

The background features a complex network of blue lines, including solid, dashed, and dotted lines, some of which are curved. A prominent feature is a large blue circle containing a white cross with rounded ends. A vertical line with an upward-pointing arrowhead connects the bottom of this circle to the bottom edge of the slide. The overall aesthetic is clean and professional, using a light blue color palette.

*Techniques in Asthma
Management to
Improve Quality of Life
and Decrease
Hospitalization*

Anjum Khurshid, PhD, MBBS
Director Clinical Research & Evaluation
Integrated Care Collaboration (ICC)

Steve Conti, MBA, RRT, AE-C
Director of Disease Management
Seton Family of Hospitals

Outline

- Background
- Program Description
- Evaluation Methodology
- Data Sources
- Results
- Discussion
- Recommendations





Background

- >16 million Americans (7.3%)¹
- >6.8 million Children (9.3%)¹
- In 2005, >12 million office visits, 1.3 million hospital visits, 1.8 million ED visits¹
- Total cost of asthma >\$12.7 billion annually²

1. National Health Interview Survey 2006
2. Weiss, 2001. *J Allergy Clin Immunol*

Asthma in Texas

- 12.9% adults have ever been diagnosed asthma¹
- 8.2% adults have current asthma¹
- In 2005, 25000 hospitalizations²
- 12% respondents in Williamson and Travis Counties reported ever having asthma³

1. BRFSS 2007

2. Texas DSHS

3. SMART BRFSS 2007

Program Description

- Use I-Care database to identify patients
- Criteria:
 - One or more ED visits in last twelve months
 - One or more inpatient visits last twelve months
 - Two or more oral steroid prescriptions in last twelve months
 - More than four clinic visits in last twelve months
 - Where encounter occurred in previous 14 days
- Postcards and telephone (at least 3 attempts)





Central Data repository

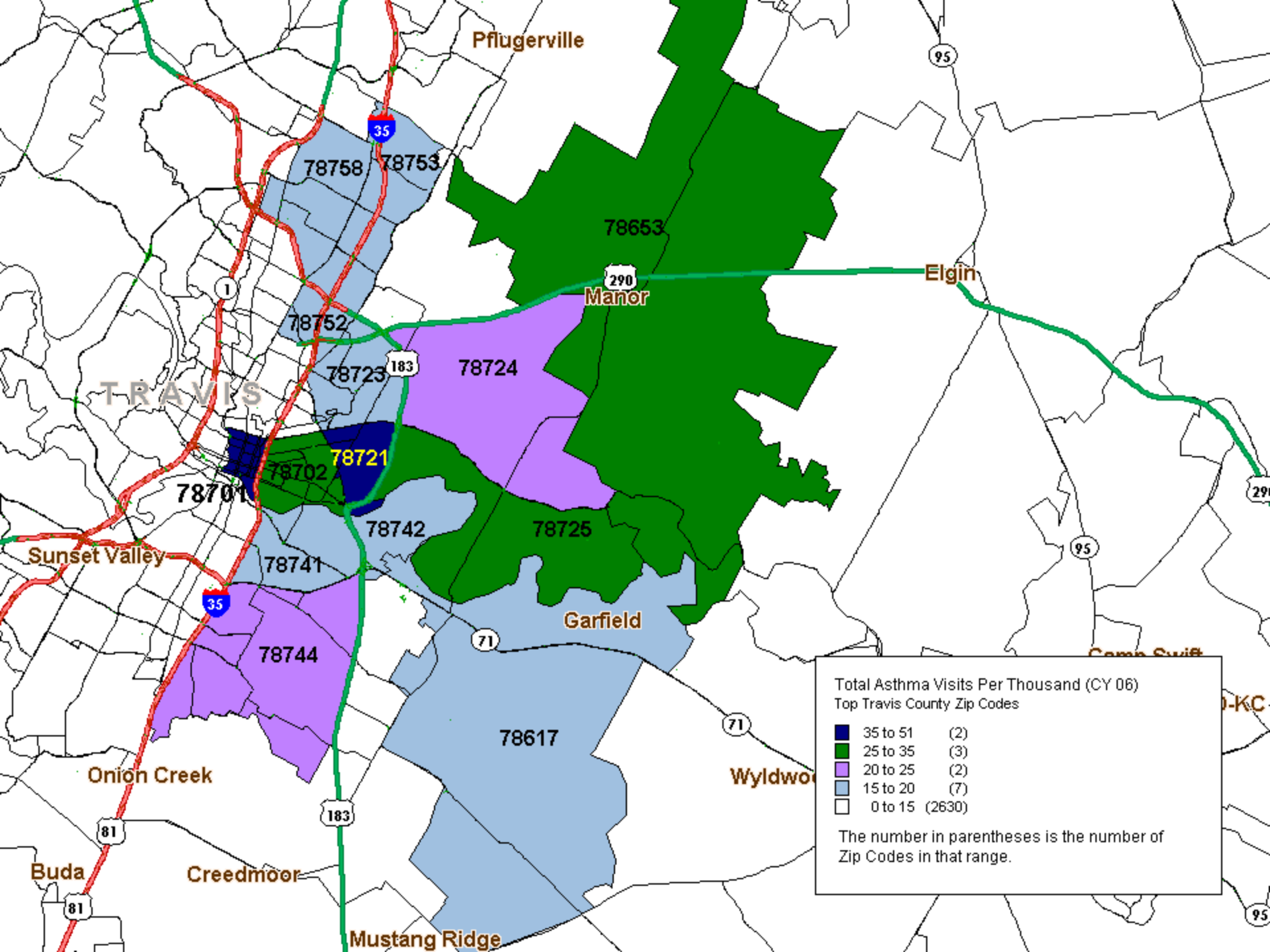
Backbone of the community health record

- HL7 interfaces with community safety net providers
- Aggregate data analysis
- Epidemiologic analysis
- Public health application
- Direct end-user data access

Data as of August 2008

- Data collected from over 60 locations:
 - 16 Hospitals
 - 45 Clinics
 - MHMR residential, group facilities
- Nearly 750,000 patients
- Nearly 5 million encounters
 - Data primarily from 2002 to date
 - Data includes ICD-9 Diagnosis, CPT-4 Procedure, Patient Demographics, Provider Name/Location
 - Encounter types include ED, Inpatient, Clinic, Dental, Non-Medical
- Nearly 750,000 prescriptions





