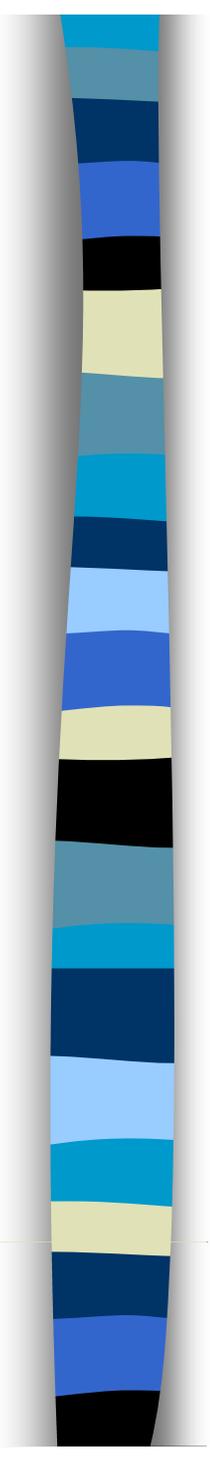# Family History of diabetes: Incorporating genomics data into the BRFSS

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WREN 2007
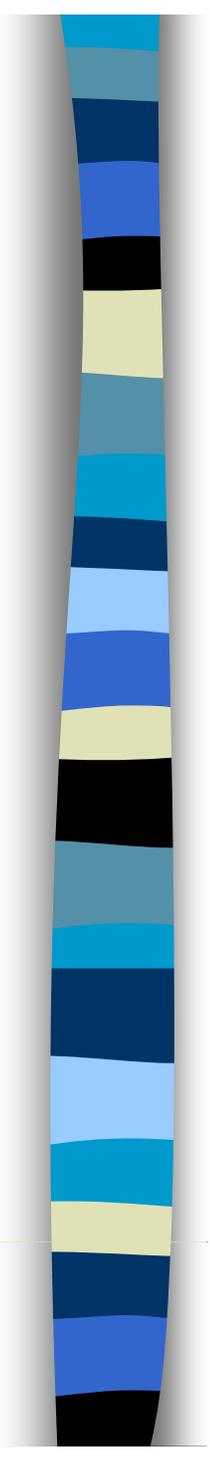
Overview

- Describe Importance of Family History

- 2005 BRFSS Genomics Results

Why Family History?

2005 BRFSS Genetics Topics

- Prevalence of family history of diabetes

- Collection of family history of diabetes by healthcare providers

- Discussion of risk by healthcare providers about development of diabetes

- Perceived risk of developing diabetes
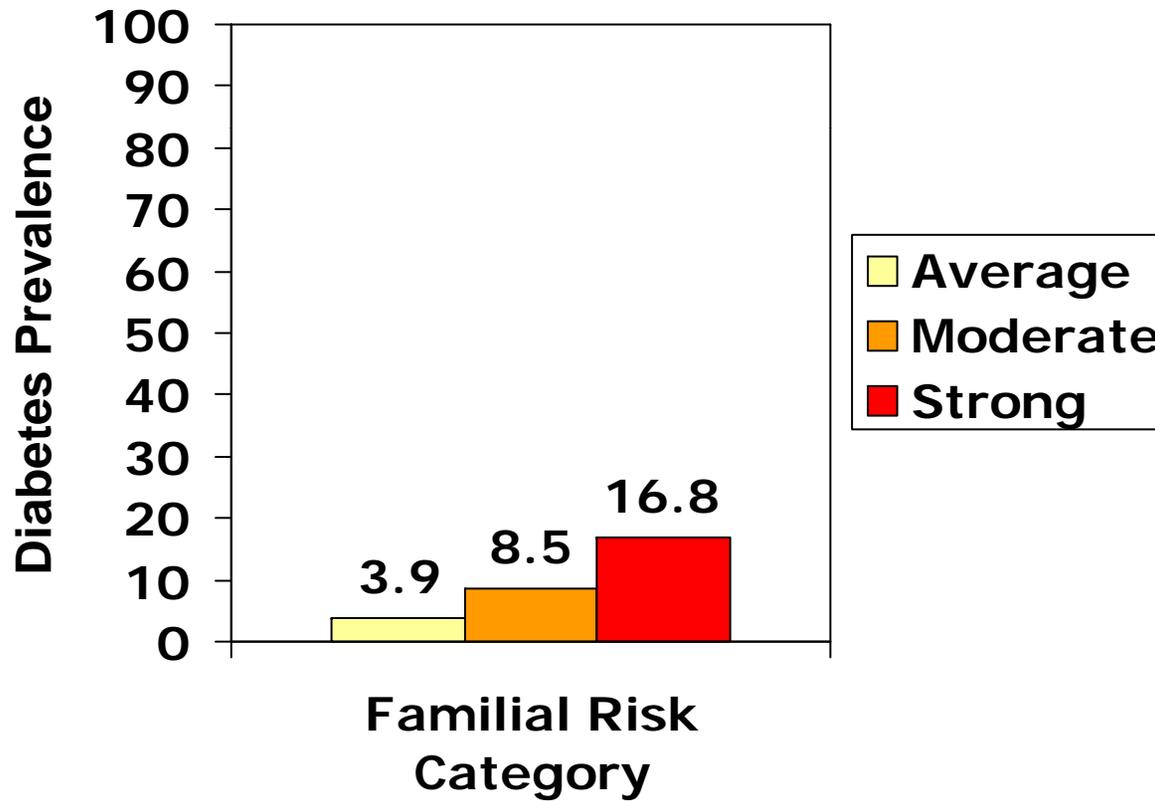
- Reported lifestyle changes

