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Adherence to guidelines when evaluating fitness-to-drive in the elderly: a practice review of Swiss physicians

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Summary

OBJECTIVE: We aimed to explore the extent to which general practitioners (GPs) in Western Switzerland adhere to Swiss recommendations when assessing fitness-to-drive in the elderly.

METHODS: A random sample of 500 GPs practicing in Vaud, Neuchatel and Jura, and all GPs certified to conduct fitness-to-drive assessments in Geneva ("experts", n = 69) were invited to participate. They were asked how often they performed twenty procedures (recommended in Swiss guidelines developed by experts in traffic medicine) when assessing older drivers during the previous year, scored on a five-point Likert scale ranging from "never" to "always performed". The GPs were considered to be adhering to the recommended procedure if they performed it often or always. We computed the proportion of GPs adhering to each procedure, and compared GPs with or without specialised expertise.

RESULTS: A total of 268 GPs completed the questionnaire (participation rate 47%). The most frequently reported procedures were asking for current medication (96%), cardiovascular (94%) and neurological diseases (91%), and screening for visual acuity impairment (93%), whereas the least frequently reported procedures were screening for cognitive impairment in drivers aged between 70 and 80 years (44%) and for mood disorder (31%), asking for a history of driving license withdrawal (38%), and interviewing close relatives (10%). Six procedures were statistically significantly more frequently performed by the experts than by the other GPs. In general, GPs reported using validated tools, except when screening for at-risk drinking and mood disorder (tools used by 26 and 28%, respectively).

CONCLUSIONS: Many Swiss GPs seem not to systematically follow the current Swiss recommendations. Although several important procedures appear to routinely be part of older drivers' assessment, others are infrequently performed. Further research should identify how GPs select the recommended items to which they adhere and those they never apply, and how to facilitate the use of recommended procedures to help them decide if a person is fit, unfit or requiring further evaluation.

Keywords: *assessment, fitness-to-drive, older drivers, guidelines, recommendations, Swiss physicians*

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Background

Swiss roads are among the safest in Europe, although there were more than 17,500 accidents in 2016. A total of 216 people died (−4.4% per year on average between 2006 and 2016) and 3785 were seriously injured (−2.7% per year on average between 2006 and 2016) in road traffic accidents. The 2016 mortality rate was 2.6 per 100,000 inhabitants per year (4.1 per 100,000 motor vehicles per year) [1]. Compared with other countries, the mortality rate is very low in Switzerland (data in 2015: 3.1 per 100,000 inhabitants per year in Switzerland, 4.8 in the European Union and 10.9 in the US) [1].

The number of older drivers has increased substantially during recent decades, and more than 350,000 individuals aged 70 years or older currently have a valid driving license in Switzerland [2, 3]. A potential decline of older drivers' driving ability related to various medical disorders, such as visual, hearing or cognitive function impairment, is believed to lead to an increased risk of car crashes [4, 5]. In 2016, in Switzerland, 32.4% (70/216) of fatal road accidents concerned people aged 70 years or more; of these, 27 were driving a car or truck, 22 were pedestrians, and 19 were on two-wheelers [6]. However, the victims' respon-

sibility was implicated in only 55.7% (39/70) of the accidents; this is lower than in the age-group 18 to 29 who were responsible for 71.6% (63/88) of their fatal accidents [6].

The fitness-to-drive regulations for older drivers vary widely between countries. In a survey comparing the regulations for older drivers with cognitive impairment between ten European and Asia-Pacific countries, Kim et al. showed that, although moderate to severe dementia was a reason for driver's license revocation in all countries, regulations on mild dementia varied considerably [7]. In Switzerland, drivers above the age of 70 are already required to undergo a medical examination every other year [8, 9]. A review of the Road Traffic Act, expected to come into force in 2019, is considering raising the minimum age for this medical examination to 75 years. The assessment is carried out by general practitioners (GPs), except in the canton of Geneva, where it is undertaken by medical assessors of the road traffic office, most of whom are also GPs. The preconditions for qualification to carry out these examinations vary between cantons: in Geneva, medical assessors have to attend a one-day theoretical training session, whereas in other cantons, GPs are only asked to self-identify to the competent cantonal authorities.

