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A structural equation model of the family physicians attitude towards their role in prevention: a cross-sectional study in Switzerland

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Abstract

Background. In contrast to many studies exploring barriers to preventive care in family medicine, there is less quantitative research regarding the self-perceived role of family physicians (FPs) in prevention and its predictive factors. Moreover, the existing studies considered this attitude as a homogeneous entity. The objective of this study is firstly, to characterize FPs' attitudes towards prevention taking into account nine different prevention themes, and secondly, to explore the factors that could be predictive of this attitude.

Methods. The data stem from a cross-sectional national survey on prevention we conducted in Switzerland from 2015 to 2016 (170 physicians randomly drawn, online questionnaire). We first performed a confirmatory factor analysis to define a homogeneous latent variable regarding physicians' attitude towards prevention, then, a structural equation modeling to identify potential predictors.

Results. The FP' attitude towards their role in preventive care was homogeneously positive whatever the topic (smoking, drinking dietary habits, physical activities, and more generally, cardiovascular risk factors) except for occupational risks and cannabis consumption. A feeling of good effectiveness was a positive predictor of this positive attitude while seniority, the lack of reimbursement and being a physician from the German-speaking area were negative predictors.

Conclusion. The FP' attitude about their role in prevention is homogeneous concerning the 'classical' topics of prevention, whereas they still under-recognize certain topics as important fields for prevention. To change this situation, we probably need a global effort to introduce other ways of thinking about prevention, including not only FP but also all stakeholders.

Keywords: Cultural variations, effectiveness, general practitioner, homogeneous attitude, prevention, self-perceived role.

Introduction

In contrast to the many studies, investigating barriers to implement preventive care, little quantitative research on family physicians' (FP) self-perceived roles (or attitudes) in prevention (1–17) and its predictive factors exists (10,18). Indeed, knowledge, beliefs, attitudes and practices are close, but not strictly overlapping concepts. In education sciences, the Knowledge, Attitudes, and Practices (KAP) model underpins a well-validated theory regarding behavior changes

distinguishing specific predictors for each component of a model ([19],[20]). Beliefs could also been added to this equation ([14],[21]). Health prevention is a good example for which a positive attitude among the professionals does not systematically lead to the implementation of actions ([22]). Moreover, most of the studies regarding FPs' attitude towards prevention either focused on one unique topic, such as smoking or lifestyle habits, or considered this attitude as a unique and homogeneous entity ([23]). Thus, it could be of interest to study FP attitude to prevention, considering simultaneously several different topics, and then, verify that their attitude is homogeneous for all the topics. Regarding the predictive factors of FPs' self-perceived role in prevention, intrinsic features such as gender and age might play a role ([24]). Additionally, beliefs such as the lack of efficacy, education or reimbursement, may not only influence prevention practice but also upstream the FP's global attitude towards prevention ([21]). Lastly, factors that are more objective, such as practice organization and functioning features might be associated with this attitude ([9],[25]).

The quantitative studies already conducted in this area used classical statistical procedures assessing straightforward relationships, such as linear or logistic regression. However, the association between all of these factors is probably more complex. Structural equation modeling (SEM) is a statistical procedure that allows testing non-straightforward relationships and is therefore well suited to the management of cross-sectional data for inferential purposes. These models enable the simultaneous fit of several multiple linear regressions and the variables present in the regressions may be either observable or latent ([26]).

The objective of the study is firstly, to characterize the FP's attitude towards prevention taking into account different topics, and secondly, to explore factors predictive of this attitude.

Methods

Study design and population

In 2015–2016, we launched a large study about prevention in family medicine in Switzerland. The objective of the study was to describe attitudes and practices regarding prevention among FPs and their patients. The present study focuses on the FP's attitude. We carried out the study using the SPAM FP network, including in 2015, 277 randomly selected members. The SPAM network was a national FPs network created in 2012 with 200 members to monitor the practice patterns of Swiss. It was formed by inviting a random sample of FPs from professional lists stratified by Canton. The representativeness of the network members in terms of gender, age and rural-urban location was cross-checked against the national statistics and considered satisfactory ([27]). To augment the membership and replace physicians leaving the network, a further 3000 FP were invited to participate by mailed invitation in 2015, increasing the network to 277 members. We asked the FPs to answer an online questionnaire about their opinions, attitudes and practices regarding preventive medicine. The data collection took place between August 2015 and May 2016. We obtained approval for this survey from the ethical review board of the Canton of Vaud.