Family History of Diabetes

- Do you have a parent, brother, sister, or child related by blood, who has been diagnosed with diabetes by a health care provider?
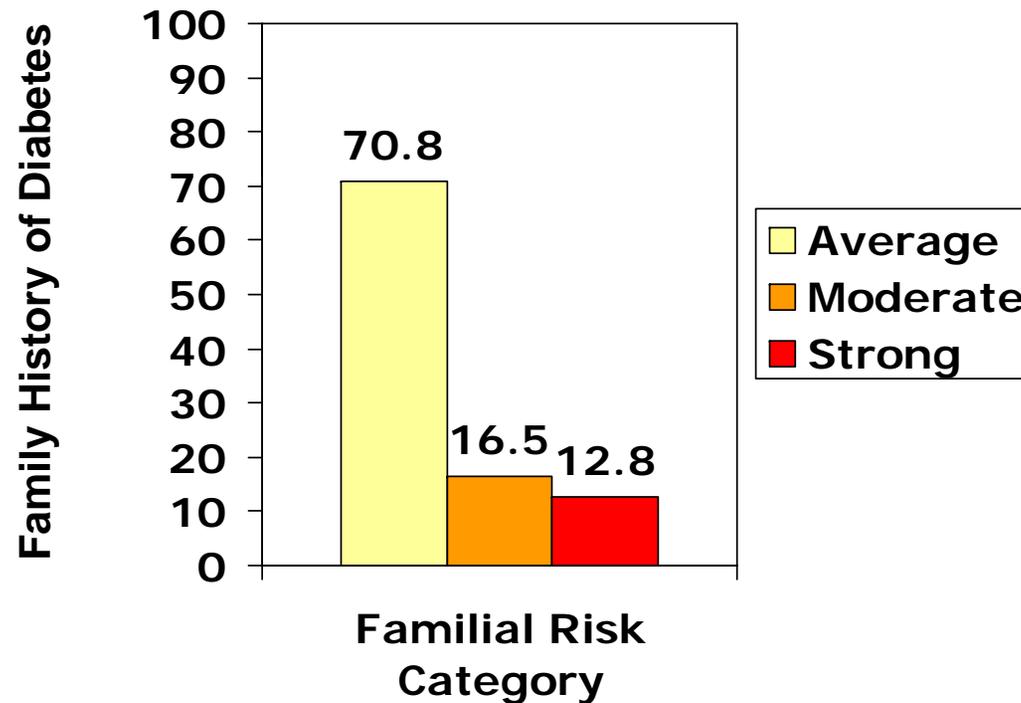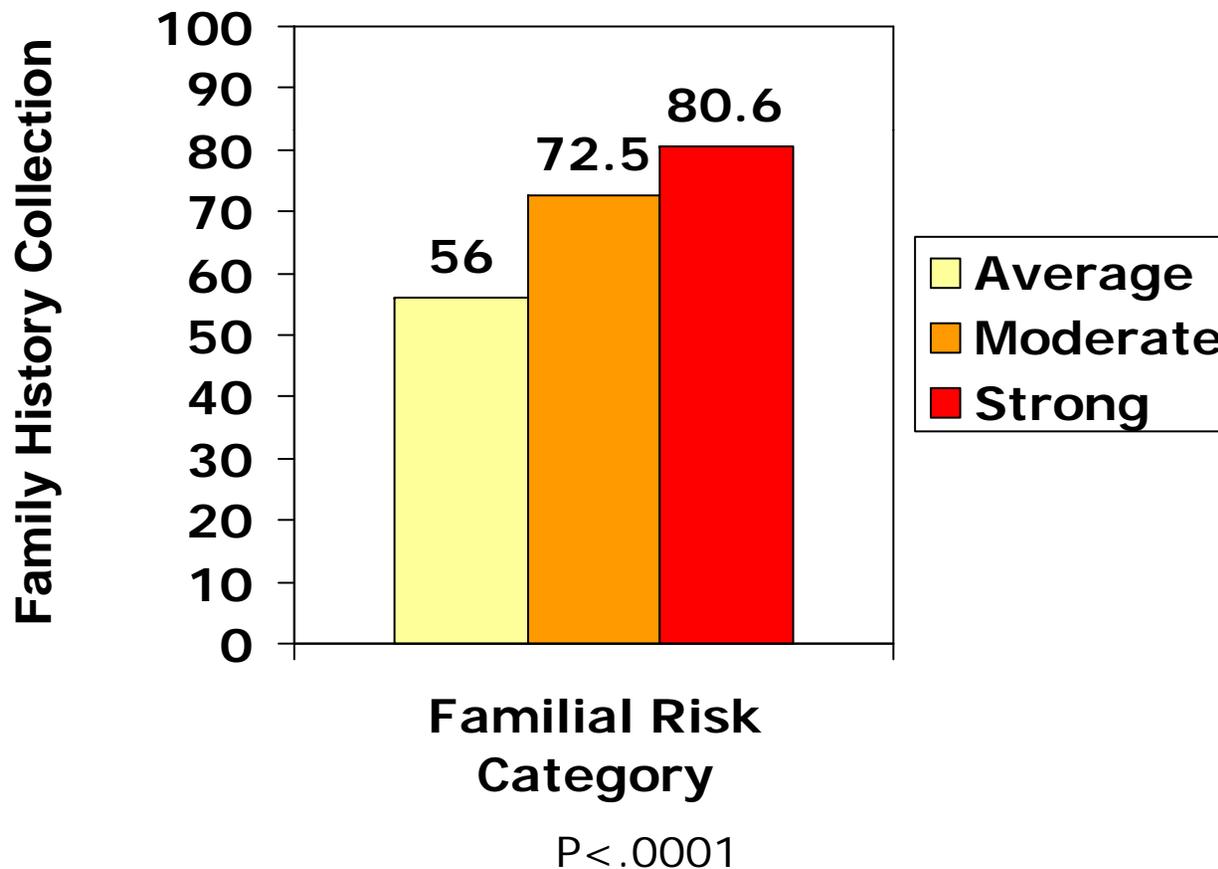
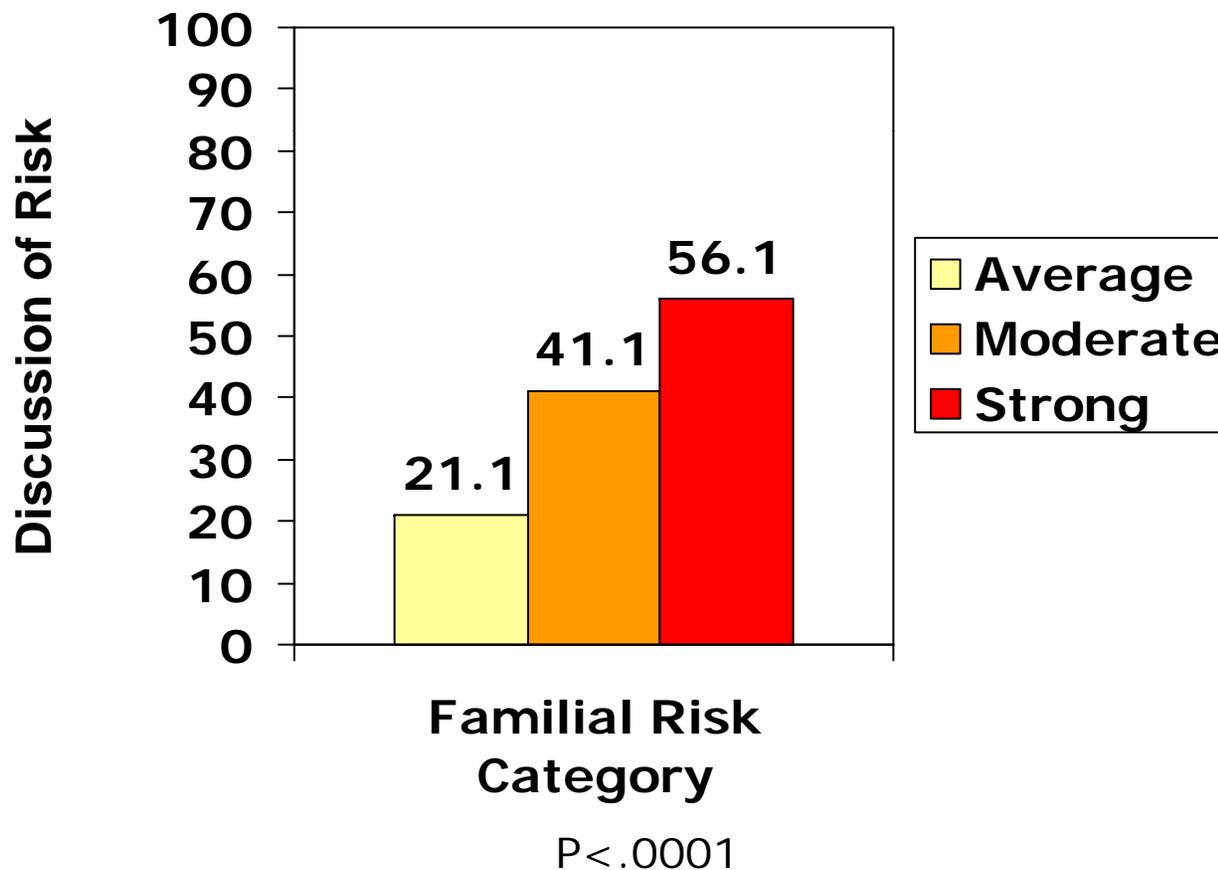# Diabetes Prevalence by Familial Risk

