

# Diabetes Nurse Case Management Training Program: Enhancing Care Consistent With the Chronic Care and Patient-Centered Medical Home Models

Sharon A. Watts, DNP, RN-C, CDE, Renée H. Lawrence, PhD, and Elizabeth Kern, MD, MS

Many patients remain at high risk for diabetes complications because of poor glycemic control.<sup>1-4</sup> Case management, defined as “the assignment of authority to a professional (the case manager) who is not the provider of direct health care, but who oversees and is responsible for coordinating and implementing care,”<sup>5</sup> is an effective intervention to improve glycemic control.<sup>6-8</sup>

The use of nurses as case managers (NCMs) for patients with poor glycemic control follows the Chronic Care Model (CCM) of collaborative care in that a proactive approach is undertaken by the health care team to improve outcomes.<sup>9</sup> Similarly, the use of NCMs is aligned with the core principles of the Patient-Centered Medical Home (PCMH) model (e.g., enhanced access and coordinated and comprehensive care).<sup>10,11</sup> However, research findings have not always shown that NCMs improve clinical outcomes.<sup>12</sup>

A recent evaluation of the Kaiser Permanente Northern California’s care management program suggests that an important consideration for achieving success in clinical outcomes is ensuring that the NCM program encourages needed intensification of medication regimens for patients.<sup>13</sup> However, finding and hiring nurses previously trained in glucose pattern management, including having the knowledge to make specific recommendations about

adjustment of hypoglycemic medications, may present a barrier to health care organizations seeking to implement an effective NCM program.

This article describes an internal training program for NCMs to improve glycemic control for patients in the Cleveland Veterans Administration (VA) health care system. This quality improvement (QI) training project allowed existing nursing staff members to become diabetes NCMs by providing them with the necessary skills to help address the growing gap between the care needs of patients with diabetes and the level of diabetes expertise available.

The Cleveland VA operates 12 community-based outpatient clinics in northeast Ohio, serving more than 20,000 veterans with diabetes. We recruited community-based outpatient clinic nurses who expressed a special interest in diabetes education and case management and tracked their utilization and patients’ outcomes via an electronic diabetes registry.<sup>14</sup>

## Study Focus

We hypothesized that NCM care would achieve greater success than usual outpatient care in improving A1C levels among patients with persistent poor glycemic control.

## QI Intervention: NCM Program

Table 1 summarizes the rationale, role definition, and patient-centered goals

that were the foundation for obtaining buy-in from key stakeholders. Table 2 outlines elements of the program and highlights components of the CCM and PCMH model addressed.

An experienced certified diabetes educator (CDE) who is a nurse practitioner in the endocrinology section of the Cleveland VA trained each NCM in weekly sessions that included review and discussion of actual patient charts and glucose data. The CDE mentored each NCM in the core principles of diabetes self-management education (DSME) and glucose pattern management, including medication adjustment.<sup>15</sup> NCMs were encouraged to study for the CDE exam<sup>16</sup> and were given time to attend an annual day-long Cleveland VA retreat on DSME.

Integral to all NCM-patient encounters was DSME and discovery of barriers to self-care. NCMs were trained in clinical protocols developed by the endocrinology section in concert with the Cleveland VA Skeggs Diabetes Center (Tables 2–4). Although the targeted population was patients whose A1C levels were  $\geq 9.0\%$ , the NCMs also worked with any patients as requested by primary care providers.

## Research Design and Methods

This was a retrospective, observational study of a QI intervention. The data source was the VA Integrated Service Network 10 (VISN 10) electronic diabetes registry. The study

**Table 1. Rationale, Role Definition, and Patient-Centered Goals Associated With Establishing Diabetes NCMs for High-Risk Patients**

**Key Rationale for Diabetes NCMs for High-Risk Patients**

High-risk patients (A1C  $\geq$  9% or experiencing hypoglycemia) have complicated care needs that consume and/or are inadequately addressed during visits with primary provider.

High-risk patients require expertise beyond some providers' areas of expertise.

High-risk patients would benefit from increased contact and monitoring, which primary providers cannot provide without substantial costs to other patients and the health care system.

