



# Electronic Patient Registries Improve Diabetes Management in Rural Community Health Care Settings

**WVU Office of Health Services Research  
Department of Community Medicine**

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# Introduction

- Diabetes care presents a challenge in rural areas
    - Prevalence in WV is 10% compared to 7.5% in US
    - Diabetes is 6<sup>th</sup> leading cause of death in WV
  - Electronic patient registries can help to reduce barriers to comprehensive care, e.g., by initiating interventions
  - When improvements in care processes resulting from registry utilization have been documented, differentiating causes from other ongoing interventions has been difficult
    - Is basic registry utilization sufficient for positive change?
  - Goal of current study: to examine very basic registry utilization in settings with few resources (rural, FQHCs)
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# Previous Findings

Study	Intervention	Improvements in Care Processes and Clinical Outcomes
Bray et al. (2005; 2005)*	System-wide, e.g., case mgmt, group visits, registry	Care processes (SMG, lipid monitoring, foot exam, ASA use); reduction in HbA1c, HbA1c pts in control
East et al. (2003)	System-wide, e.g., Health Disparities Collaborative initiatives	Care processes (e.g., foot and retinal exams, SMG, HbA1c, lipid panel, Pneumovax Immunization)
Dettori et al. (2005)*	System-wide, e.g., registry, mailings, phone outreach, education workshops	Blood Pressure, HbA1c, foot exam, immunizations, Diabetes Education
Haase & Russell (2006)*	System-wide, e.g., academic detailing, self-management education, registry	HbA1c levels, HbA1c monitoring
Hummel, Norris, & Gibbs (2003)	Registry-based, e.g., physician reports, decision support at point-of-care, nurse CDE	Blood Pressure; HbA1c (in patients with > 8.0% at baseline)
Johnson et al. (2005)*	Registry-based, e.g., mail/telephone outreach to targeted patients, diabetes education mailings to all, decision at point-of-care, summary reports	HbA1c levels (< 8.0%), HbA1c and LDL monitoring, foot and retinal exams, pneumococcal vaccination
Smith et al. (1998)	Registry generated Progress Note used at point-of-care	Care processes (e.g., BP, foot and eye exams, HbA1c monitoring)

