Prevalence of complementary and alternative medicine (CAM) use by the general population: a systematic review and update

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Disclosures
None.

SUMMARY

Objectives: To update previous systematic reviews of 12-month prevalence of complementary and alternative medicine (CAM) use by general populations; to explore trends in CAM use by national populations; to develop and apply a brief tool for assessing methodological quality of published CAM-use prevalence surveys. **Design:** Nine databases were searched for published studies from 1998 onwards. Studies prior to 1998 were identified from two previous systematic reviews. A six-item literature-based tool was devised to assess robustness and interpretability of CAM-use estimates. **Results:** Fifty-one reports from 49 surveys conducted in 15 countries met the inclusion criteria. We extracted 32 estimates of 12-month prevalence of use of any CAM (range 9.8–76%) and 33 estimates of 12-month prevalence of visits to CAM practitioners (range 1.8–48.7%). Quality of methodological reporting was variable; 30/51 survey reports (59%) met four or more of six quality criteria. Estimates of 12-month prevalence of any CAM use (excluding prayer) from surveys using consistent measurement methods showed remarkable stability in Australia (49%, 52%, 52%; 1993, 2000, 2004) and USA (36%, 38%; 2002, 2007). **Conclusions:** There was evidence of substantial CAM use in the 15 countries surveyed. Where national trends were discernable because of consistent measurement, there was no evidence to suggest a change in 12-month prevalence of CAM use since the previous systematic reviews were published in 2000. Periodic surveys are important to monitor population-level CAM use. Use of government-sponsored health surveys may enhance robustness of population-based prevalence estimates. Comparisons across countries could be improved by standardising approaches to data collection.

Review criteria

- Nine databases were searched from 1998 onwards; prior studies were identified from two previous systematic reviews.
- Studies were included if they reported prevalence of CAM use over 12-months in a representative sample of the general population. Studies were excluded if restricted to a single CAM therapy, or not written in English.
- A six-item tool to assess quality of published CAM-use prevalence surveys was devised and applied.

Message for the clinic

- The review included 51 reports from 49 surveys in 15 countries: estimates of 12-month prevalence of any CAM use ranged from 9.8% to 76%; and from 1.8% to 48.7% for visits to CAM practitioners.
- There was no evidence of a change in CAM use since previous reviews were published in 2000.
- Periodic surveys with consistent measurement methods are needed to determine trends in CAM use by national populations.

Introduction

It has been more than ten years since two systematic reviews of surveys of complementary and alternative medicine (CAM) use by the general public were published (1,2). The reviews concluded, independently, that despite the methodological limitations of the surveys included, CAM was used by substantial proportions of the general populations of a number of countries. One source (3) suggested that CAM use increased significantly in the USA between 1990 and 1997. A further review is timely to examine more recent trends and their implications for healthcare systems and policy as well as for consumers of CAM.

The use of all types of medicine is influenced by economic and socio-cultural factors. In economically disadvantaged societies where access to biomedical services is poor, there is evidence of a pervasive reliance on traditional healers, even for serious disease (4). In affluent countries, where biomedical services are more accessible, a substantial amount of CAM is used for illness prevention and health promotion purposes (3). There is also evidence that CAM is frequently used as an adjunct to biomedical treatment by patients with serious disease such as cancers (5,6) and to self-manage long-term health complaints like low back pain (7). However, the socio-cultural factors influencing CAM use in affluent societies are still not well understood. Studies have persistently shown that CAM users are more likely to be female, better educated, middle-aged and report poorer health status than non-users (6,8–12). CAM use appears to be

driven more by congruence with values and beliefs than by dissatisfaction with biomedicine (10) but motivation to use CAM is further complicated by costs and benefits as experienced by consumers.

Although the true rate of CAM use can be expected to differ between countries because of economic, social and cultural factors, the prevalence rates estimated by surveys are also affected by methodological factors. Some of these have been identified (2) with the recommendation that surveys justify the types of CAM surveyed; use pretested data collection methods; distinguish between consultations with CAM practitioners and over-the-counter products; seek reports of usage for each of the practitioner therapies and products identified; and specify the period over which CAM use is estimated (most surveys choose a 12 month retrospective period). Others have also recommended a more standardised method of collecting data to improve the comparability of CAM use estimates (13).

The two previous reviews of CAM prevalence (1,2) each included 12 surveys for review with seven[1] common to both studies because of differences in search methods and selection criteria. The current study has drawn on these two earlier reviews to develop more rigorous criteria for searching and selection and aims to (i) systematically review all surveys of CAM use by the general public, (ii) identify trends in CAM use by national populations, (iii) develop a brief tool for assessing methodological quality and apply it to each survey.

Methods

Search strategy
The systematic review followed the recommendations in the PRISMA statement (16). The following databases were searched in February 2011: MEDLINE, Medline in Process, EMBASE, Cochrane Database of Systematic Reviews, Cochrane CENTRAL Register of Controlled Trials, HTA database, Science Citation Index, AMED and PsycINFO. The search strategy combined terms for: (i) complementary and alternative medicines, (ii) prevalence, surveys or patterns of use, and iii) population-level or national-level data. The full search strategy is provided in Appendix 1. The search was restricted to studies published from 1998 onwards. Studies published prior to 1998 were identified from two previous systematic reviews of CAM prevalence (1,2). Bibliographies of included papers were checked for further relevant studies.

Inclusion and exclusion criteria
Studies were included if they reported prevalence of CAM use over a 12-month retrospective period within a representative general population sample of a nation or a defined geographical area. Surveys of clearly-defined age groups (such as adults or children) were also included. Included studies used survey methods such as structured interviews or self-complete questionnaires. Studies were excluded if they were restricted to a single therapy (rather than CAM use overall), did not report 12-month prevalence, or were not written in English. Studies were also excluded if they were not based on representative samples of the general population; for example, surveys of sub-populations with specific clinical conditions or socio-demographic characteristics (other than age).

Study selection and data extraction
Study titles retrieved by the search were assessed for inclusion by one reviewer and a sample of excluded titles was checked by a second reviewer: no instances of discrepancy were found. Potentially relevant abstracts and full texts were assessed by two reviewers and any discrepancies resolved through discussion. Data were extracted by one reviewer and checked by a second.

Quality assessment
There is no agreed set of criteria for assessing quality of health-related surveys, although various publications have explored issues relating to the critical review of questionnaire-based surveys in health research (17–22), and previous studies of CAM-use prevalence have commented on these issues (2,14,23,24).

