

The Treatment of Pertussis (Whooping Cough) With Chinese Herbal Medicine

by Jake Paul Fratkin, OMD, LAc

Pertussis (whooping cough) is aptly called “The Hundred Day Cough” (*bai re ke*) in Chinese medicine. Vaccinations against pertussis contained in the DPT (diphtheria-pertussis-tetanus) shot have reduced the incidence in the United States significantly, but parental rejection of the vaccination has resulted in a reemergence of the illness throughout the country. Both my city and state, Boulder, Colorado, have the distinction of having the highest reported pertussis rates in the country. (“Colorado children are almost three times as likely to get whooping cough as children nationwide.”¹) Subsequently, every winter I treat a handful of pertussis cases. The purpose of this paper is not only to talk about whooping cough and how to treat it, but to discuss the treatment of cough in general. My opinion is that practitioners, in treating the various stages of cough, minimize the importance of addressing causative microbial agents, concentrating classically on the treatment of heat, dryness and phlegm. My approach recommends including Chinese herbs with strong anti-viral or anti-bacterial effects.

In clinical practice, especially during the winter, there are many cases of cough coming into the clinic. One should think about the possibility of pertussis in the following circumstances. The first consideration is whether there are reported outbreaks of pertussis in your community. Second is whether the patient has had the cough for longer than two or three weeks. Third is whether there are “cough attacks” of repeated coughing ending in the inability to catch one’s breath, with a long inspiration followed again by coughing. The cough tends to be a sharp bark, similar to that observed in croup, and more pronounced at nighttime.

In my practice, pertussis crosses all age lines, and has been confirmed in infants, children, teens and adults. When suspected in the early stages, a diagnostic nasopharyngeal swab culture can be performed. A qualified technician can do the swab, and many, but not all, labs will offer it. This test is only positive in the early stages of the illness, and may be normal at the end of stage two. It is impossible to confirm by swab in stage three, but blood antibodies to the bacteria may be observed.

The Clinical Picture of Pertussis

Pertussis is a highly communicable disease caused by the bacteria *Bordetella pertussis*, a gram-negative coccobacillus. It is most common in school-aged children (elementary to high school). Pertussis is dangerous for infants, especially newborns, who often need to be hospitalized to facilitate breathing and to avoid choking to death, and in the elderly, who account for most of the deaths. The death rate outside of infants and elderly is very low, but the cough can be persistent for up to three months. Frequent nighttime coughing not only stresses the patient, but their family as well.

There is usually a 10 to 14 day incubation period after exposure to an infected person. The actual range is 7 to 21 days until symptoms appear. Infections happen by aspiration, inhaling bacteria from someone's cough, sneeze or nasal discharge. The patient is most contagious for the first 3 weeks from their earliest symptom. The total illness, if uncomplicated, is 6 to 12 weeks. There are three stages of the disease recognized in the medical literature, and modern Chinese literature also uses these stages when treating with Chinese herbal medicine.

Stage one is the catarrhal phase. This lasts one to two weeks and starts like a common cold, with sneezing, lacrimation, listlessness and a runny nose of watery consistency. Fever is either absent or low grade (less than 100.4°F). A dry, hacking cough begins to develop, which gradually takes place more frequently at nighttime. The patient at this stage is very contagious. In Chinese medicine, Stage one is due to invasion of the lung and *wei* by a seasonal pestilential factor. This disrupts the descent of lung *qi*, causing cough. The treatment priority is to dispel pathogenic *qi*.

Stage two is called the paroxysmal phase. It lasts one to four weeks and consists of frequent, repetitive coughing fits, with 5 to 15 repetitive coughs. This may take place up to 50 times in a day. There may be the whooping sound in between coughs, due to a deep inspiration for air. The coughs are intense and sudden (paroxysms), with bulging and tearing eyes and a bluish discoloration to the face. Occasionally, vomiting of mucus may accompany the paroxysm. There is copious production of phlegm, which is usually swallowed by infants and children. The mucus will be obvious on the nares of children. This stage is also contagious, but less so than stage one. In Chinese medicine, the invading pestilential factor condenses fluid and turns to phlegm-fire. The severe gasping and coughing is due to an inability to expectorate sputum.

