



Alternative medicine

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Alternative medicine or **fringe medicine** are practices claimed to have the healing effects of medicine but are disproven, unproven, impossible to prove, or only harmful. Alternative therapies or diagnoses are not part of medicine or science-based healthcare systems. Alternative medicine consists of a wide variety of practices, products, and therapies—ranging from those that are biologically plausible but not well tested, to those with known harmful and toxic effects. Contrary to popular belief, significant expense is paid in testing alternative medicine, including over \$2.5 billion spent by the United States government, with almost none showing any effect beyond that of false treatment. Perceived effects of alternative medicine are caused by placebo, decreased effects of functional treatment (and therefor also decreased side-effects), and regression toward the mean where improvement that would have occurred anyway is credited to alternative therapies. Alternative medicine is not the same as experimental medicine.

Alternative medicine has grown in popularity and is used by a significant percentage of the population in many countries. While it has extensively rebranded itself: from quackery to complementary or integrative medicine—it promotes essentially the same practices. Newer proponents often suggest alternative medicine be used together with functional medical treatment, in a belief that it "complements" (improves the effect of, or mitigates the side effects of) the treatment. However, significant drug interactions caused by alternative therapies may instead negatively influence treatments, making them less effective, notably cancer therapy. Despite it being illegal to market alternative therapies for any type of cancer treatment in most of the developed world, many cancer patients use them. In the UK complementary therapies are commonly made available to cancer patients.^{[1][2]}

Alternative medical diagnoses and treatments are not included in the science-based curriculum taught in medical schools, and are not used in medical practice where treatments are based on scientific knowledge. Alternative therapies are often based on religion, tradition, superstition, belief in supernatural energies, pseudoscience, errors in reasoning, propaganda, or fraud. Regulation and licensing of alternative medicine and health care providers varies between and within countries.

Alternative medicine has been criticized for being based on misleading statements, quackery, pseudoscience, antiscience, fraud, or poor scientific methodology. Promoting alternative medicine has been called dangerous and unethical. Testing alternative medicine that have no scientific basis has been called a waste of scarce medical research resources. Critics have said "there is really no such thing as alternative medicine, just medicine that works and medicine that doesn't", and the problem is not only that it does not work, but that the "underlying logic is magical, childish or downright absurd". There have also been calls that the concept of any alternative medicine that works is paradoxical, as any treatment proven to work is simply "medicine".

Alternative medicine

fringe medicine, unconventional medicine, unorthodox medicine, heterodox medicine, complementary medicine, integrative medicine, new-age medicine



"They told me if I took 1000 pills at night I should be quite another thing in the morning", an early 19th-century satire on Morison's Vegetable Pills, an alternative medicine supplement.

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Appeal

Practitioners of complementary medicine usually discuss and advise patients as to available alternative therapies. Patients often express interest in mind-body complementary therapies because they offer a non-drug approach to treating some health conditions.^[3]

In addition to the social-cultural underpinnings of the popularity of alternative medicine, there are several psychological issues that are critical to its growth. One of the most critical is the placebo effect—a well-established observation in medicine.^[4] Related to it are similar psychological effects, such as the will to believe,^[5] cognitive biases that help maintain self-esteem and promote harmonious social functioning,^[5] and the *post hoc, ergo propter hoc* fallacy.^[5]

Marketing

CAM's popularity may be related to other factors that Edzard Ernst mentioned in an interview in *The Independent*:

Why is it so popular, then? Ernst blames the providers, customers and the doctors whose neglect, he says, has created the opening into which alternative therapists have stepped. "People are told lies. There are 40 million websites and 39.9 million tell lies, sometimes outrageous lies. They mislead cancer patients, who are encouraged not only to pay their last penny but to be treated with something that shortens their lives. "At the same time, people are gullible. It needs gullibility for the industry to succeed. It doesn't make me popular with the public, but it's the truth."^[6]

Paul Offit proposed that "alternative medicine becomes quackery" in four ways: by recommending against conventional therapies that are helpful, promoting potentially harmful therapies without adequate warning, draining patients' bank accounts, or by promoting "magical thinking."^[7]

A failure of mainstream medicine

In a paper published in October 2010 entitled *The public's enthusiasm for complementary and alternative medicine amounts to a critique of mainstream medicine*, Ernst described these views in greater detail and concluded:

[CAM] is popular. An analysis of the reasons why this is so points towards the therapeutic relationship as a key factor. Providers of CAM tend to build better therapeutic relationships than mainstream healthcare professionals. In turn, this implies that much of the popularity of CAM is a poignant criticism of the failure of mainstream healthcare. We should consider it seriously with a view of improving our service to patients.^[8]

Social factors

Authors have speculated on the socio-cultural and psychological reasons for the appeal of alternative medicines among the minority using them *in lieu* of conventional medicine. There are several socio-cultural reasons for the interest in these treatments centered on the low level of scientific literacy among the public at large and a concomitant increase in antiscientific attitudes and new age mysticism.^[5] Related to this are vigorous marketing^[9] of extravagant claims by the alternative medical community combined with inadequate media scrutiny and attacks on critics.^{[5][10]}

There is also an increase in conspiracy theories toward conventional medicine and pharmaceutical companies, mistrust of traditional authority figures, such as the physician, and a dislike of the current delivery methods of scientific biomedicine, all of which have led patients to seek out alternative medicine to treat a variety of ailments.^[10] Many patients lack access to contemporary medicine, due to a lack of private or public health insurance, which leads them to seek out lower-cost alternative medicine.^[11] Medical doctors are also aggressively marketing alternative medicine to profit from this market.^[9]

Patients can be averse to the painful, unpleasant, and sometimes-dangerous side effects of biomedical treatments. Treatments for severe diseases such as cancer and HIV infection have well-known, significant side-effects. Even low-risk medications such as antibiotics can have potential to cause life-threatening anaphylactic reactions in a very few individuals. Many medications may cause minor but bothersome symptoms such as cough or upset stomach. In all of these cases, patients may be seeking out alternative treatments to avoid the adverse effects of conventional treatments.^{[5][10]}

Definitions and terminology

Alternative medicine



Alternative therapies often make bombastic claims, and frequently include anecdotes from healthy-looking individuals claiming successful treatment.



Edzard Ernst, a leading authority on scientific study of alternative treatments and diagnoses, and the first university professor of *Complementary and Alternative Medicine*. Here in 2012, promoting his book *Trick or Treatment* co-written with Simon Singh.



Friendly and colorful images of herbal treatments may look less threatening or dangerous when compared to conventional medicine. This is an intentional marketing strategy.

It is loosely as a defined set of products, practices, and theories that are believed or perceived by their users to have the healing effects of medicine,^{[n 1][n 2]} but whose effectiveness has not been clearly established using scientific methods,^{[n 1][n 3][15][16][17][18]} or whose theory and practice is not part of biomedicine,^{[n 2][n 4][n 5][n 6]} or whose theories or practices are directly contradicted by scientific evidence or scientific principles used in biomedicine.^{[15][16][22]} "Biomedicine" or "medicine" is that part of medical science that applies principles of biology, physiology, molecular biology, biophysics, and other natural sciences to clinical practice, using scientific methods to establish the effectiveness of that practice. Unlike medicine,^[n 4] an alternative product or practice does not originate from using scientific methodology, but may instead be based on testimonials, religion, tradition, superstition, belief in supernatural energies, pseudoscience, errors in reasoning, propaganda, fraud, or other unscientific sources.^{[n 3][12][15][16]}

In *General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine*, published in 2000 by the World Health Organization (WHO), complementary and alternative medicine were defined as a broad set of health care practices that are not part of that country's own tradition and are not integrated into the dominant health care system.^{[23][24]}

The expression also refers to a diverse range of related and unrelated products, practices, and theories ranging from biologically plausible practices and products and practices with some evidence, to practices and theories that are directly contradicted by basic science or clear evidence, and products that have been conclusively proven to be ineffective or even toxic and harmful.^{[n 2][25][26]}

The terms-*Alternative medicine*, *complementary medicine*, *integrative medicine*, *holistic medicine*, *natural medicine*, *unorthodox medicine*, *fringe medicine*, *unconventional medicine*, and *new age medicine* are used interchangeably as having the same meaning and are almost synonymous in some contexts,^{[27][28][29][30]} but may have different meanings in some rare cases.

The meaning of the term "alternative" in the expression "alternative medicine", is not that it is an effective alternative to medical science, although some alternative medicine promoters may use the loose terminology to give the appearance of effectiveness.^{[15][31]} Loose terminology may also be used to suggest meaning that a dichotomy exists when it does not, e.g., the use of the expressions "western medicine" and "eastern medicine" to suggest that the difference is a cultural difference between the Asiatic east and the European west, rather than that the difference is between evidence-based medicine and treatments that don't work.^[15]

Complementary/integrative medicine

Complementary medicine (CM) or **integrative medicine (IM)** is when alternative medicine is used together with functional medical treatment, in a belief that it improves the effect of treatments.^{[n 7][12][33][34][35]} However, significant drug interactions caused by alternative therapies may instead negatively influence treatment, making treatments less effective, notably cancer therapy.^{[36][37]} Both terms refer to use of alternative medical treatments alongside conventional medicine,^{[38][39][40]} an example of which is use of acupuncture (sticking needles in the body to influence the flow of a supernatural energy), along with using science-based medicine, in the belief that the acupuncture increases the effectiveness or "complements" the science-based medicine.^[40]

Allopathic medicine

Allopathic medicine or **allopathy** is an expression commonly used by homeopaths and proponents of other forms of alternative medicine to refer to mainstream medicine. Specifically it refers to the use of pharmacologically active agents or physical interventions to treat or suppress symptoms or pathophysiologic processes of diseases or conditions.^[41] The expression was coined in 1810 by the creator of homeopathy, Samuel Hahnemann (1755–1843).^[42] In such circles, the expression "allopathic medicine" is still used to refer to "the broad category of medical practice that is sometimes called Western medicine, biomedicine, evidence-based medicine, or modern medicine" (see the article on scientific medicine).^[43]

Use of the term remains common among homeopaths and has spread to other alternative medicine practices. The meaning implied by the label has never been accepted by conventional medicine and is considered pejorative.^[44] More recently, some sources have used the term "allopathic", particularly American sources wishing to distinguish between Doctors of Medicine (MD) and Doctors of Osteopathic Medicine (DO) in the United States.^{[42][45]} William Jarvis, an expert on alternative medicine and public health,^[46] states that "although many modern therapies can be construed to conform to an allopathic rationale (e.g., using a laxative to relieve constipation), standard medicine has never paid allegiance to an allopathic principle" and that the label "allopath" was from the start "considered highly derisive by regular medicine".^[47]

Many conventional medical treatments clearly do not fit the nominal definition of allopathy, as they seek to prevent illness, or remove the cause of an illness by acting on the etiology of disease.^{[48][49]}

CAM

CAM is an abbreviation of complementary and alternative medicine.^{[50][51]} It has also been called sCAM or SCAM with the addition of "so-called" or "supplements".^{[52][53]} The words balance and holism are often used, claiming to take into account a "whole" person, in contrast to the supposed reductionism of medicine. Due to its many names the field has been criticized for intense rebranding of what are essentially the same practices: as soon as one name is declared synonymous with quackery, a new name is chosen.^[27]

Traditional medicine

It refers to the pre-scientific practices of a culture, contrary to what is traditionally practiced in cultures where medical science dominates.