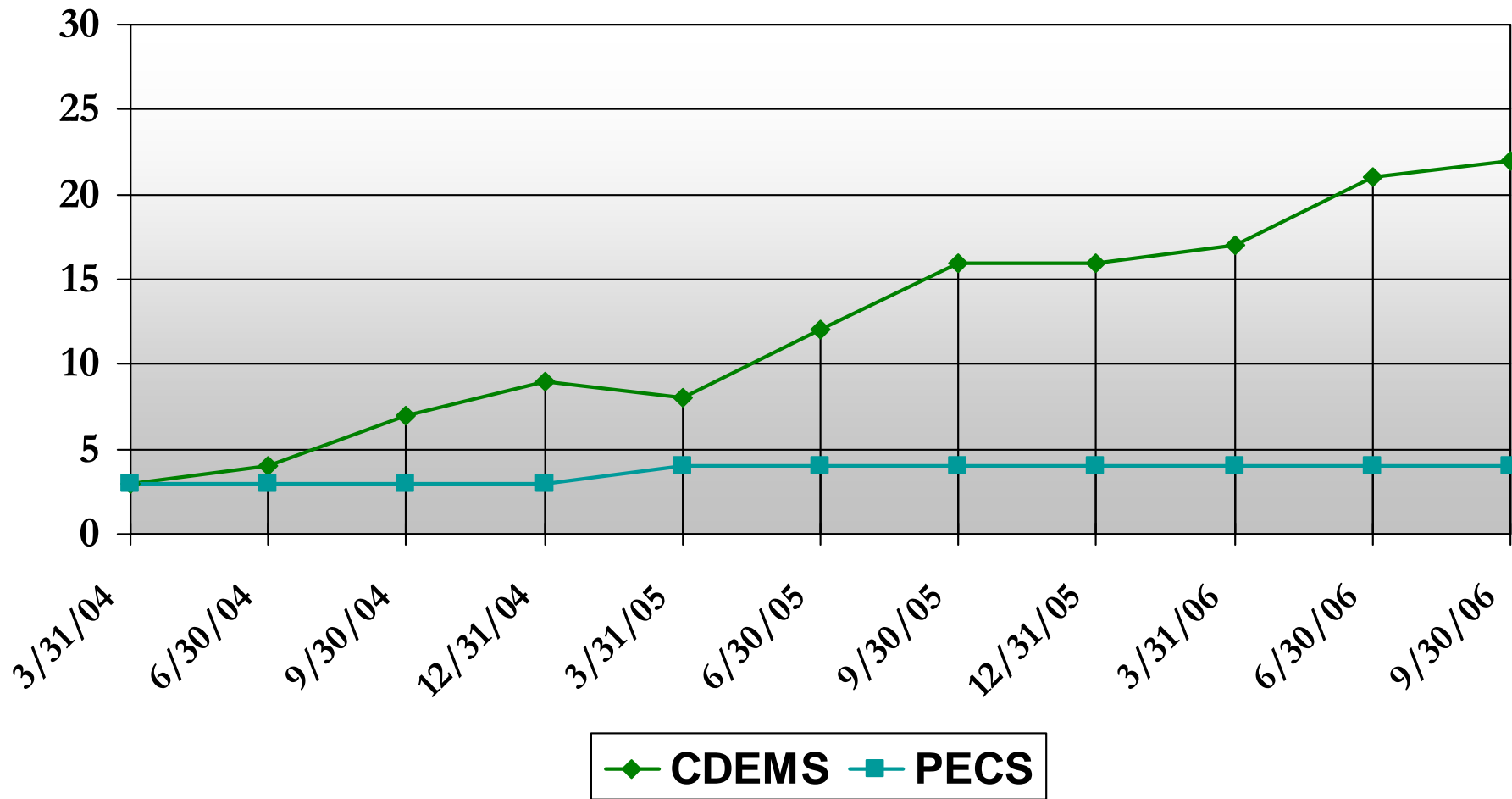
Note. \* = rural sample

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