Data

First, we developed the questionnaire and tested it locally in French with six community physicians to ensure comprehension and obtain feedback. We then translated it into German and Italian, as Switzerland contains these three main linguistic areas. The questionnaire was translated from the French version to the German and Italian versions by two translators independently (only one for the Italian translation). The two versions were then compared and discussed. There was no back translation.

The questionnaire consisted of four main sections including: (i) sociodemographics of the FPs, i.e. sex, age, seniority, linguistic and rural/urban areas, (ii) practice organization and functioning features, (iii) preventive activities provided by the FPs (counseling, immunization and screening activities), (iv) FPs' attitudes towards prevention (perceived role) and obstacles to delivering preventive care. Regarding FPs, opinions, attitudes and practices, the vast majority of the questions originated from the periodic national survey among FPs carried out in France by the National Institute for Prevention and Health Education, since the nineteens ([28],[29]). For the present study, we selected variables to study the FP's attitude regarding their role in prevention according to the topic and the potential predictive factors of this behavior. We assessed attitude for the following topics: smoking and drinking habits, cannabis consumption, dietary habits, physical activities, overweight, affective and sexual life, cardiovascular risks and occupational risks. We grouped potential predictive factors into three categories: (i) sociodemographic, (sex, age or seniority), linguistic area, rural/urban area, (ii) practice organization and functioning factors, i.e. group/solo practice, other activities beyond standard consultations, consultation length, weekly workload, pharmacy available in the practice, (iii) Opinions or beliefs regarding prevention, i.e. enough time and reimbursement, feeling of effectiveness and the global conception of health as an individual or collective responsibility.

Statistical analysis

We conducted the statistical analyses in two steps: first, a confirmatory factor analysis (CFA) in order to obtain a single latent variable characterizing FPs' attitudes regarding their role in prevention; we named '*PREV-Role*'. Nine variables were included in this analysis corresponding to the nine previously mentioned topics. We followed the strategy outlined in Acock ([30]) to select a good fitting model. We used *Ad-hoc* modification indices to suggest modifications of the CFA (between variable correlations) or variable exclusion in order to improve its fit to the data. We took the most extreme suggested modifications into account if they made sense from a substantive point of view. To assess the goodness of fit of our model, we used the following parameters: the root mean square error of approximation (RMSEA), the comparative fit index (CFI) and the standardized root mean square residual (SRMR). The RMSEA indicates how well the model would fit the hypothetical population covariance matrix while accounting for model complexity. Following Hu and Bentler ([31]), we considered values below 0.05 as a good fit while 0.10 or greater indicates a poor model. The CFI reveals the extent to which the hypothesized model provides a better fit than the null model. The CFI has a range of 0–1.0; a value greater than 0.90 suggests a reasonably good fit and ≥0.95 a good fit. Parameters estimated in a structural equations model, which can range from –1 to +1, indicate the strength and sign of the paths. They correspond to the change in standard deviation (SD) of a dependent variable when an independent variable changes by one SD. In addition to the statistical significance of the parameters, the strength of the relationship plays a role in determining whether the relationships are weak (<0.2), moderate (0.2–0.5) or strong (>0.5) ([30],[31]). In a second step, we extended the CFA and studied the association between the latent variable (as a dependent variable) and the three groups of variables characterizing the physicians' sociodemographic features, beliefs and practice features, using a SEM. First, we performed univariate analyses to select the associated variable at a *P* value of 0.2 or less and to include them in a multiple linear regression model. Lastly,

we tested associations between independent variables by additional linear models. The model was fitted using maximum likelihood; the reported inference was based on robust standard errors.

The statistical analyses were performed using STATA software (Version 14.2, Stata Corp, College Station, TX).