Pflugerville

95

78758

78753

78653

290
Manor

Elgin

78752

78723

78724

TRAVIS

78721

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78701

78742

78725

Sunset Valley

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Garfield

95

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71

Onion Creek

Wylflow

9-KC

Buda

Creedmoor

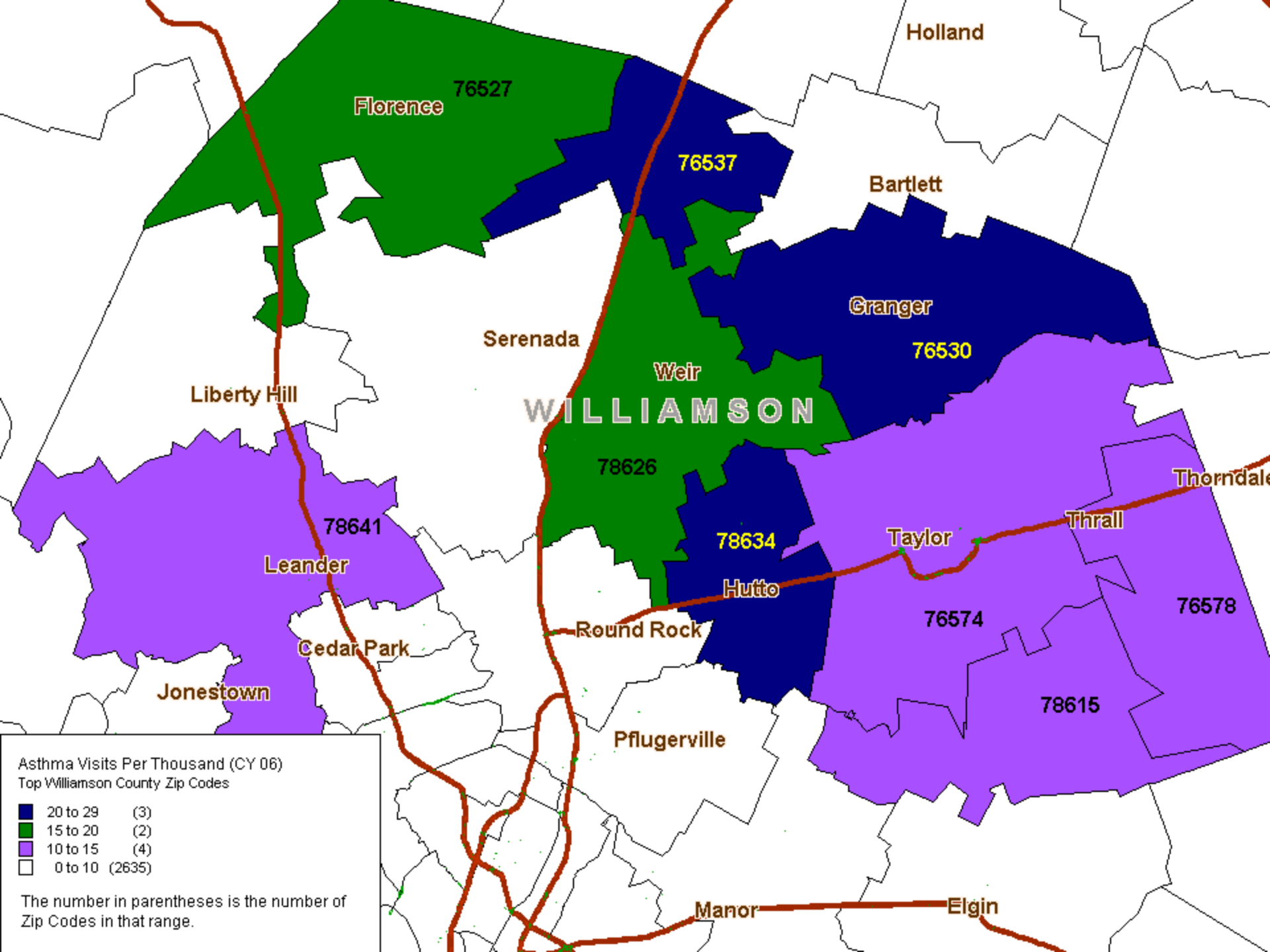
Mustang Ridge

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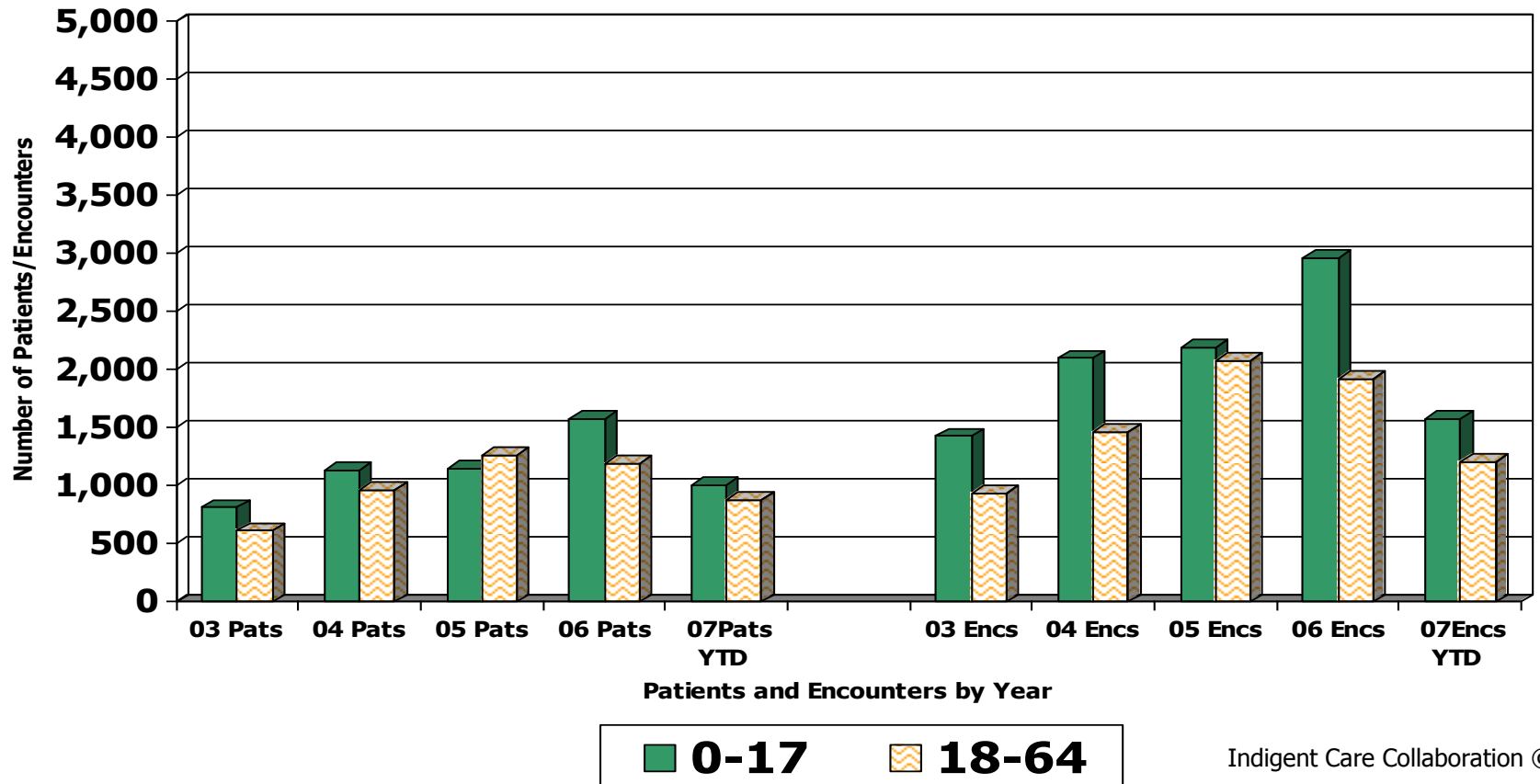
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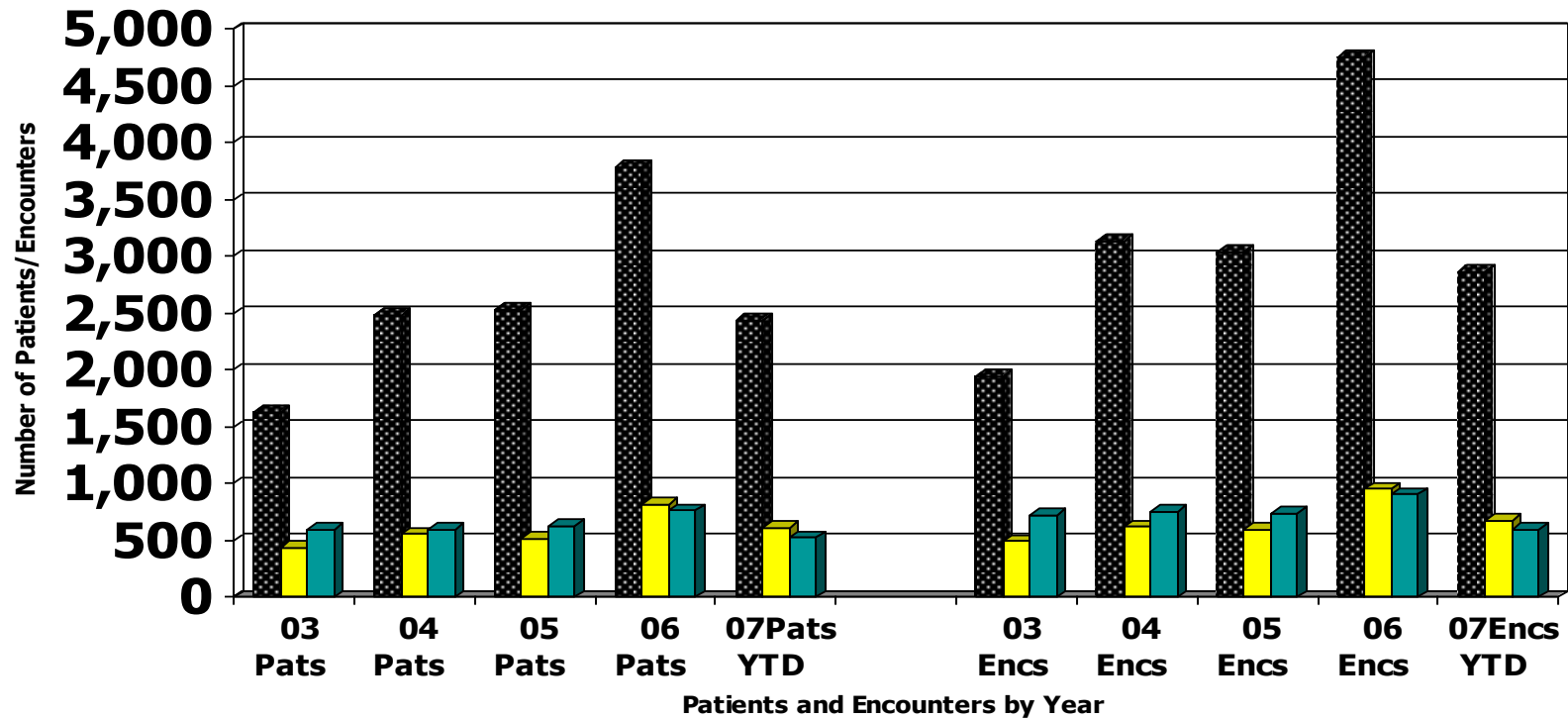
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All Clinics



