

Together 2 Goal[®]

AMGA Foundation
National Diabetes Campaign

Monthly Campaign Webinar

November 10, 2016

TODAY'S WEBINAR

- Together 2 Goal[®] Updates
 - Webinar Reminders
 - 2017 Webinar Topics
 - Goal Post Nov. Newsletter Highlights
 - Q3 2016 Data Reporting Reminder
 - National Day of Action Highlights
- Conduct Practice-Based Screening
 - John Cuddeback, MD, PhD, AMGA Analytics
 - Edward Gregg, PhD, Centers for Disease Control and Prevention
- Q&A
 - Use Q&A or chat feature



WEBINAR REMINDERS

- Webinar will be recorded today and available the week of November 14th
 - Together2Goal.org Website (Improve Patient Outcomes → Webinars)
 - Email distribution
- Participants are encouraged to ask questions using the “Chat” and “Q&A” functions on the right side of your screen



2017 WEBINAR TOPICS

- Seeking AMGA members to present on topics of interest, including:
 - How you incorporate the patient perspective (for instance, do you include patients or family members on committees?)
 - How you use innovative technology (such as mobile apps, Emmi, remote monitoring, etc.)
- To volunteer, please email together2goal@amga.org



Q3 2016 DATA REPORTING DEADLINE: DEC. 2

REPORTING TIMELINE:

Measurement Periods (Defined by Quarters)	Measurement Periods (Defined by Months and Days)	Reporting Deadline	Blinded, Comparative Reports Sent to Participating Organizations
2016 Q3 (2015 Q4 - 2016 Q3)	2016 Q3 (2015 Oct 1 - 2016 Sep 30)	December 2, 2016	December 22, 2016

For data assistance, contact DataHelpForT2G@amga.org.

GOAL POST NOV. NEWSLETTER HIGHLIGHTS



Upcoming Dates

- **November 14-17: Institute for Quality Leadership**
 - 11/14: Together 2 Goal® Pre-Conference Session (Interactive CORE Program)
 - 11/15: Quality Improvement Leadership Council Meeting
 - 11/16: Together 2 Goal® Peer-to-Peer Breakout Session
- **December 2: Q3 2016 data due**
- **December 22: Q3 blinded, comparative reports sent to participating organizations**

NATIONAL DAY OF ACTION HIGHLIGHTS



NATIONAL DAY OF ACTION HIGHLIGHTS



Henry Ford News @HenryFordNews · Nov 3
 Don't let a #diabetes diagnosis derail your health. 6 tips to help you thrive: ow.ly/9oXR305ORYL
 #NationalDiabetesMonth @AMGAFhealth

Geisinger Caring
 For Patients For Professionals For Researchers
 Make Appointment
 Make a culture.

Geisinger joins national effort to improve diabetes management

Nov 2, 2016
 FOR IMMEDIATE RELEASE:

DANVILLE, Pa. — Geisinger Health System announced today that it has joined the AMGA Foundation's Diabetes: Together 2 Goal campaign along with more than 120 other leading healthcare organizations across the country. This national campaign aims to improve care for 1 million people with Type 2 diabetes in the United States by 2019.

The Centers for Disease Control and Prevention estimates that approximately 29.1 million people – or 9.3 percent of the population – have diabetes. Type 2 diabetes accounts for 90 to 95 percent of diagnosed diabetes in U.S. adults. People who have diabetes are at higher risk of serious health complications, such as heart disease and stroke, two of the leading causes of death in the U.S. Other complications can include blindness, kidney failure, and loss of toes, feet, or legs.

Geisinger and its fellow AMGA members participating in Together 2 Goal commit to implementing one or more evidence-based care processes designed to empower patients, improve care delivery and leverage information technology.

Geisinger is currently implementing an evidenced-based care process for diabetic retinopathy screening utilizing high resolution cameras located within primary care and endocrinology specialty clinics in Danville. This new technology does not require a patient to receive dilating eye drops. The full view retinal images are then transmitted via telemedicine to an ophthalmologist for interpretation. Results and follow-up instructions are reported back to the patient and their primary care or endocrinology provider. Geisinger is seeking to expand this service to additional clinic locations in 2017 to help with the early detection of diabetic retinopathy and prevent vision loss in our patients with diabetes.

HealthyWomen @HealthyWomen · Nov 3
 It's National Day of Action to manage #diabetes. Watch Rev Run share #tips for everyday #healthyliving. @AMGAFhealth

Everyday Activities for Healthy Living
 Daily activity is important to everyone's overall health—whether or not you are at risk of diabetes. Check out some sample exercises from Rev Run and a Novo ...
youtube.com

GREETINGS:

It is my pleasure to join with Premier Medical Associates and the commonwealth's medical professionals, volunteers, and advocates to proclaim November 3, 2016, as *National Day of Action*.

Diabetes is one of the most pressing health issues we face - it affects one million adults in Pennsylvania and is the seventh leading cause of death in the commonwealth. By participating in the National Day of Action, Premier Medical Associates pledges to improve care for patients with diabetes in the Greater Pittsburgh area. I applaud this organization's campaign to improve practice based screening abilities and increase earlier diagnosis to prevent the serious and life-threatening complications that diabetes may cause. The work of the staff and providers at Premier Medical Associates are key steps in improving health outcomes and the quality of life for people with or at risk for developing diabetes. I encourage all citizens to continue to raise awareness about this disease and the complications that it can cause, while providing support to those suffering from diabetes.

As Governor, and on behalf of all citizens of the Commonwealth of Pennsylvania, I am honored to support *National Day of Action* in the commonwealth. Please accept my best wishes for continued success in your mission.

Tom Wolf
 TOM WOLF
 Governor
 November 3, 2016

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TODAY'S SPEAKERS

Edward Gregg, PhD



Chief of the Epidemiology and Statistics
Branch, Division of Diabetes Translation,
National Center for Chronic Disease
Prevention and Health Promotion,
Centers for Disease Control and
Prevention

John Cuddeback, MD, PhD



Chief Medical Informatics Officer
AMGA Analytics

CAMPAIGN PLANKS

EMPOWER PATIENTS



Build an Accountable Diabetes Team



Integrate Emotional & Behavioral Support



Refer to Diabetes Self-Management Education & Support Programs

IMPROVE CARE DELIVERY



Conduct Practice-Based Screening



Adopt Treatment Algorithm



Measure HbA_{1c} Every 3-6 months



Assess & Address Risk of Cardiovascular Disease



Contact Patients Not at Goal & with Therapy Change within 30 Days

LEVERAGE INFORMATION TECHNOLOGY



Use a Patient Registry



Embed Point-of-Care Tools



Publish Transparent Internal Reports

CAMPAIGN TOOLKIT

CONDUCT PRACTICE-BASED SCREENING

CONDUCT PRACTICE-BASED SCREENING

One-fourth of Americans who have Type 2 diabetes—and nearly twice that proportion among Asian and Hispanic Americans—are unaware they have it. Screening asymptomatic adults (practice-based case detection) is therefore an essential population health strategy.

A process is in place to identify patients seen in the practice who have Type 2 diabetes, according to American Diabetes Association recommendations for testing for diabetes or pre-diabetes in asymptomatic adults. Screening occurs at primary care, endocrinology, nephrology, and other specialty visits (as appropriate) and appropriate follow-up is provided. The practice identifies patients who already meet the clinical criteria for a diagnosis or problem list entry.

According to the American Diabetes Association's Standards of Care:

- All patients 45 years of age or older should be tested, with repeat testing every 3 years if the results are normal, every year for people who have prediabetes; and
- Testing should be considered in adults younger than 45 who are overweight (BMI \geq 25, or \geq 23 in Asian Americans) and have additional risk factors.

TIPS FOR EFFECTIVE SCREENING

- Conduct screening in a practice-based setting, where patients can receive individualized treatment and support.
- Use hemoglobin A1c (HbA1c), fasting plasma

- Organizations should consider addressing policy, system, and environmental factors through community interventions to promote healthy lifestyles.

- Create care pathways for those newly diagnosed with Type 2 diabetes or pre-diabetes:

- For people found to have Type 2 diabetes, therapy should be individualized.
- For people who have "pre-diabetes" (HbA1c 5.7–6.4%, impaired fasting glucose, or impaired glucose tolerance), retesting should occur at least once a year.

- Clinicians should provide full diagnostic disclosure that promotes shared decision-making. This may include creation of a "roadmap" for aggressive lifestyle interventions to prevent or delay the onset of overt Type 2 diabetes.

- Consider referral to programs that meet the guidelines of the Centers for Disease Control and Prevention's National Diabetes Prevention Program.

Progress and Challenges in Screening and Risk Stratification for Type 2 Diabetes Prevention

Edward W. Gregg, PhD

Division of Diabetes Translation

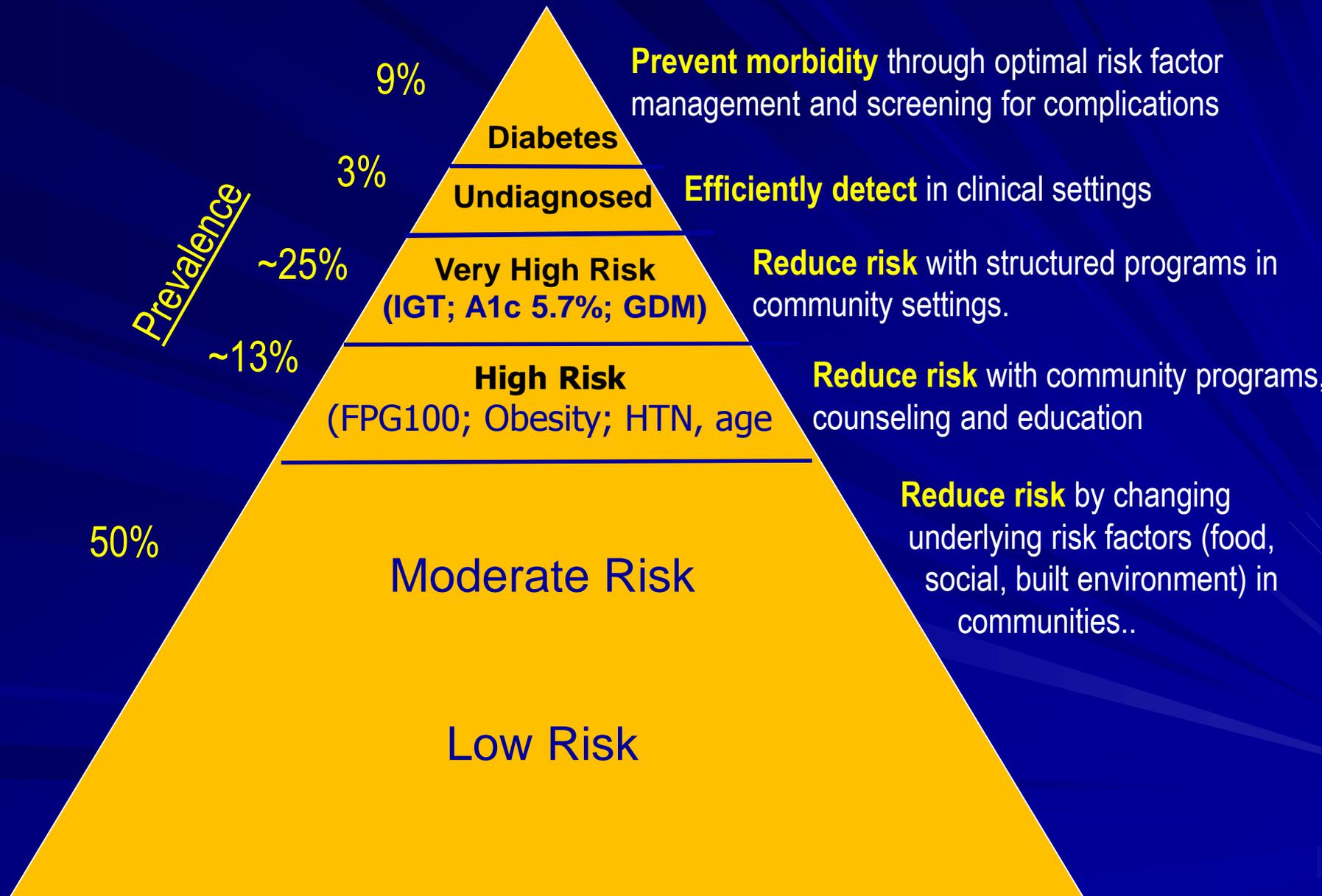
Centers for Disease Control and Prevention

Findings and conclusions in this presentation are those of the author and do not necessarily represent those of the Centers for Disease Control and Prevention

Outline

- Summary of recommendations and goals
- Recent analyses from Division of Diabetes Translation
- Quandaries and challenges

Diabetes Pyramid of Prevention



ADA Recommendations on Screening

Table 2.2—Criteria for testing for diabetes or prediabetes in asymptomatic adults

1. Testing should be considered in all adults who are overweight (BMI ≥ 25 kg/m² or ≥ 23 kg/m² in Asian Americans) and have additional risk factors:
 - physical inactivity
 - first-degree relative with diabetes
 - high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
 - women who delivered a baby weighing >9 lb or were diagnosed with GDM
 - hypertension ($\geq 140/90$ mmHg or on therapy for hypertension)
 - HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
 - women with polycystic ovary syndrome
 - A1C $\geq 5.7\%$ (39 mmol/mol), IGT, or IFG on previous testing
 - other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)
 - history of CVD
 2. For all patients, testing should begin at age 45 years.
 3. If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results (e.g., those with prediabetes should be tested yearly) and risk status.
-

US Preventive Services Task Force: *Abnormal Blood Glucose and Type 2 Diabetes Mellitus: Screening (2015)*

- **Population:** Adults aged 40 to 70 years who are overweight or obese.
- **Recommendation:** Screen for abnormal blood glucose as part of cardiovascular risk assessment in adults aged 40 - 70 y who are overweight or obese. Offer or refer patients with abnormal blood glucose to intensive behavioral counseling interventions to promote a healthful diet and PA.
- **Grade:** B (high certainty of moderate benefit or moderate certainty that the net benefit is moderate to substantial.)
- **Rationale:**
 - Benefits on BP, glucose, lipid levels, obesity, PA, and for person with IGT, progression to diabetes.
 - Minimal harm apart from short-term anxiety.

Screening and Diagnosis for Type 2 Diabetes and Pre-diabetes In the U.S.: General Principals and Concepts

- Screening/testing *in clinical settings* and established *clinical/community partnerships*, but not community-wide screening.
- 2-stage approaches that include risk assessment tools followed by diagnosis with glycemic tests.
- Screening testing for undiagnosed diabetes/prediabetes more cost-effective than either alone.
- Integrate with other recommended screening (e.g., lipid, BP).
- Need for refined risk stratification for primary prevention.

The National Diabetes Prevention Program:

A Public-private partnership to scale the translated model of the DPP.

National Diabetes Prevention Program

COMPONENTS



Training: Increase Workforce

Train the workforce that can implement the program cost effectively.



Recognition Program: Assure Quality

Implement a recognition program that will:

- Assure quality.
- Lead to reimbursement.
- Allow CDC to develop a program registry.



Intervention Sites: Deliver Program

Develop intervention sites that will build infrastructure and provide the program.



Health Marketing: Support Program Uptake

Increase referrals to and use of the prevention program.

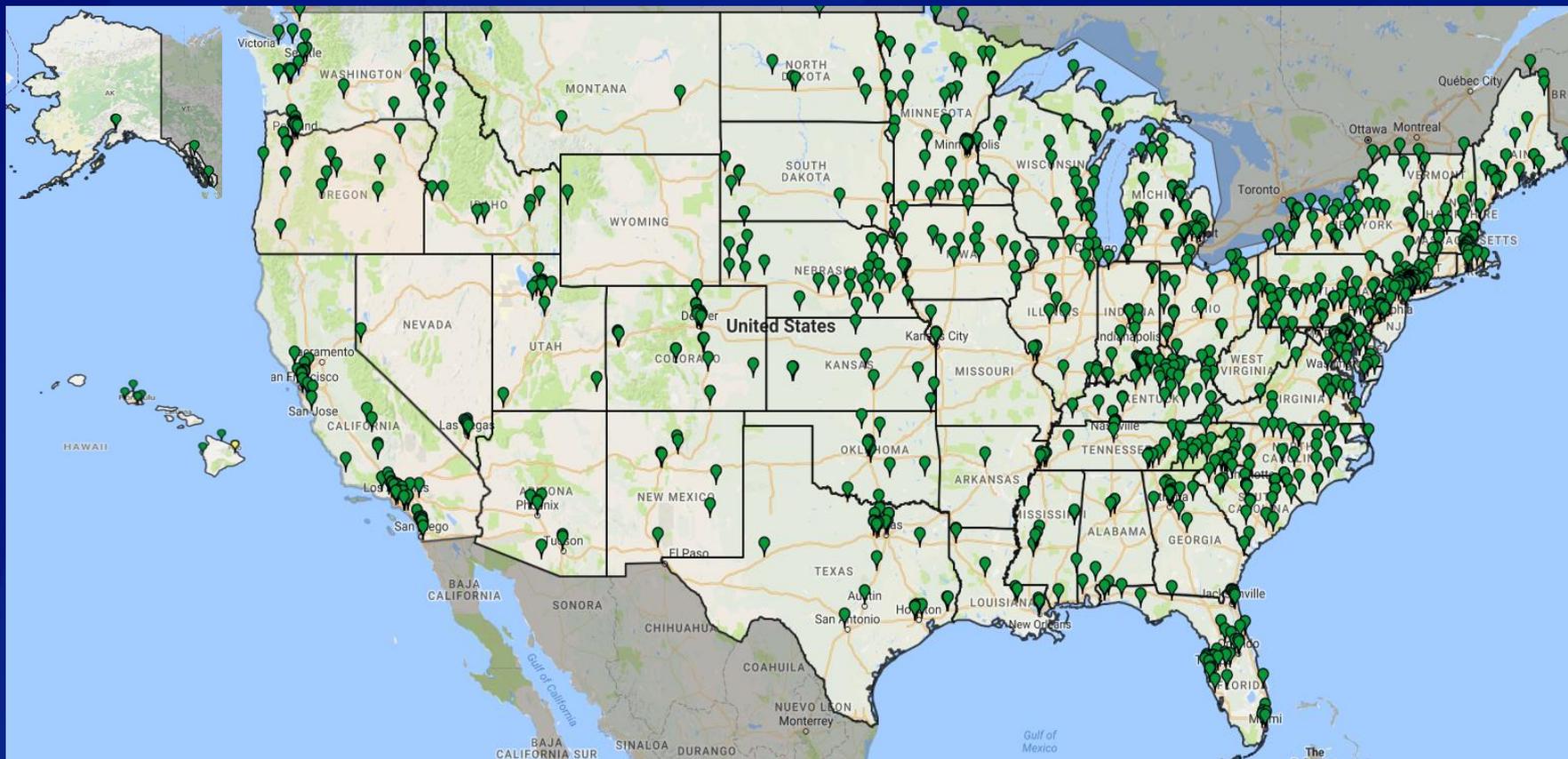
Division of Diabetes Translation • <http://www.cdc.gov/diabetes/prevention>



The National Diabetes Prevention Program:

- Clinical-community partnership with delivery by lifestyle coaches in community settings.
- Diverse settings (YMCA's, employers, community settings, virtual delivery)
- Train-the-trainer model by master trainers.
- 16-visit curriculum for small group counseling.
- Training, recognition and registry program by CDC to:
 - Train workforce
 - Ensure standards, quality, and credibility.
 - Drive reimbursement.
- Insurers and self-pays.

CDC Diabetes Prevention Recognition Program



- 1007 CDC-recognized programs across 50 states/territories.
- >10,300 coaches (lay people; health professionals) trained.
- Serving 85,008 eligible participants.
- 39 commercial health plans providing some coverage for 2.4M

Key Challenges in US Roll-Out

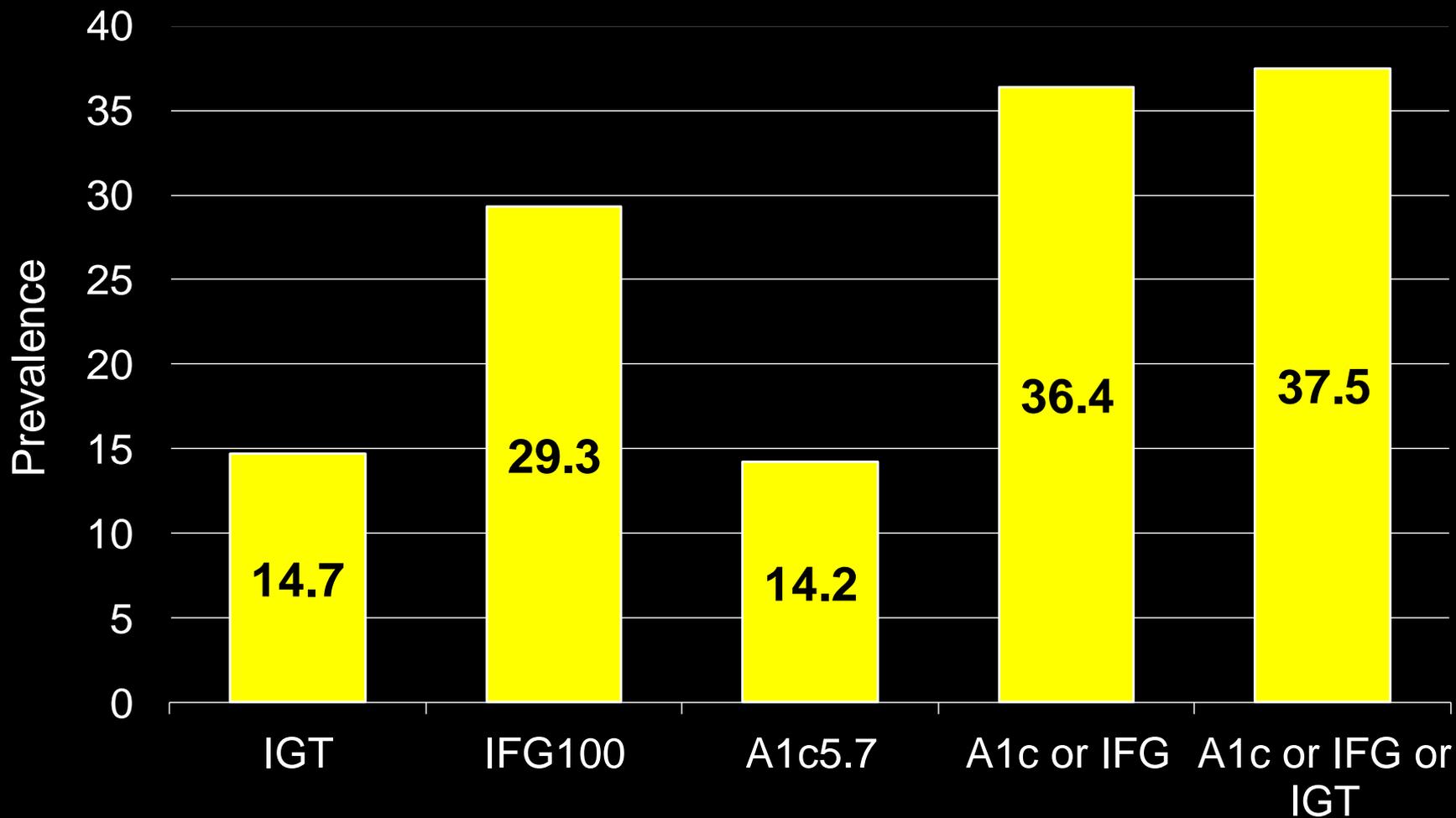
- High Risk Population
 - Sustainable reimbursement structure.
 - Assuring high quality programs in communities.
 - Referral and engagement.
 - Risk stratification that ensures cost effectiveness.
- Whole populations
 - Determining food, behavioral, physical activity, social policies that work.
 - Effectiveness of broad reach, low-intensity programs.
 - Finding politically-acceptable, effective levers.

