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1 Clinical nutrition in primary care: an evaluation of resident physicians'
2 attitudes and self-perceived proficiency

3 **Running title:** physician's attitudes regarding clinical nutrition

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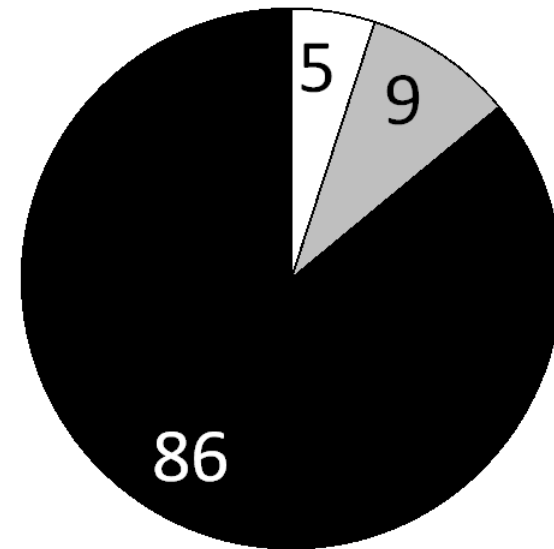
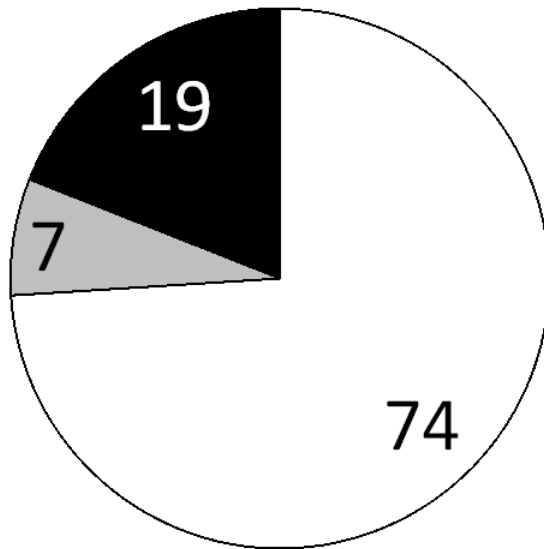
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27

All physicians, regardless of specialty, should counsel high-risk patients about dietary change (%)

My training has adequately trained me to discuss nutrition issues with patients (%)



□ Agree □ No opinion ■ Disagree

28 **Abstract**

29 **Background & aims:** There is little information regarding the impact of clinical nutrition
30 training among medical residents. We aimed to evaluate the attitudes, self-perceived proficiency
31 and knowledge of Swiss residents regarding clinical nutrition.

32 **Methods:** cross-sectional study conducted between June and September 2014 in two medical
33 education facilities located in Lausanne, Switzerland. Attitudes, self-perceived proficiency and
34 knowledge regarding clinical nutrition were assessed by questionnaire.

35 **Results:** of the 88 internal medicine residents queried, 44 (50% response rate, 25 women, mean
36 age 34±4 years) answered the questionnaire. Three quarters of the residents were trained in
37 Switzerland and one third reported receiving some training in clinical nutrition. Seven out of ten
38 (70.5%) residents agreed that all doctors should know how to provide nutrition-based
39 assessment, no matter what their specialty. Conversely, only one out of ten (11.4%) felt that
40 physicians were adequately trained. No differences were found between genders or country of
41 training regarding the answers provided.

42 **Conclusion:** residents in Lausanne perceive clinical nutrition in primary care as a priority but
43 lack the confidence and training to effectively use clinical nutrition in their daily practice.

44

45 **Keywords:** clinical nutrition; cross-sectional study; knowledge; residents; Switzerland

46

47 **Introduction**

48 Nutrition in primary care is an effective and necessary preventive health care measure. In
49 a study of the effects of nutrition counseling for overweight and obese patients, physicians who
50 were using patient-centered and motivational nutrition counseling techniques were more
51 successful in improving the fat and fiber intake scores and raising confidence to improve clinical
52 nutrition of their patients [1]. Another study found that a computer-assisted intervention to
53 improve physical activity and dietary behavior based in primary care setting was feasible and
54 promising [2]. Surveys in both Switzerland and the US have found that the overwhelming
55 majority of providers agree that preventive care should be a part of their daily practice, and that
56 clinical nutrition is an important aspect of primary care [3, 4].

57 Despite the importance of nutrition in primary care, training in nutrition is often
58 insufficient in most medical schools [5-7]. Also, the barriers to clinical nutrition in primary care
59 are substantial, such as time restraints and challenges in patient motivation. In 1993, a survey
60 found that fewer than 40 percent of US physicians regularly practiced at least 17 out of 50
61 nutrition-related “core competencies” [8]. Between 2000 and 2005, Healthy People and US
62 Preventive Task Force of 2010 found in their midcourse review that the proportion of office
63 visits that included clinical nutrition declined from 42 percent to 40 percent [4]. In Switzerland,
64 the second-most cited barrier to clinical nutrition in primary care was the lack of training (second
65 only to time restraints) [3]. In the US, lack of training was the most cited barrier [9, 10], and a
66 study suggested that medical students' perception of the importance of clinical nutrition
67 decreases during medical school [11]. Another study surveying US resident physicians found
68 that those in the midst of their training felt that they were not receiving enough training in
69 clinical nutrition [12].

70 Switzerland is a small European country with one of the best health systems worldwide
71 [13]. The system is universal but administered on a local basis (cantons); Swiss citizens and
72 established foreign residents must purchase individual health insurance coverage from local
73 insurance companies. For persons covered by non-managed care insurance, services are provided
74 of a fee-for-service basis by any primary care provider in the canton. Subjects covered by
75 managed care insurance can opt for 1) health maintenance organizations; 2) networks of general
76 practitioners with a contract with an insurer, and 3) a fee-for-service plan with a gate-keeping
77 (i.e. phone consultant) system [14, 15]. Primary care is provided by doctors trained in general
78 internal medicine. Since 2011, there is only a single specialist title for general internal medicine,
79 including both general internal medicine physicians and family physicians. Still, no information
80 was collected regarding perspectives and confidence levels of physicians toward clinical
81 nutrition.

