# Using Analytics to Improve Care Management

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# Premier Medical Associates

Eastern suburbs Pittsburgh, PA

Formed 1993

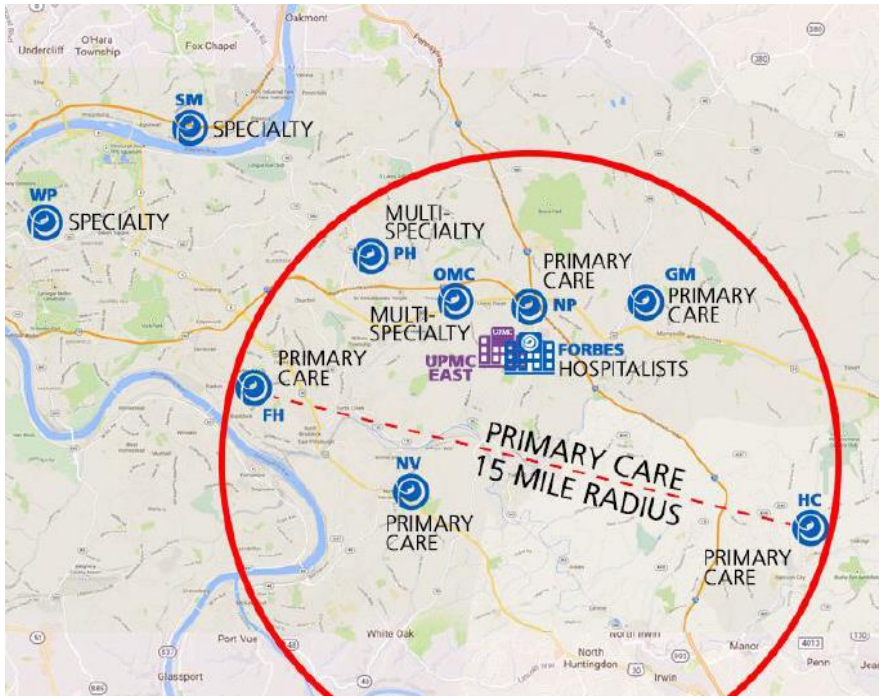
100 providers

1:1 PCP to specialists

7 adult PCP locations

Part of Highmark Health/
Allegheny Health network IDFS

Allscripts Touchworks




Provided care to more than 100,000 lives

All adult and pediatric offices have
Level 3 PCMH certification

**2018**

377,000 patient visits

## Specialties

- Allergy and immunology
- Audiology
- Behavioral Health
- Cardiology
- Electrophysiology
- Dermatology
- Ear, Nose & Throat
- Family Medicine
- Gastroenterology
- General and Breast Surgery
- Hospitalists
- Infectious Disease
- Internal Medicine
- Laboratory Services
- Neurology
- Ophthalmology
- Optometry
- Pain Management
- Pediatrics
- Pulmonology
- Radiology
- Rheumatology
- Sleep Medicine

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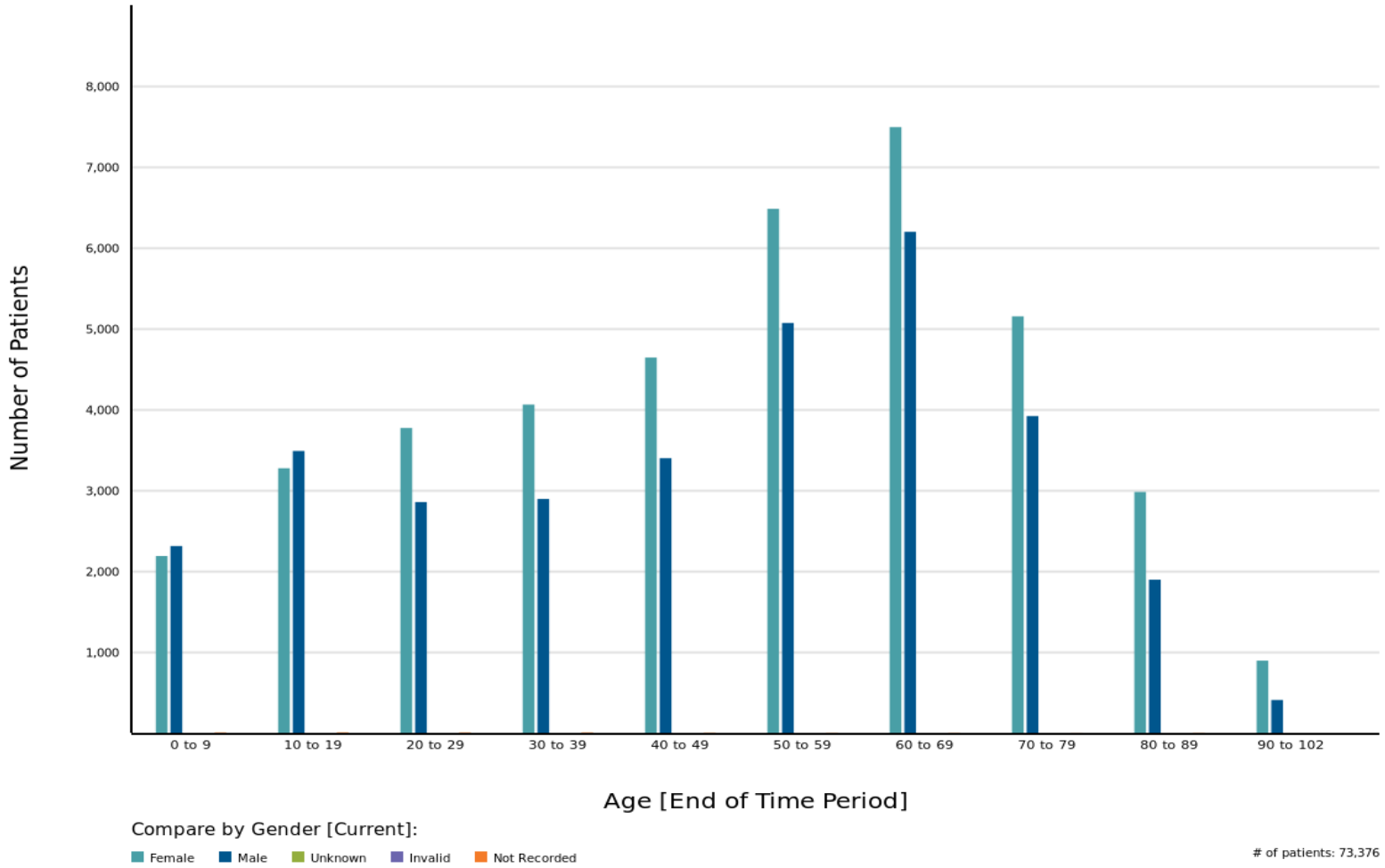
# AAP: Patients by age and gender

