

Original article

Alternative medicine in allergies – prevalence, patterns of use, and costs

Background: There is evidence that the use of alternative medicine (AM) for allergies has increased. However, little is known from population-based studies about what determines its use. The objective of this study was to evaluate the patterns of use of AM for allergies.

Methods: A population-based nested case-control study was conducted in 2000–01 using computer-assisted telephone interviews. Three hundred and fifty-one adults participated (median age 46 years) with allergies including hay fever, asthma, atopic eczema, and food hypersensitivity. Information was obtained on demographics, prevalence, motivation, information, type of AM, provider, costs, willingness to pay, and subjective assessment of AM.

Results: 26.5% of participants used AM because of their allergies. Compared to nonusers, this group of users was significantly younger (median age 43 *vs* 47; $p=0.004$) and better educated (school education > 8 year *vs* ≤ 8 year; odds ratio (OR) 2.17, 1.28–3.67) and was mostly motivated by the assumption of few side-effects (78.3%), by a wish to try everything (71.7%), and by unsatisfying results from conventional therapy (66.3%). Users also had more experience with conventional therapy than nonusers (94.6% *vs* 63.6%; OR 10.10, 4.00–25.72). Four procedures accounted for almost the entire usage: homeopathy (35.3%), autologous blood injection (28.1%), acupuncture (16.6%), and bioresonance (10.0%). The AM were mostly promoted (40.2%) and provided (60.9%) by medical doctors, and produced median costs for single and entire treatment of 4 (15–205) and 205 (15–1278)€. Reimbursement from insurance companies was received by 52.3%, in full (37.8%) or partial (14.5%). Most subjects (55.4%) admitted that they would pay more (median 153€) for the achieved result. Users scored the efficacy of conventional therapy significantly lower ($p<0.001$) than nonusers, and assessed the results of AM as very good (28.6%) or rather good (53.8%).

Conclusions: AM is used widely for allergies by the general population and is associated with considerable costs. This has implications for the health care system and health policy.

**T. Schäfer¹, A. Riehle²,
H.-E. Wichmann³, J. Ring²**

¹Department of Social Medicine, Medical University Lübeck; ²Department of Dermatology and Allergy, am Biederstein, Technical University Munich; ³GSF-National Research Center for Environment and Health, Institute of Epidemiology and, Institute of Medical Data Processing, Biometrics, and Epidemiology, Ludwig-Maximilian-University Munich, Germany

Key words: adults; allergy; alternative medicine; costs, patterns of use.

Prof Dr Torsten Schäfer MPH
Department of Social Medicine
Medical University Lübeck
Beckergrube 43–47
23552 Lübeck
Germany

Accepted for publication 12 February 2002

There is some indication of growing interest by the public in so-called alternative or complementary medicine (AM). Estimates of the frequency of use of AM range between 20% (the Netherlands) and 49% (France) and are also high in Germany (46%) (1). Other studies reveal an even higher percentage of AM users in Germany (64%), possibly indicating the highest prevalence in the world (2). In selected groups of dermatological patients the lifetime prevalence of use

ranges between 35% in Sweden and 69% in the UK (3). There is a shortage of information from population-based studies on the characteristics of use of AM. According to estimates from the US, the use of AM increased between 1990 and 1997 from 33.8% to 42.1% (4). Studies from Australia and the UK reveal that 48.5% and 21.1% of the population, respectively (5), have experience of AM. This practice is associated with considerable annual costs, which were estimated to account for 930 million AU\$ in Australia (6), 13.7 billion US\$ in the USA (7), and £1.6 billion in the UK (5).

Alternative medicine might be of particular interest to patients with chronic non life-threatening diseases,

Abbreviations: AM: alternative medicine; CI: confidence interval; MONICA: MONitoring of trends and determinants of CArdiovascular disease; OR: odds ratio.

and in this context allergies could be important in particular because they are increasingly prevalent (8). There are very few studies available so far that provide population-based data on the use of AM in allergies; our study from Germany focuses on this data and describes public health implications.