82 Thus, the aim of this study was to determine the state of clinical nutrition education and
83 application of clinical nutrition in primary practice, by evaluating the attitudes and self-perceived
84 proficiency of medical residents in Lausanne, Switzerland. In this study, we considered clinical
85 nutrition as any nutritional care provided by clinicians, and nutritional counseling as a one
86 component of clinical nutrition [16].

87 **Materials and methods**

88 *Subjects*

89 All internal medicine residents active at two medical educational facilities, the
90 Policlinique médicale universitaire (PMU) and the Centre hospitalier universitaire vaudois
91 (CHUV), were included. The list of residents was obtained from the human resources department

92 from each facility. The PMU provides consultations to ambulatory patients in general and
93 specialized internal medicine and employs a total staff of 527, of which 149 are physicians
94 (www.pmu-lausanne.ch). Only residents working in the general internal medicine ambulatory
95 care clinic of the PMU, destined for the large majority to become primary care physicians, were
96 included. The CHUV is one of the five Swiss university hospitals, with a total staff of 10,000
97 (www.chuv.ch); in 2014, 164 new physicians were trained at the CHUV.

98 *Survey development*

99 A questionnaire on attitudes and self-perceived proficiency about clinical nutrition was
100 developed. The first section of the questionnaire collected demographic information, including
101 information about time and place of medical school enrollment. No information regarding other
102 training than medicine (i.e. biology, wellness, nutrition...) was collected. Similarly, no
103 information regarding the type of clinical nutrition training in the medical curriculum (i.e.
104 compulsory or optional, number of hours or ECTS) was collected.

105 The second section used a questionnaire developed by Cornuz *et al*, which evaluated
106 Swiss general and internal medicine physicians' attitudes towards interventions for clinical
107 nutrition, physical activity, and tobacco use and specific barriers in preventive medicine [3].

108 The third section included several items of the questionnaire used by Vetter *et al* [12].
109 This questionnaire combined the previously validated Nutrition in Patient care Survey (NIPS)
110 [17] with another validated survey [18] to evaluate self-perceived proficiency in clinical nutrition
111 in order to cover ten attitudinal and self-perceived proficiency sub-scales. For our study,
112 questions addressing nine sub-scales of Vetter *et al*'s questionnaire were selectively chosen based
113 on their relevance to the research question: 1) attitudes; 2) self-perceived proficiency; 3)
114 knowledge and 4) previous training regarding nutrition. The result was a 63-question

115 questionnaire and possible responses were on a five point Likert scale: strongly disagree,
116 disagree, no opinion, agree, and strongly agree.

117 Additional questions assessed how frequently the participants assessed their patient's
118 weight history, current weight and height in their clinical practice. Answers were categorized
119 into "Never", "Seldom", "Frequently" and "Always".

120 The questionnaire was then translated into French and then reviewed by a sociologist at
121 the Pedagogical Unit at the University of Lausanne for improvements to question and response
122 wording. The complete version of the French questionnaire is available as a **supplementary file**.

123 The questionnaire was distributed, both online and in hardcopy, to internal medicine
124 residents at both the PMU and the CHUV. The residents were given three months to complete
125 and return the questionnaire, and reminders were issued by email and during medical staff
126 meetings. The questionnaires were anonymous and collected in specific drop-off boxes available
127 in the meeting rooms, so that no identification of the residents was possible.

128 *Statistical analysis*

129 Statistical analysis was conducted using Stata v.13.1 (Stata Corp, College Station, TX,
130 USA). For analysis, answers were grouped into "agree" and "disagree / other". This was done in
131 order to analyze the positive opinions of the participants relative to the others and to have
132 adequate group sizes to perform statistical analyses. Results were expressed as number of
133 responses (percentage) for categorical variables or as mean±standard deviation for continuous
134 variables. Bivariate analyses comparing between genders, location of training (Switzerland vs.
135 other countries) or previous training in clinical nutrition were performed using Fisher's exact
136 test. Statistical significance was considered for a two-sided p-value <0.05.

137 *Ethical statement*

138 The Ethics Commission of Canton Vaud (www.cer-vd.ch/) was contacted and no ethics
139 approval was considered necessary as the survey was anonymous and did not include any
140 information regarding the health status of the participants (decision of 20.06.2014).

141 **Results**

142 *Sample characteristics*

143 Thirty-seven residents from CHUV and 51 residents from PMU were invited to fill the
144 survey, 44 (50%) of whom responded. Their socio-demographic characteristics were the
145 following: 25 (57%) women, mean age 34 ± 4 years; 34 (77%) had received their training in
146 Switzerland, and their average practice was 7.5 ± 2.8 years. Only fourteen residents (33%)
147 reported previous exposure or education in clinical nutrition in medical school (e.g. courses,
148 conferences, or concepts integrated into other courses, etc.), and only 3 (7%) reported the
149 existence of an elective course in clinical nutrition in their curriculum.

150 The characteristics of the residents according to gender are summarized in **table 1**.

151 *Barriers to nutritional counseling*

152 Eighteen residents (41%) agreed to the statement that it was difficult to integrate
153 preventive measures for nutritional counseling in daily practice. The most frequently cited
154 barriers were lack of time and training, while insufficient compensation and intrusion into
155 patient's privacy were the least cited (**Figure 1**). No differences were found regarding the
156 answers between genders, location of training (Switzerland vs. other countries) or previous
157 training in clinical nutrition (**supplementary table 1**).

