

Epidemiology of Insulin-Using Commercial Motor Vehicle Drivers

Major variability of state licensing requirements in the U.S.

IDAMAE F. GOWER, MPH
THOMAS J. SONGER, PHD
HAROLD HYLTON, BA
NEILL L. THOMAS, BA

JEAN-MARIE EKOE, MD
LESTER B. LAVE, PHD
RONALD E. LAPORTE, PHD

OBJECTIVE— Licensing agencies in many areas, including the U.S., prohibit insulin-using individuals from driving CMVs or large trucks. This study examined the debate over the risks of licensing insulin-using individuals to drive CMVs as an occupation, and the variations in regulations of different states.

RESEARCH DESIGN AND METHODS— As part of an ongoing review of the regulations governing interstate commerce in the U.S., we surveyed all 50 states and Washington, D.C. to determine the regulations concerning intrastate driving. We received responses from 48 states and D.C., representing 95% of the U.S. population.

RESULTS— Only 9 states reported preventing insulin users from acquiring a CMV license, whereas 39 states and D.C. permitted licensing within state boundaries. Of the states allowing insulin users to drive, 26 placed special requirements on CMV licensing.

CONCLUSIONS— The results indicate that, despite a standardized U.S. federal law for driving across states, enormous variability exists in the policies for driving within states, ranging from no restrictions to a complete ban on CMV driving for insulin users.

FROM THE DEPARTMENT OF EPIDEMIOLOGY, GRADUATE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF PITTSBURGH, AND THE DEPARTMENT OF ECONOMICS, GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION, CARNEGIE-MELLON UNIVERSITY, PITTSBURGH, PENNSYLVANIA; THE DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, WASHINGTON, DC; AND THE DEPARTMENT OF MEDICINE, FACULTY OF MEDICINE, UNIVERSITY OF MONTREAL, MONTREAL, QUEBEC, CANADA.

ADDRESS CORRESPONDENCE AND REPRINT REQUESTS TO IDAMAE F. GOWER, MPH, DEPARTMENT OF EPIDEMIOLOGY, GRADUATE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF PITTSBURGH, PITTSBURGH, PA 15261.

RECEIVED FOR PUBLICATION 7 OCTOBER 1991 AND ACCEPTED IN REVISED FORM 2 JULY 1992.

CMV, COMMERCIAL MOTOR VEHICLE; D.C., DISTRICT OF COLUMBIA; FHWA, FEDERAL HIGHWAY ADMINISTRATION; IDDM, INSULIN-DEPENDENT DIABETES MELLITUS; NIDDM, NON-INSULIN-DEPENDENT DIABETES MELLITUS; EEC, EUROPEAN ECONOMIC COMMUNITY.

Employment opportunities for individuals with insulin-treated diabetes have been limited over the years because of the assumption that insulin-using persons are at a higher risk for occupational accidents attributable to the effects of hypoglycemia (1–3). Some people are beginning to question the relevance of these job restrictions (2,3). Few data exist to quantify the link between hypoglycemia and occupational hazards. Moreover, societal attitudes toward employment are changing, as witnessed by the recently passed Americans With Disabilities Act.

One job category currently under debate around the world concerns the operation of CMVs by persons under treatment with insulin. CMVs are trucks weighing >10,000 lb that are engaged in business activity. They are referred to here as CMVs, but also are known as heavy goods vehicles or lorries in other countries. The licensing of CMV drivers, in general, is regulated by government agencies that must balance both employment rights and public safety (accident prevention). The underlying issue is whether the benefits of licensing insulin-treated drivers outweigh the potential safety risks or vice versa.

Most public attention focuses on the risk for road crashes that may occur with the licensing of insulin-using drivers. The biggest fear is that an insulin-treated driver may suddenly lose control of a heavy vehicle and cause a disastrous accident. The risk of crash for an insulin-treated CMV driver is not clear, partly as a result of past and present employment restrictions. Numerous studies concerning private automobiles are inconclusive. They indicate an increased (4–7), similar (8–10), or decreased (11,12) accident risk for diabetic drivers. Because little definitive information is available on the risks or benefits of insulin-treated drivers, the final decision of the licensing agency is often a subjective judgment.

The beliefs of various organizations regarding the risks and benefits of

truck operation by insulin-treated drivers appear to differ substantially around the world (World Health Organization, DIAMOND Project Group on Social Issues, unpublished observations). In Europe, a recent directive from the EEC requires all member nations to ban the licensure of insulin-treated commercial drivers (14). In the U.S., the federal government prohibits all insulin-treated persons from driving CMVs in interstate commerce (15). However, the FHWA recently proposed a new rule that would, in essence, allow some insulin-treated persons to be licensed in interstate commerce (16).

