T1D Exchange

QI Collaborative Call, Adult

7/13/23

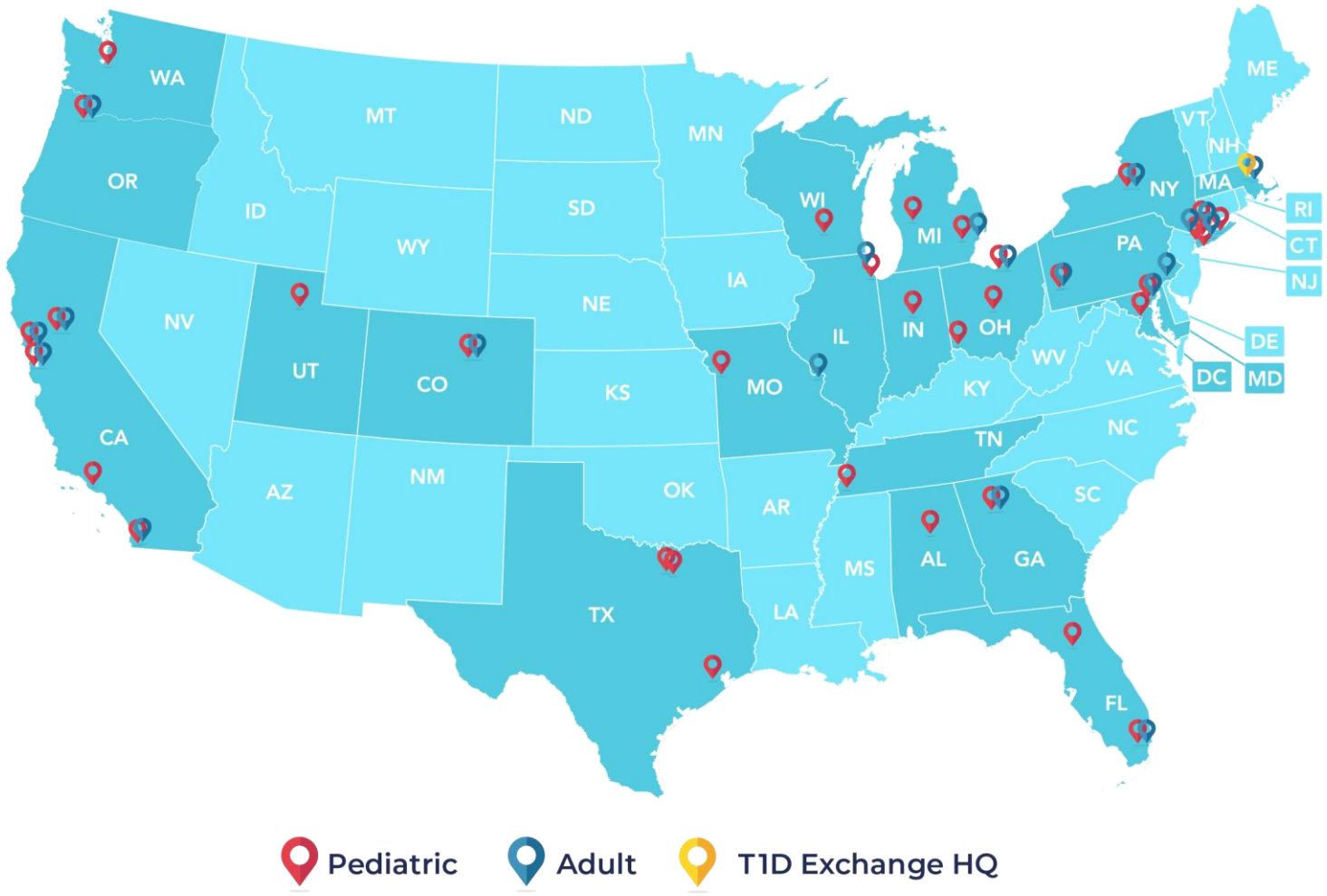
Welcome & introductions

Agenda

- Updates from Coordinating Center
  - PI RSVP reminder
  - Journal of Diabetes/November learning session abstract reminder.
  - ADCES conference
  - Q2 invoicing reminder
- Demo of new QI Portal features
- Cleveland Clinic Presentation
- Oregon Health and Sciences Presentation

T1D Exchange Updates

T1DX-QI network of 55 centers, caring for 85,000+ T1D patients across 21 states and Washington D.C.