"Eastern medicine" typically refers to the traditional medicines of Asia where conventional bio-medicine penetrated much later.

Problems with definition

Prominent members of the science^{[7][54]} and biomedical science community^[14] assert that it is not meaningful to define an alternative medicine that is separate from a conventional medicine, that the expressions "conventional medicine", "alternative medicine", "complementary medicine", "integrative medicine", and "holistic medicine" do not refer to any medicine at all.^{[7][14][54][55]}



Marcia Angell: "There cannot be two kinds of medicine — conventional and alternative".

Others in both the biomedical and CAM communities point out that CAM *cannot* be precisely defined because of the diversity of theories and practices it includes, and because the boundaries between CAM and biomedicine overlap, are porous, and change.^{[19][56]} The expression "complementary and alternative medicine" (CAM) resists easy definition because the health systems and practices it refers to are diffuse, and its boundaries poorly defined.^{[25][57][n 8]} Healthcare practices categorized as alternative may differ in their historical origin, theoretical basis, diagnostic technique, therapeutic practice and in their relationship to the medical mainstream.^[59] Some alternative therapies, including traditional Chinese medicine (TCM) and Ayurveda, have antique origins in East or South Asia and are entirely alternative medical systems;^[60] others, such as homeopathy and chiropractic, have origins in Europe or the United States and emerged in the eighteenth and nineteenth centuries.^[61] Some, such as osteopathy and chiropractic, employ manipulative physical methods of treatment; others, such as meditation and prayer, are based on mind-body interventions.^[62] Treatments considered alternative in one location may be considered conventional in another.^[63] Thus, chiropractic is not considered alternative in Denmark and likewise osteopathic medicine is no longer thought of as an alternative therapy in the United States.^[63]

Critics say the expression is deceptive because it implies there is an effective alternative to science-based medicine, and that *complementary* is deceptive because it implies that the treatment increases the effectiveness of (complements) science-based medicine, while alternative medicines that have been tested nearly always have no measurable positive effect compared to a placebo.^{[15][64][65][66]}

Different types of definitions

One common feature of all definitions of alternative medicine is its designation as "other than" conventional medicine.^[67] For example, the widely referenced^[68] descriptive definition of complementary and alternative medicine devised by the US National Center for Complementary and Integrative Health (NCCIH) of the National Institutes of Health (NIH), states that it is "a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine."^[69] For conventional medical practitioners, it does not necessarily follow that either it or its practitioners would no longer be considered alternative.^[n 9]

Some definitions seek to specify alternative medicine in terms of its social and political marginality to mainstream healthcare.^[72] This can refer to the lack of support that alternative therapies receive from the medical establishment and related bodies regarding access to research funding, sympathetic coverage in the medical press, or inclusion in the standard medical curriculum.^[72] In 1993, the British Medical Association (BMA), one among many professional organizations who have attempted to define alternative medicine, stated that it^[n 10] referred to "...those forms of treatment which are not widely used by the conventional healthcare professions, and the skills of which are not taught as part of the undergraduate curriculum of conventional medical and paramedical healthcare courses."^[73] In a US context, an influential definition coined in 1993 by the Harvard-based physician,^[74] David M. Eisenberg,^[75] characterized alternative medicine "as interventions neither taught widely in medical schools nor generally available in US hospitals".^[76] These descriptive definitions are inadequate in the present-day when some conventional doctors offer alternative medical treatments and CAM introductory courses or modules can be offered as part of standard undergraduate medical training;^[77] alternative medicine is taught in more than 50 per cent of US medical schools and increasingly US health insurers are willing to provide reimbursement for CAM therapies.^[78] In 1999, 7.7% of US hospitals reported using some form of CAM therapy; this proportion had risen to 37.7% by 2008.^[79]

An expert panel at a conference hosted in 1995 by the US Office for Alternative Medicine (OAM),^{[80][n 11]} devised a theoretical definition^[80] of alternative medicine as "a broad domain of healing resources ... other than those intrinsic to the politically dominant health system of a particular society or culture in a given historical period."^[82] This definition has been widely adopted by CAM researchers,^[80] cited by official government bodies such as the UK Department of Health,^[83] attributed as the definition used by the Cochrane Collaboration,^[84] and, with some modification, was preferred in the 2005 consensus report of the US Institute of Medicine, *Complementary and Alternative Medicine in the United States*.^[n 2]

The 1995 OAM conference definition, an expansion of Eisenberg's 1993 formulation, is silent regarding questions of the medical effectiveness of alternative therapies.^[85] Its proponents hold that it thus avoids relativism about differing forms of medical knowledge and, while it is an essentially political definition, this should not imply that the dominance of mainstream biomedicine is solely due to political forces.^[85] According to this definition, alternative and mainstream medicine can only be differentiated with reference to what is "intrinsic to the politically dominant health system of a particular society of culture".^[86] However, there is neither a reliable method to distinguish between cultures and subcultures, nor to attribute them as dominant or subordinate, nor any accepted criteria to determine the dominance of a cultural entity.^[86] If the culture of a politically dominant healthcare system is held to be equivalent to the perspectives of those charged with the medical management of leading healthcare institutions and programs, the definition fails to recognize the potential for division either within such an elite or between a healthcare elite and the wider population.^[86]

Normative definitions distinguish alternative medicine from the biomedical mainstream in its provision of therapies that are unproven, unvalidated, or ineffective and support of theories with no recognized scientific basis.^[87] These definitions characterize practices as constituting alternative medicine when, used independently or in place of evidence-based medicine, they are put forward as having the healing effects of medicine, but are not based on evidence gathered with the scientific method.^{[12][14][38][39][69][88]} Exemplifying this perspective, a 1998 editorial co-authored by Marcia Angell, a former editor of the *New England Journal of Medicine*, argued that:

"It is time for the scientific community to stop giving alternative medicine a free ride. There cannot be two kinds of medicine – conventional and alternative. There is only medicine that has been adequately tested and medicine that has not, medicine that works and medicine that may or may not work. Once a treatment has been tested rigorously, it no longer matters whether it was considered alternative at the outset. If it is found to be reasonably safe and effective, it will be accepted. But assertions, speculation, and testimonials do not substitute for evidence. Alternative treatments should be subjected to scientific testing no less rigorous than that required for conventional treatments."^[14]

This line of division has been subject to criticism, however, as not all forms of standard medical practice have adequately demonstrated evidence of benefit,^{[n 4][89][90]} and it is also unlikely in most instances that conventional therapies, if proven to be ineffective, would ever be classified as CAM.^[80]

Similarly, the public information website maintained by the National Health and Medical Research Council (NHMRC) of the Commonwealth of Australia uses the acronym "CAM" for a wide range of health care practices, therapies, procedures and devices not within the domain of conventional medicine. In the Australian context this is stated to include acupuncture; aromatherapy; chiropractic; homeopathy; massage; meditation and relaxation therapies; naturopathy; osteopathy; reflexology, traditional Chinese medicine; and the use of vitamin supplements.^[91]

The Danish National Board of Health's "Council for Alternative Medicine" (Sundhedsstyrelsens Råd for Alternativ Behandling (SRAB)), an independent institution under the National Board of Health (Danish: *Sundhedsstyrelsen*), uses the term "alternative medicine" for:

- Treatments performed by therapists that are not authorized healthcare professionals.

- Treatments performed by authorized healthcare professionals, but those based on methods otherwise used mainly outside the healthcare system. People without a healthcare authorisation are [also] allowed to perform the treatments.^[92]

Proponents of an evidence-base for medicine^{[n 12][94][95][96][97]} such as the Cochrane Collaboration (founded in 1993 and from 2011 providing input for WHO resolutions) take a position that *all* systematic reviews of treatments, whether "mainstream" or "alternative", ought to be held to the current standards of scientific method.^[98] In a study titled *Development and classification of an operational definition of complementary and alternative medicine for the Cochrane Collaboration* (2011) it was proposed that indicators that a therapy is accepted include government licensing of practitioners, coverage by health insurance, statements of approval by government agencies, and recommendation as part of a practice guideline; and that if something is currently a standard, accepted therapy, then it is not likely to be widely considered as CAM.^[80]

NCCIH classification

A United States government agency, the National Center on Complementary and Integrative Health (NCCIH), created its own classification system for branches of complementary and alternative medicine that divides them into five major groups. These groups have some overlap, and distinguish two types of energy medicine: *veritable* which involves scientifically observable energy (including magnet therapy, colorpuncture and light therapy) and *putative*, which invokes physically undetectable or unverifiable energy.^[99]

The NCCIH classification system is -

1. Whole medical systems: Cut across more than one of the other groups; examples include traditional Chinese medicine, naturopathy, homeopathy, and ayurveda
2. Mind-body interventions: Explore the interconnection between the mind, body, and spirit, under the premise that the mind can affect "bodily functions and symptoms"
3. "Biology"-based practices: Use substances found in nature such as herbs, foods, vitamins, and other natural substances. (Note that as used here, "biology" does *not* refer to the science of biology, but is a usage newly coined by NCCIH in the primary source used for this article. "Biology-based" as coined by NCCIH may refer to chemicals from a nonbiological source, such as use of the poison lead in traditional Chinese medicine, and to other nonbiological substances.)
4. Manipulative and body-based practices: feature manipulation or movement of body parts, such as is done in chiropractic and osteopathic manipulation
5. Energy medicine: is a domain that deals with putative and verifiable energy fields:
 - Biofield therapies are intended to influence energy fields that, it is purported, surround and penetrate the body. No empirical evidence has been found to support the existence of the putative energy fields on which these therapies are predicated.
 - Bioelectromagnetic-based therapies use verifiable electromagnetic fields, such as pulsed fields, alternating-current, or direct-current fields in an unconventional manner.

