- 28 Carr AC, Ghosh A, Ancill RJ. Can a computer take a psychiatric history? *Psychol Med* 1983;13:151-8.
- 29 Slack WV. A history of computerised medical interviews. *MD Comput* 1984;1:2-59.
- 30 Erdman HP, Klein MH, Greist JH. Direct patient computer interviewing. *J Consult Clin Psychol* 1985;53:760-73.
- 31 Greist JH, Gustafson DH, Strauss FF, Rowse GL, Langren TP, Chiles JA. A computer interview for suicide-risk prediction. *Am J Psychiatry* 1973;130:1327-32.
- 32 Skinner HA, Allen BA. Does the computer make a difference? Computerized vs face-to-face vs self-report assessment of alcohol, drug and tobacco use. *J Consult Clin Psychol* 1983;51:267-75.
- 33 Romer D, Hornik R, Stanton B, Black M, Li XM, Ricardo I, et al. "Talking" computers: a reliable and private method to conduct interviews on sensitive topics with children. *J Sex Res* 1997;34:3-9.
- 34 Millstein SG, Irwin CE. Acceptability of computer-acquired sexual histories in young girls. *J Pediatr* 1983;103:815-9.
- 35 Supple AJ, Aquilino WS, Wright DL. Collecting sensitive self-report data with laptop computers: impact on the response tendencies of adolescents in a home interview. *J Res Adolescence* 1999;9:467-88.
- 36 De Dombal FT, Smith RB, Modgill VK, Leaper DJ. Simulation of the diagnosis process: a further comparison. *Br J Med Educ* 1972;6:238-45.
- 37 Moore NC, Summer KR, Bloor RN. Do patients like psychometric testing by computer? *J Clin Psychol* 1984;40:875-7.
- 38 Zachary RA, Pope KS. Legal and ethical issues in the clinical use of computerized testing. In: Schwartz MD, ed. *Using computers in clinical practice: psychotherapy and mental health applications*. New York: Haworth Press, 1984:151-65.
- 39 Greist JH, Klein MH, Van Cura LJ. A computer interview for psychiatric patients target symptoms. *Arch Gen Psychiat* 1973;29:247-53.
- 40 Levenson RC. Computer-based psychological testing. *Am J Orthopsychiatry* 1989;59:619-20.
- 41 Matarazzo JD. Computerized psychological testing. *Sc* 1983;221:233.
- 42 Watts K, Baddely A, Williams M. Automated tailored testing using progressive matrices and the Mill Hill vocabulary scales: a comparison with manual administration. *Int J Man-Machine Stud* 1982;17:331-44.
- 43 Weiss DJ. Adaptive testing by computer. *J Consult Clin Psychol* 1985;53:774-89.
- 44 Reckase MD. A procedure for decision making using tailored testing. In: Weiss DJ, ed. *New horizons in testing*. New York: Academic Press, 1983: 237-56.
- 45 Richards JS, Fine PR, Wilson TL, Rogers JT. A voice operated method for administering the MMPL. *J Pers Assess* 1983;47:167-70.
- 46 Gonzalez GM. Computerized speech recognition in psychological assessment—a Macintosh prototype for screening depressive symptoms. *Behav Res Methods Instrum Comput* 1993;25:301-3.
- 47 Wetzler S. Computerized psychological assessment. In: Baskin D, ed. *Computer applications in psychiatry and psychology*. New York: Brunner/Mazel, 1990:43-56.

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Endpiece Marxian philosophy

You've got a goal. I've got a goal. Now all we need is a football team.

Groucho Marx

INFOPOINTS

CyberTranscriber—the virtual medical secretary on your desk

Clinic letters and discharge summaries provide the fundamental link between hospitals and primary care. In 1997-8 there were 41.635 million outpatient visits to NHS hospitals in England,¹ with each visit generating a typed letter. The widespread implementation of voice recognition systems should be considered as a response to the increasing typing load experienced by medical secretaries. However, currently available desktop systems require speech enrolment and considerable care to produce text with error rates of 3-5%.

CyberTranscriber² is a convergent technology, which exploits the internet, speech recognition, and email to generate letters and reports. Unlike conventional speech recognition software, it does not need speech enrolment, and the accuracy of the final report is equivalent to that achieved by an experienced medical typist. The user dictates down a telephone line, using the telephone keypad to control the record, pause, and "rewind" functions. The dictation is remotely processed into a rough draft by speech recognition software, and both the text and voice files are automatically routed via the internet to medical transcriptionists who correct the rough draft. Within 24 hours (range 4-24), all the text is returned by email as a Microsoft Word attachment.

We have explored the possible role for CyberTranscriber in NHS hospital practice by comparing the efficiency of generation of clinic letters by an experienced medical typist with letters generated by CyberTranscriber. A total of 441 consecutive outpatient clinic letters of similar length were generated, of which 215 were produced by conventional dictation and manual typing and 226 by telephone dictation and CyberTranscriber. The average time taken by the medical secretary to generate and print completed letters was 7.7 minutes per letter with manual typing and 2.2 minutes a letter with CyberTranscriber. There was no difference in the error rate between the two methods.

Thus, CyberTranscriber was three times more efficient in generating letters than an experienced typist. In practical terms CyberTranscriber allowed the medical secretary to complete the week's clinic letters in the equivalent of two days' work rather than the five to six days associated with manual typing. Further improvement in efficiency will be possible once NHSnet is operational, as the returned email could be forwarded to the relevant general practitioner without the need to print and post a letter.

CyberTranscriber could make a considerable impact on the efficiency of communication between primary and secondary care. The system costs about 1p per word but represents an irresistible technological response to the need to improve efficiency in the NHS. For more information about the project see www.epsteingastro.demon.co.uk

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1 Government Statistical Service. Table B18 health care. Hospital outpatient activity: outpatient attendances, by sector; NHS trusts England. www.doh.gov.uk/HPSSS/TBL_B18.HTM (accessed 10 Aug 2000).

2 Speech Machines. www.cybertranscriber.com (accessed 4 Aug 2000).