Complementary and alternative medicine: An overview

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It has been estimated that two-thirds of the world's population seek health care from sources other than conventional biomedicine. While many of these individuals undoubtedly self-medicate, most of them seek care from learned practitioners of traditional, indigenous systems of medicine, viz. Ayurveda, Kampo, Native American Medicine, Traditional Chinese Medicine, Traditional Hawaiian Medicine, Unani, Latin American folk systems, etc. Despite diverse cultures, languages, geographic locations, world views and health beliefs of the peoples from which these medical systems originated, they have common characteristics, including (i) the use of complex interventions often involving multiple botanical products, (ii) individualized diagnosis and treatment of patients, (iii) an emphasis on disease prevention versus disease treatment, (iv) maximizing the body's inherent healing ability, and (v) treatment of the 'whole' patient (physical, mental, and spiritual) versus a single pathology. These healing philosophies, approaches and therapies that exist largely outside the main frame of the conventional treatment are known as complementary and alternative medicine (CAM). The number of patients seeking CAM is now growing exponentially. The reasons for this changing scenario are many. This article highlights the current trends and projects the future scenario of CAM.

COMPLEMENTARY and alternative medicine (CAM) refers to a broad range of healing philosophies, approaches and therapies that exist largely outside the institutions where conventional health care is taught and provided. But some of these are now institutionalized. Complementary medicine is an increasing feature of health-care practice, but considerable confusion remains about what exactly it is and what position the disciplines included under this term should hold in relation to conventional medicine[1].

The Western health-care system has expanded and changed remarkably in recent years. Medical practices outside the mainstream of 'official' medicine (allopathy) have always been an important part of public health care. The prominence and configuration of these 'irregulars' as they were called, has waxed and waned depending on the perceived value of the orthodox medicine, the needs of the public, and the changing values of the society. The prominence of these practices subsided with the development of scientific medicine and its dramatic advances in the understanding and treatment of the disease[2]. However, in India, diverse systems of medicine are official and professionalized as to their service in education and research[3].

CAM has now undergone a revival in the West. According to a recent study, no less than 42% of American households tried it during the recent years[4]. A similar trend exists worldwide[5,6]. Recognition of the rising use of alternative medicine and other non-traditional remedies led to the establishment of the Office of Alternative Medicine, a unit of National Institutes of Health (NIH, Bethesda, MD, USA) in 1992, which alone supports over 50 investigations into the usefulness of various alternative therapies[2,7]. The relative popularity of alternative therapies differs among countries, but public demand is strong and growing. Complementary medicine is quite popular in Europe[8], Australia[9], China[10] and Israel[11]. It has increased dramatically throughout the Western world[12], and plays a significant role in primary health care in India[13]. Recently, a Select Committee of the House of Lords of the British Parliament had categorized Ayurveda in the third group, which was changed to the first group after a scientific presentation[3].

Media coverage, specialist publications and the number of complementary therapists have all increased dramatically in the past 20 years[14]. Approximately 1500 articles on CAM are published annually in the literature covered in MEDLINE[15].

What is CAM?

According to the definition used by the Cochrane Collaboration, 'complementary and alternative medicine' is a broad domain of healing resources that encompasses all health systems, modalities, practices and their accompanying theories and beliefs, other than those intrinsic to the politically dominant health system of a particular society or culture in a given historical period. CAM includes all such practices and ideas defined by their users as preventing or treating illness or promoting health and well-being. Boundaries within CAM and between the CAM domain and that of the dominant system are not always sharp or fixed[1].

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According to Eskinazi[16], alternative medicine can be defined as a broad set of health-care practices (i.e. already available to the public) that are not readily integrated into the dominant health care model, because they pose challenges to diverse societal beliefs and practices (cultural, scientific, medical and educational). This definition brings into focus factors that may play a major role in the prior acceptance or rejection of various alternative health-care practices by any society. Unlike criteria of current definitions, those of the proposed definition would not be expected to change significantly without significant societal change.

Alternative medicine comprises a large and heterogeneous group of treatments, many of which are procedures that are not readily testable under double-blinded conditions. Furthermore, alternative medicine therapies may also possess a theoretical basis, may stem from a cultural tradition that is seemingly antithetical to a quantitative, biomedical framework, or may possess little foundational research on which to base a controlled evaluation[16]. It is also argued that the different sets of axioms in diverse systems require new modes of evidence than the currently dominant chemical paradigm.