Types



Ready-to-drink traditional Chinese medicine mixture

Alternative medicine consists of a wide range of health care practices, products, and therapies. The shared feature is a claim to heal that is not based on the scientific method. Alternative medicine practices are diverse in their foundations and methodologies.^[69] Alternative medicine practices may be classified by their cultural origins or by the types of beliefs upon which they are based.^{[12][15][22][69]} Methods may incorporate or be based on traditional medicinal practices of a particular culture, folk knowledge, superstition,^[100] spiritual beliefs, belief in supernatural energies (antiscience), pseudoscience, errors in reasoning, propaganda, fraud, new or different concepts of health and disease, and any bases other than being proven by scientific methods.^{[12][15][16][22]} Different cultures may have their own unique traditional or belief based practices developed recently or over thousands of years, and specific practices or entire systems of practices.

Unscientific belief systems

Alternative medicine, such as using naturopathy or homeopathy in place of conventional medicine, is based on belief systems not grounded in science.^[69]

	Proposed mechanism	Issues
Naturopathy	Naturopathic medicine is based on a belief that the body heals itself using a supernatural vital energy that guides bodily processes. ^[101]	In conflict with the paradigm of evidence-based medicine. ^[102] Many naturopaths have opposed vaccination, ^[103] and "scientific evidence does not support claims that naturopathic medicine can cure cancer or any other disease". ^[104]
Homeopathy	A belief that a substance that causes the symptoms of a disease in healthy people cures similar symptoms in sick people. ^[n 13]	Developed before knowledge of atoms and molecules, or of basic chemistry, which shows that repeated dilution as practiced in homeopathy produces only water, and that homeopathy is not scientifically valid. ^{[106][107][108][109]}

Traditional ethnic systems

Alternative medical systems may be based on traditional medicine practices, such as traditional Chinese medicine (TCM), Ayurveda in India, or practices of other cultures around the world.^[69] Some useful applications of traditional medicines have been researched and accepted within ordinary medicine, however the underlying belief systems are seldom scientific and are not accepted.

	Claims	Issues
Traditional Chinese medicine	Traditional practices and beliefs from China, together with modifications made by the Communist party make up TCM. Common practices include herbal medicine, acupuncture (insertion of needles in the body at specified points), massage (Tui na), exercise (qigong), and dietary therapy.	The practices are based on belief in a supernatural energy called qi, considerations of Chinese Astrology and Chinese numerology, traditional use of herbs and other substances found in China—a belief that the tongue contains a map of the body that reflects changes in the body, and an incorrect model of the anatomy and physiology of internal organs. ^{[15][110][111][112][113][114]}
Ayurveda	Traditional medicine of India. Ayurveda believes in the existence of three elemental substances, the doshas (called Vata, Pitta and Kapha), and states that a balance of the doshas results in health, while imbalance results in disease. Such disease-inducing imbalances can be adjusted and balanced using traditional herbs, minerals and heavy metals. Ayurveda stresses the use of plant-based medicines and treatments, with some animal products, and added minerals, including sulfur, arsenic, lead, copper sulfate.	Safety concerns have been raised about Ayurveda, with two U.S. studies finding about 20 percent of Ayurvedic Indian-manufactured patent medicines contained toxic levels of heavy metals such as lead, mercury and arsenic. Other concerns include the use of herbs containing toxic compounds and the lack of quality control in Ayurvedic facilities. Incidents of heavy metal poisoning have been attributed to the use of these compounds in the United States. ^{[115][116][26][117][118][119]}

Supernatural energies

Bases of belief may include belief in existence of supernatural energies undetected by the science of physics, as in biofields, or in belief in properties of the energies of physics that are inconsistent with the laws of physics, as in energy medicine.^[69]

	Claims	Issues
Biofield therapy	Intended to influence energy fields that, it is purported, surround and penetrate the body. ^[69]	Writers such as noted astrophysicist and advocate of skeptical thinking (Scientific skepticism) Carl Sagan (1934-1996) have described the lack of empirical evidence to support the existence of the putative energy fields on which these therapies are predicated. ^[120]
Bioelectromagnetic therapy	Use verifiable electromagnetic fields, such as pulsed fields, alternating-current, or direct-current fields in an unconventional manner. ^[69]	Asserts that magnets can be used to defy the laws of physics to influence health and disease.
Chiropractic	Spinal manipulation aims to treat "vertebral subluxations" which are claimed to put pressure on nerves.	Chiropractic was developed in the belief that manipulating the spine affects the flow of a supernatural vital energy and thereby affects health and disease. Vertebral subluxation is a pseudoscientific concept and has not been proven to exist.
Reiki	Practitioners place their palms on the patient near Chakras that they believe are centers of supernatural energies in the belief that these supernatural energies can transfer from the practitioner's palms to heal the patient.	



Acupuncture involves insertion of needles in the body.

Holistic therapy

	Claims	Issues
Mind-body medicine	The mind can affect "bodily functions and symptoms" and there is an interconnection between the mind, body, and spirit.	

Herbal remedies and other substances used

Substance based practices use substances found in nature such as herbs, foods, non-vitamin supplements and megavitamins, animal and fungal products, and minerals, including use of these products in traditional medical practices that may also incorporate other methods.^{[69][121][122]} Examples include healing claims for nonvitamin supplements, fish oil, Omega-3 fatty acid, glucosamine, echinacea, flaxseed oil, and ginseng.^[123] Herbal medicine, or phytotherapy, includes not just the use of plant products, but may also include the use of animal and mineral products.^[121] It is among the most commercially successful branches of alternative medicine, and includes the tablets, powders and elixirs that are sold as "nutritional supplements".^[121] Only a very small percentage of these have been

shown to have any efficacy, and there is little regulation as to standards and safety of their contents.^[121] This may include use of known toxic substances, such as use of the poison lead in traditional Chinese medicine.^[123]

Religion, faith healing, and prayer

	Claims	Issues
Christian faith healing	There is a divine or spiritual intervention in healing.	
Shamanism	A practitioner can reach an altered states of consciousness in order to encounter and interact with the spirit world or channel supernatural energies in the belief that they can heal.	



A chiropractor "adjusting" the spine.

History

The history of alternative medicine may refer to the history of a group of diverse medical practices that were collectively promoted as "alternative medicine" beginning in the 1970s, to the collection of individual histories of members of that group, or to the history of western medical practices that were labeled "irregular practices" by the western medical establishment.^{[15][124][125][126][127]} It includes the histories of complementary medicine and of integrative medicine. Before the 1970s, western practitioners that were not part of the increasingly science-based medical establishment were referred to "irregular practitioners", and were dismissed by the medical establishment as unscientific and as practicing quackery.^{[124][125]} Until the 1970's, irregular practice became increasingly marginalized as quackery and fraud, as western medicine increasingly incorporated

scientific methods and discoveries, and had a corresponding increase in success of its treatments.^[126] In the 1970s, irregular practices were grouped with traditional practices of nonwestern cultures and with other unproven or disproven practices that were not part of biomedicine, with the entire group collectively marketed and promoted under the single expression "alternative medicine".^{[15][124][125][126][128]}

Use of alternative medicine in the west began to rise following the counterculture movement of the 1960s, as part of the rising new age movement of the 1970s.^{[15][129][130]} This was due to misleading mass marketing of "alternative medicine" being an effective "alternative" to biomedicine, changing social attitudes about not using chemicals and challenging the establishment and authority of any kind, sensitivity to giving equal measure to beliefs and practices of other cultures (cultural relativism), and growing frustration and desperation by patients about limitations and side effects of science-based medicine.^{[15][125][126][127][128][130][131]} At the same time, in 1975, the American Medical Association, which played the central role in fighting quackery in the United States, abolished its quackery committee and closed down its Department of Investigation.^{[124]:xxii[131]} By the early to mid 1970s the expression "alternative medicine" came into widespread use, and the expression became mass marketed as a collection of "natural" and effective treatment "alternatives" to science-based biomedicine.^{[15][131][132][133]} By 1983, mass marketing of "alternative medicine" was so pervasive that the British Medical Journal (BMJ) pointed to "an apparently endless stream of books, articles, and radio and television programmes urge on the public the virtues of (alternative medicine) treatments ranging from meditation to drilling a hole in the skull to let in more oxygen".^[131] In this 1983 article, the BMJ wrote, "one of the few growth industries in contemporary Britain is alternative medicine", noting that by 1983, "33% of patients with rheumatoid arthritis and 39% of those with backache admitted to having consulted an alternative practitioner".^[131]

By about 1990, the American alternative medicine industry had grown to a \$27 billion per year, with polls showing 30% of Americans were using it.^{[130][134]} Moreover, polls showed that Americans made more visits for alternative therapies than the total number of visits to primary care doctors, and American out-of-pocket spending (non-insurance spending) on alternative medicine was about equal to spending on biomedical doctors.^{[124]:172} In 1991, Time magazine ran a cover story, "The New Age of Alternative Medicine: Why New Age Medicine Is Catching On".^{[130][134]} In 1993, the New England Journal of Medicine reported one in three Americans as using alternative medicine.^[130] In 1993, the Public Broadcasting System ran a Bill Moyers special, *Healing and the Mind*, with Moyers commenting that "...people by the tens of millions are using alternative medicine. If established medicine does not understand that, they are going to lose their clients."^[130]

Another explosive growth began in the 1990s, when senior level political figures began promoting alternative medicine, investing large sums of government medical research funds into testing alternative medicine, including testing of scientifically implausible treatments, and relaxing government regulation of alternative medicine products as compared to biomedical products.^{[15][124]:xxii[125][126][127][128][135][136]} Beginning with a 1991 appropriation of \$2 million for funding research of alternative medicine research, federal spending grew to a cumulative total of about \$2.5 billion by 2009, with 50% of Americans using alternative medicine by 2013.^{[137][138]}

