

REDUCING HEALTH DISPARITIES WITH NURSE-DIRECTED DIABETES CARE: CARVE OUT VS CARVE IN MODELS

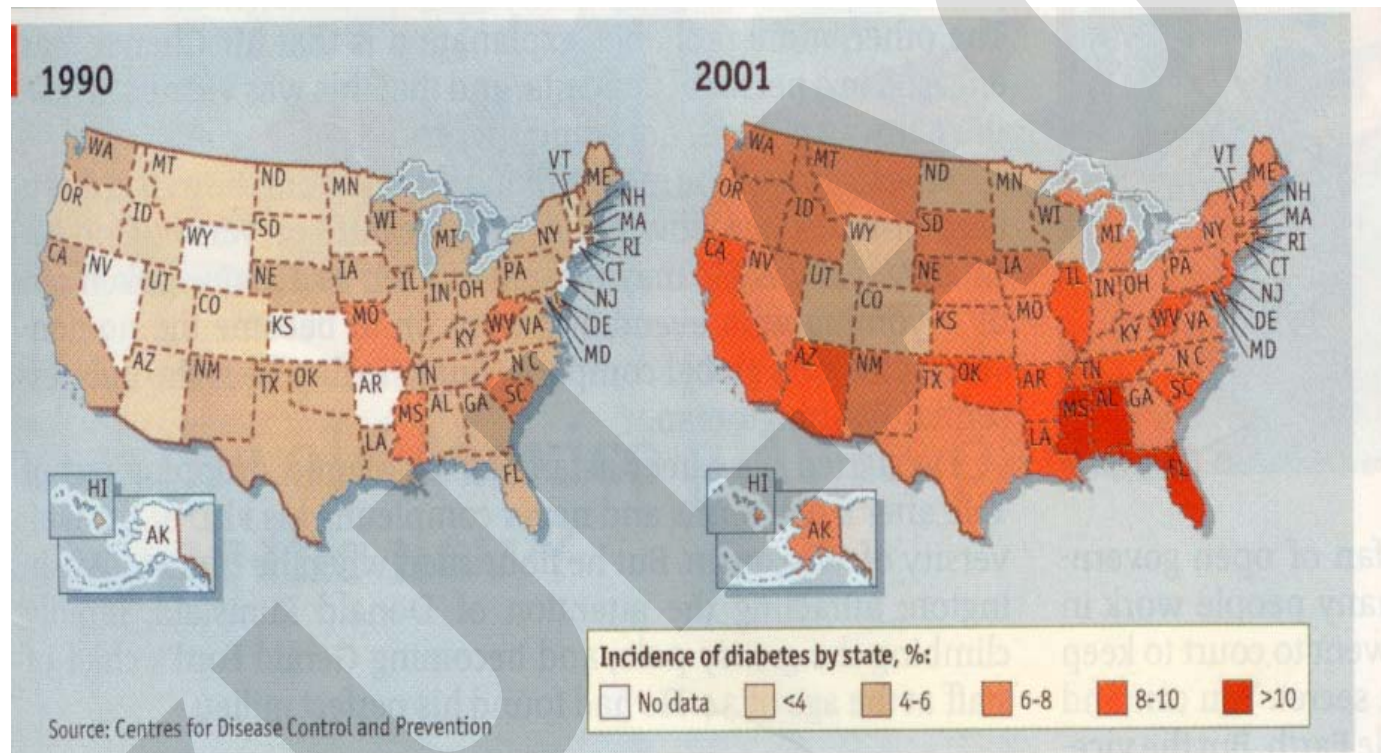
