Complementary and alternative medicine: A survey of its use in children with chronic respiratory illness

Ellison Richmond MPH[1,2], Denise Adams PhD[3], Simon Dagenais DC PhD[4], Tammy Clifford PhD[5], Lola Baydala MD MSc FRCPC[6], W James King MD FRCPC MSc[7], Sunita Vohra MD MSc FRCPC FCAHS[2,3]

E Richmond, D Adams, S Dagenais, et al. Complementary and alternative medicine: A survey of its use in children with chronic respiratory illness. Can J Respir Ther 2014;50(1):27-32.

BACKGROUND: The use of complementary and alternative medicine (CAM) has increased in recent years, with especially high prevalence in individuals with chronic illnesses. In the United States, the prevalence of CAM use in pediatric asthma patients is as high as 89%.
OBJECTIVE: To investigate the epidemiology of pediatric CAM use in respiratory subspecialty clinics.
METHODS: A survey was conducted at two hospital-based respiratory clinics in Edmonton (Alberta) and Ottawa (Ontario). Caregivers (most often parents) of children <18 years of age were asked questions regarding child and caregiver use of CAM, including products and practices used, beliefs about CAM, trust in information sources about CAM and characteristics of the respondents themselves.
RESULTS: A total of 202 survey questionnaires were completed (151 from Edmonton and 51 from Ottawa). Pediatric CAM use in Edmonton was 68% compared with 45% in Ottawa, and was associated with caregiver CAM use, poorer health and health insurance coverage for CAM. The majority (67%) of children using CAM had taken prescription drugs concurrently and 58% of caregivers had discussed this with their doctor.
DISCUSSION: Lifetime use of CAM at these pediatric clinics was higher than reported for children who do not have chronic diseases. CAM practices that are popular may be worthy of further research to evaluate their effectiveness and safety profile with regard to drug interactions. Health care providers should be encouraged to discuss CAM use at every visit, and explore their patient's health-related beliefs, behaviours and treatment preferences.

Key Words: *Asthma, Complementary medicine; Cystic fibrosis; Pediatrics; Respiratory illness; Survey*

Sondage de l'utilisation de la médecine complémentaire et parallèle chez des enfants atteints d'une maladie respiratoire chronique

HISTORIQUE : L'utilisation de la médecine complémentaire et parallèle (MCP) a augmenté ces dernières années. Sa prévalence est particulièrement élevée chez les personnes atteintes d'une maladie chronique. Aux États-Unis, sa prévalence chez les patients asthmatiques d'âge pédiatrique atteint les 89 %.
OBJECTIF : Examiner l'épidémiologie de l'utilisation de la MCP en pédiatrie dans des cliniques spécialisées en santé respiratoire.
MÉTHODOLOGIE : Les chercheurs ont effectué un sondage dans deux cliniques de santé respiratoire en milieu hospitalier, à Edmonton (Alberta) et à Ottawa (Ontario). Les personnes qui s'occupaient d'enfants de 18 ans ou moins (en général, les parents) se sont fait poser des questions sur l'utilisation de la MCP par l'enfant et par elles, y compris les produits et pratiques utilisés, les croyances au sujet de la MCP, la confiance envers les sources d'information sur la MCP et leurs caractéristiques personnelles.
RÉSULTATS : Au total, 202 sondages ont été remplis (151 à Edmonton et 51 à Ottawa). L'utilisation de la MCP en pédiatrie à Edmonton s'élevait à 68 %, et à 45 % à Ottawa. Elle s'associait à l'utilisation de MCP par la personne qui s'occupait de l'enfant, à une moins bonne santé et à une couverture d'assurance pour la MCP. La majorité des enfants (67 %) qui utilisaient la MCP prenaient simultanément des médicaments sur ordonnance, et 58 % des personnes qui s'occupaient d'eux en avaient parlé avec leur médecin.
EXPOSÉ : À ces cliniques de pédiatrie, l'utilisation générale de MCP était plus élevée que celle déclarée chez les enfants qui n'ont pas de maladie chronique. Les pratiques de MCP qui sont populaires devraient peut-être faire l'objet de recherches supplémentaires pour en évaluer l'efficacité et le profil d'innocuité en matière d'interactions médicamenteuses. Il faut encourager les dispensateurs de soins à parler de MCP à chaque rendez-vous et à explorer les croyances de leurs patients liées à la santé, leurs comportements et leurs préférences thérapeutiques.