Priya Prahalad, Nicole Rioles et al. T1D Exchange Quality Improvement Collaborative: Accelerating Change through Benchmarking and Improvement Science for People with Type 1 Diabetes. Journal of Diabetes. Nov. 2021

20 adult clinics – caring for 28,000 patients with T1D

20 participating adult clinics

Albert Einstein Shivani Agarwal MD MPH	NYU Langone Lauren Golden MD
Boston Medical Center Devin Steenkamp MD	Oregon Health & Science University Andrew Ahmann MD
Grady Memorial Hospital Sonya Haw MD	Stanford University Marina Basina MD
Northwestern Medicine Grazia Aleppo MD	SUNY Ruth Weinstock MD PhD
Penn Medicine Ilona Lorincz MD	UC Davis Prasanth Surampudi MD
Washington University Alexis McKee MD	UC San Diego Kristen Kulasa MD
Barbara Davis Center Halis Akturk MD	UCSF Umesh Masharani MD
Cleveland Clinic, Pratibha Rao, MD, MPH & Mary Vouyiouklis, MD	UPMC Jason Ng MD
Johns Hopkins Nestoras Mathioudakis MD MHS	University of Miami Francesco Vendrame, MD PhD
Mount Sinai Carol Levy MD	

T1D Exchange

Learning Session RSVP Reminder

When: November 14-15 (Tues-Wed)

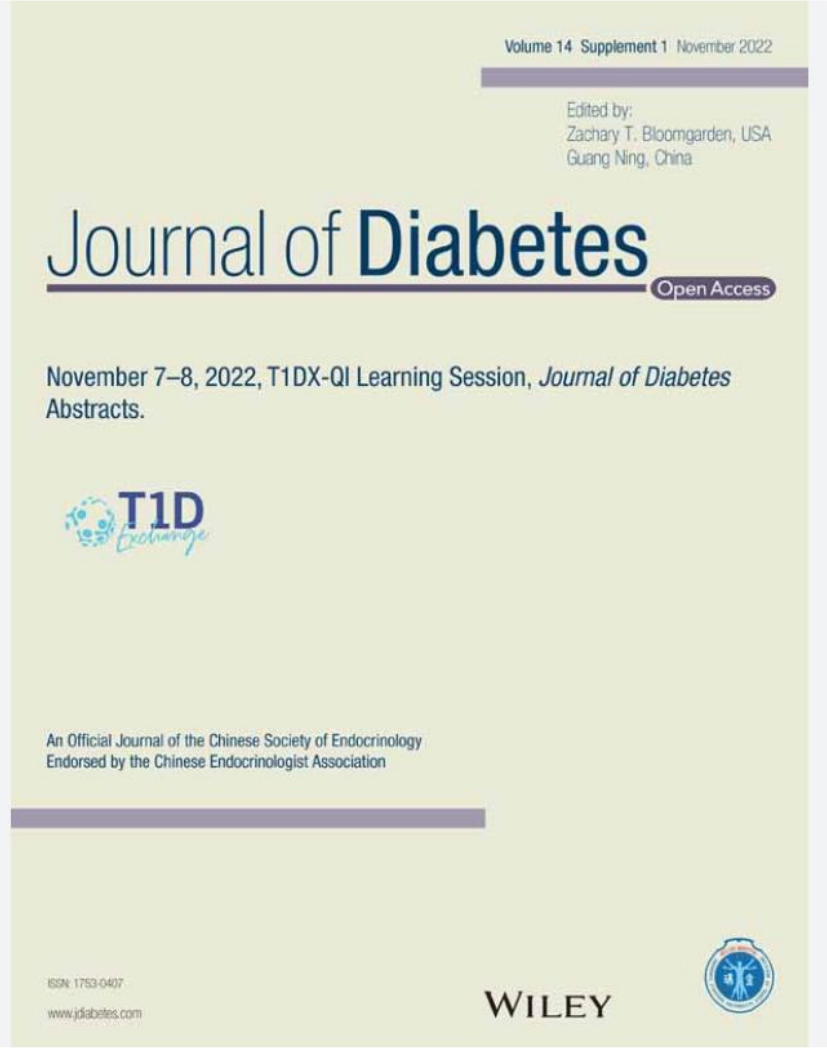
Where: NYC, Westin Grand Central

Who: PI should RSVP on behalf of team

Costs: T1DX will cover costs for two people's hotel for two nights

Submit Abstracts

Journal of Diabetes/November learning session abstract reminder! Share your abstracts now through July 31



We encourage you to submit abstracts on your T2D and T1D QI interventions and learnings.