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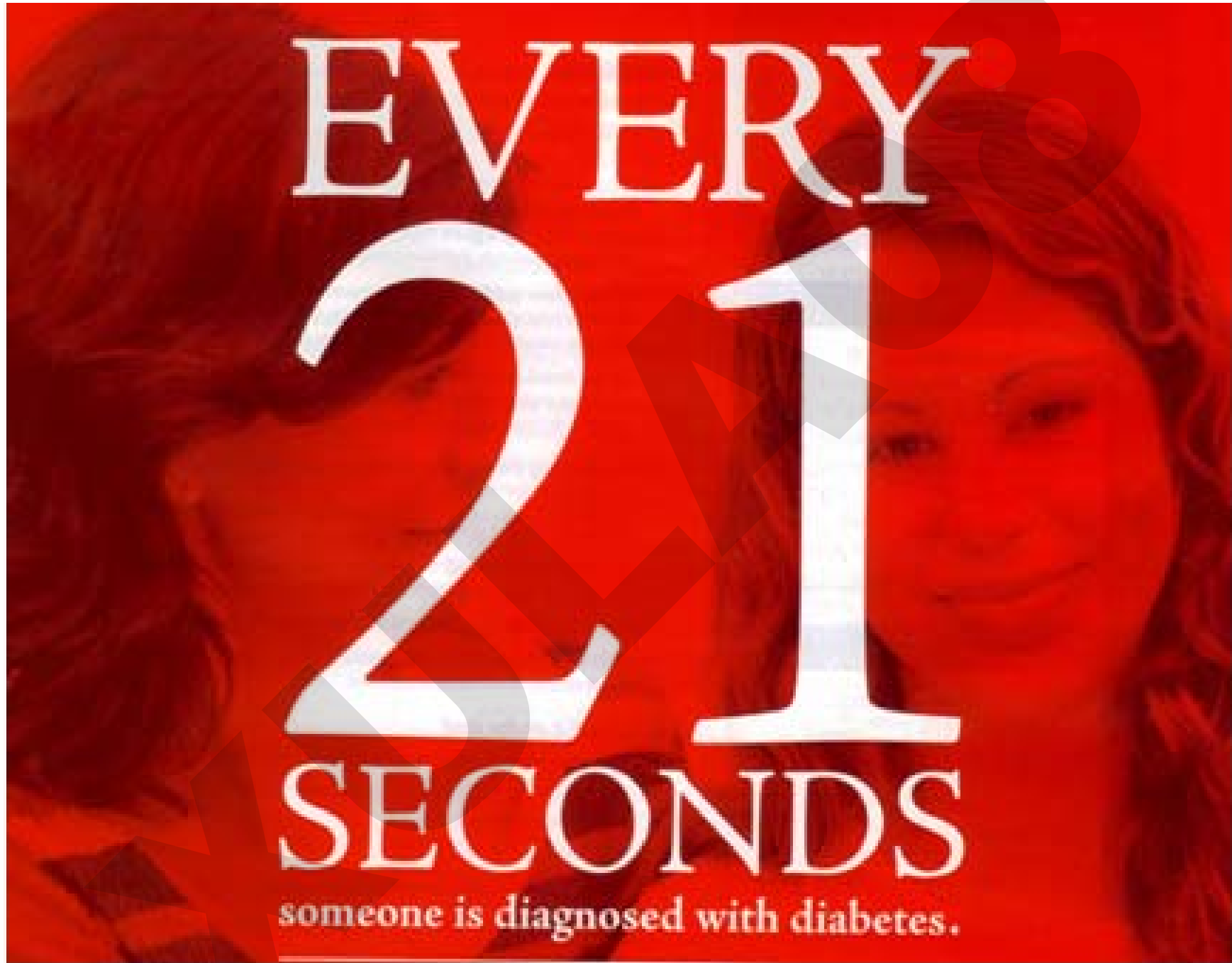
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DIABETES: AN AMERICAN EPIDEMIC