Despite the existence of Swiss recommendations for fitness-to-drive assessments of older drivers (see below, table 1) [8–17], whether and how these guidelines are used in clinical practice are currently unknown. Most of these recommendations are not evidence based, but based only on expert opinions. Also, there is currently no single document summarising all these local recommendations; they are scattered across various publications.

The aim of our review [18] was therefore (1) to describe the fitness-to-drive assessment practices of physicians in the French-speaking part of Switzerland, (2) to compare GPs' and medical assessors' ("experts") practices, by assessing whether the frequency of use of each procedure differs between physicians with and without specific training as medical assessors (higher uptake of recommendations being expected among experts), and (3) to assess the extent to which these practices correspond to current Swiss recommendations.

Methods

Survey site and survey population

This review of doctors' practices relied on a paper self-completed survey asking physicians to report their practice during the previous year. It was conducted in 2017 in four cantons of the French-speaking part of Switzerland. We used stratified simple random sampling to select the study population. Five hundred GPs practicing in the cantons of Vaud, Jura and Neuchâtel were randomly selected from a sampling frame consisting of all the GPs member of the professional organizations of physicians (Société Vaudoise de Médecine [SVM], Société Médicale du Canton du Jura [SMCJU], Société Neuchâteloise des Médecins [SNM]); they were invited to participate by mail (sample fraction 500/1075; probability weight 2.15). In addition, all the medical assessors of the road traffic office practicing in the canton of Geneva were also selected (n = 69; probability weight 1); these physicians were invited to take part in the survey either by mail or during a medical assessors' continuous education meeting held in Geneva in February 2017.

Reminder messages (one per physician) were sent to physicians who failed to reply. Those who had not practiced during the previous year were excluded from the survey (they were instructed to record this information on the cover sheet of the questionnaire and to send it back without completing the rest of the questionnaire).

Data collection

A research assistant contacted each selected physician and provided information on the aim of our survey and practical procedures for completing the questionnaire. The completed questionnaires were either returned by hand in a closed envelope at the end of the meeting or sent back in a stamped addressed envelope. The physicians were asked about sociodemographic and practice characteristics (age, gender, medical specialty, location of the practice, number of half-days worked per week, number of working-years in private practice), as well as about the content of their fitness-to-drive assessments (table 1). The twenty proposed procedures were scored on a five-point Likert scale ranging from "never performed" (0) to "always performed" (4). These items were selected on the basis of consensus within the research team, which included three traffic medicine specialists (BF, PH, PV) and three academic GPs (YM, DMH, PS). The physicians were considered to be adhering to the recommended procedure if they answered "often performed" or "always performed".

The questionnaire was pretested by five medical assessors of the Geneva road traffic office to identify any difficulties physicians might meet in answering the questions.

Confidentiality and ethical approval

Collected data remained confidential. Only the research assistant knew the name and participation code of the physicians taking part in the survey. These were however kept separate from the anonymised survey questionnaire. Tacit consent was presumed from the physicians if they handed back or sent back a completed questionnaire. Since this

Table 1: List of the procedures assessed in this survey.

Screening for cognitive impairment for drivers aged >80 years
Screening for cognitive impairment for drivers aged between 70 and 80 years
Screening for mood disorder (depression and anxiety)
Screening for at-risk drinking
Screening for use of psychotropic drugs
Screening for daytime sleepiness
Screening for use of antidiabetic drugs
Screening for visual acuity impairment
Screening for visual field impairment
Screening for diplopia
Screening for hearing impairment
Screening for gait and balance disorder
Asking for the list of current medication
Asking for history of cardiovascular diseases
Asking for history of neurological diseases
Asking for history of psychiatric diseases
Asking for recent changes in driving habits
Interviewing close relatives about medical history and/or changes in driving habits
Asking for history of traffic accidents
Asking for history of driving license withdrawal

practice review did not involve the collection of personal health-related data it did not require ethical review, according to current Swiss law.