In 1993, Britain's Prince Charles, who claimed that homeopathy and other alternative medicine was an effective alternative to biomedicine, established The Prince's Foundation for Integrated Health (FIH), as a charity to explore "how safe, proven complementary therapies can work in conjunction with mainstream medicine".^[139] The FIH received government funding through grants from Britain's Department of Health.^[139] In 2008, London's *The Times* published a letter from Edzard Ernst that asked the FIH to recall two guides promoting alternative medicine, saying: "the majority of alternative therapies appear to be clinically ineffective, and many are downright dangerous." In 2010, Britain's FIH closed after allegations of fraud and money laundering led to arrests of its officials.^[139]

In 2004, modifications of the European Parliament's 2001 Directive 2001/83/EC, regulating all medicine products, were made with the expectation of influencing development of the European market for alternative medicine products.^[140] Regulation of alternative medicine in Europe was loosened with "a simplified registration procedure" for traditional herbal medicinal products.^{[140][141]} Plausible "efficacy" for traditional medicine was redefined to be based on long term popularity and testimonials ("the pharmacological effects or efficacy of the medicinal product are plausible on the basis of long-standing use and experience."), without scientific testing.^{[140][141]} The Committee on Herbal Medicinal Products (HMPC) was created within the European Medicines Agency in London (EMA). A special working group was established for homeopathic remedies under the Heads of Medicines Agencies.^[140]

Through 2004, alternative medicine that was traditional to Germany continued to be a regular part of the health care system, including homeopathy and anthroposophic medicine.^[140] The German Medicines Act mandated that science-based medical authorities consider the "particular characteristics" of complementary and alternative medicines.^[140] By 2004, homeopathy had grown to be the most used alternative therapy in France, growing from 16% of the population using homeopathic medicine in 1982, to 29% by 1987, 36% percent by 1992, and 62% of French mothers using homeopathic medicines by 2004, with 94.5% of French pharmacists advising pregnant women to use homeopathic remedies.^[142] As of 2004, 100 million people in India depended solely on traditional German homeopathic remedies for their medical care.^[143] As of 2010, homeopathic remedies continued to be the leading alternative treatment used by European physicians.^[142] By 2005, sales of homeopathic remedies and anthroposophical medicine had grown to \$930 million Euros, a 60% increase from 1995.^{[142][144]}

Since 2009, according to Art. 118a of the Swiss Federal Constitution, the Swiss Confederation and the Cantons of Switzerland shall within the scope of their powers ensure that consideration is given to complementary medicine.^[145]

By 2013, 50% of Americans were using CAM.^[138] As of 2013, CAM medicinal products in Europe continued to be exempted from documented efficacy standards required of other medicinal products.^[146]

Individual systems and practices

Much of what is now categorized as alternative medicine was developed as independent, complete medical systems. These were developed long before biomedicine and use of scientific methods. Each system was developed in relatively isolated regions of the world where there was little or no medical contact with pre-scientific western medicine, or with each other's systems. Examples are traditional Chinese medicine and the Ayurvedic medicine of India.

Other alternative medicine practices, such as homeopathy, were developed in western Europe and in opposition to western medicine, at a time when western medicine was based on unscientific theories that were dogmatically imposed by western religious authorities. Homeopathy was developed prior to discovery of the basic principles of chemistry, which proved homeopathic remedies contained nothing but water. But homeopathy, with its remedies made of water, was harmless compared to the unscientific and dangerous orthodox western medicine practiced at that time, which included use of toxins and draining of blood, often resulting in permanent disfigurement or death.^[125]

Other alternative practices such as chiropractic and osteopathic manipulative medicine were developed in the United States at a time that western medicine was beginning to incorporate scientific methods and theories, but the biomedical model was not yet totally dominant. Practices such as chiropractic and osteopathic, each considered to be irregular practices by the western medical establishment, also opposed each other, both rhetorically and politically with licensing legislation. Osteopathic practitioners added the courses and training of biomedicine to their licensing, and licensed Doctor of Osteopathic Medicine holders began diminishing use of the unscientific origins of the field. Without the original nonscientific practices and theories, osteopathic medicine is now considered the same as biomedicine.

"Irregular practitioners"

Further information: Rise of modern medicine

Until the 1970s, western practitioners that were not part of the medical establishment were referred to "irregular practitioners", and were dismissed by the medical establishment as unscientific, as practicing quackery.^[125] The Irregular practice became increasingly marginalized as quackery and fraud, as western medicine increasingly incorporated scientific methods and discoveries, and had a corresponding increase in success of its treatments.

Dating from the 1970s, medical professionals, sociologists, anthropologists and other commentators noted the increasing visibility of a wide variety of health practices that had neither derived directly from nor been verified by biomedical science.^[147] Since that time, those who have analyzed this trend have deliberated over the most apt language with which to describe this emergent health field.^[147] A variety of terms have been used, including heterodox, irregular, fringe and alternative medicine while others, particularly medical commentators, have been satisfied to label them as instances of quackery.^[147] The most persistent term has been alternative medicine but its use is problematic as it assumes a value-laden dichotomy between a medical fringe, implicitly of borderline acceptability at best, and a privileged medical orthodoxy, associated with validated medico-scientific norms.^[148] The use of the category of alternative medicine has also been criticized as it cannot be studied as an independent entity but must be understood in terms of a regionally and temporally specific medical orthodoxy.^[149] Its use can also be misleading as it may erroneously imply that a real medical alternative exists.^[150] As with near-synonymous expressions, such as unorthodox, complementary, marginal, or quackery, these linguistic devices have served, in the context of processes of professionalisation and market competition, to establish the authority of official medicine and police the boundary between it and its unconventional rivals.^[148]

An early instance of the influence of this modern, or western, scientific medicine outside Europe and North America is Peking Union Medical College.^{[151][n 14][n 15]}

From a historical perspective, the emergence of alternative medicine, if not the term itself, is typically dated to the 19th century.^[152] This is despite the fact that there are variants of Western non-conventional medicine that arose in the late-eighteenth century or earlier and some non-Western medical traditions, currently considered alternative in the West and elsewhere, which boast extended historical pedigrees.^[148] Alternative medical systems, however, can only be said to exist when there is an identifiable, regularized and authoritative standard medical practice, such as arose in the West during the nineteenth century, to which they can function as an alternative.^[153]



Peking Union Medical College

During the late eighteenth and nineteenth centuries regular and irregular medical practitioners became more clearly differentiated throughout much of Europe and,^[154] as the nineteenth century progressed, most Western states converged in the creation of legally delimited and semi-protected medical markets.^[155] It is at this point that an "official" medicine, created in cooperation with the state and employing a scientific rhetoric of legitimacy, emerges as a recognizable entity and that the concept of alternative medicine as a historical category becomes tenable.^[156]

As part of this process, professional adherents of mainstream medicine in countries such as Germany, France, and Britain increasingly invoked the scientific basis of their discipline as a means of engendering internal professional unity and of external differentiation in the face of sustained market competition from homeopaths, naturopaths, mesmerists and other nonconventional medical practitioners, finally achieving a degree of imperfect dominance through alliance with the state and the passage of regulatory legislation.^{[148][150]} In the US the Johns Hopkins University School of Medicine, based in Baltimore, Maryland, opened in 1893, with William H. Welch and William Osler among the founding physicians, and was the first medical school devoted to teaching "German scientific medicine".^[157]

Buttressed by increased authority arising from significant advances in the medical sciences of the late 19th century onwards—including development and application of the germ theory of disease by the chemist Louis Pasteur and the surgeon Joseph Lister, of microbiology co-founded by Robert Koch (in 1885 appointed professor of hygiene at the University of Berlin), and of the use of X-rays (Röntgen rays)—the 1910 Flexner Report called upon American medical schools to follow the model of the Johns Hopkins School of Medicine, and adhere to mainstream science in their teaching and research. This was in a belief, mentioned in the Report's introduction, that the preliminary and professional training then prevailing in medical schools should be reformed, in view of the new means for diagnosing and combating disease made available the sciences on which medicine depended.^{[n 16][159]}

Putative medical practices at the time that later became known as "alternative medicine" included homeopathy (founded in Germany in the early 19c.) and chiropractic (founded in North America in the late 19c.). These conflicted in principle with the developments in medical science upon which the Flexner reforms were based, and they have not become compatible with further advances of medical science such as listed in Timeline of medicine and medical technology, 1900–1999 and 2000–present, nor have Ayurveda, acupuncture or other kinds of alternative medicine.

At the same time "Tropical medicine" was being developed as a specialist branch of western medicine in research establishments such as Liverpool School of Tropical Medicine founded in 1898 by Alfred Lewis Jones, London School of Hygiene & Tropical Medicine, founded in 1899 by Patrick Manson and Tulane University School of Public Health and Tropical Medicine, instituted in 1912. A distinction was being made between western scientific medicine and indigenous systems. An example is given by an official report about indigenous systems of medicine in India, including Ayurveda, submitted by Mohammad Usman of Madras and others in 1923. This stated that the first question the Committee considered was "to decide whether the indigenous systems of medicine were scientific or not".^{[160][161][162]}

By the later twentieth century the term 'alternative medicine' entered public discourse,^{[n 17][164]} but it was not always being used with the same meaning by all parties. Arnold S. Relman remarked in 1998 that in the best kind of medical practice, all proposed treatments must be tested objectively, and that in the end there will only be treatments that pass and those that do not, those that are proven worthwhile and those that are not. He asked 'Can there be any reasonable "alternative"?'^[165] But also in 1998 the then Surgeon General of the United States, David Satcher,^[166] issued public information about eight common alternative treatments (including acupuncture, holistic and massage), together with information about common diseases and conditions, on nutrition, diet, and lifestyle changes, and about helping consumers to decipher fraud and quackery, and to find healthcare centers and doctors who practiced alternative medicine.^[167]

By 1990, approximately 60 million Americans had used one or more complementary or alternative therapies to address health issues, according to a nationwide survey in the US published in 1993 by David Eisenberg.^[168] A study published in the November 11, 1998 issue of the Journal of the American Medical Association reported that 42% of Americans had used complementary and alternative therapies, up from 34% in 1990.^[169] However, despite the growth in patient demand for complementary medicine, most of the early alternative/complementary medical centers failed.^[170]