For the purposes of this review, we derived a short, literature-based quality assessment tool comprising important and assessable criteria of methodological quality, and applied this to each of the eligible papers identified. Our rationale for selecting quality criteria related to the need to assess the robustness and interpretability of published CAM-use estimates. Our quality criteria reflect a combination of aspects of study design, study conduct and the reporting of results (Box 1).

Rationale for quality criteria

Study design
As with all surveys of prevalence, the estimates produced are the direct product of the questions asked; slight changes in the form of questions will have the potential to affect the resulting estimates. This is particularly important in surveys of CAM where multi-

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[1]Data for Thomas 1993 [14] and Vickers 1994 [15] are from the same survey source.

Box 1 Quality assessment criteria for reports of the 12-month population prevalence of CAM use

Study design	1. Measurement method– CAM-use questions clearly described and number of therapies/questions reported.
	2. Piloting of survey reported (or assumed for government surveys).
	3. Sample size ≥ 1000 and/or CAM-specific sample size calculation reported.
Data collection	4. Reported survey response rate ≥ 60%.
Analysis	5. Data weighted to population characteristics (where appropriate) to reduce non-response bias.
Reporting	6. 95% confidence interval or standard error reported for main prevalence estimates.

ple, and sometimes culturally specific understandings exist in relation to the practice and to the constituent therapies (2,23). CAM prevalence surveys have employed one of two data collection methods; either a list of named therapies is presented, or more exploratory, open question(s) are used to elicit CAM use. Our first criterion required papers to reproduce the CAM survey question(s) verbatim or describe the CAM question in the text (e.g. 'we asked about…'). For closed questions, we required a list of the pre-specified therapies (and exclusions) presented to survey respondents (described clearly enough for the individual therapies to be counted reliably). Where open question(s) were used to collect CAM-use data, we sought evidence of the content and number of open questions employed.

As the measurement process for CAM-use is complex and variable, the validity of the survey instrument is strengthened if it has been tested in a pilot study for ease of completion and comprehensibility (2,14,18). Evidence of such piloting formed our second criterion. Explicit mention of a pilot was sought for all studies, but routine, government-sponsored surveys were assumed to have undergone a piloting phase as this is standard practice and frequently described in separate, methodological papers or reports.

Adequate sample size enhances the robustness of the estimates produced and, if something is known about expected prevalence prior to the survey, a sample size calculation can be performed to ensure adequate numbers for each item of importance to be measured (18,20–22). Surveys of CAM use that are part of wider-scope studies of health behaviour tend to have large samples, but may not perform sample size calculations in relation to items measur-

ing CAM use. Our third criterion was met if studies reported a sample of at least 1000, and/or if they reported a sample size calculation specific to CAM use.

Data collection
Previous papers have cited 'good' response rates for surveys as between 70–80%, and 'acceptable' response rates for postal surveys between 50% and 60% (18,20–22,24). Our fourth criterion was deemed to have been met if studies reported a response rate of at least 60% (we accepted adjusted or unadjusted response rates and report these in Table 1).

Analysis
Our fifth quality criterion was deemed to have been met if appropriate correction for non-response bias was used; for example, weighting the responses to the known characteristics of the original sample population (18,20–22).

Reporting of estimates
Finally, 95% confidence intervals (CIs) provide an estimate of the range in which the true prevalence value is expected to lie (18,20–22,25) and therefore provide more information whilst reducing the likelihood of 'false' precision being attributed to the estimates. Our sixth and final quality criterion was therefore met when studies reported 95% CIs, or standard errors (SEs) from which the CI can be calculated, for the main CAM-use prevalence estimates.

Results

Number of surveys included
The search identified 2312 unique citations, as shown in Figure 1. Of these, 2208 were excluded at the title and abstract stage, while the full texts of 104 references were examined. Forty-seven references were included in the review; three references (11,26,27) together contained reports from seven independent surveys, while four references (24,28–30) relating to two surveys gave separate reports for adults and children. In total, the 47 references reviewed contained 51 reports from 49 independent surveys. From these reports, we extracted 32 separate estimates of the 12-month prevalence of the use of any CAM and 33 estimates of the 12-month prevalence of visits to CAM practitioners.

Quality assessment
Table 1 identifies the 49 surveys ordered by the number of surveys per country, the country of origin, and the year of data collection. Each of the 51 survey reports (two surveys giving separate reports