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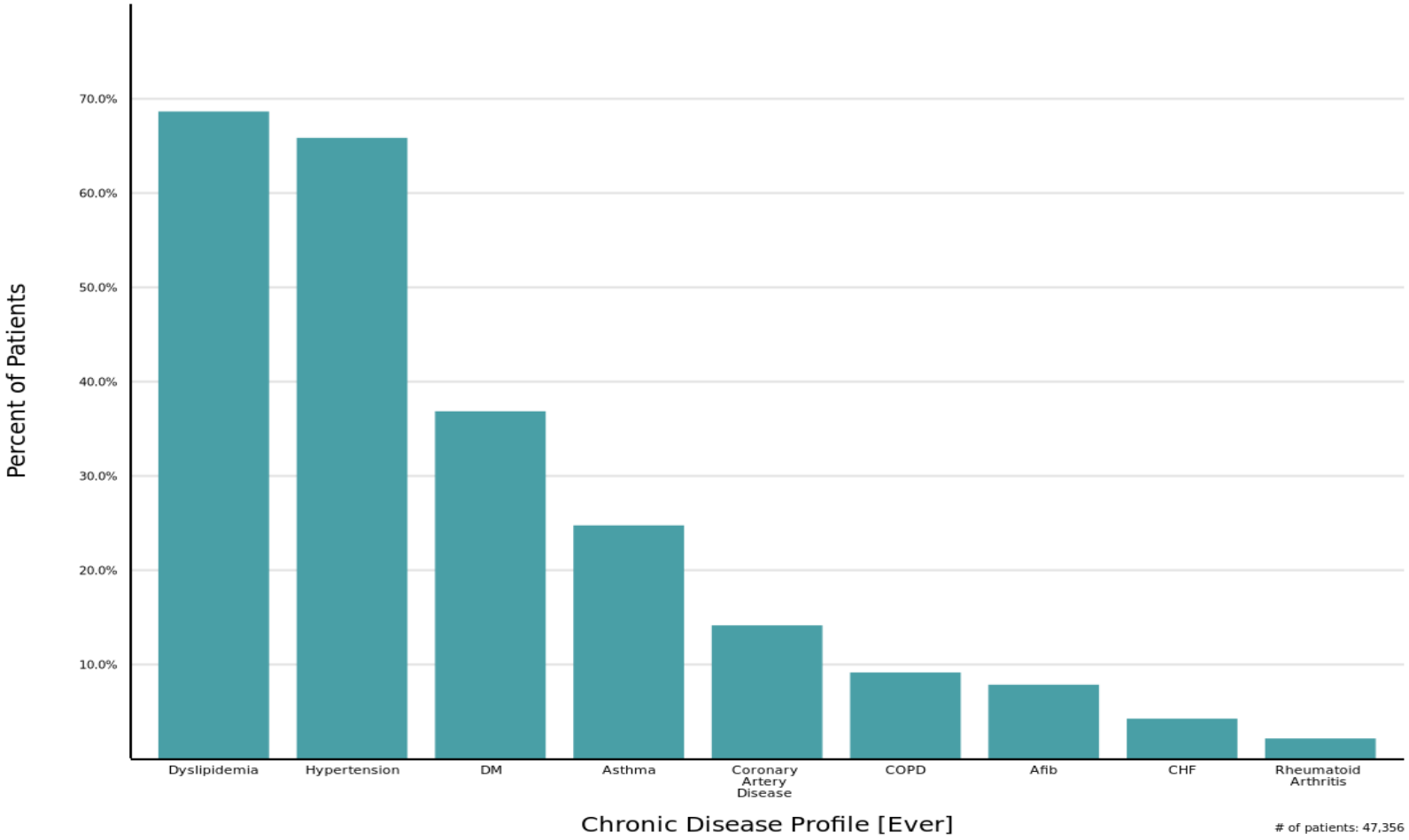
# AAP: Patients by chronic disease profile

