants santé MSA* provided information on the date of the invitation and telephone reminders and – for beneficiaries who attended the nurse appointment – its date, the needs identified during said appointment, clinical and biological results, and date of reminders for the prevention consultation.

Regional MSA bodies provided information on the date of the prevention consultation for those who had returned the voucher, along with other MSA actions required by the beneficiaries.

The central MSA reimbursement database provided information on prevention consultations without a voucher, along with other reimbursed care consumption.

2.4. Participation rates

Participation rate to the nurse appointment was calculated out of all invited beneficiaries. Participation rates to the prevention consultation with a doctor were calculated for all invited beneficiaries, for those who had been to the nurse appointment, and for those who had not. As there was some uncertainty surrounding the results due to the fact that some beneficiaries used the consultation voucher and some did not, a likely range for the true estimation was calculated. It included – for those who had been to the nurse appointment – consultation vouchers, consultations present in reimbursement databases (within three months of the nurse appointment) for people without a voucher who had been reached by the phone reminders and declared they had done or would do the prevention consultation, and an extrapolation to the population without a voucher who could not be reached by phone using the percentage of beneficiaries with a consultation among the population reached.

For people who did not attend the nurse appointment, participation was calculated based on the number of consultation vouchers returned. As we hypothesized that receiving the invitation could incite a behavioral change even without attending the nurse appointment, participation was then extrapolated to the population not using the voucher. This was done by using the ratio of consultations with and without a voucher among attendees of the nurse appointment.

The range of the participation rate varied between a minimum (i.e. only certain prevention consultations: vouchers and confirmed consultations present in the database) and a maximum value (including extrapolated consultations).

2.5. Medical needs and new care pathways

Medical needs identified during the nurse appointment were grouped in four categories : cardiovascular risk, prevention, mental health and dental care.

New care pathways were assessed through *de novo* actions in an ambulatory care setting (prescription of a new medication, consultation with a specialist...) which had not been present in the twelve months prior to the invitation to participate to *the Instants santé MSA* program and which occurred within the six months that followed. They targeted the four medical needs put forward during the nurse appointment and were identified though tracer acts in cardiology (consultation with or any act performed by a cardiologist, prescription of antihypertensive and antiaggregating drugs, stress tests), prevention (vaccinations, cancer screening, consultation with a gynecologist...), mental health (consultation with a psychiatrist, prescription of antidepressants and psycholeptics), and dental care (any act performed by a dentist or stomatologist).

2.6. Satisfaction survey

A satisfaction survey was carried out by phone interviews among 400 participants (including those who had chosen a direct access to a doctor). They were asked to rate their satisfaction out of 10, globally and for each step of the program, and open questions assessed reasons why they were satisfied or dissatisfied, and reasons for attending. Answers were then coded into themes and summarized quantitatively.

2.7. Statistical analysis

Characteristics of the population were described overall and for each step of the program using mean and standard deviation (SD) for continuous variables, and number and percentage for categorical variables. They included sex, age, profession group and socioeconomic status, which was assessed by an ecological indicator, the FDep [23]. It is calculated based on four variables measured at the postcode of residence of the patient: the percentage of blue-collar workers in the labor force, the percentage of high school graduates in the population aged 15 and over, the unemployment rate in the labor force and the median income per household. The population was then divided into quintiles based on national values. Differences between participants and non-participants were assessed using Kruskal-Wallis or Wilcoxon tests for continuous variables and Chi^2 tests for categorical variables.

Medical needs and new care pathways were assessed similarly and – for care pathways – depending on the needs identified by the nurse.

Multivariable logistic regression models were carried out to identify the factors associated with participation, all other things being equal.

3. Results

3.1. Population

7223 beneficiaries were invited to the *Instants santé MSA* program in the second half of 2017 in eligible regional MSA bodies, but only 4302 were invited using the new targeting system. Care consumption was available for 2366 of them, from three regional MSA bodies.

1559 (65.89 %) were men and mean age was 52.41 (SD = 14.86), with close to a third being over 65 (Table 2). The majority were employees, whether still active (32.16 %) or not (33.77 %). 37.91 % lived in areas from the two most disadvantaged quintiles.