Under the proposed changes, insulin-treated individuals could be licensed if they passed an extensive medical examination and followed a number of continuing rules. These rules include a medical reevaluation every 6 mo, the measurement of blood glucose levels every 4 h while working (driving), and restrictions on long-haul operations. The potential impact of this proposed change is not clear.

One possible method to evaluate its impact is to examine the regulations enacted by individual states. In the U.S., federal regulations govern interstate driving (across state borders), and state regulations govern intrastate (within state) driving. Because no comprehensive data exist on the current state regulations, this report surveys the rules in place in each state to examine the degree to which the individual states permit the licensing of insulin-treated drivers.

RESEARCH DESIGN AND METHODS

Questions were developed to compare the regulations governing the licensing of insulin-using individuals for CMV operation within individual states. Insulin-using individuals included those with IDDM and NIDDM who were on insulin therapy. Questions addressed whether insulin-using individuals were allowed to drive CMVs within state borders or not. If they were, then data were collected on the

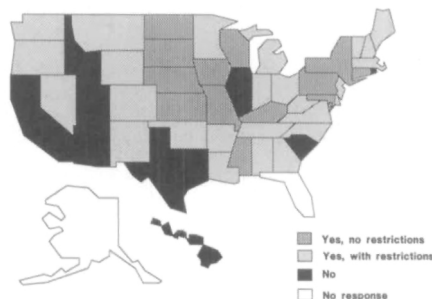


Figure 1—State laws at time of study.

number of insulin-using individuals licensed, the requirements that had to be met for a CMV license to be issued, and the restrictions placed on driving for these individuals.

Telephone calls were made between January 1991 and April 1991 to each state Department of Motor Vehicles asking for the individual best able to answer questions concerning insulin-using individuals and CMV driving. Because of variability in the authorities responsible for licensing between the states, the positions of the persons interviewed were inconsistent. Those interviewed included state police officers, license examiners, and license coordinators. When a person was not available to answer the questions, their address was verified, and the questions were mailed. On the first attempt, responses from 13 states were completed by telephone and 20 by mail. The remaining states were contacted a second time, and responses subsequently were received from an additional 16 states (13 by telephone, 3 by mail). Responses were not validated. Altogether, information was collected from 48 states and D.C.,

representing 95% of the 1988 U.S. population.

RESULTS— Figure 1 presents an overview of the state requirements for CMV licensing. Surprisingly, insulin-using individuals were eligible to drive in 40 of the states/areas surveyed, in contrast to the blanket restrictions that prohibit interstate driving under the current federal guidelines. Of these 40 areas, 14 had no restrictions at all regarding insulin-using individuals driving CMVs, and 26 permitted licensing with certain additional requirements. Only 9 states prohibited insulin-using individuals from obtaining a CMV license outright.

Accident, violation, and demographic information on insulin-using drivers was very limited, because most states did not maintain records specific to a medical condition. None of the states was able to approximate the total number of insulin-using CMV drivers. However, 3 states had data on the number of insulin-using individuals who had obtained a medical waiver subsequent to changes in their respective state laws. In each of these states, the numbers of newly licensed insulin-using individuals were extremely small. New Hampshire, Delaware, and Michigan had licensed 1, <5, and 12 insulin-using drivers, respectively. Some 20% of the states did maintain medical forms for drivers seeking a waiver, but were unable to distinguish them in such a manner that they could be identified by medical condition (Table 1).

Additional requirements for licensing insulin-using individuals were mandatory in 26 states. All these requirements were medical stipulations. The re-

Table 1—Number of states having information on licensed CMV drivers with diabetes

	YES	NO	N/A
MEDICAL INFORMATION (%)	10 (20)	30 (61)	9 (18)
ACCIDENT INFORMATION (%)	2 (4)	38 (78)	9 (18)

Table 2—Medical examinations

	Yes	No	N/A, DO NOT KNOW, NO RESPONSE
MEDICAL EXAM (%)	30 (61)	8 (16)	11 (22)
EVERY YEAR	7		
EVERY 2 YR	8		
MORE THAN EVERY 2 YR	1		
VARIES WITH INDIVIDUAL	8		
NOT STATED	6		

quirements varied considerably—from an individual's doctor submitting a letter stating that there was no medical reason for the person to be denied a license—to a medical review board's assessing the applicant's medical records before making a licensing decision. In states where medical examinations were required, we noted considerable variability in the frequency between medical examinations, ranging from an examination annually to one every 2–5 yr (Table 2). Two states, Michigan and New Hampshire, required that blood glucose logs be maintained.