Issues and Challenges for Risk Stratification

- Lifestyle intervention most cost-effective among persons with high rate of progression and with insulin resistance.
- Different glycemc tests (FPG, A1c, OGTT) find different people (IFG; eA1c; IGT).
 - All predict progression to DM and CVD.
 - Only IGT population tested in prevention trials.
 - OGTT rarely used in practice (except for GDM).
- The ADA definition of pre-diabetes captures very large proportion of the population with heterogeneous risk.
- Refinement of risk stratification approaches and a multi-tiered approach to prevention is needed.

Recent Analyses and Implications

Prevalence of Pre-Diabetes among U.S. Adults, According to Different Definitions of Pre-Diabetes, NHANES 2005-2008



Incremental Cost-Effectiveness of Alternative A1c Cut Points (Compared to Neighboring Cutpoint)

Figure 3A - Cost per QALY Gained

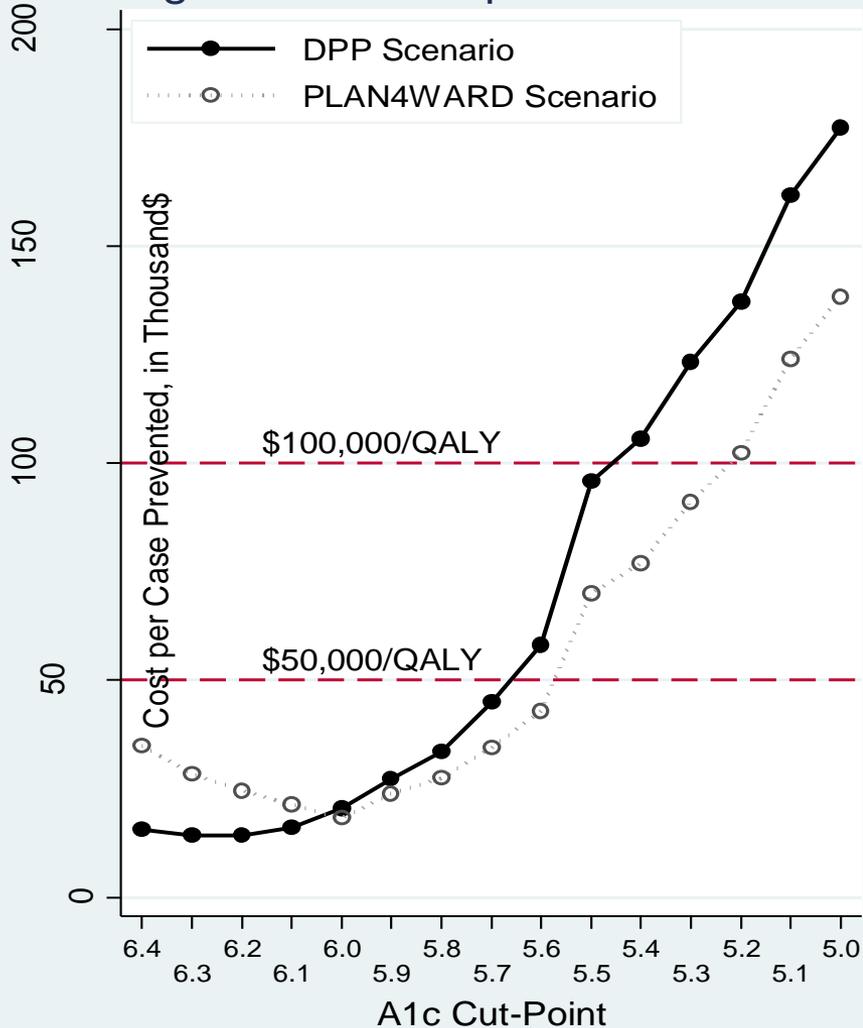
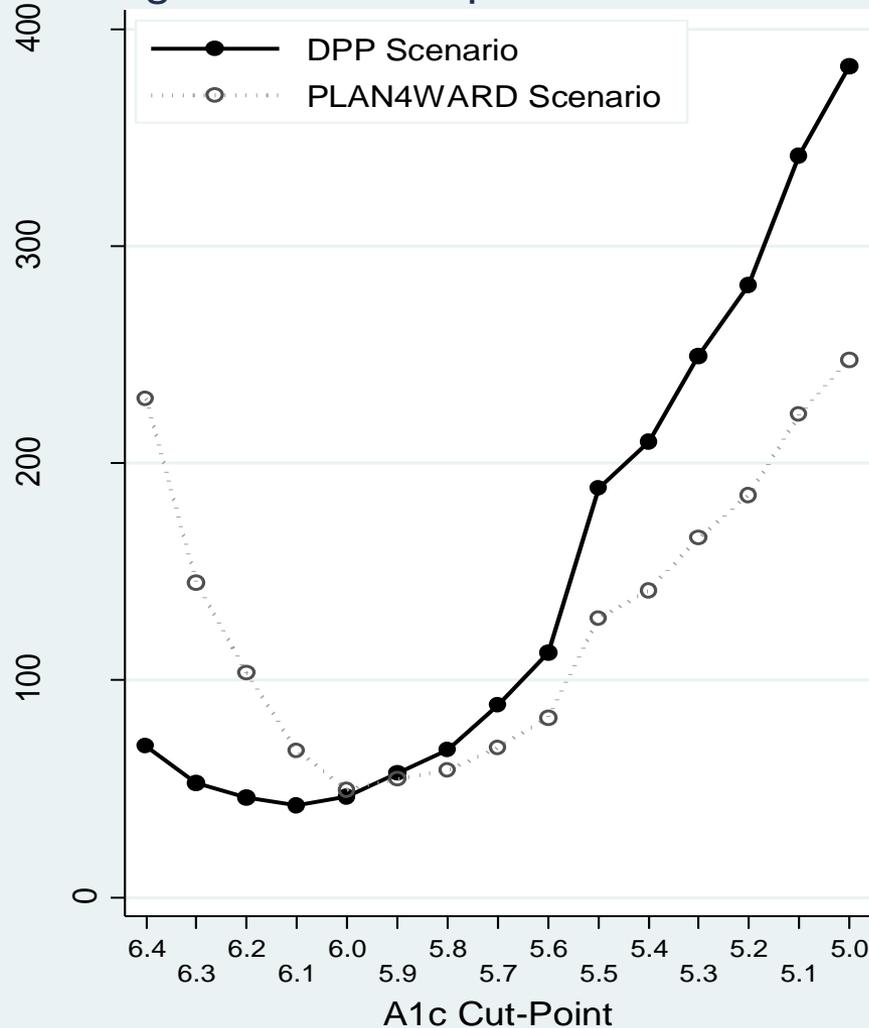
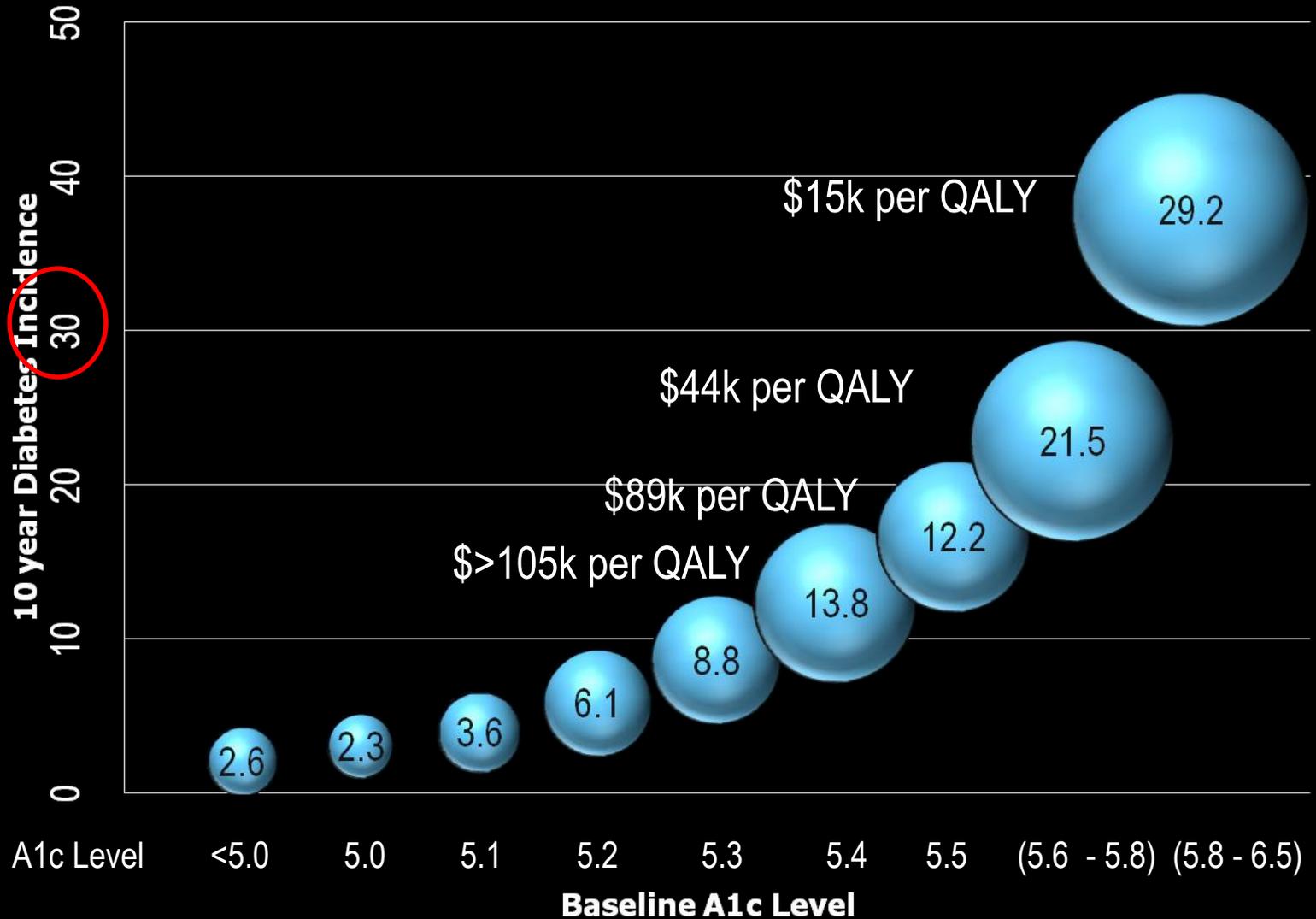


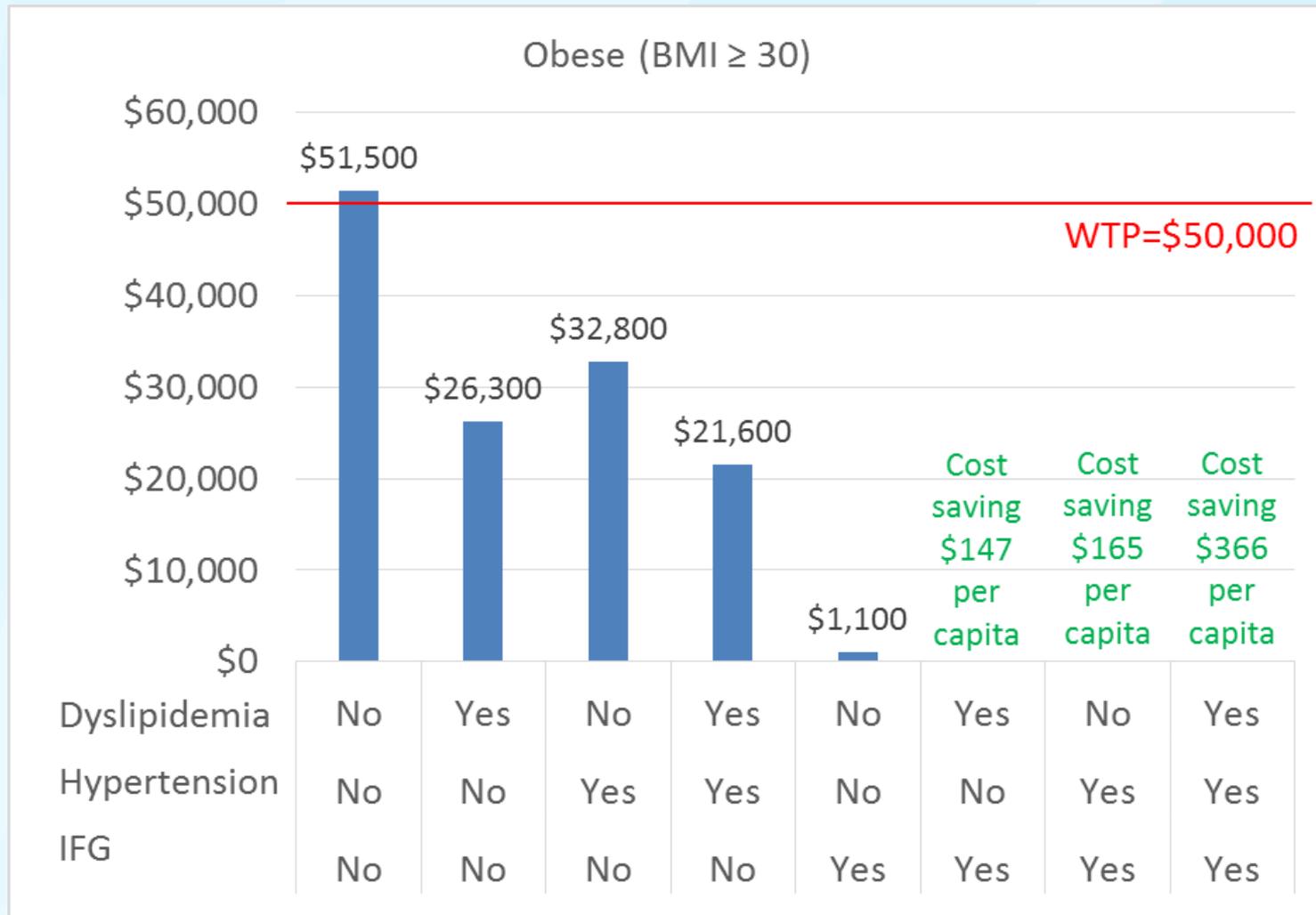
Figure 3B - Cost per Case Prevented



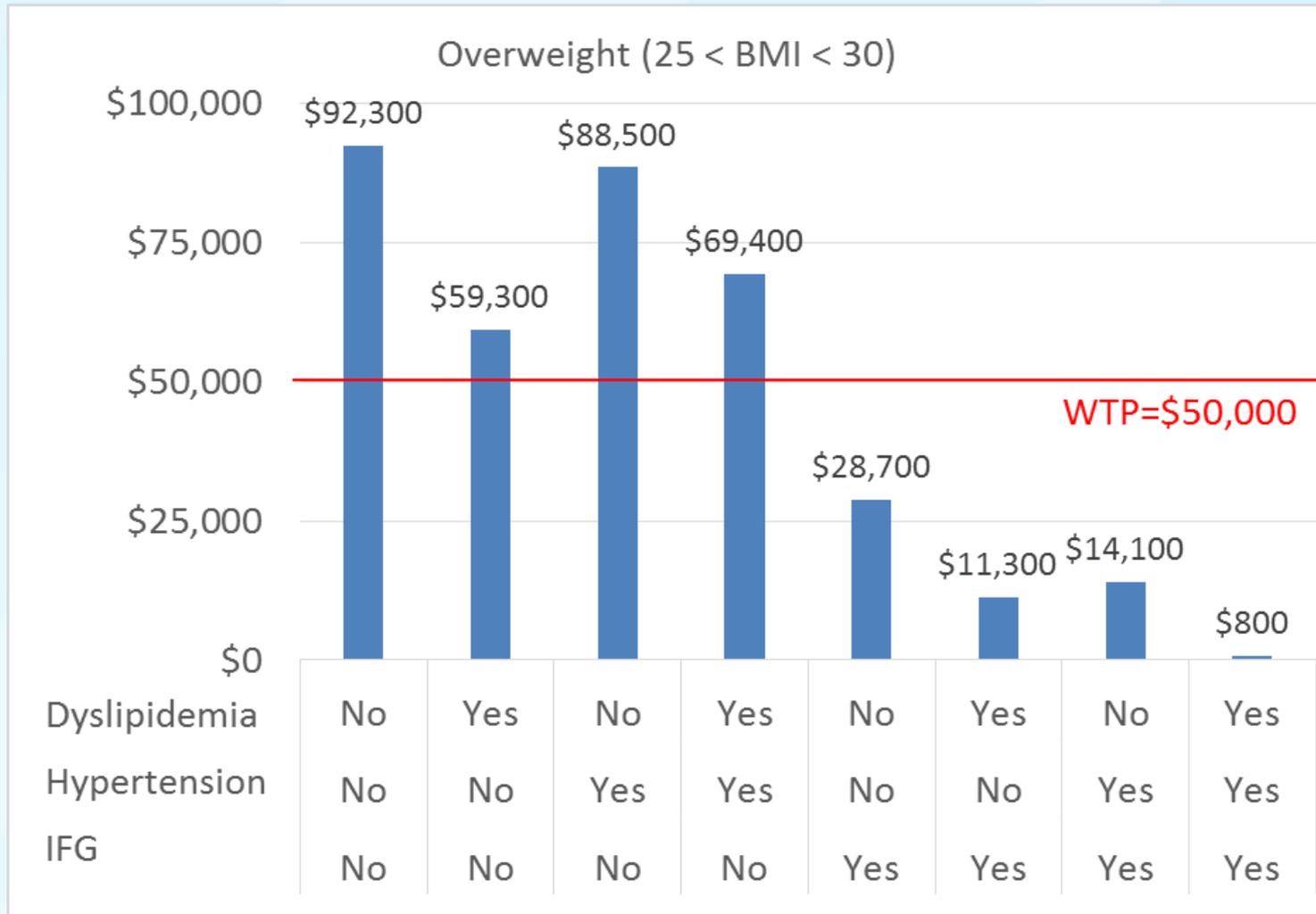
**Relationship of A1c (x-axis) and 10-year Diabetes Incidence (y axis).
Circle size represents the proportion of total diabetes cases over 10 years.**



Cost-effectiveness of the 2014 USPSTF recommendations for intensive behavioral counseling interventions for adults with cardiovascular risk factors



Cost-effectiveness of the 2014 USPSTF recommendations for intensive behavioral counseling interventions for adults with cardiovascular risk factors



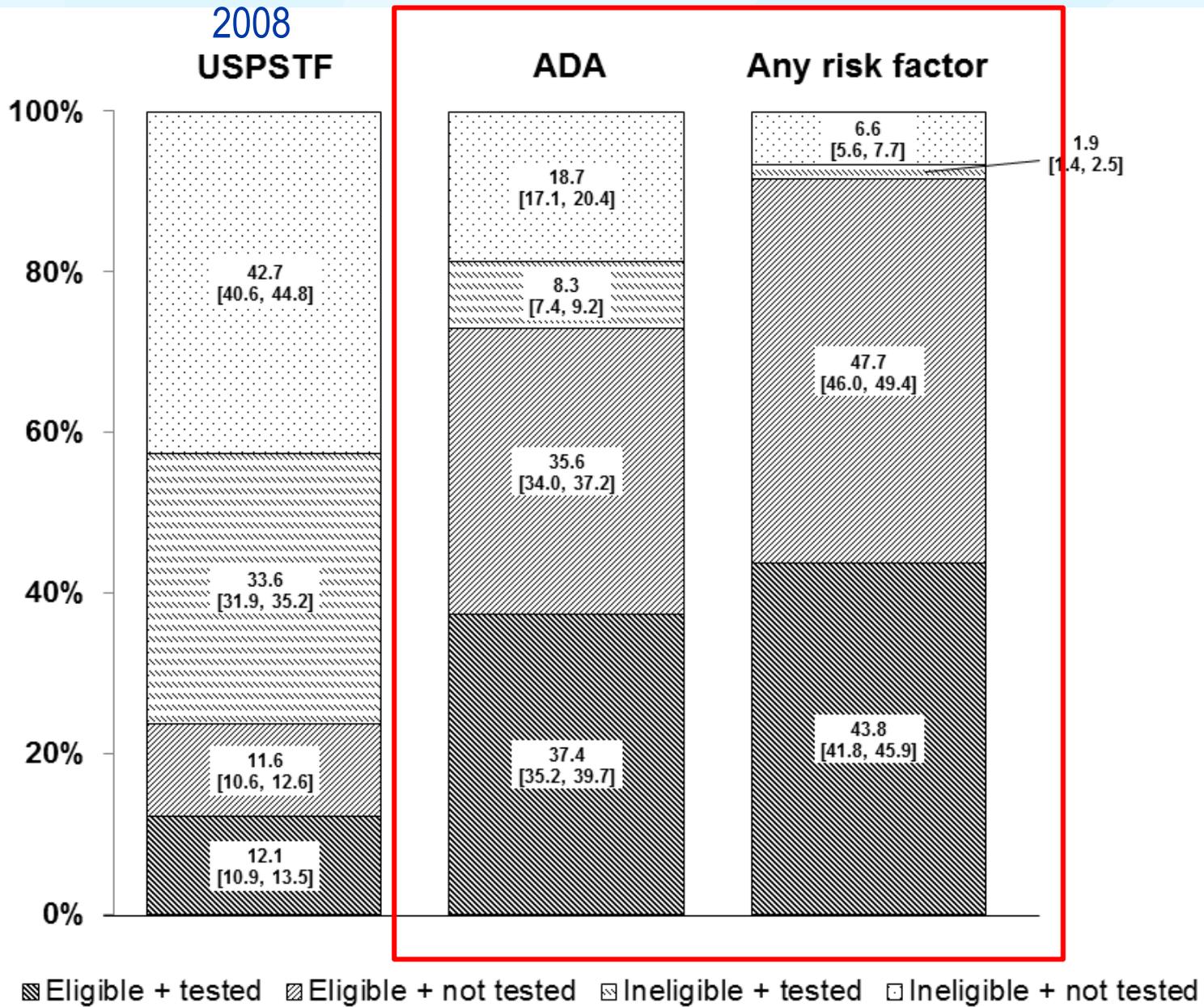
Presented at ADA Scientific Sessions, Lin et al., 2016

Summary and conclusions

- Overall, the USPSTF recommended lifestyle intervention is **cost effective**
- The cost-effectiveness varies by risk factor status
 - **Cost saving** for obese persons with IFG and ≥ 1 other CVD risk factors.
 - **Cost effective** for persons with either obesity or IFG
 - **Not cost effective** for non-obese persons without IFG
- Intervention priority should be set based on risk status

Receipt of Glucose Testing among US adults, NHANES 2007-2012 (Bullard et al., PLOS One, 2015)

- **Proportion meeting criteria for screening:**
 - 73% (156 million) met ADA criteria
- **51% of eligible adults reported being tested in past 3 years.**
- **Eligible individuals not tested were more likely to be:**
 - Lower educated
 - Poorer
 - Uninsured
 - Have no usual place of care



Summary

- Multi-tiered response to diabetes screening and prevention is essential.
- Current recommendations call for two-stage screening/testing approaches initiated in clinical settings.
- Screening and prevention of diabetes is cost-effective but will benefit from continued refinement of risk stratification approaches.