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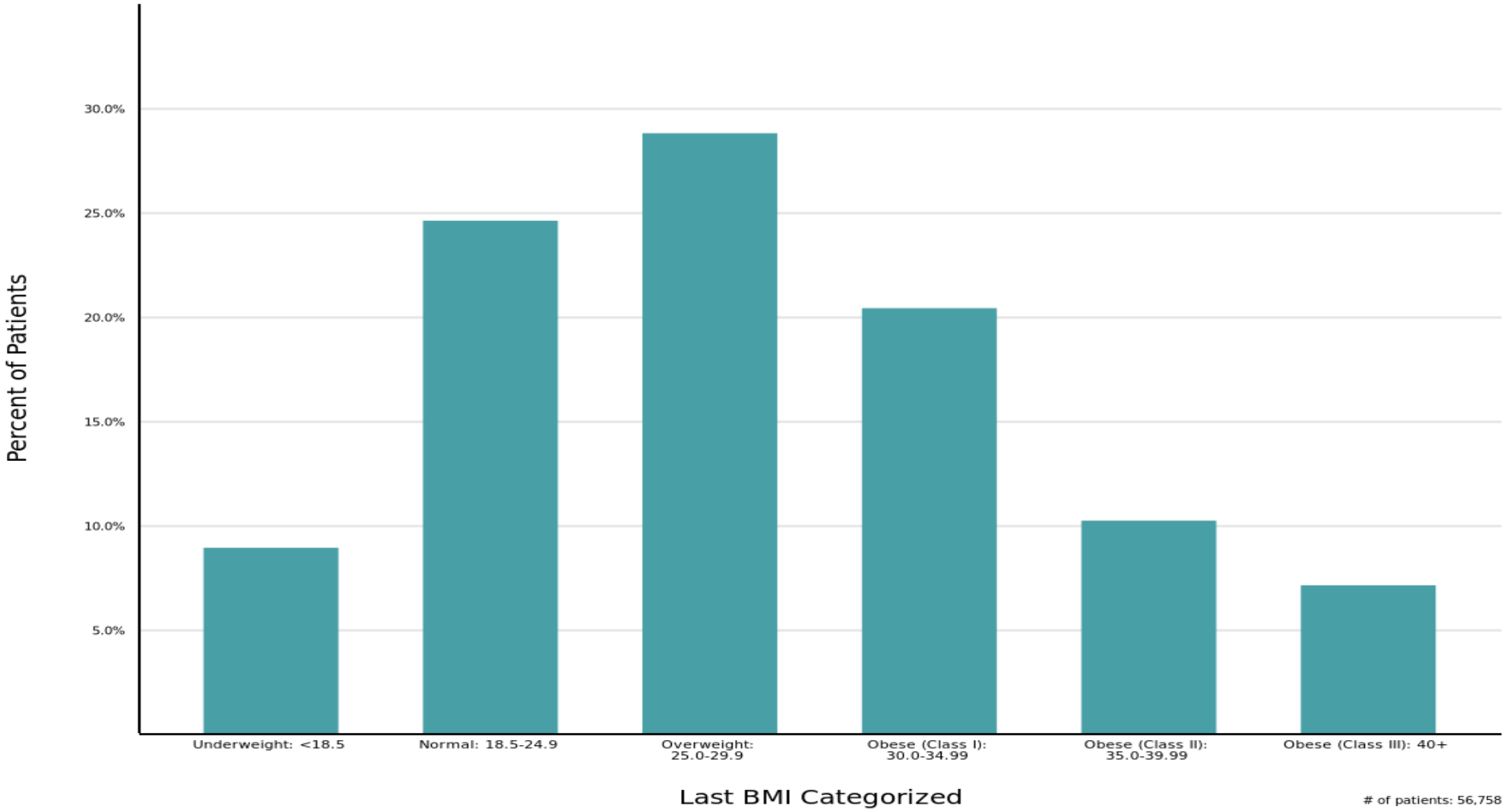
# AAP: Patients by categorized BMI

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MANAGE
YOUR RISK

# Winning patients through value-based care

- Emphasis on reducing the incidence of diseases that are amenable to screening and prevention
- Emphasis on improving control of chronic diseases
- Use of advanced analytics to risk stratify and focus care coordination efforts

$$\text{Value} = \frac{\text{Access} + \text{Differentiated Experience} + \text{Outcomes}}{\text{Cost}}$$

*(quality and safety)*

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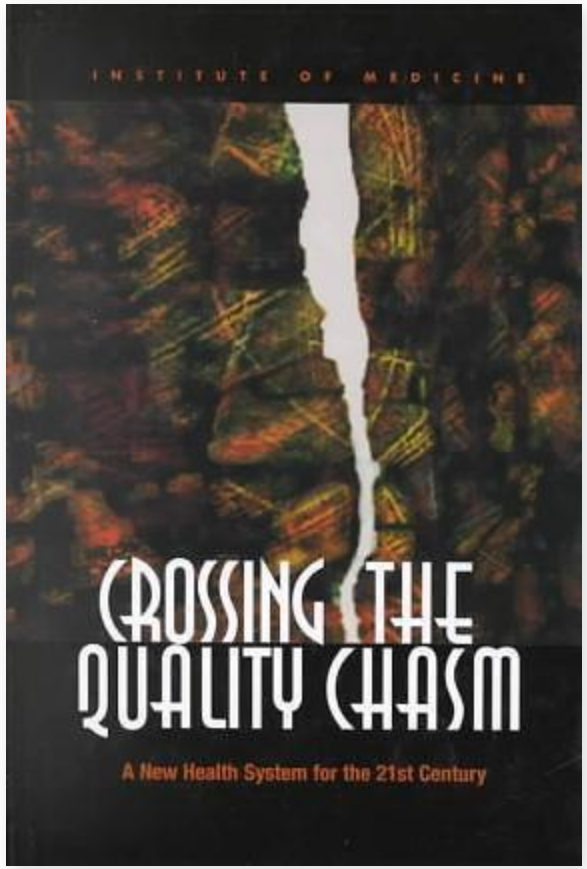


"It now takes an average of 17 years for new knowledge generated by randomized controlled trails to be incorporated into practice, and even then, application is highly uneven."

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# PMA engagement and management