158 *Attitudes and self-perceived proficiency*

159 The results regarding attitudes and self-perceived proficiency regarding clinical nutrition
160 are summarized in **Table 2**. The majority (>80%) of responders agreed that patients need
161 specific instructions about how to change their eating behavior; that physicians should assess
162 each patient's fat, fiber, and fruit and vegetable intake as a preventive strategy, and advocate diet
163 and activity balance to promote weight control; and that physicians should understand the
164 definition of moderate alcohol consumption, as well as the role of dietary cholesterol and
165 saturated fat in elevating blood cholesterol. Nobody agreed that nutrition counseling was not an
166 effective use of their time and only a minority agreed that they were adequately trained to discuss
167 nutrition issues with patients (**Table 2**). After grouping answers *disagree* and *no opinion*, no
168 difference was found between responses to the questions “I am comfortable recommending
169 dietary patterns for patients with type 2 diabetes mellitus” (considered as an indicator for clinical
170 nutrition) and “I am comfortable in dietary counseling in routine daily practice” (considered as
171 an indicator for dietary counseling), $p=0.59$ by Mc Nemar’s test.

172 No consistent differences were found regarding the answers between genders, location of
173 training (Switzerland *vs.* other countries) or previous training in nutrition (**supplementary tables**
174 **2 to 4**). Men agreed more frequently than women to the statements “I am comfortable
175 recommending dietary patterns for patients with type 2 diabetes mellitus” and “There is enough
176 nutrition training for doctors”. Participants not trained in Switzerland agreed more frequently
177 than participants trained in Switzerland to the statements “I feel comfortable assessing fluid
178 needs based on activity level and health” and “My training has adequately trained me to discuss
179 nutrition issues with patients”. No associations were found with previous training in nutrition.

180 *Daily practice*

181 When asked about their routine practice, 56% indicated that they “frequently or always”
182 assessed their patient’s weight history and 75% that they “frequently or always” assessed their
183 patient’s current weight and height. No differences were found between genders, location of
184 training (Switzerland vs. other countries) or previous training in clinical nutrition
185 (supplementary table 5).

186 **Discussion**

187 To our knowledge, this is one of the few European studies assessing attitudes, proficiency
188 and practice of clinical nutrition among young physicians. Our results indicate that in Lausanne,
189 residents in internal medicine perceive clinical nutrition in primary care as a priority but lack the
190 confidence and training to effectively apply clinical nutrition in their daily practice.

191 *Nutrition in medical education*

192 Despite the importance of nutrition in disease prevention and management, nutrition
193 education is insufficiently implemented in the medical curriculum. A survey conducted among
194 English-speaking countries showed that all have nutrition-related curriculum guidelines for
195 undergraduates, but that their scope and detail varies considerably [19]. A study published in
196 2010 showed that only one quarter (27%) of US medical schools provided the minimum amount
197 of 25 hours training in nutrition [5]. A survey of 32 medical schools from 10 European countries
198 showed a very heterogeneous provision of training in nutrition, three schools providing no
199 training at all and four schools providing less than 25 hours of training [6]. A study conducted in
200 an Irish university reported an average of 15 hours of training [20], and a survey among Japanese
201 medical schools showed that one tenth (9%) did not provide any training in nutrition, and that
202 only one sixth (16.4%) dedicated more than 5 hours of training in their curriculum [7]. Graduate

203 training also fails to compensate for this lack of training in medical schools: in the USA, only
204 one quarter (26%) of graduate medical courses have a formal nutrition curriculum [21].
205 Interestingly, and contrary to high income countries, the number of hours dedicated to training in
206 nutrition is considerably higher in low or middle income countries: 36 hours in Iran [22] and an
207 average of 59 hours in countries of West Africa [23]. This lack of training can have serious
208 consequences in the management of patients; for instance, in Italy, a study published in 2010
209 revealed that almost half (49%) of hospital structures had no nutrition professionals [24].

210 In this study, approximately one third (14/44) of respondents indicated having received
211 some type of training on clinical nutrition. Still, this definition was rather generic, as the
212 characteristics of the training were not collected. Hence, it is likely that some responders
213 received only a minimal training regarding clinical nutrition. It is also unclear whether the three
214 participants that mentioned the existence of an elective course actually took it.

215 *Barriers to nutritional counseling*

216 The residents surveyed in this study ranked barriers to nutrition counseling in almost the
217 same relative order as the general practitioners in the previous study by Cornuz *et al* [3], with
218 lack of time as the greatest and lack of training as the second most-cited barrier. However, there
219 were notable differences in the distribution of responses for each barrier. For example, in our
220 study, over 80% of residents identified time as a barrier, while only 55% of GPs did so in the
221 previous study, which suggests that time dedicated to nutrition counseling is even less than the
222 time necessary in clinical nutrition practice.

223 One of the most notable barriers *contra* clinical nutrition, as identified by the providers
224 themselves, was insufficient training [10]. These findings are in agreement with the previous
225 study by Cornuz *et al*, where half of primary care physicians responded that lack of training was

226 the second greatest barrier to preventive health strategies [3]. Similarly, in the US, a survey
227 conducted in 1995 among primary care physicians reported that only 58% stated they had
228 previously received clinical nutrition training, and 62% stated they lacked the knowledge
229 necessary to counsel their patients in diet-related health care [25]. A 2010 review of Kushner *et*
230 *al's* 1995 study found that most educators, medical students, and physicians still agreed that the
231 amount of training in clinical nutrition is inadequate [4]. Finally, a recent survey reported that the
232 perceived relevance of nutrition counseling by US medical students has declined throughout
233 medical school [9], indicating that clinical nutrition is not promoted throughout their education.
234 Overall, our data suggests that current training in clinical nutrition is not meeting the needs of
235 primary care practitioners in both the US and Switzerland.

236 *Attitudes and self-perceived proficiency*

237 Attitudes towards clinical nutrition and prevention were positive, a finding also reported
238 by Cornuz [3], suggesting a general opinion within doctors irrespective of their age, years of
239 practice or FMH certification. Most of the residents thought that nutrition counseling should be a
240 skill that all physicians have and 88% disagreed or totally disagreed that nutrition counseling is a
241 waste of time - the other 12% was *without opinion*. Furthermore, the majority of residents agreed
242 that it is important to evaluate the intake of fat, fiber, fruit and vegetables for each patient in
243 preventive care, although they were ambivalent on their knowledge on giving examples of
244 portion sizes based on the nutritional pyramid. Also, the majority of residents (70.4%) found that
245 the lack of training in clinical nutrition caused an obstacle to preventive practices, demonstrating
246 insufficient confidence in their nutrition counseling skills. Future studies should better explore
247 this aspect in order to inform training program directors on the aspects of counseling that should
248 be specifically targeted.