Advancing High Performance Health

Practice-Based Screening for Diabetes

Topics



On-line resource for “staged” screening—begin by reviewing risk factors

- Ask. Screen. Know.™ (unbranded website, provided by Novo Nordisk)

Using EHR data to identify patients for screening—data from Optum™ One

- Typical proportions of patients eligible for screening
- Proportions who are currently being screened, and
- Yield from screening—patients with evidence for diabetes and prediabetes

First with A1c, then approximate figures for fasting plasma glucose and 2-hr GTT

- Ways to identify fasting glucose results in EHR data

Prioritizing patients with prediabetes for intervention

- More than 1,000 organizations offer NDPP programs, most at multiple sites
- Insurance coverage for intensive lifestyle programs—begins in 2018 for Medicare
- DPP study: heterogeneity of treatment effect

KNOW YOUR DIABETES RISK FACTORS

Health is your first wealth. Take the Diabetes Risk Factor Assessment today, **talk to a health care professional about getting screened**, and encourage your family and friends to do the same.

[Take the Diabetes Risk Factor Assessment Today](#)

 Ask. Screen. Know. ™	How to <i>Ask.Screen.Know.</i> ™	Meet Rev Run and Justine	Take the Diabetes Risk Factor Assessment	Free Medicare Screening	Videos & Guides
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Share this site

More than 1 in 3 American adults are at-risk of diabetes



Many people who develop diabetes have 1 or more family members with the disease

African Americans are nearly twice as likely to develop diabetes as Caucasian Americans



askscreenknow.com

Topics



On-line resource for “staged” screening

- Begin by reviewing risk factors

Using EHR data to identify patients for screening—data from Optum™ One

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Prioritizing patients with prediabetes for intervention

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Optum One – Population Health Analytics



Aggregate data across the continuum



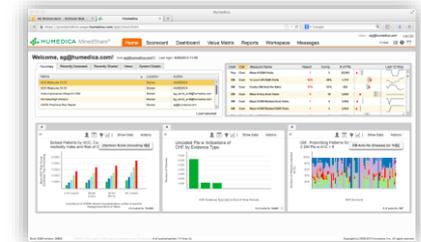
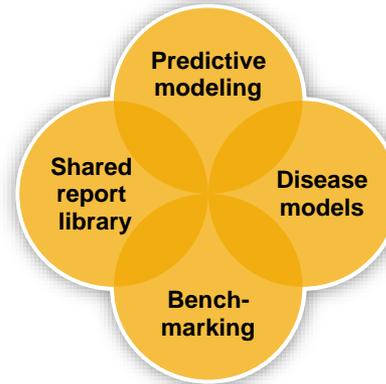
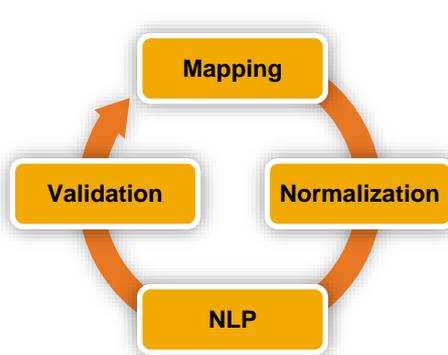
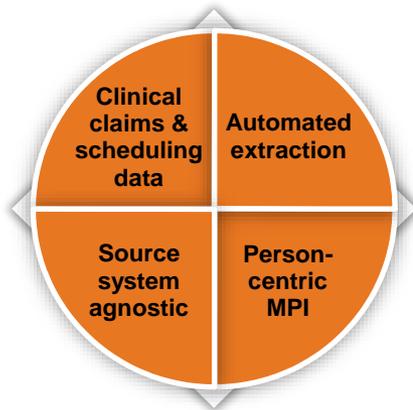
Clean, normalize and validate data



Transform data into insight



Make insights actionable



Optum™ One
Intelligent health analytics platform

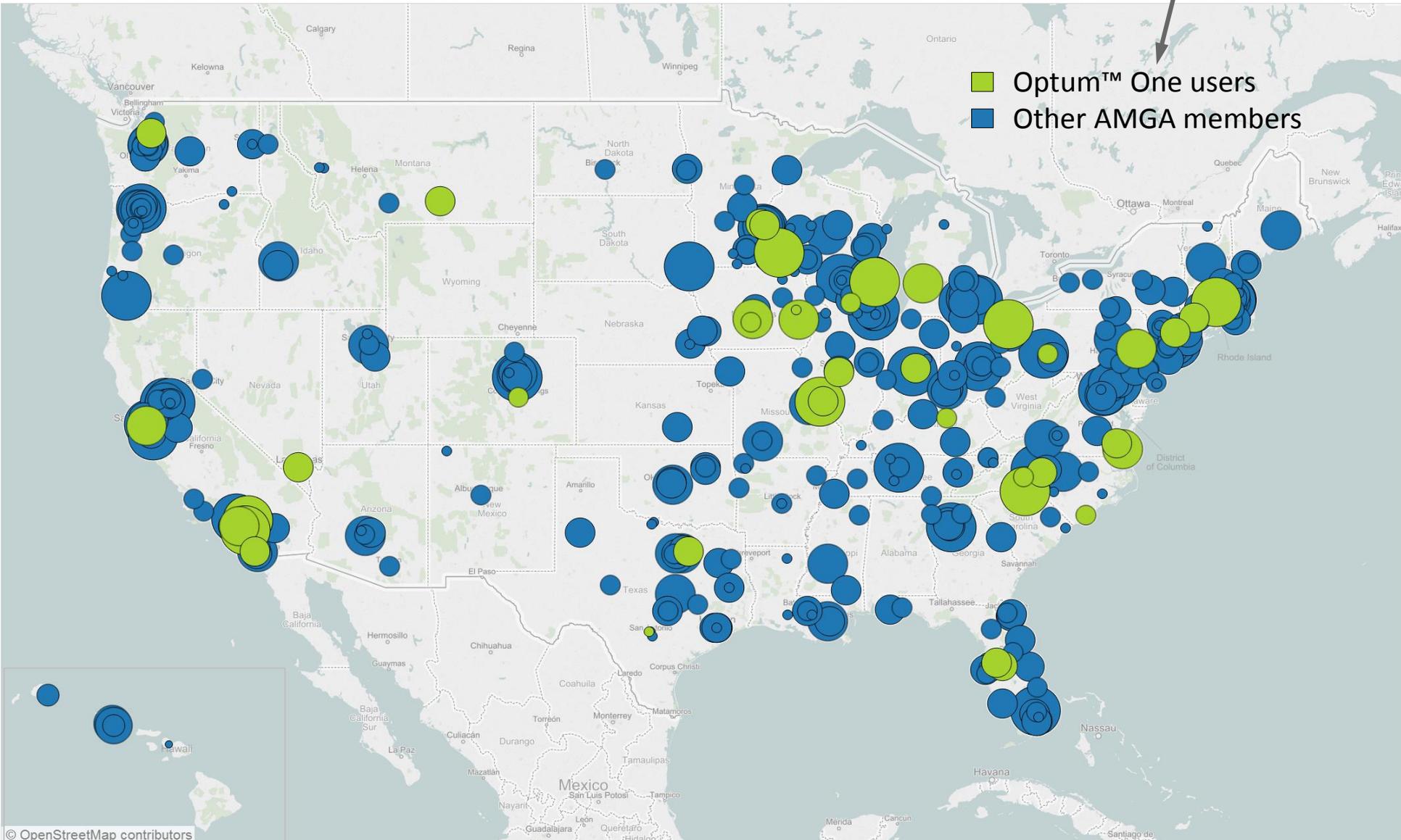


AMGA Shared Learning,
Research and Translation

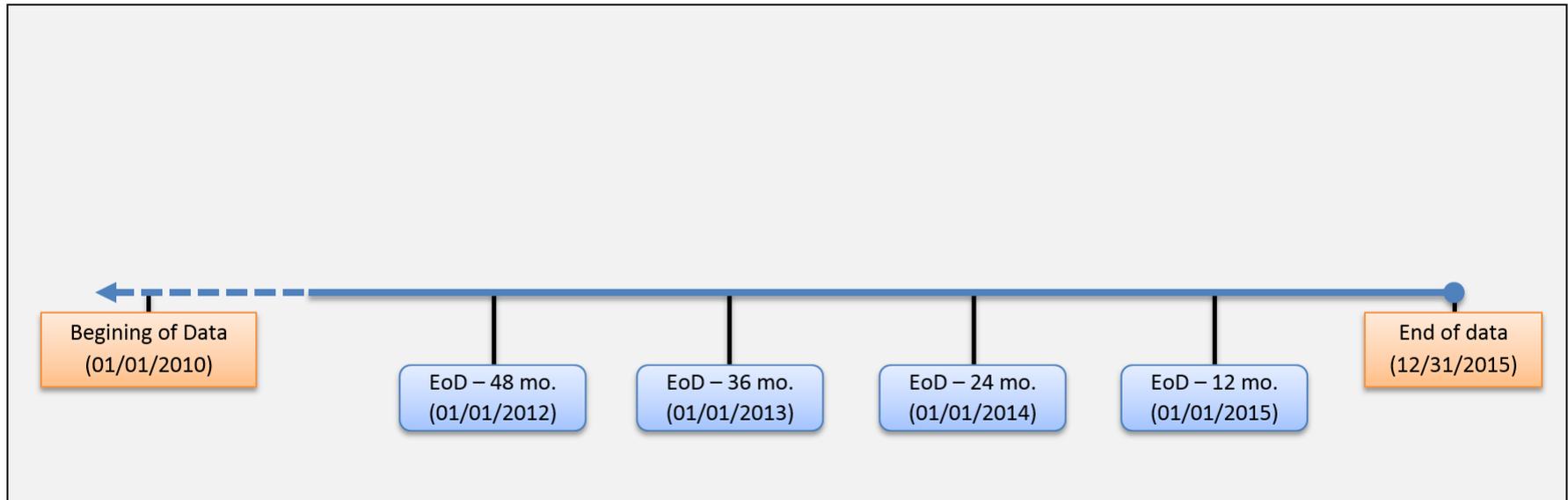


Users of Optum One among AMGA Members: “Instrumented Practices”