Statistical analyses and sample size

Physicians' sociodemographic characteristics were described as frequency tables for categorical variables, and medians and interquartile ranges (IQR) for numerical data (not normally distributed). We computed the proportion of physicians performing each of the 20 items, defined as the weighted proportion of physicians scoring 3 ("often performing the procedure") or 4 ("always performing the procedure") on the Likert scale. These proportions were compared between GPs (physicians practicing in the cantons of Vaud, Neuchâtel and Jura) and medical assessors (physicians practicing in the canton of Geneva), using design-based F tests (corrected weighted Pearson chi-square tests) [19]. Finally, we performed weighted logistic regressions for all procedures showing statistically significant differences between the two groups, to see whether the observed differences could be due to sociodemographic factors [19]. We included in the models all potential confounders (age and gender, as well as other socio-demographic characteristics associated with the outcome at a p-value ≤0.20), using a forward approach. As sensitivity analysis, we repeated the unadjusted comparison analyses (design-based F tests) using the "worst case scenario", i.e., counting all missing values on outcome variables as "procedures not performed", to find what effect missing values might have on the differences observed between the two groups.

Survey data analyses used probability weights to take the stratified sampling design into account. In other words, since physicians in Geneva were more likely to be invited to participate than physicians in other cantons, we had to consider the sampling weight and the stratification to adjust the point estimates and the standard errors.

Sample size was calculated to estimate a proportion of adherence to each of the current Swiss recommendations of about 50% (we estimated the adherence level to recommendations through discussions with GPs assessing older drivers), with a 95% confidence interval (CI) width of about 0.15 (15%) around the estimate. Given the formula for the estimation of a proportion, the minimum required sample size was 171. As a result, given the expected participation rate between 30 and 40% and the sampling design, 569 physicians were invited to participate.

Statistical significance was set at a two-sided p-value ≤0.05. No adjustments were made for multiple testing. We carried out all statistical analyses with STATA version 12.0 (College Station, USA).

Results

A total of 298 physicians returned the questionnaire, but only 268 (overall participation rate 47%; Geneva 65%, other cantons 45%) were included in the analysis (27 physicians had not practiced during the previous year and 3 physicians returned a blank questionnaire), 226 of whom were recruited by post and 42 (all practicing in Geneva) at a medical assessors' meeting in Geneva. They were all GPs, but thirteen (all practicing in Vaud) also practiced another medical specialty: cardiology (n = 4), geriatrics (2), allergology (2), rheumatology (1), pneumology (1), endocrinology (1), insurance medicine (1), palliative care (1). Given that all physicians were only or also GPs, for the sake of simplicity only this term will be used hereafter to define participating physicians.

Table 2 shows the main sociodemographic characteristics of the participating GPs. They had a median age of 57 years; the majority was male (67%), practicing in the canton of Vaud (67%) and in urban areas (75%). They were relatively experienced physicians (median number of working years in private practice 19.5). Compared with other cantons, those practicing in Geneva were slightly older, more often male, more experienced and practicing more often in urban areas.

Our sample of GPs (medical assessors excluded) appears to be relatively similar in age and gender to all GPs practising in Switzerland (professional organisation of Swiss physicians, 2016: median age 54 years vs approximately 57 years in our survey; men 59 vs 64% in our survey) [20].

Table 3 presents the number and proportion of participants who reported often or always using each of the twenty pro-

Table 2: Physicians' sociodemographic characteristics, overall and stratified by canton of practice (Vaud, Neuchâtel and Jura compared with Geneva) (n = 268).

Characteristics	Total	Vaud, Neuchâtel and Jura	Geneva	p-value†
	n* (%)	n* (%)	n* (%)	
Gender (n =266)				0.01
Male	177 (66.5)	142 (63.7)	35 (81.4)	
Female	89 (33.5)	81 (36.3)	8 (18.6)	
Age group; years (n = 266)				0.04
<45	56 (21.1)	49 (22.2)	7 (15.6)	
45–54	65 (24.4)	57 (25.8)	8 (17.8)	
55–64	97 (36.5)	78 (35.3)	19 (42.2)	
≥65	48 (18.0)	37 (16.7)	11 (24.4)	
Location of practice (n = 263)				<0.001
Urban	196 (74.5)	152 (69.7)	44 (97.8)	
Rural	67 (25.5)	66 (30.3)	1 (2.2)	
	Median (IQR)	**Median (IQR)**	**Median (IQR)**	
Age; years (n = 266)	57.0 (15.0)	57.0 (15.0)	62.0 (15.0)	0.04
Number of half-days worked per week (n = 261)	8.0 (3.0)	8.0 (3.0)	9.0 (2.0)	0.03
Number of working years in private practice (n =264)	19.5 (21.5)	18.0 (20.0)	27.5 (18.0)	0.01