Heart failure | Prediabetes | Diabetes

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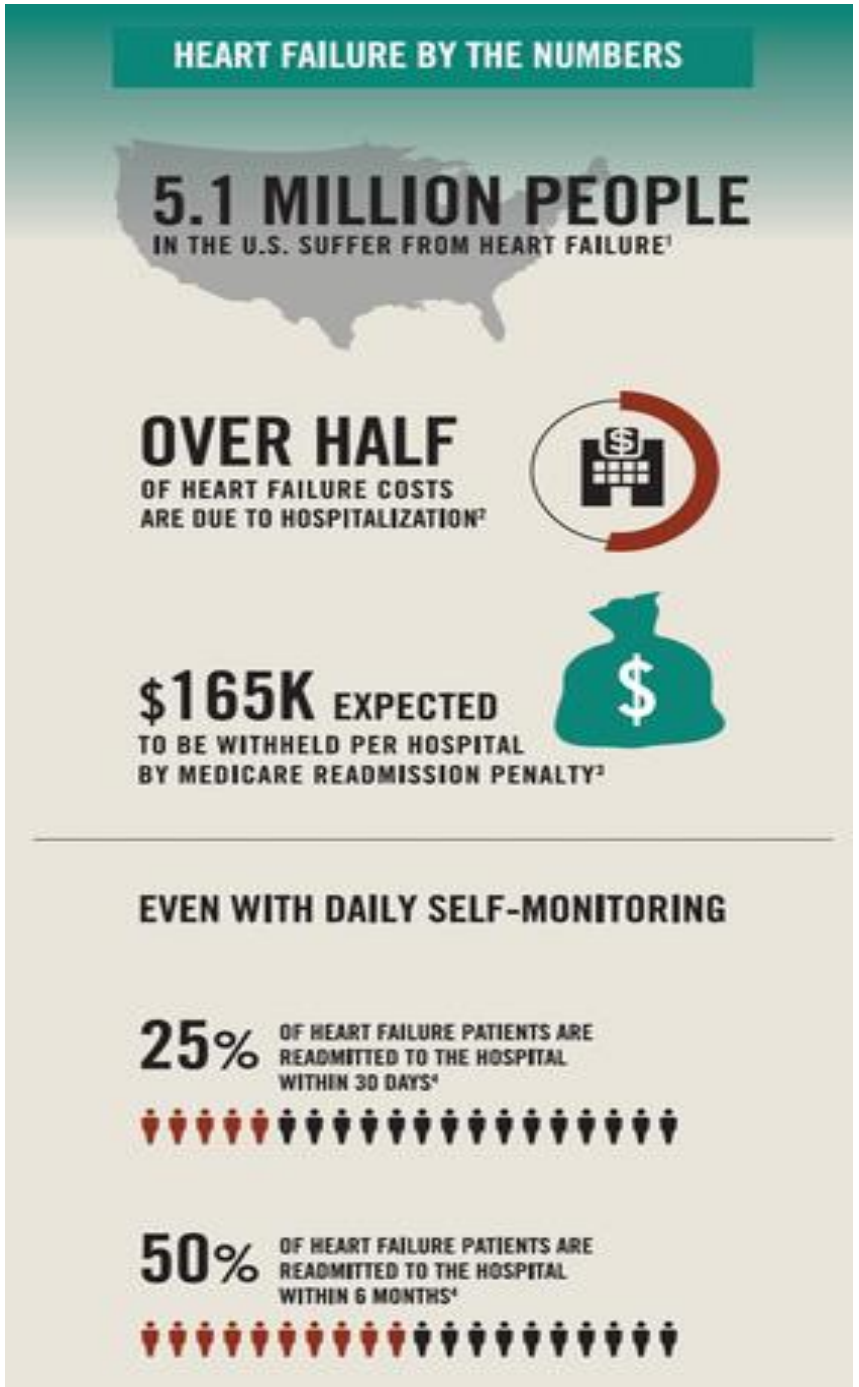


Modern Healthcare, 2015

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# Heart failure

## High cause of early readmissions nationally

Medicare: 26.9%

Western PA: 24.0%

New England Journal of Medicine, 360(14), 1418-1428.
Pittsburgh Regional Health Initiative. (2013). PRHI Readmission Reduction Guide: A Manual for Preventing Rehospitalizations.

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# Heart failure

First disease state that we employed an advanced analytics/population health software:

- To identify gaps in proper prescribing
- To risk stratify patients to direct care coordination efforts

| Correct prescribing | | |
|---|---|---|
| | 12/31/15 | 9/30/16 |
| ACE/ARB | 75% | 95.2% |
| Correct β-blocker | 76% | 97.7% |

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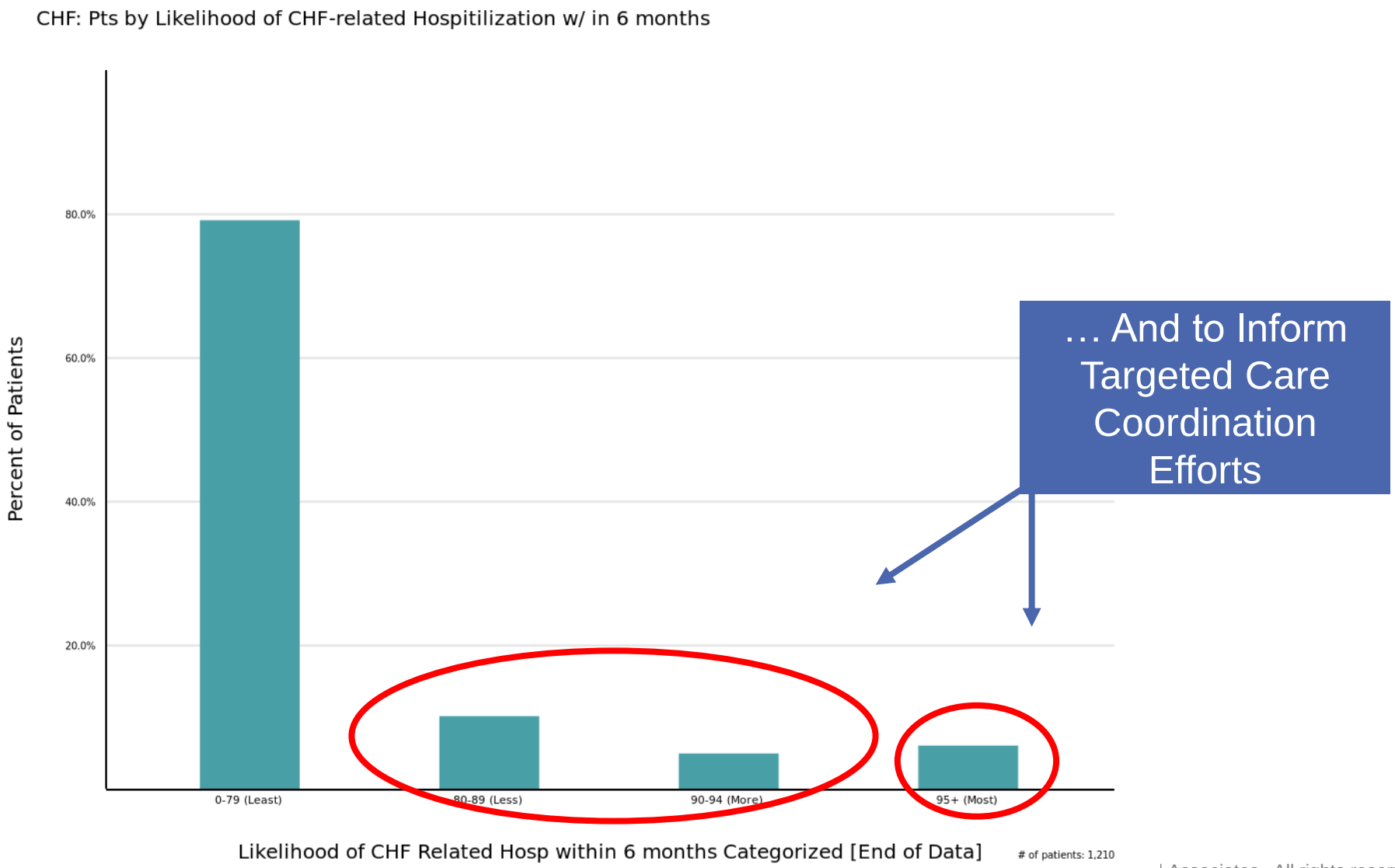
# Using predictive analytics to risk stratify…