The Economist, February 17th -23rd, 2007



NEW PATIENTS WITH DIABETES

New patient each 21 seconds = 3 per minute

1440 minutes per day x 3 = 4,320 patients
per day

365 days per year x 4,320 = **1,576,800 new
patients with diabetes per year**

**IT IS ESTIMATED THAT
ONE IN THREE CHILDREN
BORN IN THE UNITED
STATES TODAY WILL
DEVELOP DIABETES IN
THEIR LIFETIME !!!**

African-Americans – 1 in 2

Latinos - ????? (probably similar)

Diabetes Complications

- 2 in 3 people with diabetes die of heart disease or stroke
- Diabetes is the #1 cause of adult blindness
- Diabetes is the #1 cause of kidney failure
- Diabetes causes more than 60% of non-traumatic lower-limb amputations each year

NIDDK, National Diabetes Statistics fact sheet. HHS, NIH, 2005.

DIABETES IN MINORITIES

Compared to Caucasians, both African-Americans and Latinos had more/higher:

Retinopathy

Microalbuminuria

Clinical proteinuria

End stage renal disease

Lower extremity amputations

DKA

A1C levels

Poor care

Mortality

DIABETES IN MINORITIES

However, with the exception of a slight increase in renal disease, complications in African-Americans and Latinos were similar to Caucasians in a Kaiser or a Veterans Administration medical care system. Thus, there are little intrinsic racial/ethnic differences to account for these disparities.

Karter et al: JAMA 287: 2519, 2002

Jha et al: JAMA 285:297, 2001

American Diabetes Association Standards of Care

Process Measures

Number of tests/exams performed per period of time or whether specific treatment being given.

Outcome Measures

Actual results of the test or the effect of the treatment.

CURRENT AMERICAN DIABETES ASSOCIATION GUIDELINES

	<u>Frequency</u>	<u>Goal</u>
1. Hb A1c	every 6 months if goal attained; every 3 months if greater	<7%
2. LDL Cholesterol	yearly or more often as necessary	<100 mg/dl
3. Triglycerides	yearly or more often as necessary	<150mg/dl*

*Once LDL cholesterol at goal, the NCEP suggests considering treatment for triglyceride concentrations >200 mg/dl if the non-HDL cholesterol is >130 mg/dl.

4. Renal profile – yearly or more often as necessary

a) Dipstick for proteinuria

(1) if $\geq 1+$ positive, (and not due to an other identifiable cause, e.g., infection, bleeding)

ACE inhibitor unless contraindicated; serum creatinine every 6 months:

(2) if dipstick negative or trace; evaluation for microalbuminuria; if positive and confirmed, ACE inhibitor unless contraindicated.