249 Self-perceived proficiency was higher in this study than in Vetter *et al*'s study in New
250 York, even though fewer Lausanne residents were exposed to clinical nutrition education in their
251 medical education. For example, a greater proportion of Lausanne residents were confident in
252 knowing the role of omega-3 and -6 acids in heart health (**Table 2**) [12]. Vetter *et al* point to the
253 timing of clinical nutrition education in medical school curriculum. Clinical relevance is not
254 optimal in preclinical years [12]. Further research is needed to determine how timing of clinical
255 nutrition education in Switzerland compares to that of the US, and if this affects the attitudes and
256 proficiency of residents and physicians. A study has also shown that increased self-perceived
257 proficiency is correlated to an increased frequency of nutrition counseling in daily practice [26],
258 which prompts further study in Switzerland as well as research into the correlation of optimized
259 education in clinical nutrition and its application in practice.

260 Finally, although the responders were unanimous in stating that nutrition counseling not
261 an ineffective use of time, one third (36%) considered lack of evidence for benefit and one sixth
262 (17%) insufficient compensation as barriers to that practice. Possible explanations are the lack of
263 postgraduate or continuous medical training on clinical nutrition, which would prevent general
264 practitioners from receiving the evidence-based information on the effectiveness of dietary
265 prevention and the possibility of separate billing of nutritional counseling time, and the fact that,
266 at least in Switzerland, a general practitioner trained in clinical nutrition gets no financial
267 compensation compared to a colleague devoid of such training.

268 *Study limitations*

269 Our study has several limitations worth acknowledging. Firstly, these results may not be
270 generalizable, as the survey only included internal medicine residents in one city. Secondly,
271 sample size was small and recruitment bias cannot be ruled out. Hence, it is likely that our

272 sample included motivated residents who were interested in the topic of clinical nutrition. Thus,
273 our results regarding knowledge and self-reported proficiency in clinical nutrition might likely be
274 overestimated and the real picture might be even bleaker. Thirdly, the questionnaire was not
275 formally validated; still, the aim of the study was to have a first estimation of the attitudes and
276 self-perceived proficiency of medical residents regarding clinical nutrition, not to create a
277 validated instrument. Indeed, given the large cultural diversity of Switzerland (26 Cantons, 4
278 official languages), the validation of a questionnaire for the French-speaking part of Switzerland
279 only would not be cost-effective. Finally, direct comparisons with the results of Vetter *et al* [12]
280 are not sound; cultural or societal differences, as well as discrepancies in survey administration
281 and translation, could have affected responses. For example, the food pyramid is highly
282 advertised in the United States but it is not used as a guide in Switzerland, possibly accounting
283 for half of the residents' ambivalence about portion sizes based on the food pyramid.

284 *Possible interventions*

285 Based on our findings, primary care training should promote a positive attitude and
286 ideology regarding clinical nutrition [8]. Changes in nutrition training of medical students have
287 been suggested in the US [27, 28] and in Portugal [29]. Provider training should address
288 misconceptions about patient compliance and the effectiveness of nutrition counseling to
289 promote providers' willingness to practice [1]. Conversely, to our knowledge, no such initiatives
290 have been implemented in Switzerland. A first step would be the identification of areas where
291 the residents feel that their training is inadequate, to further strengthen them in the medical
292 curriculum. Further, for some items of the questionnaire, a significant (>20%) fraction of
293 responders answered “no opinion”, suggesting that these items could be used for monitoring
294 attitudes, proficiency and knowledge in clinical nutrition.

295 *Conclusion*

296 Residents in an academic general internal medicine center in the French part of
297 Switzerland find that clinical nutrition education is insufficient. They had positive attitudes about
298 the importance of nutrition in prevention in primary care, but expressed that they lacked the
299 proficiency to counsel patients. Future studies should evaluate the effect of education of residents
300 on nutrition counseling in order to properly prepare future physicians to face the rising epidemic
301 of nutrition-based diseases.

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306 **Statement of authorship**

307 SH devised the study methodology and wrote the manuscript; RA devised the study
308 methodology, collected the data and wrote the manuscript; PMV revised the study methodology,
309 analyzed the data and wrote the manuscript. JC revised the manuscript for important intellectual
310 content. All authors have seen and approved the manuscript.

311 **Conflict of interest**

312 The authors report no conflict of interest

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389
390

391 **Figure legends**

392 **Figure 1:** barriers perceived by residents in internal medicine regarding nutrition interventions.

393 **Tables**

394 **Table 1:** characteristics of the sample, according to gender.

	Man (n=19)	Woman (n=25)
Age (years)	34.3 ± 4.6	33.1 ± 2.9
Years of practice	8.1 ± 3.1	7.0 ± 2.5
Training in Switzerland (%)		
Yes	13 (68.4)	21 (84.0)
No	6 (31.6)	4 (16.0)
Previous training clinical nutrition (%)		
Yes	8 (42.1)	6 (24.0)
No	11 (57.9)	19 (76.0)

395 Results are expressed as average ± standard deviation or as number of responses (column
 396 percentage).

397 **Table 2:** Attitudes, self-perceived proficiency, knowledge and previous training in nutrition of residents in internal medicine.