Stage three, called the recovery phase, starts around week 4 and lasts about 7 weeks. Here, one has a chronic, less severe, cough that gradually goes away. It is not a contagious stage. In Chinese medicine, this stage represents the damage of lung and spleen by long term coughing, causing deficiency of *qi* and *yin*. In deficiency cases, residual coughing may remain for months.

In Western medicine, patients are treated with antibiotics, usually erythromycin, although this treatment provides no relief or help for the patient. It reduces contagion from cough or nasal discharge and is routinely given. Albuterol inhaler may be given to facilitate breathing. In infants and severely sick adults, a corticosteroid, usually betamethasone, is given. Patients need to be quarantined for the first 4 weeks from the earliest symptom, especially from infants and elderly.

Treatment with Chinese Herbal Medicine

Chinese herbal medicine offers significant help in the treatment and course of illness in pertussis, especially when one realizes that Western medicine offers only slight symptom control. I have treated all three stages successfully with the Chinese approach. In terms of research, I have found several references to successful inhibition of the *Bordetella pertussis* bacteria by Chinese herbs. Dr. Qing Zai Zhang cites Chinese studies showing

the effectiveness of *huang lian* (Rhizoma Coptis) for the treatment of Bordetella pertussis.² Dr. John Chen and Tina Chen report studies on the clinical application of *bai ji* (Rhizoma Bletillae) and *bai bu* (Radix Stemonae) on infant and pediatric pertussis, as well as studies on other herbs.^{3,4,5}

Treatment of whooping cough in mainland China is given in decoction form. Three authoritative textbooks, in English but from China, are essentially in agreement about the recommended formulas for the three stages.⁶

1. Catarrhal Stage (Invasion of Pathogenic Wind)

S/S (signs and symptoms): Similar to common cold, cough with clear dilute nasal discharge, sneezing, aversion to cold, thin white tongue coating and a floating tense pulse. Eventually wind-cold turns to heat, with increasingly heavy voice, a cough worse at night and worsening daily, inflamed throat, thicker phlegm discharge, red tongue and floating rapid pulse.

TP (treatment principle): Stop cough by relieving exterior syndrome and opening lung. The literature offers two recommended formulas from which the practitioner may choose.

Formula One:⁷ For runny nose stage.

*Jin Fo Cao San*⁸

<i>xuan fu hua</i> (Flos Inulae)	9 gm.
<i>qian hu</i> (Radix Peucedani)	6 gm.
<i>bai jie zi</i> (Semen Sinapsis Albae)	6 gm.
<i>xi xin</i> (Herba Asari)	3 gm.
<i>bai bu</i> (Radix Stemonae)	9 gm.
<i>chuan bei mu</i> (Bulbus Fritillariae Cirrhosae)	3 gm.
<i>zhi ban xia</i> (Rhizoma Pinellia)	6 gm.
<i>ma huang</i> (Herba Ephedrae)	3 gm.
<i>xing ren</i> (Semen Armeniacae)	3 gm.
<i>sang ye</i> (Folium Mori)	9 gm.
<i>ju hua</i> (Flos Chrysanthemi)	9 gm.
<i>lian qiao</i> (Fructus Forsythiae)	9 gm.

For this stage, which resembles a common cold, we resolve exterior wind-heat, descend lung *qi* and clear watery phlegm-heat. In this formula, we find herbs that dispel wind (*xi xin*, *ma huang*, *sang ye*, *ju hua*), transform phlegm (*xuan fu hua*, *qian hu*, *chuan bei mu*, *ban xia*) and stop cough (*bai bu*, *xing ren*). In addition, *lian qiao*, an anti-viral herb, clears heat and resolves toxin. Of particular use is *bai bu* for that sharp barking cough peculiar to pertussis. The combination of *xuan fu hua* and *bai jie zi* addresses watery nasal discharge.

Formula Two:⁹ For beginning cough stage.