Results

Characteristics of the sample

Of the 277 physicians participating in the SPAM network, 167 completed the online survey (response rate 60%). We show characteristics of the physicians and the practices in Table 1. Physicians were mainly men (70%), with a median age of 56 years and median

Table 1. Main characteristics of the FP sample

FP characteristics	N = 167	Frequency (%) or median
Sex (women)	51	30.5
Age	167	56
Language area		
German	89	53.6
French	63	37.9
Italian	14	8.4
Years of experience in practice	164	18
Other activities	122	73.0
Practice organization and functioning characteristics		
Group practice	130	77.8
Practice in a rural area	46	27.5
Pharmacy available in practice	69	43.4
Use of shared health electronic records	100	63.7
Consultation length	159	20
Number of patients (if patient list)	94	1700
Weekly workload (hours/week)	155	44
Number of face-to-face consultations/day	158	12

seniority of 18 years. 78% of them worked in group practice and 28% located in urban areas. Table 2 reports the FPs attitudes and beliefs regarding prevention. In general, they agreed (or strongly agreed), that preventive care is one of their roles, with a frequency varying from 80 to 99%. They felt less concern for topics related to occupational risks (83%) and affective and sexual life (80%). More than 50% of the FPs (52.5%) declared that there should be more reimbursement to perform preventive activities. They thought they could achieve better their mission of prevention with more supporting tools (70%), better training (61%) and more delegated tasks in their practice (80.2%). Finally, 35% of them reported their feeling of effectiveness as poor.

Definition of the latent variable 'PREV-Role'

The confirmatory analysis shows that the loading of each of the variables on the latent variable '*PREV-ROLE*' was highly significant. However, the loadings of three variables, i.e. preventive role in affective and sexual life, occupational risks and cannabis consumption, were lower (between 0.45 and 0.65) than those of the other variables (above 0.70) (Table 3). Additionally, the goodness of fit was not optimum. We could only obtain acceptable goodness of fit according to the different indices by dropping the two latter variables, i.e. occupational risks and cannabis consumption. Finally, the introduction of a covariance term between a role regarding smoking and drinking habits improved the CFI parameter.

Structural equation final model

Results regarding univariate analyses are described in Table 4. Our final model showing the closest good fit to the data had the following statistics; RMSEA = 0.05, CFI = 0.978; and SRMR = 0.046. Regarding FPs sociodemographic features, we found an association between *PREV-Role* and either the age (Parameter = –0.17, implying a weak association, $P = 0.03$) or the seniority of the FP. We kept the seniority variable since it was more predictive (Parameter = –0.17, implying a weak association, $P = 0.03$). We also found an association

Table 2. FPs' attitude and beliefs regarding preventive care in Switzerland

FPs' attitude	N	Frequency (%)				
Is it your role to perform preventive activities regarding…		Strongly agree	Agree	Disagree	Strongly disagree	Don't know
Smoking	161	84.5	14.3	1.2	0.0	0.0
Alcohol drinking	162	83.3	15.4	1.2	0.0	0.0
Cannabis consumption	162	66.1	27.8	6.2	0.0	0.0
Dietary habits	162	66.1	30.9	3.1	0.0	0.0
Physical activities	162	73.5	24.1	2.5	0.0	0.0
Overweight	162	76.5	19.1	4.3	0.0	0.0
Affective and sexual life	161	31.1	49.1	18.1	1.9	0.0
Cardiovascular risk	162	88.3	11.1	0.6	0.0	0.0
Occupational risks	161	37.9	45.3	16.2	0.7	0.0
FPs opinions and beliefs						
I do not have enough time to perform preventive activities	162	1.9	18.0	50.3	29.8	-
I do not have enough reimbursement to perform preventive activities	162	17.3	35.2	29.0	18.5	-
How effective do you feel in your preventive activities		Very effective	Rather effective	Little effective	Not effective	Don't know
	155	10.3	54.2	34.8	0.7	
Globally, do you think health is under (depends)…		Individual responsibility	Collective responsibility			
	158	44.3	55.7			

with the linguistic area and a lower *PREV-Role* score among the German-speaking FPs (Parameter = –0.26, implying a moderate association, *P* = 0.001) compared to the French ones (Figure 1).

Regarding FPs' beliefs about prevention, a feeling of good effectiveness (Parameter = 0.27, moderate association, *P* = 0.001) and, to a lesser extent, a need for a better training (Parameter = 0.14, weak association and borderline significant, *P* = 0.078) were both positive predictors of *PREV-Role*. In contrast, lack of reimbursement is negatively linked with *PREV-Role* (Parameter = –0.16 weak association, *P* = 0.04).