Table 2
Characteristics of the population, overall and by attendance to the nurse appointment.

	Beneficiaries who attended the nurse appointment *n* = 409	Beneficiaries who did not attend the nurse appointment *n* = 1957	*p*	Total population *n* = 2366
Sex, *n* (%)				
Men	271 (66.26)	1288 (65.82)	.8632	1559 (65.89)
Women	138 (33.74)	669 (34.18)		807 (34.11)
Mean age (SD)	55.51 (13.17)	51.77 (15.11)	<.0001	52.41 (14.86)
Age groups, *n* (%)				
25–34	38 (9.29)	375 (19.16)	<.0001	413 (17.46)
35–44	43 (10.51)	291 (14.87)		334 (14.12)
45–54	90 (22.00)	370 (18.91)		460 (19.44)
55–64	90 (22.00)	303 (15.48)		393 (16.61)
65–74	148 (36.19)	618 (31.58)		766 (32.38)
Profession category, *n* (%)				
Farmer, active	119 (29.10)	323 (16.50)	<.0001	442 (18.68)
Farmer, inactive	48 (11.74)	229 (11.70)		277 (11.71)
Employee, active	104 (25.43)	658 (33.62)		762 (32.21)
Employee, inactive	127 (31.05)	672 (34.34)		799 (33.77)
Adjacent beneficiary[†], farmer	4 (0.98)	35 (1.79)		39 (1.65)
Adjacent beneficiary, employee	7 (1.71)	40 (2.04)		47 (1.99)
Socioeconomic status, *n* (%)				
Quintile 1 (highest)	65 (15.89)	335 (17.12)	.944	400 (16.91)
Quintile 2	138 (33.74)	646 (33.01)		784 (33.14)
Quintile 3	47 (11.49)	237 (12.11)		284 (12.00)
Quintile 4	52 (12.71)	254 (12.98)		306 (12.93)
Quintile 5 (lowest)	107 (26.16)	484 (24.73)		591 (24.98)
Missing	0 (0.00)	1 (0.05)		1 (0.04)

[†] An adjacent beneficiary is a beneficiary who is entitled to MSA benefits not through their own employment status but through that of a close relative (husband/wife, parents).

3.2. Participation rate to the nurse appointment

409 invited beneficiaries attended the nurse appointment, resulting in a participation rate of 17.29 %. There were significant differences between those who attended and those who did not in terms of age and profession category (Table 2). Likewise, participation rates varied with age (up to 22.90 % for the 55–64 age group) and profession type (26.92 % for farmers vs. 13.65 % for employees) (Appendix 1).

The multivariable regression model found no association between sex and participation but a significant increase in participation with age (Table 3). Farmers were also 90.5 % more likely to participate compared to employees, as were people living in the most disadvantaged areas (+57.9 %). Significant variations between regional MSA bodies were also found.

3.3. Participation rate to the prevention consultation

255 people who had attended the nurse appointment went to a prevention consultation, including 225 who returned a voucher. With extrapolated consultations, this number rose to 299. The participation rate among those who had gone to the nurse appointment was therefore between 62.35 % and 73.11 %. Participation was higher in women, in the 65–74 age group, in inactive farmers and in participants living in more disadvantaged areas (Appendix 1).

Likewise, among those who had not attended the nurse appointment, 65 returned a voucher, rising to 87 with the extrapolation, leading to a participation rate between 3.32 % and 4.45 %. It was higher in women, in the 55–74 age groups and in inactive farmers (Appendix 1).

Overall, the participation rate to the prevention consultation was between 13.52 % and 16.31 % (Appendix 1). There were significant differences between those who participated and those who did not in terms of sex, age, and profession (Appendix 2). All other things being equal, participation to the prevention consultation was higher in women (+46.8 %), in those over 45, who had attended the nurse appointment, and varied with the regional MSA body (Table 4).

3.4. Medical needs

One or more medical needs were identified in the vast majority of participants who saw a nurse (358, 87.53 %). 31.54 % had two, and 29.83 % had three or more. The most frequent was prevention-related (69.68 %), followed by cardiovascular risk (51.10 %) and dental care (43.52 %). 16.14 % reported a mental health issue and 7.33 % wished to quit smoking. On average, the population was overweight (mean body-mass index = 26.13, SD = 3.92), with 15.16 % being obese.