Material and methods

We report on a population-based nested case-control study. The subjects were recruited from the third MONICA survey (MONItoring of trends and determinants of CARDiovascular disease), which was performed in Augsburg, Germany during the years 1994 and 1995, and which consisted of a random cross-sectional sample stratified for age and gender ($n=4178$). The objective and protocol of the MONICA survey has been published (9, 10). All registered residents aged 25–74 years, from the City of Augsburg and two adjacent counties, were eligible for the MONICA survey.

A nested case-control study on allergies was performed in 1537 of these subjects, who received a standardized interview to establish medical history. Based on that information we identified all subjects who had ever been diagnosed by a doctor with hay fever, asthma, or atopic eczema, or who had reported adverse reactions to food ($n=525$).

Between summer 2000 and spring 2001, we performed the AM study on these subjects. Sixty-five individuals were excluded because they moved from the area, died, did not consent, or denied allergies. Therefore 351 out of 460 eligible subjects participated in the study (76.3%). They suffered from hay fever ($n=219$), asthma ($n=87$), atopic eczema ($n=33$) or hypersensitivity to food ($n=208$). From all participants written, informed consent was obtained before starting the study.

We used computer-assisted telephone interviews. These were performed by one female fifth-year medical student with professional experience in telephone interviews, who was also involved in conceptual design of the questionnaire. Off-line and on-line test interviews with volunteers, including persons who had allergies and experience with AM, were completed before the study, in order to test the performance, length and understanding of the interview.

The interview covered basic demographic information and characteristics of the use of conventional therapy. Regarding AM, we obtained data on motivation, information, type of AM, provider, frequency and duration of use, costs including coverage by insurance companies, and willingness to pay, change in attitudes, overall assessment, and assessment of symptoms. We report on the results of 90 single questions covering the use of conventional and alternative therapies. AM were defined as distinct therapeutic procedures not including herbs, food supplements, home remedies or minor adjuvant measures. We also obtained data on homeopathy and acupuncture, which to some extent became part of the conventional therapeutic concept and are no longer commonly viewed as alternative medicine.

Statistical analysis

We performed descriptive analyses and compared users of AM with those who had no experience of such methods. Nonparametric tests for the comparison of means for two (Mann–Whitney U) or more (Kruskal–Wallis) independent groups, as well as Chi-squared and Chi-squared trend tests, were used as appropriate. Multiple logistic regression analysis was performed taking users vs nonusers of AM as dependent variables and age, sex, and school education as independent variables. Odds ratios (OR) and 95% confidence

intervals (CI) were given as parameters of association and stability. All calculations were performed by using the statistical software package spss 10.0.

Results

A total of 351 individuals (76.3% response) with four manifestations of hypersensitivity (11) participated in this study. The age median was 46 years (range 28–78); 60.1% were female. Ninety-three subjects (26.5%) reported to have used AM at least once. Users of AM were significantly younger (median 43 years) than those who had no experience with these methods (median 47 years; $p=0.004$). Users of AM were also better educated, whereas general health behaviours were not different between groups. The demographic characteristics of those with and without experiences with AM are given in Table 1. Logistic regression analysis confirmed that younger and better-educated individuals used AM more frequently (Table 2).

Most subjects have used only one AM (63.0%), 25.0% reported experiences with two different AM, and the remaining 12.0% were treated by three to five different AM. The AM were used to treat hay fever (62.0%), atopic eczema (14.1%), asthma (13.0%) or food allergy (10.9%).

