Applying the Chronic Care Model to Improve Prediabetes Screening

Martha (Martie) Guzman
DNPc, FNP-BC, FNP-C, PHN
California State University, Fresno
Doctor of Nursing Practice Program

Prediabetes

- Elevated blood sugar
- Growing evidence
- Silent but serious

(CDC, 2024)

Problem

Prevalence of prediabetes In the U.S. Nearly tripled, from 6.5% in 2005 -2008 to 17.4% in 2017 through 2020 (CDC, 2022).

California has 13 million adults (46%) with prediabetes and T2DM

2.5 Million (9%) with T2DM

[2 groups= 55%] (Babey, et al., 2016)

Prediabetes screening is recommended by EBP guidelines, but the implementation varies

Prediabetes Risk Test

NATIONAL DIABETES PREVENTION PROGRAM

Write your score in the boxes below

1. How old are you?

Younger than 40 years (0 points)
40–49 years (1 point)
50–59 years (2 points)
60 years or older (3 points)

2. Are you a man or a woman?

Man (1 point) Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?

Yes (1 point) No (0 points)

4. Do you have a mother, father, sister, or brother with diabetes?

Yes (1 point) No (0 points)

5. Have you ever been diagnosed with high blood pressure?

Yes (1 point) No (0 points)

6. Are you physically active?

Yes (0 points) No (1 point)

7. What is your weight category?

(See chart at right)

Height	Weight (lbs.)		
4'10"	119-142	143-190	191+
4'11"	124-147	148-197	198+
5'0"	128-152	153-203	204+
5'1"	132-157	158-210	211+
5'2"	136-163	164-217	218+
5'3"	141-168	169-224	225+
5'4"	145-173	174-231	232+
5'5"	150-179	180-239	240+
5'6"	155-185	186-246	247+
5'7"	159-190	191-254	255+
5'8"	164-196	197-261	262+
5'9"	169-202	203-269	270+
5'10"	174-208	209-277	278+
5'11"	179-214	215-285	286+
6'0"	184-220	221-293	294+
6'1"	189-226	227-301	302+
6'2"	194-232	233-310	311+
6'3"	200-239	240-318	319+
6'4"	205-245	246-327	328+
	1 Point	**2 Points**	**3 Points**
	You weigh less than the 1 Point column (0 points)		

Total score:

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Original algorithm was validated without gestational diabetes as part of the model.

If you scored 5 or higher

You are at increased risk for having prediabetes and are at high risk for type 2 diabetes. However, only your doctor can tell for sure if you have type 2 diabetes or prediabetes, a condition in which blood sugar levels are higher than normal but not high enough yet to be diagnosed as type 2 diabetes. **Talk to your doctor to see if additional testing is needed.**

If you are African American, Hispanic/Latino American, American Indian/Alaska Native, Asian American, or Pacific Islander, you are at higher risk for prediabetes and type 2 diabetes. Also, if you are Asian American, you are at increased risk for type 2 diabetes at a lower weight (about 15 pounds lower than weights in the 1 Point column). Talk to your doctor to see if you should have your blood sugar tested.

You can reduce your risk for type 2 diabetes

Find out how you can reverse prediabetes and prevent or delay type 2 diabetes through a **CDC-recognized lifestyle change program** at https://www.cdc.gov/diabetes/prevention/lifestyle-program.

Risk Test provided by the American Diabetes Association and the Centers for Disease Control and Prevention.