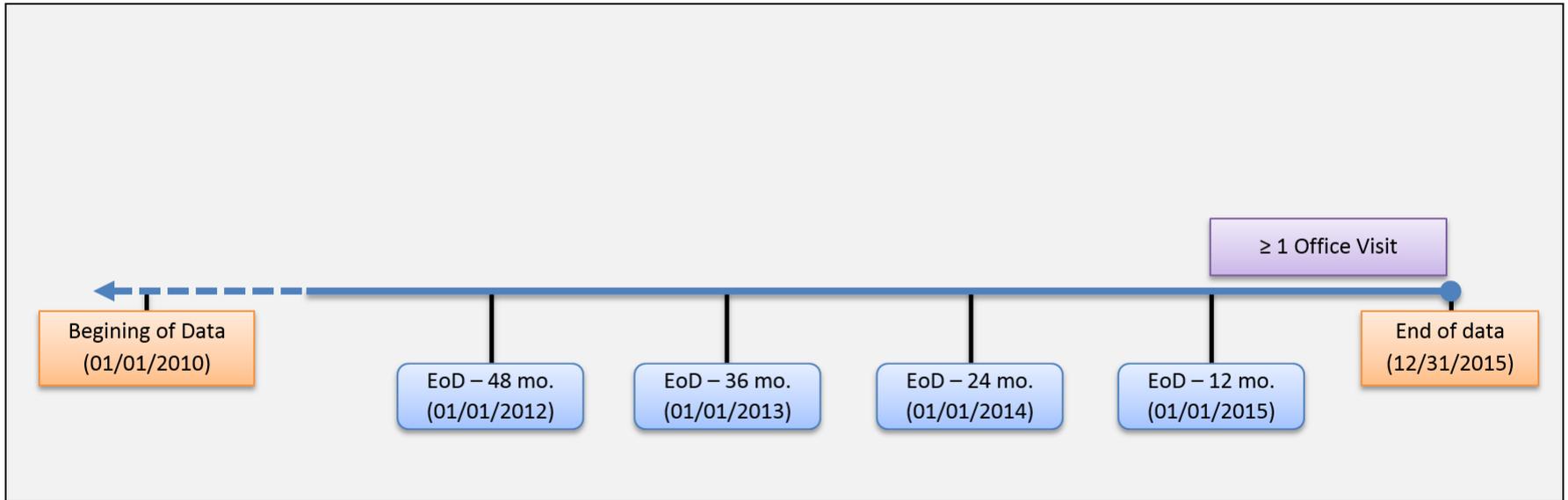
15% of AMGA members
25% of patients



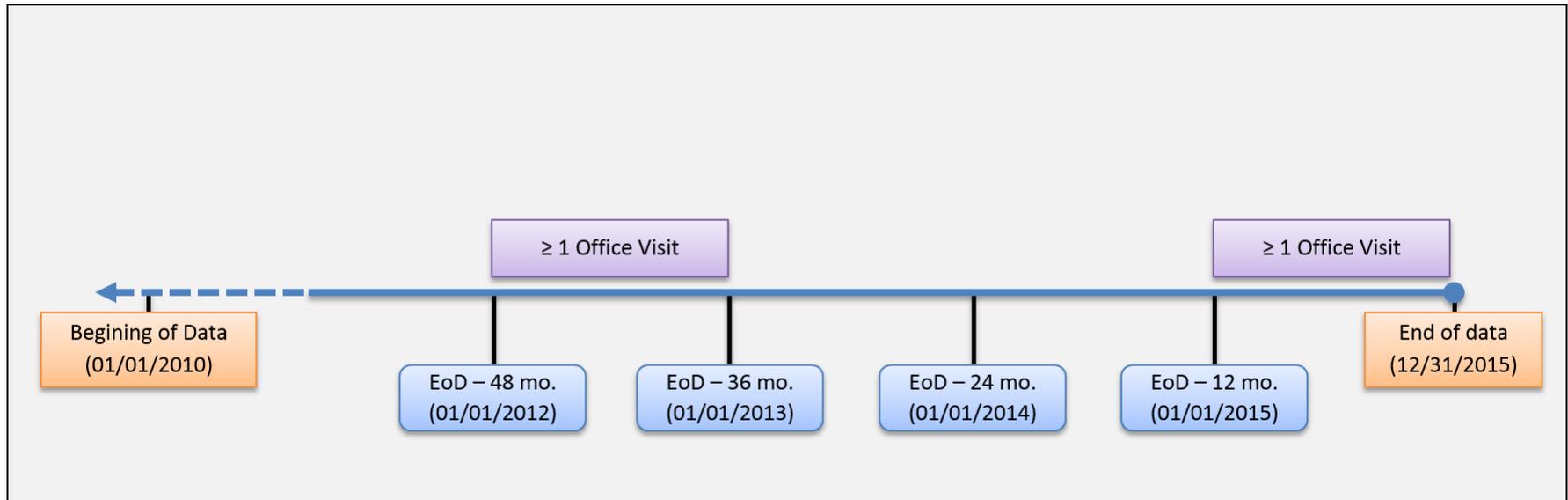
Study Population



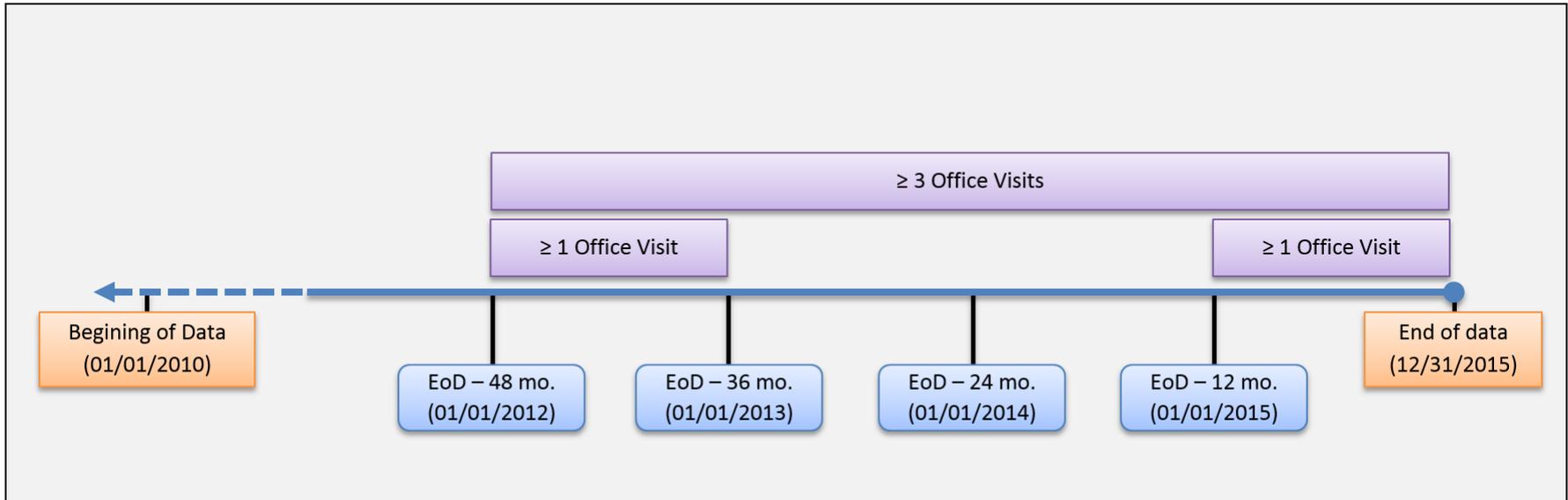
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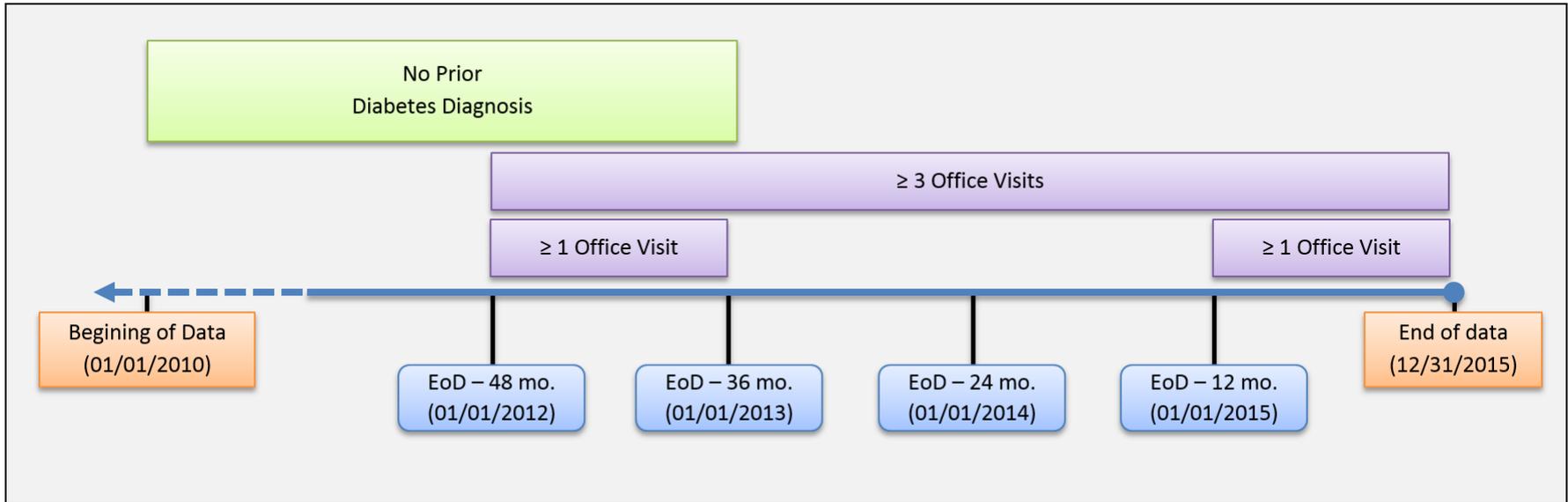
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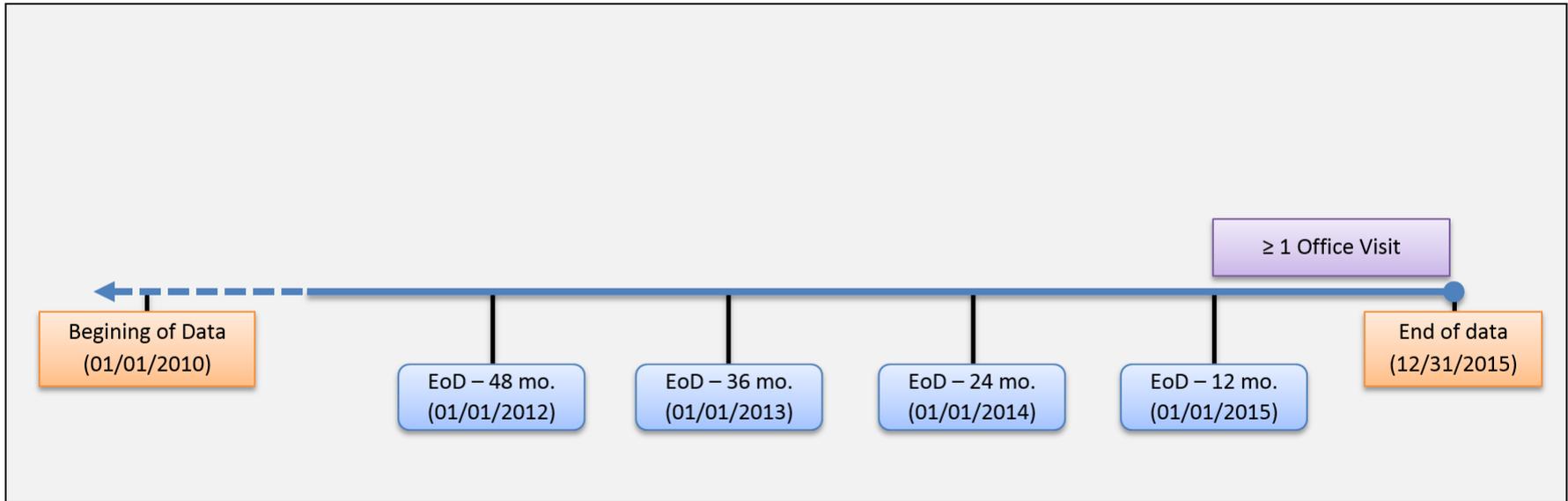
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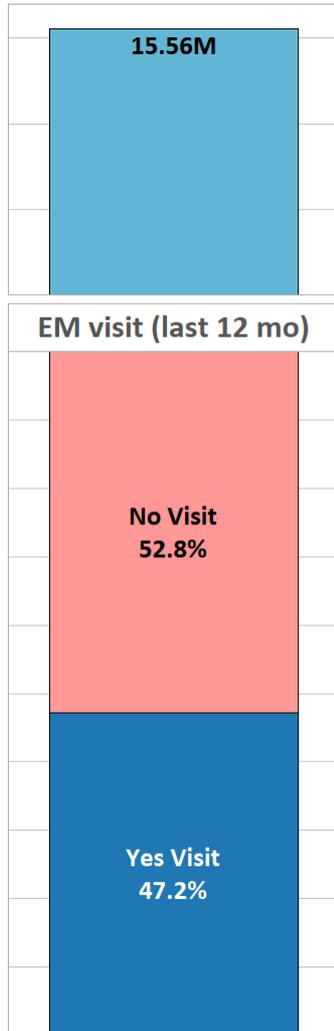
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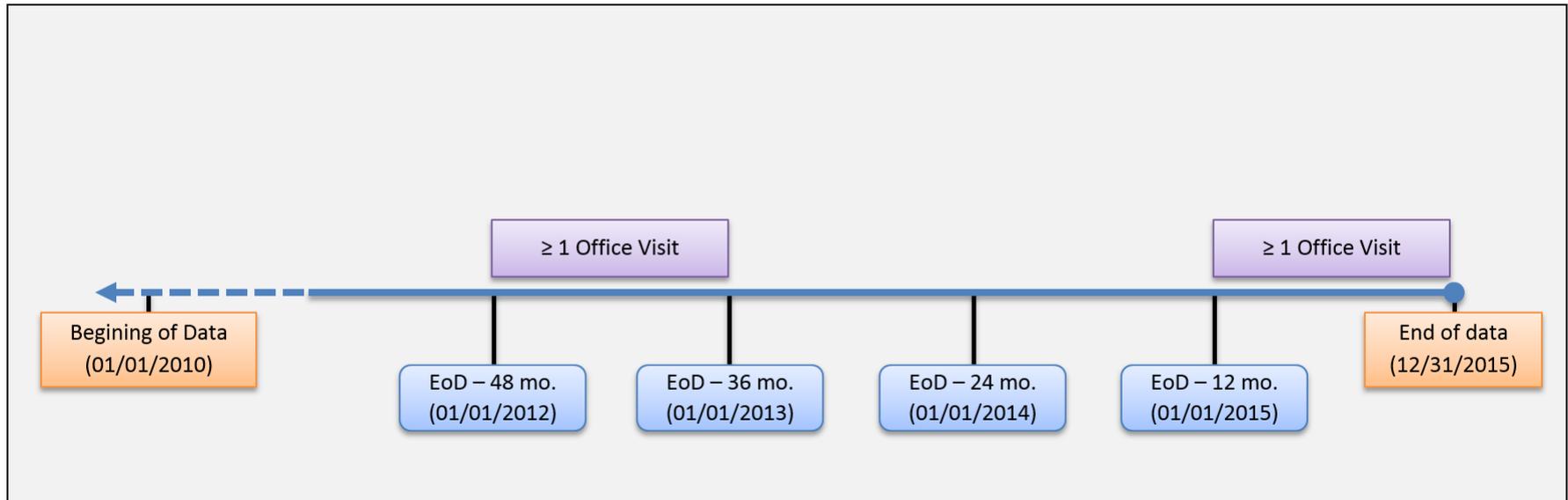
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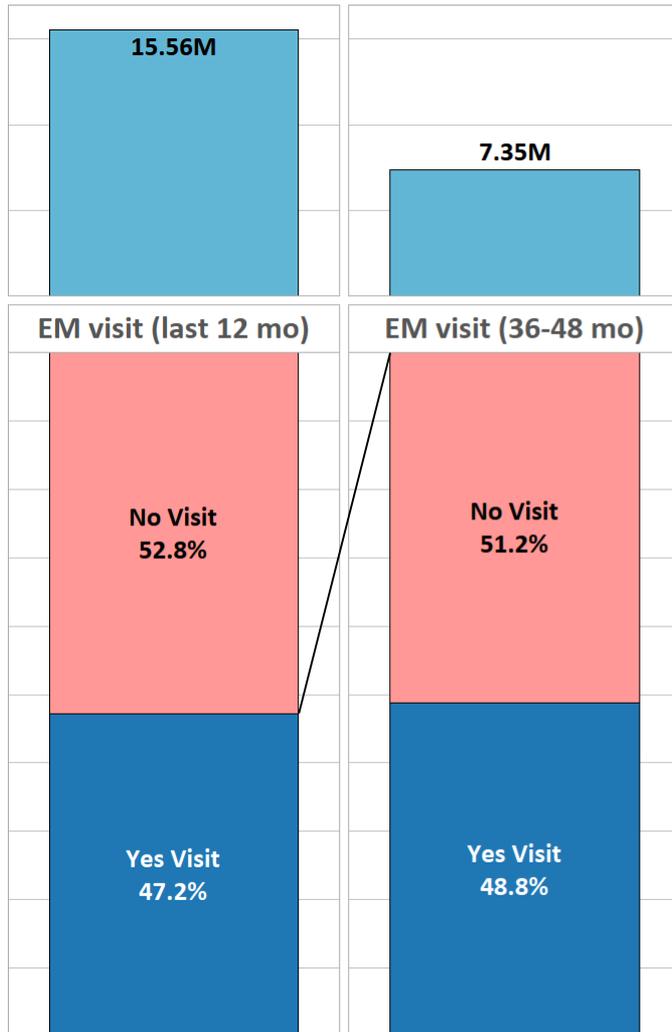
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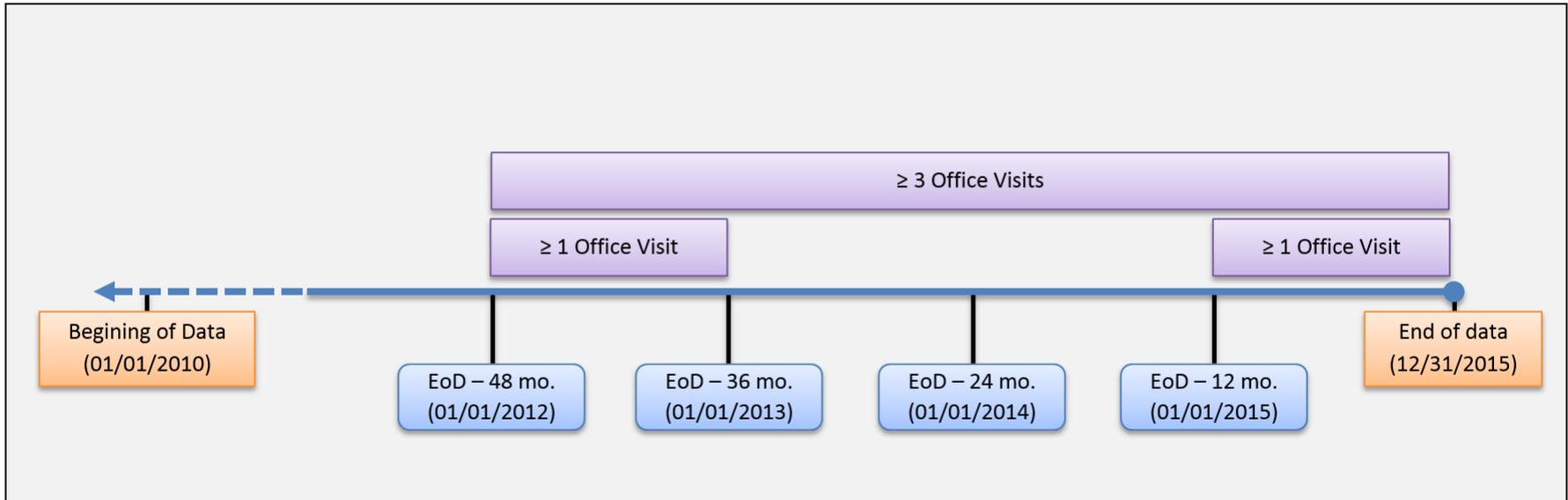
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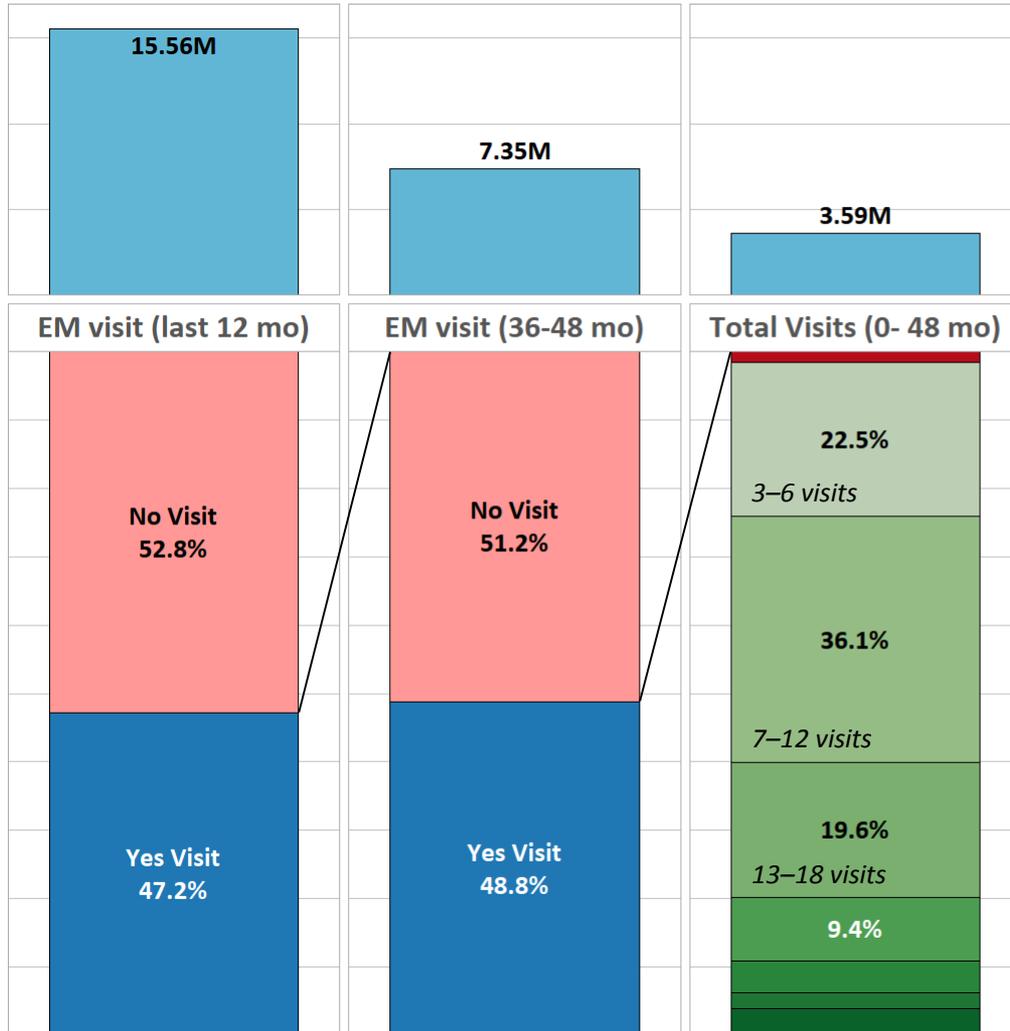
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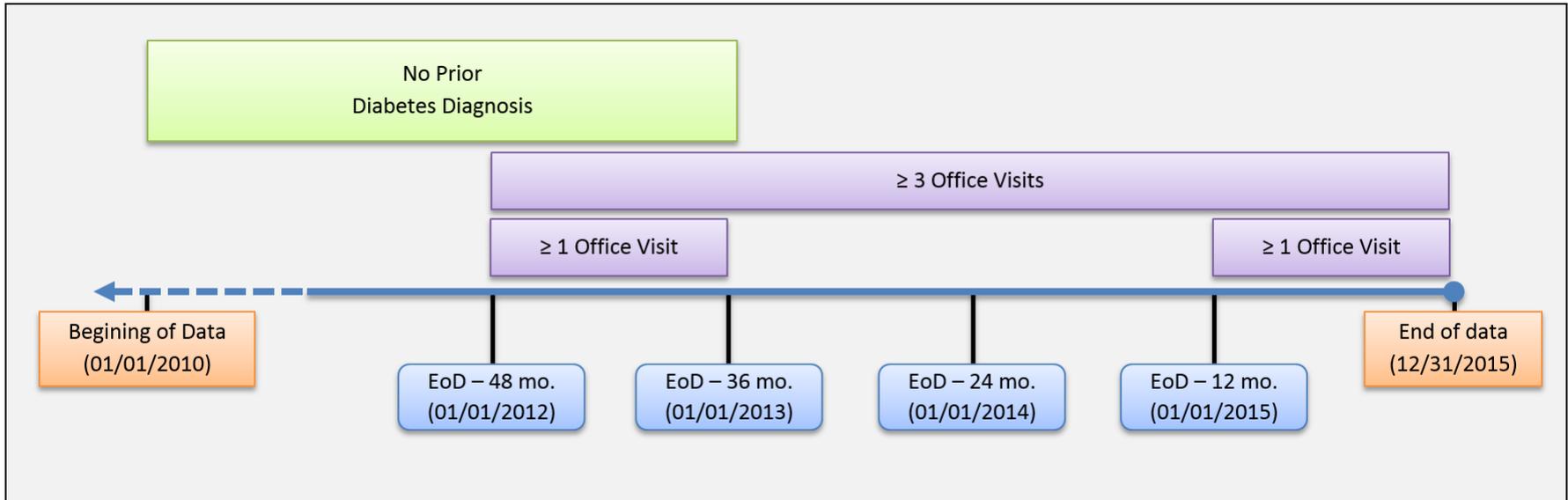
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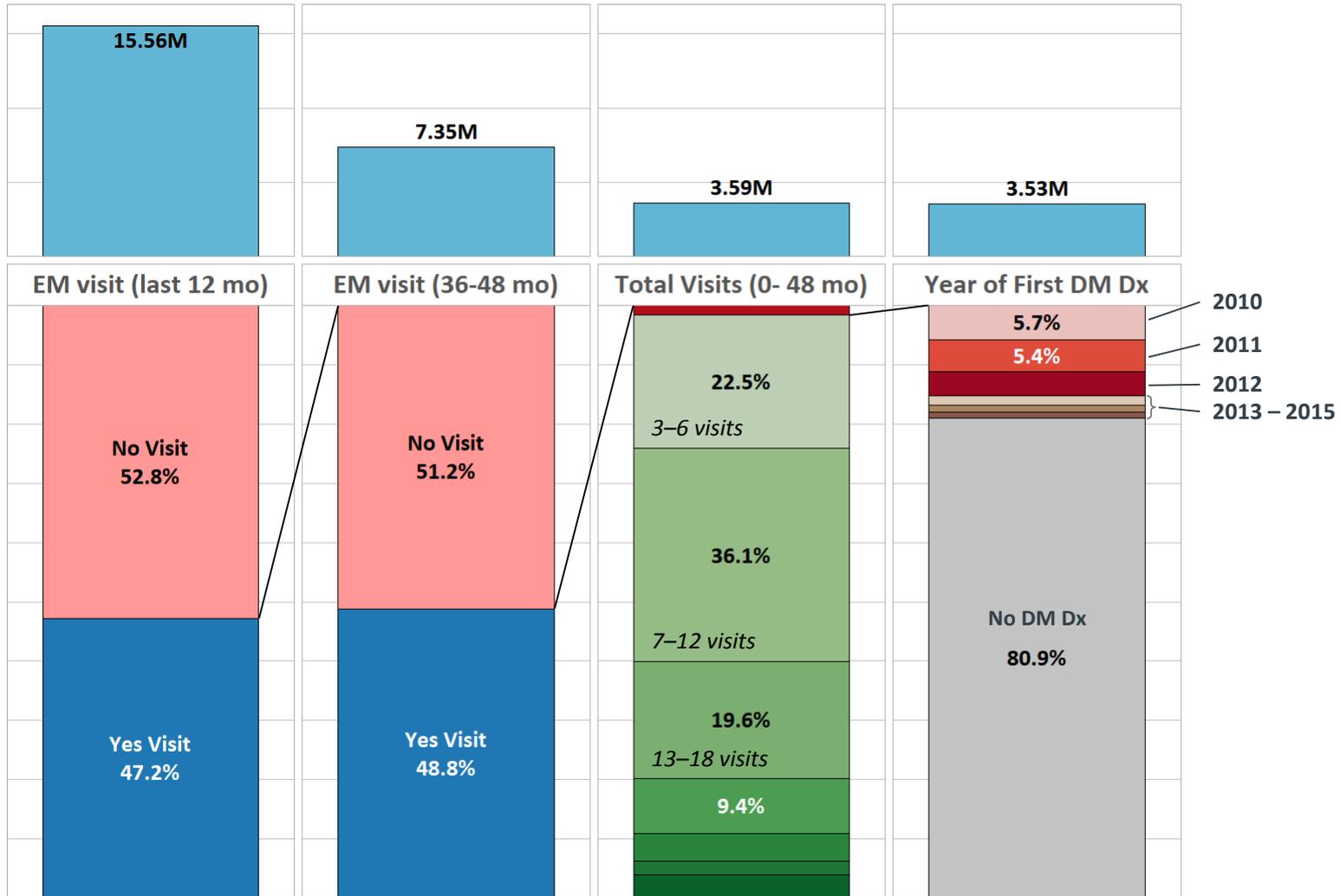
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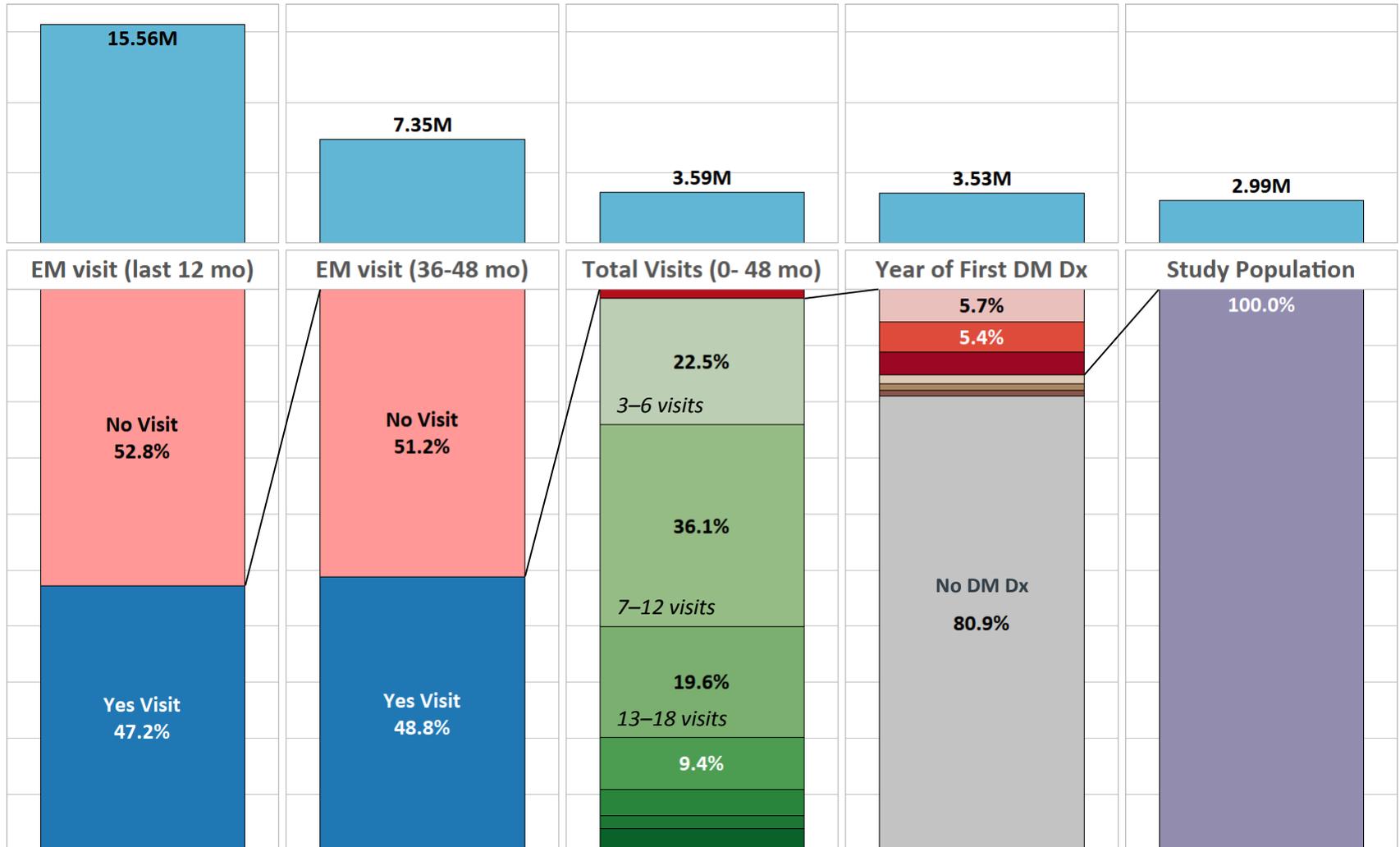
Study Population



Study Population



Study Population



Who is Eligible for Screening?