Complementary and alternative medicine (CAM) is broadly defined as healing ideas and practices separate from and complementary to 'conventional' medicine (1). Examples include natural health products (also known as dietary supplements), massage and acupuncture. CAM use has been shown to be increasing in both adult and pediatric populations (2,3). CAM use has been variably linked to ethnicity/race, income and education, and severity of health concerns (3).

In Canada, a nationwide survey in 2006 found that 15% of children had used CAM in the previous year. (4). Similarly, a recent United States study reported that 12% of children had used CAM in the previous year (3); however, use appears to be much higher in children with chronic health concerns (5). CAM use was reported by 54% of patients of a general pediatric clinic (6) and by 64% of a pediatric rheumatology clinic (7). As the most common chronic disease among children, asthma appears to be associated with significant CAM use (6). While no major Canadian study investigating the epidemiology of CAM use in pediatric asthma has been published, American surveys of this population have found that the prevalence of lifetime CAM use ranges from 51% to 89% (8,9).

Concerns have been raised about the potential for interactions between CAM and prescription medications, especially in pediatric patients (10,11). Meanwhile, providers may be dangerously ignorant of their patients' CAM use because parents often do not disclose CAM practices of their children, and physician acknowledgement and charting of these is often deficient (12,13). Thus, there is an urgent need to investigate the pediatric use of CAM in Canada. Better understanding of which CAM modalities are used, why or why they are not used, and patients' sources of CAM information may inform patient management and may guide future research into the determinants and effects of CAM use.

The present article focuses on CAM use in pediatric respiratory clinics in Edmonton (Alberta) and Ottawa (Ontario), examining the characteristics of caregivers and children, opinions/beliefs about CAM, use of CAM and sources of information regarding CAM.

[1]*School of Population and Public Health, Faculty of Medicine, University of British Columbia, Vancouver, British Columbia;* [2]*Department of Pediatrics; Faculty of Medicine and Dentistry;* [3]*CARE Program, Department of Pediatrics, University of Alberta, Edmonton, Alberta;* [4]*Palladian Health, West Seneca, New York, USA;* [5]*Departments of Pediatrics, and Epidemiology & Community Medicine, University of Ottawa, Ottawa, Ontario;* [6]*Department of Pediatrics; Faculty of Medicine and Dentistry; University of Alberta, Edmonton, Alberta;* [7]*Division of Pediatric Medicine, Department of Pediatrics, University of Ottawa, Ottawa, Ontario*
Correspondence: Dr Sunita Vohra, Edmonton General Hospital, 8B19-11111 Jasper Avenue, Edmonton, Alberta T5K 0L4. Telephone 780-342-8592, fax 780-342-8464, e-mail svohra@ualberta.ca

METHODS

The present article describes part of a larger study that was performed at the Stollery Children's Hospital (Stollery) in Edmonton, Alberta, and the Children's Hospital of Eastern Ontario (CHEO) in Ottawa, Ontario. Five pediatric subspecialty clinics (cardiology, gastroenterology, neurology, oncology and respiratory) were selected as sites for the larger study and patients in these clinics were surveyed at each of the two hospitals.

Pediatric patients and their families were eligible to participate if they were <18 years of age and could read French or English. All families were approached in the waiting room of each participating clinic before their appointment. Research assistants remained in the waiting room to answer questions and collect the completed questionnaires. Surveys were anonymous and, to prevent duplicate surveys, participants were asked by the research assistant if they had previously completed a survey for the present study.

At the time of the present study, no standard survey tool existed for assessing pediatric CAM use and, therefore, the authors' team developed a survey for use by all participants regardless of specialty or setting. The final version contained 19 questions that addressed patient and family demographics, health status, current and lifetime use of specific CAM products and therapies, reasons for use, use of CAM concurrently with conventional medicine, satisfaction with conventional care, adverse effects and disclosure about CAM use. Questions were informed by previous CAM use surveys and literature reviews of CAM products and practices commonly used by children, and were intended to address gaps in knowledge of CAM use in children. The survey was piloted for concept validity and revised as needed. The final English-language survey was translated into French and then back translated into English to verify the translation. The French version of the survey was also pilot tested.