T1D Exchange

Q2 2023 Invoicing

Reminder to submit invoices for January-June 2023 deliverables

Who should invoice?

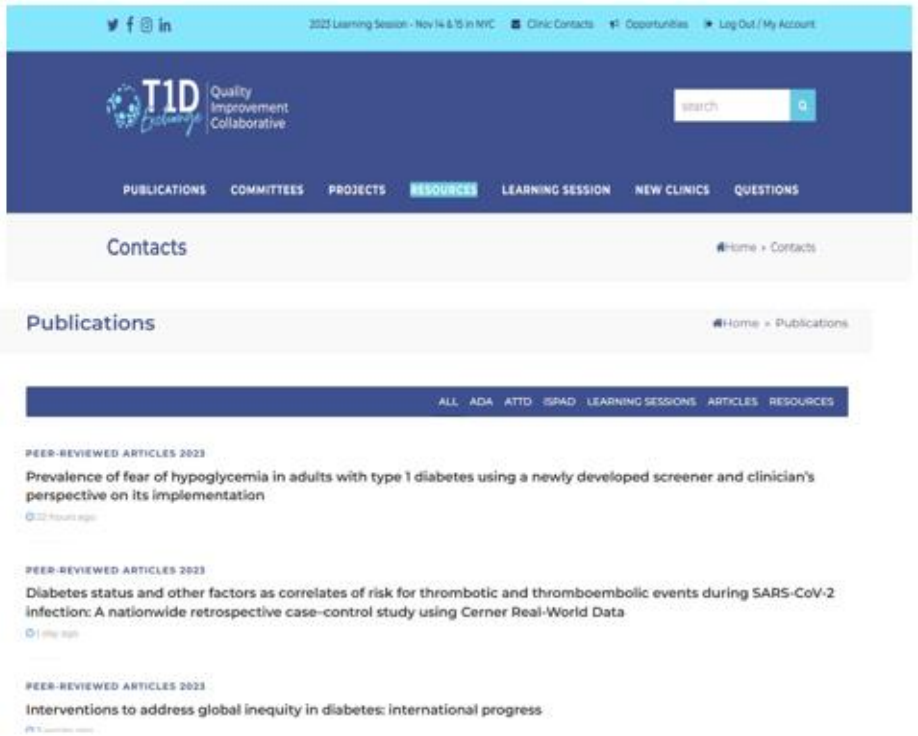
- Any center that has a deliverable that ends on or before 7/1/2023