Attributes by familial risk of diabetes

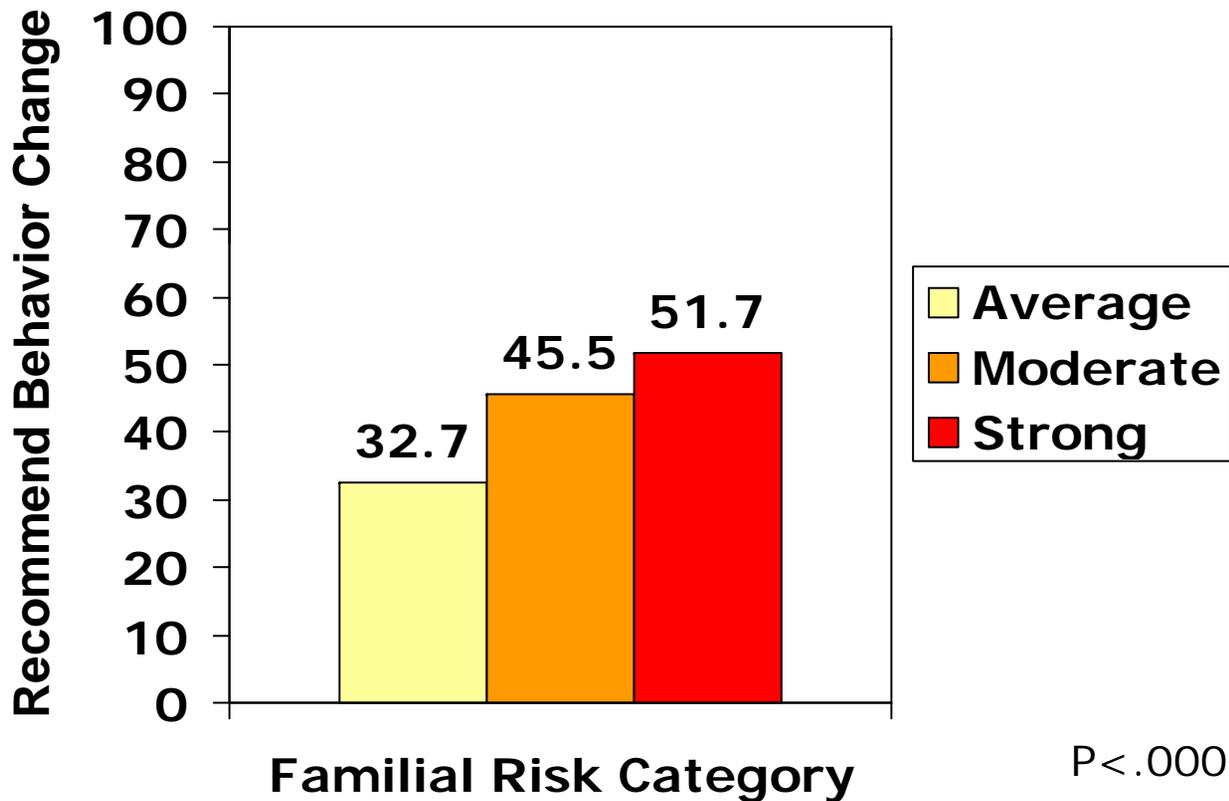|	Average risk (N = 4519)		Moderate risk (N = 1146)		Strong risk (N = 895)		
	n	**%**	**n**	**%**	**n**	**%**	**p-value**
Age							<0.0001
18-44 years	1594	51.2	334	42.2	261	47.7	
$\geq$45 years	2925	48.8	812	57.8	634	57.5	
Sex							<0.0001
Male	1889	51.7	395	43.3	265	40.0	
Female	2630	48.3	751	56.7	630	60.0	
SES							0.0017
Not Low	2908	61.0	748	63.6	513	54.4	
Low	1611	39.0	398	36.4	382	45.6	
Race and Ethnicity							.015
Non-Hispanic white	3978	83.4	1018	85.4	755	77.8	
Hispanic or Latino	114	4.7	23	3.4	23	5.0	
Other	427	11.9	105	11.2	117	17.2	
Obesity							<0.0001
BMI < 30	3381	78.3	801	74.5	533	62.7	
BMI $\geq$ 30	957	21.7	286	25.5	316	37.3	