American Diabetes Association. CDC Centers for Disease Control and Prevention

CS300699-A

Purpose of the project

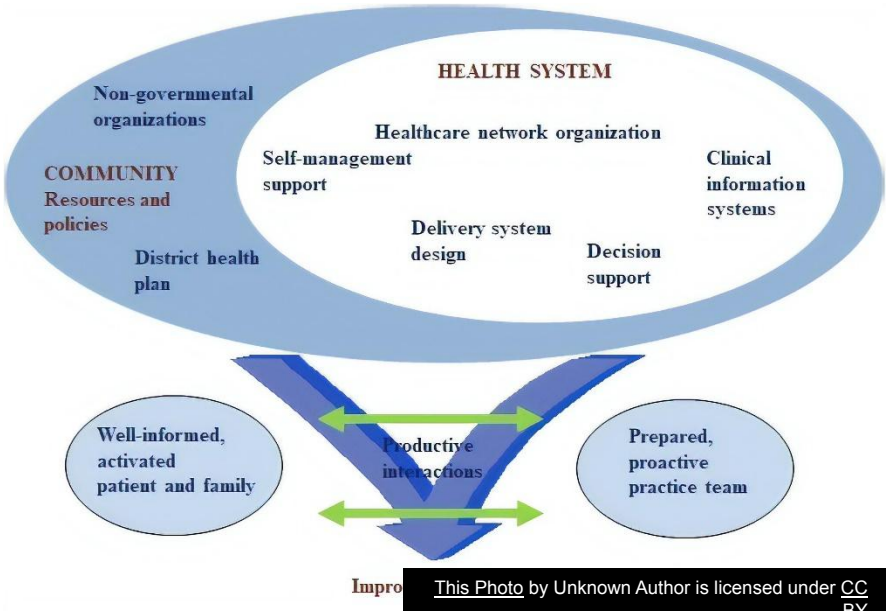
Improve prediabetes screening among non-diabetic adults aged 18 to 75

by primary care providers

Using the Chronic Care Model (CCM) theoretical framework in a primary care clinic.

Theoretical Framework: The Chronic Care Model (CCM)

(Baptista et al., 2016)



Review of the literature

The National Clinical Care Commission (Herman et al., 2023).

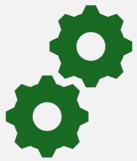
The American Diabetes Association (ADA, 2021).

A literature review on the impact of the CCM to improve diabetes outcomes (Stuckey et al., 2011).