Combine *San Ao Tang*, *Sang Ju Yin* and *Dai Ge San*

<i>ma huang</i> (Herba Ephedrae)	5 gm.
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<i>xing ren</i> (Semen Armeniacae)	10 gm.
<i>gan cao</i> (Radix Glycyrrhizae)	5 gm.
<i>bai bu</i> (Radix Stemonae)	10 gm.
<i>bai qian</i> (Rhizoma Cynanchii Stauntoni)	10 gm.
<i>sang ye</i> (Folium Mori)	10 gm.
<i>ju hua</i> (Flos Chrysanthemi)	10 gm.
<i>niu bang zi</i> (Fructus Arctii)	10 gm.
<i>jie geng</i> (Radix Platycodi)	5 gm.
<i>qing dai</i> (Indigo Naturalis) *	6 gm.
<i>hai ge ke</i> (Concha Cyclinae)	6 gm.

*or substitute *ban lan gen* or *da qing ye*

This approach is similar to that of formula one, with some significant adjustments. *Niu bang zi* addresses sore throat, while the last three herbs work together to break up thick sputum due to phlegm-fire. I would recommend formula one for the earlier presentation of watery nasal discharge and formula two for more pronounced coughing and phlegm production. Experienced herbalists can modify these formulas as they wish.

Treatment with Chinese Herbal Products

For practitioners without access to custom formulas, I recommend combining several prepared products to achieve the effect of the recommended formulas. In this first stage, we need a formula that resolves exterior wind-heat and another formula to clear phlegm-heat. In addition, I strongly suggest adding an herbal product that has strong anti-viral and anti-bacterial effects.

To resolve exterior wind-heat, choose from: *Sang Ju Yin*, *Yin Qiao San* or *Chai Ge Jie Ji Wan*. To clear phlegm-heat, choose from: *Qing Qi Hua Tan Wan*, *Ning Sou Wan* or similar products from the American manufacturers. For reinforcing the anti-viral effect with herbs that clear heat and resolve toxin, choose from: *Huang Lian Jie Du Wan*, *Gan Mao Ling*, *Zhong Gan Ling*, *Chuan Xin Lian*, etc.

2. Paroxysmal Stage (Retention of Phlegm-Fire)

S/S: Paroxysmal gasping coughs with a strong barking sound, thick sputum that is difficult to expectorate, noisy inhaling of breath, vomiting of mucus, red eye, occasional blood in sputum. The tongue is red with a yellow greasy or sticky coat, and the pulse is rapid, slippery and forceful.

TP: Clear heat, resolve toxins, transform phlegm, stop cough.

Two formulas are recommended for the practitioner to choose from.

Formula One.¹⁰

<i>su zi</i> (Fructus Perillae)	9 gm.
<i>ting li zi</i> (Semen Lepidii seu Descurainiae)	9 gm.
<i>wu wei zi</i> (Fructus Schisandrae)	6 gm.
<i>meng shi</i> (Lapis Chloriti)	6 gm.
<i>jie geng</i> (Radix Platycodi)	9 gm.

<i>zhi shi</i> (Fructus Aurantii Immaturus)	6 gm.
<i>gua lou</i> (Fructus Trichosanthis)	12 gm.
<i>da zao</i> (Fructus Zizyphi Jujubae)	5 pc.

Modifications:

With frequent, spasmodic and violent cough, add:

<i>jiang can</i> (Bombyx Batryticatus)	6 gm.
<i>di long</i> (Lumbricus)	6 gm.

Dry cough with little sputum, add:

<i>nan sha shen</i> (Radix Adenophorae)	12 gm.
<i>tian men dong</i> (Radix Asparagi)	12 gm.
<i>mai men dong</i> (Radix Ophiopogonis)	12 gm.

Formula Two.¹¹

Sang Bai Pi Tang

<i>sang bai pi</i> (Cortex Mori Albae Radicis)	10 gm.
<i>huang qin</i> (Radix Scutellariae Baicalensis)	10 gm.
<i>huang lian</i> (Rhizoma Coptidis)	2 gm.
<i>chao zhi zi</i> (Fructus Gardeniae, fried)	10 gm.
<i>su zi</i> (Fructus Perillae)	10 gm.
<i>xing ren</i> (Semen Armeniacae)	10 gm.
<i>chuan bei mu</i> (Bulbus Fritillariae Cirrhosae)	5 gm.
<i>ting li zi</i> (Semen Lepidii seu Descurainiae)	10 gm.
<i>bai bu</i> (Radix Stemonae)	10 gm.