Table 1 Quality assessment of survey reports of CAM use

Country (year of survey)	First author (year of pub.)	CAM-use measurement method (N)*	Piloting of survey reported†	Sample size ≥ 1000 and/or calculation reported (SSC)	Reported response rate ≥ 60% (adj/unadj/NR)	Data weighted to population characteristics	95% CI or SE reported	Meets ≥ 4 quality criteria
USA (2007)	Barnes (2008) (31)	Named therapies (36)	Gvt. Survey	Age 18+: 23,393 / Age 0–17: 9417	Age 18+: 67.8% (NR) / Age 0–17: 76.5% (NR)	Yes	SE	Yes
USA (2002)	Barnes (2004) (32)	Named therapies (27)	Gvt. Survey	31,044	74.3% (adj)	Yes	SE	Yes
USA (2001)	Hughes (2006) (54)	Open questions (NR)	Piloted	1104	65.9% (NR)	NR	NR	–
USA (1999)	Arcury (2004) (55)	Open questions (NR)	NR	1059	83.8% (NR)	Yes	SE	Yes
USA (1999)	Ni (2002) (33)	Named therapies (12)	Gvt. Survey	30,801	70% (NR)	Yes	CI	Yes
USA (1998)	Oldendick (2000) (56)	Named therapies (NR)	NR	1584	66.2% (NR)	Yes	CI	Yes
USA (1997–8)	Astin (2000) (37)	Named therapies (10)	NR	728	51% (unadj)	NR	NR	–
USA (1997)	Eisenburg (1998) (3)	Named therapies (16)	Piloted	2055; SSC	60% (adj); 49% (unadj)	Yes	SE	Yes
USA (1997)	Landmark Healthcare (1998) (36)	Named therapies(11)	NR	1500	NR	NR	CI	–
USA (1996)	Druss (1999) (24)	Named therapies (11)	Gvt. Survey	Age 18+: 16,068	77.7% (NR)	Yes	NR	Yes
USA (1995–6)	Davis (2003) (28)	Named therapies (11)	Gvt. Survey	Age < 18: 6262	Children interviewed by proxy	Yes	CI	Yes
USA (1995–6)	Honda (2005) (34)	Named therapies (14)	Gvt. Survey	4242	60.8% (NR)	Yes	NR	Yes
USA (1994)	Paramore (1997) (57)	Named therapies (4)	NR	3450	75% (NR)	Yes	NR	Yes
USA (1990)	Eisenberg (1993) (35)	Named therapies (16)	Piloted	1539; SSC	67% (unadj)	Yes	CI	Yes
USA (NR)	Cheung (2007) (38)	Named therapies (16)	Piloted	445; SSC	37% (unadj)	NR	NR	–
USA (NR)	Shreffler-Grant (2005) (39)	Open questions(NR)	Piloted	325	69.3% (unadj)	NR	NR	–
USA (NR)	Astin (1998) (10)	Named therapies (17)	NR	1035	69% (unadj)	NR	NR	–
UK (2005)	Hunt (2010) (42)	Named therapies (23)	Gvt. Survey	7630	71% (unadj)	NR	NR	Yes
UK (2001)	Thomas (2004) (43)	Named therapies (23)	Gvt. Survey	1794	65% (unadj)	Yes	CI	Yes
UK (1999)	Ernst (2000) (41)	Open questions (5)	NR	1204	NR	Yes	NR	–
UK (1998)	Thomas (2001) (40)	Named therapies (10)	Piloted	2669; SSC	59% (adj)	Yes	CI	Yes
UK (1993)	Thomas (1993) (14)	Named therapies (6)	Piloted	676	78% (adj)	Yes	CI	Yes
UK (1986)	Yung (1988) (58)	Named therapies (6)	Gvt. Survey	4268	70% (adj)	NR	CI	Yes
Canada (2001–5)	Metcalfe (2010) (46)	Named therapies (14)	Gvt. Survey	400,055	NR	Yes	CI	Yes
Canada (1998–9)	Millar (2001) (45)	Open questions (2)	Gvt. Survey	14,150	NR	Yes	CI	Yes
Canada (1994–5)	Millar (1997) (44)	Open questions (2)	Gvt. Survey	17,626	NR	Yes	CI	Yes
Canada (1988)	Northcott (1993a) (26)	Named therapies (NR)	Gvt. Survey	464	80% (NR)	NR	NR	–
Canada (1979)	Northcott (1993b) (26)	Named therapies (NR)	Gvt. Survey	439	75% (NR)	NR	NR	–
Australia (2005)	Xue (2007) (59)	Named therapies (17)	Piloted	1067; SSC	NR	Yes	CI	Yes
Australia (2004)	MacLennan (2006) (29)	Named therapies (16)	Gvt. Survey	Age 15+: 3015	71.7% (unadj)	Yes	CI	Yes
Australia (2004)	Smith (2006) (30)	Named therapies (12)	Gvt. Survey	Age < 15: 911	Children interviewed by proxy	Yes	CI	Yes
Australia (2000)	MacLennan (2002) (47)	Named therapies (NR)	Gvt. Survey	3027	70.4% (NR)	Yes	CI	Yes
Australia (1993)	MacLennan (1996) (9)	Named therapies (19)	Gvt. Survey	3004	73.6% (NR)	Yes	NR	Yes
Norway (2007)	Fonnebo (2009) (60)	Named therapies (8)	NR	1007	NR	NR	NR	–
Norway (2002)	Steinsbekk (2009) (61)	Open question(1)	Gvt. Survey	6612	70.4% (NR)	Yes	NR	Yes
Norway (1997)	Hanssen (2005a) (11)	Open questions (5)	NR	1000	51% (unadj)	NR	NR	–

Table 1 Continued

Country (year of survey)	First author (year of pub.)	CAM-use measurement method (M)*	Piloting of survey reported†	Sample size ≥ 1000 and/or calculation reported (SSC)	Reported response rate ≥ 60% (adj/unadj/NR)	Data weighted to population characteristics	95% CI or SE reported	Meets ≥ 4 quality criteria
Norway (1995–7)	Steinsbekk (2007) (62)	Open question(1)	NR	54,448	59% (unadj)	NR	NR	–
Israel (2003–4)	Niskar (2007) (63)	NR	Gvt. Survey	2365	58.6% (unadj)	NR	NR	–
Israel (2000)	Schmueli (2004a) (27)	NR	NR	2505	NR	NR	NR	–
Israel (1993)	Schmueli (2004b) (27)	NR	NR	2003	NR	NR	NR	–
Denmark (2000)	Hanssen (2005b) (11)	Open questions (4)	Gvt. Survey	16,690	74% (unadj)	NR	NR	Yes
Denmark (1987)	Rasmussen (1990) (64)	NR	Gvt. Survey	4753	NR	NR	NR	–
Singapore (2003–4)	Feng (2010) (65)	Named therapies (NR)	Gvt. Survey	1092	72.4% (NR)	Yes	NR	Yes
Singapore (2002)	Lim (2005) (52)	Open questions(NR)	Piloted	468	72.2% (unadj)	NR	CI	–
Germany (1997–2001)	Schwarz (2008) (66)	Named therapies (14)	NR	4291	68.8% (unadj)	NR	NR	–
Italy (1996–7)	Dello Buono (2001) (67)	Open questions(NR)	NR	655	65% (adj); 58% (unadj)	NR	NR	–
Japan (2001)	Yamashita (2002) (48)	Named therapies (10)	Piloted	1000	NR	Yes	CI	Yes
Malaysia (2004)	Siti (2009) (49)	Open questions (4)	Gvt. Survey	6947	81% (adj)	Yes	CI	Yes
Saudi Arabia (2003)	Al-Faris (2008) (51)	NR	Piloted	1408; SSC	95% (unadj)	NR	CI	Yes
South Korea (2006)	Ock (2009) (50)	Named therapies (27)	NR	3000	49.8% (unadj)	Yes	NR	–
Sweden (2000)	Hanssen (2005c) (11)	Open questions (4)	NR	1001	63% (unadj)	NR	NR	–