There are a limited number of specialists to address the needs, and expanding their role or numbers would be an expensive strategy.

NCMs can help build team-based care to support primary providers and assure adequate, continuous tailored care for patients.

NCMs are not meant to replace primary provider visits but to enable more effective and efficient care of the whole patient.

**Role Definition<sup>a</sup>**

The primary functions of this position are treatment planning, glucose monitoring, medication regulation and titration, and close observation of patients' progress through telephone and face-to-face encounters.

The primary responsibility of this position is to work closely with diabetic patients on lifestyle and medication management practices that will improve clinical outcomes.

An essential element of this position is helping patients understand and accept responsibility for the management of their diabetes and related health problems.

The diabetes NCM promotes informed patient choice and self-directed decision-making by emphasizing the importance of diabetes self-management through education.

The diabetes NCM uses outcome results to guide the development and implementation of new strategies and teaching methods.

The diabetes NCM collaborates with primary care and specialty care providers to develop protocols and individualized treatment plans that promote coordinated continuity of care.

The diabetes NCM must possess a high level of diabetes clinical practice, interpersonal relationship, and leadership skills to positively affect diabetes care for adult and aging patients.

**Enhanced Capabilities to Provide Patient-Centered Services Goals**

NCMs enable practices to enhance access to care for patients.

NCMs align with adult learning theory (i.e., adults learn best via problem-based learning and problem-solving that is directly relevant to the individual learner).

The patient apprenticeship to learn self-management provides unique and ideal pairing of education and medical management to benefit the patient; NCMs engage patients in problem-solving the management of their own daily glucose patterns in real-time at a faster pace than is typical for medical practice relying solely on appointments with experts and/or primary care providers.

*"Our definition for case manager is that expressed by Norris et al.<sup>5</sup>: "The assignment of authority to a professional (the case manager) who is not the provider of direct health care, but who oversees and is responsible for coordinating and implementing care."*

**Table 2. Components of RN Case Management Intervention and How They Correspond to Elements of the CCM and the PCMH Model's Key Characteristics**

Components of RN Case Management Training Program for Diabetes	Primary CCM Elements	PCMH Key Characteristics
<b>Initial Steps</b>		
Identify core training and support team: Physician-diabetologist and nurse practitioner CDE to provide protocol and educational support to community-based outpatient clinics	DSD; Decis Sup; HCO	Q&S
Identify a nurse with or without a current CDE certificate at the clinic to be a local diabetes champion (done with help of providers, oversight staff, and interview/interactions by core training and support team)	DSD; Decis Sup;	Access
<b>Obtain Organization Empowerment of Local Diabetes Champions: NCMs</b>		
Chief of community-based outpatient clinics endorsed NCM pulling of a patient from a provider	DSD; HCO	Access
NCM's schedule freed up to provide direct access line for patients and more dedicated time for patient-centered diabetes care coordination	DSD	Access
<b>Resource Support/Tools</b>		
Computer-generated clinical reminders of the Expanded ABCs of Diabetes Care; expected outcomes show up on each patient's chart	Decis Sup; CInfoS	
Generated lists of high-risk patients provided monthly or bi-monthly to each NCM, obtained via diabetes registry	CInfoS	Q&S (IT)
Developed point-and-click computer charting template containing hard-coded items that would drop into the progress note, enabling outcomes retrieval via the diabetes registry at a later date. Also served to remind NCMs to address the Expanded ABCs of Diabetes Care and medication adherence—not just blood glucose control	DSD; DecisSup; HCO; CInfoS	Q&S (IT)
<b>Initial On-Site Visit by Core Training and Support Team (3 Hours)</b>		
Develop rapport; clarify roles of NCM to identified champion; show how to find online resources and computer tools, including worksheets containing diabetes-specific lab results to trend labs for safety monitoring	DSD; HCO; Decis Sup; CInfoS	Q&S (IT)
Clarify NCM role to primary care providers and encourage them to refer high-risk veterans (A1C > 9% or those experiencing hypoglycemia) for short-term follow-up with the NCM	DSD; HCO; Decis Sup; CInfoS	Q&S (IT)
<b>Weekly Diabetes Clinic Conference Call Individually With Each NCM (for 6 Months)</b>		
Provide and explain medication management algorithm (Table 3); the introduction of bedtime insulin was encouraged when sulfonylureas and biguanide therapy no longer kept blood glucose levels in the target range	Decis Sup; CInfoS	Q&S (IT)
Trained on safe titration of insulin and lab work necessary to monitor glucose management; PCP needs to sign-off on medication adjustments	Decis Sup; CInfoSup	Q&S (IT); PD
Provide general diabetes information	Decis Sup	