Data were entered into SPSS version 11 (IBM Corporation, USA). Descriptive statistics were tabulated as means ± SD or medians (interquartile range) for continuous variables, and frequencies and percentages for categorical variables. The following participant variables were compared according to centre (Stollery versus CHEO) using Wilcoxon tests, independent *t* tests and χ^2 tests as appropriate: demographics, general health and use of specific CAM products and practices, satisfaction with care and opinions/beliefs about CAM including helpfulness of CAM, information needs and trust in information sources, and reasons for not using CAM.

Comparison of CAM use between the centres was modelled by univariate and multivariable logistic regression; predictor variables included child's age, ethnicity, sex, health status, time since diagnosis as well as family's use of CAM, family's CAM insurance, parent's education and income, and discussion of CAM with conventional medical practitioner. Regression diagnostics and measures for detecting outliers and influential observations were peformed. The full methods are described in Adams et al (14).

Ethics approval was granted by the CHEO and Stollery Research Ethics Boards.

RESULTS

Completed surveys were obtained for 202 pediatric respiratory patients (n=151 from Edmonton and n=51 from Ottawa). Of the 215 families approached, only 12 declined; one survey was excluded because the respondent completed the survey for multiple children rather than one per child. The most common reasons for visiting the respiratory clinics were asthma (n=84 [41.6%]), cystic fibrosis (n=24 [11.9%]) and other respiratory disorders (n=31 [15.3%]).

Population characteristics

Pediatric patients sampled were 42.1% female, with a mean age of 7.3 years (6.9 years in Edmonton; 8.5 years in Ottawa; P=0.049) (Table 1). More than one-half reported their ethnicity as Caucasian (55.2%) with others identifying as French Canadian (30.9%), First Nations/Inuit/Métis (11.9%), South Asian (3.1%), East Asian (4.6%), Black (2.6%), Middle Eastern/Arabic (1.5%) and Latin American/Mexican (1.0%).

Child CAM use was 61.9% (Edmonton 67.5%; Ottawa 45.1%; P=0.004). The questionnaire was administered >12 months after the patient's diagnosis (58.1%) and most (61.0%) were at the clinic for a routine follow-up without treatment or ongoing treatment (26.2%). Child health was positive ('excellent' [12.4%], 'very good' [34.2%] and 'good' [40.6%]) compared with 'fair' (10.4%) and 'poor' (2.5%).

Mean parent/caregiver age was 36.2 years in Edmonton and 39.9 years in Ottawa (P=0.024) (Table 1). Respondents were predominantly female (85.1%), 97.5% were the primary caregiver and 80.5% were the mother of the patient. Most described their health as 'excellent' (32.0%), 'very good' (46.2%) or 'good' (20.3%). Significantly more caregivers in Ottawa than Edmonton had a university degree (34.7% versus 17.6%; P=0.012), but household incomes did not differ, with most (75.8%) respondents earning >$40,000 annually. Most (91.9%) caregivers said they would know if the child had used CAM. Fewer than one-half (42.3%) said the child's CAM costs could be reimbursed by a private health insurance plan, 33.8% said they could not and 23.9% said they were not sure. Most caregivers reported "don't know enough about CAM" (60.3%) as a reason for the child not using CAM, or "don't think CAM is necessary" (20.5%) and "worried about side effects from mixing CAM with other treatments from my doctor" (10.3%). Caregiver CAM use was 67.0% and was not significantly different between Edmonton and Ottawa. Reasons for lack of use were similar to those reported for pediatric use.

In Edmonton, multivariable models showed that patients with 'poor' or 'fair' health status had higher odds of using CAM as those with 'good' to 'excellent' health (adjusted OR 5.2 [95% CI 1.3 to 20.4]; P=0.02). Edmonton patients with health insurance coverage for CAM had 3.4 (1.4 to 8.3; P=0.009) times greater odds of using CAM than those without coverage, while adjusting for other factors in the model. In Edmonton, children of caregivers who used CAM themselves had 4.2 (95% CI 1.8 to 9.5; P<0.001) increased odds of using CAM compared with children whose caregivers do not use CAM. In Ottawa, models showed that children of caregivers who use CAM had 11.4 (95% CI 2.7 to 48.2; P<0.001) times greater odds of using CAM than children whose caregivers do not use CAM. No other variables were predictive of CAM use in Ottawa patients.

Products and practices

Most respondents reported pediatric use of some type of vitamin or mineral-type CAM products (85.6%), with more Edmonton than Ottawa patients having ever used multivitamins (80.2% versus 59.1%; P=0.036) (Table 2). Calculation of overall CAM use excluding multivitamins/minerals decreased CAM use rate from 61.9% to 52.5%.