*Parenthesis following 'Named therapies' includes number of therapists, therapies and over-the-counter products named in the survey (excludes 'other' category); following 'Open questions, parenthesis includes number of interview questions. †Piloting was assumed for government surveys. NR, data not reported
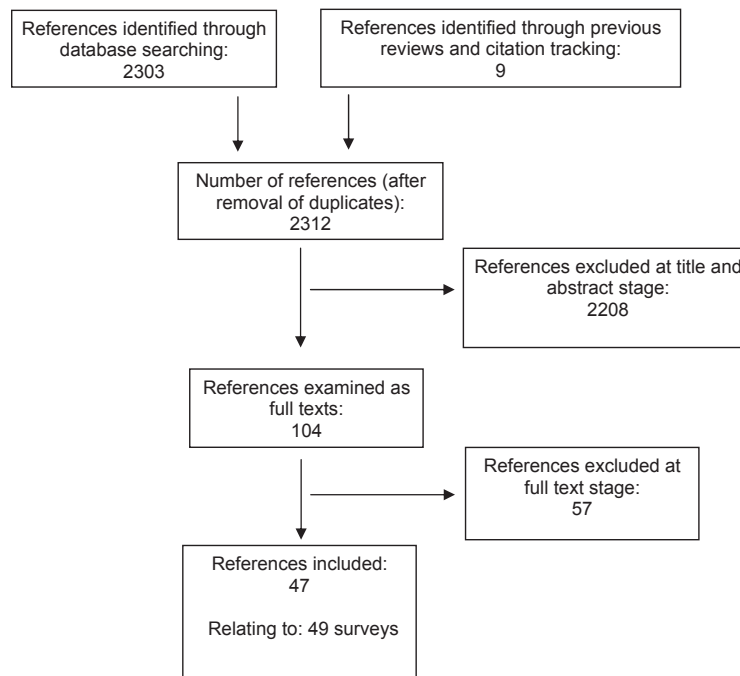
Figure 1 PRISMA flow chart of included and excluded studies

for adults and children) is assessed using the six quality criteria developed for this review.

Based on the information reported, we assessed all surveys reviewed with regards to our six quality criteria (see Table 2). The proportion of all survey reports achieving each of our criteria ranged from 43% to 84%. The criteria least likely to be met were (5) data weighting to reduce non-response bias, and (6) reporting CI or SE for key prevalence estimates. Fifty-nine percent of all survey reports met four or more of our quality criteria. Although proportionately more reports from government–sponsored surveys achieved four or more of the qual-

ity criteria compared with other survey reports, and there was a trend towards more of these reports meeting each individual criterion, the only marked difference observed was for the piloting criterion, where we made the assumption that all government-sponsored surveys were piloted. We found no evidence of an association between date of publication and quality.

Prevalence of CAM use

Table 3 is a quick access guide to CAM use over a 12-month period as reported from the 49 surveys conducted in 15 countries. It shows the percentage

Table 2 Summary of the quality of survey reports

Quality criterion	All survey reports N = 51		Gvt. sponsored survey reports N = 24		Other CAM survey reports N = 27	
	n	%	n	%	n	%
1. CAM-use measurement method clearly described	36	71	18	75	18	67
2. Piloting of survey reported (or assumed for government surveys)	35	69	24	100 (assumed)	11	41
3. Sample size ≥ 1000 and/or sample size calculation reported	43	84	21	88	22	82
4. Reported survey response rate ≥ 60%	31	61	17	71	14	52
5. Data weighted to population characteristics	27	53	16	67	11*	41
6. 95% confidence interval or standard error reported for main prevalence estimates	22	43	11	46	11	41
Four or more criteria met	30	59	20	83†	10	37

*Inc. one survey (Al-Faris et al. 2008) with 95% response reported where this was deemed unnecessary.
†This includes the assumption that the pilot criterion is 100% for this group.

Table 3 Summary of CAM use in 15 countries: all-CAM use and all CAM-visits to practitioners

Country	Age group	Survey type	Sample size (range)	All-CAM use % (year of survey)	All CAM –visits % (year of survey)	Refs, name of survey*	Meets ≥ 4 quality criteria
Adult or all ages							
USA	Adult or all ages	Government national	4242–31,044	2007: 38.3	2007: 16.2	(31) NHIS	Yes
				2002: 36.0	2002: 12.5	(32) NHIS	Yes
				1999: 28.9		(33) NHIS	Yes
					1996: 8.3	(24) MEPS	Yes
				1995–6: 54.0		(34) MIDUS	Yes
USA	Adult or all ages	Other national	1035–3450	1997: 42.1, 42.0	1997: 19.5	(3,36)	Yes, No
					1994: 9.4	(57)	Yes
				1990: 33.8	1990: 12.3	(35)	Yes
				NR: 40.0		(10)	–
USA	Adult or all ages	Sub-national	1059–1584	1999: 45.7	1999: 8.6	(55)	Yes
				1998: 43.7		(56)	Yes
UK	Adult or all ages	Government national	1794–7630	2005: 26.3	2005: 12.1	(42) HSE	Yes
					2001: 10.0	(43) NOS	Yes
UK	Adult or all ages	Other national	676–2669	1999: 20.3		(41)	No
				1998: 28.3	1998: 13.6	(40)	Yes
					1993: 8.5	(14)	Yes
UK	Adult or all ages	Government sub-national	4268		1986: 2.6	(58) CHS	Yes
Canada	Adult or all ages	Government national	14,150–400,055		2001–5: 12.4	(46) CCHS	Yes
					1998–9: 17.0	(45) NPHS	Yes
					1994–5: 15.0	(44) NPHS	Yes
Canada	Adult or all ages	Government sub-national	439–464	1988: 14.4		(26) AEAS	No
				1979: 9.8		(26) AEAS	No
Australia	Adult or all ages	Other national	1067	2005: 68.9	2005: 44.1	(59)	Yes
Australia	Adult or all ages	Government sub-national	3004–3027	2004: 52.2	2004: 26.5	(29) SAHOS	Yes
				2000: 52.1	2000: 23.3	(47) SAHOS	Yes
				1993: 48.5	1993: 20.3	(9) SAHOS	Yes
Norway	Adult or all ages	Government national	6612		2002: 8.7	(61) LLS	Yes
Norway	Adult or all ages	Other national	1000–1007		2007: 48.7	(60)	No
					1997: 12.0	(11)	No
Norway	Adult or all ages	Sub-national	54,448		1995–7: 9.9	(62)	No
Israel	Adult or all ages	Government national	2365		2003–4: 5.8	(63) INHIS	No
Israel	Adult or all ages	Sub-national	2003–2505		2000: 9.8	(27)	No
					1993: 6.1	(27)	No
Denmark	Adult or all ages	Government national	4753–16,690		2000: 21.0	(11) SUSY	Yes
					1987: 10.0	(64) DICE	No
Singapore	Adult or all ages	Sub-national	468	2002: 76.0		(52)	No
Germany	Adult or all ages	Sub-national	4291		1997–2001: 6.0	(66)	No
Japan	Adult or all ages	Other national	1000	2001: 76.0		(48)	Yes
Malaysia	Adult or all ages	Government national	6947	2004: 55.6		(49)	Yes
Saudi Arabia	Adult or all ages	Sub-national	1408	2003: 67.8	2003: 23.9	(51)	Yes
South Korea	Adult or all ages	Other national	3000	2006: 74.8		(50)	No
Sweden	Adult or all ages	Sub-national	1001	2000: 20.0		(11)	No
Children							
USA	Children	Government national	6262–9417	2007: 11.8		(31) NHIS	Yes
					1996: 1.8	(28) MEPS	Yes
USA	Children	Sub-national	1104		2001: 22.6	(54)	No
Australia	Children	Government sub-national	911	2004: 18.4		(30) SAHOS	Yes
Older adults							
USA	Older adults	Sub-national	325–728	1997–8: 41.0		(37)	No
				NR: 45.2, 62.9	NR: 17.5	(38,39)	No, No
Singapore	Older adults	Government national	1092	2003–4: 44.6		(65) NMHSE	Yes
Italy	Older adults	Sub-national	655	1996–7: 29.5		(67)	No