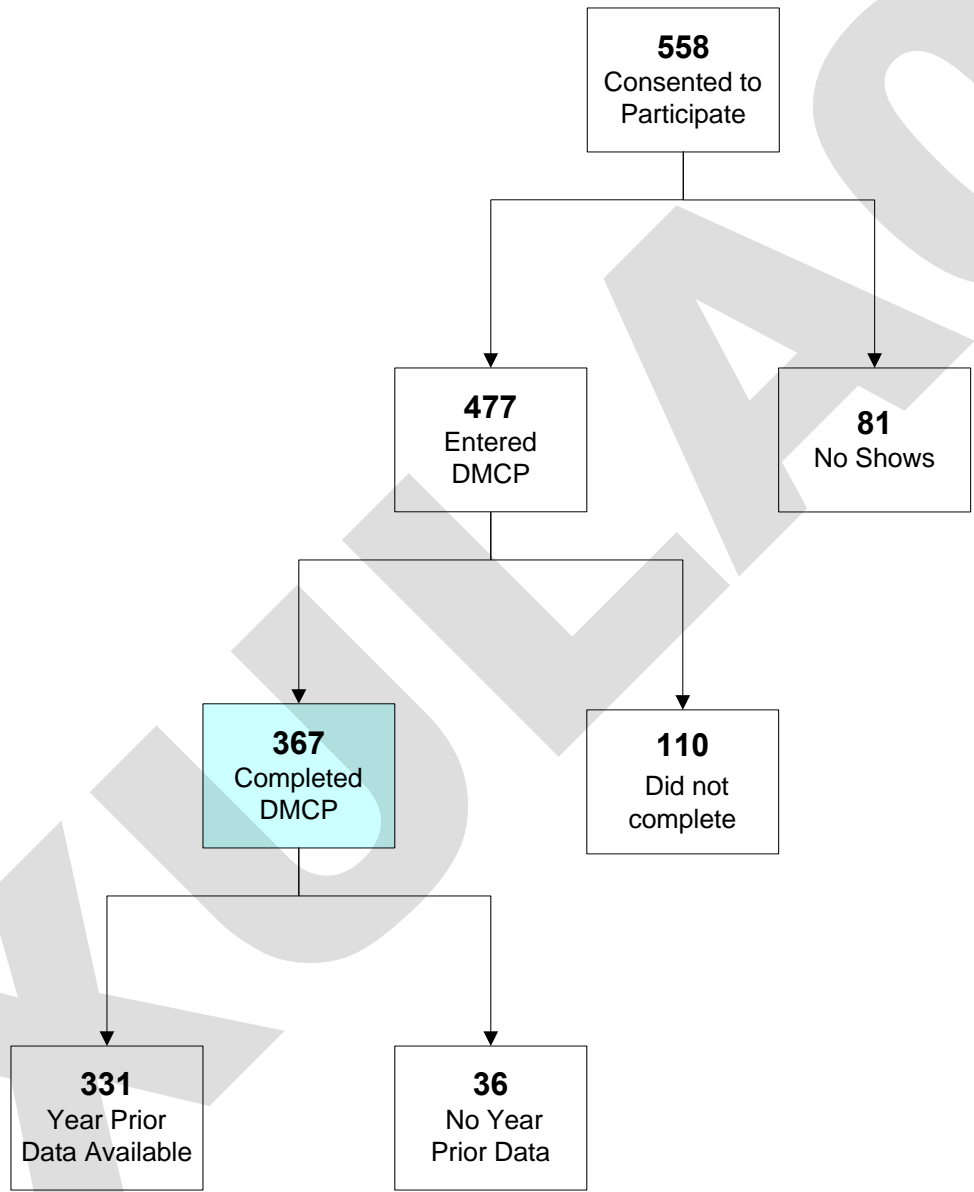
5. Blood pressure – minimum every 6 months (or more often as necessary) as long as target level of $\leq 130/80$ mm Hg met.
6. Visits-minimum every 6 months as long as all goal levels met; otherwise a contact at least every 3 months.
7. Eye exam-yearly dilated funduscopic exam in all diabetic patients except type 1 patients within 5 years of diagnosis.

8. Foot examinations- minimum every 6 months or more often as necessary.
9. Weight – minimum every 6 months.
10. Smoking assessment – yearly; if current smoker, counseling or referral for cessation.
11. Aspirin (75-325 mg/day) in patients >30 years of age with macrovascular disease or one or more cardiovascular risk factors (unless contraindicated).

NURSE-DIRECTED DIABETES CARE IN A MINORITY POPULATION (CARVE OUT MODEL)

- Specially trained registered nurse followed detailed treatment algorithms
- Endocrinologist (MBD) available by phone
- Endocrinologist met with nurse once per week to sign charts and review any problems (mostly administrative)
- Clinics two evenings and Saturday mornings

Patient Recruitment and Retention



DEMOGRAPHICS

Number of Patients – 367

Age – 51.2 ± 10.6 years

Disease Duration – 6.9 ± 6.6 years

Females – 71%

Race/Ethnicity

African-American - 80 (22%)

Caucasian - 2 (0.5%)

Latino - 283 (77%)

Asian - 2 (0.5%)

Type 1 diabetes – 2 (0.5%)

Type 2 diabetes – 365 (99.5%)

EDUCATION AND INCOME LEVELS

- Subset of Latino patients (107/283) queried
- Education (n=102) – 73% had 6th grade or less
- Household Income (n=63) – 95% <\$25,000

PROCESS MEASURES

- Overall, all ADA-recommended process measures were carried out significantly more ($P < 0.001$) during nurse-directed diabetes care (98%) than during the year prior (54%).