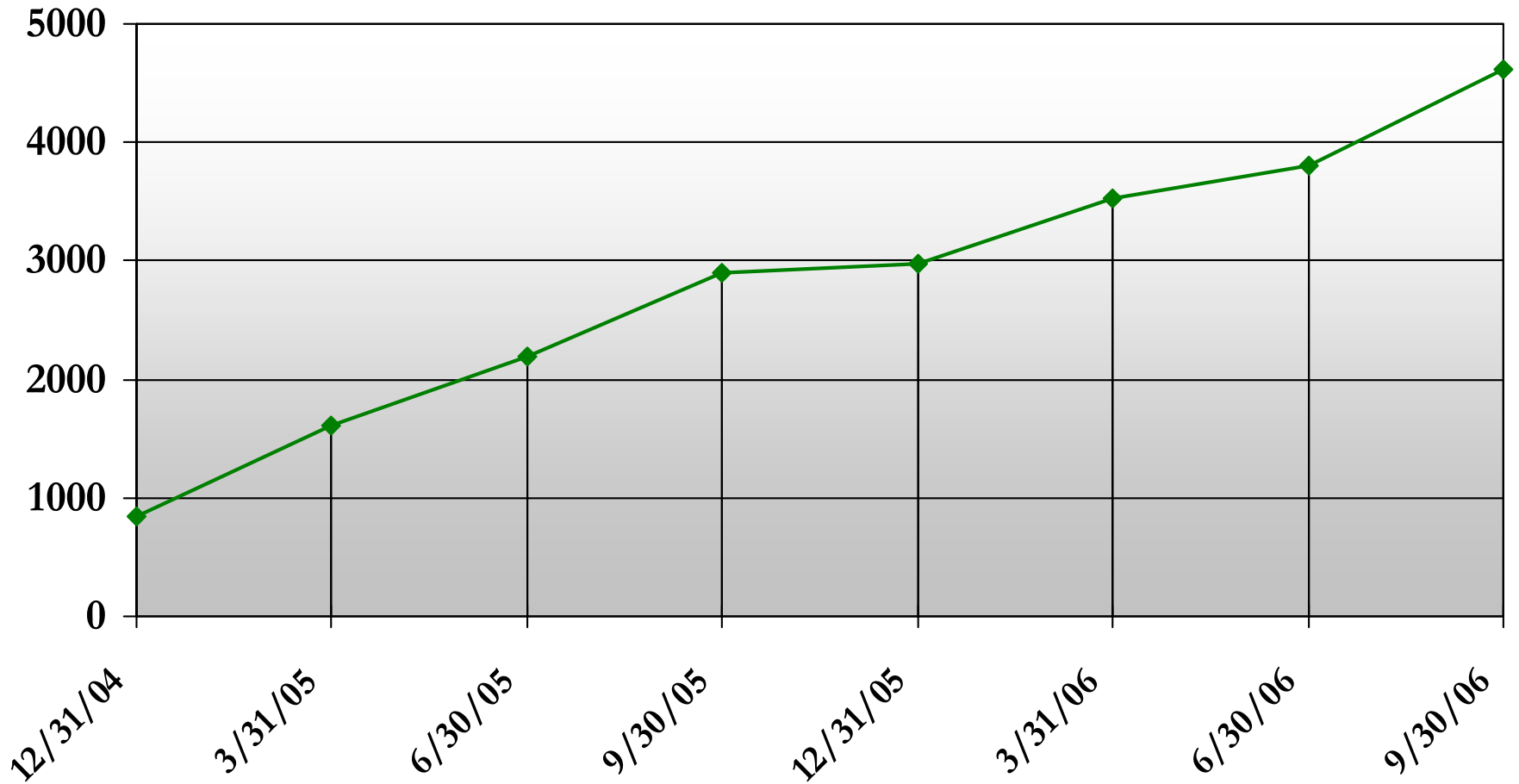
# Electronic Registries for Diabetes Management in WV