*Survey names are provided where reported for government surveys: AEAS, Annual Edmonton Area Survey; CCHS, Canadian Community Health Survey; CHS, Cardiff Health Survey; DICE, Danish Institute for Clinical Epidemiology; HSE, Health Survey for England; INHIS, Israeli National Heath Interview Survey; LLS, Level of Living Survey; MEPS, Medical Expenditure Panel Survey; MIDUS, Midlife Development in the US; NHIS, National Health Interview Survey; NOS, National Omnibus Survey; NMHSE, National Mental Health Survey of the Elderly; NPHS, National Population Health Survey; SAHOS, South Australian Health Omnibus Survey; (SUSY, abbreviation not reported).

of the general population using at least one type of CAM (all-CAM use), the percentage visiting any CAM practitioner (all CAM-visits), and gives an assessment of each survey using our quality criteria. Table 4 gives details for each survey of the survey population, the sampling and data collection method, the sample itself, and CAM use estimates with 95% CIs (CIs calculated by the review authors are identified). In both tables the survey data are grouped by age: adults or all ages; children; and older adults. Where possible, the following narrative identifies trends in CAM use by national populations from data obtained using consistent methodologies.

USA

Of the surveys (see Table 1) conducted in the USA from 1990 to 2007, five were government-sponsored surveys (24,31–34). Data from the National Health Interview Surveys (NHIS) provided the best available evidence of recent trends in CAM use by adults (Tables 3 and 4). Excluding prayer, all-CAM use by adults (age 18+), over a 12-month period, was estimated to be 36% in 2002 (32) and 38% in 2007 (31). Four US independent national surveys of adults (age 18+) conducted in the 1990s (3,10,35,36) estimated rates for all-CAM use of 34–42%.Visits by adults to CAM practitioners in the USA (Tables 3 and 4) increased from 13% in 2002 to 16% in 2007 with substantial variation in the use of specific CAM therapies and reported significant increases in usage of some types of therapy including acupuncture and massage therapy (31,32).

The data from the 2007 NHIS (31) indicates that all-CAM use in children (age 0–17) is considerably lower than for adults: 12% vs. 38%. The Medical Expenditure Panel Survey (MEPS) of 1996 (28) also shows that adults (age 18+) were much more likely than children (age <18) to visit CAM practitioners (8% vs. 2%). The three independent studies (37–39) of CAM use in later life (age 60+ or 65+) gave rates for all-CAM use varying from 41 to 63% (Table 3).

UK

In the UK, 12-month prevalence estimates for all-CAM use by adults in 1998 (40), 1999 (41) and 2005 (42) were 28%; 20%; and 26% respectively. Fourteen percent of the adult population (age 18+) of England were reported to have visited at least one CAM practitioner in 1998 (40). In 2001, the estimate for adults (age 16+) was 10% for England, Scotland and Wales (43), and 12% for England in 2005 (42). None of these surveys used the same measurement tool. No UK estimates for children or older adults were identified.

Canada

The National Population Health Survey (NPHS) in Canada reported rates of adult (age 15+) visits to CAM practitioners at 15% in 1995 (44) and 17% (for age 18+) in 1999 (45). Based on data from 2001–5 the Canadian Community Health Survey (CCHS) estimated that 12% of the population age 12 or older had visited some type CAM practitioner over a 12-month period (46). None of these three surveys estimated the 12-month prevalence of all CAM-use.

Australia

In Australia, the South Australian Health Omnibus Surveys (SAHOS) collected data on CAM use by adults (age 15+) living in Southern Australia in 1993, 2000 and 2004 (9,29,47). These methodologically consistent studies report remarkably similar estimates of overall CAM-use during that period (49%, 52% and 52%). Visits to CAM practitioners were reported as 20% of the population in 1993 (9), 23% in 2000 (47) and 27% in 2004 (29). As in the US, the SAHOS 2004 survey showed lower rates of overall CAM use in children (age < 15) than adults (18% vs. 52%) (29,30).

Other countries

Data from survey reports in the remaining 11 countries were considered insufficient to indicate national trends in CAM use; surveys in Norway, Israel, Demark and Singapore used inconsistent measurement methods, targeted different populations, and/or the quality of the survey reports was assessed as poor. Of surveys with national samples, the three highest rates of CAM use were reported in East Asian countries: Japan: 76%, South Korea: 75% and Malaysia: 56% (48–50).

Discussion

This is the most comprehensive and systematic review to date of surveys reporting the prevalence of CAM use by the general public. The two previous systematic reviews, published in 2000 (1,2), together included 18 reports from 17 surveys conducted in nine countries. Nine reports from the two previous reviews met the criteria for the current review, a further 40 surveys were identified yielding 42 further reports; 38 were published during or post-2000. The enduring popularity of CAM surveys was also evidenced by the number of repeat surveys conducted, particularly by government agencies, in the USA, Australia and the UK and the resultant data were used to explore trends in CAM use for this review. Reports of CAM surveys from many countries are absent and this partly reflects the limitation of excluding studies not written in English.