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**Table 2. Components of RN Case Management Intervention and How They Correspond to Elements of the CCM and the PCMH Model's Key Characteristics, continued from p. 27**

Components of RN Case Management Training Program for Diabetes	Primary CCM Elements	PCMH Key Characteristics
Enhances ownership and problem-based learning by focusing on their patients, issues, and concerns	Decis Sup	Access; Q&S
Used to review case manager-identified difficult cases and review NCM's clinical thought processes	Decis Sup; CInfoS	Q&S
Provide information handouts and flyers, including information on local community resources	SMS; Comm	
NCMs encouraged to first enroll patients into diabetes self-management classes before individual case management where patients learn concepts in a group setting (minimizes one-on-one time for individual medication titration and safety monitoring); peer support; family education	SMS	C/Comp; Wh; Q&S; Coord
Encourage NCMS to request nutrition consults for patients to review and reinforce carbohydrate counting	SMS	C/Comp; Wh; Coord
<b>Annual Diabetes Care Retreat</b>		
Created so NCMs and dietitians could meet to review guidelines and titration and medication management algorithms and to address access and care issues	DSD; Decis Supp; HCO	C/Comp; Q&S
<p><b>CCM Elements:</b> CInfoS, clinical information system; Comm, community; Decis Supp, decision support; DSD, delivery system design; HCO, health care organization; SMS, self-management support</p> <p><b>PCMH Key Characteristics:</b> Access, enhanced access; C/Comp, continuous and comprehensive care; Coord, coordination of care; PD, provider directed; Q&amp;S, quality and safety (including IT, information technology); Wh, whole-person orientation</p> <p><b>Expanded ABCs of Diabetes Care:</b> A1C, Blood pressure/microalbumin, cholesterol/aspirin, diabetes education, eye examinations, foot examinations, glucose monitoring, health maintenance, and indications for specialty care</p>		

was approved by the Louis Stokes Cleveland Department of Veterans Affairs Medical Center Institutional Review Board.

#### Patient groups

Patients with diabetes enrolled in the Cleveland VA Medical Center were defined by at least one diabetes-specific ICD-9-CM diagnosis code (250.xx, 357.2, 362.0, 366.41) listed as an active problem in the electronic chart or a diabetes-specific medication dispensed from a VA pharmacy on at least two separate dates between 1 October 2001 and 31 December 2006.<sup>14</sup> Insulin-taking patients were defined by having insulin dispensed from a VISN 10 pharmacy in either the baseline or follow-up periods.

The NCM patient group included all diabetic patients with at least

one visit to an NCM between April 2003 and March 2005. The concurrent usual care (UC) patient group included all diabetic patients with no NCM visits through October 2005. Patients whose baseline mean A1C was < 7% or who lacked A1C test results at baseline or follow-up were excluded from the comparison analysis but were counted in the general descriptive data.

#### Time-dependent variables

For NCM patients, the index date was the date of each patient's first visit to the NCM. For UC patients, the index date was defined as 1 October 2004—the median of all index dates for the NCM group. The mean baseline A1C value was the average of all A1C values for each patient for 12 months up to and including the index

date. The mean follow-up A1C value was the mean of all A1C values within the 12 months following the index date.

#### Statistical methods

Each patient's A1C values were averaged across the 12-month baseline and follow-up periods to minimize bias induced by seasonal shifts in glycemic control<sup>17</sup> and regression to the mean. Statistical analysis used Student's *t* test and  $\chi^2$  analysis. Statistical software was SAS (Cary, NC), V 9.1.