In the 1970s and 1980s the therapeutics that were mainly provided as an alternative to conventional health care were collectively known as 'alternative medicine'. The name 'complementary medicine' developed as the two systems began to be used alongside (to complement) each other. Over the years, 'complementary' has changed from describing this relationship between unconventional health-care disciplines and conventional care to defining the group of disciplines itself. Some authorities use the term 'unconventional medicine', synonymously[1]. Other terms that are also used for CAM are unproven, unorthodox, fraudulent, dubious, integrative, questionable, quackery[17], irregular, unscientific and naturopathic[18], propaganda-based medicine[19] and opinion-based medicine[15]. Such a diversity of labels bespeaks of judgmental attitudes, conditioned by cultural beliefs.

According to Fontanarosa and Lundberg[20] there is no alternative medicine. There is only scientifically-proven, evidence-based medicine supported by solid data or unproven medicine, for which scientific evidence is lacking. Whether a therapeutic practice is 'Eastern' or 'Western', is conventional or mainstream, or involves mind–body techniques or molecular genetics is largely irrelevant, except for historical purposes and cultural interests.

Conceptual differences and commonalities between biomedicine and CAM

The characteristic common to traditional (alternative) system of health (vital force, spirituality and holism) seems to distinguish it from biomedicine. Biomedicine is founded in part on materialism (in contrast to the vital force explanation). Materialism, in this context, refers to the theory that 'physical matter is the only or fundamental reality, and that all beings and processes and phenomena are manifestation or result of matter'. While biomedicine does not necessarily reject religion or spirituality, it does not routinely incorporate these aspects into diagnosis and treatment (unlike the traditional system)[15]. It negates any evidence of the role of the spirit, and the mind is viewed as merely a product of the brain.

Traditional medicine teaches that energy flows within, around and through all things in the universe. Energy cannot be destroyed, but can be affected negatively, leading to flow imbalance or disease. Traditional medicine does not exclusively view disease as an invasion or poisoning of the body by a foreign organism. Instead it sees the disease as a condition when the human body is out of balance with its milieu. Healing, therefore, is the art of manipulating the flow of energy to re-establish balance in the whole person, rather than just the area of complaint. Spirituality, unlike in allopathy, is an integral part of traditional medicine and, as a result, traditional medicine therapy can be very individualized, with no two people receiving the same treatment, despite similar complaints or the same disease. In contrast, Western medicine tends to divide the body into systems and compartments and measures functions by evaluating tissues and examining body fluids. Although there is a great deal of knowledge regarding the body's complex interactions, abnormalities are often diagnosed and treated as individual entities apart from the patient. Western physicians frequently subspecialize and view disease as an invasion of the body by foreign organisms or a proliferation or death of individual cells. The focus of Western medicine is therefore to provide a cure for a specific ailment. The Western scientific method is applied rigorously and claims of its efficacy are documented and proved by repeated independent studies. Like traditional medicine, biomedicine also now advocates some changes in diet, environment and lifestyle to promote health[21].

Different complementary and alternative medicinal systems

CAM can be broadly divided into seven major categories[22], viz. (i) mind–body medicine, (ii) alternative medical systems, (iii) lifestyle and disease prevention, (iv) biologically-based therapies, (v) manipulative and body-based systems, (vi) biofield, and (vii) bioelectromagnetics. Within each category, medical practices that are not commonly used, accepted or available in conventional medicine are designated as CAM. Those practices that fall mainly within the domains of conventional medicine are designated as 'Behavioural Medicine'.

Practices that can be either CAM or behavioural are designated as overlapping.

Mind–body medicine involves behavioural, psychological, social and spiritual approaches to health. It is divided into four subcategories: (i) mind–body system, (ii) mind–body methods (e.g. yoga, internal Qi Gong, hypnosis, meditation), (iii) religion and spirituality (e.g. confession, spiritual healing, prayer), and (iv) social and contextual areas (e.g. holistic nursing, intuitive diagnosis, community-based approaches).