Table 4 Detail of CAM use in 15 countries: all-CAM use and all CAM-visits to practitioners

Country (year of survey)	First author (year of pub.)	Population (name of Gvt. Survey)	Sampling method	Data collection method	Includes prayer	N	Sample ages (% males)	All CAM use %	All-CAM use 95% CI	All CAM visits %	All CAM-visits 95% CI	Meets ≥ 4 quality criteria
Adult or all ages												
USA (2007)	Barnes (2008) (31)	National (National Health Interview Survey, NHIS)	Random sample of households	Interview	No†	23,393 (18+)	18+ (NR)	38.3	37.7–38.9*	16.2	15.7–16.7*	Yes
USA (2002)	Barnes (2004) (32)	National (National Health Interview Survey, NHIS)	Random sample of households	Interview	Yes No	31,044	18+ (NR)	62 36.0	61.6–62.6* 35.5–36.5*	12.5	12.1–12.9*	Yes
USA (1999)	Arcury (2004) (55)	Sub-national (NA)	Stratified cluster sample	Interview	No	1059	18+ (NR)	45.7	42.7–48.7*	8.6	6.9–10.3*	–
USA (1999)	Ni (2002) (33)	National (National Health Interview Survey, NHIS)	Nationally representative sample	Interview	Yes	30,801	18+ (NR)	28.9	28.1–29.7	–	–	Yes
USA (1998)	Oldendick (2000) (56)	Sub-national (NA)	Random digit dialling	Telephone interview	No	1584	18+ (38)	43.7	41.2–46.2	–	–	Yes
USA (1997)	Eisenburg (1998) (3)	National (NA)	Random sample of household telephones	Telephone interview	No	2055	18+ (48)	42.1	40.0–44.2*	19.5	17.8–21.2*	Yes
USA (1997)	Landmark Healthcare (1998) (36)	National (NA)	Random sample of households	Telephone interview	No	1500	18+ (NR)	42.0	39.5–44.5	–	–	–
USA (1996)	Druss (1999) (24)	National (Medical Expenditure Panel Survey, MEPS)	Random sample of population	Interview	No	16,068	18+ (47)	–	–	8.3	7.9–8.7*	Yes
USA (1995–6)	Honda (2005) (34)	National (Midlife Development in the US, MIDUS)	Nationally representative sample	Telephone interview + postal questionnaire	Yes	4242	25–74 (43)	54.0	52.5–55.5*	–	–	Yes
USA (1994)	Paramore (1997) (57)	National (NA)	Nationally representative sample	Interview	No	3450	All ages incl. children (NR)	–	–	9.4	8.4–10.4*	Yes
USA (1990)	Eisenberg (1993) (35)	National (NA)	Random sample of household telephones	Telephone interview	No	1539	18+ (52)	33.8	31.0–37.0	12.3	10.7–13.9*	Yes
USA (NR)	Astin (1998) (10)	National (NA)	Random sample of self-selecting group	Postal questionnaire	No	1035	18+ (49)	40.0	37.0–43.0*	–	–	–
UK (2005)	Hunt (2010) (42)	National (Health Survey for England, HSE)	Random sample of households	Interview	No	7630	16+ (45)	26.3	25.3–27.3*	12.1	11.4–12.8*	Yes

Table 4 Continued

Country (year of survey)	First author (year of pub.)	Population (name of Gvt. Survey)	Sampling method	Data collection method	Includes prayer	N	Sample ages (% males)	All CAM use %	All-CAM use 95% CI	All CAM visits %	All CAM-visits 95% CI	Meets ≥ 4 quality criteria
UK (2001)	Thomas (2004) (43)	National (National Omnibus Survey, NOS)	Random sample within postal sectors	Interview	No	1794	16+ (47)	–	–	10.0	8.7–11.5	Yes
UK (1999)	Ernst (2000) (41)	National (NA)	Random-digit dialling	Telephone interview	No	1204	18+ (45)	20.3	18.0–22.6*	–	–	–
UK (1998)	Thomas (2001) (40)	National (NA)	Random sample of 12 health authorities	Postal questionnaire	No	2669	18+ (43)	28.3	26.6–30-0	13.6	12.3–14.9	Yes
UK (1993)	Thomas (1993) (14)	National (NA)	Random sample from electoral register	Postal questionnaire	No	676	18+ (47)	–	–	8.5	6.7–10.9	Yes
UK (1986)	Yung (1988) (58)	Sub-national (Cardiff Health Survey, CHS)	Random sample from electoral register	Postal questionnaire	No	4268	18+ (NR)	–	–	2.6	2.2–3.0	Yes
Canada (2001–5)	Metcalfe (2010) (46)	National (Canadian Community Health Survey, CCHS)	Random cluster sample of households	Interview	No	400,055	12+ (49)	–	–	12.4	12.2–12.5	Yes
Canada (1998–9)	Millar (2001) (45)	National (National Population Health Survey, NPHS)	Longitudinal sample from randomly selected participants in 1994–5 survey	Telephone interview	No	14,150	18+ (46)	–	–	17.0	16.4–17.6*	Yes
Canada (1994–5)	Millar (1997) (44)	National (National Population Health Survey, NPHS)	Random sample of households	Interview	No	17,626	15+ (NR)	–	–	15.0	14.5–15.5*	Yes
Canada (1988)	Northcott (1993a) (26)	Sub-national (Annual Edmonton Area Survey, AEAS)	Representative sample derived from census data.	Interview	No	464	18+ (49)	14.4	11.2–17.6*	–	–	–
Canada (1979)	Northcott (1993b) (26)	Sub-national (Annual Edmonton Area Survey, AEAS)	Representative sample derived from census data.	Interview	No	439	18+ (47)	9.8	7.0–12.6*	–	–	–
Australia (2005)	Xue (2007) (59)	National (NA)	Random-digit dialling with quota for age and sex	Telephone interview	No	1067	18+ (49)	68.9	66.1–71.7	44.1	41.1–47.1	Yes
Australia (2004)	MacLennan (2006) (29)	Sub-national (South Australian Health Omnibus Survey, SAHOS)	Random cluster sample of households	Interview	No	3015	15+ (49)	52.2	50.3–54.1	26.5	24.9–28.1*	Yes