OUTCOME MEASURES

(Hb A1C - %)

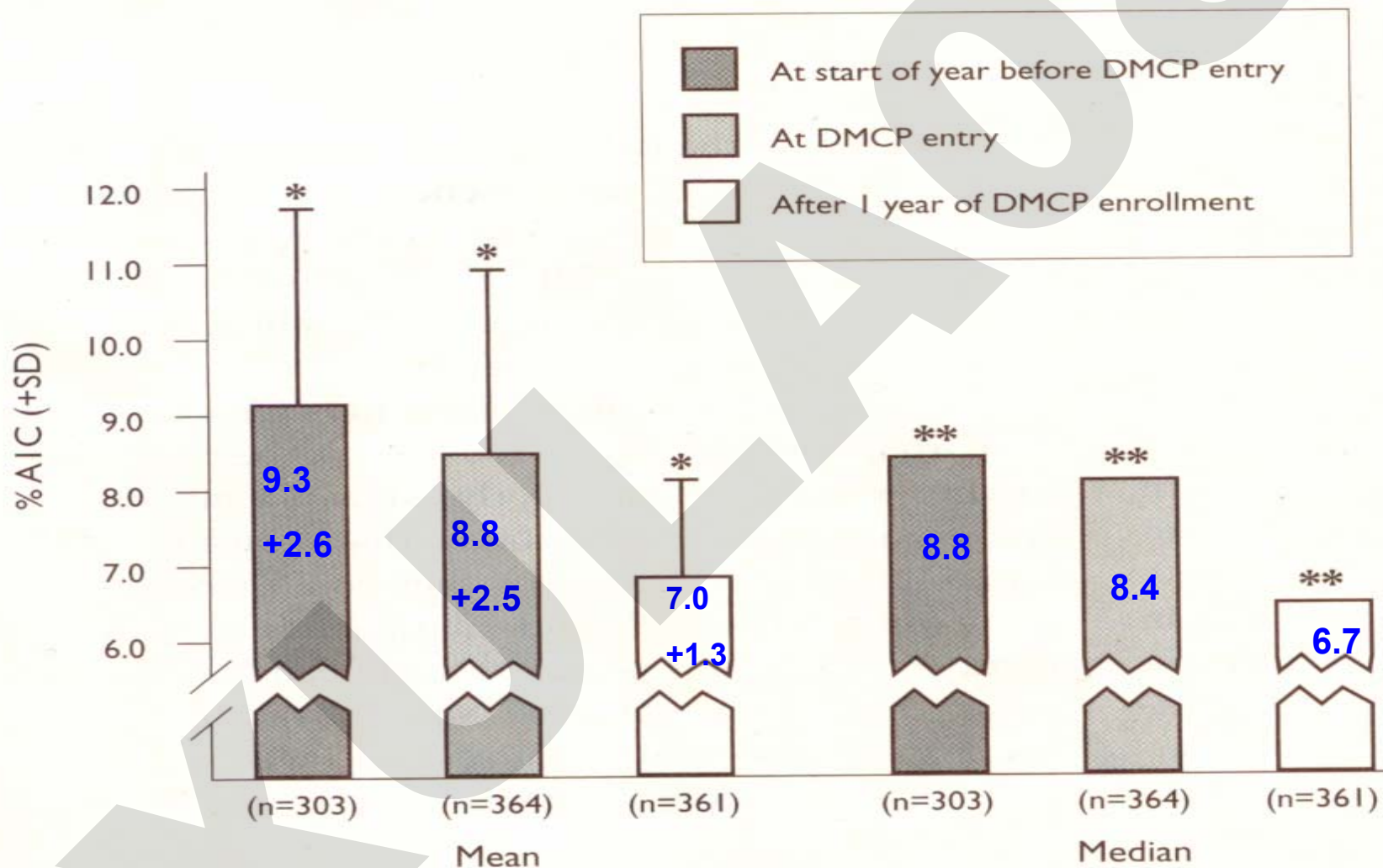
	<u>Usual Care*</u> (n=303)	<u>Nurse-Directed Care</u> (n=364) ⁺	<u>P Value</u>
Initial	9.3 ± 2.5	8.8 ± 2.5	<0.001
Final	8.7 ± 2.4	7.0 ± 1.3	<0.001
Change	-0.6 ± 2.8	-1.8 ± 2.6 [‡]	<0.001
P Value	<0.001	<0.001	