Has a doctor, nurse, or other health care provider asked you about your family history of diabetes?

P<.0001

Has a doctor, nurse, or other health care provider ever discussed the chance of you getting diabetes?

Discussion of Risk (y-axis: 0 to 100)

- Average: 21.1
- Moderate: 41.1
- Strong: 56.1

Familial Risk Category

P<.0001

Has a health care provider ever recommended changes in diet or exercise to reduce your chances getting diabetes or other diseases?

P<.0001

How worried are you that you will get diabetes in the future?
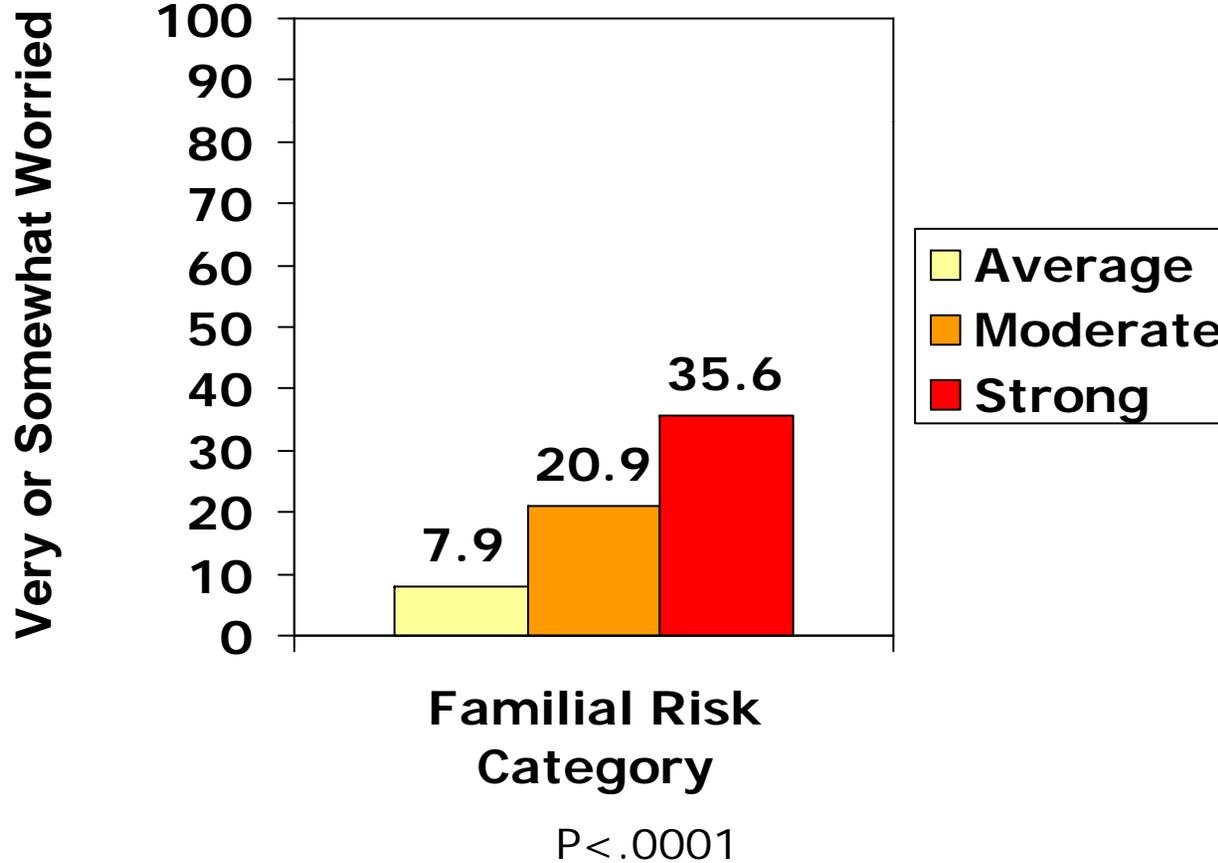
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Have you made changes in your diet or exercise, to reduce your chance of getting diabetes or other diseases?