Medical education

Mainly as a result of reforms following the Flexner Report of 1910^[171] medical education in established medical schools in the US has generally not included alternative medicine as a teaching topic.^[n 18] Typically, their teaching is based on current practice and scientific knowledge about: anatomy, physiology, histology, embryology, neuroanatomy, pathology, pharmacology, microbiology and immunology.^[173] Medical schools' teaching includes such topics as doctor-patient communication, ethics, the art of medicine,^[174] and engaging in complex clinical reasoning (medical decision-making).^[175] Writing in 2002, Snyderman and Weil remarked that by the early twentieth century the Flexner model had helped to create the 20th-century academic health center, in which education, research, and practice were inseparable. While this had much improved medical practice by defining with increasing certainty the pathophysiological basis of disease, a single-minded focus on the pathophysiological had diverted much of mainstream American medicine from clinical conditions that were not well understood in mechanistic terms, and were not effectively treated by conventional therapies.^[176]

By 2001 some form of CAM training was being offered by at least 75 out of 125 medical schools in the US.^[177] Exceptionally, the School of Medicine of the University of Maryland, Baltimore includes a research institute for integrative medicine (a member entity of the Cochrane Collaboration).^{[98][178]} Medical schools are responsible for conferring medical degrees, but a physician typically may not legally practice medicine until licensed by the local government authority. Licensed physicians in the US who have attended one of the established medical schools there have usually graduated Doctor of Medicine (MD).^[179] All states require that applicants for MD licensure be graduates of an approved medical school and complete the United States Medical Licensing Exam (USMLE).^[179]

The British Medical Association, in its publication *Complementary Medicine, New Approach to Good Practice* (1993), gave as a working definition of non-conventional therapies (including acupuncture, chiropractic and homeopathy): "...those forms of treatment which are not widely used by the orthodox health-care professions, and the skills of which are not part of the undergraduate curriculum of orthodox medical and paramedical health-care courses."^[180] By 2000 some medical schools in the UK were offering CAM familiarisation courses to undergraduate medical students while some were also offering modules specifically on CAM.^[181]

United States government

In 1991, pointing to a need for testing because of the widespread use of alternative medicine without authoritative information on its efficacy, United States Senator Tom Harkin used \$2 million of his discretionary funds to create the Office for the Study of Unconventional Medical Practices (OSUMP), later renamed to be the Office of Alternative Medicine (OAM).^{[124]:170[182][183]} The OAM was created to be within the National Institute of Health (NIH), the scientifically prestigious primary agency of the United States government responsible for biomedical and health-related research.^{[124]:170[182][183]} The mandate was to investigate, evaluate, and validate effective alternative medicine treatments, and alert the public as the results of testing its efficacy.^{[134][182][183][184]}

Sen. Harkin had become convinced his allergies were cured by taking bee pollen pills, and was urged to make the spending by two of his influential constituents.^{[134][182][183]} Bedell, a longtime friend of Sen. Harkin, was a former member of the United States House of Representatives who believed that alternative medicine had twice cured him of diseases after mainstream medicine had failed, claiming that cow's milk colostrum cured his Lyme disease, and an herbal derivative from camphor had prevented post surgical recurrence of his prostate cancer.^{[124][134]} Wiewel was a promoter of unproven cancer treatments involving a mixture of blood sera that the Food and Drug Administration had banned from being imported.^[134] Both Bedell and Wiewel became members of the advisory panel for the OAM. The company that sold the bee pollen was later fined by the Federal Trade Commission for making false health claims about their bee-pollen products reversing the aging process, curing allergies, and helping with weight loss.^[185]



Sen. Tom Harkin at a press conference.

In 1994, Sen. Harkin (D) and Senator Orrin Hatch (R) introduced the Dietary Supplement Health and Education Act (DSHEA).^{[186][187]} The act reduced authority of the FDA to monitor products sold as "natural" treatments.^[186] Labeling standards were reduced to allow health claims for supplements based only on unconfirmed preliminary studies that were not subjected to scientific peer review, and the act made it more difficult for the FDA to promptly seize products or demand proof of safety where there was evidence of a product being dangerous.^[187] The Act became known as the "The 1993 Snake Oil Protection Act" following a New York Times editorial under that name.^[186]

Senator Harkin complained about the "unbendable rules of randomized clinical trials", citing his use of bee pollen to treat his allergies, which he claimed to be effective even though it was biologically implausible and efficacy was not established using scientific methods.^{[182][188]} Sen. Harkin asserted that claims for alternative medicine efficacy be allowed not only without conventional scientific testing, even when they are biologically implausible, "It is not necessary for the scientific community to understand the process before the American public can benefit from these therapies."^[186] Following passage of the act, sales rose from about \$4 billion in 1994, to \$20 billion by the end of 2000, at the same time as evidence of their lack of efficacy or harmful effects grew.^[186] Senator Harkin came into open public conflict with the first OAM Director Joseph M. Jacobs and OAM board members from the scientific and biomedical community.^[183] Jacobs' insistence on rigorous scientific methodology caused friction with Senator Harkin.^{[182][188][189]} Increasing political resistance to the use of scientific methodology was publicly criticized by Dr. Jacobs and another OAM board member complained that "nonsense has trickled down to every aspect of this office...It's the only place where opinions are counted as equal to data."^{[182][188]} In 1994, Senator Harkin appeared on television with cancer patients who blamed Dr. Jacobs for blocking their access to untested cancer treatment, leading Jacobs to resign in frustration.^{[182][188]}

In 1995, Wayne Jonas, a promoter of homeopathy and political ally of Senator Harkin, became the director of the OAM, and continued in that role until 1999.^[190] In 1997, the NCCAM budget was increased from \$12 million to \$20 million annually.^[191] From 1990 to 1997, use of alternative medicine in the US increased by 25%, with a corresponding 50% increase in expenditures.^[169] The OAM drew increasing criticism from eminent members of the scientific community with letters to the Senate Appropriations Committee when discussion of renewal of funding OAM came up.^{[124]:175} Nobel laureate Paul Berg wrote that prestigious NIH should not be degraded to act as a cover for quackery, calling the OAM "an embarrassment to serious scientists."^{[124]:175[191]} The president of the American Physical Society wrote complaining that the government was spending money on testing products and practices that "violate basic laws of physics and more clearly resemble witchcraft".^{[124]:175[191]} In 1998, the President of the North Carolina Medical Association publicly called for shutting down the OAM.^[192]

In 1998, NIH director and Nobel laureate Harold Varmus came into conflict with Senator Harkin by pushing to have more NIH control of alternative medicine research.^[193] The NIH Director placed the OAM under more strict scientific NIH control.^{[191][193]} Senator Harkin responded by elevating OAM into an independent NIH "center", just short of being its own "institute", and renamed to be the National Center for Complementary and Alternative Medicine (NCCAM). NCCAM had a mandate to promote a more rigorous and scientific approach to the study of alternative medicine, research training and career development, outreach, and "integration". In 1999, the NCCAM budget was increased from \$20 million to \$50 million.^{[192][193]} The United States Congress approved the appropriations without dissent. In 2000, the budget was increased to about \$68 million, in 2001 to \$90 million, in 2002 to \$104 million, and in 2003, to \$113 million.^[192]

In 2009, after a history of 17 years of government testing and spending of nearly \$2.5 billion on research had produced almost no clearly proven efficacy of alternative therapies, Senator Harkin complained, "One of the purposes of this center was to investigate and validate alternative approaches. Quite frankly, I must say publicly that it has fallen short. It think quite frankly that in this center and in the office previously before it, most of its focus has been on disproving things rather than seeking out and

approving.^{[193][194][195]} Members of the scientific community criticized this comment as showing Senator Harkin did not understand the basics of scientific inquiry, which tests hypotheses, but never intentionally attempts to "validate approaches".^[193] Members of the scientific and biomedical communities complained that after a history of 17 years of being tested, at a cost of over \$2.5 Billion on testing scientifically and biologically implausible practices, almost no alternative therapy showed clear efficacy.^[137] In 2009, the NCCAM's budget was increased to about \$122 million.^[193] Overall NIH funding for CAM research increased to \$300 Million by 2009.^[193] By 2009, Americans were spending \$34 Billion annually on CAM.^[196]

In 2012, the Journal of the American Medical Association (JAMA) published a criticism that study after study had been funded by NCCAM, but "failed to prove that complementary or alternative therapies are anything more than placebos".^[197] The JAMA criticism pointed to large wasting of research money on testing scientifically implausible treatments, citing "NCCAM officials spending \$374,000 to find that inhaling lemon and lavender scents does not promote wound healing; \$750,000 to find that prayer does not cure AIDS or hasten recovery from breast-reconstruction surgery; \$390,000 to find that ancient Indian remedies do not control type 2 diabetes; \$700,000 to find that magnets do not treat arthritis, carpal tunnel syndrome, or migraine headaches; and \$406,000 to find that coffee enemas do not cure pancreatic cancer."^[197] It was pointed out that negative results from testing were generally ignored by the public, that people continue to "believe what they want to believe, arguing that it does not matter what the data show: They know what works for them".^[197] Continued increasing use of CAM products was also blamed on the lack of FDA ability to regulate alternative products, where negative studies do not result in FDA warnings or FDA-mandated changes on labeling, whereby few consumers are aware that many claims of many supplements were found not to have not to be supported.^[197]

In 2014 the NCCAM was renamed to the National Center for Complementary and Integrative Health (NCCIH) with a new charter requiring that 12 of the 18 council members shall be selected with a preference to selecting leading representatives of complementary and alternative medicine, 9 of the members must be licensed practitioners of alternative medicine, 6 members must be general public leaders in the fields of public policy, law, health policy, economics, and management, and 3 members must represent the interests of individual consumers of complementary and alternative medicine.^[198]

Efficacy

There is a general scientific consensus that Alternative Therapies lack the requisite scientific validation, and their effectiveness is either unproved or disproved.^{[12][15][199][200]} Many of the claims regarding the efficacy of alternative medicines are controversial, since research on them is frequently of low quality and methodologically flawed.^[201] Selective publication bias , marked differences in product quality and standardisation, and some companies making unsubstantiated claims, call into question the claims of efficacy of isolated examples where there is evidence for alternative therapies.^[202]

The Scientific Review of Alternative Medicine points to confusions in the general population - a person may attribute symptomatic relief to an otherwise-ineffective therapy just because they are taking something (the placebo effect); the natural recovery from or the cyclical nature of an illness (the regression fallacy) gets misattributed to an alternative medicine being taken; a person not diagnosed with science-based medicine may never originally have had a true illness diagnosed as an alternative disease category.^[203]

Edzard Ernst characterized the evidence for many alternative techniques as weak, nonexistent, or negative^[204] and in 2011 published his estimate that about 7.4% were based on "sound evidence", although he believes that may be an overestimate.^[205] Ernst has concluded that 95% of the alternative treatments he and his team studied, including acupuncture, herbal medicine, homeopathy, and reflexology, are "statistically indistinguishable from placebo treatments", but he also believes there is something that conventional doctors can usefully learn from the chiropractors and homeopath: this is the therapeutic value of the placebo effect, one of the strangest phenomena in medicine.^{[206][207]}

In 2003, a project funded by the CDC identified 208 condition-treatment pairs, of which 58% had been studied by at least one randomized controlled trial (RCT), and 23% had been assessed with a meta-analysis.^[208] According to a 2005 book by a US Institute of Medicine panel, the number of RCTs focused on CAM has risen dramatically.