#### Study Results

Forty-one percent (647/1,567) of NCM patients were taking insulin at baseline compared to 25% (2,080/8,290) of UC patients ( $P < 0.01$ ). During follow-up, an additional 14% of the

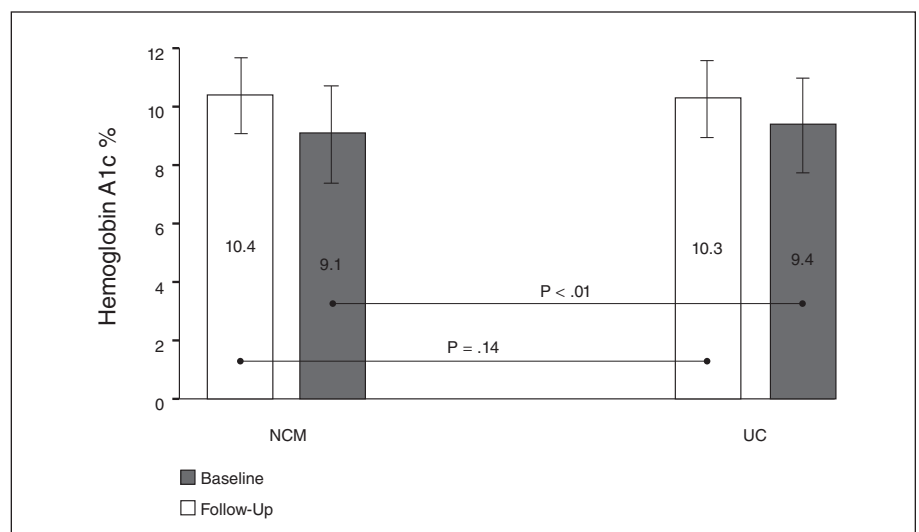
**Table 3. Diabetes Nurse Educator Protocol for Case Management**

- A. Priority will be given for individual case management when A1C is  $\geq 9\%$ . A list of veterans per site will be given to the case managers by the Louis Stokes Cleveland Department of Veterans Affairs Medical Center Skeggs Diabetes Center. Referrals by providers to the case manager of veterans with A1Cs  $< 9\%$  will be scheduled for diabetes class, nutrition education, group management, or individual management as determined by the NCM as needed. Veterans experiencing low blood glucose will ALWAYS be seen individually to remedy this dangerous situation.
1. Refer patients with A1Cs  $> 9\%$  for nursing care management for 6 months maximum or until they meet individualized goal A1C based on risk, or whichever occurs first. Case management is meant to be comprehensive and will include dietitian consults at the discretion of the nurse.
  2. Refer patients with any value A1C who need direction/guidance/skills for starting insulin for nursing case management for 6 months maximum, or until they meet individualized goal based on risk, or whichever occurs first. The NCM will coordinate/schedule the dietitian consult needed for any insulin start. NCMs will titrate insulin prescribed by the primary care provider in 10–20% increments every 3–7 days until the daily glucose pattern shows the best effect. If changes are needed in the type of insulin, the nurse will review the patient data with the primary care provider and help to design a new treatment plan.
  3. Refer patients with recurrent hypoglycemia for follow-up with the NCM until the hypoglycemia ceases.
  4. Refer patients with A1C levels  $\leq 9\%$  to be scheduled by the nurse to attend group diabetes education classes and individual visits with the dietitian. This includes all newly diagnosed patients with A1C levels  $< 9\%$ , as well as others. (Note: The extra attention to the patient resulting from having the nurse coordinate classes and dietitian consults will likely result in higher show rates, so it is probably worth the effort to have the nurse coordinate this and call patients, rather than just handing class information to patients. Making it easy for primary care providers to refer to a single person [the nurse] is likely to result in higher rates of referrals to the classes. The nurse is the most likely provider to persuade the patient to see the dietitian.)
  5. The nurse will encourage all patients to attend group diabetes education classes and individual visits with the dietitian.
  6. If patients have an A1C of 8% and are appropriate candidates for class education, they will be given this intervention first, before individual case management is provided.