Fewer Edmonton than Ottawa patients had ever used herbal-type CAM products (22.9% versus 50.0%; P=0.011) including echinacea (11.5 versus 45.5%; P<0.001), probiotics (acidophilus) (20.8% versus 45.5%; P=0.017), fish oil/omega 3s (14.6% versus 40.9%; P=0.014), flax oil (6.3% versus 31.8%; P=0.003) and green food powder (2.1% versus 18.2%; P=0.011). Slightly more than one-third (38.1%) of all respondents had ever used homeopathic products. Regarding current use, approximately three-quarters (75.9%) of patients were currently using some type of vitamin and mineral-type CAM product, especially multivitamins (64.6%), herbal products (13.9%) and homeopathy (7.6%) (Table 2).

While the most common CAM practices ever used by patients included chiropractic (45.7%), massage (34.3%), aromatherapy (28.6%), faith healing (18.6%), relaxation (14.3%), homeopathy (12.9%) and acupuncture (10.0%), CAM practices currently used by patients included massage (40.0%), aromatherapy (37.1%), chiropractic (22.9%), faith healing (17.1%), relaxation (14.3%) and energy healing (11.4%). Most of the identified CAM products and practices were perceived to be helpful by the respondents and very few reported receiving no help from them (Table 2).

TABLE 1
Demographic information

	Edmonton, Alberta		Ottawa, Ontario		
	n	n (%)	n	n (%)	Total, n (%)
Patient information					
Child/youth age*, years, mean ± SD	151	6.9±4.3	51	8.5±5.0	7.3±4.5
Female sex	151	61 (40.4)	51	24 (47.1)	85 (42.1)
Time since diagnosis, months	147		51		
0–3		30 (20.4)		6 (11.8)	36 (18.2)
3–6		18 (12.2)		4 (7.8)	22 (11.1)
6–12		18 (12.2)		7 (13.7)	25 (12.6)
>12		81 (55.1)		34 (66.7)	115 (58.1)
Reason for clinic visit	146		49		
Routine follow-up		87 (59.6)		32 (65.3)	119 (61.0)
Diagnostic testing		9 (6.2)		3 (6.1)	12 (6.2)
Ongoing treatment		40 (27.4)		11 (22.4)	51 (26.2)
New condition		2 (1.4)		2 (4.1)	4 (2.1)
Other		8 (5.5)		1 (2.0)	9 (4.6%)
Health status	151		51		
Excellent		16 (10.6)		9 (17.6)	25 (12.4)
Very good		48 (31.8)		21 (41.2)	69 (34.2)
Good		65 (43.0)		17 (33.3)	82 (40.6)
Fair		19 (12.6)		2 (3.9)	21 (10.4)
Poor		3 (2)		2 (3.9)	5 (2.5)
CAM insurance, yes	150	63 (42.0)	51	22 (43.1)	85 (42.3)
Child/youth has ever used CAM†, yes	151	102 (67.5)	51	23 (45.1)	125 (61.9)
Parent/caregiver information					
Parent/caregiver age‡, years, mean ± SD	149	36.2 (7.1)	50	39.9 (9.0)	37.2 (7.8)
Female sex	151	130 (86.1)	50	41 (82.0)	171 (85.1)
Highest completed level of education	148		49		
No formal education		1 (0.7)		0 (0)	1 (0.5)
Primary school only		3 (2.0)		0 (0)	3 (1.5)
Secondary (high) school		35 (23.6)		11 (22.4)	46 (23.4)
Registered apprenticeship or other trade		12 (8.1)		0 (0)	12 (6.1)
College, CEGEP or other nonuniversity		53 (35.8)		17 (34.7)	70 (35.5)
University, without university degree		13 (8.8)		4 (8.2)	17 (8.6)
University, with university degree§		26 (17.6)		17 (34.7)	43 (21.8)
Other		5 (3.4)		0 (0)	5 (2.5)
Annual household income, $	141		49		
<10,000		2 (1.4)		2 (4.1)	4 (2.1)
10,000 to 19,000		11 (7.8)		3 (6.1)	14 (7.4)
20,000 to 39,000		20 (14.2)		8 (16.3)	28 (14.7)
40,000 to 79,999		44 (31.2)		19 (38.8)	63 (33.2)
≥80,000		64 (45.4)		17 (34.7)	81 (42.6)
Respondent had ever used CAM, yes	150	105 (70.0)	50	29 (58.0)	134 (67.0)