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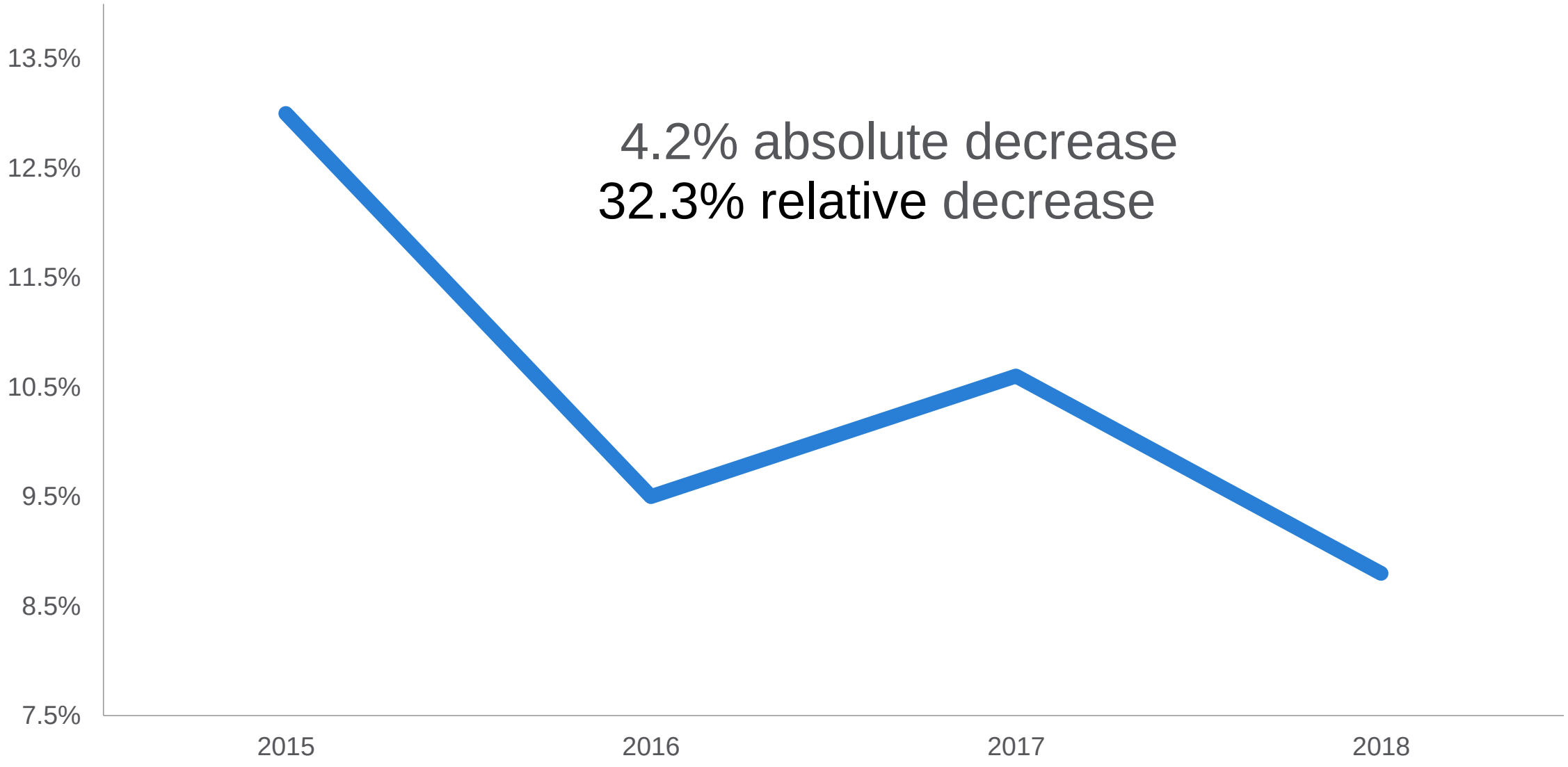