Table 2.2—Criteria for testing for diabetes or prediabetes in asymptomatic adults

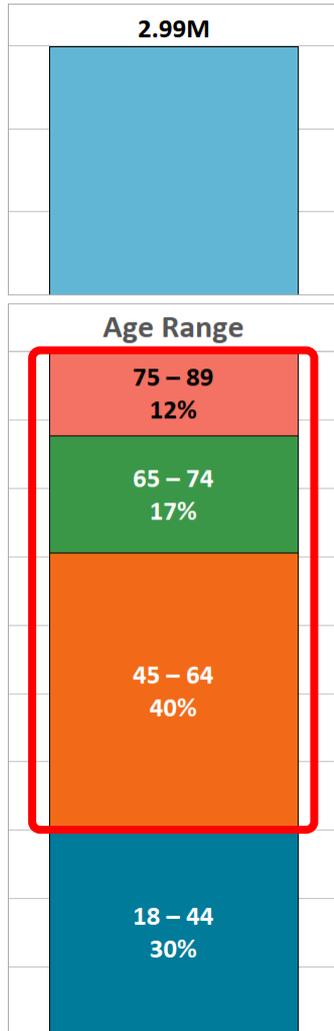
1. Testing should be considered in all adults who are overweight (BMI ≥ 25 kg/m² or ≥ 23 kg/m² in Asian Americans) and have additional risk factors:

- physical inactivity
- first-degree relative with diabetes
- high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
- women who delivered a baby weighing >9 lb or were diagnosed with GDM
- hypertension ($\geq 140/90$ mmHg or on therapy for hypertension)
- HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
- women with polycystic ovary syndrome
- A1C $\geq 5.7\%$ (39 mmol/mol), IGT, or IFG on previous testing
- other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)
- history of CVD

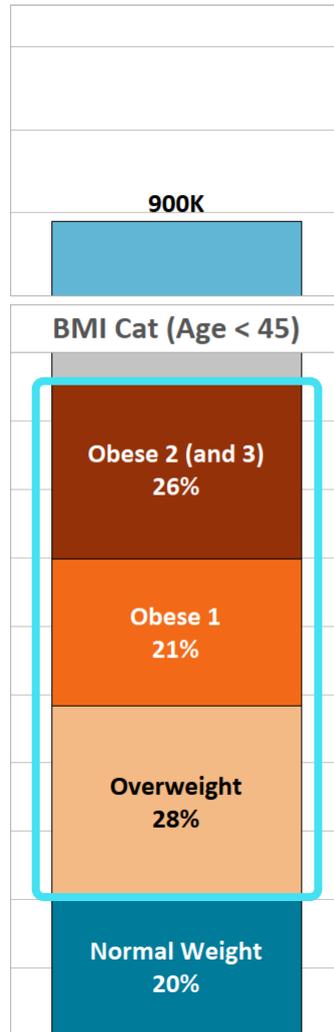
2. For all patients, testing should begin at age 45 years.

3. If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results (e.g., those with prediabetes should be tested yearly) and risk status.

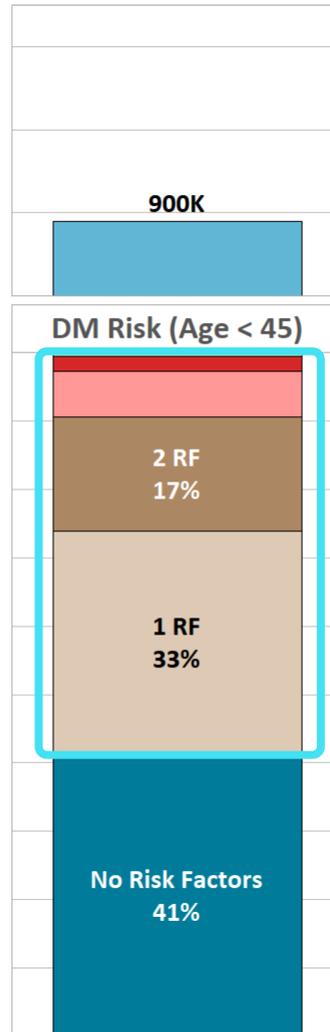
Who is Eligible for Screening?



Who is Eligible for Screening?

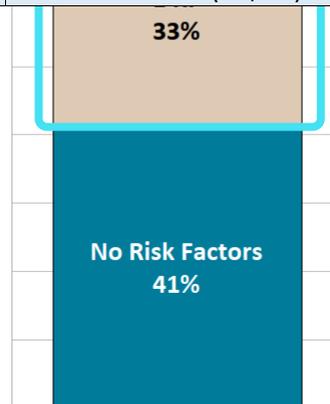


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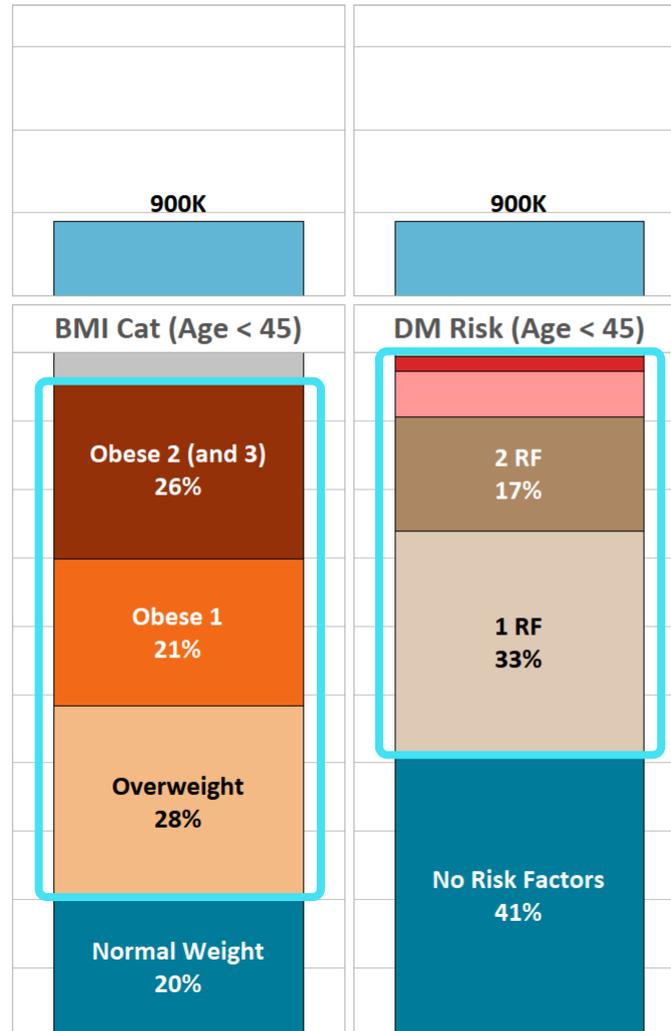


Who is Eligible for Screening?

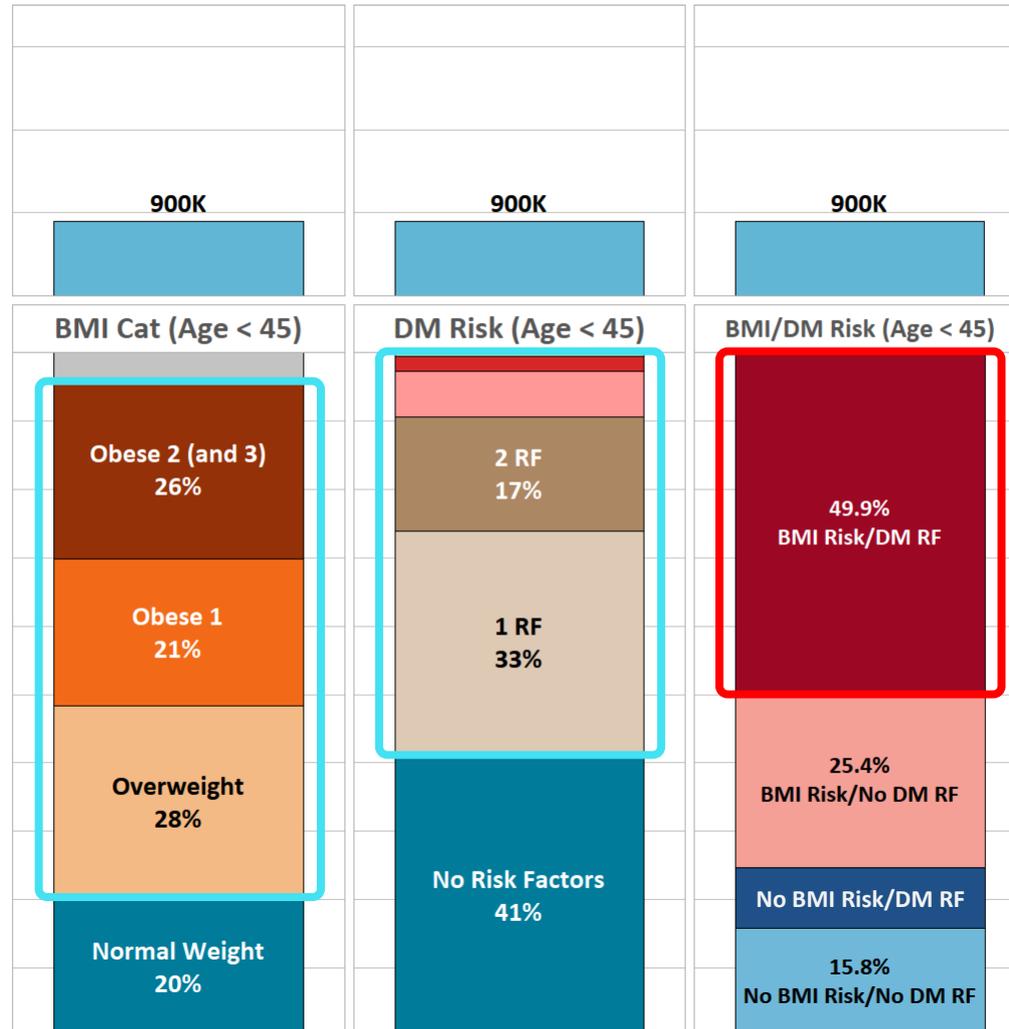
Risk Factor	Available Data	% of Study Population
Physical inactivity	self reported exercise status	18.1%
First-degree relative with diabetes	diagnosis (V180)	3.3%
High-risk race/ethnicity	self reported race/ethnicity	16.5%
Women who delivered a baby weighing > 9 lb or were diagnosed with gestational diabetes	diagnosis (V1221, 648.8)	2.8%
Hypertension (or on therapy for hypertension)	diagnosis, BP, Rx	31.5%
HDL cholesterol level < 35 mg/dL and/or a triglyceride level > 250 mg/dL	lab results	11.9%
Women with polycystic ovary syndrome	diagnosis, BP (140/90), Rx	2.8%
Past A1C ≥ 5.7%	lab results	1.0%
Other clinical conditions associated with insulin resistance	diagnosis, BMI (acanthosis nigricans, severe obesity)	8.4%
History of CVD	evidence of CAD (Dx, Rx)	1.1%



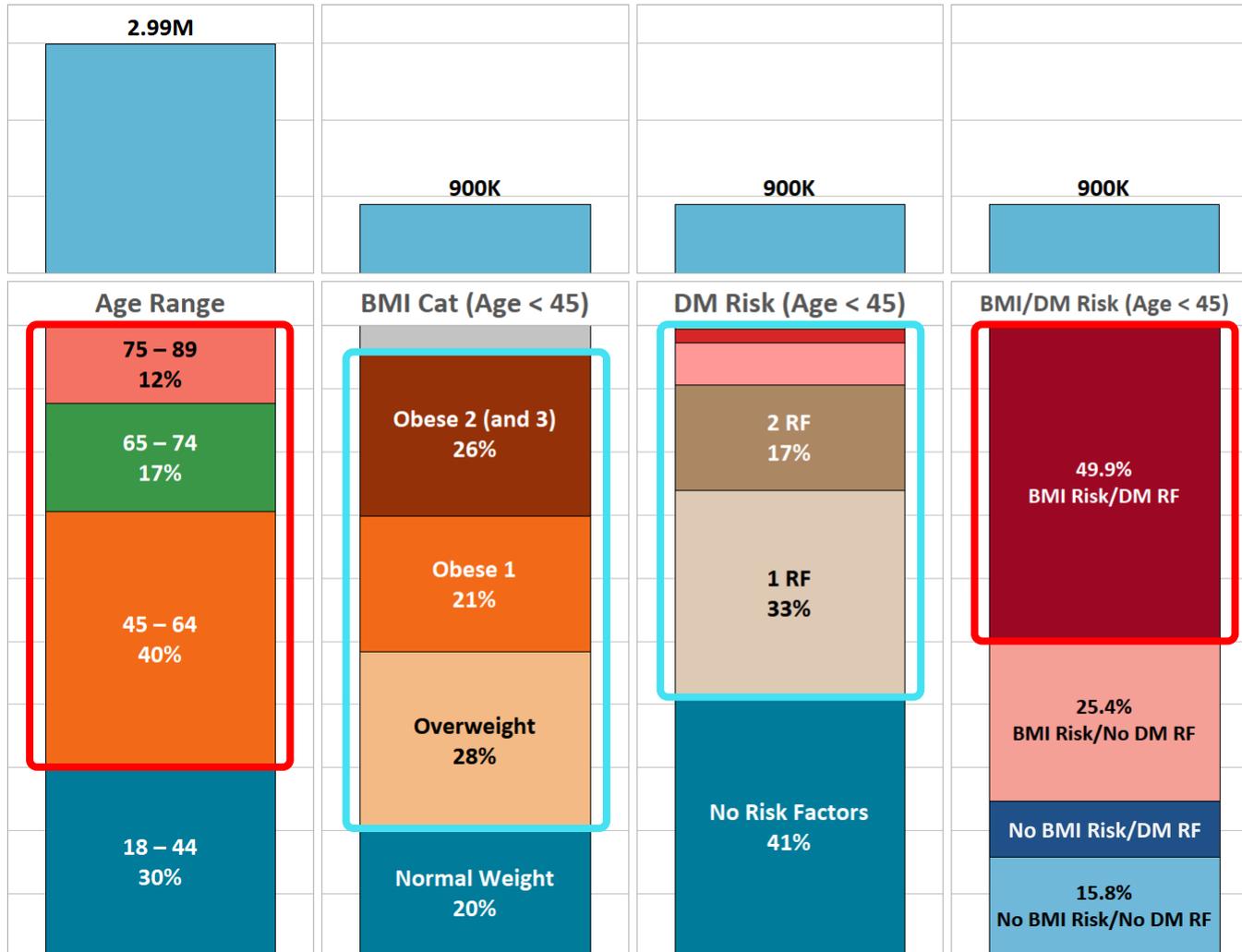
Who is Eligible for Screening?



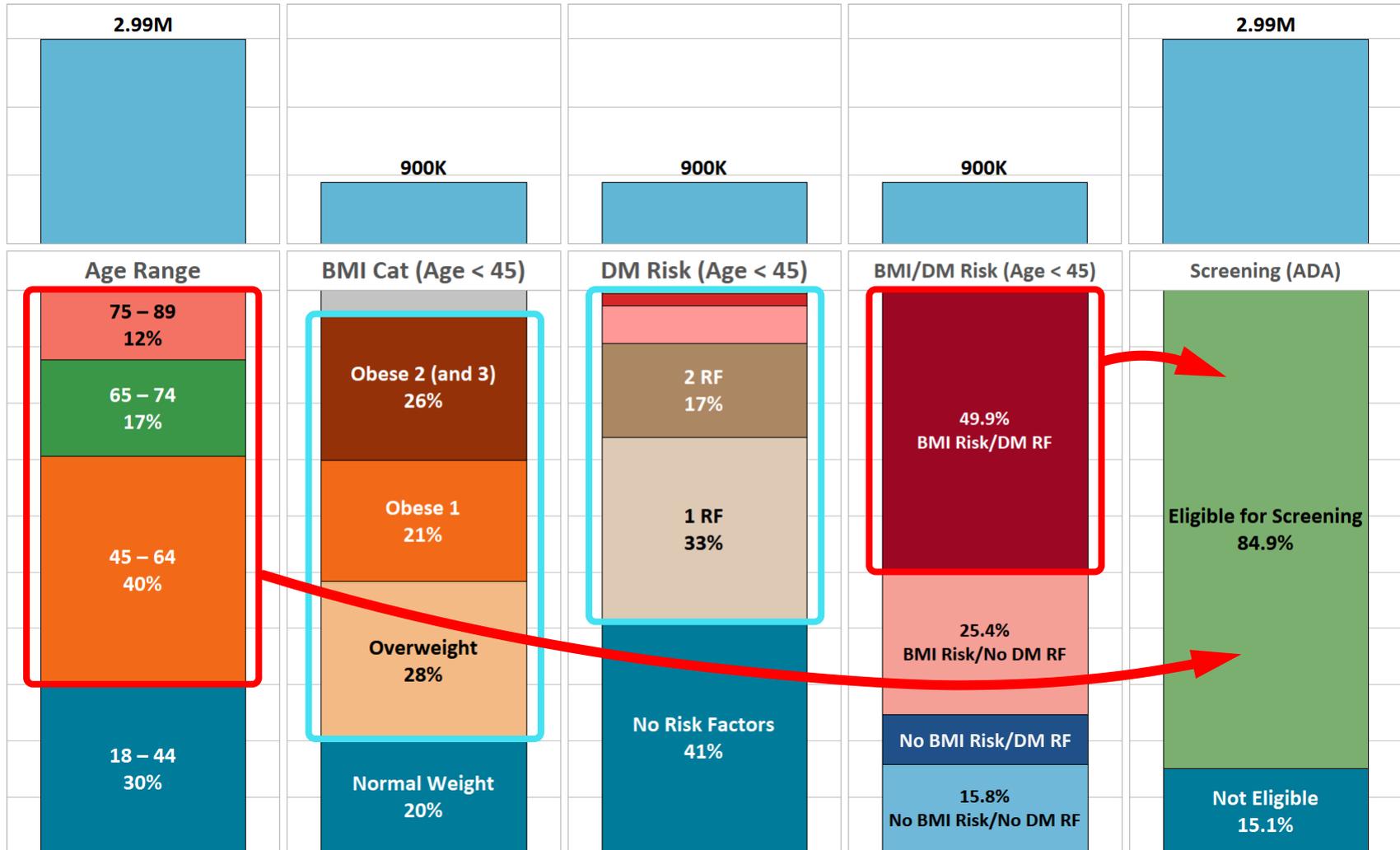
Who is Eligible for Screening?



Who is Eligible for Screening?



Who is Eligible for Screening?