Reported Lifestyle Changes

- 55.9 — Average
- 66.8 — Moderate
- 70 — Strong

Familial Risk Category
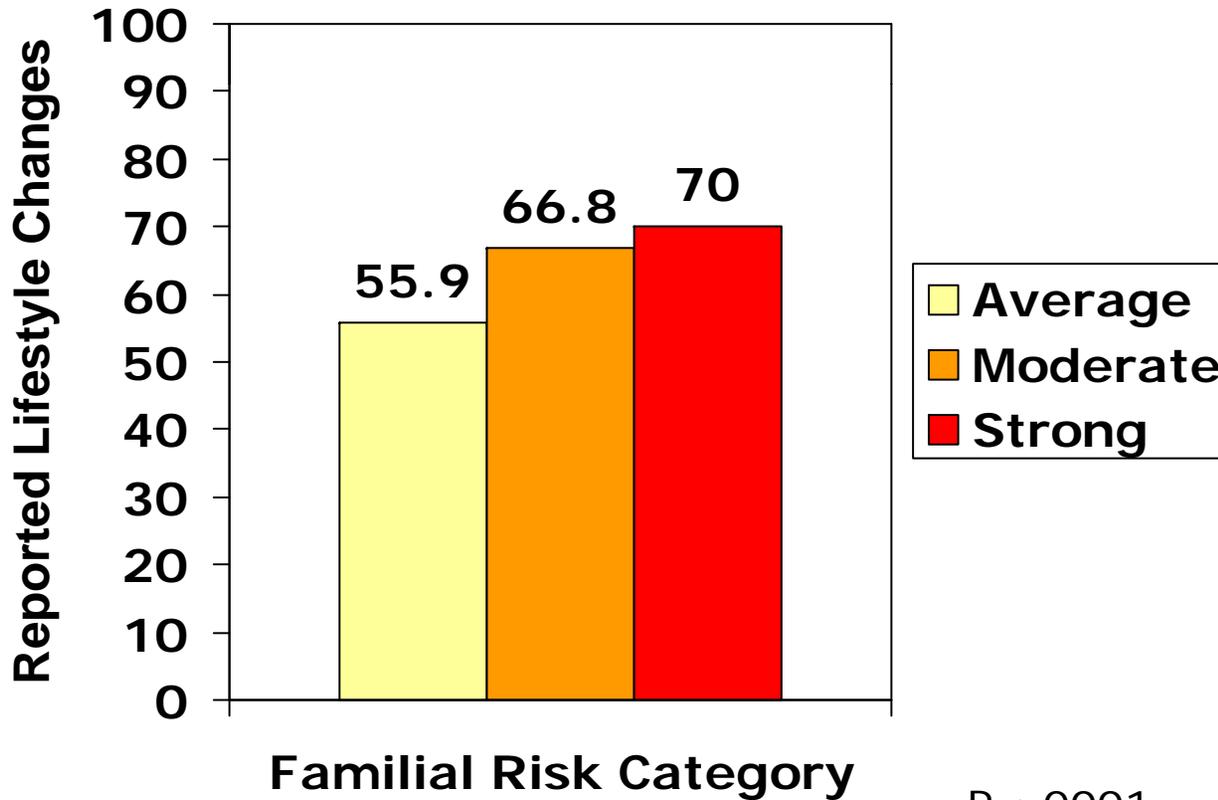
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Behaviors by Familial Risk of Diabetes