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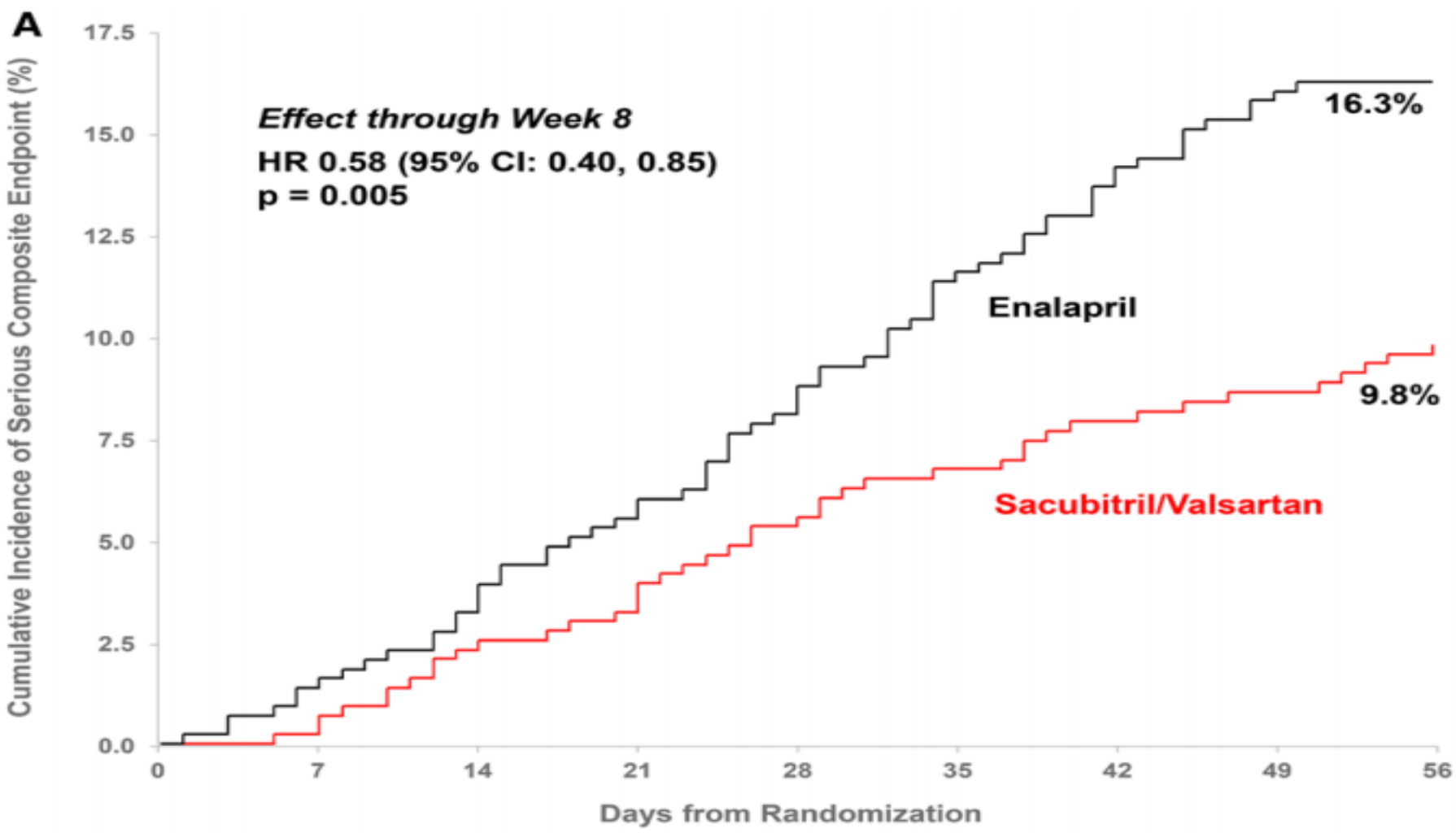


Circulation, 139(19), 2285-2288.

# PMA ARNI use

| As of | ARNI prescribed | Potential use | % compliance |
|---|---|---|---|
| 12/31/16 | 29 | 403 | 7.2% |
| 12/31/18 | 70 | 399 | 17.5% |
| 6/30/19 | 82 | 408 | 20.1% |

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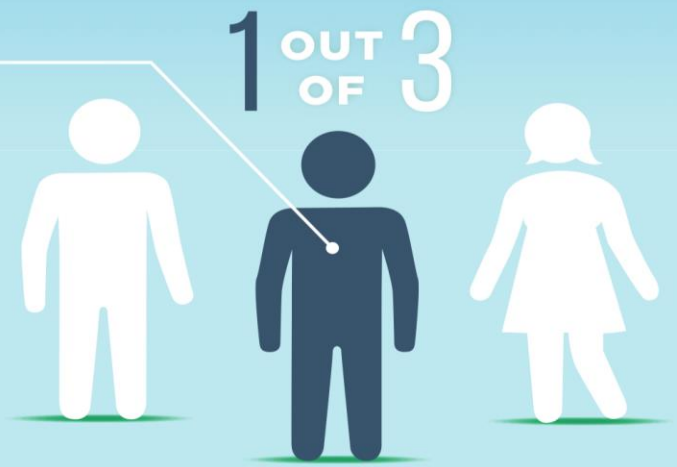
# PREDIABETES

COULD IT BE YOU?

84.1 MILLION

84.1 million American adults — more than 1 out of 3 — have prediabetes




9 OUT OF 10 people with prediabetes don't know they have it

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The New England
Journal of Medicine



VOLUME 346 FEBRUARY 7, 2002 NUMBER 6

# REDUCTION IN THE INCIDENCE OF TYPE 2 DIABETES WITH LIFESTYLE INTERVENTION OR METFORMIN

DIABETES PREVENTION PROGRAM RESEARCH GROUP*

## ABSTRACT

***Background*** Type 2 diabetes affects approximately 8 percent of adults in the United States. Some risk factors — elevated plasma glucose concentrations in the fasting state and after an oral glucose load, overweight, and a sedentary lifestyle — are potentially reversible. We hypothesized that modifying these factors with a lifestyle-intervention program or the administration of metformin would prevent or delay the development of diabetes.

***Methods*** We randomly assigned 3234 nondiabetic persons with elevated fasting and post-load plasma glucose concentrations to placebo, metformin (850 mg twice daily), or a lifestyle-modification program with the goals of at least a 7 percent weight loss and at least 150 minutes of physical activity per week. The mean age of the participants was 51 years, and the mean body-mass index (the weight in kilograms divided by the square of the height in meters) was 34.0; 68 percent were women, and 45 percent were members of minority groups.

***Results*** The average follow-up was 2.8 years. The incidence of diabetes was 11.0, 7.8, and 4.8 cases per 100 person-years in the placebo, metformin, and lifestyle groups, respectively. The lifestyle intervention reduced the incidence by 58 percent (95 percent con-

TYPE 2 diabetes mellitus, formerly called non-insulin-dependent diabetes mellitus, is a serious, costly disease affecting approximately 8 percent of adults in the United States.[1] Treatment prevents some of its devastating complications[2,3] but does not usually restore normoglycemia or eliminate all the adverse consequences. The diagnosis is often delayed until complications are present.[4] Since current methods of treating diabetes remain inadequate, prevention is preferable. The hypothesis that type 2 diabetes is preventable[5,6] is supported by observational studies and two clinical trials of diet, exercise, or both in persons at high risk for the disease[7,8] but not by studies of drugs used to treat diabetes.[5]

The validity of generalizing the results of previous prevention studies is uncertain.[9] Interventions that work in some societies may not work in others, because social, economic, and cultural forces influence diet and exercise. This is a special concern in the United States, where there is great regional and ethnic diversity in lifestyle patterns and where diabetes is especially frequent in certain racial and ethnic groups, including American Indians, Hispanics, African Amer-

# Metformin for prediabetes

| NHANES 2005 to 2012 | Commercially insured 2010 to 2012 |
|---|---|
| < 1% use | 3.7% use |

Annals of internal medicine, 162(8), 542-548. | Diabetes Care, dc161509.