As of 2005, the Cochrane Library had 145 CAM-related Cochrane systematic reviews and 340 non-Cochrane systematic reviews. An analysis of the conclusions of only the 145 Cochrane reviews was done by two readers. In 83% of the cases, the readers agreed. In the 17% in which they disagreed, a third reader agreed with one of the initial readers to set a rating. These studies found that, for CAM, 38.4% concluded positive effect or possibly positive (12.4%), 4.8% concluded no effect, 0.69% concluded harmful effect, and 56.6% concluded insufficient evidence. An assessment of conventional treatments found that 41.3% concluded positive or possibly positive effect, 20% concluded no effect, 8.1% concluded net harmful effects, and 21.3% concluded insufficient evidence. However, the CAM review used the more developed 2004 Cochrane database, while the conventional review used the initial 1998 Cochrane database.^[209]

In the same way as for conventional therapies, drugs, and interventions, it can be difficult to test the efficacy of alternative medicine in clinical trials. In instances where an established, effective, treatment for a condition is already available, the Helsinki Declaration states that withholding such treatment is unethical in most circumstances. Use of standard-of-care treatment in addition to an alternative technique being tested may produce confounded or difficult-to-interpret results.^[210]

Cancer researcher Andrew J. Vickers has stated:

"Contrary to much popular and scientific writing, many alternative cancer treatments have been investigated in good-quality clinical trials, and they have been shown to be ineffective. The label 'unproven' is inappropriate for such therapies; it is time to assert that many alternative cancer therapies have been 'disproven'."^[211]

Criticism, legitimacy and effects

"CAM", meaning "complementary and alternative medicine", is not as well researched as conventional medicine, which undergoes intense research before release to the public.^[212] Funding for research is also sparse making it difficult to do further research for effectiveness of CAM.^[213] Most funding for CAM is funded by government agencies.^[212] Proposed research for CAM are rejected by most private funding agencies because the results of research are not reliable.^[212] The research for CAM has to meet certain standards from research ethics committees, which most CAM researchers find almost impossible to meet.^[212] Even with the little research done on it, CAM has not been proven to be effective.^[214]

“ 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. ”

— P.B. Fontanarosa, *Journal of the American Medical Association* (1998)^[55]

Steven Novella, a neurologist at Yale School of Medicine, wrote that government funded studies of integrating alternative medicine techniques into the mainstream are "used to lend an appearance of legitimacy to treatments that are not legitimate."^[215] Marcia Angell considered that critics felt that healthcare practices should be classified based solely on scientific evidence, and if a treatment had been rigorously tested and found safe and effective, science-based medicine will adopt it regardless of whether it was considered "alternative" to begin with.^[14] It is possible for a method to change categories (proven vs. unproven), based on increased knowledge of its effectiveness or lack thereof. A prominent supporter of this position is George D. Lundberg, former editor of the *Journal of the American Medical Association* (JAMA).^[55]

Writing in 1999 in *CA: A Cancer Journal for Clinicians* Barrie R. Cassileth mentioned a 1997 letter to the US Senate Subcommittee on Public Health and Safety, which had deplored the lack of critical thinking and scientific rigor in OAM-supported research, had been signed by four Nobel Laureates and other prominent scientists. (This was supported by the National Institutes of Health (NIH).)^[216]

In March 2009 a staff writer for *the Washington Post* reported that the impending national discussion about broadening access to health care, improving medical practice and saving money was giving a group of scientists an opening to propose shutting down the National Center for Complementary and Alternative Medicine. They quoted one of these scientists, Steven Salzberg, a genome researcher and computational biologist at the University of Maryland, as saying "One of our concerns is that NIH is funding pseudoscience." They noted that the vast majority of studies were based on fundamental misunderstandings of physiology and disease, and had shown little or no effect.^[215]

Writers such as Carl Sagan (1934-1996), a noted astrophysicist, advocate of scientific skepticism and the author of *The demon-haunted world: science as a candle in the dark* (1996), have lambasted the lack of empirical evidence to support the existence of the putative energy fields on which these therapies are predicated.^[120]

Sampson has also pointed out that CAM tolerated contradiction without thorough reason and experiment.^[217] Barrett has pointed out that there is a policy at the NIH of never saying something doesn't work only that a different version or dose might give different results.^[137] Barrett also expressed concern that, just because some "alternatives" have merit, there is the impression that the rest deserve equal consideration and respect even though most are worthless, since they are all classified under the one heading of alternative medicine.^[218]

Some critics of alternative medicine are focused upon health fraud, misinformation, and quackery as public health problems, notably Wallace Sampson and Paul Kurtz founders of Scientific Review of Alternative Medicine and Stephen Barrett, co-founder of The National Council Against Health Fraud and webmaster of Quackwatch.^[219] Grounds for opposing alternative medicine include that:

- It is usually based on religion, tradition, superstition, belief in supernatural energies, pseudoscience, errors in reasoning, propaganda, or fraud.^{[10][12][15][220]}
- Alternative therapies typically lack any scientific validation, and their effectiveness is either unproved or disproved.^{[15][199][200]}
- Treatments are not part of the conventional, science-based healthcare system.^{[23][69][221][222]}
- Research on alternative medicine is frequently of low quality and methodologically flawed.^[201]
- Where alternative treatments have replaced conventional science-based medicine, even with the safest alternative medicines, failure to use or delay in using conventional science-based medicine has caused deaths.^{[223][224]}
- Methods may incorporate or base themselves on traditional medicine, folk knowledge, spiritual beliefs, ignorance or misunderstanding of scientific principles, errors in reasoning, or newly conceived approaches claiming to heal.^{[10][15][225]}

Many alternative medical treatments are not patentable,, which may lead to less research funding from the private sector. In addition, in most countries, alternative treatments (in contrast to pharmaceuticals) can be marketed without any proof of efficacy—also a disincentive for manufacturers to fund scientific research.^[226]

English evolutionary biologist Richard Dawkins, in his 2003 book *A Devil's Chaplain* , defined alternative medicine as a "set of practices that cannot be tested, refuse to be tested, or consistently fail tests."^[227] Dawkins argued that if a technique is demonstrated effective in properly performed trials then it ceases to be alternative and simply becomes medicine.^[228]

CAM is also often less regulated than conventional medicine.^[212] There are ethical concerns about whether people who perform CAM have the proper knowledge to treat patients.^[212] CAM is often done by non-physicians who do not operate with the same medical licensing laws which govern conventional medicine,^[212] and it is often described as an issue of non-maleficence.^[229]

According to two writers, Wallace Sampson and K. Butler, marketing is part of the training required in alternative medicine, and propaganda methods in alternative medicine have been traced back to those used by Hitler and Goebels in their promotion of pseudoscience in medicine.^{[15][230]}

In November 2011 Edzard Ernst stated that the "level of misinformation about alternative medicine has now reached the point where it has become dangerous and unethical. So far, alternative medicine has remained an ethics-free zone. It is time to change this."^[231]

Placebo effect

A research methods expert and author of "Snake Oil Science", R. Barker Bausell, has stated that "it's become politically correct to investigate nonsense."^[137] There are concerns that just having NIH support is being used to give unfounded "legitimacy to treatments that are not legitimate."^[215]

Use of placebos to achieve a placebo effect in integrative medicine has been criticized as, "...diverting research time, money, and other resources from more fruitful lines of investigation in order to pursue a theory that has no basis in biology."^{[65][66]}

Another critic has argued that academic proponents of integrative medicine sometimes recommend misleading patients by using known placebo treatments to achieve a placebo effect.^[n 19] However, a 2010 survey of family physicians found that 56% of respondents said they had used a placebo in clinical practice as well. Eighty-five percent of respondents believed placebos can have both psychological and physical benefits.^[233]

Integrative medicine has been criticized in that its practitioners, trained in science-based medicine, deliberately mislead patients by pretending placebos are not. "quackademic medicine" is a pejorative term used for *integrative medicine*, which medical professionals consider an infiltration of quackery into academic science-based medicine.^[66]

An analysis of trends in the criticism of complementary and alternative medicine (CAM) in five prestigious American medical journals during the period of reorganization within medicine (1965–1999) was reported as showing that the medical profession had responded to the growth of CAM in three phases, and that in each phase, changes in the medical marketplace had influenced the type of response in the journals.^[234] Changes included relaxed medical licensing, the development of managed care, rising consumerism, and the establishment of the USA Office of Alternative Medicine (now National Center for Complementary and Alternative Medicine).^[n 20] In the "condemnation" phase, from the late 1960s to the early 1970s, authors had ridiculed, exaggerated the risks, and petitioned the state to contain CAM; in the "reassessment"

phase (mid-1970s through early 1990s), when increased consumer utilization of CAM was prompting concern, authors had pondered whether patient dissatisfaction and shortcomings in conventional care contributed to the trend; in the "integration" phase of the 1990s physicians began learning to work around or administer CAM, and the subjugation of CAM to scientific scrutiny had become the primary means of control.