- 3 years of registry use
  - Two types of registries being used
    - PECS – supported by Health Disparities Collaboratives (4 sites)
    - CDEMS – supported by WVU Office of Health Services Research (OHSR) with funding from CDC/BPH (≈ 26 sites)
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# Health Centers with Established Electronic Patient Registries, by Quarter



# Number of Patients with DM in CDEMS & PECS Electronic Patient Registries, by Quarter



# The Chronic Disease Electronic Management System (CDEMS)

- CDEMS Developed by the Washington State DPCP. Modified by OHSR
- **Addressing the Care Model:**
  - Progress Note compiles info.
  - Clinic-wide summary reports on health outcomes and progress in meeting quality improvement goals
  - Lists of patients overdue for a visit, lab, other specialty service
  - Reminders letters for overdue visits, labs, services
  - Recommended guidelines / graphs used in patient education
  - Facilitation of individual patient care planning



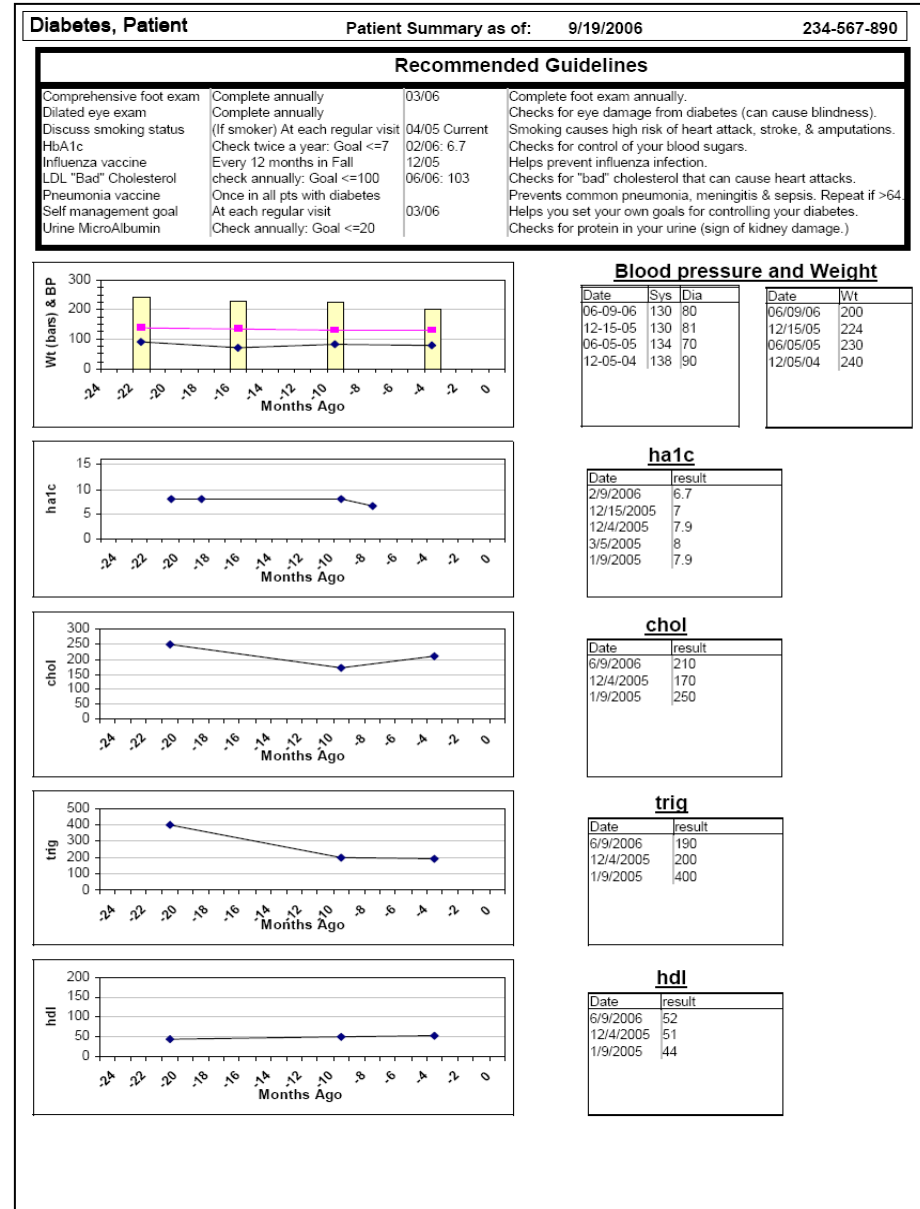
# CDEMS Tickler

- Highlights laboratory values and services that are either overdue or outside of recommended guidelines

This Visit	Last Visit	This Visit	CDEMS Progress Note 234-567-890 Clinic-Main														
Date mddy	06/09/06		LN	Diabetes	FN	Patient	DOB	01/01/01	Sex	F							
Weight (pds)	200	pds	Address	123 Street; City	Phone	(304) 555-5555	Age	5	BMI	33.2							
Height (ins)	65	inches	PLanguage	English	Ethnicity	Caucasia	PCP	Doctor	Migrant	N	Homeless	N					
BP-Sys/Dia	130/80		Other														
Profile	Dx	D/C	Add	Services	LDate	LResult	NDate	NResult	Ref	De	Measures	LDate	LResult	NDate	NResult	Ref	De
CAD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DM Ed							Potass						
CAD Family H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SM Goal	03/06						HbA1c	02/06	6.7				
CHF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nutrition Ed	03/06						MiAI/Crea ratio						
CVA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dental							Ser. Creatinine						
Depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Retinal Ex							Cholesterol	06/06	210				
DM-1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Smke Asmt	04/05	Current					Triglyceride	06/06	190				
DM-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Smke Ce							HDL	06/06	52				
HTN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foot chk	03/06						LDL	06/06	103				
Hyperlipidemia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foot risk Asmt							24HrUrineProtein						
Post MI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Depression Scr							ALT (SGPT)						
PVD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hospitalization	02/03						AST (SGOT)						
SelfMonitrBG	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flu Vac	012/0												
Nephropathy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pne Vac													
Neuropathy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ExerStress Tst													
Retinopathy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sub Abuse Scr													
Renal Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exercise x/wk	03/06	2											
Meds	Rx	D/C	Add														
Insulin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Sulfonylurea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Glucophage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Glitazones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Prandin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
AG Inhibitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
ACE Group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
ASA/antiplat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Lipid Agent	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Smoke Cess	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
												NOTE					
												NEW NOTE (leave blank if no change)					
												Next Visit Date <input type="text"/> Provider <input type="text"/>					

# CDEMS Graphed Results & Guidelines

- Indicates patient care needs
- Automatically updated as data is entered and imported
- Providers use this sheet in patient education and self-management goal setting
- Labs present on the sheet are customizable



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# OHSR's Initial Investigation of CDEMS:

## Methods

- 6 Federally Qualified Health Centers in rural WV
    - Sample was limited to health centers with diabetes patients who had received care (i.e., an office visit) during the year pre and post CDEMS implementation
  - Registry's initial data
    - Imported demographic data for patients with DM-I or DM-II from billing systems
    - Lab data was transferred electronically or hand-entered
    - Medical records were reviewed and baseline data was entered
  - Registry's maintenance
    - Lab data was transferred electronically or hand-entered
    - Patient information, e.g., weight, blood pressure, patient education and other services was gathered from Progress Note used by provider at point-of-care and hand-entered into registry
    - An updated Progress Note with new outliers identified was printed and filed with patient's chart for provider's subsequent use
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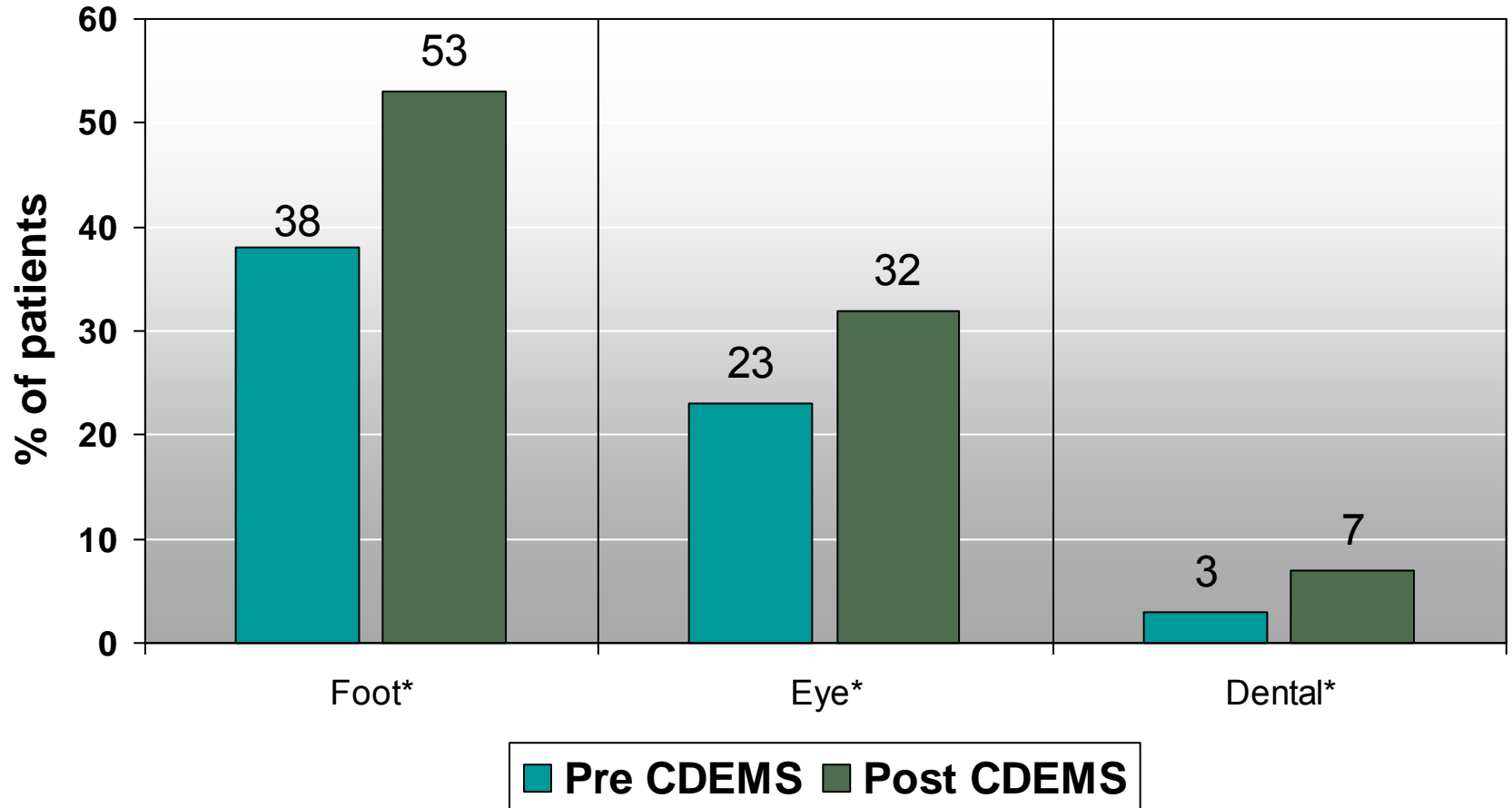
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# OHSR's Initial Investigation of CDEMS:

## Participants

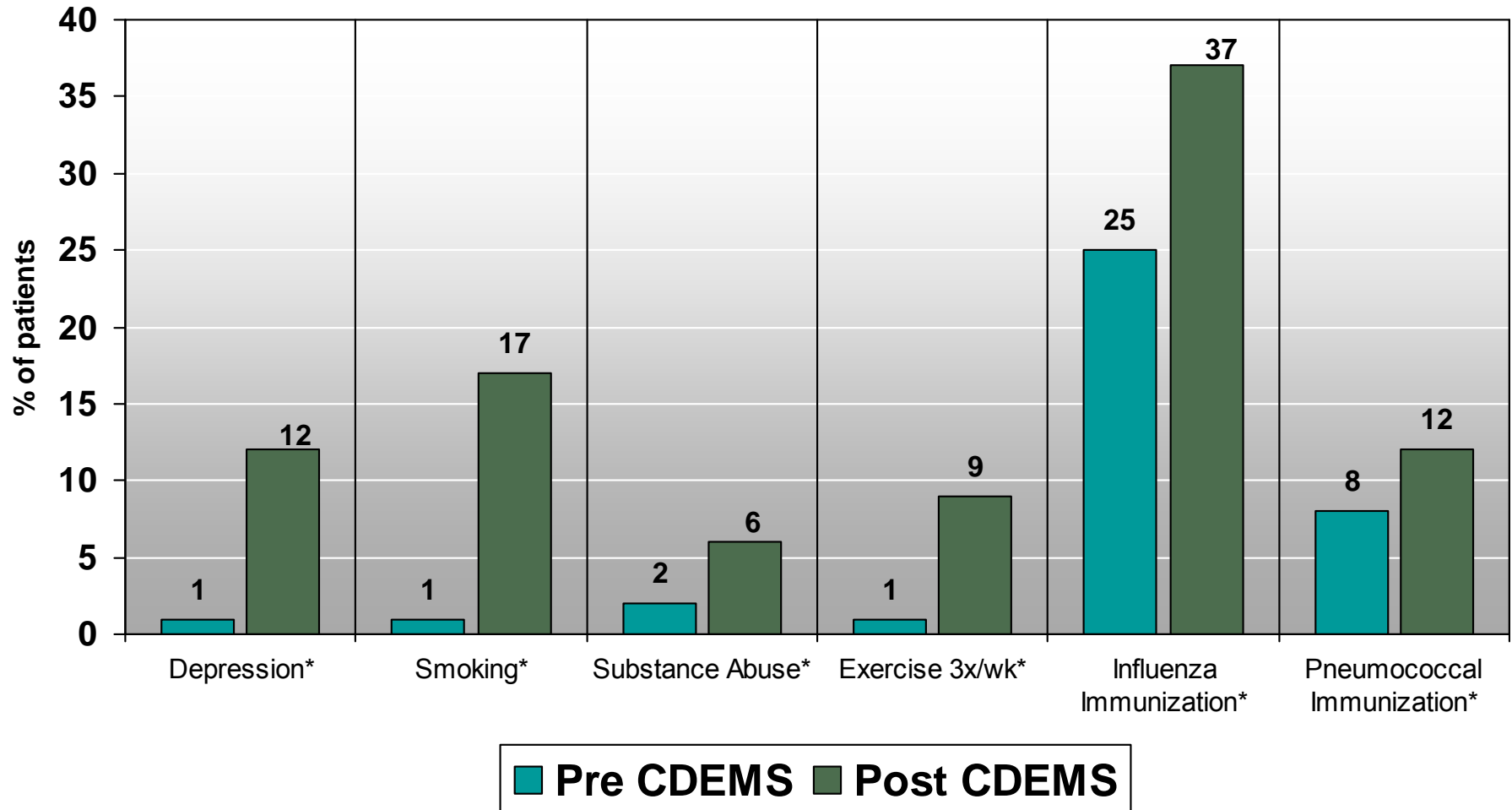
- N = 661
  - 95.3% type 2 diabetes
  - Ages 18- to 95-years-old;  
Mean age 60.24-years-old
  - 61.9% female
  - 31% of patients (N = 205) had providers who were members of the Health Disparities Collaborative (HDC)
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# Care Processes: Annual Examinations