Formula two has stronger heat-clearing and anti-bacterial effects, combining *huang qin*, *huang lian* and *zhi zi*. These can be added to formula one. Similarly, the modifications of formula one can be applied to formula two.

Treatment with Chinese Herbal Products

This stage is the most serious in terms of repetitive cough, especially during nighttime. It represents a combined presentation of lung fire, deficiency of lung *yin* and a stage I call sticky phlegm-heat. Products for each group needed to be combined, with additional herbs to clear toxic heat (anti-viral) or dispel damp heat (anti-bacterial).

For lung fire, choose from: *Huang Lian Shang Qing Pian*, *Qing Fei Yi Huo Pian*, etc. Also, Seven Forests' *Belamcanda 15* is particularly useful. For deficiency of lung *yin*, choose from: *Bai He Gu Jin Wan*, *Sha Shen Mai Men Dong Wan*, etc. For accumulation of toxic heat or damp-heat, choose from *Huang Lian Jie Du Wan*, *Gan Mao Ling*, *Zhong Gan Ling*, etc., or any product using significant amounts of *ban lan gen* and/or *da qing ye*. Also consider syrups or capsules containing *man shan hong* (Radix Rhododendri Daurici) or *zi hua du juan* (Radix Rhododendri Mariae), such as *Hsiao Keh Chuan*.

3. Recovery Stage (Deficiency of Lung and Spleen).

This stage continues for two to three weeks, but may last several months. The severity of the paroxysmal cough and noisy inhalation gradually decreases.

a) Deficiency of *Qi*

S/S: Weak cough, feeble low voice. Tongue may be pale and the pulse is weak.

TP: Tonify lung and spleen *qi*.

Ren Shen Wu Wei Zi Tang

<i>dang shen</i> (Radix Codonopsis Pilosulae)	9 gm.
<i>fu ling</i> (Poria)	9 gm.
<i>bai zhu</i> (Rhizoma Atractylodis Macrocephalae)	9 gm.
<i>mai men dong</i> (Radix Ophiopogonis)	12 gm.
<i>wu wei zi</i> (Fructus Schisandrae)	6 gm.
<i>gan cao</i> (Radix Glycyrrhizae)	3 gm
<i>sheng jiang</i> (Rhizoma Zingiberis Officinalis)	3 pc.
<i>da zao</i> (Fructus Zizyphi Jujubae)	5 pc.

Treatment with Chinese Herbal Products

Choose from the following:

Cordyceps capsules (*dong chong xia cao*, Pulvis Cordyceps Sinensis); American Ginseng capsules (*xi yang shen*, Radix Panacis Quinquefolii); *Qing Zao Jiu Fei Wan*, *Sheng Mai Yin*, *Liu Jun Zi Wan*, etc. *Dong chong xia cao* and *xi yang shen* are particularly helpful and should be used in most cases.

b) Deficiency of *Yin*.

S/S: Hoarse voice, dry cough, dry throat, red tongue, weak rapid pulse.

TP: Moisten lung *yin*

Qing Zao Jiu Fei Tang, modified

<i>nan sha shen</i> (Radix Adenophorae)	9 gm.
<i>sang ye</i> (Folium Mori)	9 gm.
<i>xing ren</i> (Semen Armeniacae)	9 gm.
<i>mai men dong</i> (Radix Ophiopogonis)	9 gm.
<i>tian men dong</i> (Radix Asparagi)	9 gm.
<i>jie geng</i> (Radix Platycodi)	9 gm.
<i>hei zhi ma</i> (Semen Sesami Indici)	12 gm.
<i>e jiao</i> (Gelatinum Corii Asini)	9 gm.
<i>da zao</i> (Fructus Zizyphi Jujubae)	5 pc.

Treatment with Chinese Herbal Products

Choose from the following:

Cordyceps capsules (*dong chong xia cao*, Pulvis Cordyceps Sinensis); American Ginseng capsules (*xi yang shen*, Radix Panacis Quinquefolii); *Qing Zao Jiu Fei Wan*, *Sheng Mai*

Yin, Bai He Gu Jin Wan, Sha Shen Mai Men Dong Wan, etc. Again, use of *dong chong xia cao* and *xi yang shen* is very helpful.