All Hospitals



■ **Emergency Room**

■ **Inpatient**

■ **Outpatient**



Direct end-user functionality

Backbone of the chronic disease management

- Allows views of encounter history
- Allows views of pharmacy history
- Allows data extraction for aggregate analysis
- Allows data extraction for case discovery/review

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View option: Exclude per profile

Search by: Department Search

Click on a date to select an individual encounter; or check the boxes next to the encounters of interest and then click "Start Review". (Last updated - 2/24/2004 3:43:53 PM)

Encounter Review

	A	Date	Type	Dept	Provider	Description
<input type="checkbox"/>		02/16/2004	Emergency Room	BRCK		ONYCHIA OF FINGER;DIABETES UNCOMPL JUVEN-TYPE I
<input type="checkbox"/>		01/30/2004	Emergency Room	BRCK		
<input type="checkbox"/>		01/17/2004	Emergency Room	BRCK		DISORDER OF COCCYX NEC
<input type="checkbox"/>		01/08/2004	Outpatient	SNW		GLAUCOMA NOS;TOBACCO USE DISORDER;HYPERTENSION NOS;PERS HX CIRCULATORY DIS NEC;DIABETES UNCOMPL ADULT-TYPE II
<input type="checkbox"/>		12/22/2003	Outpatient	SNW		GLAUCOMA NOS;TOBACCO USE DISORDER;HYPERTENSION NOS;PERS HX CIRCULATORY DIS NEC;DIABETES UNCOMPL ADULT-TYPE II
<input type="checkbox"/>		12/12/2003	Clinic Visit	ATCRZ		DIAB NEURO MANIF JUVEN-UNCONTRLLD
<input type="checkbox"/>		12/04/2003	Emergency Room	BRCK		PERIAPICAL ABSCESS;UNSPEC DENTAL CARIES
<input type="checkbox"/>		11/29/2003	Emergency Room	BRCK		
<input type="checkbox"/>		11/19/2003	RXHX			
<input type="checkbox"/>		11/14/2003	Emergency	BRCK		

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<input type="checkbox"/>	11/09/2003	Emergency Room	BRCK		
<input type="checkbox"/>	11/03/2003	RXHX			
<input type="checkbox"/>	11/03/2003	Clinic Visit	ATCRZ	MARCUS WELBY	DIABETES UNCOMPL ADULT-TYPE II
<input type="checkbox"/>	10/18/2003	Emergency Room	BRCK	HARRY JEKYL	
<input type="checkbox"/>	09/29/2003	RXHX			
<input type="checkbox"/>	09/29/2003	Clinic Visit	ATCRZ	MARCUS WELBY	DIAB W COMPL NOS JUVEN
<input type="checkbox"/>	09/25/2003	RXHX			
<input type="checkbox"/>	09/25/2003	Emergency Room	SMCC		CONVULSIONS, OTHER;NAUSEA WITH VOMITING;DIABETES UNCOMPL ADULT-TYPE II
<input type="checkbox"/>	09/07/2003	Inpatient	SMCC		POISONING-HYDANTOIN DERIVAT;CONVULSIONS, OTHER;DIAB KETOACIDOSIS JUVEN;HYPOVOLEMIA;SCHIZOPHRENIA NOS-UNSPEC
<input type="checkbox"/>	09/02/2003	RXHX			
<input type="checkbox"/>	08/13/2003	RXHX			
<input type="checkbox"/>	07/25/2003	RXHX			
<input type="checkbox"/>	07/07/2003	RXHX			
<input type="checkbox"/>	05/30/2003	Outpatient	BRCK		CONVULSIONS, OTHER
<input type="checkbox"/>	05/29/2003	Emergency Room	BRCK	DAVID LIVINGSTONE	
<input type="checkbox"/>	05/22/2003	Emergency	BRCK	RUTH	

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Patient Information

Patient IDs	ID Type	ID #
	ICC	26
	SETON NETWORK HOSPITAL	SH11
	BRACKENRIDGE HOSPITAL	B11
	ATC CLINICS	A11

Patient Information	Patient Name	Sex	DOB
	Verysick, Velma (A11)	Female	01/01/1982

Visit Summary

Visit Information	Date	Enc Type	Location	Provider
	1/16/03	Clinic Visit	ATC RZ	DOC SEVERINSEN

Diagnoses [Visit Diagnosis](#)
DIABETES UNCOMPL JUVEN-TYPE I [250.01]

Order Summary [Orders](#)
REAGENT STRIP/BLOOD GLUCOSE [82948] **Order #:** 57
INSULIN INJECTION [J1820] **Order #:** 58

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Wed Sep 5, 2007 **Steve Conti**

My Reports Edit

- Weekly Ddm Report
- Qtr Ddm
- Chron Ob Pulm Dis
- Chron Ob Pulm Dis Qtr
- lccasthmanetwork_authed
- lccasthmanetworksfh

Data identify patients at risk



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Type a question for help

AD1

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Sheet1

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Data identify patients at risk



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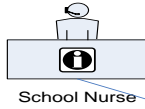
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Sheet1

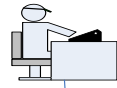
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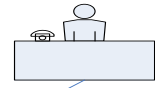
School Nurse