*n Number with valid responses; *Child/youth mean age was significantly higher in Ottawa, Ontario (P=0.0492); †Child use of complementary and alternative medicine was significantly higher in Edmonton, Alberta (P=0.043); ‡Parent age was significantly higher in Ottawa (P=0.024); §A significantly higher percentage of parent/caregivers in Ottawa had university, with a university degree (P=0.012). CEGEP* Collège d'enseignement général et professionnel

Safety issues: Concurrent medication use, side effects

Most (66.7%) patients who used CAM products had done so while concurrently taking prescription medications (Edmonton 62.6% versus Ottawa 85.7%; P=0.042). Slightly more than one-half (57.0%) of caregivers said this was discussed with a doctor, 22.8% with a pharmacist and 15.2% with other individuals; 22.8% did not report talking to anyone about this.

More than one-half of respondents used some form of CAM (product or practice) at the same time as conventional medicine (54.6%) as opposed to before (8.3%) or after conventional medicine was successful (2.8%), or was not successful (6.5%). One-fifth (21.3%) of respondents reported that the timing of use depended on the type of CAM or reason for use. Of those using CAM and conventional medicine concurrently, 53.6% were using more than one prescription drug at a time, while 34.8% reported using more than one type of CAM at a time. CAM products most commonly used concurrently with prescribed conventional therapeutics were vitamins and minerals (65.2%), herbals (24.6%) and homeopathic remedies (10.1%). Concurrent CAM-drug use was most common for anti-asthmatic agents (52.2%), antibiotics (34.8%) and nasal corticosteroids (21.7%) (Table 3).

Few side effects of CAM products or practices were reported. Six minor side effects were reported, in association with calcium, garlic, cold remedies and chiropractic. Two moderate side effects were reported in association with chiropractic and one severe harm was reported in association with the use of magnets. Details of the side effects were not reported by participants.

TABLE 2
Commonly used products/practices and their perceived helpfulness

	Ever used	Current use	Perceived helpfulness			
Product	**(n=118)**	**(n=79)**	**n**	**Yes**	**No**	**Maybe**
Vitamins and minerals	101 (85.6)	60 (75.9)				
Calcium	16 (13.6)	8 (10.1)	14	10 (71.4)	0 (0)	4 (28.6)
Folic acid	4 (3.4)	2 (2.5)	2	2 (100.0)	0 (0)	0 (0)
Vitamin B	6 (5.1)	3 (3.8)	6	5 (83.3)	0 (0)	1 (16.7)
Vitamin C	32 (27.1)	16 (20.3)	30	17 (56.7)	1 (3.3)	12 (40.0)
Multivitamin/mineral	90 (76.3)*	51 (64.6)	78	42 (53.8)	3 (3.8)	33 (42.3)
Herbals	33 (28.0)	11 (13.9)				
Echinacea	21 (17.8)‡	5 (6.3)	18	11 (61.1)	0 (0)	7 (38.9)
Garlic	12 (10.2)	6 (7.5)	11	9 (81.8)	0 (0)	2 (18.2)
Ginseng	4 (3.4)	1 (1.3)	3	2 (66.7)	0 (0)	1 (33.3)
Peppermint	10 (8.5)	3 (3.8)	9	8 (88.9)	0 (0)	1 (11.1)
Homeopathics	45 (38.1)	6 (7.6)				
Cold remedy	19 (16.1)	3 (3.8)	16	11 (68.8)	2 (12.5)	3 (18.8)
Colic remedy	15 (12.7)	1 (1.3)	11	7 (63.6)	1 (9.1)	3 (27.3)
Ear drops	11 (9.3)	1 (1.3)	9	7 (77.8)	1 (11.1)	1 (11.1)
Teething remedy	20 (16.9)	1 (1.3)	15	14 (93.3)	0 (0)	1 (6.7)
Miscellaneous	51 (42.3)	27 (34.2)				
Fish oil/omega 3s	23 (19.5)†	11 (13.9)	20	13 (65.0)	2 (10.0)	5 (25.0)
Flax oil	13 (11.0)‡	9 (11.4)†	10	6 (60.0)	0 (0)	4 (40.0)
Green food powder	6 (5.1)†	0 (0)	5	1 (20.0)	2 (20.0)	3 (60.0)
Probiotics	30 (25.4)†	8 (10.1)	26	18 (69.2)	1 (3.8)	7 (26.9)
Practice	**n=70**	**n=35**				
Acupuncture	7 (10.0)	0 (0)	6	5 (83.3)	0 (0)	1 (16.7)
Aromatherapy	20 (28.6)	13 (37.1)	18	11 (61.1)	0 (0)	7 (38.9)
Chiropractic	32 (45.7)	8 (22.9)	27	18 (66.7)	2 (7.4)	7 (25.9)
Energy healing	6 (8.6)	4 (11.4)	5	2 (40.0)	0 (0)	3 (60.0)
Faith healing	13 (18.6)	6 (17.1)	12	11 (91.7)	0 (0)	1 (8.3)
Homeopathy	9 (12.9)	2 (5.7)	7	6 (85.7)	1 (14.3)	0 (0)
Massage	24 (34.3)	14 (40.0)	22	18 (81.8)	0 (0)	4 (18.2)
Relaxation	10 (14.3)	5 (14.3)	9	8 (88.9)	0 (0)	1 (11.1)