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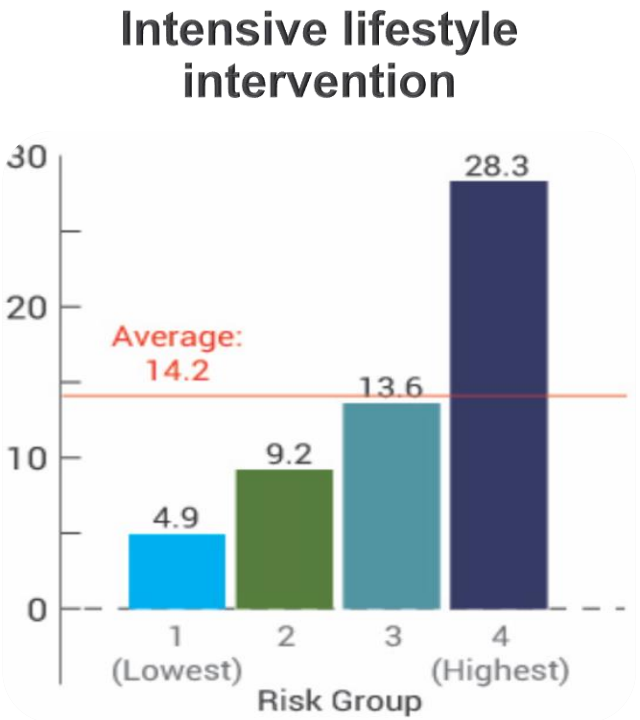
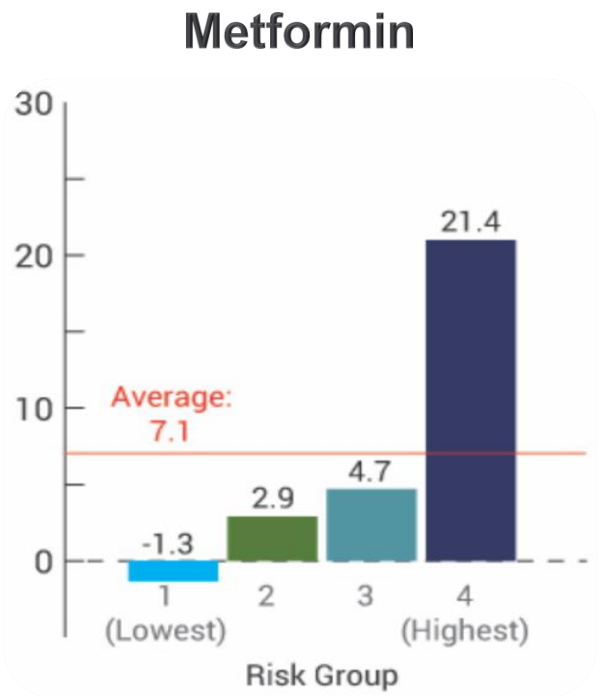
# Heterogeneity of treatment effect:

## Diabetes prevention program study




### Value of a multivariable model

In the lowest-risk quartile, about 15% of patients: A1c ≥ 6.0

In the highest-risk quartile, more than 25% of patients: A1c < 6.0

http://www.pcori.org/research-in-action/moving-beyond-averages

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# Calculator variables

- Age
- Gender
- Race
- Smoking status
- Hypertension
- HGB A1C
- Fasting glucose
- Triglycerides
- BMI
- Systolic BP
- HDL cholesterol

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# Predictive model results

## (as displayed in EHR at Premier Medical Associates)

**Interpretation:** Low Risk Patient

| Predicted Risk of Type 2 Diabetes at 3 Years | Treatment | Relative Risk Reduction (RRR) | Number Needed to Treat (NNT) |
|---|---|---|---|
| 5.47 % | Usual Care | Reference | N/A |
| 4.38 % | Metformin | 20% | 91.4 |
| 2.30 % | DPP Lifestyle | 58% | 31.5 |

Add to Chart

**Interpretation:** High Risk Patient

| Predicted Risk of Type 2 Diabetes at 3 Years | Treatment | Relative Risk Reduction (RRR) | Number Needed to Treat (NNT) |
|---|---|---|---|
| 55.7 % | Usual Care | Reference | N/A |
| 24.5 % | Metformin | 56% | 4 |
| 23.4 % | DPP Lifestyle | 58% | 4 |

Add to Chart

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# PMA experience-reach of project

| | 5/1/18 – 8/31/19 |
|---|---|
| Total prediabetes | 2518 |
| Calculation completed | 1881 |
| Percent with calculation | 74.7% |

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# PMA risk stratification

| Risk stratification | n= | % |
|---|---|---|
| High risk | 901 | 47.9% |
| Medium risk | 921 | 48.5% |
| Low risk | 68 | 3.6% |

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# Of the 722 high risk patients …

## Metformin

- 45 were on it before 5/1/18 (6.2%)
- 118 were started on it after 5/1/18 (16.3%)

## Diabetes Prevention Program

- 0 were referred before 5/1/18 (0%)
- 378 were referred after 5/1/18 (52.3%)

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# Interventions vs. Risk

| Risk stratification | Intervention ordered |
|---|---|
| High risk | 75.2% |
| Medium risk | 20.6% |
| Low risk | 7.3% |