Conventional therapy

Of the total study population 71.8% had ever received conventional therapy for their allergies, provided by general practitioner (52.8%), dermatologist (26.6%), or another specialist (20.6%). Almost all AM users had also experienced conventional therapy (94.6%), whereas only 63.6% of those who had not used AM had

Table 1. Basic characteristics of users and nonusers of alternative medicine (AM) for allergies

Variables	Users ($n=93$)	Nonusers ($n=258$)
Demographics		
Age group (years)		
<30	5.4	1.6
30–44	50.0	40.3
45–59	33.7	33.3
>59	10.9	24.8*
Female	63.4	58.9
Male	36.6	41.4
Highest school graduation (year)		
No	0	3.1
8	30.1	47.7
10	35.5	28.9
12	10.8	4.7
>12	23.7	15.6*
Health behaviour		
Smoking	16.1	17.1
Alcohol daily or multiple/week	45.2	45.1
Coffee daily or multiple/week	89.2	90.3
Sport daily or multiple/week	47.3	38.9

* Trend test $P < 0.01$.

Table 2. Logistic regression analysis for users of alternative medicine (AM) for allergies

Variables	Odds ratio (95% confidence interval)
Age group (years)	
< 30	1
30–44	0.42 (0.11–1.67)
45–59	0.38 (0.09–1.53)
> 59	0.18 (0.04–0.81)
Males	0.85 (0.51–1.42)
Highest school graduation (year)	
> 8 vs ≤8	2.17 (1.28–3.67)

been treated conventionally (OR 10.10, 4.00–25.72). At the time of investigation, 51.6% were being treated conventionally. Symptoms of hypersensitivity occurred on average (Median) 16.5 years (range 2–65) before the study, and subjects reported that they first sought conventional therapy on average (Median) 15 years (1–65) before the study. Some subjects (13.1%) had to be treated in hospital because of their hypersensitivity. The overall effect of conventional therapy was assessed as follows: very good 13.1%; rather good 59.1%; no effect 14.3%; rather poor 8.7%; and very poor 3.6%. When comparing this assessment between groups of users and nonusers of AM, it turned out that users of AM scored the efficacy of conventional therapy significantly lower (Table 3).

Only three subjects had used AM prior to conventional therapy, and nine started both types of treatment in parallel. The majority (86.2%) tried AM on average (Median) 10 years (range 1–63) after they had started conventional therapy. Overall, 39.1% reported that they used AM and conventional therapies simultaneously. The majority (86.1%) informed their current medical practitioner that they were using AM in parallel with conventional methods. No informed medical doctor disapproved of AM; most provided these methods themselves (64.5%) or supported them (22.6%). Only 3.2% of doctors were not interested in AM. On completing the course of AM, 53.0% of subjects returned to conventional therapy by either their GP (57.1%) or a specialist (42.9%).

Source of information and motivation

The most important sources of information regarding AM were the current practitioners (medical doctors) (40.2%) and friends and family (37.0%). Medical practitioners who are not members of the recognized health professions, so-called “Heilpraktiker” (7.6%), as well as the media including newspapers (7.6%), TV and radio (2.2%), seemed not to be important sources of information.

We further asked what has motivated the use of AM. The question included nine closed categories, an open answer category, and allowed for multiple answers. The majority were motivated by a conviction that AM has less side-effects (78.3%), by a wish to try everything (71.7%), because of unsatisfying results from conventional therapy (66.3%), and the belief that AM is more natural (60.9%). A minority of subjects was disappointed by conventional medicine (17.4%), and believed that AM is safer (13.0%). Some felt that their current medical doctor was not interested in their case (9.8%), did not understand the problem (7.6%), or did not take enough time (6.5%). According to open answers, 8.7% were motivated by the efficacy perceived by themselves or friends and family.