Domains and items	Disagree	No opinion	Agree
Attitudes			
1. It is important to advocate diet and activity balance to promote weight control	0	0	100
2. Patients need specific instructions about how to change their eating behavior	2	7	90
3. It is important that I assess each patient's fat, fiber, and fruit and vegetable intake as a preventive strategy	7	10	83
4. All physicians, regardless of specialty, should counsel high-risk patients about dietary change	19	7	74
5. My patient education efforts will be effective in increasing patients' compliance with nutrition recommendations	5	21	74
6. Nutritional assessment and counseling should be included in any routine appointment	37	2	61
7. It is important that I address the importance of diet whenever I care for a patient	68	23	9
8. Nutrition counseling is not an effective use of my time	88	12	0
Self-perceived proficiency			
1. I am comfortable recommending dietary patterns for patients with type 2 diabetes mellitus	27	7	66
2. I am comfortable in dietary counseling in routine daily practice	34	7	59
3. I am comfortable providing examples of serving sizes of each category of the Swiss dietary pyramid	50	2	48
4. I feel comfortable assessing fluid needs based on activity level and health	48	14	38
5. I am comfortable providing nutrition strategies for patients losing weight due to chronic illness	59	5	36
Knowledge			
1. I am knowledgeable about the definition of moderate alcohol consumption	5	0	95
2. I am knowledgeable about the role of dietary cholesterol and saturated fat in elevating blood cholesterol	14	7	80
3. I am knowledgeable about the role of omega-3 and omega-6 fatty acids in heart health	45	14	41
4. I am knowledgeable about the role of genetics, diet, and pharmacology in weight loss regimens	57	7	36
Previous training			
1. I apply what I learned in nutrition	52	34	14
2. There is enough nutrition training for doctors	75	14	11
3. My training has adequately trained me to discuss nutrition issues with patients	86	9	5

398 Results are expressed as percentage of responses.

399

400 **Supplementary tables**

401 **Supplementary table 1:** factors associated with barriers perceived by residents in internal medicine regarding nutrition interventions.

	Lack of time	Lack of training	Lack of patient interest	Lack of evidence for benefit	Insufficient compensation	Intrusion in patient's privacy
Gender						
Man (n=19)	15 (79.0)	12 (63.2)	8 (42.1)	9 (47.4)	2 (10.5)	1 (5.6)
Woman (n=24)	22 (88.0)	19 (76.0)	14 (56.0)	7 (28.0)	5 (22.7)	5 (20.0)
<i>P-value</i>	0.443	0.507	0.543	0.220	0.419	0.375
Training in Switzerland						
Yes (n=34)	30 (88.2)	26 (76.5)	17 (50.0)	15 (44.1)	6 (19.4)	5 (15.2)
No (n=10)	7 (70.0)	5 (50.0)	5 (50.0)	1 (10.0)	1 (10.0)	1 (10.0)
<i>P-value</i>	0.322	0.131	1.000	0.067	0.660	1.000
Previous training clinical nutrition						
Yes (n=14)	12 (85.7)	8 (57.1)	6 (42.9)	5 (35.7)	1 (8.3)	1 (7.1)
No (n=30)	25 (83.3)	23 (76.7)	16 (53.3)	11 (36.7)	6 (20.7)	5 (17.2)
<i>P-value</i>	1.000	0.288	0.747	1.000	0.651	0.645

402 Results are expressed as number of positive answers and (row percentage). Between-group comparisons by Fisher's exact test (two-
 403 sided)

404

405 **Supplementary table 2:** factors associated with attitudes, self-perceived proficiency, knowledge and previous training in nutrition of
 406 residents in internal medicine: gender.

Domains and items	Men (n=19)		Women (n=25)		P-value
	Disagree/No opinion	Agree	Disagree/No opinion	Agree	
Attitudes					
1. It is important to advocate...	(0)	17 (100) §	(0)	25 (100)	NA
2. Patients need specific...	2 (11.8)	15 (88.2) §	2 (8.0)	23 (92.0)	1.000
3. It is important that I assess...	3 (17.7)	14 (82.4) §	4 (16.0)	21 (84.0)	1.000
4. All physicians...	6 (35.3)	11 (64.7) §	5 (20.0)	20 (80.0)	0.305
5. My patient education..	4 (23.5)	13 (76.5) §	7 (28.0)	18 (72.0)	1.000
6. Nutritional assessment...	10 (58.8)	7 (41.2) §	6 (25.0)	18 (75.0)	0.050
7. It is important that I address...	16 (84.2)	3 (15.8)	24 (96.0)	1 (4.0)	0.300
8. Nutrition counseling is not ...	17 (100)	(0)	25 (100)	(0)	1.000
Self-perceived proficiency					
1. ... recommending dietary patterns	3 (15.8)	16 (84.2)	13 (52.0)	12 (48.0)	0.025
2. ...in dietary counseling in routine ...	4 (23.5)	13 (76.5) §	13 (54.2)	11 (45.8) †	0.062
3. ...providing examples of serving...	9 (47.4)	10 (52.6)	14 (56.0)	11 (44.0)	0.761
4. ...assessing fluid needs ...	10 (58.8)	7 (41.2) §	16 (64.0)	9 (36.0)	0.757
5. ...providing nutrition strategies ...	11 (57.9)	8 (42.1)	17 (68.0)	8 (32.0)	0.540
Knowledge					
1. ...definition of moderate alcohol...	0 (0)	19 (100)	2 (8.0)	23 (92.0)	0.498
2. ...role of dietary cholesterol ...	3 (15.8)	16 (84.2)	6 (24.0)	19 (76.0)	0.710
3. ...role of omega-3 and omega-6...	12 (63.2)	7 (36.8)	14 (56.0)	11 (44.0)	0.760

4. ...role of genetics...	11 (64.7)	6 (35.3) §	16 (64.0)	9 (36.0)	1.000
Previous training					
1. I apply what I learned in nutrition	14 (73.7)	5 (26.3)	24 (96.0)	1 (4.0)	0.07
2. There is enough nutrition training ...	14 (73.7)	5 (26.3)	25 (100)	0 (0)	0.011
3. My training has adequately trained...	18 (94.7)	1 (5.3)	24 (96.0)	1 (4.0)	1.000

407 Results are expressed as number of answers and (column percentage). For the complete statement of each item, please consult table 1.
408 Between-group comparisons by Fisher's exact test (two-sided); NA, not assessable. § two answers missing; † one answer missing
409

410 **Supplementary table 3:** factors associated with attitudes, self-perceived proficiency, knowledge and previous training in nutrition of
 411 residents in internal medicine: training in Switzerland