Table 3
Factors associated with the participation to the nurse appointment.

	Odds ratio	95 % confidence interval
Woman (ref: man)	1.022	0.803 – 1.300
Age group (ref: 25–34)		
35–44	1.227	0.766 – 1.965
45–54	1.966	1.297 – 2.982
55–64	2.639	1.736 – 4.012
65–74	2.865	1.842 – 4.455
Profession group (ref : employee, active)		
Farmer, active	1.905	1.393 – 2.604
Farmer, inactive	0.709	0.435 – 1.154
Employee, inactive	0.881	0.625 – 1.244
Adjacent beneficiary[†], farmer	0.449	0.152 – 1.329
Adjacent beneficiary, employee	0.790	0.331 – 1.885
Socioeconomic status (ref : Q1, highest)		
Quintile 2	1.147	0.824 – 1.596
Quintile 3	1.074	0.694 – 1.662
Quintile 4	0.976	0.634–1.502
Quintile 5 (lowest)	1.579	1.079–2.312
Regional MSA body (ref : MSA 1)		
MSA 2	1.612	1.149–2.262
MSA 3	1.659	1.193–2.308

[†] An adjacent beneficiary is a beneficiary who is entitled to MSA benefits not through their own work status but through that of a close relative (husband/wife, parents).

Table 4
Factors associated with the participation to the prevention consultation.

	Odds ratio	95 % confidence interval
Woman (ref: man)	1.468	1.033 – 2.085
Age group (ref : 25–34)		
35–44	1.160	0.555 – 2.423
45–54	2.254	1.193 – 4.259
55–64	2.119	1.121 – 4.005
65–74	2.895	1.487 – 5.637
Attended the nurse appointment (ref : no)	58.945	41.308 – 84.113
Profession group (ref : employee)		
Farmer, active	0.670	0.410 – 1.095
Farmer, inactive	1.184	0.586 – 2.389
Employee, inactive	1.002	0.599 – 1.675
Adjacent beneficiary[†], farmer	2.446	0.762 – 7.852
Adjacent beneficiary, employee	0.836	0.226 – 3.098
Socioeconomic status (ref : Q1, highest)		
Quintile 2	0.939	0.573 – 1.538
Quintile 3	1.108	0.585 – 2.099
Quintile 4	1.066	0.569 – 1.997
Quintile 5 (lowest)	1.086	0.615 – 1.918
Regional MSA body (ref : MSA 1)		
MSA 2	0.809	0.482 – 1.358
MSA 3	2.264	1.383 – 3.706

[†] An adjacent beneficiary is a beneficiary who is entitled to MSA benefits not through their own work status but through that of a close relative (husband/wife, parents).

Surprisingly, people with no identified need had a higher participation rate to the prevention consultation (66.67 % vs. 61.48 % among those with three needs or more). People with a mental health problem also had a higher participation rate (68.18 %) while those who wished to quit smoking had lower participation rates (53.33 %).

3.5. New care pathways

Out of all invited beneficiaries, 908 (38.38 %) were enrolled in a new care pathway in the six months that followed their invitation to the *Instants santé MSA* program. For the vast majority this was a prevention measure (67.73 %), followed by dental care (40.31 %). The percentage of beneficiaries with a new care pathway was higher among those who had attended the nurse appointment (55.50 % vs. 34.80 %, $p < .0001$). New prevention, dental and cardiovascular care were all significantly higher in that population (39.36 % vs. 23.20 %, $p < .0001$, 24.45 % vs. 13.59 %, $p < .0001$, and 5.13 % vs. 2.66 %, $p = .0084$, respectively).

However, there was no association between having a medical need identified during the nurse appointment and new care pathways, overall (48.41 % when a need was identified vs. 56.86 % when it was not, $p = .8344$) or by type of medical need, except for prevention (Table 5).

