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A Quantitative Estimate of the Clinical Significance of Treating Tobacco Dependence

John R. Hughes, MD
Department of Psychiatry University of Vermont Burlington, VT

The U.S. Public Health Service [1], the WHO [2] and many other organizations have stated that treatment to help smokers stop smoking is one of the most, if not the most, effective clinical interventions to prevent early death. Despite this, many have underestimated the magnitude of this benefit [3]. A prior paper quantified this benefit in terms of cost per life year gained from treatment [4]; however, a probably more widely used measure of clinical benefit is the number-needed-to-treat (NNT) to avoid an excess (or early) death [5] (www.medicine.ox.ac.uk/bandolier). I am unaware of a prior calculation of the NNT for smoking cessation treatment.

To calculate an NNT for treatment of smoking, assume that 100 smokers try to quit. Then assume that 5% of those who do not receive treatment will quit.[6] Then assume two scenarios: one in which smokers receive minimal treatment (e.g., brief physician advice or use of over-the-counter medication) and one in which smokers receive optimal therapy (e.g., combined NRT or prescription medication plus intensive counseling). In the minimal treatment approach, the quit rate should increase to about 10% [1;7]. In the optimal treatment it should increase to about 20% [8;9]. Thus, if 100 smokers were treated, an extra 5 would stop with minimal treatment and an extra 15 with optimal treatment. To determine how many of these 5 or 15 avoided an excess death from smoking, assume that if they continued to smoke, half would have died [10]. Then assume half of these smokers stopped before age 30 years and almost all of this risk was avoided, and that half stopped at age 50 years and half of this risk was avoided [11]. With these assumptions, minimal treatment would avoid 1.9 excessive deaths and, thus, the NNT for minimal treatment would be 52 smokers (100/1.9). The optimal treatment would avoid 5.7 deaths and the NNT is 18 smokers. If these assumptions were more conservative (e.g., only 3% quit on their own, only 6% quit with minimal treatment, only 12% quit with optimal treatment, and all quit after age 50 years) the NNTs would be 67 for minimal and 22 for optimal treatments.

For comparison, daily aspirin treatment for a lifetime has an NNT of 40 to prevent an early death from heart disease (www.medicine.ox.ac.uk/bandolier). As another example, the NNT for ten annual mammograms to prevent an early death ranges from 377 for women aged 60–69 years to 1904 for women aged 39–49 years[12].

The NNT statistic can be misleading; it does not take into account cost of the intervention in time and money, years of life avoided, quality of life, harm from the intervention, or other such considerations[5]. However, treatments for smoking cessation are inexpensive compared to most

clinical interventions, require little time on the part of the clinician or patient, substantially decrease morbidity as well as mortality [10], and very rarely cause harm.

In summary, if the early prevention of death is a major aim of clinicians or organizations, these results suggest that allocation of resources to promote smoking cessation should be a top priority.

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Biography

The author is currently employed by The University of Vermont and Fletcher Allen Health Care. Since 1/1/2007, he has received research grants from the NIH, Pfizer; the later two develop and sell smoking cessation medications. During this time, he has accepted honoraria or consulting fees from several nonprofit and for-profit organizations and companies that develop, sell or promote smoking cessation products or services or educate/advocate about smoking cessation: Abbot Pharmaceuticals; Acrux; Aradigm; American Academy of Addiction Psychiatry; American Psychiatric Association; Begbies Traynor; Cline, Davis and Mann; Constella Group; Consultants in Behavior Change; Dean Foundation, DLA Piper, EPI-Q, European Respiratory Society, Evotec; Exchange Limited,; Fagerstrom Consulting; Free and Clear; Glaxo-Smith Kline; Golin Harris; Healthwise; Insyght; Informed, Invivodata; Johns Hopkins University; J L Reckner;, Maine Medical Center; McNeil Pharmaceuticals; Novartis Pharmaceuticals; Oglivy Health PR, Ottawa Heart Institute, Pfizer Pharmaceuticals; Pinney Associates; Reuters; Scientia; Temple University of Health Sciences; University of Arkansas; University of California San Francisco; University of Cantabria; University of Kentucky; NIH; and Xenova.

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