Training in Switzerland	Yes (n=34)		No (n=10)		P-value
	Disagree/No opinion	Agree	Disagree/No opinion	Agree	
Domains and items					
Attitudes					
1. It is important to advocate...	(0)	32 (100) §	(0)	10 (100)	NA
2. Patients need specific...	1 (3.1)	31 (96.9) §	3 (30.0)	7 (70.0)	0.036
3. It is important that I assess...	4 (12.5)	28 (87.5) §	3 (30.0)	7 (70.0)	0.328
4. All physicians...	9 (28.1)	23 (71.9) §	2 (20.0)	8 (80.0)	1.000
5. My patient education..	6 (18.8)	26 (81.3) §	5 (50.0)	5 (50.0)	0.094
6. Nutritional assessment...	11 (34.4)	21 (65.6) §	5 (55.6)	4 (44.4)	0.276
7. It is important that I address...	31 (91.2)	3 (8.8)	9 (90.0)	1 (10.0)	1.000
8. Nutrition counseling is not ...	32 (100)	(0) §	10 (100)	(0)	NA
Self-perceived proficiency					
1. ... recommending dietary patterns	15 (44.1)	19 (55.9)	1 (10.0)	9 (90.0)	0.067
2. ...in dietary counseling in routine ...	15 (48.4)	16 (51.6) †	2 (20.0)	8 (80.0)	0.152
3. ...providing examples of serving...	19 (55.9)	15 (44.1)	4 (40.0)	6 (60.0)	0.481
4. ...assessing fluid needs ...	25 (78.1)	7 (21.9) §	1 (10.0)	9 (90.0)	<0.001
5. ...providing nutrition strategies ...	24 (70.6)	10 (29.4)	4 (40.0)	6 (60.0)	0.133
Knowledge					
1. ...definition of moderate alcohol...	2 (5.9)	32 (94.1)	0 (0)	10 (100)	1.000
2. ...role of dietary cholesterol ...	8 (23.5)	26 (76.5)	1 (10.0)	9 (90.0)	0.659
3. ...role of omega-3 and omega-6...	21 (61.8)	13 (38.2)	5 (50.0)	5 (50.0)	0.716

4. ...role of genetics...	22 (68.8)	10 (31.3)	5 (50.0)	5 (50.0)	0.451
Previous training					
1. I apply what I learned in nutrition	30 (88.2)	4 (11.8)	8 (80.0)	2 (20.0)	0.606
2. There is enough nutrition training ...	31 (91.2)	3 (8.8)	8 (80.0)	2 (20.0)	0.317
3. My training has adequately trained...	34 (100)	0 (0)	8 (80.0)	2 (20.0)	0.048

412 Results are expressed as number of answers and (column percentage). For the complete statement of each item, please consult table 1.

413 Between-group comparisons by Fisher's exact test (two-sided); NA, not assessable. § two answers missing; † three answers missing

414

415 **Supplementary table 4:** factors associated with attitudes, self-perceived proficiency, knowledge and previous training in nutrition of
 416 residents in internal medicine: previous medical training in clinical nutrition.

Training in clinical nutrition	Yes (n=14)		No (n=30)		P-value
	Disagree/No opinion	Agree	Disagree/No opinion	Agree	
Domains and items					
Attitudes					
1. It is important to advocate...	(0)	14 (100)	(0)	28 (100) §	NA
2. Patients need specific...	0 (0)	14 (100)	4 (14.3)	24 (85.7) §	0.283
3. It is important that I assess...	3 (21.4)	11 (78.6)	4 (14.3)	24 (85.7) §	0.668
4. All physicians...	4 (28.6)	10 (71.4)	7 (25.0)	21 (75.0) §	1.000
5. My patient education..	3 (21.4)	11 (78.6)	8 (28.6)	20 (71.4) §	0.723
6. Nutritional assessment...	6 (46.2)	7 (53.9)	10 (35.7)	18 (64.3) §	0.732
7. It is important that I address...	11 (78.6)	3 (21.4)	29 (96.7)	1 (3.3)	0.088
8. Nutrition counseling is not ...	14 (100)	(0)	28 (100)	(0) §	NA
Self-perceived proficiency					
1. ... recommending dietary patterns	4 (28.6)	10 (71.4)	12 (40)	18 (60.0) §	0.521
2. ...in dietary counseling in routine ...	4 (28.6)	10 (71.4)	13 (48.2)	14 (51.9) †	0.321
3. ...providing examples of serving...	6 (42.9)	8 (57.1)	17 (56.7)	13 (43.3)	0.521
4. ...assessing fluid needs ...	8 (57.1)	6 (42.9)	18 (64.3)	10 (35.7)	0.742
5. ...providing nutrition strategies ...	9 (64.3)	5 (35.7)	19 (63.3)	11 (36.7)	1.000
Knowledge					
1. ...definition of moderate alcohol...	1 (7.1)	13 (92.9)	1 (3.3)	29 (96.7)	0.540
2. ...role of dietary cholesterol ...	2 (14.3)	12 (85.7)	7 (23.3)	23 (76.7)	0.695
3. ...role of omega-3 and omega-6...	8 (57.1)	6 (42.9)	18 (60)	12 (40.0)	1.000

4. ...role of genetics...	7 (50.0)	7 (50.0)	20 (71.4)	8 (28.6)	0.193
Previous training					
1. I apply what I learned in nutrition	10 (71.4)	4 (28.6)	28 (93.3)	2 (6.7)	0.071
2. There is enough nutrition training ...	11 (78.6)	3 (21.4)	28 (93.3)	2 (6.7)	0.307
3. My training has adequately trained...	13 (92.9)	1 (7.1)	29 (96.7)	1 (3.3)	0.540