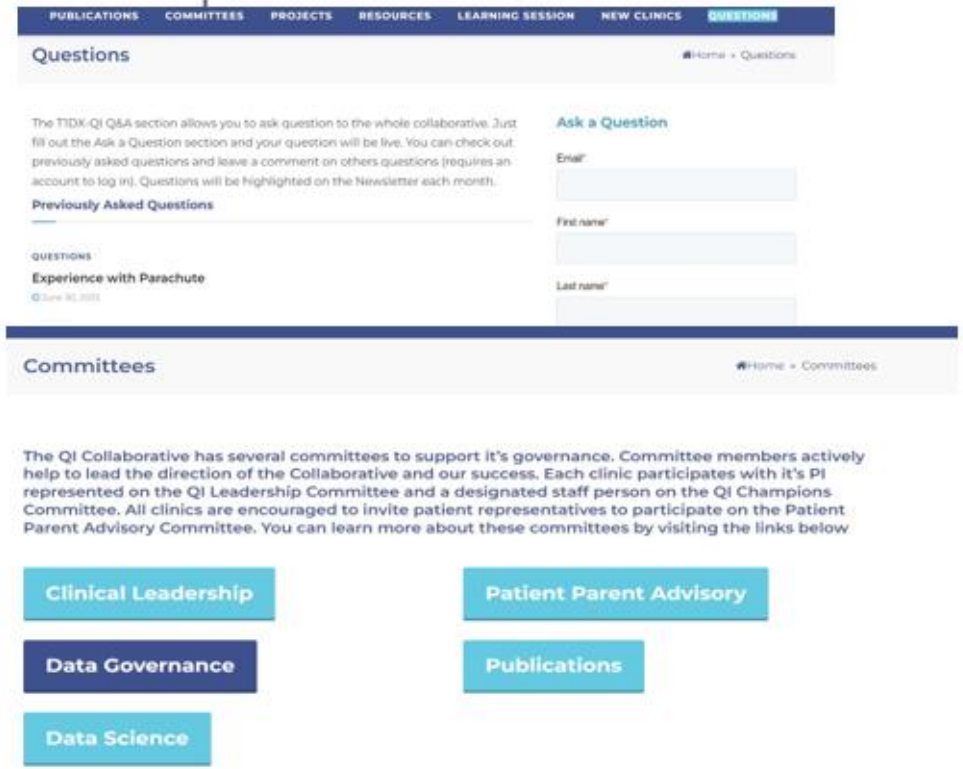
ADCES

Tell us if you or a member of your team is joining the ADCES conference. We would love to see you in Houston next month! T1DX will host a breakfast or dinner. More details TBD.

T1DX-QI Member Website

The T1DX-QI member site is your go to resource for all things collaborative. You can find meeting notes, publications, contacts, past newsletter, and ask the collaborative a question.





T1DX-QI Annual Survey

- One submission per clinical center
- 25 minutes or less to complete
- Data used for abstracts and manuscripts
- Response due by Wednesday August 25th

Portal Updates

Clinical Presentation:

Prevalence and Clinical Determinants of Non-Alcoholic Fatty Liver Disease by Liver Scores in Adults with T1DM

Michelle D. Lundholm, MD, Jim Bena, Keren Zhou, MD, Yumiko Tsushima, MD, & Sangeeta Kashyap, MD

Cleveland Clinic

T1D Exchange Meeting 7/13/23

Disclosures

- The authors do not have any conflicts of interest to report

Introduction

- Prevalence of non-alcoholic fatty liver disease (NAFLD) is increasing; estimated 1 in 4 globally[1,2] and becoming a major indicator for liver transplantation

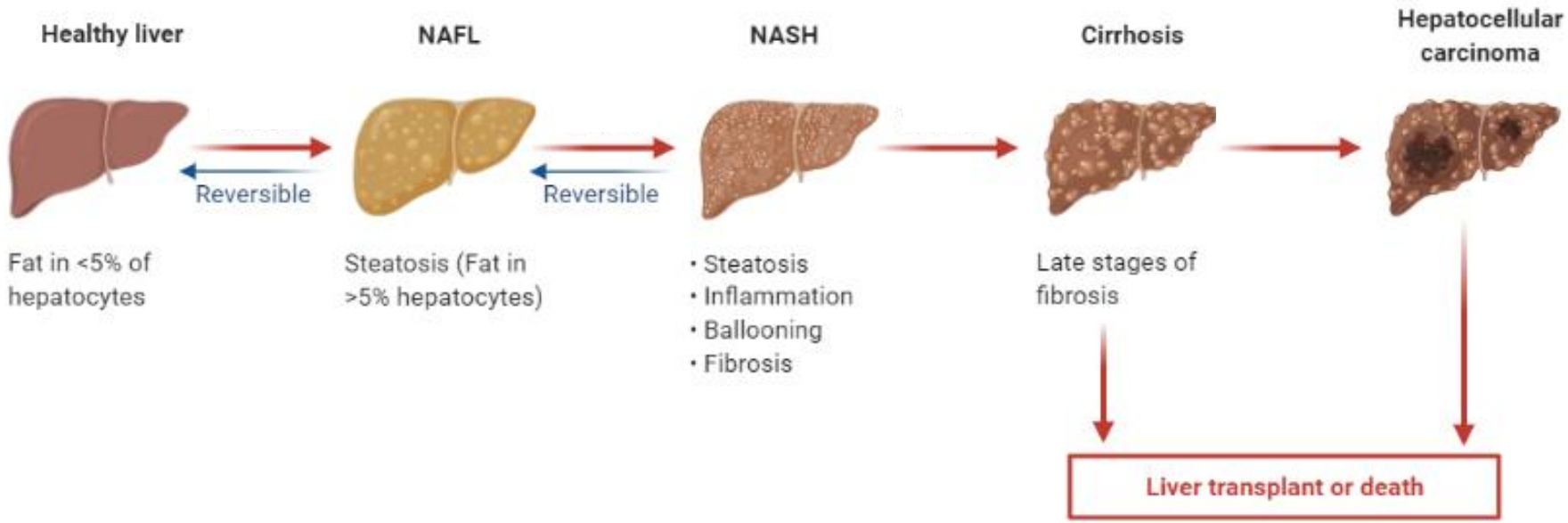


Figure adapted from "Non-Alcoholic Fatty Liver Disease (NAFLD) Spectrum", by BioRender, July 2020