Use and regulation

Prevalence of use

Complementary and alternative medicine (CAM) has been described as a broad domain of healing resources that encompasses all health systems, modalities, and 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 self-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.^[80]

According to recent research, the increasing popularity of the CAM needs to be explained by moral convictions or lifestyle choices rather than by economic reasoning.^[236]

About 50% of people in developed countries use some kind of complementary and alternative medicine other than prayer for health.^{[11][237][238]} A British telephone survey by the BBC of 1209 adults in 1998 shows that around 20% of adults in Britain had used alternative medicine in the past 12 months.^[239] About 40% of cancer patients use some form of CAM.^[240]

In developing nations, access to essential medicines is severely restricted by lack of resources and poverty. Traditional remedies, often closely resembling or forming the basis for alternative remedies, may comprise primary healthcare or be integrated into the healthcare system. In Africa, traditional medicine is used for 80% of primary healthcare, and in developing nations as a whole over one-third of the population lack access to essential medicines.^[241]

Some have proposed adopting a prize system to reward medical research.^[242] However, public funding for research exists. Increasing the funding for research on alternative medicine techniques is the purpose of the US National Center for Complementary and Alternative Medicine. NCCIH and its predecessor, the Office of Alternative Medicine, have spent more than \$2.5 billion on such research since 1992; this research has largely not demonstrated the efficacy of alternative treatments.^{[137][243][244][245]}

That alternative medicine has been on the rise "in countries where Western science and scientific method generally are accepted as the major foundations for healthcare, and 'evidence-based' practice is the dominant paradigm" was described as an "enigma" in the Medical Journal of Australia.^[246]

In the US

In the United States, the 1974 Child Abuse Prevention and Treatment Act (CAPTA) required that for states to receive federal money, they had to grant religious exemptions to child neglect and abuse laws regarding religion-based healing practices.^[247] Thirty-one states have child-abuse religious exemptions.^[248]

The use of alternative medicine in the US has increased,^{[12][169]} with a 50 percent increase in expenditures and a 25 percent increase in the use of alternative therapies between 1990 and 1997 in America.^[169] Americans spend many billions on the therapies annually.^[169] Most Americans used CAM to treat and/or prevent musculoskeletal conditions or other conditions associated with chronic or recurring pain.^[11] In America, women were more likely than men to use CAM, with the biggest difference in use of mind-body therapies including prayer specifically for health reasons.^[11] In 2008, more than 37% of American hospitals offered alternative therapies, up from 26.5 percent in 2005, and 25% in 2004.^{[249][250]} More than 70% of the hospitals offering CAM were in urban areas.^[250]

A survey of Americans found that 88 percent thought that "there are some good ways of treating sickness that medical science does not recognize".^[12] Use of magnets was the most common tool in energy medicine in America, and among users of it, 58 percent described it as at least "sort of scientific", when it is not at all scientific.^[12] In 2002, at least 60 percent of US medical schools have at least some class time spent teaching alternative therapies.^[12] "Therapeutic touch", was taught at more than 100 colleges and universities in 75 countries before the practice was debunked by a nine-year-old child for a school science project.^{[12][251]}

Prevalence of use of specific therapies

The most common CAM therapies used in the US in 2002 were prayer (45.2%), herbalism (18.9%), breathing meditation (11.6%), meditation (7.6%), chiropractic medicine (7.5%), yoga (5.1%-6.1%), body work (5.0%), diet-based therapy (3.5%), progressive relaxation (3.0%), mega-vitamin therapy (2.8%) and Visualization (2.1%)^{[11][252]}

In Britain, the most often used alternative therapies were Alexander technique, Aromatherapy, Bach and other flower remedies, Body work therapies including massage, Counseling stress therapies, hypnotherapy, Meditation, Reflexology, Shiatsu, Ayurvedic medicine, Nutritional medicine, and Yoga.^[253] Ayurvedic medicine remedies are mainly plant based with some use of animal materials.^[254] Safety concerns include the use of herbs containing toxic compounds and the lack of quality control in Ayurvedic facilities.^{[117][119]}

According to the National Health Service (England), the most commonly used complementary and alternative medicines (CAM) supported by the NHS in the UK are: acupuncture, aromatherapy, chiropractic, homeopathy, massage, osteopathy and clinical hypnotherapy.^[255]

In palliative care

Complementary therapies are often used in palliative care or by practitioners attempting to manage chronic pain in patients. Integrative medicine is considered more acceptable in the interdisciplinary approach used in palliative care than in other areas of medicine. "From its early experiences of care for the dying, palliative care took for granted the necessity of placing patient values and lifestyle habits at the core of any design and delivery of quality care at the end of life. If the patient desired complementary therapies, and as long as such treatments provided additional support and did not endanger the patient, they were considered acceptable."^[256] The non-pharmacologic interventions of complementary medicine can employ mind-body interventions designed to "reduce pain and concomitant mood disturbance and increase quality of life."^[257]

Regulation

In Austria and Germany complementary and alternative medicine is mainly in the hands of doctors with MDs,^[50] and half or more of the American alternative practitioners are licensed MDs.^[258] In Germany herbs are tightly regulated: half are prescribed by doctors and covered by health insurance.^[259]

Some professions of complementary/traditional/alternative medicine, such as chiropractic, have achieved full regulation in North America and other parts of the world^[260] and are regulated in a manner similar to that governing science-based medicine. In contrast, other approaches may be partially recognized and others have no regulation at all. Regulation and licensing of alternative medicine ranges widely from country to country, and state to state.^[260]

Government bodies in the USA and elsewhere have published information or guidance about alternative medicine. The U.S. Food and Drug Administration (FDA), has issued online warnings for consumers about medication health fraud.^[261] This includes a section on Alternative Medicine Fraud,^[262] such as a warning that Ayurvedic products generally have not been approved by the FDA before marketing.^[263]

Conflicts of interest

Some commentators have said that special consideration must be given to the issue of conflicts of interest in alternative medicine. Edzard Ernst has said that most researchers into alternative medicine are at risk of "unidirectional bias" because of a generally uncritical belief in their chosen subject.^[264] Ernst cites as evidence the phenomenon whereby 100% of a sample of acupuncture trials originating in China had positive conclusions.^[264] David Gorski contrasts evidence-based medicine, in which researchers try to disprove hypotheses, with what he says is the frequent practice in pseudoscience-based research, of striving to confirm pre-existing notions.^[265] Harriet A. Hall writes that there is a contrast between the circumstances of alternative medicine practitioners and disinterested scientists: in the case of acupuncture, for example, an acupuncturist would have "a great deal to lose" if acupuncture were rejected by research; but the disinterested skeptic would not lose anything if its effects were confirmed; rather their change of mind would enhance their skeptical credentials.^[266]



Health campaign flyers, as in this example from the Food and Drug Administration, warn the public about unsafe products.

Risks

Adequacy of regulation and CAM safety

Many of the claims regarding the safety and efficacy of alternative medicine are controversial. Some alternative treatments have been associated with unexpected side effects, which can be fatal.^[267]

A commonly voiced concerns about complementary alternative medicine (CAM) is the way it's regulated. There have been significant developments in how CAMs should be assessed prior to re-sale in the United Kingdom and the European Union (EU) in the last 2 years. Despite this, it has been suggested that current regulatory bodies have been ineffective in preventing deception of patients as many companies have re-labelled their drugs to avoid the new laws.^[268] There is no general consensus about how to balance consumer protection (from false claims, toxicity, and advertising) with freedom to choose remedies.

Advocates of CAM suggest that regulation of the industry will adversely affect patients looking for alternative ways to manage their symptoms, even if many of the benefits may represent the placebo affect.^[269] Some contend that alternative medicines should not require any more regulation than over-the-counter medicines that can also be toxic in overdose (such as paracetamol).^[270]

Interactions with conventional pharmaceuticals

Forms of alternative medicine that are biologically active can be dangerous even when used in conjunction with conventional medicine. Examples include immun augmentation therapy, shark cartilage, bioresonance therapy, oxygen and ozone therapies, and insulin potentiation therapy. Some herbal remedies can cause dangerous interactions with chemotherapy drugs, radiation therapy, or anesthetics during surgery, among other problems.^[51] An anecdotal example of these dangers was reported by Associate Professor Alastair MacLennan of Adelaide University, Australia regarding a patient who almost bled to death on the operating table after neglecting to mention that she had been taking "natural" potions to "build up her strength" before the operation, including a powerful anticoagulant that nearly caused her death.^[271]

To *ABC Online*, MacLennan also gives another possible mechanism:

And lastly [*sic*] there's the cynicism and disappointment and depression that some patients get from going on from one alternative medicine to the next, and they find after three months the placebo effect wears off, and they're disappointed and they move on to the next one, and they're disappointed and disillusioned, and that can create depression and make the eventual treatment of the patient with anything effective difficult, because you may not get compliance, because they've seen the failure so often in the past.^[272]

Potential side-effects

Conventional treatments are subjected to testing for undesired side-effects, whereas alternative treatments, in general, are not subjected to such testing at all. Any treatment – whether conventional or alternative – that has a biological or psychological effect on a patient may also have potential to possess dangerous biological or psychological side-effects. Attempts to refute this fact with regard to alternative treatments sometimes use the *appeal to nature* fallacy, i.e., "That which is natural cannot be harmful." Specific groups of patients such as patients with impaired hepatic or renal function are more susceptible to side effects of alternative remedies.^{[273][274]}

An exception to the normal thinking regarding side-effects is Homeopathy. Since 1938, the U.S. Food and Drug Administration (FDA) has regulated homeopathic products in "several significantly different ways from other drugs."^[275] Homeopathic preparations, termed "remedies", are extremely dilute, often far beyond the point where a single molecule of the original active (and possibly toxic) ingredient is likely to remain. They are, thus, considered safe on that count, but "their products are exempt from good manufacturing practice requirements related to expiration dating and from finished product testing for identity and strength", and their alcohol concentration may be much higher than allowed in conventional drugs.^[275]

Treatment delay

Those having experienced or perceived success with one alternative therapy for a minor ailment may be convinced of its efficacy and persuaded to extrapolate that success to some other alternative therapy for a more serious, possibly life-threatening illness.^[276] For this reason, critics argue that therapies that rely on the placebo effect to define success are very dangerous. According to mental health journalist Scott Lilienfeld in 2002, "unvalidated or scientifically unsupported mental health practices can lead individuals to forgo effective treatments" and refers to this as "opportunity cost". Individuals who spend large amounts of time and money on ineffective treatments may be

left with precious little of either, and may forfeit the opportunity to obtain treatments that could be more helpful. In short, even innocuous treatments can indirectly produce negative outcomes.^[223] Between 2001 and 2003, four children died in Australia because their parents chose ineffective naturopathic, homeopathic, or other alternative medicines and diets rather than conventional therapies.^[224]

Unconventional cancer "cures"

There have always been "many therapies offered outside of conventional cancer treatment centers and based on theories not found in biomedicine. These alternative cancer cures have often been described as 'unproven,' suggesting that appropriate clinical trials have not been conducted and that the therapeutic value of the treatment is unknown." However, "many alternative cancer treatments have been investigated in good-quality clinical trials, and they have been shown to be ineffective....The label 'unproven' is inappropriate for such therapies; it is time to assert that many alternative cancer therapies have been 'disproven'.^[211]

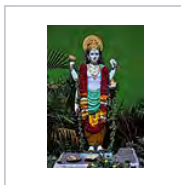
Edzard Ernst has stated:

"... any alternative cancer cure is bogus by definition. There will never be an alternative cancer cure. Why? Because if something looked halfway promising, then mainstream oncology would scrutinize it, and if there is anything to it, it would become mainstream almost automatically and very quickly. All curative "alternative cancer cures" are based on false claims, are bogus, and, I would say, even criminal."^[277]

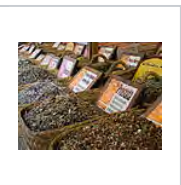
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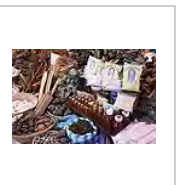
Christian laying on of hands, prayer intervention, and faith healing



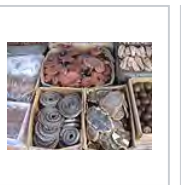
Indian Ayurvedic medicine includes a belief that the spiritual balance of mind influences disease.