Topics



On-line resource for “staged” screening

- Begin by reviewing risk factors

Using EHR data to identify patients for screening—data from Optum™ One

- Typical proportions of patients eligible for screening
- Proportions who are currently being screened, and
- Yield from screening—patients with evidence for diabetes and prediabetes

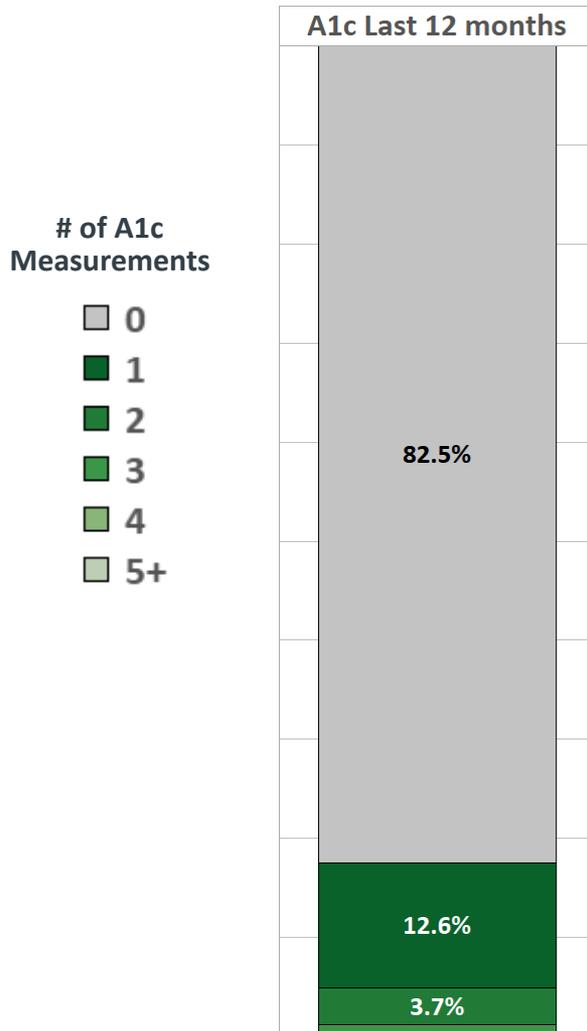
First with A1c, then approximate figures for fasting plasma glucose and 2-hr GTT

- Ways to identify fasting glucose results in EHR data

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- DPP study: heterogeneity of treatment effect

Are Patients Being Screened?



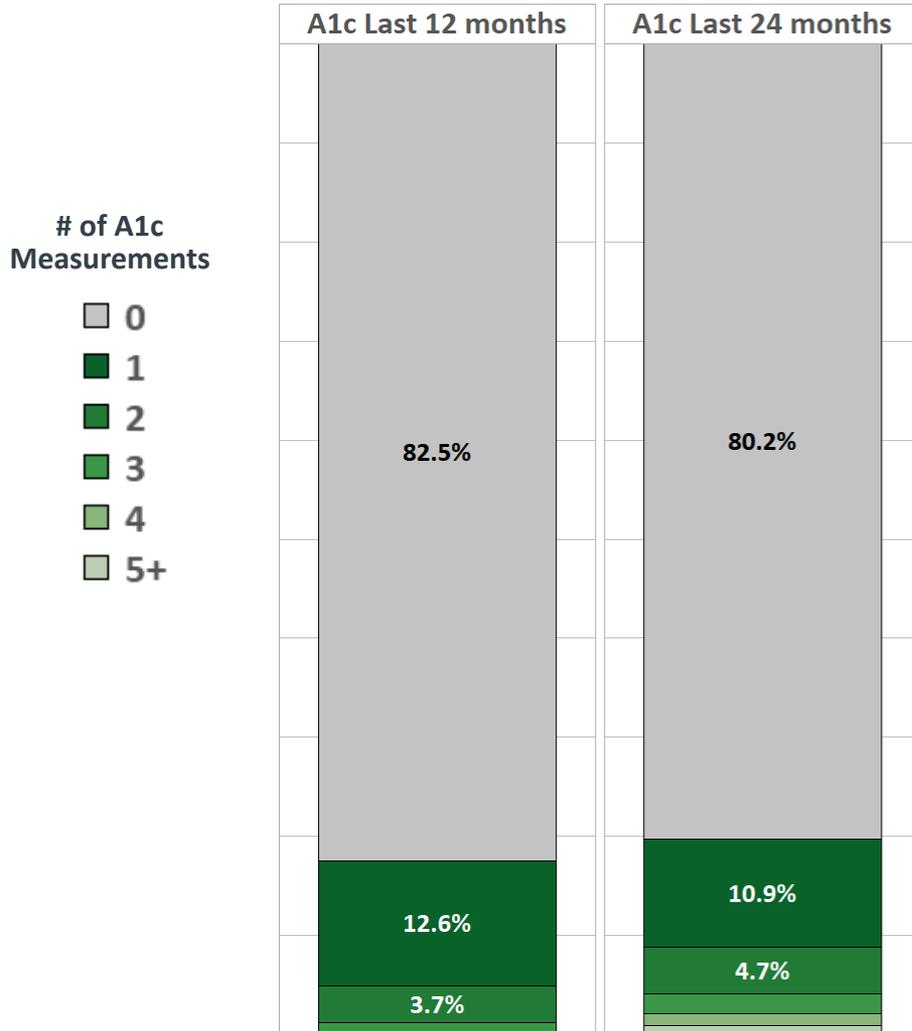
Important Note

The next few slides reflect screening using A1c only, so they significantly under-estimate current screening rates.

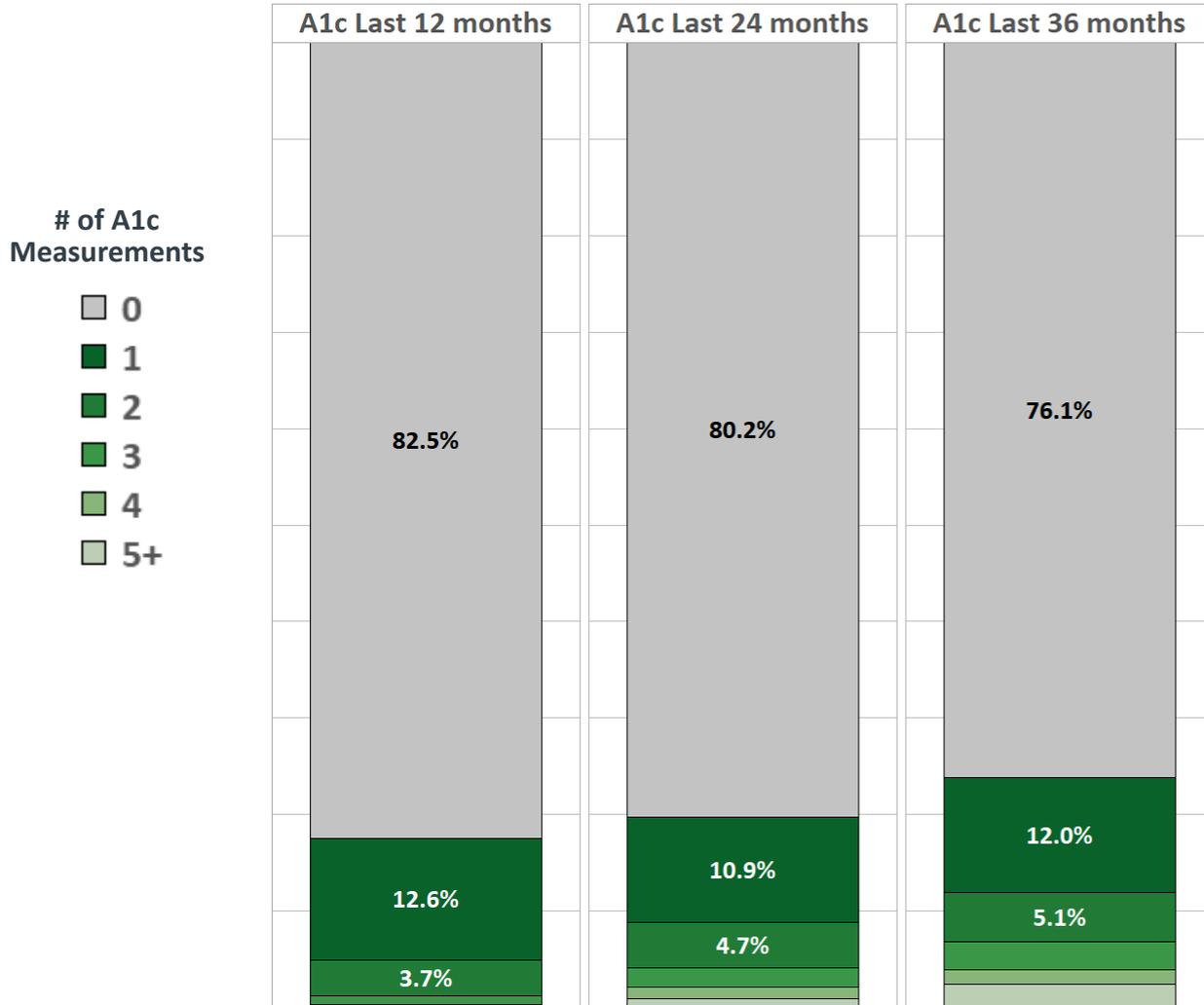
We then explore plasma glucose results identified as fasting in the EHR, although only a few organizations have a large number of such results. But many glucose tests are drawn on the same day as lipid panels, which are almost always done fasting. Taking the lowest value among the glucose results on days when a lipid panel was done, the distribution is similar to that of results identified as fasting glucose—slightly lower, in fact. So it is probably correct to assume that those values were drawn fasting, just not clearly identified as such when reported in the EHR.

Optum labels glucose results as fasting only when they are clearly identified as fasting in the EHR. Overall, there are about 10 times as many results that were *probably* drawn fasting, along with a lipid panel.

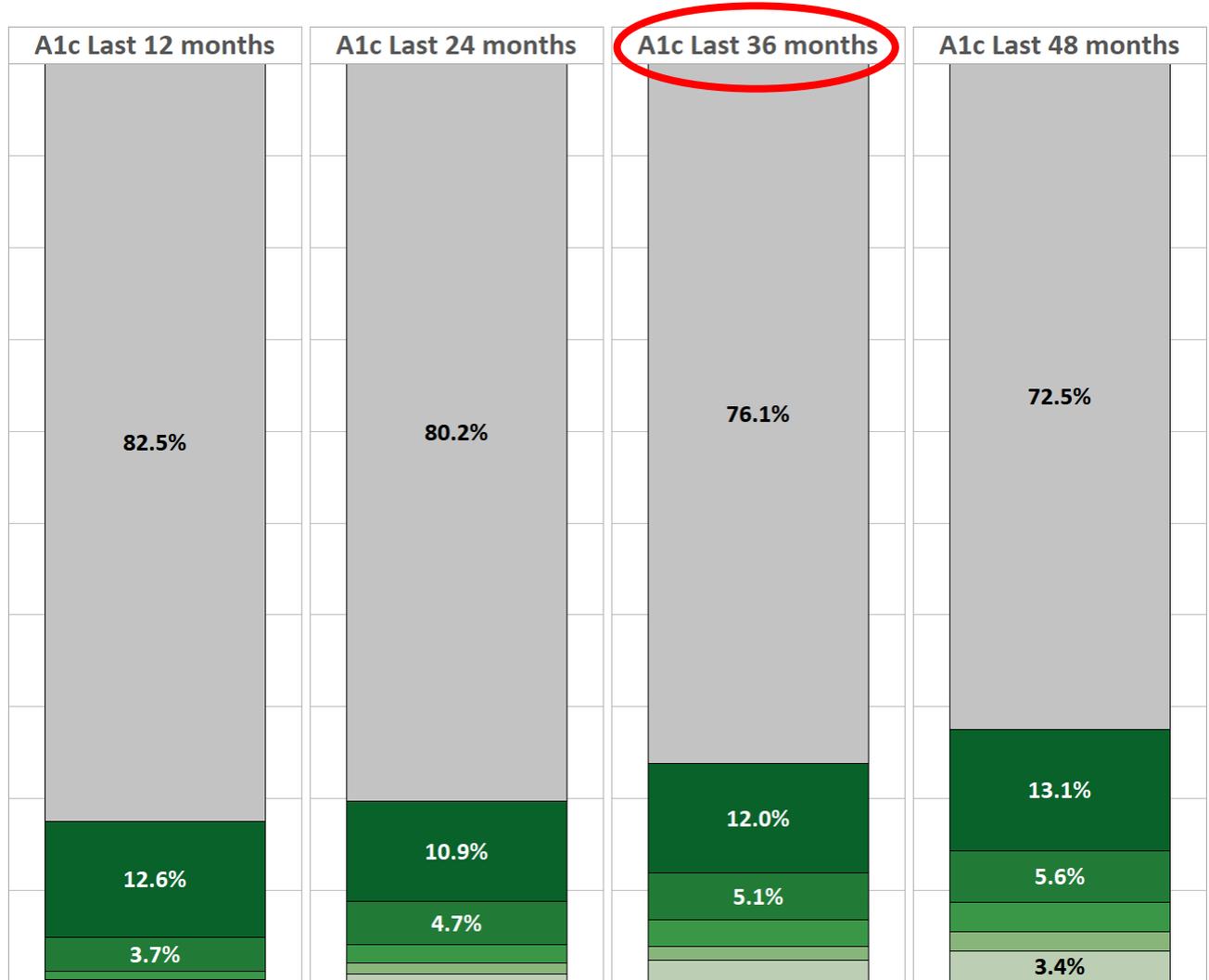
Are Patients Being Screened? *(HbA1c only)*



Are Patients Being Screened? *(HbA1c only)*

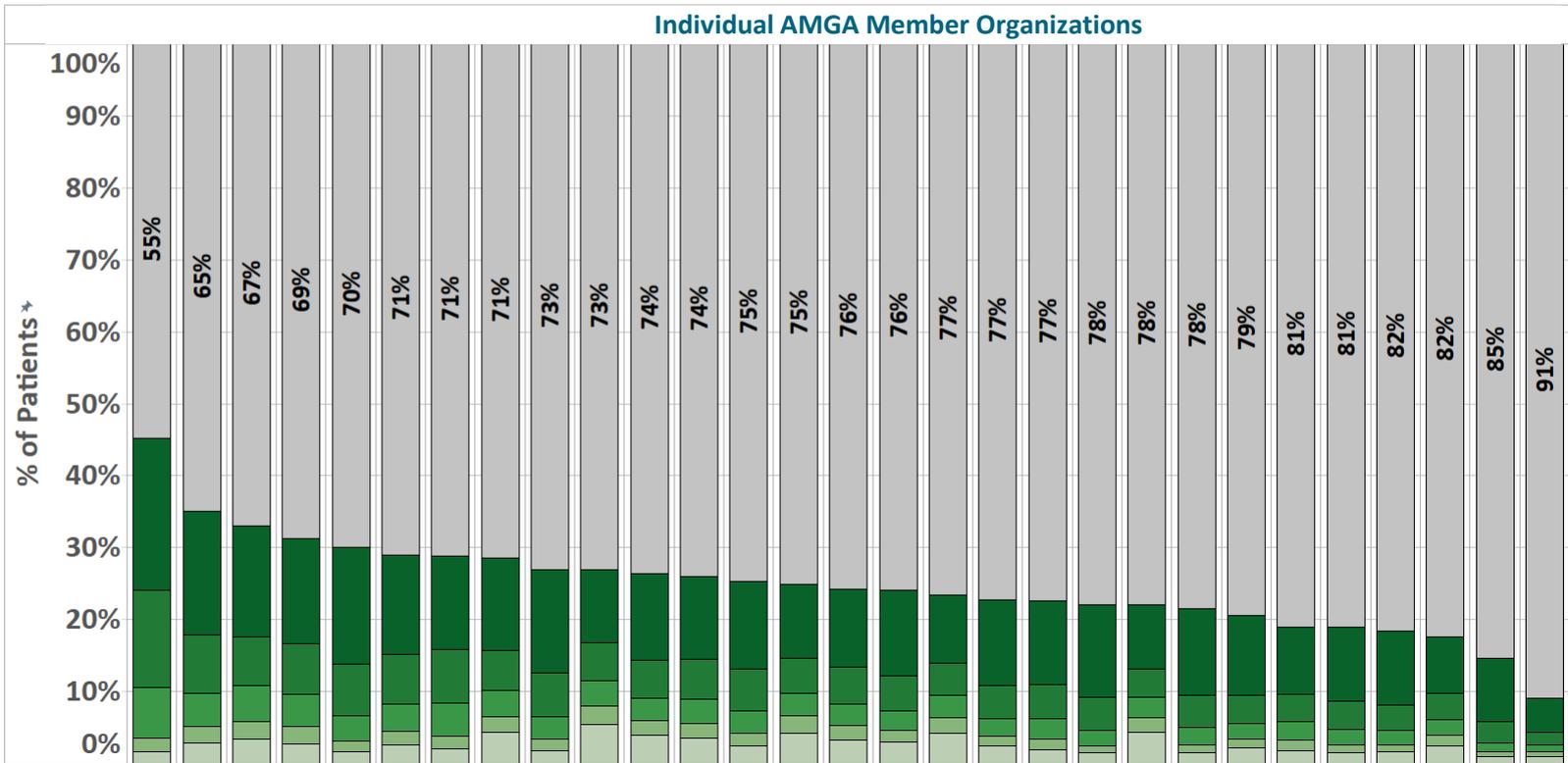
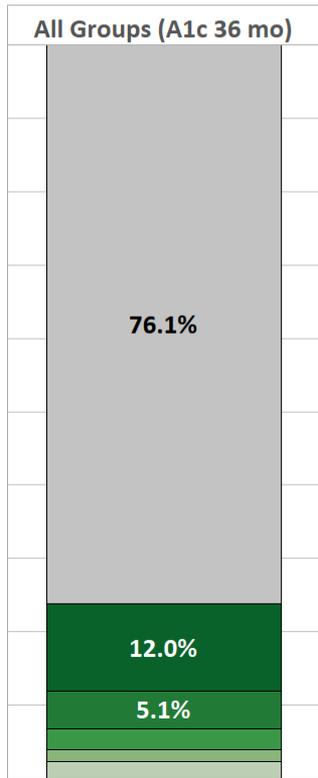
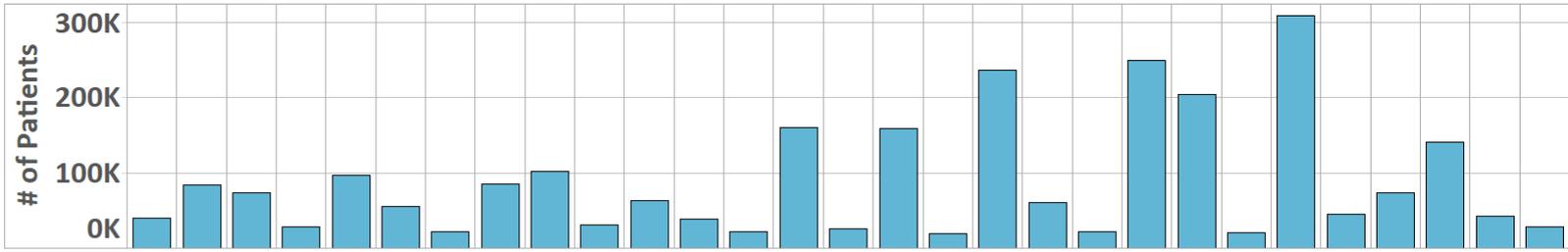
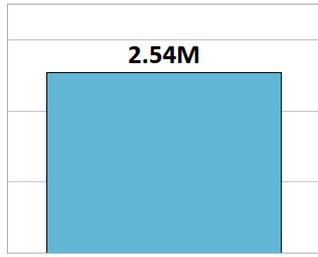