*Prior year

⁺3 patients had hemoglobinopathies

[‡] n= 361 (3 patients had only one test)

A1C LEVELS



P <0.001 for similarly marked comparisons, * and **

OUTCOME MEASURES

(Hb A1C – Percent meeting goal of <7.0%)

	<u>Usual Care*</u> (n=303)	<u>Nurse-Directed Care</u> (n=361)	<u>P Value</u>
Initial	17%	28%	<0.001
Final	28%	60%	<0.001
P value	<0.001	<0.001	

* Prior year

OUTCOME MEASURES

(LDL Cholesterol – Percent meeting goal*)

	<u>Usual Care**</u> (n=244)	<u>Nurse-Directed Care</u> (n=366)	<u>P Value</u>
Initial	51%	50%	NS
Final	50%	82%†	<0.001
P Value	NS	<0.001	

*Goal <130 mg/dl in year 1 and <100 mg/dl in years 2 and 3

**Prior year

†352 patients had at least 2 values

TOTAL URGENT CARE AND EMERGENCY ROOM VISITS AND HOSPITALIZATIONS

	<u>Year Prior</u>	<u>Nurse-Directed Care</u>
Urgent Care	30	19
ER	49	25
Hospitalizations	<u>16</u>	<u>8</u>
Total	95	52

45% reduction

(P <0.001)

PREVENTABLE DIABETES-RELATED URGENT CARE (UC) AND EMERGENCY ROOM (ER) VISITS AND HOSPITALIZATION

Causes	UC/ER Visits		Hospitalizations	
	<u>Year Prior</u>	<u>DMCP</u>	<u>Year Prior</u>	<u>DMCP</u>
Metabolic*	11	1	2	0
Infection**	<u>4</u>	<u>4</u>	<u>4</u>	<u>1</u>
Total	15	5	6	1

*Hyperglycemia, hypoglycemia, DKA

**Foot ulcer, cellulitis, fungal

TOTAL CHARGES FOR URGENT CARE AND EMERGENCY ROOM VISITS AND HOSPITALIZATIONS

Year Prior

DMCP

\$129,426

\$24,630

LIMITATIONS OF STUDY

Patients may have used non-county centers
(unlikely because only 15% had any kind of
insurance)

Differences between usual care and nurse-
directed care may be greater in minorities
(possibly true)

Total charges do not reflect actual costs nor
reimbursements (cost savings can not be
determined)

Effects of Quality Improvement Strategies for Type 2 Diabetes on Glycemic Control: A Meta-Regression Analysis (JAMA 296:424-440, 2006)

Ineffective

Audit and Feedback
Electronic Patient Registry
Clinician Education
Clinician Reminders
Patient Education
Promotion of Self-Management
Patient Reminder Systems
Continuous Quality Improvement
Facilitated Relay of Clinical Information to Clinicians

Slightly Effective

Case Management
Team Changes

CONCLUSION

“Most QI strategies produced small to modest improvements in glycemic control. Team changes and case management showed more robust improvements, **especially for interventions in which case managers could adjust medications without awaiting physician approval.**”

IMPORTANCE OF NURSES INDEPENDENTLY IMPLEMENTING TREATMENT

	<u>Nurse → PCP</u> ^a		<u>Nurse Alone</u> ^b	
A1C (%)	Control (n=103)	Intervention (n=106)	Control (n=29)	Intervention (n=36)
Baseline	9.2	9.3	10.2	10.1
Change	-0.16	-0.02	-0.9 ^c	-2.1 ^c