*Data presented as n (%) unless otherwise indicated. *Edmonton (Alberta) use greater than Ottawa (Ontario) use (P<0.05); †Ottawa use greater than Edmonton use (P<0.05); ‡Ottawa use greater than Edmonton use (P<0.01)*

Sources of information

The most commonly used sources of information (in descending order of frequency) regarding CAM were: family/friends (65.1%), books (39.6%), health food stores (36.8%), pharmacy (34.9%), Internet (29.2%), CAM health providers (28.3%), the hospital clinic (27.4%) and conventional health providers (26.4%). The most trusted sources of information on CAM (rated on a 10-point scale) were conventional health providers (mean [± SD] 8.4±1.6), the hospital clinic (8.2±2.1), the pharmacy (8.0±1.7) and CAM health providers (7.6±2.5).

The majority of caregivers reported 'strongly agreed' (33.2%) or 'agreed' (42.7%) in response to "I feel comfortable discussing CAM use in this clinic". Most also 'strongly agreed' (21.1%) or 'agreed' (40.7%) with "I would like more information on CAM from this clinic."

DISCUSSION

The present survey sheds light on the use of CAM by pediatric respiratory disease patients and the characteristics of its users and their parents/caregivers. As the first multicentre survey of this population in Canada, it may inform both caregivers and researchers in improving care and focusing further research.

While child lifetime CAM use differed significantly between patients in Edmonton and Ottawa (67.5% versus 45.1%, respectively; P<0.004), these values are consistent with other studies investigating pediatric chronic illness (5,9). These values also suggest regional/geographical differences within similar patient populations; however, our survey did not identify reasons for these regional differences.

As expected, child CAM use was strongly correlated with caregiver CAM use, which suggests that its use is tied to caregiver health-related beliefs, values and preferences. As in similar studies, poorer health status was related to CAM use (13). Parents, especially of children with chronic illness, may seek CAM after becoming dissatisfied with conventional therapy and its effects. It may be regarded as a 'second chance' at effective treatment and may be a way for parents to gain control over difficult-to-manage situations (15).

Two-thirds of patients in the present study used prescription medicine at the same time as CAM products and many did not discuss this with their physician or pharmacist. Concurrent use is not necessarily hazardous and, while most respondents did not report experiencing harm, given the frequency of concurrent use, more data demonstrating the safety of this practice are urgently needed. It has been suggested that several of the CAM products most popular with the study group can interact adversely with other CAM and conventional practices. Vitamin C with acetaminophen, vitamins D, B_6, B_9 and B_{12} with corticosteroids, and vitamins B_3, E and folic acid with ibuprofen have potential to interact, among countless combinations (11). Such combinations are not rare; a large Toronto emergency department survey of CAM and conventional medication use identified potential interaction in 16% of surveyed children (11). As such, physicians and other health care providers should inquire about and record history of CAM use routinely during patient visits. Some drug-natural health product combinations may, in fact, be helpful; for example, studies have suggested that probiotics may be effective in preventing antibiotic-associated diarrhea (16,17). Patient safety depends on disclosure and discussion of all health practice and our concern is not that patients use natural health products to improve their health, but that they do so without disclosure.