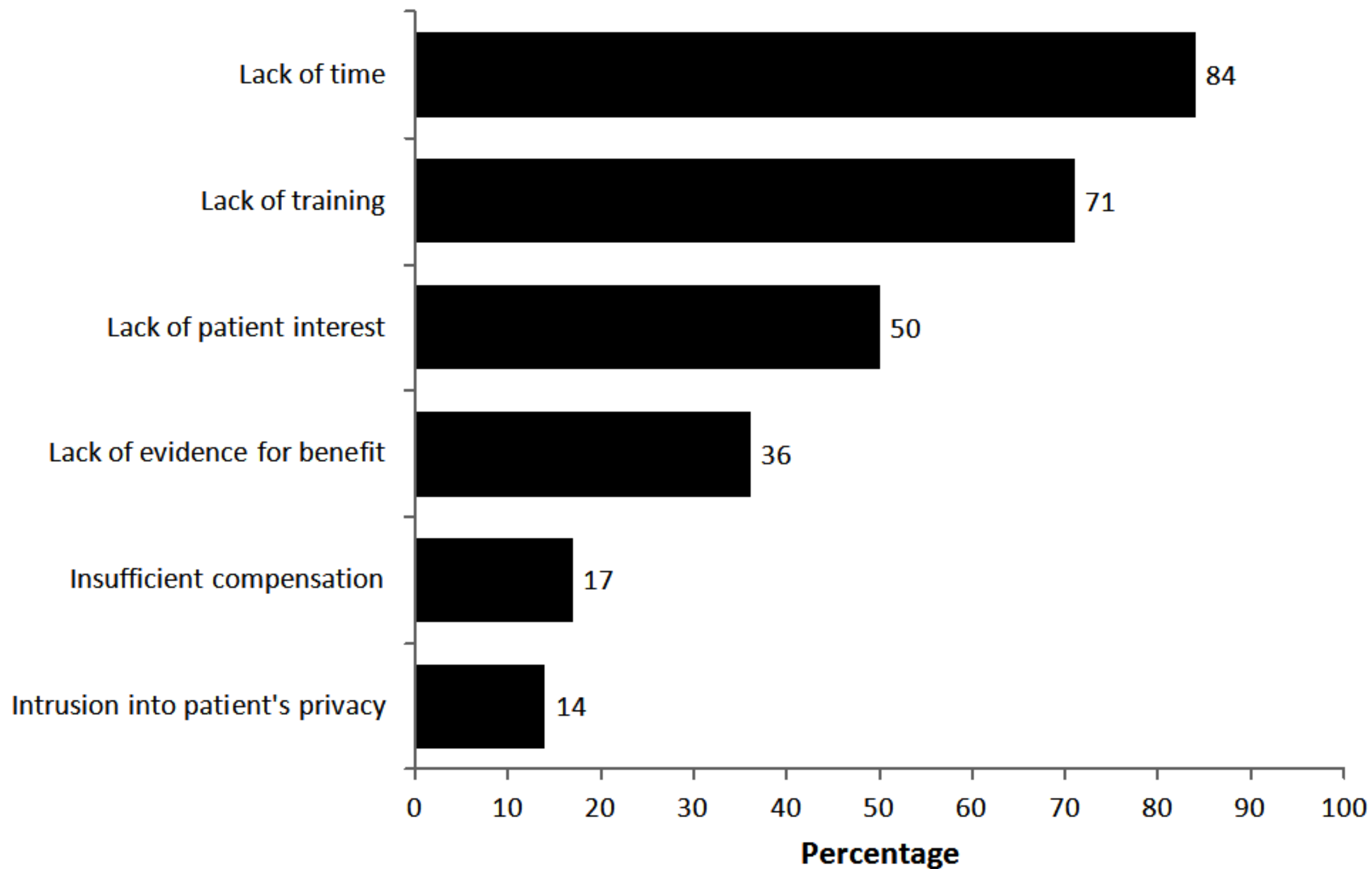
417 Results are expressed as number of answers and (column percentage). For the complete statement of each item, please consult table 1.
418 Between-group comparisons by Fisher's exact test (two-sided); NA, not assessable. § two answers missing; † three answers missing
419

420 **Supplementary table 5:** factors associated with recording of weight history or current weight.

Domains and items	Weight history		Current weight	
	Never or seldom	Frequently or always	Never or seldom	Frequently or always
Gender				
Man (n=19)	4 (21.0)	15 (79.0)	4 (21.0)	15 (79.0)
Woman (n=24)	7 (28.0)	18 (72.0)	7 (28.0)	18 (72.0)
<i>P-value</i>	0.731		0.731	
Training in Switzerland				
Yes (n=34)	10 (29.4)	24 (70.6)	8 (23.5)	26 (76.5)
No (n=10)	1 (10.0)	9 (90.0)	3 (30.0)	7 (70.0)
<i>P-value</i>	0.408		0.692	
Previous training clinical nutrition				
Yes (n=14)	3 (21.4)	11 (78.6)	3 (21.4)	11 (78.6)
No (n=30)	8 (26.7)	22 (73.3)	8 (26.7)	22 (73.3)
<i>P-value</i>	1.000		1.000	

421 Results are expressed as number of positive answers and (row percentage). Between-group comparisons by Fisher's exact test (two-
422 sided)

423



La nutrition clinique dans les soins primaires et en prévention

Vous êtes: un homme une femme

Quelle est votre **année** de naissance ? _____

Quelle est votre année de diplôme de médecin ? _____

Où avez-vous fait vos études de médecine ? _____

Où travaillez-vous actuellement PMU Service de Médecine Interne, CHUV
 IUMSP Autre : _____

Au CHUV ou à la PMU

	Toujours	Souvent	Parfois	Jamais	Pas applicable
Intégrez-vous les données du KONDRUP (sur SOARIAN, CHUV uniquement) dans votre prise en charge ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intégrez-vous les données de TRACES (sur SOARIAN, CHUV uniquement) dans votre prise en charge ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demandez-vous aux patient·e·s les variations du poids durant les dernières semaines avant l'hospitalisation ou la consultation ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demandez-vous le poids du/de la patient·e ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demandez-vous la taille du/de la patient·e ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Considérez-vous que la prévention fasse partie de vos tâches de médecin ?