3.6. Satisfaction

Out of the 400 people who participated in the satisfaction survey, 75 % were men, two-thirds were aged between 45 and 64, and 58 % were farmers. 178 (44.50 %) had attended the nurse appointment only, 199 (49.75 %) both the nurse appointment and the prevention consultation, and 23 (5.75 %) only the consultation. Reasons for not going to the prevention consultation were lack of time (59 %), followed by no perceived need (18 %) and postponing it until later (16 %).

Regarding overall satisfaction, 87 % gave the program a grade of 7 or more out of 10. The reasons for said grade were the possibility of having a check-up (36 %), the conviviality of the program (26 %) and the teams' attentiveness (12 %). On the other hand, 18 % felt it could have gone further. When asked what made them attend, they mentioned the opportunity of a health check-up (73 %), the prevention aspect (18 %), and the fact that they did not go to the doctor often enough (14 %).

Table 5
New care pathways depending on medical needs.

	Identified medical need *n* (%)	No identified medical need *n* (%)	*p*
Cardiovascular risk			
New cardiovascular pathway	12 (5.74)	9 (4.50)	.5695
No new cardiovascular pathway	197 (94.26)	191 (95.50)	
Mental health (excluding addictions)			
New mental health pathway	0 (0)	1 (0.29)	.6605
No new mental health pathway	66 (100)	342 (99.71)	
Smoking cessation			
New smoking cessation pathway	0 (0)	0 (0)	–
No new smoking cessation pathway	30 (100)	379 (100)	
Prevention			
New prevention pathway	124 (43.51)	37 (29.84)	.0093
No new prevention pathway	161 (56.49)	87 (70.16)	
Dental care			
New dental care pathway	49 (27.53)	51 (22.08)	.2036
No new dental care pathway	129 (72.47)	180 (77.92)	

Regarding the appointment with the nurse, 90 % gave a grade of 7 or more. The main reason for a grade below 7 was that too few tests and exams had been carried out (51 %).

Regarding the prevention consultation, 91 % went to their own GP, and 91 % gave it a grade of 7 or more. Among those who gave a grade below 7, 50 % felt their GP did not appreciate the goal of the *Instants santé MSA* program, 25 % thought their GP had not spent enough time on the consultation, and 25 % felt their GP did not properly investigate the nurse's initial findings.

4. Discussion

A little under a fifth of under-consuming beneficiaries invited to the *Instants santé MSA* program attended a nurse appointment and among those who did, participation to a prevention consultation with a medical doctor was high (between 62.59 % and 73.84 %). The program led to new care pathways being initiated in over half of people who attended the nurse appointment.

There was a high prevalence of unmet medical needs in our population, with close to 9 out of 10 people having at least one and prevention and cardiovascular risk being the most frequent. Similar results have been reported in the literature on the health of agriculture workers, who have been shown to have higher prevalence of cardiovascular risk factors and fewer up-to-date vaccination and cancer screenings [24–26], as well as many medical needs [27].

Possible mental health problems were also highlighted in 16 % of participants, which is not surprising given the high prevalence of mental disorders and suicide risk in that population [14,16,28–30] but would benefit from further investigations so that dedicated actions may be put in place, especially when considering the very low rate of initiated mental health care following an attendance to the *Instants santé MSA* program.

Despite those identified needs, we found no association between specific needs and corresponding care pathways, except for prevention. There are two possible reasons for this. First, actions implemented by GPs may not be identifiable in our data sources. Indeed, when confronted with cardiovascular risk factors, a GP may first recommend hygiene and dietary measures which are not associated with a prescription and therefore are not present in reimbursement

databases. Likewise, for non-severe mental health problems, people may consult a psychologist whose care is not reimbursed in France and therefore not recorded in the databases. Second, it is possible that the summary written by the nurse with the participant's medical needs did not reach the doctor, either because the patient forgot to bring it with them or, if they did, because the doctor did not go over it. Additional studies, in particular sociological work, are required to investigate this further, and if the latter appeared to be the case, work should be done to increase GPs' awareness to the *Instants santé MSA* program and its objectives.