^a Am J Med 116: 732, 2004

^b Am J Manag Care 11: 253, 2005

^c P <0.03



Same VA
system

Weighted Average of Hb A1c Levels in Patients under Nurse-and/or Pharmacist- Directed Diabetes Care Compared to Usual Care

	<u>Usual Care</u>				<u>Nurse and/or Pharmacist Care</u>			
	N	Baseline A1c (%)	Final A1c (%)	Δ A1c (%)	N	Baseline A1c (%)	Final A1c (%)	Δ A1c (%)
Nurse (n=14)	1325	9.8	9.1	-0.7	1739	10.0	7.7	-2.3
Pharmacist (n=5)	248	9.7	8.8	-0.9	230	10.2	8.2	-2.0
Both	1573	9.8	9.1	-0.7	1969	10.0	7.8	-2.2

TWO BARRIERS TO GENERALIZABILITY OF CARVE OUT MODELS

- **Fragmented patient care**
- **Many too few endocrinologists**

REMOVAL OF BARRIERS (?CARVE IN MODEL)

Barrier

Fragmented patient care

Too few endocrinologists

Solution

Nurse-directed diabetes care delivered in the primary care setting

Supervision by primary care physicians

CARVE IN MODEL DEMOGRAPHICS

Number of Patients – 114

Age – 54.5 ± 8.6 years

Disease Duration – 10.4 ± 6.5 years

Females – 61%

Race/Ethnicity

African-American – 19 (17%)

Caucasian - 0 (0%)

Latino - 93 (81%)

Asian - 2 (2%)

Type 1 diabetes – 1 (1%)

Type 2 diabetes – 113 (99%)

CARVE IN MODEL RESULTS*

(ABSOLUTE VALUES)

<u>Measure</u>	<u>Baseline</u> (Mean ± SD)	<u>Final</u> (Mean ± SD)	<u>P Value</u> †
Hb A1c (%)	10.9 ± 2.6	8.7 ± 1.9	<10 ⁻⁵
LDL Chol (mg/dl)	108 ± 45	84 ± 43	<10 ⁻⁵
Triglyceride (mg/dl)	169 ± 155	130 ± 66	<10 ⁻³
Systolic BP (mm Hg)	130 ± 20	124 ± 14	<10 ⁻⁴
Diastolic BP (mm Hg)	73 ± 9	68 ± 8	<10 ⁻⁵

*mean duration – 5.8 months; †Wilcoxon signed-rank test

CARVE IN MODEL RESULTS*

(PERCENT ACHIEVING TARGETS)

<u>Measure (Target)</u>	<u>Baseline</u>	<u>Final</u>	<u>P Value</u> †
Hb A1c (<7.0%)	4%	13%	<0.004
LDL Chol (<100 mg/dl)	41%	72%	<10 ⁻⁵
Triglyceride (<150 mg/dl)	51%	70%	<0.0002
Systolic BP (<130 mm Hg)	42%	63%	<10 ⁻³
Diastolic BP (<80 mm Hg)	72%	90%	<10 ⁻⁴

*mean duration – 5.8 months;

†McNemar's test

Characteristics of Models

	<u>Carve Out</u>	<u>Carve In</u>
Nurse following algorithms	Yes	Yes
Supervision by	Endocrinologist	PCP
Subjects	Randomized	Referred
Computer tracking of broken visit and lab appointments	Yes	No
Medical assistant	Yes	No
Evening/Saturday clinics	Yes	No

KEY COMPONENTS FOR GOOD DIABETES CARE

- Knowledgeable provider
- Time to interact with patient
- Communication with patient
- Educated patient
- Patient's ability to carry out treatment recommendations

Nurses following protocols under appropriate supervision do it better!

CONCLUSION

Policy makers seeking to improve diabetes care and conserve resources (especially in minority populations) should seriously consider adopting nurse-directed diabetes care.

**THANK
YOU**