IQR = interquartile range * n = number with factor considered † Design-based F tests (corrected weighted Pearson chi-square tests) for categorical variables and Wilcoxon rank sum tests for numerical data

cedures to assess fitness-to-drive in older drivers. The four procedures that were most frequently performed (by more than 90% of GPs) were: (1) asking for the list of current medication (96%), (2) taking a history of cardiovascular (94%) and (3) neurological diseases (91%), and (4) screening for visual acuity impairment (93%). The four procedures which were the least often performed (by less than 50% of GPs) were: (1) screening for cognitive impairment of drivers aged between 70 and 80 years (44%) and (2) for mood disorder (31%), (3) asking for history of driving license withdrawal (38%), and (4) interviewing close relatives about medical history or changes in driving habits (10%). Fifty to 90% of GPs reported performing the remaining twelve procedures.

As shown in table 3, most GPs (>90%) reported using standardised clinical tests for (1) screening for visual acuity and (2) visual field impairment, (3) gait and balance disorder and (4) cognitive impairment. Three procedures were less often performed with clinical tests: (1) screening for daytime sleepiness (61% of GPs reported using them), and above all, (2) mood disorder (28%) and (3) at-risk drinking (26%). Finally, 81% of GPs regularly recommended that diabetic drivers taking drugs with risk of hypoglycaemia test capillary blood sugar before driving.

Medical assessors reported using six procedures more often than other GPs (table 4). These were screening for visual field impairment, asking for history of neurological diseases, screening for use of antidiabetic drugs, screening for gait and balance disorder, asking for history of traffic accidents, and screening for diplopia. These differences between experts and nonexperts remained significant even after adjustment for age, gender and activity (number of half-days worked).

These results were similar when the analyses were repeated with all missing values on outcome variables considered as as "procedure not performed", the differences remaining statistically significant between experts and nonexperts.

Discussion

Main findings

Out of a list of 20 procedures recommended in Switzerland to assess fitness-to-drive in older drivers, more than 90% of the surveyed GPs reported that they frequently ask for current medication, cardiovascular and neurological diseases, and screen for visual acuity impairment, whereas less than 50% of them reported that they frequently screen for cognitive impairment in drivers aged 70 to 80 years and for mood disorder, ask for history of driving license withdrawal, and interview close relatives. Many procedures are performed using validated clinical tests. Finally, experts reported using several procedures more often than the other GPs.

Comparison with the existing literature

Many Swiss GPs seem not to systematically follow Swiss recommendations for assessing older drivers' fitness-to-drive, though our findings are mixed. Several important procedures appear to be part of the routine assessment of older drivers; on the other hand, certain procedures are infrequently performed.

We may consider two explanations for these contrasted results. A mandatory medical education programme (train-

Table 3: Twenty procedures emphasised during assessment of older drivers.

Procedures	Number of respondents	% of physicians reporting they often or always apply the procedure (95% CI)
Asking for the list of current medication	263	95.8 (93.0–97.6)
Asking for history of cardiovascular diseases	263	94.0 (90.6–96.1)
Screening for visual acuity impairment*	254	93.1 (89.5–95.5)
Asking for history of neurological diseases	263	90.6 (86.8–93.4)
Screening for use of antidiabetic drugs†	261	89.1 (85.0–92.1)
Screening for gait and balance disorder‡	263	87.5 (83.3–90.7)
Screening for visual field impairment§	244	86.7 (82.2–90.3)
Asking for history of psychiatric diseases	261	83.2 (78.7–87.0)
Asking for recent changes in driving habits	264	80.8 (76.1–84.7)
Screening for hearing impairment	262	73.5 (68.3–78.1)
Screening for cognitive impairment for drivers aged >80 years¶	268	70.1 (65.0–74.8)
Screening for daytime sleepiness**	265	67.9 (62.6–72.7)
Screening for use of psychotropic drugs	265	66.1 (60.8–71.1)
Screening for at-risk drinking††	256	66.1 (60.7–71.2)
Asking for history of traffic accidents	262	57.8 (52.2–63.1)
Screening for diplopia	257	54.0 (48.4–59.4)
Screening for cognitive impairment for drivers aged between 70 and 80 years¶	268	43.6 (38.3–49.1)
Asking for history of driving license withdrawal	263	38.4 (33.3–43.9)
Screening for mood disorder (depression and anxiety)‡‡	258	31.1 (26.2–36.5)
Interviewing close relatives about medical history and/or changes in driving habits	262	9.8 (7.0–13.7)