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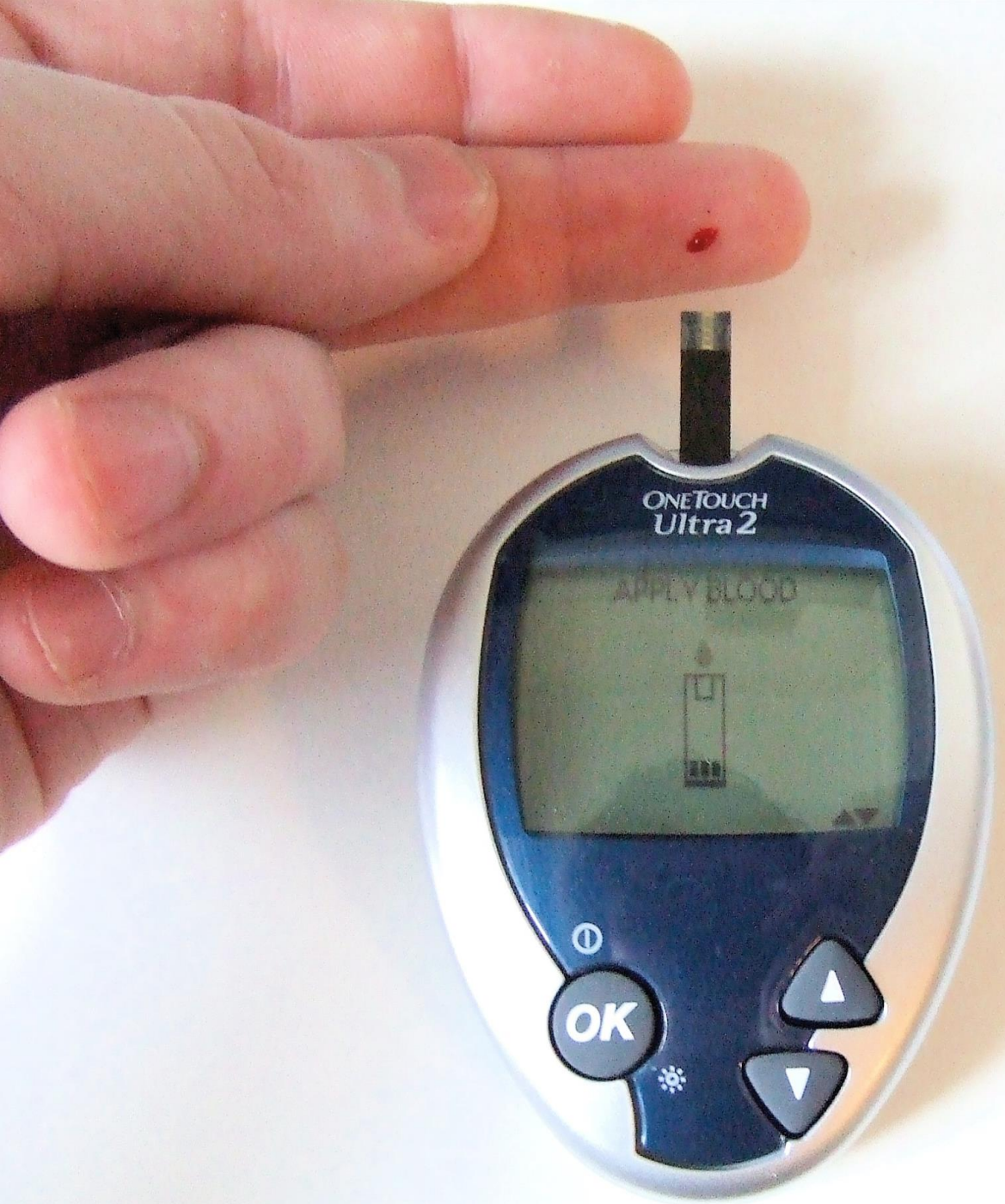


# Potential cost savings

Intermountain Insurance Plan saves $3,500 per person per year; development of diabetes is averted or delayed.

CMS Office of the Actuary estimates a savings of $2,650 over 15 months for Medicare beneficiaries participating in a DPP lifestyle program.

# Why a bundle measure?

COMMENTARY

## All-or-None Measurement Raises the Bar on Performance

Thomas Nolan, PhD
Donald M. Berwick, MD, MPP

THE PURSUIT OF EVIDENCE-BASED MEDICINE IS NOW AT the core of the agenda for improving health care in the United States. All major quality measurement systems use science-based indicators of proper processes of care, such as the ORYX measures of the Joint Commission on Accreditation of Healthcare Organizations,[1] the Health Employer Data and Information Sets measures of the National Committee on Quality Assurance,[2] the measures used by the Quality Improvement Organizations under contract with the Centers for Medicare & Medicaid Services,[3] and at least 70 of the 179 measures in the 2004 National Health Care Quality Report from the Agency for Healthcare Research and Quality.[4]

Often, several individual performance measures are used to assess care of the same condition. For example, a recent summary of data on the Joint Commission on Accredita-

**Option 2: Composite Measurement**

Performance on the provision of several elements of care is reported by computing a percentage across all patients and criterion indicators. For example, for the 4 elements of pneumonia care (excluding the continuous variable of time to treatment), a composite measure of performance can be computed by summing the numerators for each measure across the population of interest to create a composite numerator (all the care that was given), summing the denominators for each measure to form a composite denominator (all the care that should have been given), and reporting the ratio (the percentage of all the needed care that was given). This approach to measurement gives partial credit for incomplete care of an individual patient. If a patient receives 3 of the 4 recommended care elements, a hospital whose performance is being assessed with such a composite measure gets credit for delivering 3 elements. The Centers for Medicare & Medicaid Services uses composite measurement of this type in its Hospital Quality Incentive Demonstration Project.[5]

*JAMA.* 2006;296(4):392-393.
doi:10.1001/jama.296.4.392-a

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# Why a bundle measure?

- What would you want for yourself or your family member?
- Reflects the patient's perspective—holistic view
  - Address *all* key risk factors or care needs
- Encourages system perspective—no dropped balls
  - Are all contributors to the care process working together?
- More sensitive scale for assessing improvement
  - Amplifies variation in care process
  - Also amplifies errors in measurement

*JAMA.* 2006;296(4):392-393.
doi:10.1001/jama.296.4.392-a

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# PMA diabetes bundle improvement

| Measure | As of 12/31/15 | As of 6/30/17 | As of 6/30/18 | As of 6/30/19 |
|---|---|---|---|---|
| HGBa1c control rate (<8%) | 70.6% | 72.0% | 74.8% | 73.9% |
| BP control rate | 78.8% | 80.5% | 81.5% | 85.1% |
| Medical attention to kidney disease | 88.6% | 90.3% | 91.8% | 90.3% |
| Statin prescribing rates | 68.9% | 78.3% | 84.9% | 85.2% |
| D4 control bundle | 40.7% | 47.2% | 49.2% | 51.7% |

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