Introduction

- NAFLD is underdiagnosed. Early stages are reversible, but advanced stages may not
- 6-30% of patients with NAFLD on US have biopsy-proven NASH, 40% of those develop fibrosis[3]

Introduction

- Highest prevalence of NAFLD is seen in populations with pre-existing T2DM and obesity[4,5]
- There are guidelines on screening for NAFLD in T2DM, but there is a lack of guidance in T1DM
- Prior studies looking at the prevalence of NAFLD in T1DM have been conflicting, ranging 8-44%[6-8]

Objective

- We aim to use non-invasive liver scores to approximate the prevalence and clinical features of NAFLD in a T1DM population at Cleveland Clinic endocrinology clinic

- Overall, looking to highlight opportunities to screen, detect, and intervene on NAFLD at an earlier stage in T1DM

Methods

- Retrospective single center cross-sectional analysis
- <u>Inclusion criteria:</u>
  - ✓ Patients with T1DM aged >18 years seen in the CCF system between 2015-2018. T1DM identified by ICD coding and also further confirmed with one or more of the following:
    - ✓ Age <10 years at diagnosis
    - ✓ Pancreatic autoantibody positive (GAD65, IA1, ICA, or ZnT8)
    - ✓ Two or more of the following:
      - ✓ Age at diagnosis <40 years
      - ✓ Non-obese at diagnosis (BMI <30 kg/m^2)
      - ✓ Diabetic ketoacidosis at any time
      - ✓ C-peptide <0.8 ng/mL (with associated glucose >80 mg/dL)
      - ✓ Family history of T1DM in a first degree relative

- <u>Exclusion criteria:</u>
  - Type 2 diabetes
  - Monogenic diabetes
  - Pregnancy within the 4 year period
  - *Alcoholic liver disease*
  - *Autoimmune hepatitis*
  - *Alcohol abuse*
  - *Chronic hepatitis C*
  - *Wilson's disease*
  - *Lipodystrophy*
  - *Parenteral nutrition*
  - *Drug-induced liver disease*
  - *Insufficient lab results (CBC, LFTs, lipid panel) to calculate liver scores*

Methods

- Variables collected:
  - Demographic data: age, race/ethnicity, gender, weight, BMI
  - Comorbidities: HTN, HLD, CVD
  - Insulin doses if MDI, or pump
  - Medications: metformin, TZD, GLP-1
  - History of bariatric surgery
  - Labs: A1c, LFTs, Plts, TG, HDL
  - Imaging of liver: RUQ US, elastography, fibroscan, CT, MRI of abdomen
  - Liver biopsy
  - Hepatology referral

Liver Score Calculation

Biomarker	Formula	Interpretation
Hepatic Steatosis Index[10-12]	HSI = 8*ALT/AST + BMI (+2 if diabetes, +2 if female)	≥36 = NAFLD likely 30-35.9 = Indeterminant <30 = NAFLD ruled out
Framingham Steatosis Index[13,14]	X_{FSI} = −7.981 + 0.011*age + 0.173*BMI + 0.007*triglycerides + (−0.146 if female, +0.593 if hypertension, +0.789 if diabetes, +1.1 if ALT/AST ratio ≥ 1.33) FSI = $100/(1+e^{-X})$	≥23 = hepatic steatosis likely <23 = hepatic steatosis unlikely
Fibrosis-4 Score[15,16]	FIB-4 = (Age*AST)/(Platelets*√(ALT))	Age 36-64: • <1.3 = advanced fibrosis excluded • 1.3-2.67 = further investigation needed • >2.67 = advanced fibrosis likely Age ≥65: • <2.0 = advanced fibrosis excluded • 2.0-2.67 = further investigation needed • >2.67 = advanced fibrosis likely
AST to Platelet Ratio Index[17-19]	APRI = (AST/upper limit normal)/(100*Platelets)	≥0.7 → significant fibrosis ≥1.0 → severe fibrosis or cirrhosis

Statistical methods

- Categorical factors:
  - frequencies and percentages, compared using Pearson chi-square tests and Fisher exact tests
- Normally distributed continuous measures:
  - means and standard deviations, compared using two-sample t-tests
- Non-normal measures:
  - medians and quartiles, compared with Wilcoxon rank sum tests

- Analysis was performed using SAS software (version 9.4; Cary, NC). A significance level of 0.05 was assumed for all tests