Table 4 Continued

Country (year of survey)	First author (year of pub.)	Population (name of Gvt. Survey)	Sampling method	Data collection method	Includes prayer	N	Sample ages (% males)	All CAM use %	All-CAM use 95% CI	All CAM visits %	All CAM-visits 95% CI	Meets ≥ 4 quality criteria
Australia (2000)	MacLennan (2002) (47)	Sub-national (South Australian Health Omnibus Survey, SAHOS)	Random cluster sample of households	Interview	No	3027	15+ (49)	52.1	50.3–53.9	23.3	22.1–24.5	Yes
Australia (1993)	MacLennan (1996) (9)	Sub-national (South Australian Health Omnibus Survey, SAHOS)	Random cluster sample of households	Interview	No	3004	15+ (49)	48.5	46.7–50.3*	20.3	18.9–21.7*	Yes
Norway (2007)	Fonnebo (2009) (60)	National (NA)	Random sample of telephone users (landlines stratified by location)	Telephone interview	No	1007	15+ (46)	–	–	48.7	45.6–51.8*	–
Norway (2002)	Steinsbekk (2009) (61)	National (Level of Living Survey, LLS)	Nationally representative sample of households	NR	No	6612	18+ (44)	–	–	8.7	8.0–9.4*	Yes
Norway (1997)	Hanssen (2005a) (11)	National (NA)	Nationally representative sample	Telephone interview	No	1000	NR (44)	–	–	12.0	10.0–14.0*	–
Norway (1995–7)	Steinsbekk (2007) (62)	Sub-national (NA)	NR	Postal questionnaire	No	54,448	20+ (45)	–	–	9.9	9.6–10.2*	–
Israel (2003–4)	Niskar (2007) (63)	National (Israeli National Heath Interview Survey, INHIS)	Random sample of general population	Telephone interview	No	2365	21+ (44)	–	–	5.8	4.9–6.7*	–
Israel (2000)	Schmueli (2004a) (27)	Sub-national (NA)	NR	Interview	No	2505	45–75 (47.4)	–	–	9.8	8.6–11.0*	–
Israel (1993)	Schmueli (2004b) (27)	Sub-national (NA)	NR	Interview	No	2003	45–75 (47.5)	–	–	6.1	5.1–7.1*	–
Denmark (2000)	Hanssen (2005b) (11)	National (SUSY-2000)	Nationally representative sample	Interview	No	16,690	16+ (49)	–	–	21.0	20.4–21.6*	Yes
Denmark (1987)	Rasmussen (1990) (64)	National (Danish Institute for Clinical Epidemiology, DICE)	NR	Interview	No	4753	16+ (NR)	–	–	10.0	9.1–10.9*	–
Germany (1997–2001)	Schwarz (2008) (66)	Sub-national (NA)	A two-stage cluster sample	Interview	No	4291	20–79 (49)	–	–	6.0	5.3–6.7*	–

Table 4 Continued

Country (year of survey)	First author (year of pub.)	Population (name of Gvt. Survey)	Sampling method	Data collection method	Includes prayer	N	Sample ages (% males)	All CAM use %	All-CAM use 95% CI	All CAM visits %	All CAM-visits 95% CI	Meets ≥ 4 quality criteria
Japan (2001)	Yamashita (2002) (48)	National (NA)	Random-digit dialling with stratified sample	Telephone interview	No	1000	20–79 (49)	76.0	73.4–78.6	–	–	Yes
Malaysia (2004)	Siti (2009) (49)	National (by Ministry of Health, Malaysia)	Stratified random sampling (by age, gender, and ethnicity)	Interview	Yes	6947	0–80+ (NR)	55.6	53.8–57.4	–	–	Yes
Saudi Arabia (2003)	Al-Faris (2008) (51)	Sub-national (NA)	Random cluster sample of households	Interview	Yes	1408	M 35.5; SD 13.9 (39)	67.8	66–70	23.9	21.7–26.1*	Yes
Singapore (2002)	Lim (2005) (52)	Sub-national (NA)	Random sample of housing estate (demographically matching Singapore)	Interview	No	468	18+ (46)	76.0	73.9–77.9	–	–	–
South Korea (2006)	Ock (2009) (50)	National (NA)	Proportionate quote sampling (by area, age, and gender)	Interview	Yes	3000	30–69 (50)	74.8	73.2–76.4*	–	–	–
Sweden (2000)	Hanssen (2005c) (11)	Sub-national (NA)	NR	Telephone interview	No	1001	16–84 (47)	20.0	17.5–22.5*	–	–	–
Children												
USA (2007)	Barnes (2008) (31)	National (National Health Interview Survey, NHIS)	Random sample of households	Interview by proxy	No	9417 (0–17)	0–17 (NR)	11.8	11.1–12.5*	–	–	Yes
USA (2001)	Hughes (2006) (54)	Sub-national (NA)	Representative sample of households	Telephone interview by proxy	No	1104	0–18 (52)	–	–	22.6	20.1–25.1*	–
USA (1996)	Davis (2003) (28)	National (Medical Expenditure Panel Survey, MEPS)	Random sample of population	Interview by proxy	Yes	6262	< 18 (52)	–	–	1.8	1.3–2.3	Yes
Australia (2004)	Smith (2006) (30)	Sub-national (South Australian Health Omnibus Survey, SAHOS)	Random cluster sample of households	Interview by proxy	No	911	≤ 15 (46)	18.4	15.9–21.0	–	–	Yes
Older adults												
USA (1997–8)	Astin (2000) (37)	Sub-national (NA)	NR	Postal questionnaire	No	728	65+ (45)	41.0	37.4–44.6*	–	–	–
USA (NR)	Cheung (2007) (38)	Sub-national (NA)	Randomly selected from drivers license & ID data base of over 65s	Postal questionnaire	Yes	445	65–94 (45)	62.9	58.4–67.4*	–	–	–

Table 4 Continued

Country (year of survey)	First author (year of pub.)	Population (name of Gvt. Survey)	Sampling method	Data collection method	Includes prayer	N	Sample ages (% males)	All CAM use %	All-CAM use 95% CI	All CAM visits %	All CAM-visits 95% CI	Meets ≥ 4 quality criteria
USA (NR)	Shreffler-Grant (2005) (39)	Sub-national (NA)	Random sample rural communities	Telephone interview	No	325	60+ (51)	45.2	39.8–50.6*	17.5	13.4–21.6*	–
Italy (1996–7)	Dello Buono (2001) (67)	Sub-national (NA)	Random sample from electoral register	Interview	No	655	65+ (37)	29.5	26.0–33.0*	–	–	–
Singapore (2003–4)	Feng (2010) (65)	National (National Mental Health Survey of the Elderly, NMHSE)	Random sample of households	Interview	No	1092	60+ (44)	44.6	41.7–47.5*	–	–	Yes

*95% CI calculated by review authors using the formula: 95% CI, proportion (p) ± 1.96 √ [(p (1-p)/N].
†Su & Li 2011 (53) cited all-CAM use for 18+: with prayer 60.1%; without prayer 29.4% (slightly different Ns).