	Average risk (N = 4519)		Moderate risk (N = 1146)		Strong risk (N = 895)		
	n	**%**	**n**	**%**	**n**	**%**	**p-value**
Current smoker							0.046
Yes	744	17.4	190	17.5	178	21.6	
No	3751	82.6	952	82.5	713	78.4	
Physical activity							
Met recommendations	2402	51.4	607	57.4	418	56.5	0.01
Insufficient activity	1476	37.4	394	33.5	322	34.5	
No activity	411	11.2	95	9.2	111	9.1	
Fruit and vegetable consumption							0.058
< 5 servings per day	3174	72.4	831	76.1	632	74.4	
≥ 5 servings per day	1338	27.6	315	23.9	263	25.6	
Cholesterol Screening							0.0001
Yes	3606	73.3	976	80.3	759	79.8	
No	812	26.7	156	19.7	124	20.2	

Logistic Regression

Dependent variable	Average Adjusted Odds Ratio [95% CI]	Moderate Adjusted Odds Ratio [95% CI]	Strong Adjusted Odds Ratio [95% CI]
Collection of family history of diabetes	1.0	1.7 [1.3-2.0]	3.3 [2.5-4.3]
Discussion of risk by a healthcare provider	1.0	2.0 [1.7-2.4]	3.9 [3.2-4.7]
Recommendations by a healthcare provider	1.0	1.5 [1.3-1.8]	1.8 [1.5-2.1][1]
Perceived risk of diabetes (Very or somewhat worried vs. Not at all or slightly worried)	1.0	2.0 [1.6-2.5]	4.8 [3.9-6.0]
Reported lifestyle changes	1.0	1.5 [1.2-1.7]	1.7 [1.4 -2.1]
Current smoker	1.0	1.0 [0.8-1.2]	1.3 [1.1-1.6]
Cholesterol screening	1.0	1.4 [1.1-1.7]	1.3 [1.1-1.7]
Obesity (Obese vs. not obese)	1.0	1.1 [0.9-1.3]	2.1 [1.7- 2.5]

Predictors of Diabetes

Independent variable	Adjusted odd ratio [95% CI]
Age (≥45 years vs. <45 years)	2.2 [1.4-3.5]
Race & Ethnicity (Hispanic or Latino vs. Non-Hispanic white)	2.8 [1.2-6.7]
Obesity (Obese vs. not obese)	2.5 [1.9-3.2]
Hypertension (High vs. low)	3.7 [2.8- 4.9]
High Cholesterol (High vs. low)	2.2 [1.7- 2.8]
Moderate familial risk of diabetes (vs. not moderate familial risk)	2.1 [1.5-2.9]
Strong familial risk of diabetes (vs. not strong familial risk)	4.7 [3.4-6.6]

Predictive Power of Risk Factors for Diabetes

| Risk Factor	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)
Family history of diabetes	58.3%	72.0%	12.6%	96.1%
Obesity	52.7%	96.0%	14.2%	96.0%
Age (45+ years)	84.5%	51.6%	10.8%	97.8%
Family history of diabetes and obesity	33.0%	96.0%	23.0%	77.0%
Family history of diabetes, obesity and age	27.0%	73.1%	31.5%	68.5%
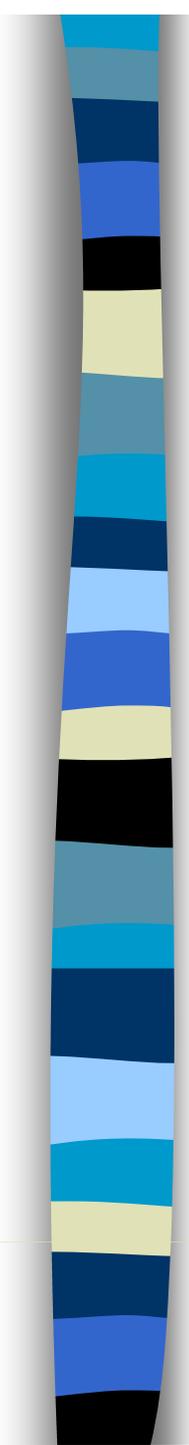
Take home messages