Type of alternative method, provider, frequency and duration of use

Taking information from up to three different used AM, for all subjects together, the 93 study subjects reported on 139 experiences with AM. Only four procedures accounted for almost the entire usage. These were homeopathy (35.3%), autologous blood injection (28.1%), acupuncture (16.6%), and bioresonance (10.0%). With respect to the single types of hypersensitivity, there was no significant difference in this pattern of use. Users of AM with hay fever reported experience with homeopathy (38.6%), autologous blood injection (28.1%), acupuncture (17.5%), and bioresonance (7.0%). The corresponding figures for users with asthma (41.7%, 33.3%, 16.7%, 0%), eczema (30.8%, 30.8%, 30.8%, 0%) and food hypersensitivity (30.0%, 10.0%, 10.0%, 40.0%) were slightly different, but without statistical significance. Single answers were given regarding the use of phytotherapy, electro-

Table 3. Overall assessment of the efficacy of conventional therapy by users and nonusers of alternative medicine for allergies

	Very good (1)	Rather good (2)	No effect (3)	Rather poor (4)	Very poor (5)	Mean (1–5)
Nonusers						
<i>n</i>	28	106	16	10	1	
%	17.4	65.8	9.9	6.2	0.6	2.1
Users*						
<i>n</i>	5	43	20	12	8	2.7
%	5.7	48.9	22.7	13.6	9.1	
Overall						
<i>n</i>	33	149	36	22	9	
%	13.3	59.8	14.5	8.8	3.6	

* $P < 0.001$ (Chi-squared and Mann–Whitney U).

Table 4. Costs of individual alternative medicine methods (overall treatment costs in Euros)

Method	Median*	Minimum	Maximum
Bioresonance	409	153	1023
Acupuncture	363	153	767
Homeopathy	192	102	1278
Autologous blood	77	18	614

* $P=0.02$ (Kruskal–Wallis).

acupuncture, and autologous urine therapy. AM was mostly provided by medical professionals (GPs 45.7%, specialists 15.2%) and in 31.5% by the Heilpraktiker. In 6.5% the affected subjects themselves applied the AM. AM was used for a Median time of three months (1 week–20 years) and applied on average twice a week (daily–monthly).

Information provided on alternative methods

Most individuals (88%) who used AM reported that the provider informed them about the procedure. In particular, information was given on the performance of the procedure (80%), its mechanisms (72%), and success rate (72%). The subjects were less frequently informed about possible side-effects (46%) or other risks (40%).

Costs and willingness to pay

About half of the individuals, who used AM ($n=41$) could give information on costs. The average (Median) single treatment cost 41€ (range 15–205) and the expenditure for a complete treatment was 205€ (15–1278). There were significant differences in costs between the individual methods (Table 4). The insurance companies covered some costs for half of the subjects (52.3%); in 72.3% of these cases the individuals received full reimbursement and the remaining 27.7% received an average reimbursement of 75% (Median; range 30–90%) of their expenditures.

Of those experiencing AM, 55.4% were willing to pay more for the achieved therapeutic results. These subjects would pay on average (Median a total of 409€ (51–4090), which is on average 153€ (84–1534) more than they actually paid.

Thirty-nine subjects (42.4%) were not willing to pay more; 61.0% of these stated that the procedures were worth the money but they would not pay more. Only 5.4% felt that the procedures were generally too expensive.

The majority (81.5%) were willing to pay more for a complete healing. On average these subjects were willing to pay a single amount of 1534€ (51–10226) to achieve full remission.

Efficacy

The overall efficacy of the AM was assessed as follows: very good 28.6%, rather good 53.8%, no effect 15.4%, rather poor 2.2%, very poor 0%. The majority (56.5%) noticed that the effect was still lasting and 26.0% reported that the effect lasted up to 6 months. One quarter of the subjects reported that they were able to give up other therapies, mainly external corticosteroids and antihistamines, which they had needed. In comparison to the efficacy of conventional therapy, the effect of AM was considered to be greater by 38.0%, equal by 23.9%, and smaller by 22.8%. Three quarters of the AM users reported that their symptoms changed due to the therapy. Details are given in Table 5.

Those who used AM and conventional therapy simultaneously assessed AM (mean 2.06) better than conventional therapy (mean 2.44, $p=0.049$) on the five-point scale (1 = very good, to 5 = very poor).