A total of 47 publications were reviewed containing 51 reports from 49 surveys conducted in 15 (out of a possible 196) countries. The surveys indicated that CAM was frequently used and that prevalence estimates varied widely between the 15 countries; the prevalence of all types of CAM use ranged from 9.8% to 76%, the range for visits to CAM practitioners was 1.8–48.7%. There was consistent evidence that adults were more frequent users of CAM than children; and that national estimates of CAM use were highest in East Asian countries such as Japan (48), South Korea (50), and Malaysia (49).

Prevalence estimates were also influenced by differences in methodology which make it difficult to compare figures between countries and within countries. Examples of this include variable age ranges and sampling techniques, but by far the most important source of variability which influences the comparability of estimates comes from the way in which CAM is defined and operationalised for data collection: of the 31 reports (61%) that used lists of named therapies to elicit CAM use, the number of therapies identified ranged from 4 to 36. Most surveys also allowed respondents to report the use of 'other' types of CAM, but CAM prevalence estimates were inflated by the inclusion of prayer as a type of CAM (32). Use of prayer was most frequently reported in studies from the USA and East Asia. Other factors contributing to high estimates of CAM use were the inclusion of religious practices other than prayer (51); named therapies not commonly regarded as CAM such as 'dietary supplements' (48); and the use of indigenous, traditional medicine (52). This reinforces the call for a more standardised approach to collecting comparable population data (13).

There was evidence of national trends in Australia, UK and USA. In Australia during 2004, about one in two adults and one in five children had used some type of CAM and about one in four adults had visited CAM practitioners (29,30) with no significant change in CAM use from 2000 to 2004. UK surveys also suggested that CAM use has remained fairly constant since 1998 (40) with about one in four adults using CAM and one in eight consulting a CAM practitioner during 2005 (42). In the USA, CAM use has remained steady since 2002 with the most recent survey (2007) indicating that nearly four in ten adults and one in nine children had used some type of CAM (31). However, in general, information on trends is limited by insufficient data from repeat surveys with consistent, high quality methods.

There is currently no consensus regarding 'what is quality' in the context of prevalence surveys. Sanderson et al. (19) argue for quality criteria focussed on the reduction of bias, but acknowledge that other

aspects of quality are important. We aimed to produce quality criteria that relate to the likely robustness and interpretability of the estimates produced. The development of the assessment tool was based on researcher experience and authoritative sources. Our experience of applying the six identified criteria suggested they had face validity, but further work is needed to establish their reliability and validity. Reliable and valid criteria can be used to select high quality surveys for future systematic reviews and to help guide the development and reporting of prevalence surveys.

Application of the six-item quality assessment tool developed for this review suggested that the quality was variable; 30 survey reports (59%) achieved four or more of the six quality criteria. There was no evidence of an association between date of publication and quality, but we did observe a trend towards higher quality in the government-sponsored surveys, according to our criteria.

The rationales cited for conducting CAM surveys in the reports reviewed were predominantly concerned with perceptions of the popularity of CAM, and its increasing use, and the implications of this for public health and health service planning. Recent surveys have revealed that delayed medical care was associated with CAM use in the USA (53); that most respondents in Australia were unaware that CAM use was not routinely tested for safety and efficacy by a government agency (29); and that more than one in four UK respondents taking prescribed drugs stated they were also using CAM (42). All of the recent reports in Australia, UK, and USA (29,31,42) emphasised the need to improve communication between physicians and patients about their use of CAM; openness and non-judgemental communication is needed to determine the risks of drug interactions and other potential complications (29). Periodic surveys of general populations are required to monitor changing patterns in CAM use as well as public perceptions and awareness, and the quality of communication between healthcare providers and their users.

Finally, most studies reviewed also reported estimates for visits to specific CAM practitioners. This will be the subject of a separate publication and complete the picture of the world-wide use of CAM based on the best available evidence.

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Author contributions

All authors contributed to the design of the review, extraction and compiling of the data, drafting and critical revision of the manuscript.

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Appendix 1 Medline search strategy

Search terms for complementary and alternative medicine (CAM)
1   exp Complementary Therapies/
2   (complementary adj5 medicine$).tw.
3   (complementary adj5 therap$).tw.
4   (complementary adj5 health care).tw.
5   (complementary adj5 healthcare).tw.
6   (complementary adj5 treatment$).tw.
7   alternative medicine$.tw.
8   alternative therap$.tw.
9   alternative health care.tw.
10 alternative healthcare.tw.
11 alternative treatment$.tw.
12 (unconventional adj5 medicine$).tw.
13 (unconventional adj5 therap$).tw.
14 (unconventional adj5 care).tw.
15   (unconventional adj5 health care).tw.
16 (unconventional adj5 healthcare).tw.
17 (unconventional adj5 treatment$).tw.
18 (nonconventional adj5 medicine$).tw.
19 (non-conventional adj5 medicine$).tw.
20 (nonconventional adj5 health care$).tw.
21 (non-conventional adj5 health care$).tw.
22 (nonconventional adj5 healthcare$).tw.
23 (non-conventional adj5 healthcare$).tw.
Search terms for prevalence, surveys or patterns of use
24 Prevalence/
25 prevalence.tw.
26 Health Care Surveys/
27 survey$.tw.
28 'pattern$ of use'.tw.
29 'pattern$ of usage'.tw.
30 'level$ of use'.tw.
31 'level$ of usage'.tw.
Combining terms for CAM and prevalence/surveys
32 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23
33 24 or 25 or 26 or 37 or 28 or 29 or 30 or 31
34 32 and 33
Terms for population-level or national-level data
35 national.tw.
36 population.tw.
37 Population
Combining terms
38 35 or 36 or 37
39 34 and 38
Restricting to 1998 onwards
40 limit 39 to yr = '1998 – current'

($ = truncation; / = medical subject heading; tw = title/abstract free text search)