TABLE 3
Therapeutics and concurrent complementary and alternative medicine (CAM) use

Therapeutic agent(s)*	Users, n (%) (n=69)	CAM products used concurrently	n
Analgesic agents: acetaminophen, codeine, diclofenac, ibuprofen	6 (8.7)	Vitamins and minerals	5
		Herbals	1
		Miscellaneous	5
		Homeopathy	1
Antiasthmatic agents: beclomethasone, budesonide, fluticasone, montelukast salbutamol, terbutaline; budesonide/formoterol, fluticasone/salmeterol	36 (52.2)	Vitamins and minerals	28
		Herbals	8
		Miscellaneous	8
		Homeopathy	6
Antibiotics: amikacin, amoxicillin, azithromycin, cephalexin, ciproflaxacin clarithromycin, tobramycin, trimethoprim/sulfamethoxazole	24 (34.8)	Vitamins and minerals	14
		Herbals	8
		Miscellaneous	11
		Homeopathy	1
Anti-ulcer agents: lansoprazole, omeprazole, ranitidine, sucralfate	11 (15.9)	Vitamins and minerals	6
		Herbals	2
		Miscellaneous	3
		Homeopathy	2
Nasal corticosteroids: budesonide, furoate, mometasone, triamcinolone	15 (21.7)	Vitamins and minerals	15
		Herbals	2
		Miscellaneous	3
		Homeopathy	1
Pancreatic enzymes: pancrelipase	8 (11.6)	Vitamins and minerals	6
		Herbals	1
		Miscellaneous	5
		Homeopathy	0
Psychostimulants: atomoxetine, caffeine, dextroamphetamine, modafinil, amphetamine/dextroamphetamine	6 (8.7)	Vitamins and minerals	4
		Herbals	0
		Miscellaneous	3
		Homeopathy	0
Other: deflazacort, desmopressin, dornase alfa, insulin, peglyte, phenobarbital, prednisone, tamsulosine, valproic acid; brompheniramine/phenylephrine/dextromethorphan (Dimetapp†)	14 (20.3)	Vitamins and minerals	9
		Herbals	2
		Miscellaneous	7
		Homeopathy	1

**Listed alphabetically (single products; combinations); †Pfizer, USA*

Aside from being able to advise about positive and negative interactions, understanding CAM use can improve the ability of health professionals to deliver patient- and family-oriented care. While most patients in the present study reported that CAM was helpful and that they felt comfortable discussing their CAM use in the clinic, physicians have been shown, in many cases, to be dismissive of CAM and negligent in recording its use by their patients (12). Patient-centred care demands that health care practitioners learn about their patient's health care beliefs and preferences (18). Beliefs about CAM and its effectiveness, especially compared with biomedical approaches, can impact adherence to prescribed therapy. For example, when respiratory disease therapy is perceived by patients to be ineffective or inappropriate, adherence can diminish (19).

Generalizability of the present study is limited by the selection of patients speaking either English or French, and attending one of two urban hospital-based clinics. The ability to recall the use of CAM may be limited, especially via a proxy (caregiver on behalf of a child), and responses may have been biased by expectations of desired responses. Finally, the present survey was not conducted over a full calendar year; there may be seasonal factors affecting the patients attending clinics and/or the use of CAM.

However, the present study does lay important groundwork. The CAM used by these patients may direct research on the motivation for their use and the dynamic between CAM and conventional therapy. The specific products and practices identified to be popular may be targets for more focused research on effectiveness and/or interaction with medications typical for pediatric respiratory patients. Ultimately, a better understanding of why patients seek CAM and the effects of its use may improve our ability to effectively work with patients and better support their health decisions.

ACKNOWLEDGEMENTS: The authors thank Adam Gruszczynski (CHEO Research Assistant) Deepika Mittra (Edmonton Research Assistant), Marilou Hervas-Malo (Biostatistician) and Melba Baylon for their assistance in the study. The authors gratefully thank the clinic directors and staff from participating clinics for their support of the study.

DISCLOSURES: The authors have no financial disclosures or conflicts of interest to declare.

FUNDING: This project was supported by a grant from the SickKids Foundation. Sunita Vohra receives salary support from Alberta Innovates-Health Solutions (formerly Alberta Heritage Foundation for Medical Research).