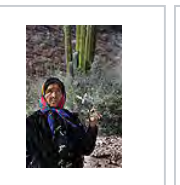
Medicinal herbs in a traditional Spanish market



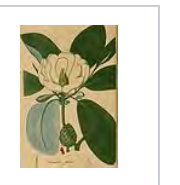
Traditional medicines in Madagascar



Assorted dried plant and animal parts used in traditional Chinese medicine



Shaman healer in Sonora, Mexico.



Phytotherapy (herbal medicine): an engraving of *magnolia glauca* in Jacob Bigelow's "American medical botany"

See also

- Conservation medicine
- Ethnomedicine
- Psychic surgery

Notes

- ^[A]Alternative medicine refers to all treatments that have not been proven effective using scientific methods.^[12]
- "Complementary and alternative medicine (CAM) is a broad domain of resources that encompasses health systems, modalities, and practices and their accompanying theories and beliefs, other than those intrinsic to the dominant health system of a particular society or culture in a given historical period. CAM includes such resources perceived by their users as associated with positive health outcomes. Boundaries within CAM and between the CAM domain and the domain of the dominant system are not always sharp or fixed."^[13]
- "It is time for the scientific community to stop giving alternative medicine a free ride. There cannot be two kinds of medicine – conventional and alternative. There is only medicine that has been adequately tested and medicine that has not, medicine that works and medicine that may or may not work... speculation, and testimonials do not substitute for evidence."^[14]
- "The phrase complementary and alternative medicine is used to describe a group of diverse medical and health care systems, practices, and products that have historic origins outside mainstream medicine. Most of these practices are used together with conventional therapies and therefore have been called complementary to distinguish them from alternative practices, those used as a substitute for standard care. ... Until a decade ago or so, "complementary and alternative medicine" could be defined as practices that are neither taught in medical schools nor reimbursed, but this definition is no longer workable, since medical students increasingly seek and receive some instruction about complementary health practices, and some practices are reimbursed by third-party payers. Another definition, practices that lack an evidence base, is also not useful, since there is a growing body of research on some of these modalities, and some aspects of standard care do not have a strong evidence base."^[19]
- "An alternative medical system is a set of practices based on a philosophy different from Western biomedicine."^[20]
- "CAM is a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine."^[21]
- The *Final Report* (2002) of the White House Commission on Complementary and Alternative Medicine Policy states: "The Commissioners believe and have repeatedly stated in this Report that our response should be to hold all systems of health and healing, including conventional and CAM, to the same rigorous standards of good science and health services research. Although the Commissioners support the provision of the most accurate information about the state of the science of all CAM modalities, they believe that it is premature to advocate the wide implementation and reimbursement of CAM modalities that are yet unproven."^[32]
- Mary Ruggie in Chapter 2 of *Marginal to Mainstream: Alternative Medicine in America* said, "By the mid-1990s, the notion that some alternative therapies could be complementary to conventional medicine began to change the status of...alternative medicine. The 21st century is witnessing yet another terminological innovation, in which CAM and conventional medicine are becoming integrative."^[58]
- As David J. Hufford, Professor and Director at the Doctors Kienle Center for Humanistic Medicine at the Penn State College of Medicine,^[70] has argued: "Simply because an herbal remedy comes to be used by physicians does not mean that herbalists cease to practice, or that the practice of the one becomes like that of the other."^[71]
- The BMA used the term non-conventional medicine instead of alternative medicine.^[73]
- The Office for Alternative Medicine, part of the National Institutes of Health, was renamed NCCAM in 1998.^[81]
- "Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients";^[93] "Evidence based medicine, whose philosophical origins extend back to mid-19th century Paris and earlier, remains a hot topic for clinicians, public health practitioners, purchasers, planners, and the public. British centres for evidence based practice have been established or planned in adult medicine, child health, surgery, pathology, pharmacotherapy, nursing, general practice, and dentistry; the Cochrane Collaboration and Britain's Centre for Review and Dissemination in York are providing systematic reviews of the effects of health care".^[93]
- In his book *The Homœopathic Medical Doctrine* Samuel Hahnemann the creator of homeopathy wrote: "Observation, reflection, and experience have unfolded to me that the best and true method of cure is founded on the principle, *similia similibus curentur*. To cure in a mild, prompt, safe, and durable manner, it is necessary to choose in each case a medicine that will excite an affection similar (*ὁμοιος πάθος*) to that against which it is employed."^[105]
- Peking University Health Science Center (formerly Beijing Medical University) was the first of the kind in China to teach western medicine and train medical professionals.

15. For an encyclopaedic account of the development of "western" medicine in the period leading up to the reforms in the medical schools of US resulting from the Flexner Report, published at the time of that report, see the article, Allbutt, Thomas Clifford (1911). "Medicine". In Chisholm, Hugh. *Encyclopædia Britannica*. **18** (11th ed.). Cambridge University Press.
16. In his introduction to the Flexner Report, Henry S. Pritchett stated, "The fundamental sciences upon which medicine depends have been greatly extended. The laboratory has come to furnish alike to the physician and to the surgeon a new means for diagnosing and combating disease. The education of the medical practitioner under these changed conditions makes entirely different demands in respect of both preliminary and professional training."^[158]
17. The earliest occurrence of the term "alternative medicine" in an English language publication was only in 1974, according to the Oxford English Dictionary.^[163]
18. As the medical professor Kenneth M. Ludmerer noted in 2010: "Flexner pointed out that the scientific method of thinking applied to medical practice. By scientific method, he meant testing ideas with well-planned experiments to establish accurate facts. The clinician's diagnosis was equivalent to the scientist's hypothesis: both medical diagnosis and hypothesis required the test of an experiment. Flexner argued that mastery of the scientific method of problem solving was the key for physicians to manage medical uncertainty and to practice in the most cost-effective way."^[172]
19. As a 2010 article in the *New England Journal of Medicine* concluded:

real acupuncture treatments were no more effective than sham acupuncture treatments. There was, nevertheless, evidence that both real acupuncture and sham acupuncture were more effective than no treatment, and that acupuncture can be a useful supplement to other forms of conventional therapy for low back pain.^[232]
20. According to the medical historian James Harvey Young:

In 1991 the Senate Appropriations Committee responsible for funding the National Institutes of Health (NIH) declared itself "not satisfied that the conventional medical community as symbolized at the NIH has fully explored the potential that exists in unconventional medical practices."^[235]

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- Journal of Integrative Medicine (<http://www.jintmed.org/>)
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- Scientific Review of Alternative Medicine (SRAM) (<http://www.sram.org/index.html>)

External links

- Alternative medicine (<https://www.dmoz.org/Health/Alternative/>) at DMOZ

- The National Center for Complementary and Integrative Health (<http://nccih.nih.gov/>): US National Institutes of Health
- The Office of Cancer Complementary and Alternative Medicine (<http://www.cancer.gov/cam/>): US National Cancer Institute, National Institutes of Health
- Knowledge and Research Center for Alternative Medicine (<http://www.vifab.dk/uk/>): Denmark, the Ministry of the Interior and Health
- Guidelines For Using Complementary and Alternative Methods (http://www.cancer.org/docroot/eto/content/eto_5_3x_guidelines_for_using_complementary_and_alternative_methods.asp): from the American Cancer Society
- Complementary and Alternative Medicine Index (<http://www.umm.edu/altmed/>): from the University of Maryland Medical Center
- Integrative Medicine Podcasts and Handouts (<http://www.fammed.wisc.edu/integrative/modules>): Teaching modules from the University of Wisconsin Integrative Medicine Program
- "Alternative Medicine" (<http://www.open2.net/alternativemedicine/index.html>): A BBC/Open University television series that examines the evidence scientifically
- "Complementary and alternative medicine: What is it?" (<http://www.mayoclinic.com/health/alternative-medicine/PN00001>): from the Mayo Clinic
- Natural Standard Research Collaboration (<http://www.naturalstandard.com/>)
- A Different Way to Heal? (<http://www.pbs.org/saf/1210/index.html>) and Videos (<http://www.pbs.org/saf/1210/video/watchonline.htm>): from PBS and Scientific American Frontiers
- Who Gets to Validate Alternative Medicine? (http://www.pbs.org/kcet/closetotruth/explore/show_11.html): from PBS

Criticism

- What is Complementary and Alternative Medicine? (<http://www.theness.com/index.php/what-is-complementary-and-alternative-medicine/>) – Steven Novella, Maryland
- "Alternative" health practice (<http://www.skepdic.com/althelth.html>) – Skeptic's Dictionary
- Quackwatch.org (<http://www.quackwatch.org>) – Stephen Barrett (See also: Quackwatch)
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- What's the harm? (<http://whatstheharm.net/>) Website created by Tim Farley listing cases of people harmed by various alternative treatments
- The Alternative Medicine Racket (<https://www.youtube.com/watch?v=RWbkvCMuU5A/>) A video investigation of state-supported quackery at the National Institutes of Health. – Reason TV

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