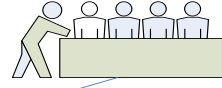
Hospital



Self-referral



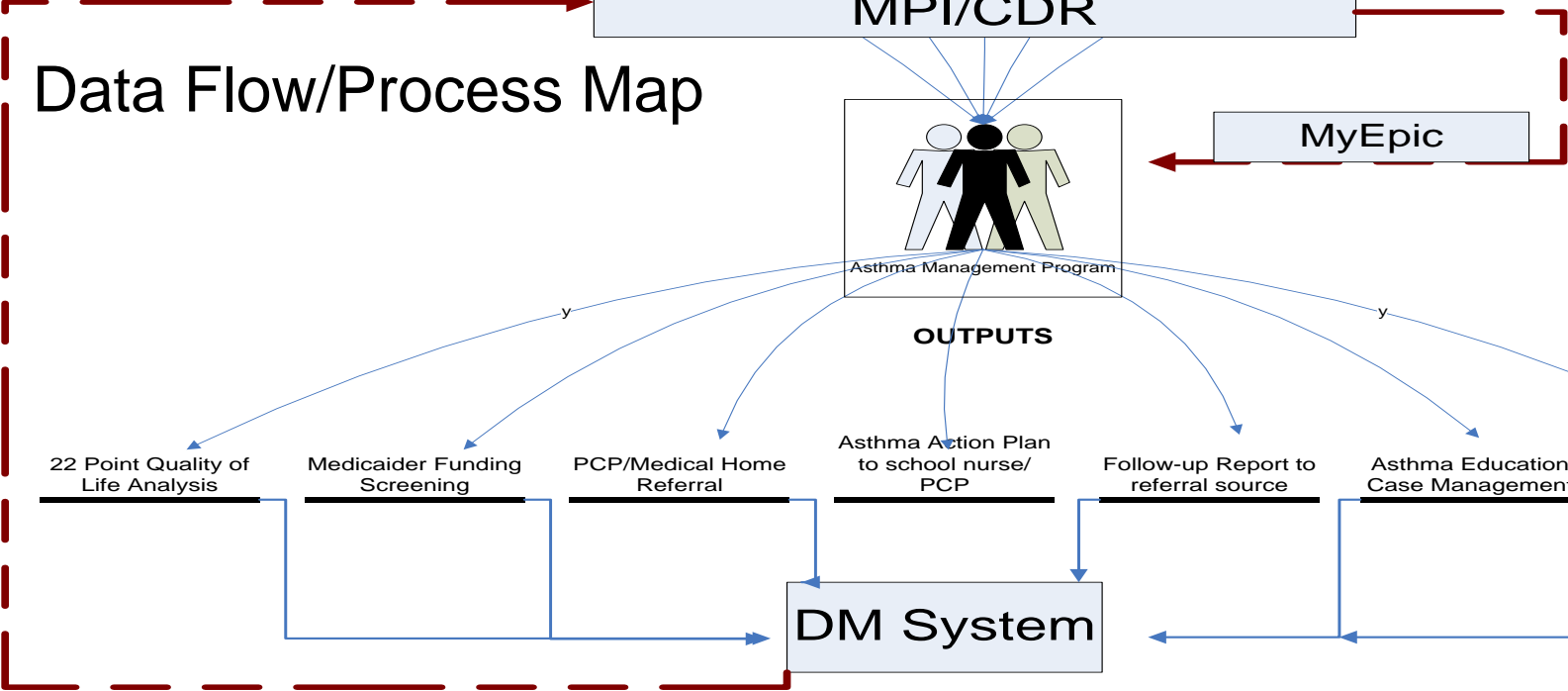
SETON Clinics



Other Physicians



MPI/CDR



Data Flow/Process Map

MyEpic



Asthma Management Program

OUTPUTS

22 Point Quality of Life Analysis

Medicaider Funding Screening

PCP/Medical Home Referral

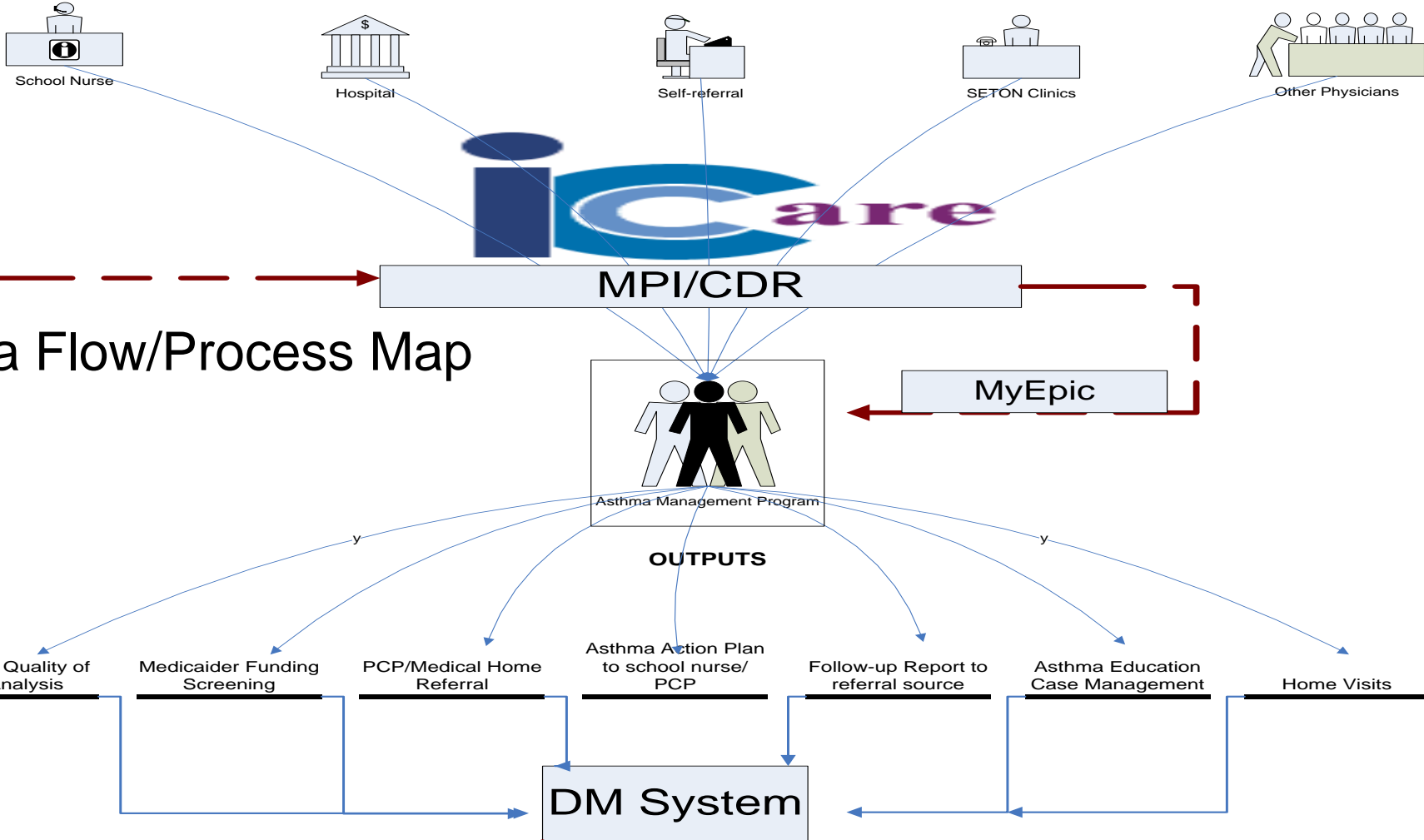
Asthma Action Plan to school nurse/PCP

Follow-up Report to referral source

Asthma Education Case Management

Home Visits

DM System



Asthma Program Goals

- Decrease in hospital utilization
- Improvement in Quality of Life
- Improvement in spirometry
- Decrease in daytime and nighttime symptoms
- Increase in physical activity
- Decrease in school/work absence
- Decrease in rescue medication usage
- Improved compliance with controller medication
- Improved self-management of asthma



Program Intervention

Interventions provided through Registered Respiratory Therapist:

- Asthma education program
- Asthma Action Plan
- Case Management/ Care Coordination
- ICC's *Medicaider*® Program
- Quality of Life Surveys



Evaluation Methodology



- Purpose:
 - to assess achievement of program goals and evaluate effectiveness of strategies
- Conceptual Framework:
 - Precede/Proceed Model¹
 - Wagner's Chronic Care Model²
 - CDC's guidelines for evaluation of public health programs³

1. Green & Kreuter, 2004
2. Wagner 1998
3. CDC 1999

Process Evaluation



Process Measures	Data Source
Patients categorized according to NHLBI/NAEPP Guidelines by severity of asthma	PECSYS
Patients completing Quality of Life (QoL) surveys	QoL Surveys
Patients with persistent asthma given a written AAP	PECSYS
Patients who complete follow-up surveys	QoL Surveys
School-aged children who have action plan at school	PECSYS
Patients receiving training on using Peak Exploratory Flow Rate (PEFR) meters	PECSYS
Patients receiving education on use and care of inhaler	PECSYS
Patients receiving education about asthma triggers	PECSYS
Patient satisfaction with program	Patient Satisfaction Surveys