- Family History matters to providers
  - Room for improvement

- Family History determinant of perceived risk

- Family History predictor of some behaviors
  - Reported risk reducing behaviors
  - Cholesterol screening
  - Smoking

- Family History predictor of health outcomes
  - Diabetes
  - Obesity

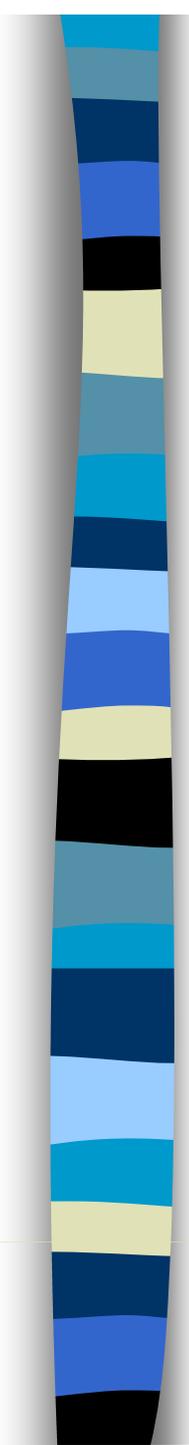- PPV of risk factors low but had a dose response
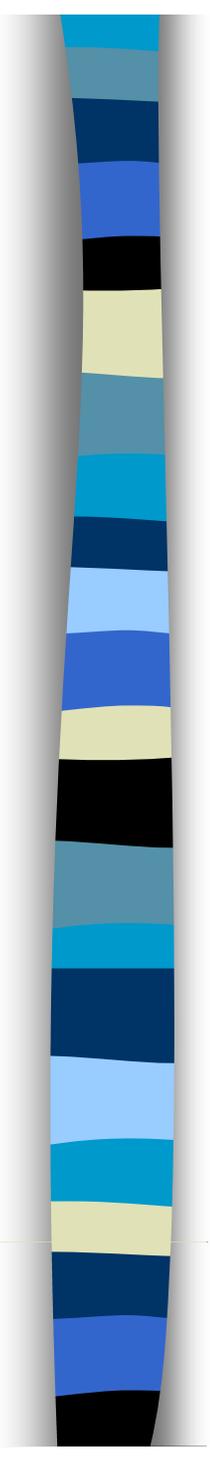
Program Implications

- Provider education
  - Screening guidelines

- Populations at familial risk for diabetes
  - Develop stage-appropriate interventions

- Family history ID high risk indiv
 - Risk assessment
  - Despite low PPV

References

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- The Diabetes Prevention Program (DPP): description of lifestyle intervention. Diabetes Care 2002;25(12):2165-71.

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- Harrison TA, Hindorff LA, Kim H, et al. Family history of diabetes as a potential public health tool. Am J Prev Med 2003;24(2):152-9.
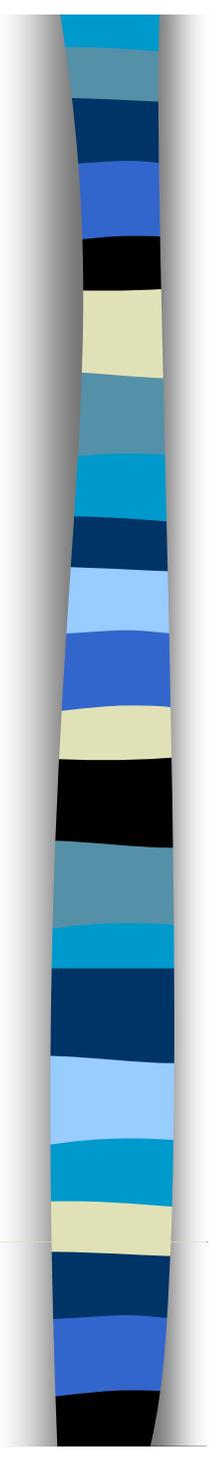
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