Introducing other regressions between the explanatory variables allowed studying indirect pathways. Thus, the SEM showed a (negative) direct path between seniority and *PREV-Role* but also indirect path via the need of better training and the lack of reimbursement. In the same way, belonging to the German-speaking area was a direct negative predictor of *PREV-Role* and an indirect predictor via the self-perceived effectiveness and the need for better training. This illustrates the ability of the SEM to highlight the phenomenon of confusion in association models. For example, seniority and insufficient reimbursement were negatively associated with *Prev-Role*, but seniority was also negatively associated with insufficient reimbursement. If we dropped insufficient reimbursement from the final

model, the value of the parameter (absolute value) for seniority would increase. Finally, we found no association with practice organization and functioning variables (solo/group practice, urban/rural area, use of health electronic record, quantitative workload, consultation duration) in the final multiple model. In univariate analysis, the availability of an integrated pharmacy in the practice was negatively predictive of the FPs attitude about prevention, but the association disappeared when we introduced the linguistic area.

Discussion

This study showed that the FPs attitude towards their role in preventive care was homogeneously positive whatever the topic and can be summarized by a single latent variable, except for occupational risks and cannabis consumption. A feeling of good effectiveness was a positive predictor of this positive attitude while seniority, lack of reimbursement and being a physician from the German-speaking area were negative ones.

The role of the FPs in preventive care

Despite an unfavorable context (preventive care are little valuated by the healthcare system), this study shows that the Swiss FPs' attitude towards prevention is globally positive, even if there may be room for improvement in some domains. First, the FP's attitude is homogeneous and positive considering 'classic' topics, i.e. cardiovascular risks and major addictions (with a reinforced link for attitude towards smoking and drinking habits). It is however less clear about some less common topics in prevention, in particular for occupational risk factors, cannabis consumption and, to a lesser extent, for affective and sexual life. With a deficit in occupational medicine, as there is in Switzerland the FP could be the right professional to target and prevent occupational risks (chemical, physical and occupational), with his central position in the health system and his good knowledge of the patients' way of life. However, without 'the culture of occupational risks', physicians may feel uncomfortable and unsure of their abilities to address this issue. A better training in pre- and post-graduate education, including specific *ad hoc* courses, as exist for smoking and drinking habits, is necessary. Similarly, specific tools for routine use could be useful.

Table 3. Confirmatory factor analysis for the latent variable PREV-Role

Items	Items loading on the latent variable PREV-Role		
'Is it your role to perform preventive activities regarding'	Parameter	95% CI	*P* value
Smoking	0.75	[0.67–0.82]	<10⁻³
Alcohol drinking	0.76	[0.68–0.83]	<10⁻³
Cannabis consumption	0.64	[0.54–0.74]	<10⁻³
Dietary habits	0.77	[0.70–0.84]	<10⁻³
Physical activities	0.84	[0.78–0.98]	<10⁻³
Overweight	0.83	[0.78–0.89]	<10⁻³
Affective and sexual life	0.59	[0.48–0.70]	<10⁻³
Cardiovascular risk	0.73	[0.65–0.81]	<10⁻³
Occupational risks	0.46	[0.32–0.58]	<10⁻³

CI, confidence interval.

Table 4. Predictive factors of the latent variable 'PREV-Role', univariate analyses

FP characteristics	N (167)	Parameter	95% CI
Sex women	51	0.07	[–0.9;0.23]
Age	167	–0.13	[–0.28;0.03]
Years of experience in practice—Seniority	164	–0.18	[–0.33; –0.20]
Language area—German	89	–0.25	[–0.40; –0.10]
Practice organization and functioning characteristics			
Other activities	122	–0.15	[–0.30;0.01]
Solo practice	130	–0.01	[–0.17–;0.15]
Practice in a urban area	46	–0.04	[–0.20;0.12]
Pharmacy available in practice	69	–0.21	[–0.36; –0.53]
Consultation length	159	0.12	[–0.04;0.28]
Number of patients (if patient list)	94	0.01	[–0.16;0.18]
Weekly workload (hours /week)	155	0.09	[–0.07;0.26]
FPs opinions and beliefs			
Insufficient reimbursement	85	–0.15	[–0.30;0.01]
Insufficient time	32	0.19	[0.03;0.34]
Felling of effectiveness	100	0.21	[0.06;0.37]
Need for better training	96	0.22	[0.07;0.37]
Health is individual responsibility	70	0.13	[–0.03;0.29]