Outcome Evaluation

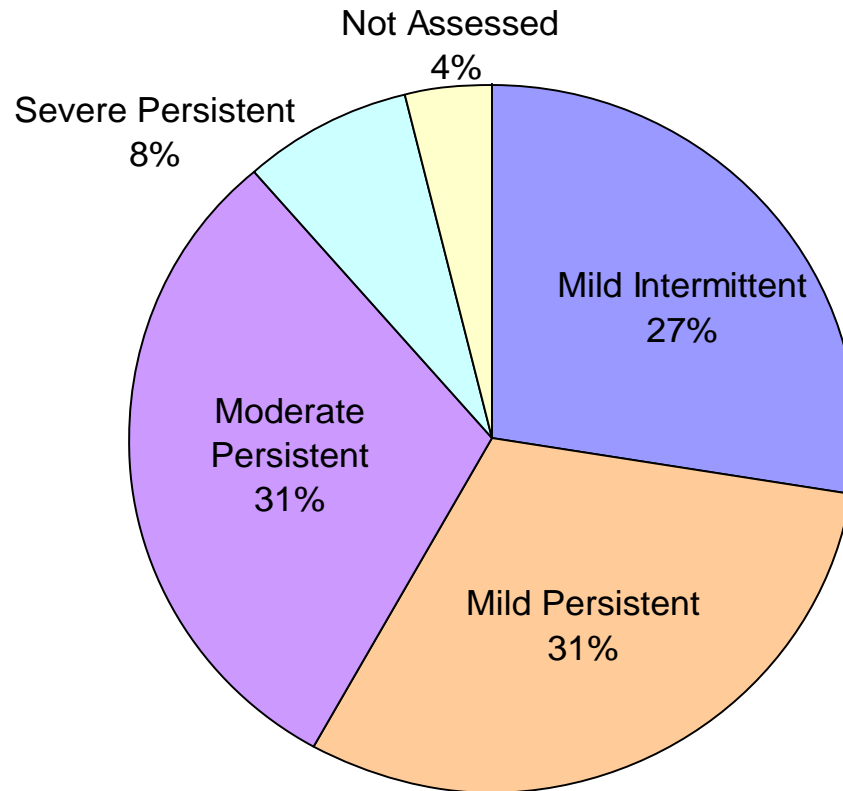


Outcome Measures	Data Source
Average number of Emergency Department (ED) visits per patient	I-Care
In-Patient (IP) visits per patient	I-Care
Average length of stay per patient	I-Care
Patients with symptom-free days	QoL Survey
Patients with symptom free nights	QoL Survey
Patients with physically active days	QoL Survey

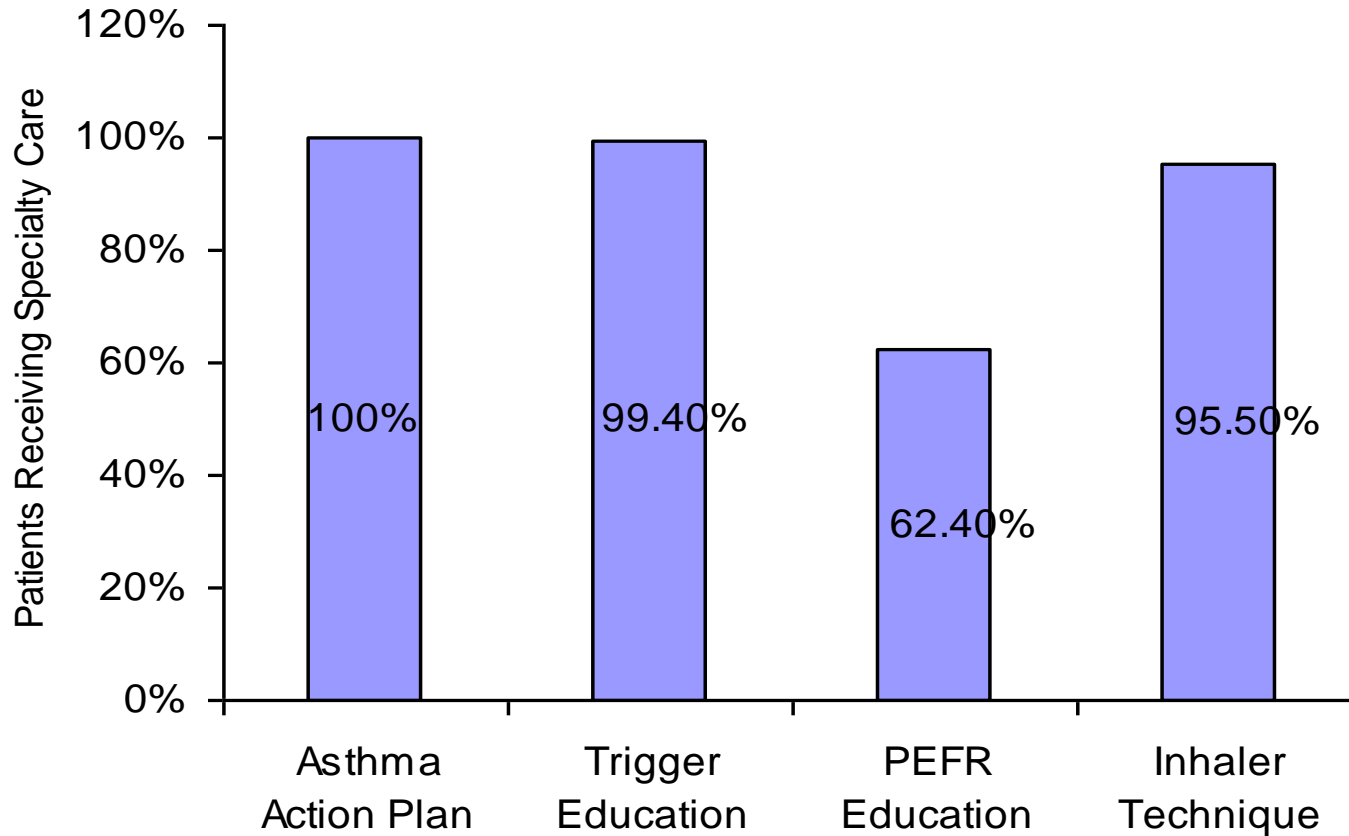


Results

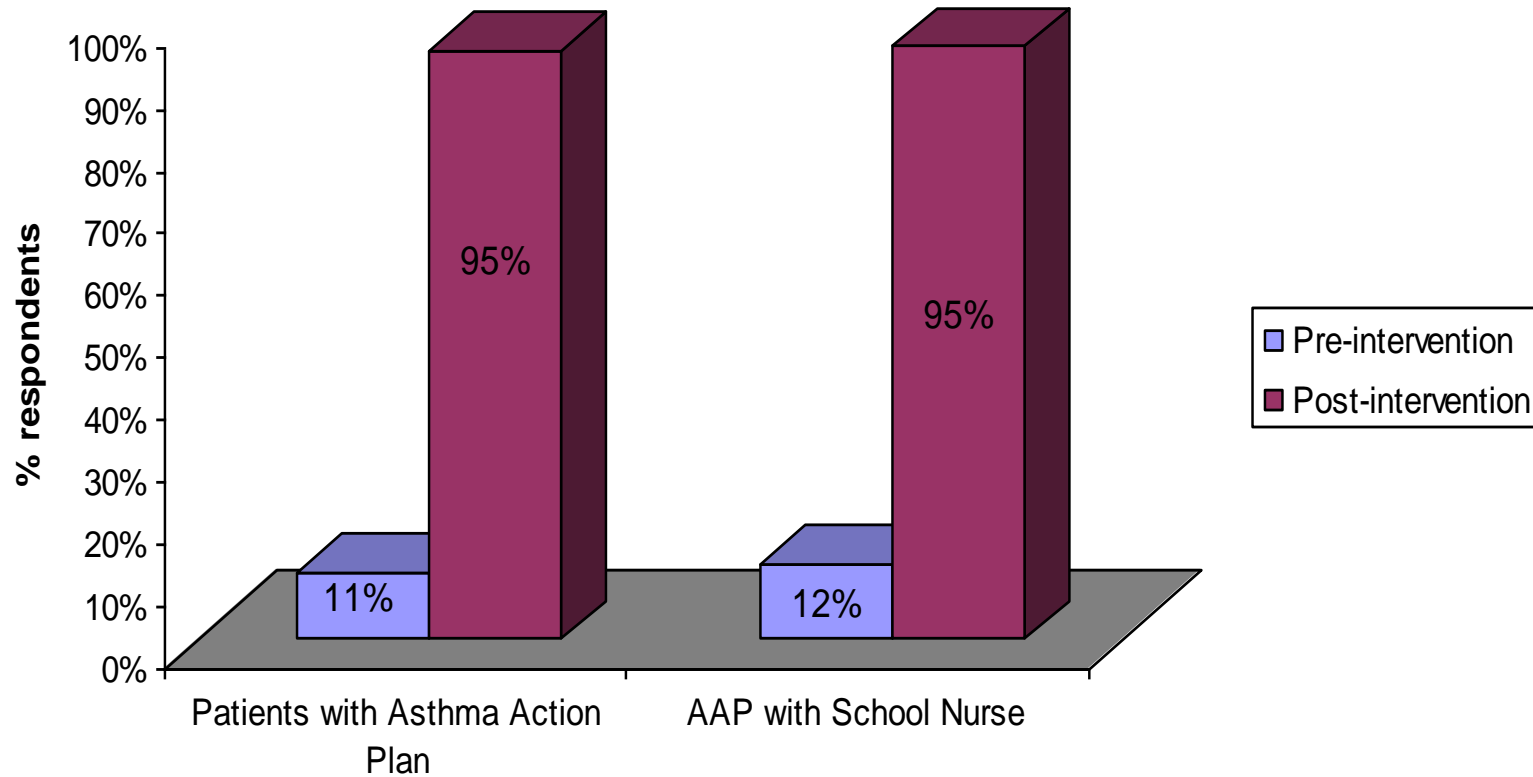
Underlying asthma severity categorization at enrollment