Methods

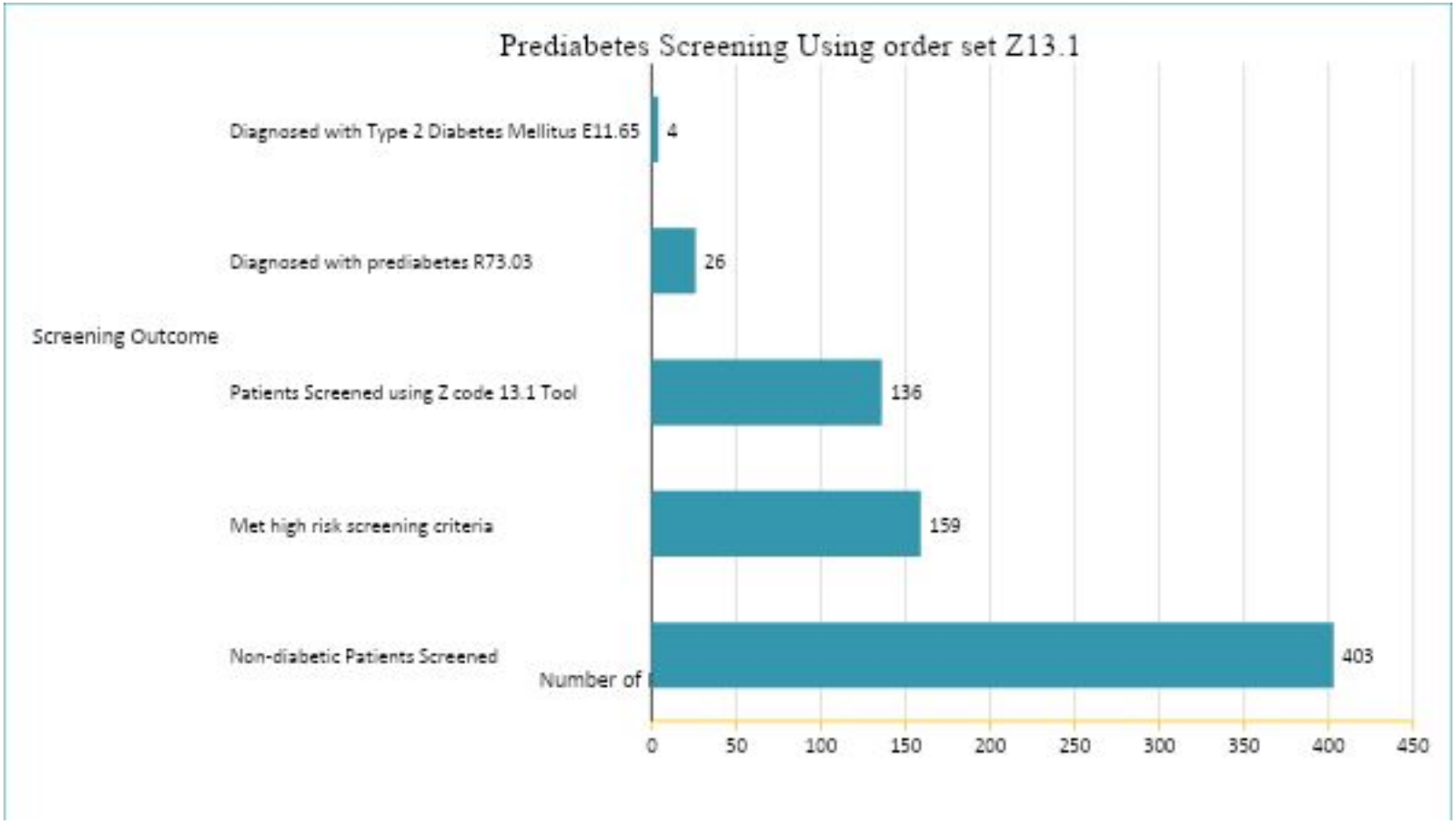
Clinical Information system Changes

Decision Support Intervention



Changes to the Delivery System Design

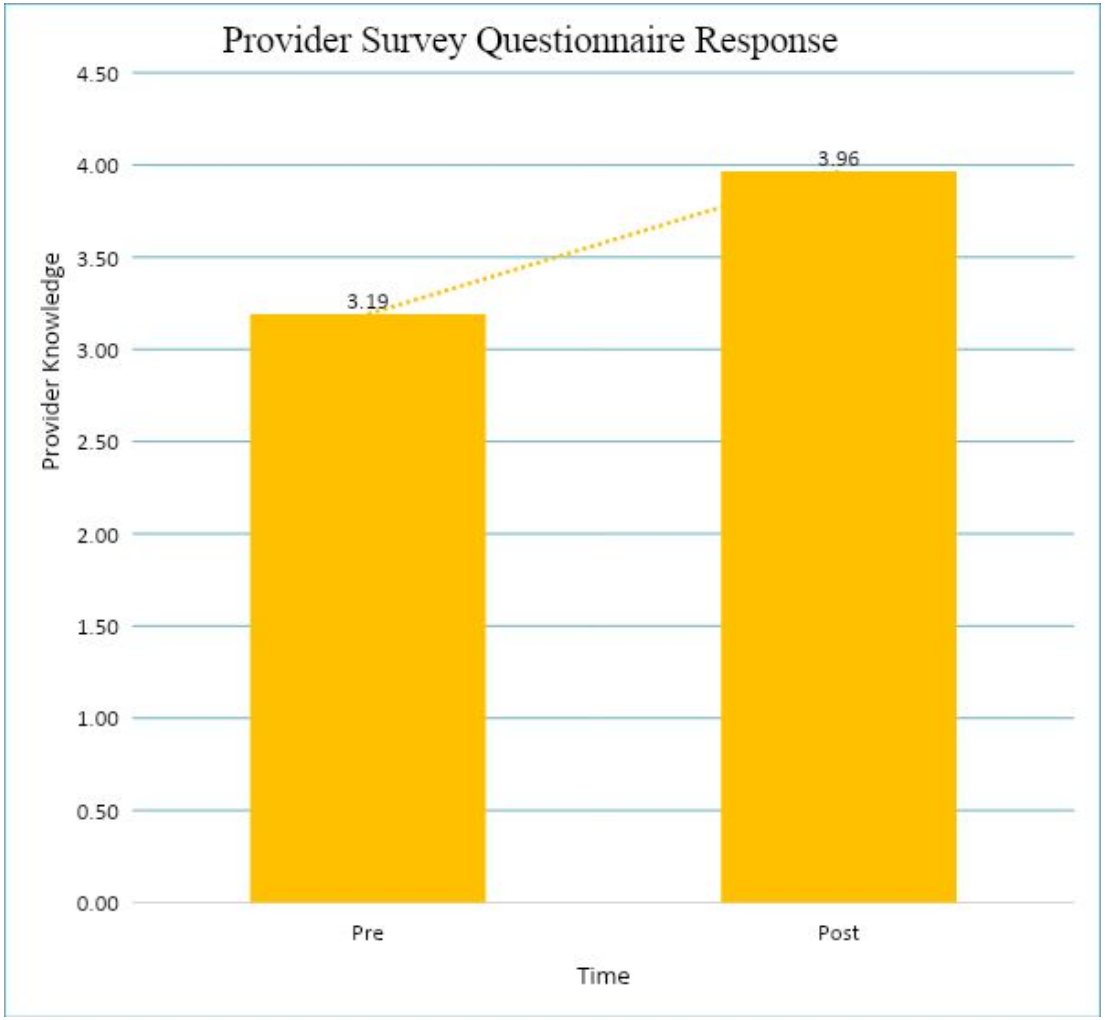
Data Analysis



T-test analysis of provider survey questions 4, 5, 12, and 15

Seven Medical Providers participated in this QI Project

Mean Score: (t (6) =-1.59, p = 0.08)



Outcomes

- Significant Improvement in screening practices
- Pre- intervention screening: 3% (1/34)
- Post – intervention screening: 85.5% (136/159)
- Resulting: 26 (19.1%) non-diabetic patients were diagnosed with prediabetes (R73.03), and four patients (2.9%) were diagnosed with T2DM (E11.65)
-

Conclusion

- Implementation of Several CCM interventions
- Proactive screening
- Clinical education

Recommendations for Future Study

- Investigate outcome measures and treatment
- Sustainability of screening process
- Exploring reasons for variations in screening practices amongst providers

Limitations

- Implicit pre-and post nature of the project design
- Small sample size
- Data collection and measurements do not consider valid exclusions.
- Time and resource limitations
- Convenience sample
- Confounding bias

Acknowledgements

God

Living Water Clinic

Committee

Mentor

Chair

Family

FRESNO STATE


Thank You!

References

- American Diabetes Association (2021). 1. Improving care and promoting health in populations: *Standards of medical care in diabetes-2021*. *Diabetes Care*, *44 (Suppl 1), S7–S14.* https://doi.org/10.2337/dc21-S001
- Babey, S. H., Wolstein, J., Diamant, A. L., & Goldstein, H. (2016). Prediabetes in California: nearly half of California adults on path to diabetes. *Policy brief (UCLA Center for Health Policy Research)*, (PB2016-1), 1–8. Majority of California adults have prediabetes or diabetes | UCLA
