bin measurements averaged 10.3 ± 0.8% (N = 5) over 5 mo.

Glycemic control was maintained, suggesting that the findings of Albisser et al. may apply also to subcutaneous infusion systems. The dosage required was somewhat less than that found to be optimal using crystalline pork insulin.

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CSII: Scale Units to Insulin Units

Recent developments in insulin infusion pumps have made the interpretation of administered insulin doses relatively simple. Previous models of pumps displayed insulin delivery in arbitrary "scale units." Depending upon the concentration of insulin used, the "insulin unit" equivalent of each scale unit had to be defined for each individual. This created a great deal of confusion both for the patients and many of their physicians. The newer models now display actual insulin units, thus eliminating the problem. However, many patients are still using earlier models and can financially ill afford to convert to an updated version. For those using the Autosyringe AS*6C (Travenol Laboratories, Hooksett, New Hampshire), this may not be necessary. This pump is designed to deliver a total volume of 2.8 ml over a 24-h period. This represents 100 arbitrary scale units. We have found that by decreasing the total infusion volume by 50% (1.4 ml/24 h) and using an insulin concentration of 50 U/1.4 ml, the pump's digital display is in insulin units (each scale unit being equal to an insulin unit). This assumes, however, that the patient's insulin requirement is within the operating range for this particular device. Furthermore, we have found prolonged catheter survival, presumably related to less volume of infusate. For those patients currently using AS*6C, this represents an inexpensive alternative.

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Prediction of Diabetic Retinopathy from Color Vision Data

Early diagnosis of diabetic retinopathy seems desirable to prevent late visual impairment by tight metabolic control.[1] Aspinall and co-workers have recently pointed out that color vision impairment was a good predictor for the development of ophthalmoscopic retinopathy 7 yr later.[2] We have investigated the capacity of color vision data to predict the degree of retinal damage at the time of the examination.

We performed simultaneously Farnsworth 100-Hue test and fluorescein angiography in 103 insulin-treated diabetic subjects (mean age: 44 ± 14 yr). Fundi results are presented as follows: A = no retinopathy; B = only angiographic retinopathy (at least two microaneurysms at the posterior pole); C = background retinopathy; D = preproliferative retinopathy (presence of edema or ischemia); E = proliferative retinopathy (retinal or preretinal neovascularization); F = retinopathy at uncurable stage.

The 100-Hue test numeric scores of the second eye are shown in Table 1. There is a global trend toward deterioration of color vision from group A to F ($F = 2.42$; $P < 0.05$). But compared in pairs, the first three groups do not appear statistically different. The scores of subjects without retinopathy and those of subjects with only angiographic and background retinopathy are similar. Therefore it seems that data on color vision obtained by 100-Hue test are unable to predict the presence of the earliest signs of retinopathy. An-

TABLE 1
Scores obtained with 100-Hue test by diabetic subjects at different stages of retinopathy

	Type of retinopathy					
	A	B	C	D	E	F
N	24	15	48	12	2	2
100-Hue score (mean ± SD)	107 ± 50	144 ± 109	124 ± 78	182 ± 96	189 ± 21	234 ± 89