Alternative medical systems involve complete systems of theory and practice that have been developed outside the Western biomedical approaches. They are divided into four subcategories: (i) acupuncture and Oriental medicine; (ii) traditional indigenous systems (e.g. Ayurvedic medicine, Siddha, Unani-tibbi, native American medicine, Kampo medicine, traditional African medicine); (iii) unconventional Western systems (e.g. Homeopathy, psionic medicine, orthomolecular medicine, functional medicine, environmental medicine), and (iv) naturopathy.

Lifestyle and disease prevention category involves theories and practices designed to prevent the development of illness, identify and treat risk factors, or support the healing and recovery process. This system is concerned with integrated approaches for the prevention and management of chronic disease in general, or the common determinants of chronic disease. It is divided into three subcategories: (i) clinical prevention practices (e.g. electrodermal diagnosis, medical intuition, panchakarma, chirography); (ii) lifestyle therapies and (iii) health promotion.

Biologically-based therapy includes natural and biologically-based practices, interventions and products. Many overlap with conventional medicine's use of dietary supplements. This category is divided into four subcategories: (i) phytotherapy or herbalism (plant-derived preparations that are used for therapeutic and prevention purpose, e.g. Ginkgo biloba, garlic, ginseng, turmeric, aloe vera, echinacea, saw palmetto, capsicum, bee pollen, mistletoe); (ii) special diet therapies (e.g. vegetarian, high fibre, pritikin, ornish, Mediterranean, natural hygiene); (iii) orthomolecular medicine (products used as nutritional and food supplements and are not covered in other categories. These are usually used in combinations for prevention or therapeutic purpose, e.g. ascorbic acid, carotenes, folic acid, vitamin-A, riboflavin, lysine, iron, probiotics, biotin), and (iv) pharmacological, biological and instrumental interventions (include product and procedures applied in an unconventional manner, e.g. Coley's toxin, ozone, 714X, enzyme therapy, cell therapy, EDTA, induced remission therapy, chirography, neural therapy iridology, MORO device, bioresonance, apitherapy).

Manipulative and body-based systems are based on manipulation and/or movement of the body. They are divided into three subcategories: (i) chiropractic medicine; (ii) massage and body work (e.g. osteopathic manipulative therapy, kinesiology, reflexology, Alexander technique, rolfing, Chinese tui na massage and acupressure), and (iii) unconventional physical therapies (e.g. hydrotherapy, colonics, diathermy, light and colour therapy, heat and electrotherapy).

Biofield medicine involves systems that use subtle energy fields in and around the body for medical purpose, viz. therapeutic touch, Reiki and external Qi Gong. Bioelectromagnetics refers to the unconventional use of electromagnetic fields for medical purposes.

A number of complementary and alternative medicinal systems are popular in India, with Ayurveda being the most popular[23]. CAM is mostly associated with the treatment of chronic diseases. Patients are also found using naturopathy, herbal medicine, biopathy, home remedies, wheat-grass therapy, hydrotherapy, electro-energizers, auto urine therapy, vipasana and traditional healing methods for the treatment of cancer pain[24]. Fish medicine is tried out in a large number of patients for the treatment and prevention of asthma. Mass meditation is practised for treatment of chronic problems[25]. Ayurvedic medicines are tried for epilepsy[26]. Other popular CAMs in India are yoga, massage, prayers, spiritual healing, tantra/mantra, astromedicine, gem therapy, hypnosis, acupuncture and magnet therapy. India, as quoted by Vaidya[27] is literally a 'therapeutic jungle' with awaited serendipitous discoveries as well as lurking prelature of hazardous practices.

Why do people use CAM ?

The increasing popularity of CAM reflects changing needs and values in modern society in general. This includes a rise in prevalence of chronic diseases, an increase in public access to worldwide health information, reduced tolerance for paternalism, an increased sense of entitlement to quality life, declining faith that scientific breakthrough will have relevance for the personal treatment of disease, and an increased interest in spiritualism. In addition, concern about the adverse effect and skyrocketing cost of conventional health care are fuelling the search for alternative approaches to the prevention and management of illness[2].

As there are many factors like the sociocultural and personal (health status, belief, attitude, motivation, etc.), underlying a person's decision to use alternative therapies, at present, there is no clear or comprehensive theoretical model to account for the increased use of alternative forms of health care[28]. Three assumptions have been proposed to explain the use of alternative medicine:

(1) Dissatisfaction: Patients are dissatisfied with conventional treatment because it has been ineffective, has produced adverse side effects, or is seen as impersonal, too technologically-oriented, and/or too costly.
(2) Need for personal control: Patients seek alternative

therapies because they see them as less authoritarian with more personal autonomy and control over their health care decisions.