Regarding participation rates and the factors associated with it, our findings are in line with the literature with regards to the effect of sex and age. While we found no association between sex and participation to the nurse appointment, women were more likely to participate to the prevention consultation and, indeed, studies have shown that women show more interest in, participate more, and are more likely to complete prevention and health promotion programs [31–35]. The same has been found for older people [35–37].

Regarding socioeconomic status, the program did not increase social health inequalities. Indeed, the deprivation of the local area where people lived was not associated with participation to either step of the program. This was an initial concern as studies have shown that people with a lower income, lower education level, with a disability pension or unemployed were less likely to participate to prevention programs [38–42].

This study is one of the first to evaluate a program dedicated to orienting under-consuming beneficiaries, in particular farmers and other agriculture-related workers, back into the healthcare system. It also has limits, some which are due to the program itself and others to its evaluation. Regarding the program, the invitation thresholds were chosen in part to facilitate the evaluation, rather than to identify only "true" under-consuming beneficiaries. However, to the best of our knowledge, there are no existing recommendations regarding the appropriate number of GP visits per year based on age in France and too few invitations may have led to inefficiencies in the program. Still, it would be interesting to investigate who the participants were in terms of prior healthcare consumption so as to find out who the program did reach.

Regarding the evaluation, there were relatively few beneficiaries included in the pilot evaluation, and so we may not have had the statistical power to identify differences between groups, in particular where medical needs and new care pathways were concerned. As with any prevention program, participants may not be representative of the entire target population. In this particular case, the postal invitation may have excluded beneficiaries who move frequently, such as seasonal workers, although this was partially overcome by a phone call to non-respondents. No non-participant was included to the satisfaction survey, while it would have been interesting to investigate why they did not in order to improve the appeal of the program and increase participation rates. There may also be a participation bias in those who did answer. In addition, only three regional MSA bodies were included, and results showed variations in participation between them. As a result, we cannot exclude the possibility that some of the results may be due to local context and therefore results cannot be extrapolated to all of France. In order to investigate this, a nation-wide evaluation for the year 2018 and onwards is underway. Finally, while GPs were asked to return a summary of their consultation with the beneficiaries as part of the program, the return rate was too low to allow data analysis.

This pilot evaluation shows promising results in the short-term but the *Instants santé MSA* program still needs to prove its effectiveness and that of its separate components. In particular, the necessity of the systematic blood test should be evaluated, in particular in younger participants in whom the likelihood of a biological anomaly is low. To this end, a cost-effectiveness analysis would be of interest. In addition, these preliminary results need to be confirmed with an exhaustive national evaluation of the program so as to ensure that the observed results are not due to local context. Longer-term evidence is also needed. In particular, while over half of participants benefited from an integration into a new care pathway in the six months that followed their invitation, it remains to be seen whether this renewed contact with the healthcare system will be long-lasting and the impact it will have on their future health. As it is possible to follow care consumption in reimbursement databases over time, this will be investigated in the future to evaluate the long-term effect of the program, with the hope that the program's participants will maintain regular contacts with the healthcare system and that, *in fine*, chronic diseases will either be prevented or diagnosed at an early stage rather than following an acute decompensation, leading to better health outcomes.

5. Conclusions

Our findings show that it is possible to implement a health promotion program to an underserved population and obtain good participation rates without increasing health inequalities. It could serve as a stepping stone for other communities and settings, or – more broadly – benefit any person who has had no recent contact with the healthcare system so as to improve prevention and health promotion.

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Conflict of interest statement

MM, CD and KC report no conflict of interest apart from the funding received to carry out the study. MAS and VD are both employees of the funder, the *Mutualité Sociale Agricole* central body (*CCMSA, Caisse centrale de la Mutualité Sociale Agricole*).

Authors' contributions

MM made contributions to the design of the study, analyzed and interpreted the data and drafted the manuscript. MAS made contributions to the design of the study, helped acquired the data, interpreted the data and critically revised the manuscript. CD analyzed and interpreted the data and critically revised the manuscript. VD made contributions to the design of the study, helped acquired the data, interpreted the data and critically revised the manuscript. KC made contributions to the design of the study, interpreted the data and critically revised the manuscript. All authors read and approved the final version of the manuscript, and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi : 10.1016/j.respe.2022.101420.

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