

tion of symptoms, which was not statistically significant.^{10,13,15,16,26} Only in the remaining five trials did the authors report a reduction in the duration of colds that was significant. There is thus a little more evidence for a small therapeutic effect of ascorbic acid, but it is not clear which symptom it relieves or how.

A. STEWART TRUSWELL, M.D.
N.S.W. 2006, Australia
University of Sydney

To the Editor: Dr. Levine's review sits on the fence in the matter of ascorbic acid and common colds. He cites four references, only two of which are primary sources.^{1,2} A search of the literature reveals at least 27 controlled trials of ascorbic acid for colds.¹⁻²⁷ The majority (22 trials) tested for prevention and also for any ameliorating effect of maintenance doses. A therapeutic effect was tested for in only five trials.¹⁷⁻²¹

It is by now fairly clear that for preventing common colds, vitamin C has no worthwhile effect. There was no significant advantage over placebo in 15 trials,^{1,3-16} all but 1 double-blind.³ These were performed in a total of 9169 subjects in various settings in six countries. By contrast, seven trials^{2,22-27} in a total of 3209 subjects reported some beneficial effect. But one trial was small²⁵ and not well designed⁹; in another²⁶ a preventive effect was observed only in girls, not boys.²⁸ The authors of another three trials thought the preventive effect unimpressive.^{2,22,26} Two went on to repeat trials with ascorbic acid and obtained negative results.^{1,17} The only striking reduction in the number of colds was reported by Ritzel.²³ More ink has been used in the criticism of this trial^{29,30} than in the original description. The subjects took ascorbic acid for only one or two weeks. This is not long enough for a trial of prevention; saturation of tissues with ascorbate takes several days.

As for a therapeutic effect, all five randomized double-blind trials designed to test this, without a combined trial for prophylaxis, had negative results.¹⁷⁻²¹ Most of the trials that tested for a prophylactic effect also looked for amelioration of the duration or severity of colds in subjects given maintenance doses of vitamin C (in three trials^{8,10,27} the subjects took extra tablets if symptoms appeared). In eight of these combined trials there was no reduction in duration or severity with ascorbic acid as compared with placebo.^{1,3,4,8,9,11,14,22} In another five combined trials there appeared to be slight ameliora-

- Coulehan JL, Eberhard S, Kapner L, Taylor F, Rogers K, Garry P. Vitamin C and acute illness in Navajo schoolchildren. *N Engl J Med* 1976; 295: 973-7.
- Coulehan JL, Reisinger KS, Rogers KD, Bradley DW. Vitamin C prophylaxis in a boarding school. *N Engl J Med* 1974; 290:6-10.
- Glazebrook AJ, Thomson S. The administration of vitamin C in a large institution and its effect on general health and resistance to infection. *J Hyg (Lond)* 1942; 42:1-19.
- Dahlberg G, Engel A, Rydin H. The value of ascorbic acid as a prophylactic against "common colds." *Acta Med Scand* 1944; 119:540-61.
- Walker GH, Bynoe ML, Tyrrell DAJ. Trial of ascorbic acid in prevention of colds. *Br Med J* 1967; 1:603-6.
- Schwartz AR, Togo Y, Hornick RB, Tominaga S, Gleckman RA. Evaluation of the efficacy of ascorbic acid in prophylaxis of induced rhinovirus 44 infection in man. *J Infect Dis* 1973; 128:500-5.
- Carson M, Corbett M, Cox H, Pollitt N. Vitamin C and the common cold. *Br Med J* 1974; 1:577.
- Anderson TW, Suranyi G, Beaton GH. The effect on winter illness of large doses of vitamin C. *Can Med Assoc J* 1974; 111:31-6.
- Clegg KM, Macdonald JM. L-ascorbic acid and D-isoascorbic acid in a common cold survey. *Am J Clin Nutr* 1975; 28:973-6.
- Karlowski TR, Chambers TC, Frenkel LD, Kapikian AZ, Lewis TL, Lynch JM. Ascorbic acid for the common cold: a prophylactic and therapeutic trial. *JAMA* 1975; 231:1038-42.
- Elwood PC, Lee HP, St. Leger AS, Baird IM, Howard AN. A randomized controlled trial of vitamin C in the prevention and amelioration of the common cold. *Br J Prev Soc Med* 1976; 30:193-6.
- Gormly PJ. Megadosage of ascorbic acid in an Antarctic expedition. *Br J Nutr* 1977; 37:269-77.
- Ludvigsson J, Hansson LO, Tibbling G. Vitamin C as a preventive medicine against common colds in children. *Scand J Infect Dis* 1977; 9:91-8.
- Miller JZ, Nance WE, Norton JA, Wolen RL, Griffith RS, Rose RJ. Therapeutic effect of vitamin C: a co-twin control study. *JAMA* 1977; 237: 248-51.
- Pitt HA, Costrini AM. Vitamin C prophylaxis in marine recruits. *JAMA* 1979; 241:908-11.
- Carr AB, Einstein R, Lai LYC, Martin NG, Starmer GA. Vitamin C and the common cold: using identical twins as controls. *Med J Aust* 1981; 2: 411-2.
- Cowan DW, Diehl HS. Antihistaminic agents and ascorbic acid in the early treatment of the common cold. *JAMA* 1950; 143:421-4.
- Tebrock HE, Arminio JJ, Ossining NY, Johnston JH. Usefulness of bioflavonoids and ascorbic acid in treatment of common cold. *JAMA* 1956; 162:1227-33.
- General Practitioner Research Group. Ineffectiveness of vitamin C in treating coryza. *Practitioner* 1968; 200:442-5.
- Elwood PC, Hughes SJ, St. Leger AS. A randomized controlled trial of the therapeutic effect of vitamin C in the common cold. *Practitioner* 1977; 218:133-7.
- Tyrrell DAJ, Craig JW, Meade TW, White T. A trial of ascorbic acid in the treatment of the common cold. *Br J Prev Soc Med* 1977; 31:189-91.
- Cowan DW, Diehl HS, Baker AB. Vitamins for the prevention of colds. *JAMA* 1942; 120:1268-71.
- Ritzel G. Kritische Beurteilung des Vitamins C als Prophylacticum und Therapeuticum der Erkaltungskrankheiten. *Helv Med Acta* 1961; 28: 63-8.
- Anderson TW, Reid DBW, Beaton GH. Vitamin C and the common cold: a double-blind trial. *Can Med Assoc J* 1972; 107:503-8.
- Charleston SS, Clegg KM. Ascorbic acid and the common cold. *Lancet* 1972; 1:1401-2.
- Wilson CWM, Loh HS, Foster FG. The beneficial effect of Vitamin C on the common cold. *Eur J Clin Pharmacol* 1973; 6:26-32.
- Anderson TW, Beaton GH, Corey PN, Spero L. Winter illness and vitamin C: the effect of relatively low doses. *Can Med Assoc J* 1975; 112: 823-6.
- Kinlen L, Peto R. Vitamin C and colds. *Lancet* 1973; 1:944.
- Dykes MHM, Meier P. Ascorbic acid and the common cold: evaluation of its efficacy and toxicity. *JAMA* 1975; 231:1073-9.
- Chalmers TC. Effects of ascorbic acid on the common cold: an evaluation of the evidence. *Am J Med* 1975; 58:532-6.