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NCM patients started insulin compared to 6% of UC patients ( $P < 0.01$ ). A greater percentage of NCM than UC patients had mean baseline A1C levels  $\geq 9\%$  (39 vs. 25%, respectively). Among patients whose mean baseline A1C was  $\geq 9\%$ , NCM patients did not differ from UC patients in mean baseline A1C value ( $10.4 \pm 1.4$  vs.  $10.3 \pm 1.2\%$ ,  $P = 0.14$ ) (Figure 1). However, during follow-up, NCM patients improved their A1C values to a slightly greater extent ( $9.1 \pm 1.6$  vs.  $9.4 \pm 1.6\%$ ,  $P < 0.01$ ). By October 2006, the NCMs had seen a cumulative total of 3,842 unique patients at least once, representing 22% of patients with diabetes in the Cleveland VA system.

Interviews with the NCMs indicated improved job satisfaction; they appreciated the new NCM role as providing a meaningful intervention



*Figure 1. Change in mean hemoglobin across time. NCM, nursing case management group; UC, usual care group. White columns represent the group's mean A1C during the 12-month baseline period. Gray columns represent the group's mean A1C during the 12-month follow-up period. Vertical bars represent the standard deviations for the group means.*

**Table 3. Diabetes Nurse Educator Protocol for Case Management, *continued from p. 29*****B. History questions for diabetes educators**

1. What type of diabetes? Type 1—hypoglycemia unawareness, 911 calls, wide fluctuations in daily blood glucose (e.g., from 44 to 450 mg/dl in the same day), diabetic ketoacidosis, was only on pills for 1–2 years maximum, family or personal history of autoimmune disease.
2. How long have you had diabetes? (In type 2, determine usefulness of glipizide (e.g., for duration of diabetes > 20–30 years, it probably will not help).
3. Metformin: you take with food? Did you try Fibercon if you had loose stools? Metformin SA if you had loose stools?
4. At what time do you take NPH insulin? Before bedtime? (We want it to be the last thing before sleep!)
5. Do you hold or not take your insulin if your blood glucose is 100 mg/dl? 150 mg/dl or less?
6. Do you take your insulin injection if you go out to eat?
7. Do you have glucose back-up for hypoglycemia on yourself, with your spouse, in the car, on your bedside table?
8. Have you ever fallen with low blood glucose? (Especially important if patient is frail and elderly)
9. Do you drink alcohol? (Can cause low glucose)
10. Is cheese or chicken a carbohydrate food? (No? Assess need for instruction in carbohydrate counting)
11. Do you carry identification that you have diabetes?
12. Do you take rapid-acting insulin at bedtime? (Avoid this)
13. Do you have nightmares/nightsweats? (Possible lows during the night)
14. Do you ever visit the fridge during the night? (Lows)
15. Do you ever feel the sudden need to eat during the day? (Lows)
16. Do you eat between meals? (Especially in type 1; could be chasing insulin with food; could need to lower basal insulin)
17. Do you shake your NPH vial (Avoid this; causes it to be less potent)
18. Exercise can cause lows; for type 1, every 20–30 minutes of vigorous exercise can cause blood glucose to drop by 30–50 mg/dl; therefore, lower mealtime insulin (by 1 unit aspart for every 20–30 minutes) or eat carbohydrate to cover exercise (15 g for every 20–30 minutes). Always carry glucose tablets during exercise. The effect of exercise on blood glucose can be delayed up to 12–24 hours!
19. Are insulin injection sites rones? Are there hard spots from lipodystrophy? (If so, insulin will not be absorbed as well)

C. Titration of insulin will be allowed by the diabetes NCM after competency has been established with a mentoring program. The guidelines for insulin titration (see item H2 below) will be followed.

D. All other medication adjustments, although possibly suggested by the diabetes educator, will be ordered by the primary care provider.

E. Converting 70/30 insulin to NPH and regular insulin for easier titration of dose. (Example: Patient is on 30 units of 70/30 =  $30 \times 0.7 = 21$  units of NPH and  $30 \times 0.3 = 9$  units of regular)

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for their patients. Most part-time NCMs have now been converted to full-time NCMs. From 2003 to 2007, the program grew from 1 to 10 NCMs, all of whom have achieved CDE status. (Only two were CDEs before the NCM program.)