Delivery of specialty care services



Percentage of enrolled patients with Asthma Action Plan



Patient Satisfaction Surveys



Survey Question	Respondents	Average Response (1-5)
Methods used to support learning were helpful to me	107	5
The pace of the offering was appropriate for me	107	4.98
The facilities were appropriate to learning	107	4.99
The informational materials provided were clear and understandable	106	5
The instructor had the subject matter expertise to provide instruction	106	5
The instructor created an environment that supported learning	107	5
The information provided will help me control my asthma	105	4.99
Overall satisfaction score	107	99.36%

Utilization of medical services by enrolled patients



n=172

Pre-intervention

Post-intervention

ED visits

99

36

IP visits

33

2

Encounters

132

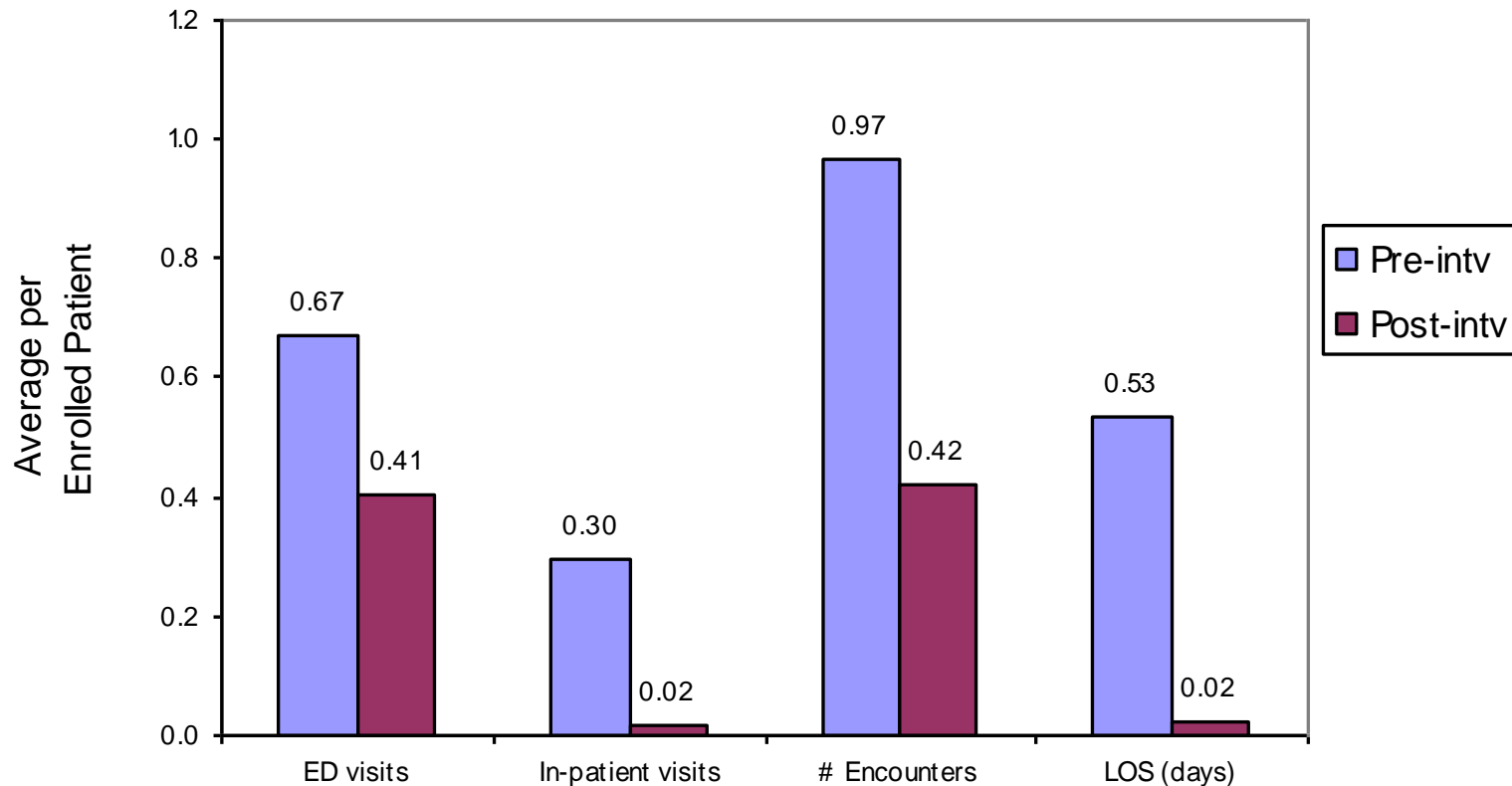
38

Total LOS (days)