Are Patients Being Screened? *(HbA1c only)*

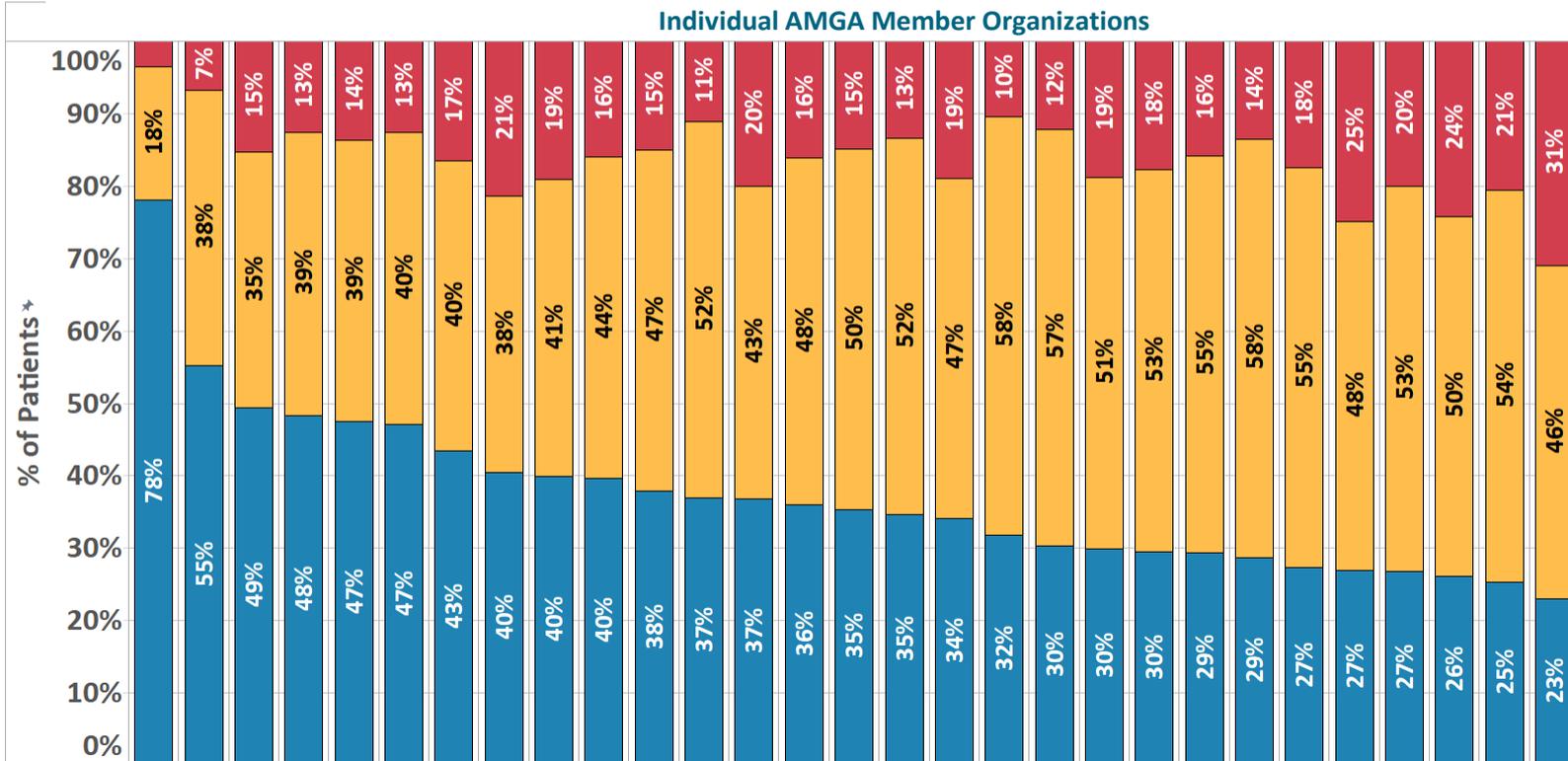
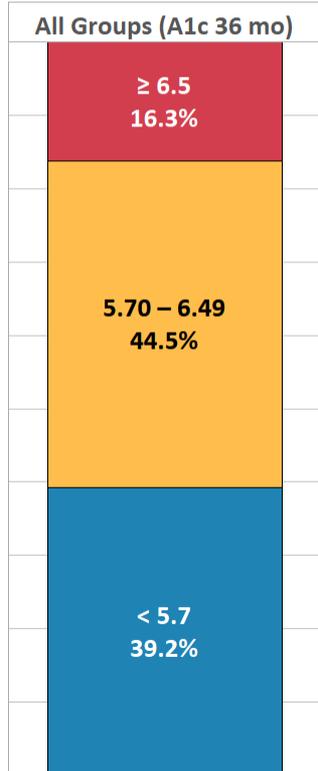
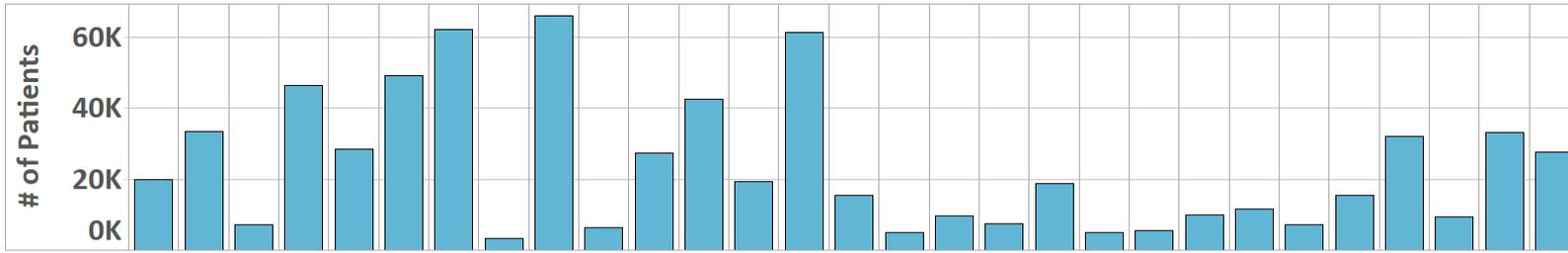
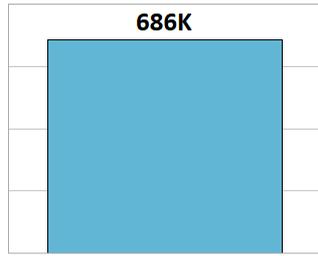


Are Patients Being Screened? *(HbA1c only)*

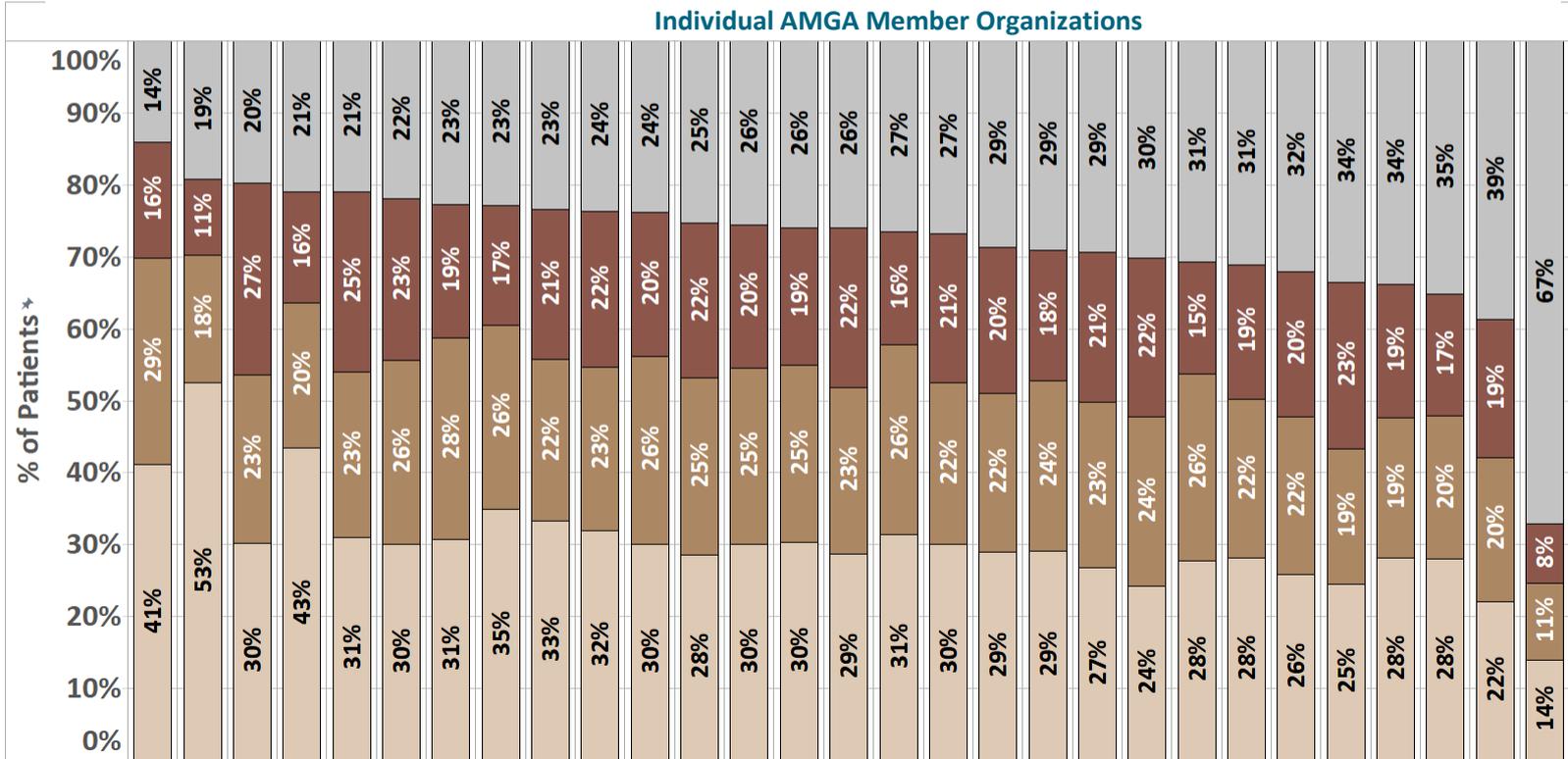
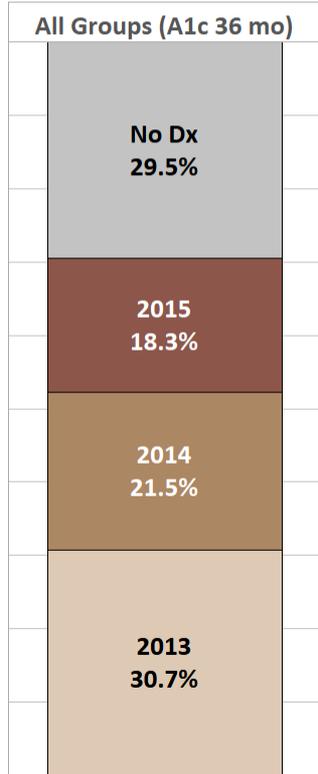
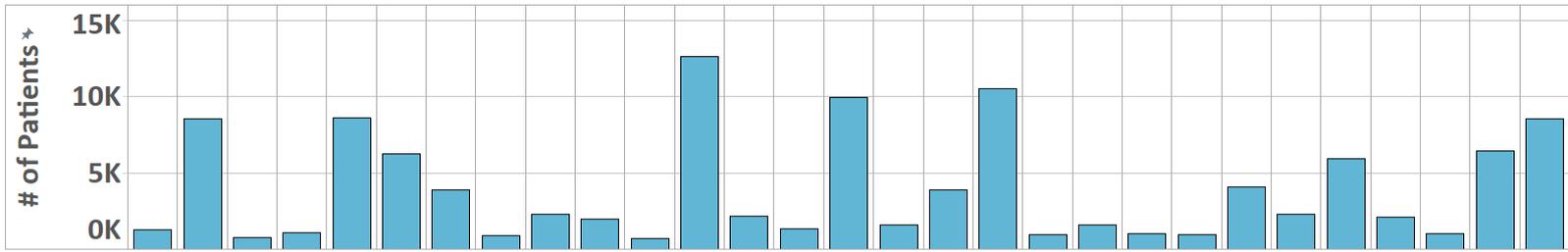
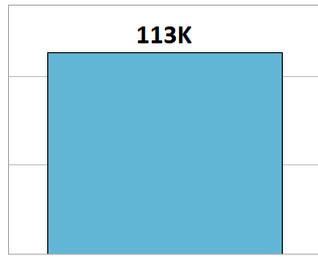
of A1c Measurements



HbA1c Results: Evidence of DM or Pre-DM

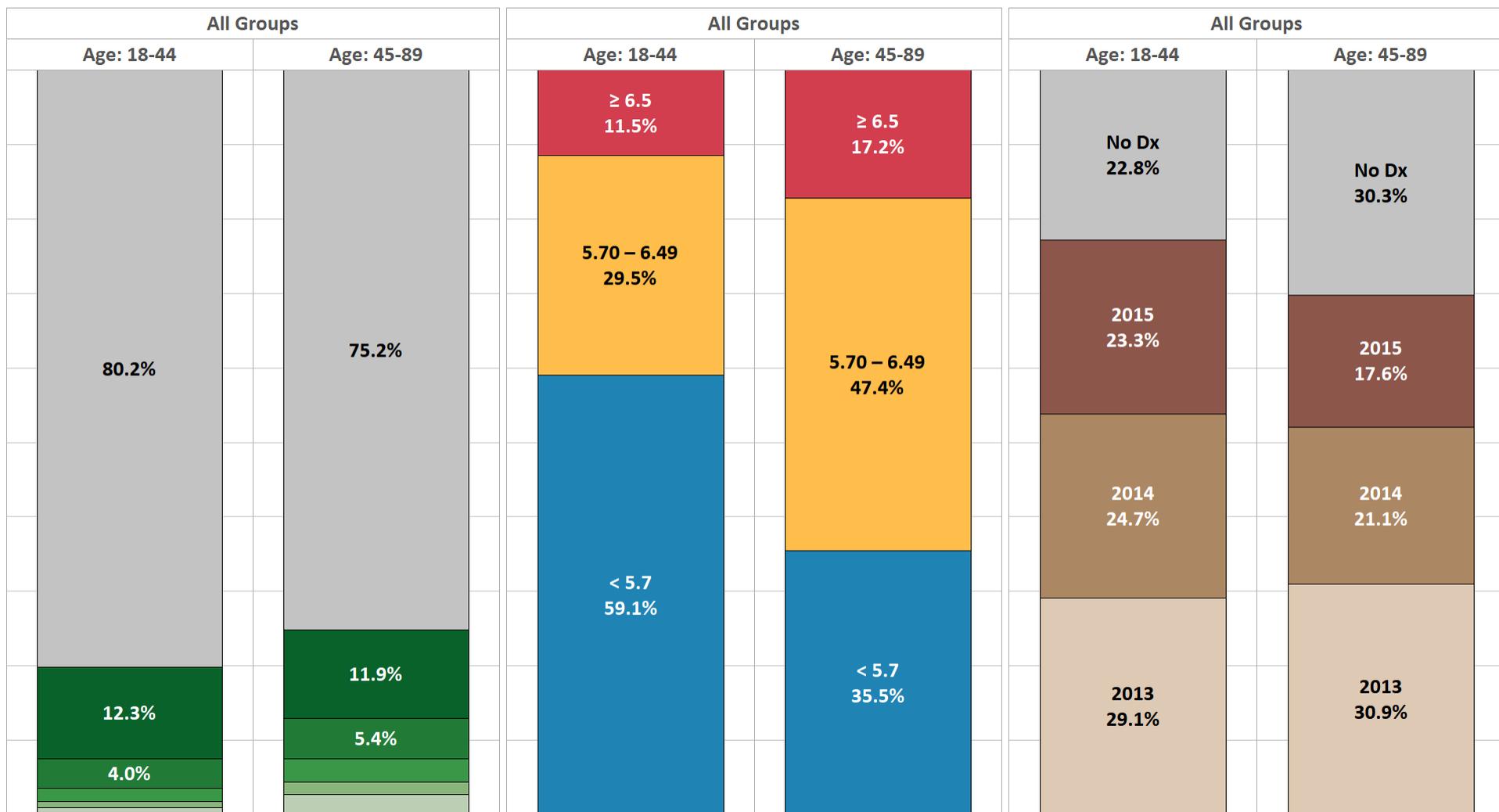


A1c ≥ 6.5% – How Many Have a Diagnosis?



Differences by Age (*HbA1c only*)

of A1c Measurements



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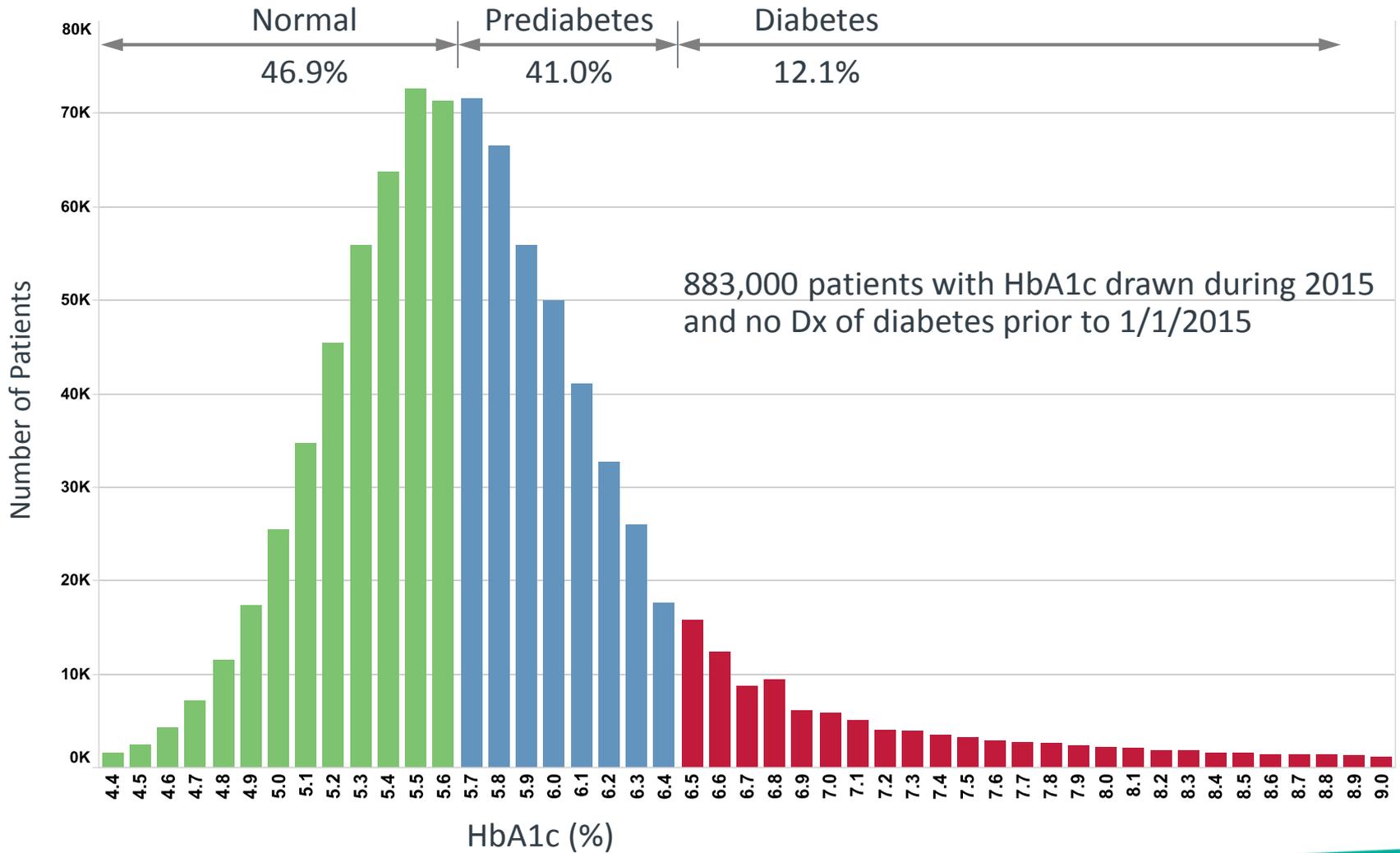
Measures of Glycemic Control



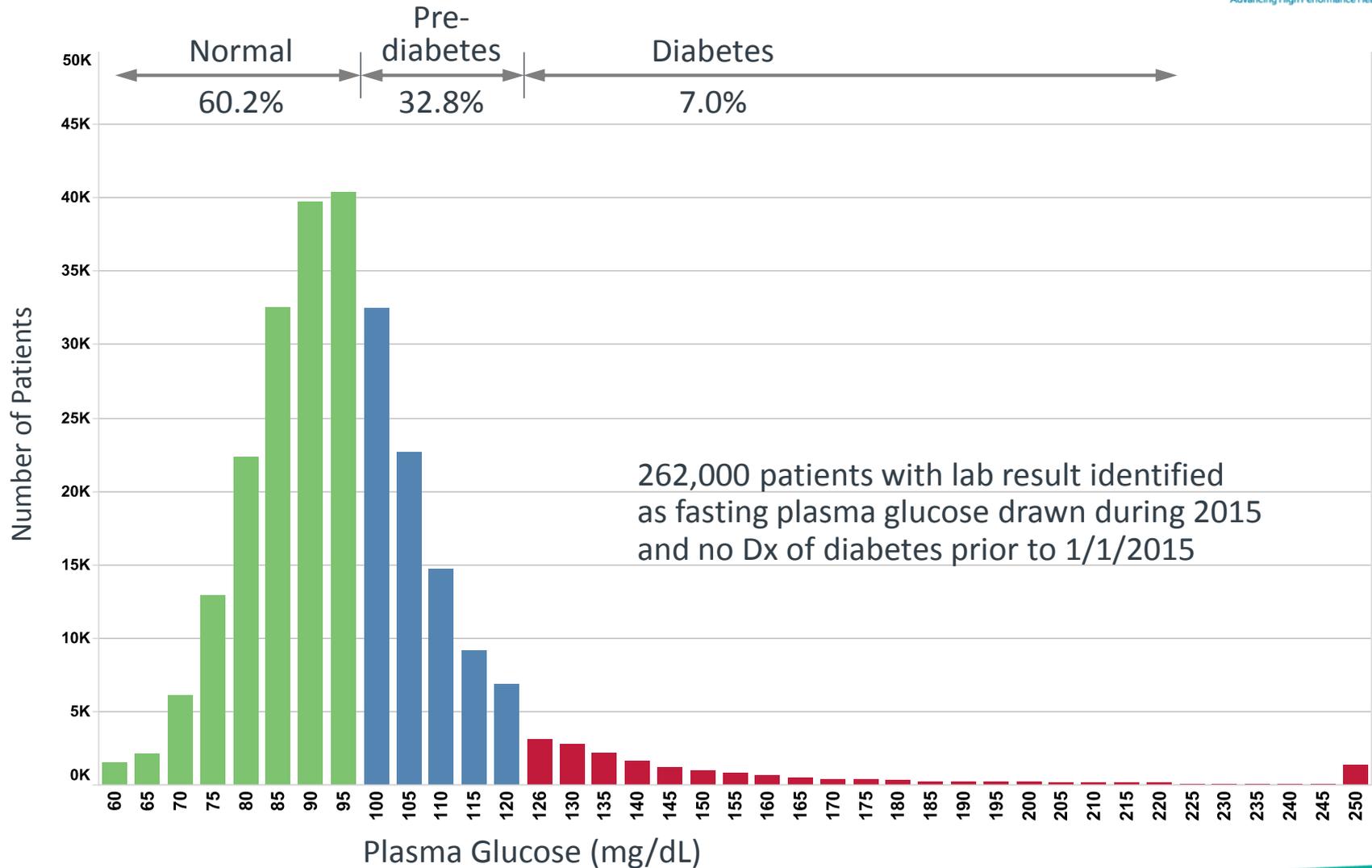
Test	Prediabetes	Diabetes
HbA1c	5.7 – 6.4%	≥ 6.5%
Fasting Plasma Glucose (FPG)	100 – 125 mg/dL	≥ 126 mg/dL
2-hr PG in 75-g Oral Glucose Tolerance Test*	140 – 199 mg/dL	≥ 200 mg/dL
Random Plasma Glucose		≥ 200 mg/dL w/ classic symptoms

* Across provider organizations, the oral glucose tolerance test is used almost exclusively in patients who are pregnant, presumably to identify gestational diabetes. These patients are not included in Together 2 Goal.®