Oui	Plutôt oui	Plutôt non	Non	Pas d'avis
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Est-il difficile pour vous d'intégrer des interventions de prévention dans les domaines suivants ?

	Oui	Plutôt oui	Plutôt non	Non	Pas d'avis
Tabac	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Activité physique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Selon votre expérience, les éléments suivants constituent-ils des obstacles à une intervention préventive dans le domaine **du tabac** ?

	Oui	Plutôt oui	Plutôt non	Non	Pas d'avis
Le manque de formation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Le manque de temps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
le manque de confiance dans l'efficacité de ces interventions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Le manque d'intérêt chez le/la patient·e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Il s'agit souvent de conseils qui interfèrent avec la sphère privée du/de la patient·e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L'absence d'incitation financière	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Autre : _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Selon votre expérience, les éléments suivants constituent-ils des obstacles à une intervention préventive dans le domaine de **l'activité physique** ?

	Oui	Plutôt oui	Plutôt non	Non	Pas d'avis
Le manque de formation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Le manque de temps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
le manque de confiance dans l'efficacité de ces interventions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Le manque d'intérêt chez le/la patient·e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Il s'agit souvent de conseils qui interfèrent avec la sphère privée du/de la patient·e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L'absence d'incitation financière	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Autre : _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Selon votre expérience, les éléments suivants constituent-ils des obstacles à une intervention préventive dans le domaine de **la nutrition** ?

	Oui	Plutôt oui	Plutôt non	Non	Pas d'avis
Le manque de formation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Le manque de temps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
le manque de confiance dans l'efficacité de ces interventions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Le manque d'intérêt chez le/la patient·e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Il s'agit souvent de conseils qui interfèrent avec la sphère privée du/de la patient·e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L'absence d'incitation financière	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Autre : _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Formation

	Oui	Non
Avez-vous eu une quelconque formation en prévention du tabac pendant vos études de médecine (cours ou conférences sur les conseils à l'arrêt du tabac, concepts intégrés dans des cours, etc.) ?	<input type="checkbox"/>	<input type="checkbox"/>
Si oui, indiquez : _____		
Un cours à option en prévention du tabagisme était-il offert durant vos études de médecine ?	<input type="checkbox"/>	<input type="checkbox"/>
Si oui, l'avez-vous suivi ?	<input type="checkbox"/>	<input type="checkbox"/>
	Oui	Non
Avez-vous eu une quelconque formation en conseils à l'activité physique pendant vos études de médecine (cours ou conférences sur les conseils à l'activité physique, concepts intégrés dans des cours, etc.) ?	<input type="checkbox"/>	<input type="checkbox"/>
Si oui, indiquez : _____		
Un cours à option en conseils à l'activité physique était-il offert durant vos études de médecine ?	<input type="checkbox"/>	<input type="checkbox"/>
Si oui, l'avez-vous suivi ?	<input type="checkbox"/>	<input type="checkbox"/>
	Oui	Non
Avez-vous eu une quelconque formation en nutrition pendant vos études de médecine (cours ou conférences sur la nutrition , concepts intégrés dans des cours, etc.) ?	<input type="checkbox"/>	<input type="checkbox"/>
Si oui, indiquez : _____		
Un cours à option en nutrition était-il offert durant vos études de médecine ?	<input type="checkbox"/>	<input type="checkbox"/>
Si oui, l'avez-vous suivi ?	<input type="checkbox"/>	<input type="checkbox"/>

Dans mon exercice quotidien...

	Totalement en désaccord	En désaccord	Sans opinion	D'accord	Totalement d'accord
Les évaluations nutritionnelles et les conseils nutritionnels devraient être inclus dans chaque consultation de routine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Les patient·e·s ont besoin d'instructions spécifiques sur la manière de changer leur comportement alimentaire.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tous les médecins, quelle que soit leur spécialité, devraient savoir donner des conseils nutritionnels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mon éducation des patients sera efficace si j'augmente leur adhésion aux recommandations nutritionnelles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Donner des conseils nutritionnels aux patient·e·s est une perte de temps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dans une optique de prévention, il est important d'évaluer les apports en matières grasses, fibres, fruits et légumes de chaque patient·e.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Il est important de conseiller un équilibre entre alimentation et activité physique pour favoriser le contrôle du poids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je me sens à l'aise pour fournir des conseils nutritionnels dans le cadre des soins de routine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je me sens à l'aise pour évaluer les besoins hydriques de chaque patient·e selon son niveau d'activité et sa santé.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je sais comment calculer l'indice de masse corporelle (IMC) et le rapport taille/hanche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je connais le rôle de la génétique, de l'alimentation et des médicaments dans les régimes pour perdre du poids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Totalement en désaccord	En désaccord	Sans opinion	D'accord	Totalement d'accord
Je me sens à l'aise pour donner des exemples de portions de chaque catégorie de la pyramide alimentaire (viande, céréales, légumes, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je connais le rôle des acides gras oméga-3 et oméga-6 dans la prévention cardiovasculaire.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je connais la définition d'une consommation modérée d'alcool et son rôle dans la santé et la maladie.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je suis à l'aise pour fournir des stratégies alimentaires à des patient·e·s perdant du poids à cause d'une maladie chronique.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je suis à l'aise pour donner des recommandations alimentaires à des patient·e·s ayant un diabète non insulino-dépendant (type 2).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je connais le rôle du cholestérol alimentaire et des graisses saturées dans l'augmentation des lipides sanguins.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je me sens à l'aise de discuter des bénéfices de l'exercice physique pour la santé et le bien-être.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je me sens préparé·e et compétent·e à faire des évaluations nutritionnelles et à fournir des conseils nutritionnels appropriés.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Je pense que mes études m'ont préparé·e à faire des évaluations nutritionnelles et à fournir des conseils nutritionnels appropriés dans le cadre des soins médicaux courants et liés à l'alimentation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Il y a assez de formation en nutrition pour les médecins.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J'applique dans ma pratique quotidienne ce que j'ai appris sur la nutrition durant mes études.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

MERCI POUR VOTRE PARTICIPATION !