CI = confidence interval * Using a clinical test in general 93.3% (eye chart 96.8%); testing each eye separately 93.7% † Examiners' recommendation of regularly testing capillary blood sugar before driving if driver uses drugs with risk of hypoglycaemia 80.7%; examiners' adherence to guidelines for diabetic drivers 85.3% ‡ Using a clinical test in general 95.6% (Romberg 92.1%, tightrope walking 59.0%, Get-up and Go test or Timed Up and Go test 35.2%, general gait assessment in medical office 2.5%, other 5.9%) § Using a clinical test in general 91.2% (direct confrontation 96.2%); testing each eye separately 71.1% ¶ Using a validated tool in general 89.2% (Mini-Mental State Examination 86.5%, clock drawing 79.9%, Montreal Cognitive Assessment 11.8%, Trail Making Test part B 11%, Mini-Cog 3.1%, other 1.8%) ** Using a validated tool in general 61.4% (Epworth 97.3%, NoSAS [acronym for Neck circumference, Obesity, Snoring, Age and Sex] 4.7%, other 4%) †† Using a validated tool in general 26.4% (CAGE [acronym for Cut down, Annoyed, Guilty and Eye-opener] 69.7%, Alcohol Use Disorders Identification Test 25.8%, Michigan Alcohol Screening Test 13.6%, other 3%) ‡‡ Using a validated tool in general 28.2% (Hamilton 47%, Geriatric Depression Scale 42.4%, Primary Care Evaluation of Mental Disorders 18.2%, Beck Depression Inventory and/or Beck Anxiety Inventory 3.0%, other 4.6%)

ing sessions first provided to medical experts of the road traffic office, and more recently, to all physicians assessing the driving ability of older drivers who reported not having the required skills) was introduced on an optional basis only in 2011 and has been mandatory since 2016 in Western Switzerland. The impact of this training has probably been relatively modest so far. The fact that only 6 out of the 20 procedures are more frequently performed by experts than by other GPs could be explained in the same way (alternatively, the medical experts in Geneva are also GPs and have in general their own private practice; they probably have therefore similar practice styles to those practicing in other cantons). Two studies have shown that physicians do not feel they have the required competencies to carry out these assessments and demand further specific training [21, 22]. A survey conducted in English-speaking Canada (460 GPs) showed that nearly half of physicians were not confident in assessing fitness-to-drive of older drivers and the great majority (89%) were interested in receiving adequate training in this area [21]. In another survey (523 physicians including GPs) carried out in Saskatchewan, a province of western Canada, 97% of responders reported that continuing medical education would be useful [22].

In addition, GPs can be reluctant to perform some of these procedures, for example because they consider that they are not helpful for assessing fitness-to-drive in older drivers or because of time constraints. As a matter of fact, the procedures that are less often performed are in general those that require more time, either because they are based on questionnaires, such as screening for daytime sleepiness, at-risk drinking, cognitive impairment for drivers aged 70 to 80 years and mood disorder, or because they require interview of close relatives. For example, it has been shown that Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA), two of the three tests used most often by our study sample to screen for cognitive impairment, usually take 10 minutes [23–26]. Interview of close relatives is the least performed procedure, maybe because it is considered to be extremely time-consuming and/or particularly difficult to achieve during the medical visit (a phone interview following the visit is often necessary to obtain information from relatives), or because GPs fear that interviewing close relatives could increase tensions within the family. In any case, when drivers are considered unfit to drive, we strongly recommend involving the family in finding mobility alternatives and helping their relative accept the decision to cease driving [27].