Attitude

Most users of AM (50.0%) answered that it is equally important, for both conventional and AM, to believe in the effectiveness of the method. However, 31.5% felt that believing in the method is more important for AM than for conventional medicine, and 16.3% answered that belief is irrelevant for both methods. The use of AM has changed the attitude towards AM for 42.3% of participants, whereby 40.2% rated AM higher after using it; 1.1% rated it lower. General attitudes changed in 20.7% of AM users and affected areas of the disease (63.2%), the way of living (42.1%), the own person (26.3%), and other individuals (21.1%).

Table 5. Reported effects (%) of alternative medicine on symptoms of hypersensitivity in those (69/92) who noticed therapy-related changes

	Not relevant	Complete remission	Better	Unchanged
Atopic eczema ($n=9$)				
itch		11.1	55.6	
sleep loss		11.1	11.1	33.3
redness	66.7	11.1	66.7	11.1 + 11.1 (worse)
scaling	11.1	11.1	44.4	33.3
oozing, bleeding	33.3	11.1	33.3	22.2
Hay fever ($n=44$)				
sneezing	11.4	11.4	59.1	18.2
runny nose	6.8	15.9	54.5	22.7
blocked nose	22.7	9.1	52.3	15.9
itchy nose	38.6	13.6	31.8	15.9
itchy/watery eyes	6.8	20.5	54.5	18.2
Asthma ($n=9$)				
shortness of breath (rest)		22.2	44.4	
shortness of breath (activity)		11.1	88.9	
pace of attacks	33.3	11.1	88.9	
wheezing	11.1	11.1	66.7	11.1
Food hypersensitivity ($n=7$)				
oral symptoms	71.4			
erythema	42.9		28.6	
itchy skin	28.6	14.3	42.9	
gastrointestinal symptoms	100	28.6	42.9	

Discussion

We report on the usage of AM in 351 adults from the general population with doctor-diagnosed asthma, hay fever or atopic eczema, or self-reported hypersensitivity to food.

In our survey, 26.5% reported use of AM. These methods were used more often by younger and better-educated individuals, were mainly promoted and provided by medical doctors, and were effective according to subjective assessments. There were considerable costs associated with these procedures, which were largely paid "out of the pocket".

The results of this study should be generalizable to a larger German adult population with allergies because the participants were drawn from a representative population-based sample and a satisfying response to the telephone interview was achieved (76.3%). One can assume that not all reported hypersensitivity to food is allergic. It is not clear whether or how this self-report is confirmed by a doctor's diagnosis. The subgroup of those reporting hypersensitivity to food, however, has been characterized recently in more detail (12). With respect to the use of AM, it should be noted that such therapies were used infrequently (by 10.9%) in connection with food hypersensitivity in this group.

We have focused on explicit alternative therapeutic procedures and have not considered minor adjuvant measures, dietary supplements, herbs or home remedies. We have not gathered the same information as other studies and have therefore lost comparability. Furthermore, we have obtained a lifetime prevalence for use of AM in order to catch all relevant information. With this caveat in mind, our estimate (26.5%) of the frequency of use is somewhat lower than estimates for the general population in the US (34–42%) (4, 7), and Australia (20.3–48.5%) (6), but still higher than estimates from the UK (20%) (5, 13). A recent telephone survey in an adult US population revealed that 30% of people aged 65 and older, and 46% of those less than age 65, had used AM in the preceding year (14). The most commonly used modalities were chiropractic, herbal remedies or vitamins, and relaxation techniques, which were not assessed or reported in our study.

In a large study on presurgical patients, 39.2% admitted using AM. In the group of users, women aged 35–49 years with higher socioeconomic status (SES) and allergies were predominant (15). Flaherty and colleagues have studied older outpatients and concluded that 74.3% of Japanese, 61.1% of Americans and 47.2% of African Americans have experience with AM. Again, lifestyle, diet, herbal therapy, or relaxation techniques and spiritual healing were reported frequently in this study (16).