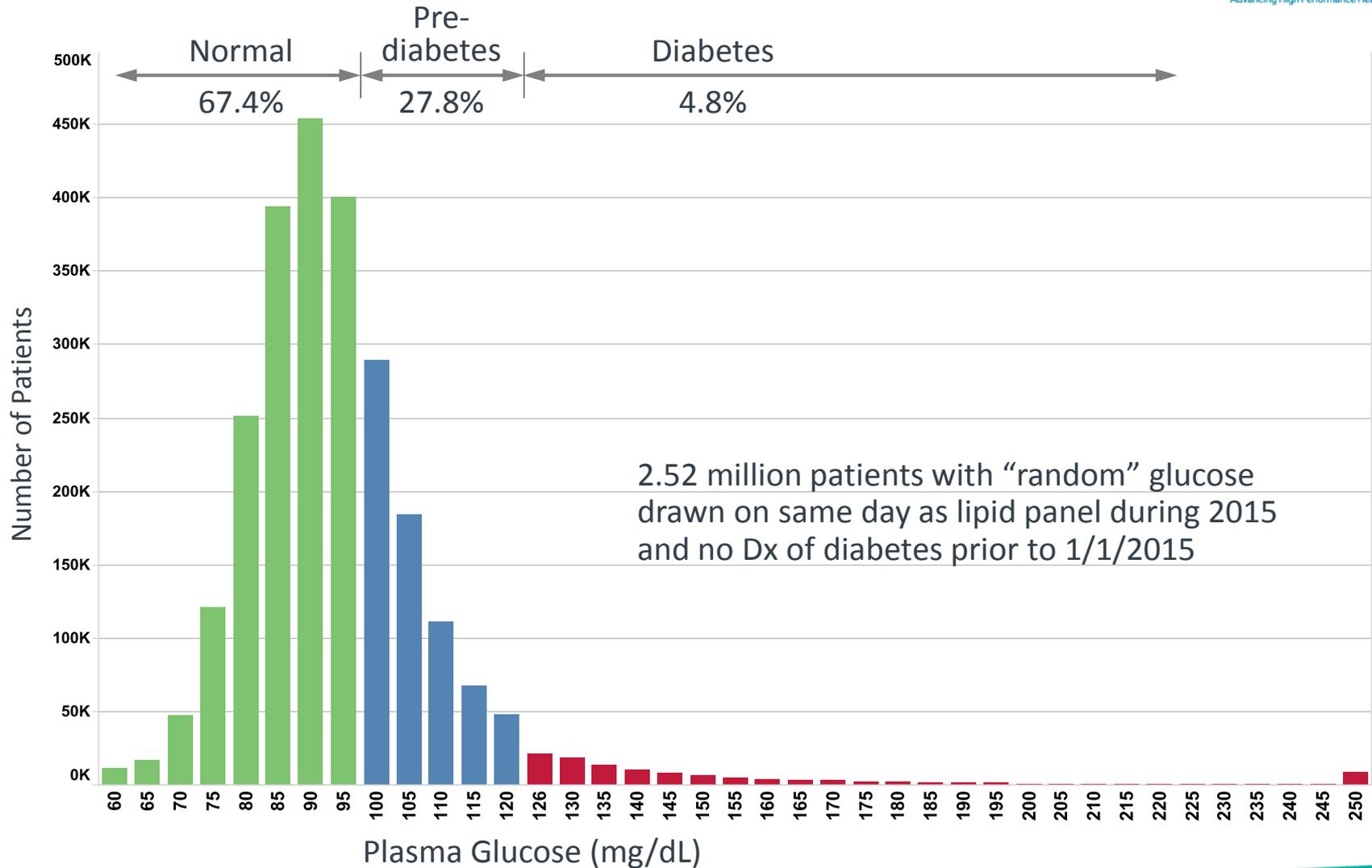
Max A1c (during 2015)



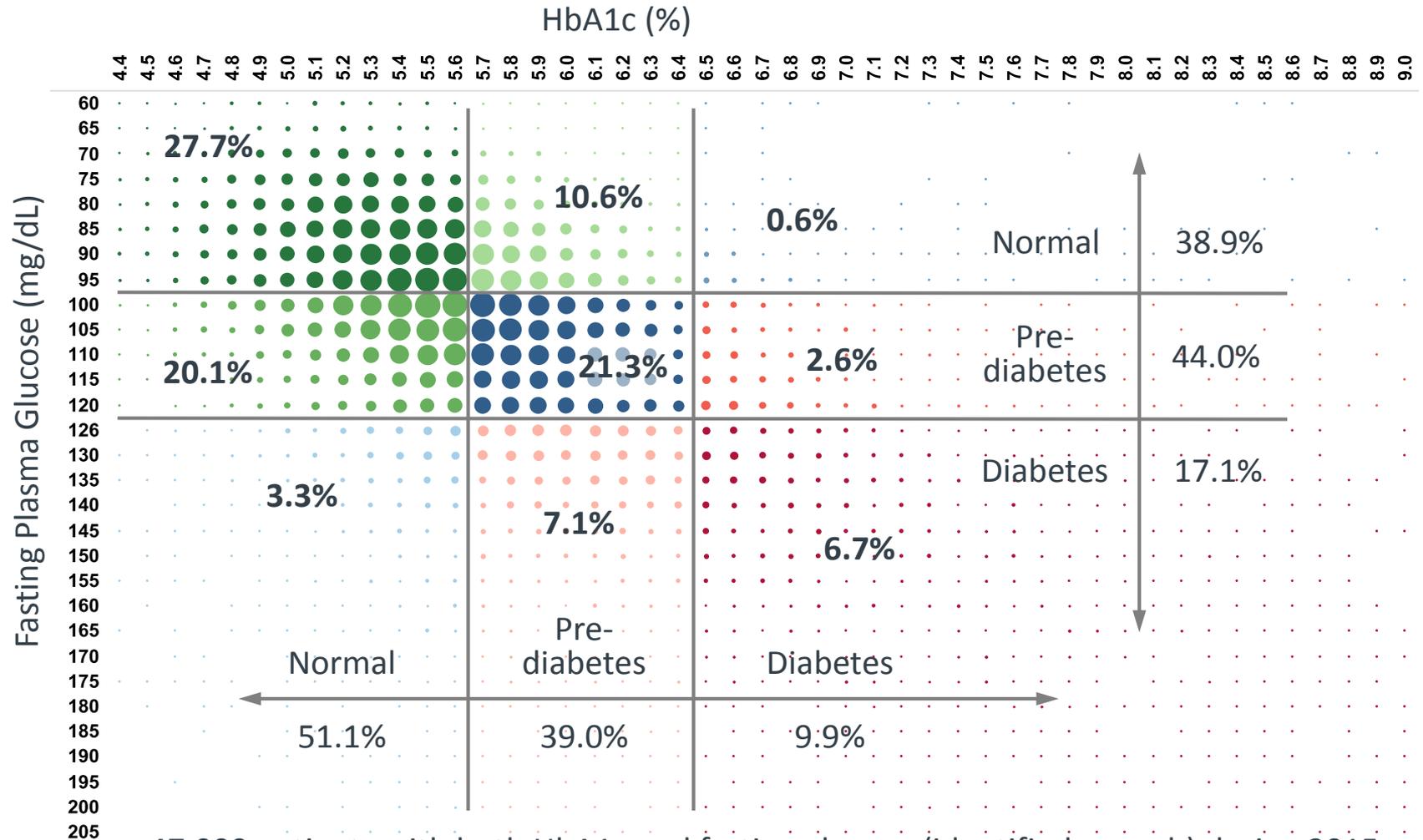
Max Fasting Plasma Glucose



Max “Random” Glucose Drawn with Lipid Panel

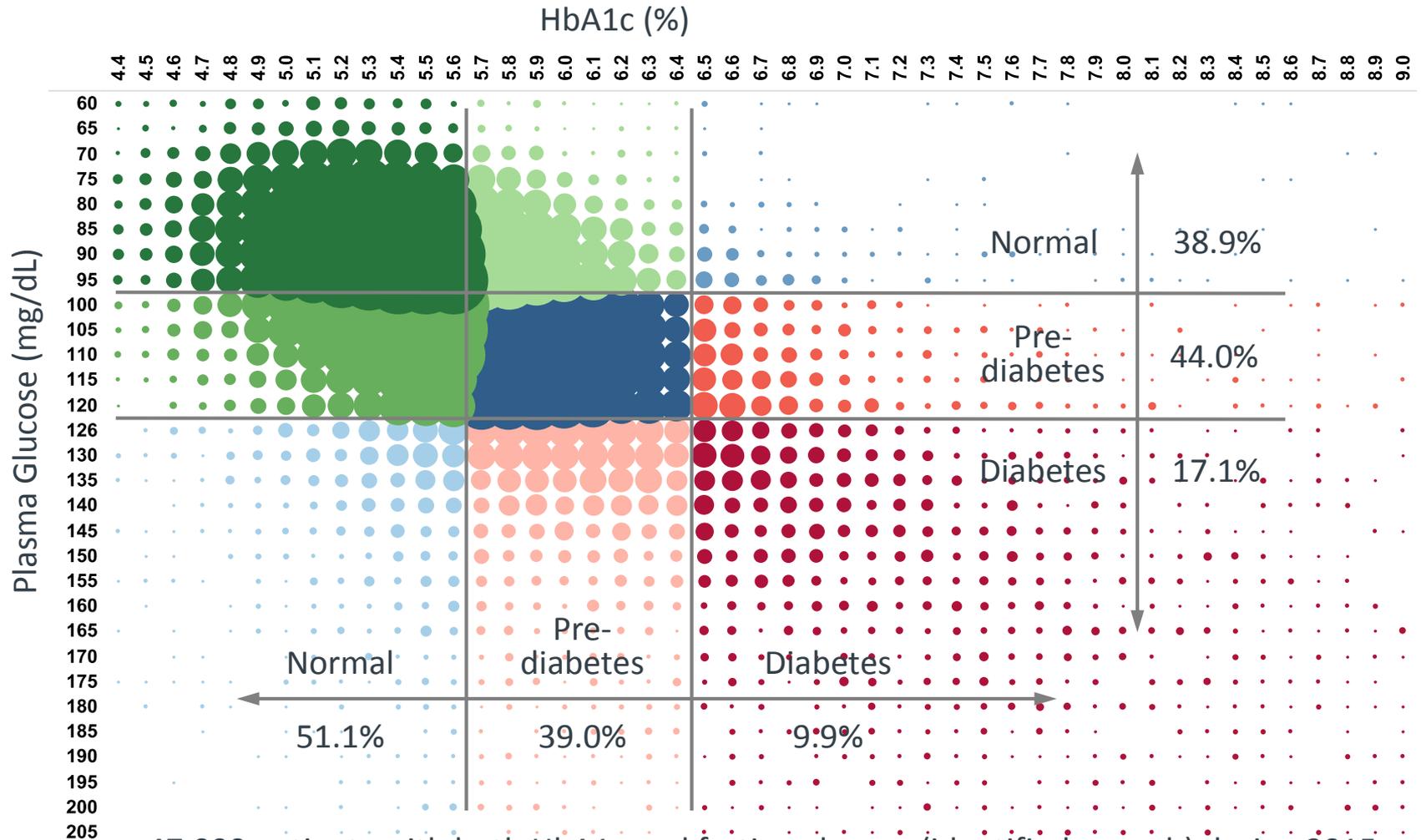


Max A1c vs. Max FPG



47,000 patients with both HbA1c and fasting glucose (identified as such) during 2015 and no Dx of diabetes prior to 1/1/2015

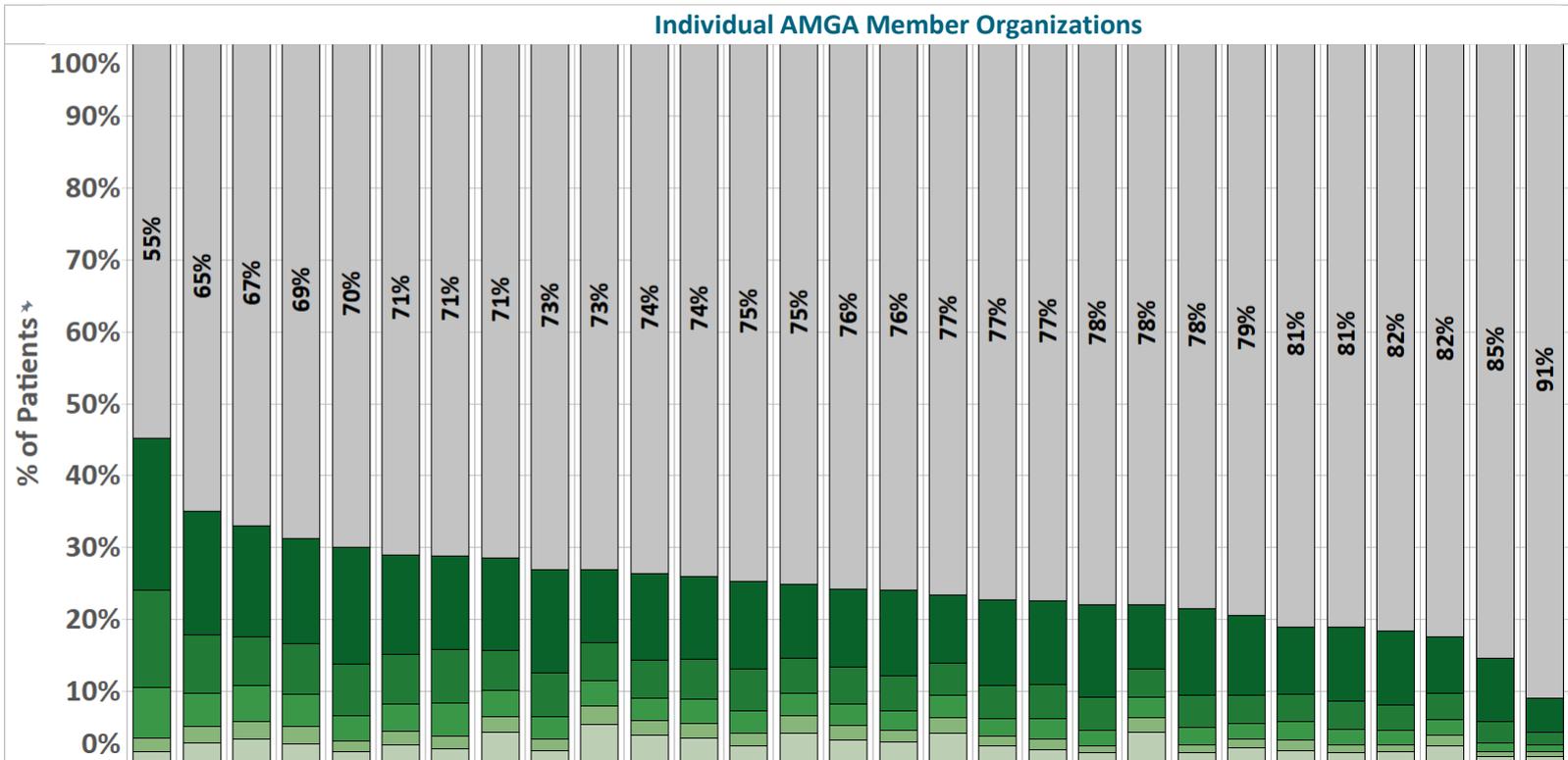
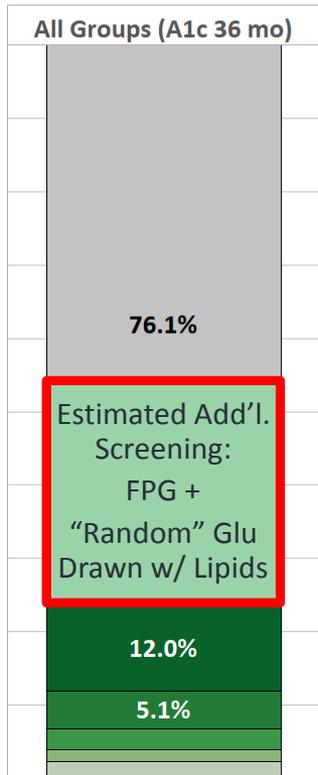
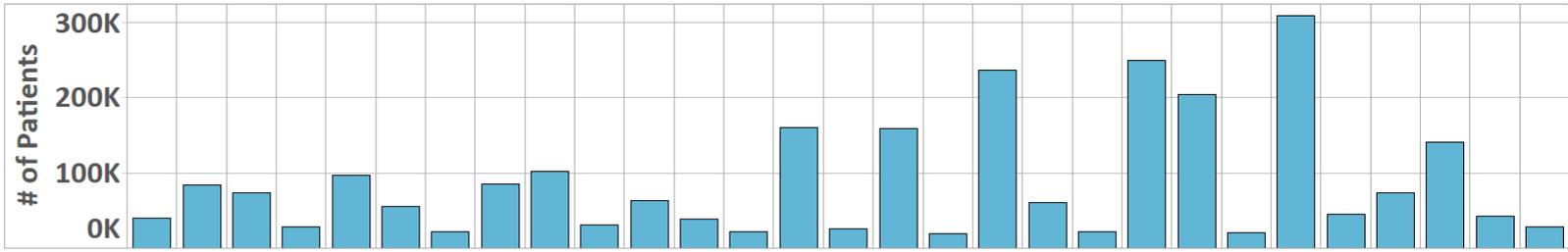
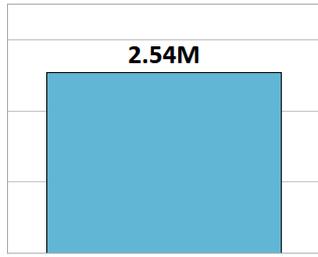
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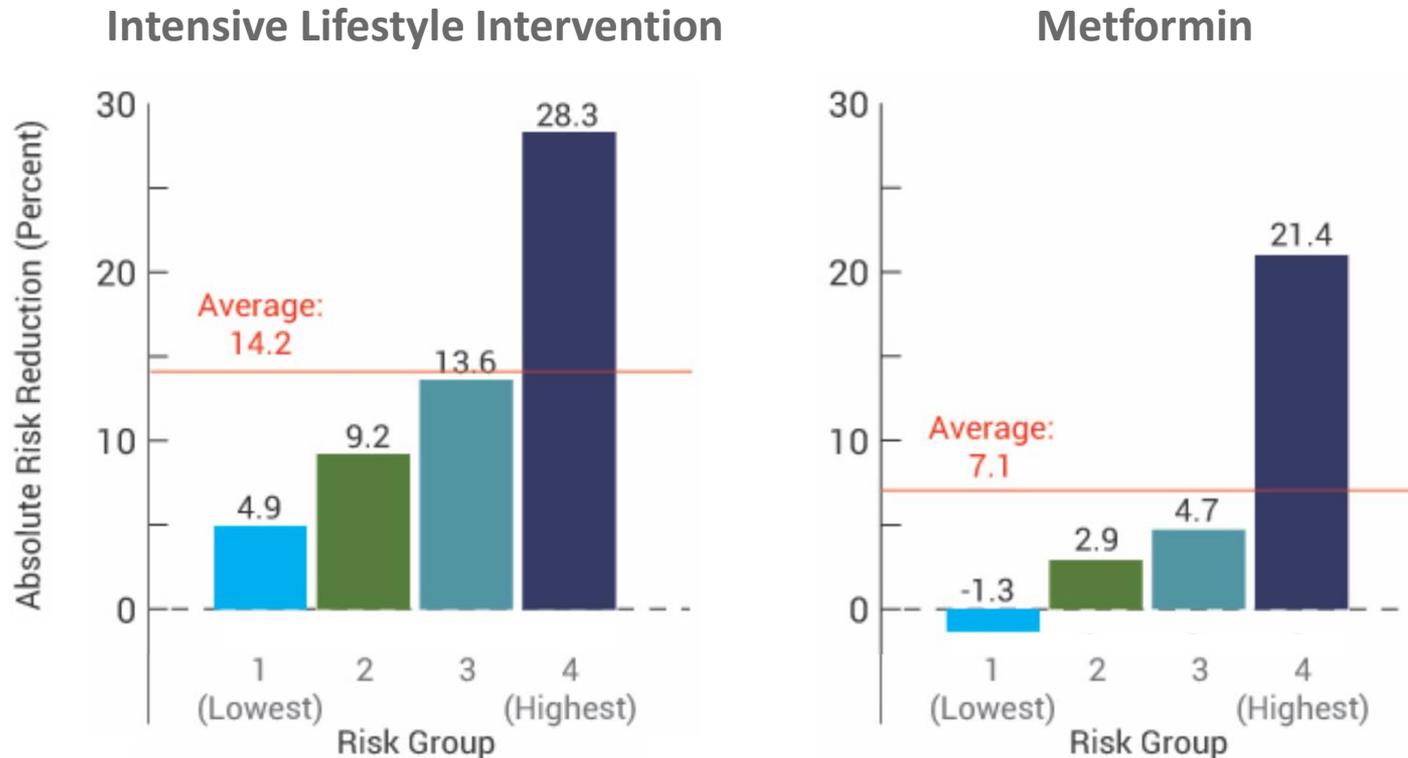
Heterogeneity of Treatment Effect



- Reanalysis of data from randomized trials—subsets of patient populations
 - PCORI-funded
 - Tufts, University of Michigan, Veterans Health Administration
- Diabetes Prevention Program Study (DPP)
 - 3,234 adults with “pre-diabetes”
 - Impaired fasting glucose, impaired glucose tolerance
 - BMI ≥ 24 (or ≥ 22 in Asians)
 - Conducted 1996–2001, stopped one year early
 - Two interventions reduced the risk of progression to overt diabetes
 - 14.2% for intensive lifestyle intervention
 - 7.1% for metformin 850 mg/d

Sussman JB, Kent DM, Nelson JP, Hayward RA. Improving diabetes prevention with benefit-based tailored treatment: Risk-based reanalysis of Diabetes Prevention Program. *BMJ* 350 (February 2015): h454.

Heterogeneity of Treatment Effect: Diabetes Prevention Program Study



Lowest-risk quartile – 15% of patients have HbA1c > 6.0%
Highest-risk quartile – 25% of patients have HbA1c < 6.0%

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

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