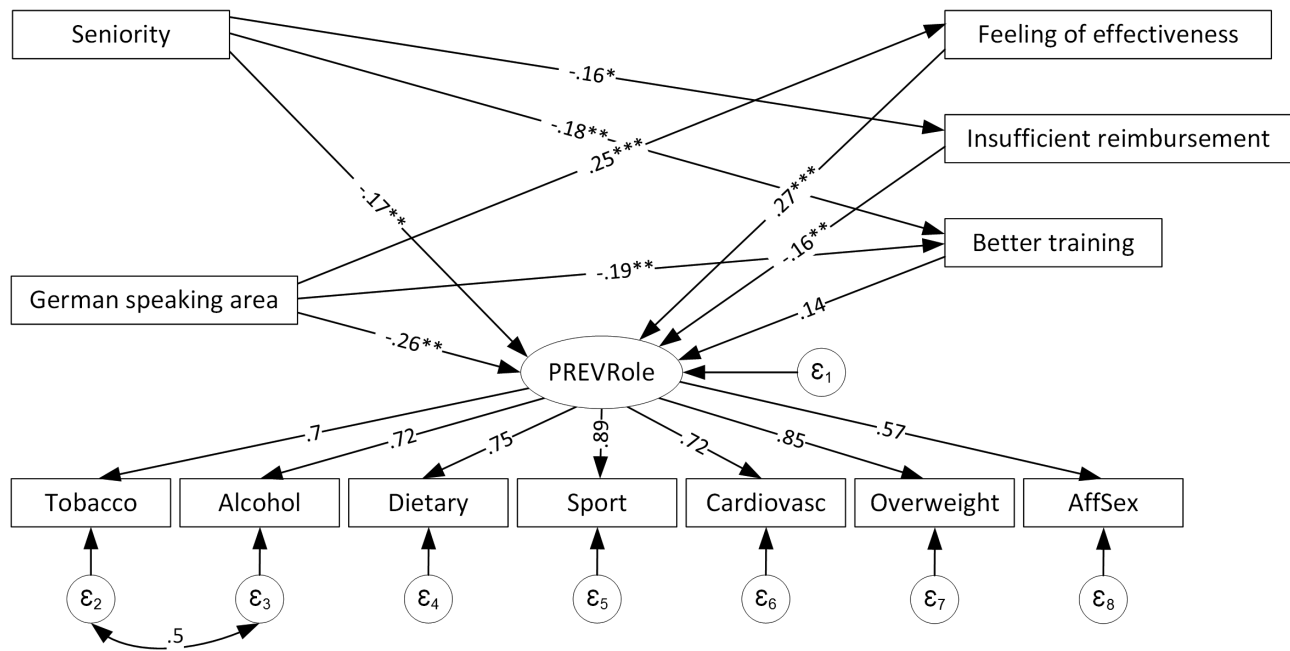**Figure 1.** Structural equation model for PREV-Role according to FPs' sociodemographic features and opinions in Switzerland. Parameter: < 0.2, Weak association: 0.2–0.5, Moderate association: > 0.5, Strong association: * 0.05< P <0.01/** 0.01< P <0.001/***P ≤ 0.001.

Along the same lines, FPs seem to have less interest in prevention pertaining to cannabis consumption. The quite elevated average age of their patients (around 60 years old in our study) could be an explanation. Another explanation might be the lack of knowledge and skill regarding the damage of cannabis consumption on health. Again, training and specific tools related to this topic may be necessary.

Predictive factors of a positive attitude for FPs' role in prevention

Among the predictive factors of the FPs' attitude towards prevention, we found some of them, i.e. lack of training, insufficient reimbursement and doubt regarding effectiveness, already reported in the literature as predictors of implementation of preventive care. With regards to the theory of behaviors related to the KAP model, we mentioned in the introduction (19,20), it is interesting to note that these factors are also predictive of the FP's self-perceived role in prevention. This suggests that they might already influence the attitude first, before influencing the practice. There is not extensive reporting in the literature of associations between the FP's attitude about prevention and sociodemographic features. A recent American study found no difference according to gender, age, seniority and rurality (18). Conversely, in Sweden, Johansson reported that male FPs had a more positive attitude about the role of primary healthcare professionals in preventive care (24) than female FPs. Our results did not show differences according to gender. However, our survey also reported a high-contrasted gender difference regarding responsibility in health (results not shown). Female FPs reported that health was the result of a collective responsibility whereas male FPs reported that it was an individual responsibility. Finally, this opposite opinion regarding the responsibility for health does not seem to affect the FPs self-perceived role in prevention.