Risks and Benefits of Vaccinations

The discussion of pertussis would be incomplete without some comments regarding vaccinations. The DPT (diphtheria-pertussis-tetanus) vaccine is given in three injections: the first is recommended at 2, 4 or 6 months of age, the second at 15 or 18 months, and the third sometime between 4 and 6 years.

There is no question that the pertussis vaccination has greatly reduced the incidence of pertussis. “If we stopped pertussis immunizations in the US, we would experience a massive resurgence of pertussis disease. A recent study found that, in eight countries where immunization coverage was reduced, incidence rates of pertussis surged to 10 to 100 times the rates in countries where vaccination rates were sustained.”¹²

Pertussis can be very serious for newborns, and the death incidence is more pronounced in the elderly. However, the risk of death from pertussis is quite low. In the last major outbreak, which affected 13,000 people in Japan in 1979, there were 41 deaths, all among the elderly.¹³ In truth, pertussis can seriously inconvenience the patient and their families up to three months, but is not a fatal disease. In Colorado it is estimated that 40% of children are not vaccinated against pertussis, but it still only manifests as isolated cases, not raging epidemics.

The argument for vaccination is that whooping cough is common, virulent, and incapacitating to the patient and the parents for several months. Once, when I treated a 6 month old for pertussis, the mother had not gotten any sleep for weeks and was becoming an emotional wreck. I had to ask myself, “Might it not have been better to have the vaccine?”

The bigger question is risk versus benefit of immunization. If there were no vaccine, then large outbreaks could surely arise, but in reality, most Americans are getting this vaccine, and risk of exposure is low. The question has to be directed to the individual patient’s parents, and there will be those who refuse or postpone vaccination.

The DPT vaccine is not without risk. Numerous studies have linked this triple vaccine with illness. One study of 1265 children included 23 who receive no DPT immunization. A huge 23% of the immunized children eventually developed asthma or allergic illness, but none of the 23 children without the DPT vaccination developed asthma or allergic illness.¹⁴ The asthma epidemic in the developed world may very well have to do with early DPT vaccination.

The risk of dying from the pertussis disease is one in several million. The risk of a “serious adverse reaction” from the vaccine is one in 1750, and deaths attributed to the vaccine far outnumber deaths due to the illness.¹⁵ This is based on use of the newer acellular pertussis vaccine, which is much safer than the previous one used up to 1996.

Finally, the vaccine probably loses its protectiveness after ten to fifteen years. In a study from Australia, as many as 32 percent of teenagers and adults having a cough longer than two weeks in duration were shown to have pertussis. The study felt that secondary vaccination as a teen or adult would confer life-long immunity.¹⁶

Any risk with the DPT shot is compounded by the multiple vaccinations that are required or recommend by the Western medical establishment. Currently, seven vaccinations are strongly recommended in the first 5 months of life, and an additional ten vaccinations are recommended between 6 and 15 months. This puts a significant stress on an infant's developing immunological system. Other vaccines pose their own problems, due to the inclusion of thimerosal (which contains 50% mercury) as a preservative, or live virus vaccines such as MMR (measles-mumps-rubella), Chickenpox, and Sabin polio.¹⁷ The DPT vaccine uses neither thimerosal nor live virus.

In Chinese medicine, it is thought that the immunological system develops slowly and is not mature until age three at the earliest. Serious consequences associated with vaccination seem to be due to vaccinations given in the first year, especially the first 6 months. In my practice, I feel early vaccination plays a part in asthma, eczema, autism, and ADD. Postponement of vaccinations until after age 3, or even 5, seems reasonable. A published protocol to reduce risk recommends introduction of single vaccinations starting at age 2, each separated by 6 months.¹⁸ I agree with this. I am not unequivocally against vaccinations, because they offer real benefit against epidemic illness. However, they should be given singly, spaced out in time, and can start after age three. Exceptions are during risks of local epidemics, such as pertussis, when combined with early enrollment in daycare.