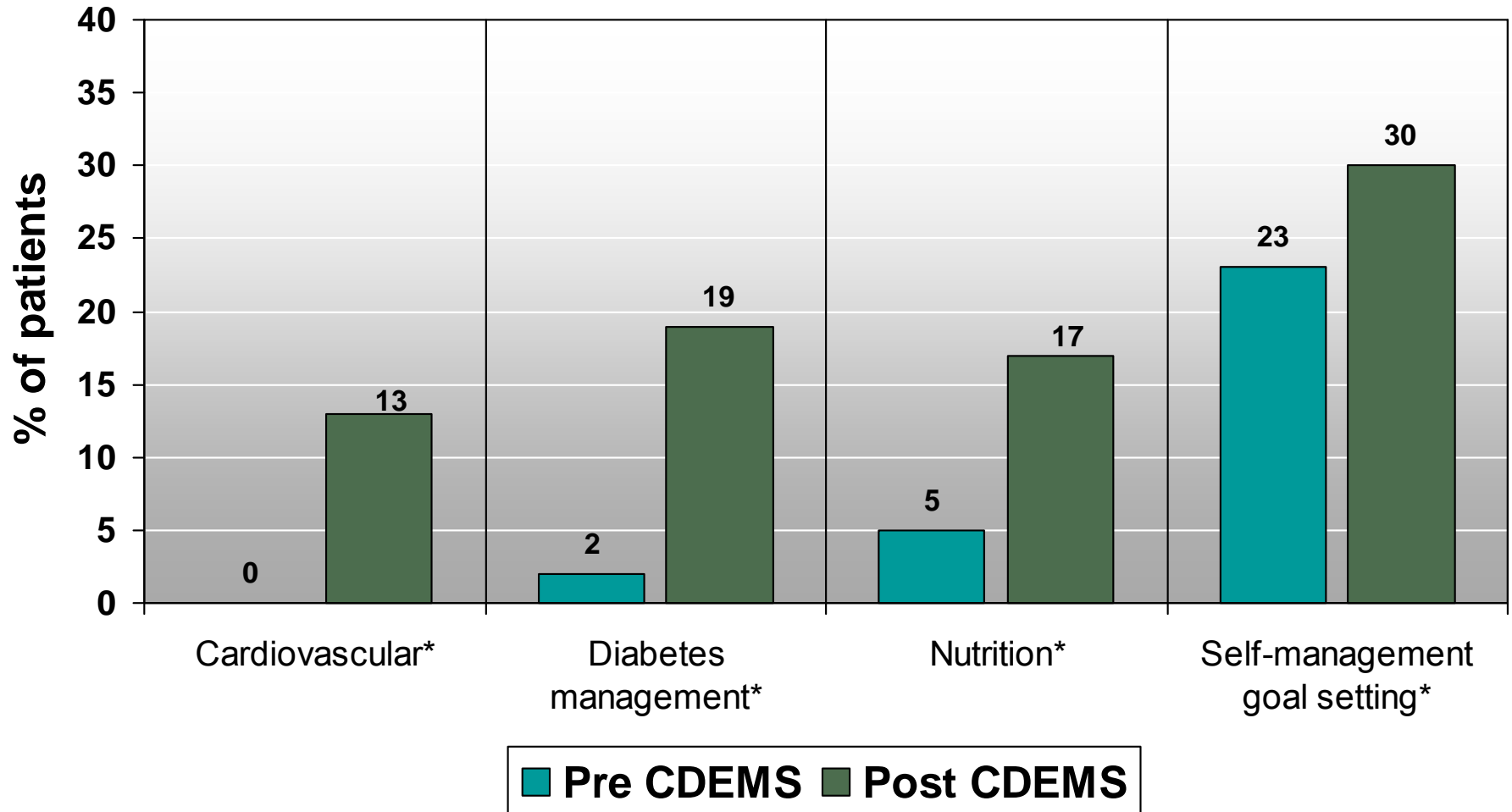
Note: \* =  $p < .05$

# Care Processes: Screens to Promote Wellness



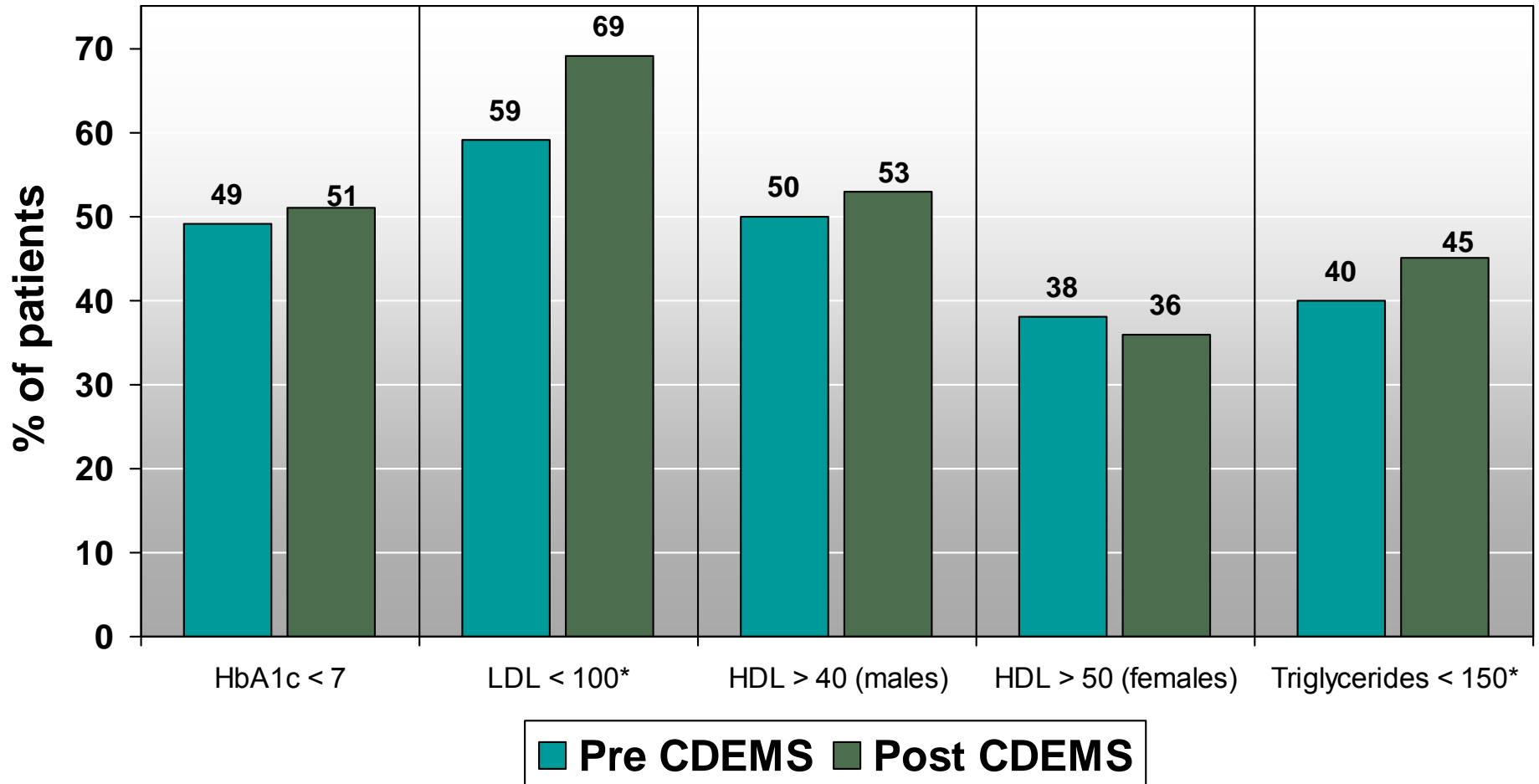
Note: \* =  $p < .05$

# Care Processes: Education



Note: \*= p<.05

# Clinical Outcomes: ADA Recommendations



Note: \*= p<.05

# Clinical Outcomes: Blood Pressure, BMI, Glycemic and Lipid Control

<b>Lab</b>	<b>Mean: Pre CDEMS</b>	<b>Mean: Post CDEMS</b>
<b>BMI</b>	<b>34.04</b>	<b>33.95</b>
<b>Systolic BP*</b>	<b>132.97</b>	<b>130.80</b>
<b>Diastolic BP*</b>	<b>76.97</b>	<b>74.77</b>
<b>HbA1c</b>	<b>7.34</b>	<b>7.33</b>
<b>HbA1c in patients with baseline &gt; 8.0%*</b>	<b>9.42</b>	<b>8.89</b>
<b>LDL*</b>	<b>95.54</b>	<b>87.36</b>
<b>HDL for males</b>	<b>41.87</b>	<b>42.56</b>
<b>HDL for females</b>	<b>47.63</b>	<b>48.04</b>
<b>Cholesterol*</b>	<b>180.84</b>	<b>170.99</b>
<b>Triglycerides*</b>	<b>212.10</b>	<b>193.43</b>

Note: \* = p < .05

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# Conclusions

- Simple registry utilization resulted in improved care and clinical outcomes
  - Results suggest that having a comprehensive display of patient information (from the CDEMS Progress Note) will drive improvements in provider and patient processes and outcomes
  - Limitations
    - Health Disparities Collaborative initiatives (31% of sample)
    - Other ongoing interventions
  - Future research
    - Larger sample
    - Control group
    - To what extent are improvements caused by interventions initiated by registry utilization
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