We showed a predictive effect of age (P = 0.12 in univariate analysis) and seniority (due to collinearity, only seniority was kept in the final model). This result suggests that years of experience play a role in favor of a negative attitude towards prevention. In contrast,

it may suggest that younger generations of physicians are more favorable to prevention. Unfortunately, since we cannot distinguish age and seniority, we cannot differentiate a generational effect; i.e. younger physicians show a more positive attitude compared to older physicians because of different training or from a consequence of their professional experience.

The predictive role of the linguistic area is interesting to discuss. Despite the existence of linguistic regions, Switzerland offers harmonized pre and post-graduate training programs for FP. The three regions also part of a single health funding system. One difference between the German and French speaking areas is the possibility of drug delivery from practice-integrated pharmacies in German-speaking practices. Actually, this factor was predictive of the FPs' attitude about prevention in univariate analysis but the association disappeared when we introduced the linguistic area, as the two variables are highly confounded. This association might suggest that the possibility to provide drugs would lead the FPs providing more oriented-curative care. This issue requires further attention. Beyond this hypothesis, the results also raise the issue of the cultural aspect of FPs' attitude towards prevention. Despite the unique health care system across the country (with a few minor differences in functioning), the linguistic area is correlated with particular FP opinions such as the feeling of effectiveness (higher among the German-speaking physicians) and the need for better training to be able to perform preventive activities (lower in the German-speaking area). The issue of cultural variations in an interesting results to address for considering potential generalization of the study.

Limitations and strengths

The representativeness of the sample might be limited. Despite a random sampling and good representation in terms of age, gender and rural/urban repartition (27), the low acceptation rate for participation in a practice-based network (although classically observed in such research) might introduce some level of bias on other unmeasured characteristics. A relatively small sample size, probably limits the possibility of observing associations that are more significant.

We did no formal power analysis. However, Wolf *et al.* explored a series of SEMs for required sample sizes. When considering a single factor CFA with strong factor loadings, as in our case, these authors reported required sample sizes which never exceeded 100 (32). However, the relatively small sample size, may have limited the statistical significance of our associations that are more significant. There are some caveats in the proposed statistical analysis. The variables characterizing the attitudes were not normally distributed and had low variability. However using the theoretically more adapted generalized structural equation modelling with ordered logit link as implemented in the stata command gsem, led to qualitatively similar results although with some convergence problems (33). Other factor structures (e.g. dependent on the language or 2 factors) might have been considered. We preferred to concentrate on the determinants of the general attitude towards prevention. These determinants might indeed have been different for the excluded prevention attitudes towards occupational risks or cannabis. These specific questions were considered to be out of the scope of the paper. Finally the shown relationships between independent variables should not directly be used as evidence indirect effects. No specific analysis of mediation was done.

Lastly, the study was cross-sectional and thus we cannot assess the causal nature of the associations even if the use of a SEM allows better understanding of the links between the different factors and the mechanisms of their association.

Conclusion

Considering the 'classic' topics of prevention such as smoking and drinking habits, physical activities, dietary habits and more generally cardiovascular risk factors, the attitude of Swiss FPs concerning their role in prevention is homogeneous. However certain topics including, occupational risks and cannabis consumption, are often under recognized as an important field of prevention in family medicine. A global effort is probably needed to change the situation. It should include all the stakeholders (not only the FPs) to mastermind a new way of thinking about prevention in society. Indeed, at present implementation of preventive care in family medicine often occurs in response to a clinical context while universal primary preventive care, or health promotion, is lacking (excluding immunization). Regarding public health policies, the situation is often ambivalent. In Switzerland and probably as in other industrialized countries, the public health planners regularly underline the importance of preventive care but the part of the health budget devoted to prevention remains low, at best 2%, and even a slight decrease (relative part) between 2008 and 2013. Moreover, the prevention plans are currently, according to the topic, fragmented whereas a global approach from the authorities is necessary to improve the culture of prevention.

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