CONCLUSIONS— Three items were apparent from this study. The first is the extraordinary variability in regulations between states, ranging from no regulation in 14 states to an outright denial of licenses in 9 states. An individual was not able to drive in Rhode Island, for example, but could relocate across the state line to any of the surrounding states and be licensed to drive. The second is that for most of the population (in states representing 67% of the U.S. population), granting an interstate license to insulin-using individuals would be a non-issue, because these individuals already were permitted to drive CMVs on an intrastate basis. Third, it appears that the number of insulin-using individuals applying for CMV licensure would be small. This was demonstrated in New Hampshire, Delaware, and Michigan where <20 individuals were licensed after a change in state laws created medical waivers.

Although a uniform, blanket prohibition is in effect for interstate CMV driving, no uniform regulations were in effect for intrastate CMV driving at the time of this study. In fact, the vast majority of insulin-using individuals could drive CMVs within state borders. This same variability in CMV licensing is found worldwide (World Health Organization, DIAMOND Project Group on Social Issues, unpublished observations). Ekoe et al. (17) summarize that the inadequate information available on accident risks for insulin-treated drivers leads to conflicting regulations between nations. Without hard data, licensing authorities are left to base their decisions on observation and common sense. Interestingly, the results of our study suggest that most state licensing agencies, by virtue of their permissive policies, may have regarded the risk for crashes among insulin-using drivers as minimal. A few states, though, thought the risk was too high to allow licensing.

One consequence of the lack of uniformity in regulations between the states has been the enactment of federal legislation requiring that all state rules for CMV operation must conform to the federal rules. This, necessarily, has taken the subjective decision-making found with diabetes out of the hands of the state agencies. As of 1 April 1992, all intrastate licensing of CMV drivers became standardized to the existing FHWA guidelines. It is likely that this change will decrease the number of licensed insulin-using intrastate drivers in the fu-

ture. The same process is occurring in Europe, as witnessed by the EEC directive, in which member nations are being instructed to forgo their individual regulations, as it appears, for the sake of conformity and a perceived opinion of safety.

What do the results of this study mean in terms of potential impact of the proposed interstate regulation changes? Overall, it appears that the proposed rule will not bring a large number of new insulin-using drivers to the interstate roads, because most applicants likely will have either previous driving experience within state borders while being treated with insulin or previous interstate experience before being diagnosed with diabetes. Many persons with IDDM still may select alternative occupations—whether by personal choice or as a result of social and medical influences or underlying discrimination. Moreover, it appears that the number of insulin-using individuals who would be licensed for interstate driving would be very small. The data from Michigan, New Hampshire, and Delaware suggest that insulin-using individuals would represent ~0.001% of the driving-age population. CMV drivers without diabetes represent ~3.8% of the driving-age population (18).

The responses provided by these states on the number of licensed, insulin-using drivers were not verified independently. The numbers reported by the states could, therefore, underestimate the actual number driving, because persons using insulin may conceal their condition in fear of losing their job by such a disclosure. Frier et al. (19) reported previously that 43% of an insulin-dependent cohort surveyed did not disclose their diabetes condition to the licensing authorities.

Our review of the state licensing criteria also suggests that most state regulations were considerably less restrictive than those proposed by the FHWA. For example, the FHWA proposes a medical examination every 6 mo for licensed drivers (16); none of the states that li-

censed insulin-using individuals required a medical examination that frequently. The FHWA proposal also requires that a log of blood glucose levels be maintained every 4 h while working (driving); only 2 states required any blood glucose monitoring.

The proposed FHWA rule, although providing a greater opportunity for the employment of insulin-using individuals, may in fact only slightly increase the number of insulin-using CMV drivers in its initial stages. Given the lack of data on the crash risk for insulin-treated drivers, we would argue, as others have (2), that if a change in federal regulations does come about, this change should be followed with prospective monitoring. Such an evaluation would be important to examine not only the accident risk involved for insulin-using drivers, but also the number affected by the rule change.

Acknowledgments—This study was supported by U.S. Department of Transportation, FHWA, Contract DTFH61-90-R-00097.

This material represents the position of the authors and not necessarily that of the Department of Transportation.

This study was a poster presentation at the 14th annual meeting of the International Diabetes Federation Congress Satellite, Williamsburg, Virginia, 29 June-1 July 1991.