(3) Philosophical congruence: Alternative therapies are attractive because they are seen as more compatible with patients' values, world-view, spiritual/religious philosophy or beliefs regarding the nature and meaning of health and illness[29].

Surveys of users of complementary medicine indicate that about 80% are satisfied with the treatment they receive. Interestingly, this is not always dependent on a simultaneous improvement in their condition. For example, one survey of cancer patients in the UK suggested that the users were more hopeful about their future and were emotionally stronger and less anxious, even if the cancer remained unchanged[28]. Previous research has indicated that patients with higher levels of education and poor health status are likely to be alternative medicine users[30].

Regulation of CAM

The interaction of politics and science in the arena of health care, one of the most lucrative industries in the US, has played a significant role in the recent development of alternative medicine there. In October 1991, the US Congress instructed the NIH to create an Office of Unconventional Medical Practices, later renamed the Office of Alternative Medicine (OAM). The mandate was met with a less-than-enthusiastic response from the NIH, but simultaneously with high public expectation. Compounding the difficulties other key governmental agencies, in particular the Food and Drug Administration (FDA), were overlooked in the mandate, although their role was necessary and complementary to that of the OAM. Similar to other federal programmes, the activities of the OAM must comply with FDA regulations and policies. Yet, FDA regulations designed for conventional drugs are devices not applicable for alternative medicine products[16]. Many contemporary cures are not pills and potions, but lifestyle-oriented remedies. These remedies are usually beyond the regulatory responsibility of the FDA[17]. Often the remedies of CAM are masked under the label of 'dietary supplements'.

Regulation of CAM practitioners varies widely. In most countries only registered health professionals may practice, but in the UK practice is virtually unregulated[8], except for osteopathic and chiropractic. The General Osteopathy Council and the General Chiropractic Council have been established by the act of parliamentary and statutory self-regulation status with similar powers and functions as those of the General Medical Council. A small number of other disciplines, such as acupuncture, herbal medicine and homeopathy, have a single main regulatory body and are working towards statutory self-regulation[1]. Germany and some Scandinavian countries have intermediate systems[8]. Belgium's parliament has recently paved the way for formal recognition of four types of complementary medicine, viz. acupuncture, homeopathy, osteopathy and chiropractic[31].

Since independence, four Indian systems of medicine, viz. Ayurveda, Homeopathy, Unani and Siddha have received considerable encouragement from both the central and state governments[32]. These systems are regulated by national health services. In India there are more than 500,000 Ayurvedic practitioners[33] and 100,000 homeopathic physicians[34].

Safety issue of CAM

CAM remedies are popular among patients with chronic diseases such as cancer[35], AIDS[36], arthritis[37], asthma[38], diabetes, epilepsy, etc.[38]. Cancer patients throughout the world use alternative medical methods[40]. Treatments include vitamins, herbs, diet, healing, 'psy
treatment, folk medicines and homeopathy. However, the recent failure of the Luigi Di Bella cancer therapy[41,42] and the wonder anti-cancer drug advocated by Asru Kumar Sinha[43] has raised questions on the effectiveness of alternative therapies in dealing with chronic diseases like cancer. According to Durant[44], most of the alternative cancer therapies are nothing but an attractive nuisance. However, there are remarkable anecdotal cure and survival up to five years in cancer patients treated with CAM, which need to be studied[45].

All medicines can be toxic under specific circumstances, there is always a risk that an adverse reaction will present a hazard to patients with licensed medicines. However, regulations are expected to ensure that the risk is small and the pharmaceutical industries monitor the medicine's efficacy, safety and quality. No such global control over natural medicine or herbal medicine exists. India has ayurvedic and herbal pharmacopoeias and the approval process for manufacturers of CAM. Patients with cancer and AIDS should be warned that some of the adverse effects of natural medicines are often similar to symptoms of problems associated with their disease or treatment, thus making it difficult to discern if the disease or the 'remedy' is the problem[39]. The harm caused by unproven therapies or poor quality CAM is not only medical, but also societal and can be summarized as follows:

(i) Economic harm – through loss of resources. It is estimated that four times more money is spent on quackery than on cancer research. In 1983 an estimated $ 200 million was to have been spent on cancer chemotherapy, and in 1981, $ 1 billion was estimated to have been spent on laetrile, which was found to be ineffective, despite anecdotal success.