There are some studies which are based on populations of patients with allergies or dermatological disorders. A proportion very similar to the result of

our study of Italian allergy patients reported the use of AM (28%). Young women (16–40 years) had significantly more experience with AM (17). An identical result (28%) was achieved in a telephone interview study in the US in 1997 (4) regarding AM for allergies in the preceding year. An earlier German study of patients in a dermatology clinic showed that 37% had used AM before (18). According to a systematic review of seven worldwide studies on the use of AM in dermatological patients, the lifetime prevalence of the use of AM ranged between 35% (Sweden) and 69% (UK) (3). The latter study might be limited by the small sample size of 50 patients suffering from psoriasis.

Although a huge number of alternative methods are promoted and used for allergies (19, 20) only four procedures accounted for the majority of reported experiences. Whereas homeopathy and acupuncture are well known and practised throughout the world (20–22); bioresonance and especially autologous blood injection seem to represent regional peculiarities which are rarely mentioned in other studies.

It was shown in this study that younger and better-educated individuals use AM significantly more often. This is in accordance with findings in the general population of the USA (4, 7), Australia (6) and the UK (5) and was reported similarly for patients with allergies (17). We also obtained a tendency for higher usage in women and in those who exercise frequently, which agrees with previous findings (6, 23). We could not confirm reports about differences between users and nonusers with respect to other health behaviours (6), which agrees with previous findings in dermatological patients (23).

The *motivations* for using AM were mainly characterized by the assumption that AM has less side-effects and is more natural, by the wish to try everything, and because of unsatisfying results with conventional therapies. The presumed lack of side-effects (17) and the wish to try everything (23) corresponds with studies in clinical patients. Only a few subjects were disappointed by conventional therapy, which confirms earlier findings from Australia (24), but the overall assessment of conventional therapy in our study was significantly lower by users of AM as compared to nonusers. Perceived effectiveness was also an issue for the subjects in our study, as it was in a study from the UK (5).

It is an important finding that medical doctors promoted (40.2%) and provided (60.9%) these methods to a large extent. Both factors seem not to be the case in other countries such as USA, UK, and Australia, but resemble the situation in France (1, 2). A study from Norway indicated that some physicians recommended acupuncture (11%) and homeopathy (3%) in patients with atopic eczema (25) and a report from Italy showed that in 23% of cases alternative methods were recommended by physicians for patients with allergies

(17). However, it seems unusual that in France and Germany AM is provided by medical doctors. This practice has been criticised and further studies need to elucidate far this is motivated by government promotion, patient demands, and economic reasons (26). From our interview data, we could deduct the degree in which conventional and alternative treatments are used simultaneously. However, we did not assess physicians' opinions on using AM alone or combined with conventional therapy.

The average *costs* for a single treatment were estimated to be 41€, somewhat higher than the corresponding estimate for the USA (\$ 27.6) (7) and comparable to results from the UK (£ 19.5–40) (2). The average cost of 205€ for a complete treatment can be extrapolated to the German population, assuming a prevalence of atopic diseases of 20% and a frequency of use of AM of 26.5% in this group. According to those assumptions the total expenditure would be 0.9 billion€. Estimates for the overall annual expenditure for AM yielded 13.7 billion US\$ for the US, 930 million AU\$ for Australia, and £1.6 billion for the UK (5). Our study revealed that a substantial percentage (55.4%) would be willing to pay even more for the results that were achieved by AM. Independently from the therapeutic procedure, individuals with allergies would be willing to pay on average a single amount of 1534€ for complete healing.

The majority subjectively assessed the *efficacy* of AM as very good (28.6%) or rather good (53.8%). This is a higher ranking than that given by allergy patients from Italy, who assessed AM as moderately effective in 29% and good or excellent in 32% (17) and higher than reports from Germany (64.8% good and good with limitations) (18). Only one patient with eczema in our study felt that AM made his sleep-loss worse. We did not record specific side-effects which were unrelated to the reported symptoms.