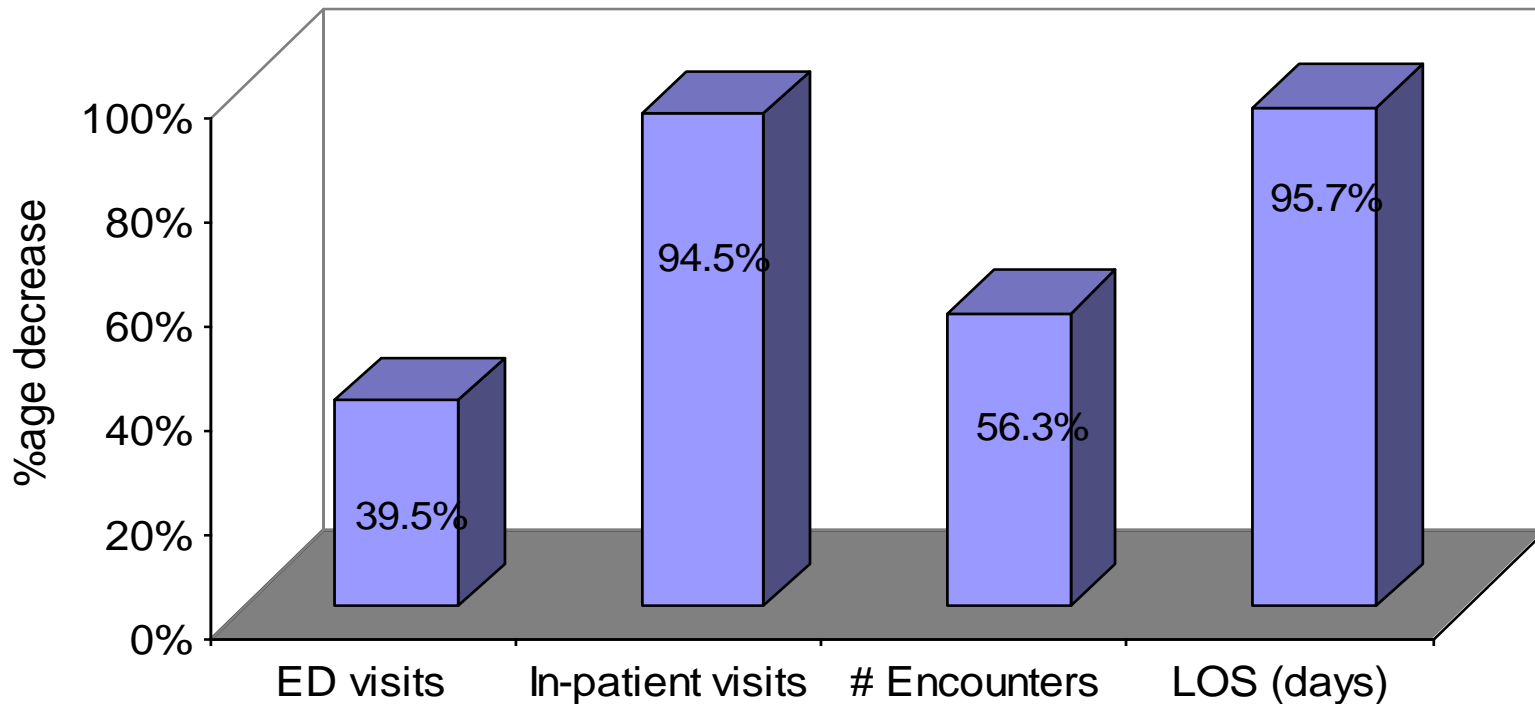
62.9

3.5

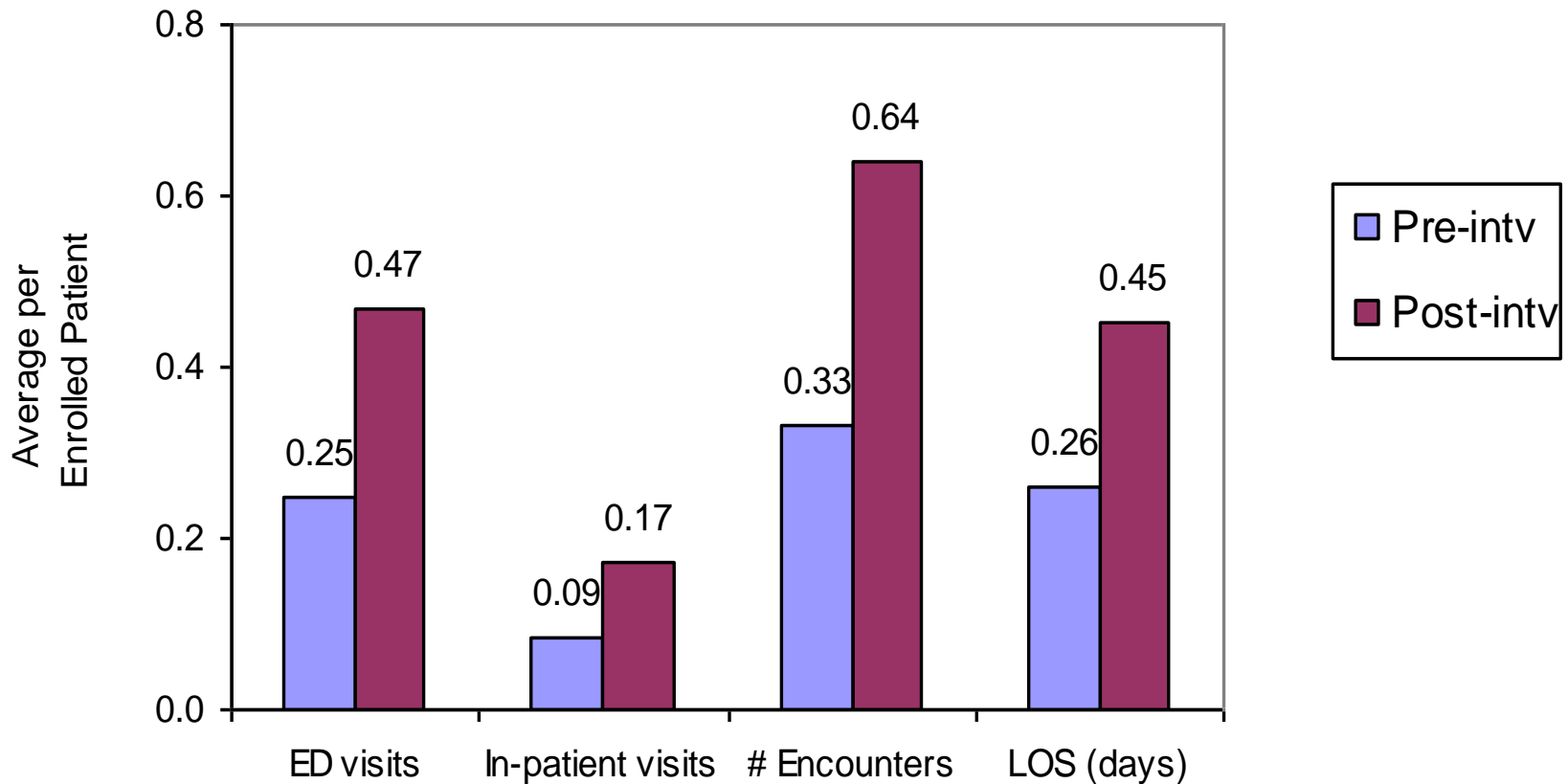
Average utilization by >6 months enrolled patients (extrapolated mean)



Percentage decrease in utilization by >6 months enrolled patients (extrapolated mean)