(ii) Direct harm – cyanide toxicity death related to laetrile; metabolic disturbances caused by some diet, harmful effect of some megavitamin regimens and ruptured colons

with coffee enemas. Transmission of viral and bacterial diseases with contaminated serologic product, etc. can recur.
(iii) Indirect harm – the harm of omission, total avoidance or delay in seeking responsible therapy while pursuing alternative therapies. Utilization of diet for cure rather than nutritional preservation. The psychological effect of prolonged denial, guilt associated with inability to self-control the disease and feelings of inadequacy. The incorrect diagnosis of cancer by iridology, kinesiology or a variety of serologic tests, and the resultant questionable treatment with its consequences.
(iv) Societal harm – the impact of large groups advocating mistrust of established institutions, frequently supported by the media, legislative bodies, etc., distorts progress by altering expenditure of funds, delaying public health measures and formation of laws[17].

Alternative medicine offers more than physical and mental health care. In the words of one observer, it comprises a medical system that also dispenses a heavy dose of unconventional religion. Through the patient's participation in Nature, vital forces and a 'human' science, the quest for health takes on sacred proportions, allowing the patient to discern the ultimate meaning and make profound connections with the universe[46]. Since ancient times, it has been known that the state of mind of a sick person influences the response to treatment. A recent study by Harris *et al.*[47] suggests that prayer may be an effective adjunct to standard medical care. However, the general uses of prayer as a modality of treatment for the sick is not itself a prima facie argument in favour of the efficacy of prayer[48]. In a recent incident, fundamentalist Christian parents resisted the conventional treatment of their son suffering from osteogenic sarcoma and believed a regimen of vitamins and prayer would heal their child[49], which was really unfortunate. There is no doubt that the faith of an individual patient is relevant to recovery, but not at the cost of neglecting scientific therapy.

Complementary practitioners do not need a conventional diagnosis to initiate treatment. In fact, many think that their treatments are most effective in patients without organic pathology. The risks of missing serious conditions if complementary treatments are given to patients without definite diagnosis, are of great concern. Little is known about the malpractices of practitioners of CAM or about the relationship between conventional and alternative medicine[50].

The amount of money some patients spend on complementary medicine is considerable. Costs vary widely, and higher prices do not necessarily mean better or more effective treatment. The lack of evidence concerning many complementary interventions means that the likelihood of a successful outcome is often impossible to predict, patients should be aware of the risk. They should also know in advance about the estimated cost for a complete course of treatment, including tests and medications, before starting complementary therapy[29].

Little information has been published on the combined use of complementary and conventional treatment, but some serious interactions have mostly involved herbal products or dietary supplements. In a recent instance, several women developed rapidly progressive interstitial renal fibrosis after taking Chinese herbs prescribed by a slimming clinic[51]. Doctors in Belgium have discovered recently that a Chinese herb, *Aristolochia fangchi*, is not only linked to kidney failure, but may cause cancer as well[52]. At several institutions in India, continued therapy of two systems of medicine is used. This needs good documentation, as to their safety and utility.

Most herbal products in the market today have not been subjected to the drug approval process to demonstrate their safety and effectiveness. Some of them contain mercury, lead, arsenic[53], corticosteroids[54] and poisonous organic substances in harmful amounts. Hepatic failure and even death following ingestion of herbal medicine have been reported[55]. A prospective study shows that 25% of corneal ulcer in Tanzania and 26% of childhood blindness in Nigeria and Malawi were associated with the use of traditional eye medicine[56]. Ayurvedic tablets for epilepsy cure were found to have higher phenytoin and phenobarbitone contents[57]. Such adulteration, though not universal, emphasizes the need for quality control of herbal drugs.

Herbal preparation should be used with caution and only on the advice of an herbalist or CAM practitioner who is familiar with the relevant conventional pharmacology. There are case reports of serious adverse effects after administration of herbal products. In most cases, the herbs involved were self-prescribed and bought over the counter or obtained from a source other than a registered practitioner. The lack of a formal adverse drug reaction reporting system makes their true incidence unknown and therefore more reliable information is needed. Encouraging patients who are taking conventional medication to disclose and discuss intentions to use complementary therapies, and to initiate treatment only under medical supervision may help reduce the risk[57].