The vaccination issue is a big one, and I recommend further reading through Dr. Randall Neustaedter (www.cure-guide.com) or Dr. Joseph Mercola (www.mercola.com).

Conclusion

Pertussis, or whooping cough, is a very serious cough and can be ameliorated or cured with Chinese herbal medicine. The clinical management of pertussis points out certain guidelines that should be important to the conscientious and well-trained herbal practitioner.

First, when confronting any serious disorder, it is important to “hit the books”. After 27 years of practice, I do not hesitate to look at herbal protocols established and recommended from doctors in mainland China. This is the land of the herbal masters, honed not only by their knowledge of the classics, but also by their vast clinical experience of treating hundreds of millions of patients every year. We have available in English many, many books from China on herbal treatment, and the conscientious practitioner needs to have these books on hand for immediate reference.

Second, a cough needs to be treated according to its presentation, keeping in mind its etiology. Think of any cough as being a point on a graph that relates viscosity of phlegm (watery to thick to dry) with temperature (cold to hot). Choose herbs that relate to the

presentation, and you cannot fail, taking into account that phlegm presentations and their treatments change often. They should be re-evaluated weekly.

Third, in any disorder involving outside pathogenic microbes, employ herbs that kill viruses (clear heat and resolve toxin) or bacteria (dispel damp-heat). There is hesitation by some practitioners who feel that cold herbs will injure spleen *qi*, but in an otherwise healthy individual laid low by an infection, 3 to 10 days of strong antimicrobial herbs, used within appropriate formulas, will kill the microbe without significantly damaging spleen *qi*. They certainly do not create the consequences of Western antibiotics.¹⁹

Cough can be stubborn in any case, and often needs time and persistence to resolve. Observing the effectiveness of herbal therapy in treating cough, including pertussis, I once again acknowledge that Chinese medicine is the greatest of all natural therapies.

Jake Paul Fratkin, OMD, LAc, is the author of Chinese Herbal Patent Medicines, The Clinical Desk Reference (2001), and a frequent contributor to California Journal of Oriental Medicine. He will be presenting in "Childhood Acute Illness" and "GI Disorders in Children" at the San Francisco CSOMA Expo on Sunday, May 1, 2005, from 9:00 to 12:30 and 2:00 to 5:30, respectively, as part of the Pediatric Track. He lives in Boulder, Colorado, and maintains a website at www.drjakefratkin.com.

References

1. Associated Press, 21 January 2004.
2. <http://www.dr-zhang.com/LD/formulas/Coptin.htm>
3. *Chinese Medical Herbology and Pharmacology*, p. 582.
4. *Ibid*, p. 727.
5. *Ibid*, p. 1106.
6. Higher Education Press, Foreign Language Press and Academy Press. See Bibliography.
7. This formula can be found both in *Paediatrics; Volume 13 of The English-Chinese Encyclopedia of Traditional Chinese Medicine*, p. 200, and in *Treatment of Paediatric Diseases in Traditional Chinese Medicine*, p. 246.
8. *Jin fo cao* is another name for *xuan fu hua* (Flos Inulae).
9. *Essentials of Traditional Chinese Pediatrics*, pp. 171-172.
10. *Paediatrics; Volume 13 of The English-Chinese Encyclopedia of Traditional Chinese Medicine*, p. 201.
11. *Essentials of Traditional Chinese Pediatrics*, pp. 172-173.
12. Center for Disease Control. See: <http://www.cdc.gov/nip/publications/fs/gen/WhatIfStop.htm>
13. www.ndsc.ie/DiseaseTopicsA-Z/Vaccination/d266.PDF. Original article: Kanai K., *Japan's Experience in Pertussis Epidemiology and Vaccination in the Past Thirty Years*. *Japan J Med Sci Biol* 1980;33:107-43.
14. *Journal of Chinese Medicine*, England. News #57, May 1998. Original study: Kemp T, Pearce N, Fitzharris P, Crane J, Fergusson D, St George I, Wickens K & Beasley R. *Is Infant Immunization A Risk Factor For Childhood Asthma Or Allergy?* *Epidemiology*, 1997; 8:678-680.
15. Reported in Mercola Website: http://www.mercola.com/2001/aug/18/vaccine_myths.htm
16. *Clinical Infectious Diseases*, Volume 39, No. 12, December 15, 2004.
17. *Ibid*.
18. An excellent overview can be found in, *A User-Friendly Vaccination Schedule* by Donald Miller, Jr, MD. See: http://www.mercola.com/2004/dec/29/vaccination_schedule.htm
19. For more on the consequences of antibiotics, see my article on Pediatric Ear Infection, <http://www.gfcherbs.com/Pediatricear.asp?page=5>