In addition, registered dietitians at the clinic sites who also team-taught the diabetes classes and saw patients for medical nutrition

therapy were motivated by the success of the program. An additional six dietitians have become CDEs as well. Together with the primary care providers, they developed a comprehensive team approach to the delivery of diabetes care.

#### **Conclusions**

To serve the increasing number of patients with high-risk diabetes

within the Cleveland VA, a system-level change was needed consistent with CCM and PCHM models. We demonstrated that NCMs who were recruited and trained from within our own pool of clinic nurses achieved meaningful improvement in glycemic control despite caring for patients with greater severity of diabetes. The NCM program is well accepted, as demonstrated by the growth in num-

**Table 3. Diabetes Nurse Educator Protocol for Case Management, *continued from p. 30***

F. For type 1 diabetes, calculate 0.4–0.5 units/kg body weight to find the starting total daily dose of insulin. Half should be basal (glargine) and half should be divided into daily mealtime insulin (aspart). Correction scale should start at < 80 mg/dl, subtract 1 unit at mealtime; for glucose 150–200 mg/dl, add 1 unit to mealtime dose; for glucose 201–250 mg/dl, add 2 units at mealtime; for 251–300 mg/dl, add 3 units at mealtime; for > 300 mg/dl, add 4 units at mealtime.

G. Suggested algorithm for blood glucose control in type 2 diabetes:

1. Diagnostic criteria: refer to American Diabetes Association guidelines
2. Lifestyle counseling (~ 3 months)
  - a. Weight loss
  - b. Increase activity (unless overt and symptomatic cardiac disease)
3. Add metformin (usually first, especially if obese and serum creatinine is < 1.5 mg/dl in men or add sulfonylurea)
4. Add sulfonylurea (especially if thin) or metformin (especially if obese and serum creatinine is < 1.5 mg/dl in men)
5. Add (without stopping oral medications) NPH/glargine insulin at bedtime if morning blood glucose is high. If NPH insulin, consider titrating up to 30 units every night, then switch to morning and bedtime NPH)

H. Suggested algorithm for initiating and titrating basal (NPH or glargine) insulin by diabetes educators for veterans with type 2 diabetes only:

1. Position: adding bedtime NPH or glargine insulin is an effective way to reduce hyperglycemia when oral agents are no longer sufficient. Diabetes educators are a vital link for providers and veterans in making a smooth transition to this new and important step of quality diabetes care. Veterans may present with misconceptions and fears that educators can help mitigate. Additionally, educators can provide preventative hypoglycemia education and supportative help in titration of the insulin until fasting target goals are met.
2. Protocol:
  - Bedtime insulin will be initiated only if morning blood glucose levels are consistently > 140 mg/dl.
  - Initial starting dose of bedtime NPH or glargine insulin will be the lowest dose of either 10 units or 0.1 units/kg body weight, rounded up to the nearest full unit (e.g., 78 kg × 0.1 units/kg = 7.8, rounded to 8 units; this is < 10 units, so the patient will start at a dose of 8 units at bedtime).
  - Veterans will be instructed to take their insulin right before bedtime (ideally, between 9:00 p.m. and midnight).
  - Veterans will be discouraged from having a bedtime snack at the same time as their insulin because this will minimize the desired impact of the insulin on fasting glucose levels.
  - Hypoglycemia precautions will be taught at the initiation of bedtime NPH or glargine; this will include the 15–15 rule (15 units of glucose, wait 15 minutes, and recheck blood glucose). Titration of NPH or glargine insulin will be based on morning fasting glucose levels if insulin is given at bedtime.
  - Titration of the NPH or glargine insulin can be made slowly and safely by increasing the dose by 2 units every 4 days as long as there are no low blood glucose levels (< 70 mg/dl) and fasting blood glucose levels remain > 130 mg/dl.
  - Veterans may increase their own insulin by 2 units per week if their morning blood glucose levels remain > 130 mg/dl without hypoglycemia (< 70 mg/dl) and the educator believes the veteran is capable of making this adjustment correctly and safely. Written instructions about titration must accompany the veteran home.
  - Educators will be aware of the delayed effect of vigorous exercise on lowering blood glucose levels, often through the night. If veterans initiate exercise while starting bedtime NPH or glargine insulin, blood glucose levels may fall. Education about the glucose-lowering effect of exercise will be provided to veterans. If hypoglycemia (< 70 mg/dl) occurs during titration of bedtime NPH or glargine insulin, the primary care provider will be notified and the dose of bedtime NPH or glargine may be decreased by 20% (example: 20 units of bedtime NPH or glargine will be decreased to 16 units). If a blood glucose of < 60 mg/dl occurs, the primary care provider will adjust the insulin.
  - Titration increases will be made no more frequently than once every 4 days by the diabetes educator or weekly by the veteran.
  - Veterans will be given the local advice nurse telephone number for 24-hour emergency access.