Despite our mixed results, they compare favourably with the survey conducted in English-speaking Canada [21], where 89% of GPs reported that they often/always review medication (vs 96% of Swiss GPs in our survey), 89% often/always screen for visual acuity impairment (vs 94%), 68% often/always screen for neurologic disease (vs 88% for gait and balance disorder in our survey), 67% often/always screen for hearing loss (vs 74%), 66% often/always screen for visual field impairment (vs 88%), 49% often/always perform a cognitive assessment (vs 69% for drivers >80 years and 43% for drivers between 70 and 80 years in our survey), and finally 45% often/always ask for history of traffic accidents (vs 59%). Only alcohol history is

Table 4: Twenty procedures emphasised during drivers' assessment, stratified by physicians' canton of practice (Vaud, Neuchâtel, Jura compared with Geneva).

Procedures	Non-experts (cantons of Vaud, Neuchâtel and Jura)		Experts (canton of Geneva)		Crude p-value*	Adjusted p-value†
	Number of respondents	% of physicians reporting they often or always apply the procedure (95% CI)	Number of respondents	% of physicians reporting they often or always apply the procedure (95% CI)		
Asking for the list of current medication	218	95.9 (92.7–97.7)	45	95.6 (90.2–98.1)	0.88	
Asking for history of cardiovascular diseases	218	93.6 (89.9–96.0)	45	97.8 (93.1–99.3)	0.08	
Screening for visual acuity impairment	213	92.5 (88.6–95.1)	41	93.1 (89.5–95.5)	0.07	
Asking for history of neurological diseases	218	89.9 (85.7–93.0)	45	97.8 (93.1–99.3)	**0.006**	**0.03**
Screening for use of antidiabetic drugs	216	88.4 (84.0–91.8)	45	95.6 (90.2–98.1)	**0.02**	**0.03**
Screening for gait and balance disorder	218	86.7 (82.1–90.3)	45	95.6 (90.2–98.1)	**0.007**	**0.03**
Screening for visual field impairment	203	85.7 (80.8–89.6)	41	97.6 (91.7–99.3)	**0.001**	**0.009**
Asking for history of psychiatric diseases	216	83.3 (78.4–87.3)	45	82.2 (74.5–88.0)	0.78	
Asking for recent changes in driving habits	219	80.8 (75.7–85.1)	45	80.0 (72.1–86.1)	0.85	
Screening for hearing impairment	217	73.3 (67.7–78.2)	45	75.6 (67.3–82.3)	0.63	
Screening for cognitive impairment in drivers aged >80 years	223	70.9 (65.2–75.9)	45	62.2 (53.4–70.3)	0.08	
Screening for daytime sleepiness	220	68.6 (62.9–73.9)	45	60.0 (51.2–68.2)	0.09	
Screening for use of psychotropic drugs	220	65.5 (59.6–70.9)	45	73.3 (64.9–80.3)	0.12	
Screening for at-risk drinking	214	65.9 (60.0–71.4)	42	69.1 (59.5–77.2)	0.56	
Asking for history of traffic accidents	217	56.7 (50.7–62.5)	45	68.9 (60.3–76.4)	**0.02**	**0.004**
Screening for diplopia	213	52.6 (46.5–58.6)	44	68.2 (59.2–76.0)	**0.004**	**0.003**
Screening for cognitive impairment for drivers aged between 70 and 80 years	223	44.0 (38.2–49.8)	45	40.0 (31.8–48.8)	0.46	
Asking for history of driving license withdrawal	218	38.1 (32.5–44.0)	45	42.2 (33.9–51.0)	0.43	
Screening for mood disorder (depression and anxiety)	215	31.2 (25.9–37.0)	43	30.2 (22.4–39.4)	0.86	
Interviewing close relatives about medical history and/or changes in driving habits	217	10.1 (7.1–14.4)	45	6.7 (3.4–12.6)	0.26	

CI = confidence interval * Design-based F tests (corrected weighted Pearson chi-square tests) † Adjusted for gender, age and number of half-days worked per week (logistic regressions for survey weighted data)

reviewed more often by Canadian than by Swiss GPs (86 vs 66%); the question asked in our survey was, however, more specific (at-risk drinking and not only alcohol history), and simply comparing this procedure between the two populations would be problematic.