- Centers for Disease Control and Prevention (CDC). (2024, August 11). A snapshot: Diabetes in the United States. *Centers for Disease Control and Prevention.* https://www.cdc.gov/diabetes/library/socialmedia/infographics/diabetes.html
- CDC (2022, July 7). *The Surprising Truth About Prediabetes. Center for Disease Control and Prevention.* https://www.cdc.gov/diabetes/library/features/truth-about-prediabetes.html
- Centers for Disease Control and Prevention (CDC). (2022*). Diabetes Report Card 2014.* https://www.cdc.gov/diabetes/pdfs/library/diabetesreportcard2014.pdf
- Stacker. (2023, February 14). *Counties with the highest diabetes rate in California*. *[Internet]*. https://stacker.com/california/counties-highest-diabetes-rate-california
- Stuckey, H., Adelman, A., & Gabbay, R. (2011). Improving care by delivering the chronic care model for diabetes. *Open access journals*. https://www.openaccessjournals.com/articles/improving-care-by-delivering-the-chronic-care-model-for-diabetes.pdf
- United States [U.S.]. Census Bureau quick facts: Porterville City, California. (2024). "*U.S. Census Bureau. [Internet]*. https://www.census.gov/quickfacts/portervillecitycalifornia.
- Wagner E. H. (1998). Chronic disease management: what will it take to improve care for chronic illness? *Effective clinical practice: ECP*, *1*(1), 2–4.)
- Yeoh, E. K., Wong, M. C. S., Wong, E. L. Y., Yam, C., Poon, C. M., Chung, R. Y., Chong, M., Fang, Y., Wang, H. H. X., Liang, M., Cheung, W. W. L., Chan, C. H., Zee, B., & Coats, A. J. S. (2018). Benefits and limitations of implementing chronic care model (CCM) in primary care programs: A systematic review. *International journal of cardiology*, *258*, 279–288. https://doi.org/10.1016/j.ijcard.2017.11.057