Table 4. Steps for Analyzing Blood Glucose Patterns

Guideline	Pattern	Example	Caution
<b>Look for lows first</b>	Two or more or one very low blood glucose needs to be explained (e.g., too much activity, skipped meal)	Every morning, every afternoon after exercise	Nightmares and night sweats may signify nighttime lows
<b>Look for consistent highs</b>	Several at same time of day	Always at bedtime? Consider adding dinner regular or analog insulin, or address too much snacking	May be related to snacking, inactivity, or skipping medicines
<b>Correct morning fasting glucose</b>	Majority > 90–130 mg/dl	Correcting morning fasting glucose will allow rest of day to follow lower	Rule out Somogyi effect or rebound high after 3:00 a.m. low; can set patient alarm to rule this out (rare in type 2 diabetes)
<b>Make one change at a time</b>	This allows pattern changes to be monitored	Change only insulin or medications, one at a time	Too many changes may cause hypoglycemia
<b>Change insulin at only 10–20% increments</b>	Change can be titrated every 3–4 days	Bedtime insulin titration to achieve fasting glucose of 90–130 mg/dl	Change one insulin dose at a time
<b>Correct 2-hour postprandial glucose</b>	≤ 140 mg/dl is normal without diabetes	Check before and 2 hours after largest meal	Cardiovascular risk may be linked with elevated postprandial glucose levels
<b>Keep bedtime blood glucose level &gt; 110 mg/dl</b>		If bedtime glucose is too low, there may be too much dinnertime regular or rapid-acting analog insulin	Bedtime snack is necessary only if blood glucose level is < 110 mg/dl

bers of NCMs and patients served. As reported by others,<sup>18,19</sup> we found NCMs to be enthusiastic about their new role and CDE status. NCMs have now been trained to perform diabetic foot screenings and to monitor and refer patients for annual eye exams, enabling our system to implement new aspects of comprehensive and coordinated care.

Although the success of our NCM program depended on the talent and leadership of the nurse practitioner CDE who led the program, the administrative support for necessary training and mentoring time for each NCM was essential. One of the benefits of an internal training program is that the NCMs

not only form natural teams with the primary care providers in their clinics, but also function as a highly motivated team of experts within the Cleveland VA. We conclude that the diabetes NCM program has enhanced access to intensified care for diabetic patients with poor glycemic control and has improved glycemic outcomes in the Cleveland VA system.

#### Author Contributions

SAW originated the concept of nurse case managers in diabetes, implemented the training program, and wrote the article. RHL contributed to the discussion and writing of the article and reviewed and edited it. EK

participated in the implementation of the training program, provided measurement and analytic data, and reviewed and edited the article.

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*Sharon A. Watts, DNP, RN-C, CDE, is a nurse practitioner in endocrinology, and Renée H. Lawrence, PhD, is a health services researcher at the Louis Stokes Cleveland Department of Veterans Affairs Medical Center in Ohio. Elizabeth Kern, MD, MS, was formerly co-director of the Skeggs Cleveland VA Diabetes Center and an assistant professor of medicine in the Department of Medicine at Case Western Reserve University in Cleveland, Ohio. She is currently director of the diabetes program and an associate professor of medicine at National Jewish Health in Denver, Colo.*