Future of CAM

Throughout the world, patients in unprecedented numbers are going outside of conventional medicine to look for help. This is a movement that has been building up since the late 1960s and it is now reaching the point that visits to alternative practitioners exceed visits to primary care providers[58]. Many alternative therapies are now moving to the hospital sector[59]. The review by Austin[60] suggests that a large number of physicians are either referring to or practising some of the more prominent and well-known forms of CAM and that many physicians believe that these therapies are useful or efficacious. Yoga, for example, is being tried out for the management of carpal

tunnel syndrome[61,62]. Yoga lifestyle intervention is also found to increase the regression of coronary atherosclerosis in patients with severe coronary artery disease[63]. Hypnosis is being tried out in cancer clinics for the management of pain. The American Medical Association (AMA) and other medical associations have formally recognized hypnosis as a viable medical treatment[64].

Clinical outcome and research papers in several areas of complementary therapies now find a place in orthodox medical journals, and it is no longer possible to maintain the traditional medical stance that referring patients to complementary therapists is unethical[65]. The Union Ministry for Health and Family Welfare has asked the Medical Council of India to include the basic principles and concept of the Indian System of Medicine and Homeopathy in the course content of MBBS[66].

The rapid increase in public interest and use of complementary and alternative therapies is exerting a powerful influence on medical education[67] and has gained ground in several medical universities[68,69]. A significant number of medical students want instructions in complementary therapies[58]. Medical educators increasingly realize that it is not a question of whether to address these issues in the education of future physicians, but rather how to respond to these relentless challenges[70].

The AMA has recognized the need for medical schools to respond to the growing interest in alternative health care practices. The result of the 1996–97 and 1997–98 Annual Medical School Questionnaire Part II distributed by the Liaison Committee on Medical Education indicated a notable increase in instruction in 'alternative medicine'. Although no medical school reported offering a separate required course in complementary health care practice, medical schools covering these areas as part of a required course increased to 63 (from 46 in 1996–97) and medical schools offering a separate elective course increased to 54 (from 47 in 1996–97). In the 1996–97 academic year, 34 medical schools offered instruction as part of an elective course, and 28 offered other educational experiences[70].

Multicentric clinical trials and research on CAM are lacking due to paucity of specific funding. In the UK, the Medical Research Council spent no money researching complementary therapies in 1998–99 and in 1999, the UK medical research charities spent only 0.05% of their total budget[71]. In the past 12 years, the Indian Council of Medical Research has set up a unique network throughout the country for carrying out controlled clinical trails for herbal medicines. Using this network, the council has shown the efficacy of several traditional medicines, including *Picrorhizia kurroa* in hepatitis and *Pterocarpus marsupium* in diabetes. As a result of the trials, these medicines can now be used in allopathic hospitals[72]. Double-blinded and well-designed clinical trials have also been conducted with *Arogyawardhini* in viral hepatitis[73], *Mucuna pruriens* in Parkinson's disease[74], *Phyllanthus amarus* in hepatitis and *Tinospora cordifolia* in obstructive jaundice. But these have not been widely emulated[75]. Key policy issue of integrating CAM with mainstream medicine has been outlined by Commonwealth health ministers. The ministers established the Commonwealth Working Group on Traditional and Complementary Health Systems to promote the integration of traditional health systems and complementary medicine into national health care[76].

Conclusion

Nearly 80% of the world's population does not have access to modern medicine. Most of the money for health care in the developing world goes to the remaining 20% of the population[77]. Health-care costs are predicted to double in the next 10 years. Low-cost intervention such as lifestyle changes, diet, supplement therapy and behavioural medicine can be delivered as substitute for high-cost drugs and technological intervention. All the major alternative medicine systems approach illness first by trying to support and induce the self-healing process of the person. If recovery can occur from this, the likelihood of adverse effect and the need for high-impact, high-cost intervention is reduced. It is this orientation towards self-healing and health promotion (salutogenesis rather than pathogenesis) that makes alternative medicine approaches to chronic disease especially attractive[2].

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