The high reported efficacy is in contrast to results of the few available randomised controlled trials. Autologous blood injection was investigated in an appropriate clinical trial only for use in patients with spondylitis and it did not prove effective (27). Similarly, bioresonance did not show efficacy in the treatment of atopic eczema (28) and hay fever (29). There is also not enough evidence to support the use of homeopathy in atopic eczema (30). However, there is considerable information showing positive effects of homeopathy and acupuncture in hay fever and asthma. Because there are also contradictory findings it seems hard to draw definite conclusions at this time (20, 31–34).

We conclude that alternative medicine is widely used in the population to treat allergies. Younger and better-educated individuals tend to use these methods more frequently and there seem to be national peculiarities concerning individual methods and providers. Alternative medicine for allergies should be recognized as a considerable cost burden for society and the individual patient. Implications for public health should also be discussed in context with the limited evidence of efficacy.

Acknowledgments

We like to thank all participants of the study. We are indebted to the survey team, namely K. Papke, Dr B. Giesecke, and Dr R. Holle from the GSF-National Research Center for Environment and Health. We would also like to acknowledge the support of Dr Linde from the Münchner Model (Center for Complementary Medicine Research).

This study was supported exclusively by a government funding source: German Ministry of Education, Science, Research, and Technology (Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, 01EG9703/7).

There were no conflicts of interest.

References

1. FISHER P, WARD A. Complementary medicine in Europe. *BMJ* 1994;**309**:107–111.
2. ERNST E. The role of complementary and alternative medicine. *BMJ* 2000;**321**:1133–1135.
3. ERNST E. The usage of complementary therapies by dermatological patients: a systematic review. *Br J Dermatol* 2000;**142**:857–861.
4. EISENBERG D, DAVIS R, ETTNER S, et al. Trends in alternative medicine use in the United States, 1990–97: results of a follow-up national survey. *JAMA* 1998;**280**:1569–1575.
5. ERNST E, WHITE A. The BBC survey of complementary medicine use in the UK. *Complement Ther Med* 2000;**8**:32–36.
6. MACLENNAN A, WILSON D, TAYLOR A. Prevalence and cost of alternative medicine in Australia. *Lancet* 1996;**347**:569–573.
7. EISENBERG D, KESSLER R, FOSTER C, NORLOCK F, CALKINS D, DELBANCO T. Unconventional medicine in the United States. *N Engl J Med* 1993;**328**:246–252.
8. SCHÄFER T, RING J. Epidemiology of allergic disease. *Allergy* 1997;**52**:14–22.
9. BÖTHIG S. WHO MONICA Project: objectives and design. *Int J Epidemiol* 1989;**18**:29–37.
10. KEIL U, LIESE A, HENSE W, et al. Classical risk factors and their impact on incident non-fatal and fatal myocardial infarction and all-cause mortality in southern Germany. Results from the MONICA Augsburg cohort study 1984–92. Monitoring trends and determinants in cardiovascular diseases. *Eur Heart J* 1998;**19**:1197–1207.
11. JOHANSSON S, HOURIHANE JO'B, BOUSQUET J et al. A revised nomenclature for allergy. An EAACI position statement from the EAACI nomenclature task force. *Allergy* 2001;**56**:813–824.