Recommended Reading

1. *Chinese Herbal Medicine Materia Medica*, 3rd Edition, Dan Bensky, Steven Clavey and Erich Stöger, Eastland Press, Seattle, 2004.
2. *Chinese Medical Herbology and Pharmacology*, John K. Chen and Tina T. Chen, Art of Medicine Press, City of Industry, 2003.
3. *Essentials of Traditional Chinese Pediatrics*, Foreign Language Press, Beijing, 1990.
4. *The Merck Manual*, Mark H. Beer, MD and Robert Berkow, MD, editors. Merck Research Laboratories, Whitehouse Station, NJ. Published yearly.
5. *Notes from South Mountain*, Andrew Ellis, The Moon Publishing, Berkeley, 2003.
6. *Paediatrics; The English-Chinese Encyclopedia of Traditional Chinese Medicine*, Volume 13, Higher Education Press, Beijing, 1990.
7. *Treatment of Paediatric Diseases in Traditional Chinese Medicine*, Hou Jinglun, ed. Academy Press, Beijing, 1995.
8. *The Vaccine Guide, Risks and Benefits for Children and Adults*, Revised Edition, Randall Neustaedter, North Atlantic Books, Berkeley, 2002.

¹ Associated Press, 21 January 2004.

² <http://www.dr-zhang.com/LD/formulas/Coptin.htm>

³ *Chinese Medical Herbology and Pharmacology*, p. 582.

⁴ *Ibid*, p. 727.

⁵ *Ibid*, p. 1106.

⁶ Higher Education Press, Foreign Language Press and Academy Press. See Bibliography.

⁷ This formula can be found both in *Paediatrics; Volume 13 of The English-Chinese Encyclopedia of Traditional Chinese Medicine*, p. 200, and in *Treatment of Paediatric Diseases in Traditional Chinese Medicine*, p. 246.

⁸ *Jin fo cao* is another name for *xuan fu hua* (Flos Inulae).

⁹ *Essentials of Traditional Chinese Pediatrics*, pp. 171-172.

¹⁰ *Paediatrics; Volume 13 of The English-Chinese Encyclopedia of Traditional Chinese Medicine*, p. 201.

¹¹ *Essentials of Traditional Chinese Pediatrics*, pp. 172-173.

¹² Center for Disease Control. See: <http://www.cdc.gov/nip/publications/fs/gen/WhatIfStop.htm>

¹³ www.ndsc.ie/DiseaseTopicsA-Z/Vaccination/d266.PDF. Original article: Kanai K., *Japan's Experience in Pertussis Epidemiology and Vaccination in the Past Thirty Years*. Japan J Med Sci Biol 1980;33:107-43.

¹⁴ *Journal of Chinese Medicine*, England. News #57, May 1998. Original study: Kemp T, Pearce N, Fitzharris P, Crane J, Fergusson D, St George I, Wickens K & Beasley R. *Is Infant Immunization A Risk Factor For Childhood Asthma Or Allergy?* Epidemiology, 1997; 8:678-680.

¹⁵ Reported in Mercola Website: http://www.mercola.com/2001/aug/18/vaccine_myths.htm

¹⁶ *Clinical Infectious Diseases*, Volume 39, No. 12, December 15, 2004.

¹⁷ *Ibid*.

¹⁸ An excellent overview can be found in, *A User-Friendly Vaccination Schedule* by Donald Miller, Jr, MD. See: http://www.mercola.com/2004/dec/29/vaccination_schedule.htm

¹⁹ For more on the consequences of antibiotics, see my article on Pediatric Ear Infection, <http://www.gfcherbs.com/Pediatricear.asp?page=5>