We thank the following individuals for their contribution to our research: AL, Lt. James A. Byrd; AZ, Tom Burch; AR, Sgt. Robert Felcher; CA, Bob Lewis; CO, James C. Kilgore; CT, Nancy McCorkle; DE, Mike Shahan; DC, Lloyd Parker; GA, Capt. C. D. Mason; HI, Peggy Umetsu; ID, Allan Killian; IL, Sgt. Luman; IN, Carol Bradley and Tom Gar-

nall; IA, Walter A. McDonald; KS, Martha Gonzales; KY, Mickey Goff; LA, Michael Cammarosano; ME, Judy Flarety; MD, Maj. John F. Lyding; MA, Richard C. Monlison; MI, Lt. Moore; MN, Paul R. Johnson; MS, Maj. Ron Ford; MO, Bob Ordway; MT, Anita Drews; NE, Joe Botsford; NV, Caleb Jackson; NH, Winn Hayes and Robert K. Turner; NJ, Donald J. Apai; NM, Bill Darmitzel; NY, Anita Orsino; NC, Neal Burkhead; ND, LeRoy G. Fred; OH, Jim Feddern; OK, Barbara Ray; OR, Dee Carr and Karen Pearl; PA, Douglas Tobin; RI, Bob Halpin; SC, Bob Schilling; SD, Stan Knox; TN, Lt. Vona Lasater; TX, John M. Cowan; UT, Richard Peterson; VT, Robert C. King; VA, David Pierce; WA, Jim R. Sneddon; WV, Doug Thompson; WI, Linda Sunstad; WY, Ron McKees.

References

1. Fisher JN: Diabetics need not apply. *Diabetes Care* 12:659-60, 1989
2. Ratner RE, Whitehouse FW: Motor vehicles, hypoglycemia, and diabetic drivers. *Diabetes Care* 12:217-22, 1989
3. Patton A: Employment, the law, and you. *Diabetes Forecast* 41(8):28-36, 1988
4. Waller JA: Chronic medical conditions and traffic safety; review of the California experience. *N Engl J Med* 273:1413-20, 1965
5. Crancer A, McMurray L: Accident & violation rates of Washington's medically restricted drivers. *JAMA* 205:272-76, 1968
6. Songer TJ, LaPorte RE, Dorman JS, Orchard TJ, Cruickshanks KJ, Becker DJ, Drash AL: Motor vehicle accidents and IDDM. *Diabetes Care* 11:701-707, 1988
7. Hansotia P, Broste SK: The effect of epilepsy or diabetes mellitus on the risk of automobile accidents. *N Engl J Med* 324: 22-26, 1991
8. Davis TG, Wehling EH, Carpenter RL: Oklahoma's medically restricted drivers: a study of selected medical conditions. *J Okla State Med Assoc* 66:322-27, 1973
9. DeKlerk NH, Armstrong BK: Admission to hospital for trauma in patients with diabetes mellitus. *J Epidemiol Community Health* 37:232-37, 1983
10. Stevens AB, Roberts M, McKane R, Atkinson AB, Bell PM, Hayes JR: Motor vehicle driving among diabetics taking insulin and non-diabetics. *Br Med J* 299: 591-95, 1989
11. Ysander L: The safety of drivers with chronic disease. *Br J Ind Med* 23:28-36, 1966
12. Eadington DW, Frier BM: Type 1 diabetes and driving experience: an eight year cohort study. *Diab Med* 6:137-41, 1989
14. Taylor J: Medical fitness to drive. In *Recent Advances in Occupational Health*. Harrington JM, Ed. London, Churchill Livingstone, 1987, p. 303-10
15. Code of Federal Regulations: Title 49, Part 391.41(b)(3), Qualifications of Drivers
16. Federal Highway Administration: 49 CFR Part 391—qualifications of drivers; diabetes. Notice of proposed rulemaking. *Fed Reg* 55:41028-37, 5 October 1990
17. Ekoe JM, Laberge-Nadeau C, Ghadirian P, Hamet P: L'impact du diabete sucre sur la securite routiere (impact of diabetes mellitus on road safety). *Diab Metab* 17:61-67, 1991
18. Federal Highway Administration: 49 CFR Part 391—qualifications of drivers; diabetes. Announcement of notice of proposed rulemaking. *Fed Reg* 52:45215, 25 November 1987
19. Frier BM, Matthews DM, Steel JM, Duncan LJP: Driving and insulin-dependent diabetes. *Lancet* 1:1232-34, 1980