12. SCHÄFER T, BÖHLER E, RUHDORFER S, et al. Epidemiology of food allergy / food intolerance in adults. Associations with other manifestations of atopy. *Allergy* 2001;**56**:1172–1179.
13. HARRIS P, REES R. The prevalence of complementary and alternative medicine use among the general population: a systematic review of the literature. *Complement Ther Med* 2000;**8**:88–96.
14. FOSTER D, PHILLIPS R, HAMEL M, EISENBERG D. Alternative medicine use in older Americans. *J Am Geriatr Soc* 2000;**48**:1560–1565.
15. LEUNG J, DZANKIC S, MANKU K, YUAN S. The prevalence and predictors of the use of alternative medicine in presurgical patients in five California hospitals. *Anesth Analg* 2001;**93**:1062–1068.
16. FLAHERTY J, TAKAHASHI R, TEOH J, et al. Use of alternative therapies in older outpatients in the United States and Japan: prevalence, reporting patterns, and perceived effectiveness. *J Gerontol a Biol Sci Med Sci* 2001;**56**:M650–M655.
17. SENNA G, PASSALACQUA G, CRIVELLARO M et al. Unconventional medicine: a risk of undertreatment of allergic patients. *Allergy* 1999;**54**:1114–1123.
18. TRIEBSKORN A, DROSNER M. 'Alternativ-medizinische' Behandlungsmethoden in der Beurteilung von Allergikern und chronisch Hautkranken. *H + G Z Hautkrankheiten* 1989;**64**:487–494.
19. DORSCH W. Alternative Heilmethoden in der Allergologie? *Allergo J* 1996;**5**:388–393.
20. ZIMENT I, TASHKIN D. Alternative medicine for allergy and asthma. *J Allergy Clin Immunol* 2000;**106**:603–614.
21. THOMAS K, CARR J, WESTLAKE L, WILLIAMS B. Use of non-orthodox and conventional health care in Great Britain. *BMJ* 1991;**302**:207–210.
22. BIELORY L. Complementary medicine for the allergist. *Allergy Asthma Proc* 2001;**22**:33–37.
23. BERG M, ARNETZ B. Characteristics of users and nonusers of alternative medicine in dermatologic patients attending a University hospital clinic: a short report. *J Alternat Compl Med* 1998;**4**:277–279.
24. DONNELLY W, SPYKERBOER J, THONG Y. Are patients who use alternative medicine dissatisfied with orthodox medicine? *Med J Aust* 1985;**142**:539–541.
25. JENSEN P. Alternative therapy for atopic dermatitis and psoriasis. patient-reported motivation, information source and effect. *Acta Derm Venereol (Stockh)* 1990;**70**:425–428.
26. HAPPLE R. The essence of alternative medicine. A dermatologist's view from Germany. *Arch Dermatol* 1998;**134**:1455–1460.
27. SCHIRMER K, FRITZ M, JACKEL W. Effectiveness of *Formica rufa* and autologous blood injection in patients with ankylosing spondylitis: a double-blind randomized study. *Z Rheumatol* 2000;**59**:321–329.
28. SCHÖNI M, NIKOLAIZIK W, SCHÖNI-AFFOLTER F. Efficacy trial of bioresonance in children with atopic dermatitis. *Int Arch Allergy Immunol* 1997;**112**:238–246.
29. KOFLER H, ULMER H, MECHTLER E, FALK M, FRITSCH P. Bioresonanz bei Pollinosis. Eine vergleichende Untersuchung zur diagnostischen und therapeutischen Wertigkeit. *Allergologie* 1996;**3**:114–122.
30. HOARE C, LI WAN PO A, WILLIAMS H. Systematic review of treatments for atopic eczema. *Health Technology Assessment; Volume (4)*. Southampton: National Coordinating Centre for HTA, 2000.
31. TAYLOR M, REILLY D, LLEWELLYN-JONES R, MCSHARRY C, AITCHISON T. Randomised controlled trial of homeopathy versus placebo in perennial allergic rhinitis with overview of four trial series. *BMJ* 2000;**321**:471–476.
32. WIESENAUER M, GAUS W. Double-blind trial comparing the effectiveness of the homeopathic preparation *Galphimia* potentiation D6, *Galphimia* dilution 10 (-6) and placebo on pollinosis. *Arzneimittelforschung* 1985;**35**:1745–1747.
33. LINDE K, JOBST K. Homeopathy for chronic asthma. *Cochrane Database Syst Rev* 2000;**2**:CD000353.
34. LINDE K, JOBST K, PANTON J. Acupuncture for chronic asthma. *Cochrane Database Syst Rev* 2000;**2**:CD000008.