Recommendations for Desirable Features of Adaptive Diabetes Self-Care Equipment for Visually Impaired Persons

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The Task Force on Adaptive Diabetes Education for Visually Impaired Persons (ADEVIP) met at Cleveland Sight Center on 23–25 April 1993 for a consensus development meeting (1). This project brought together a multidisciplinary group of professionals who have expertise in working with visually impaired people who have diabetes. Building on the work of the 1988 National Task Force on Diabetes and Vision Impairment, the Task Force on ADEVIP addressed a number of issues that affect diabetes care for people who live with both diabetes and visual impairment. In the U.S., between 15,000 and 39,000 people with diabetes become blind each year (2). One recent estimate was as high as 47,000 (R. Brechner, unpublished observation). With numbers of this magnitude, these concerns are not of trivial significance.

One issue the Task Force on ADEVIP addressed was the functional usefulness of currently available adaptive diabetes self-care equipment for visually impaired people. In the last 5 years, the quality and variety of this equipment has improved substantially. Manufacturers are to be commended for their efforts at designing adaptive equipment and making it available to visually impaired consumers.

Equal accessibility to modern health care by people who have disabilities is implicitly mandated by the Americans with Disabilities Act. It follows that intensive diabetes self-management, with benefits clearly demonstrated in sighted people in the Diabetes Control and Complications Trial, should be an available option for visually impaired people. This requires adaptive equipment that is both portable and flexible in its use. We offer the following suggestions concerning the design of such equipment.

Insulin measurement

These adaptive equipment features are necessary for consistently accurate, nonvisual measurement of insulin in flexible doses by a visually impaired person:

- quality control for accuracy and precision
- dose settings that are easily adjusted by the user
- easy mixing of different insulin types in the syringe
- easy use by people with functional physical impairments, such as neuropathy
- small, portable size
- nonbreakable materials used in construction
- a means to guide the syringe needle into the insulin bottle accurately
- instructions provided in accessible form, i.e., audiotape
- accuracy in the very-low-dose range (<6 U)
- a convenient way of setting large doses (>30 U), which reduces the chance of human error in counting up the dose setting (3).

We urge manufacturers of all insulin delivery systems, including those not specifically designed for visually impaired people, to consider engineering adaptations for such possible use. We encourage controlled testing of these products by visually impaired people before marketing, which will ensure that product recommendations can specify safety limitations and can be based on actual consumer trials.

Self-monitoring of blood glucose

These equipment features are necessary for consistently accurate blood-glucose monitoring that is fully accessible to visually impaired people with active lifestyles.

For test strips:

- tactual markings, such as indentations or raised dots, to aid the user in locating the pad and correct insertion position
- durable pads that are not damaged by touching
- a method, such as tactual markings or coded chips, by which a visually impaired person can independently discover the expiration date, calibration code, and acceptable control solution range for each package of strips
- small blood sample size necessary for accurate readings
- for systems with a check strip, tactual markings to ensure proper insertion.

For blood glucose meters:

- clear speech output that announces all necessary functions of meter operation,

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ADEVIP, Adaptive Diabetes Education for Visually Impaired Persons.

including all visual display messages, battery low and on/off messages, error messages, and reminders to turn meter off after use
- small, portable size meter with voice, preferably pocket-sized
- instructions provided in accessible form, i.e., audiotape
- simple operating procedure, preferably a no-wipe system
- a method for accurately placing an adequate blood drop consistently
- strip aperture that is easy to locate tactually, with foolproof strip insertion
- a carrying case holding both meter and supplies, with an adjustable shoulder strap that leaves the user's hands free to perform such necessary tasks as using a white cane for safe travel
- simple cleaning procedure
- an enclosed certificate of payment for proper instruction by a health-care professional (4,5).

Because many people with diabetic retinopathy have fluctuating vision, ranging from near-normal to nonfunctional, conventional meters that can be easily adapted are preferred to an entirely separate system. This also helps to decrease the added expense, which is crucial for financial accessibility because third-party payments are often not available for the purchase of a different meter following vision loss.

We suggest that equipment manufacturers who are contemplating designing a system for use by visually impaired people consult a panel of potential users before the design is finalized. Many difficulties encountered in the use of nonvisual equipment are not readily evident to most visually oriented people. However, such difficulties could be easily discovered by people who are accustomed to nonvisual equipment use.

In the spirit of the Americans with Disabilities Act, we urge manufacturers to produce and market their own integrated voice-adapted systems rather than relying on adaptations produced by separate companies. This participation will facilitate fuller accessibility, both to the equipment itself and to the trouble-shooting and repairs that are necessary when consumers have difficulties with the equipment.

Finally, we encourage companies that are designing noninvasive blood-glucose monitoring systems to consider the potential for speech adaptations in the design and to produce a speech-adapted model concurrent with the visually accessible model.

APPENDIX— MEMBERS OF THE TASK FORCE ON ADEVIP

— Chair: Ann S. Williams, MSN, RN, CDE. Members: Kathy Berkowitz, RN, CFNP, CDE; Marla Bernbaum, MD; Ed Bryant (President, Diabetics Division, National Federation of the Blind); Margaret Cleary, MS, RN, CDE; Judy Davis, BA, RN, CDE; Cate Evers (low vision consultant); Donald G. Kiger, MA; Patricia J. Koenig, MA, CRT; Lynne Luxton, Ed.D, CRT; Robin D. Martin (health educator); Ruth Ann Petzinger, MS, RN, CDE; Susan Ponchillia, Ed.D, CRT; Joyce M. Schulz, RN, CDE; Marilyn L. Teasley, RN, CDE; and Susan L. Thom, RD, LD, CDE.

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