AUTHORSHIP: Each of the authors met the criteria for authorship established by the ICMJE. Each author contributed substantially to conception and design, acquisition of data, or analysis and interpretation of data; drafting the manuscript or revising it critically for important intellectual content; and final approval of the version to be published. Ellison Richmond: Mr Richmond was substantially involved in analysis and interpretation of data, drafting and revising the manuscript and final approval of the version to be published. Denise Adams: Dr Adams was substantially involved in analysis and interpretation of data, drafting and revising the

manuscript and final approval of the version to be published. Simon Dagenais: Dr Dagenais was substantially involved in design and conduct of the study, revising the manuscript and final approval of the article to be published. Tammy Clifford: Dr Clifford was substantially involved in design and conduct of the study, revising the manuscript and final approval of the article to be published. Lola Baydala: Dr Baydala was substantially involved in design of the study, revising the manuscript and final approval of the article to be published. W James King: Dr King was substantially involved in design of the study, revising the manuscript and final approval of the article to be published. Sunita Vohra: Dr Vohra was substantially involved in design and conduct of the study, interpretation of the data, drafting and revising the manuscript and final approval of the article to be published.

REFERENCES

1. Ernst E, Resch KL, Mills S, et al. Complementary medicine – a definition. Br J Gen Pract 1995;45:506.
2. Barnes PM, Powell-Griner E, McFann K, Nahin RL. Complementary and alternative medicine use among adults: United States, 2002. Semin Integr Med 2004;2:54-71.
3. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. Natl Health Stat Report 2008;10:1-23.
4. Esmail N. Complementary and Alternative Medicine in Canada: Trends in Use and Public Attitudes, 1997-2006. Public Policy Sources, 2007;87.
5. McCann LJ, Newell SJ. Survey of paediatric complementary and alternative medicine use in health and chronic illness. Arch Dis Child 2006;91:173-4.
6. Jean D, Cyr C. Use of complementary and alternative medicine in a general pediatric clinic. Pediatrics 2007;120:e138-41.
7. Hagen LE, Schneider R, Stephens D, Modrusan D, Feldman BM. Use of complementary and alternative medicine by pediatric rheumatology patients. Arthritis Rheum 2003;49:3-6.
8. Post-White J, Fitzgerald M, Hageness S, Sencer SF. Complementary and alternative medicine use in children with cancer and general and specialty pediatrics. J Pediatr Oncol Nurs 2009;26:7-15.
9. Slader CA, Reddel HK, Jenkins CR, Armour CL, Bosnic-Anticevich SZ. Complementary and alternative medicine use in asthma: Who is using what? Respirology 2006;11:373-87.
10. Gardiner P, Phillips R, Shaughnessy AF. Herbal and dietary supplement – drug interactions in patients with chronic illnesses. Am Fam Physician 2008;77:73-8.
11. Goldman RD, Rogovik AL, Lai D, Vohra S. Potential interactions of drug-natural health products and natural health products-natural health products among children. J Pediatr 2008;152:521-6.
12. Cockayne NL, Duguid M, Shenfield GM. Health professionals rarely record history of complementary and alternative medicines. Br J Clin Pharmacol 2005;59:254-8.
13. Sidora-Arcoleo K, Yoos HL, Kitzman H, McMullen A, Anson E. Don't ask, don't tell: Parental nondisclosure of complementary and alternative medicine and over-the-counter medication use in children's asthma management. J Pediatr Health Care 2008;22:221-9.
14. Adams D, Dagenais S, Clifford T, et al. Complementary and alternative medicine use by pediatric specialty outpatients. Pediatrics 2013;131:225-32.
15. Committee on Children with Disabilities. American Academy of Pediatrics: Counseling families who choose complementary and alternative medicine for their child with chronic illness or disability. Pediatrics 2001;107:598-601.
16. Cremonini F, Di Caro S, Nista E, et al. Meta-analysis: The effect of probiotic administration on antibiotic-associated diarrhoea. Aliment Pharmacol Ther 2002;16:1461-7.
17. D'Souza A, Rajkumar C, Cooke J, Bulpitt C. Probiotics in prevention of antibiotic associated diarrhoea: Meta-analysis. BMJ 2002;324:1361.
18. Pulvrenti M, McMillan J, Lawn S. Empowerment, patient centred care and self management. Health Expect. 2012 Jan 2. doi: 10.1111/j.1369-7625.2011.00757.x. (Epub ahead of print)
19. Horne R, Price D, Cleland J, et al. Can asthma control be improved by understanding the patient's perspective? BMC Pulm Med 2007;7:8.