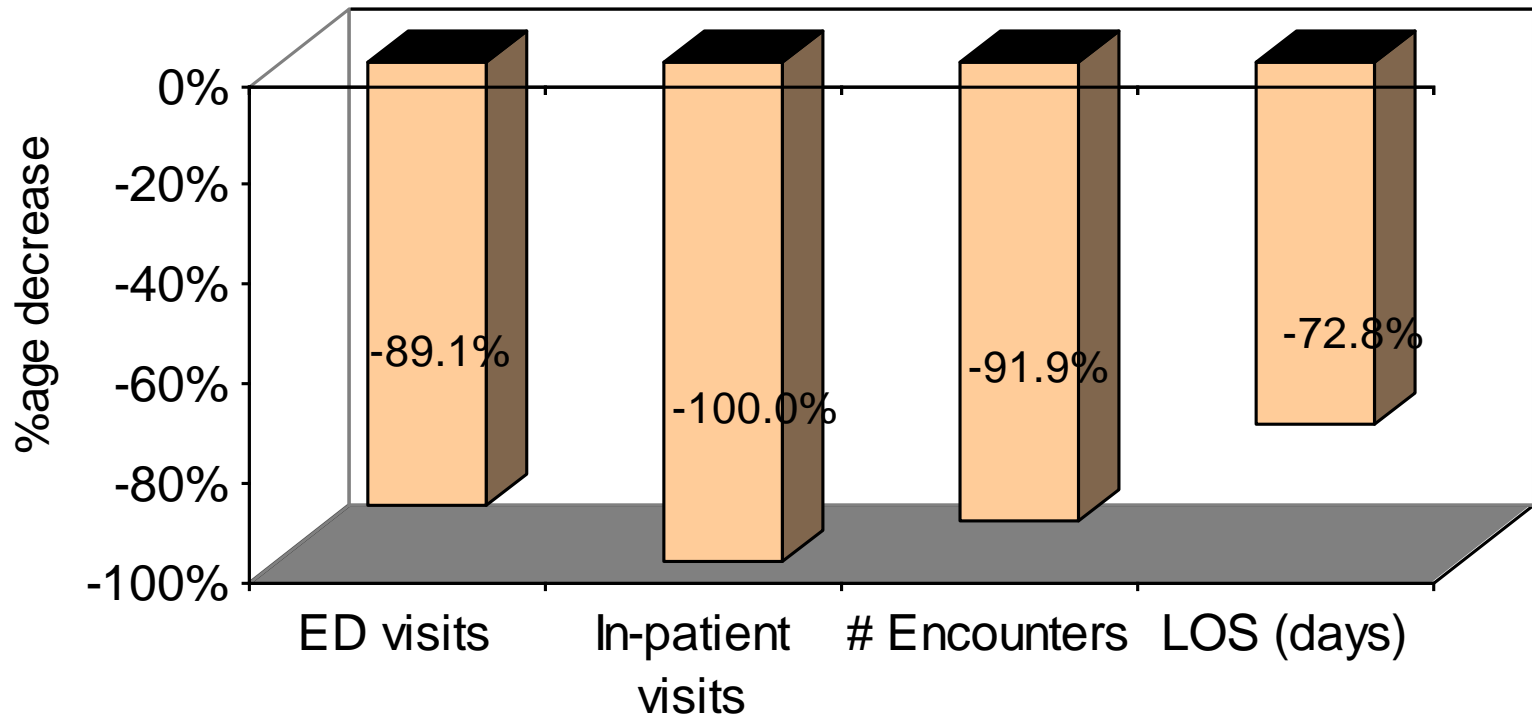


Average utilization by control group

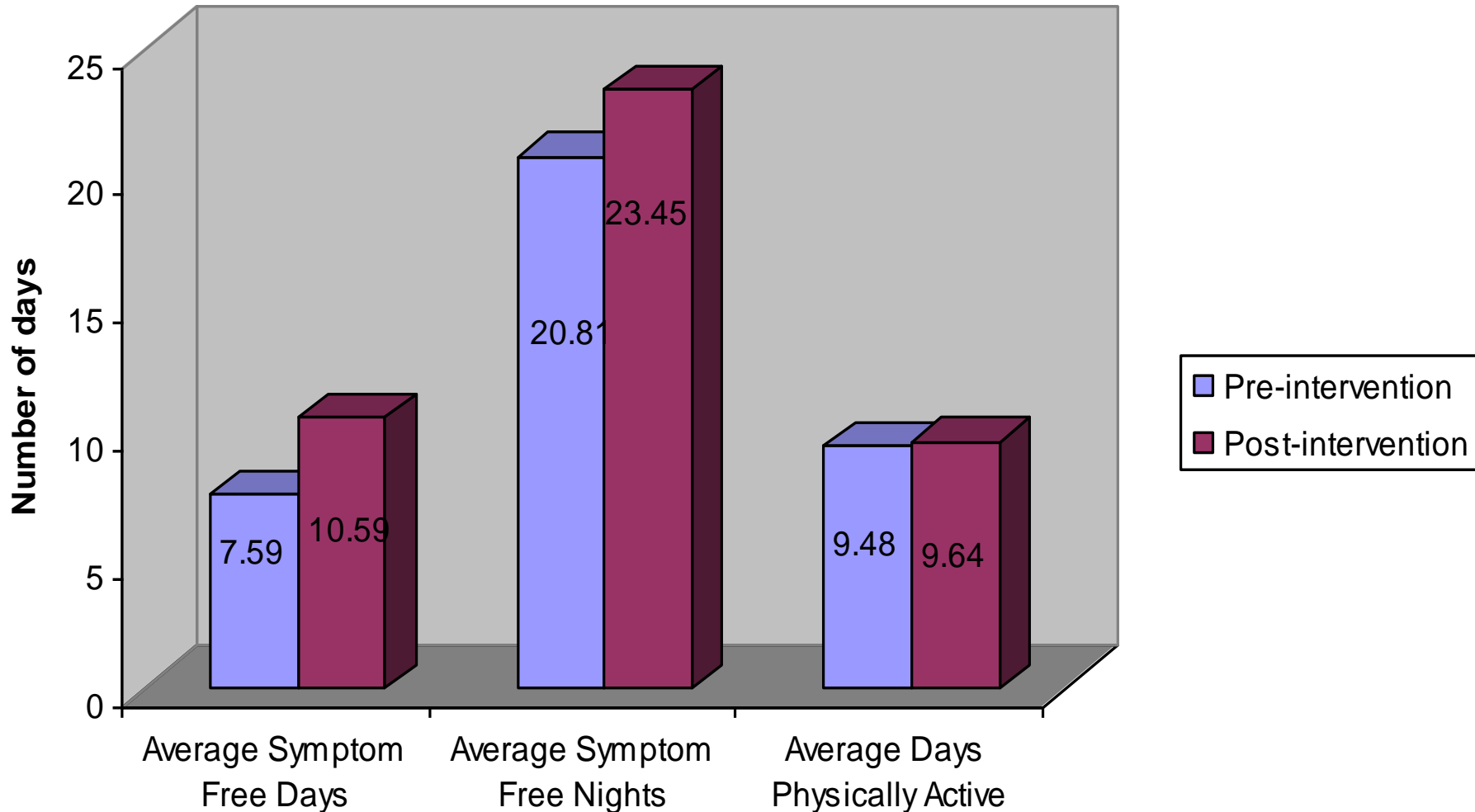




Percentage decrease in average utilization by control group



Quality of Life Survey Results





Financial benefit using program effect on patients with more than 6 months duration and using proxy pricing methodology

<i>n=172</i>	
Total operating expenditures (reported) (salaries + benefits + other expenses (supplies + printing etc))	=\$ 98,489
Potential saving in ED visits (decrease by 40%) <i>total ED visits * Proxy cost per visit * estimated reduction in ED visits post-intervention</i>	=\$ 40,798
Potential saving in IP visits (decrease by 95%) <i>total IP visits * Proxy cost per visit * estimated reduction in IP visits post-intervention</i>	=\$ 247,911
Net benefit for enrolled patients using program effect on patients with >6 months in the program <i>(Potential savings in ED+IP visits) – Total operating expenditures</i>	=\$ 190,130

Potential financial benefit for control group patients if given the intervention and using proxy pricing

<i>n=172</i>	
Total operating expenditures (reported) (salaries + benefits + other expenses (supplies + printing etc))	= \$ 98,489
Potential saving in ED visits (decrease by 129%) <i>total ED visits * Proxy cost per visit * estimated reduction in ED visits post-intervention</i>	= \$ 132,431
Potential saving in IP visits (decrease by 195%) <i>total IP visits * Proxy cost per visit * estimated reduction in IP visits post-intervention</i>	= \$ 505,148
Net benefit of the potential effect on control-group patients <i>(Potential savings in ED+IP visits) – Total operating expenditures</i>	= \$ 539,089
Return on Investment Ratio for the program <i>net benefit/total operating expenditure</i>	= 5.5

Discussion

- Underlying assumptions
 - Conditions hold over longer period
 - Diagnosis of asthma in patient record is accurate description of the cause of visit
 - No systematic bias in enrollment
 - Self-reported data are accurate
 - Cost and expenditure data are scalable without transformation



Literature Review



Author/Date/Journal	Intervention	Results
Guttman et al, 2007, <i>Pediatrics</i>	Home visits by an asthma educator	reduction in ED visits for children
Kotses et al, 1995, <i>J Allergy Clin Immunol</i>	Self-management asthma program	Reduced physician visits and asthma symptoms
Dwan, 2002, <i>Respir Care</i>	Case management program using RCP	Reduced ED (56%) and IP (39%) visits
Kropfelder et al, 1997, <i>Pediatr Nurs</i>	Case management program for children	Reduced ED (50%) and IP (66%) visits
Lieu et al, 1998, <i>Pediatrics</i>	Written management plans	Reduced ED (55%) and IP (46%) visits

Recommendations

- Expand the program
- Improve enrollment efforts
- Scientific evaluation methodology adopted before the start of an intervention/program
- Longer follow-up of patients
- Enhance I-Care database capability to provide detailed clinical and payer data
- Use I-Care database to coordinate care for other chronic diseases in community
- Further analysis of these data to include age-adjusted visit rates and regression analysis



Conclusions

- ICC-Asthma Network successfully demonstrates benefits of patient education and case management for asthma
- Lays foundation for a community-wide effort
- Key role of I-Care database in identifying & tracking patients and in evaluating such programs