We showed that GPs tend to use well-known tests that they already frequently use in clinical practice, such as the Romberg test for gait and balance disorder, eye chart and direct confrontation for visual acuity and visual field impairment, the MMSE and clock drawing for cognitive impairment and Epworth for daytime sleepiness. Though the MMSE is usually recommended in guidelines, because it is well known by most physicians, it has the disadvantage of placing too much weight on memory, which has little effect on driving performances in general; the MoCA is usually considered more appropriate for assessing drivers with cognitive impairment, especially because it includes the Trail Making Test (TMT) and the clock drawing test that have been shown to better investigate functions required for driving [28–31].

Limitations

Some limitations need to be kept in mind when considering the results. Though our survey was carried out in four different cantons, only GPs practicing in the French-speaking part of the country (Western Switzerland) were included; these GPs are not necessarily representative of all GPs practicing in Switzerland. The sample size was relatively small, though it was in fact higher than the estimated minimum required sample size for our study. Our survey was prone to reporting bias, as it was based on the answers to a self-administered questionnaire. Responders might over-report positive behaviours (social desirability bias), particularly among experts; we could not assess the extent of this bias, because we did not conduct direct observations in GPs' private practices for fear of not achieving a high enough participation rate. We did not record data on GPs declining participation; thus, hypothesis of a different profile between responders and non-responders cannot be ruled out; however, our sample appears to be representative in terms of age and gender of all GPs practising in Switzerland. In addition, there is a risk of bias among the responders towards tighter adherence to guidelines than among non-responders. Finally, the recommendations that we used in our survey are not evidence-based and therefore one should not over-interpret the fact that many GPs do not adhere to them.

Implications for research and practice

The level of evidence supporting these screening practices is relatively low (mainly expert opinions), and whether the majority of these procedures accurately predict fitness-to-drive remains unknown. In other words, despite the implementation of national programmes to assess older drivers (including in Switzerland), to our knowledge, no studies have so far shown that medical screening reduced crash risk.

For example, clinical tests may not be sufficient to assess drivers suffering from Alzheimer disease [32–35]. Piersma and colleagues showed that clinical examination was clearly less accurate than in-depth neuropsychological assessment in predicting fitness-to-drive of patients suffering from Alzheimer disease [32], but even in-depth neuropsychological assessment lacks the ability to correctly predict on-road behaviour and difficulties [36–38]. These findings demonstrate the need for developing new, accurate and less time-consuming instruments to help physicians to determine who is medically unfit to drive and who should be referred for an extended assessment [22]. According to a recent exploratory study conducted in Switzerland (the GarAge project), a battery of clinical tests had very low value in identifying those with driving difficulties [2].

In addition, we do not currently know whether GPs have enough knowledge of the fitness-to-drive regulations after having judged drivers to be unfit. Indeed, it has been shown that physicians treating patients with stroke at a stroke unit had limited knowledge regarding driving restrictions after stroke or transient ischaemic attack [39]. The same conclusion was drawn from a survey aiming to explore GPs' and neurologists' knowledge after epilepsy [40]. Note that the fitness-to-drive regulations for older drivers vary widely between countries. In a survey comparing the regulations for older drivers with cognitive impairment between ten European and Asia-Pacific countries, Kim and colleagues showed that, although moderate to severe dementia was a reason for driver's license revocation in all countries, regulations on mild dementia varied considerably [7]. In any case, investigating knowledge of the fitness-to-drive regulations in Switzerland was beyond the aims of our survey.

Therefore, further research should identify how GPs select the recommended items to which they adhere and those they never apply, and how they use the recommended procedures to decide if a person is fit, unfit or requires further investigations. In addition, research should focus on confirming the usefulness of the guidelines in predicting fitness-to-drive and on identifying the link between various health conditions and difficulties met during on-road evaluations.

Conclusion

Many Swiss GPs seem to have difficulties in following current Swiss recommendations. Although several important procedures appear to be part of older drivers' assessment routine, others were infrequently performed by our sample of GPs, mainly screening for cognitive impairment in drivers aged between 70 and 80 years and for mood disorder, asking for history of driving license withdrawal, and interviewing close relatives.

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Potential competing interests

No potential conflict of interest relevant to this article was reported.

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