Results – Patient Features

Table 1. Patient features

	Cohort (N=447)
Age (years)	38.6 ± 14.5
Female Gender	241 (53.9)
Ethnicity	
White	367 (82.7)
Black	62 (14.0)
Other	18 (4.0)
BMI (kg/m^2)	28.0 ± 5.9
Obesity	125 (30.0)
Hypertension	130 (29.1)
Hyperlipidemia	163 (36.5)
Cardiovascular Disease	31 (6.9)
HbA1c (%)	8.4 ± 1.8
Triglycerides (mg/dL)	98.2 ± 72.4
HDL (mg/dL)	59.9 ± 19.4
Triglyceride/HDL ratio	2.2 ± 4.4
Metabolic syndrome	103 (23.0)

Table 2. NAFLD prevalence by liver score

Liver Score	**Positive**	**Prevalence (95% CI)**	
HSI	271	60.6 (56.1,65.2)	Steatosis scores
FSI	230	51.5 (46.8,56.1)	
FIB-4*	8	3.6 (1.2,6.1)	Fibrosis scores
APRI	18	4.0 (2.2,5.8)	

*N=221 patients met criteria for FIB-4 calculation

Prevalence by BMI category

Table 3. NAFLD score positivity by BMI category

	BMI Category			
Liver Score	**Normal <25 (N=148)**	**Overweight 25-29.9 (N=174)**	**Obese 30+ (N=125)**	**p-value**
HSI Categories				<0.001[b]
Negative (<30)	29 (19.6) [23]	0 (0.00) [13]	0 (0.00) [12]	
Indeterminate (30-35.9)	86 (58.1)	61 (35.1)	0 (0.00)	
Positive (≥36)	33 (22.3)	113 (64.9)	125 (100.0)	
FSI Categories				<0.001[c]
Negative (<23)	125 (84.5) [23]	89 (51.1) [13]	3 (2.4) [12]	
Positive (≥23)	23 (15.5)	85 (48.9)	122 (97.6)	
FIB-4 Categories*				0.32[b]
Negative	45 (75.0)	67 (75.3)	54 (75.0)	
Indeterminate	13 (21.7)	20 (22.5)	14 (19.4)	
Positive	2 (3.3)	2 (2.2)	4 (5.6)	
APRI Categories				0.66[c]
Negative (<0.7)	142 (95.9)	168 (96.6)	119 (95.2)	
Positive (≥0.7)	6 (4.1)	6 (3.4)	6 (4.8)	

*Data not available for all subjects. N=221 patients included for FIB-4.
p-values: b=Kruskal-Wallis test, c=Pearson's chi-square test. Post-hoc pairwise comparisons were done using Bonferroni adjustment:
[1]: Significantly different from <25, [2]: Significantly different from 25-29.9, [3]: Significantly different from 30+

Prevalence by Metabolic Syndrome

Table 4. NAFLD score positivity by metabolic syndrome

Liver Score	Metabolic Syndrome: Absent (N=344)	Metabolic Syndrome: Present (N=103)	p-value
HSI Categories			<0.001[b]
Negative (<30)	28 (8.1)	1 (0.97)	
Indeterminate (30-35.9)	134 (39.0)	13 (12.6)	
Positive (≥36)	182 (52.9)	89 (86.4)	
FSI Categories			<0.001[c]
Negative (<23)	210 (61.0)	7 (6.8)	
Positive (≥23)	134 (39.0)	96 (93.2)	
FIB-4 Categories*			0.82[b]
Negative	113 (75.3)	53 (74.6)	
Indeterminate	33 (22.0)	14 (19.7)	
Positive	4 (2.7)	4 (5.6)	
APRI Categories			0.93[c]
Negative (<0.7)	330 (95.9)	99 (96.1)	
Positive (≥0.7)	14 (4.1)	4 (3.9)	

*Data not available for all subjects. N=221 patients included for FIB-4.
p-values: b=Wilcoxon Rank Sum test, c=Pearson's chi-square test.

Table 5. NAFLD score positivity by metabolic factor count

Liver Score	Metabolic Factor Count*: 1 (N=203)	2 (N=141)	3 (N=59)	4 (N=32)	5 (N=12)	p-value
HSI Categories						<0.001[b]
Negative (<30)	22 (10.8) [2345]	6 (4.3) [1]	1 (1.7) [1]	0 (0.00) [1]	0 (0.00) [1]	
Indeterminate (30-35.9)	95 (46.8)	39 (27.7)	9 (15.3)	4 (12.5)	0 (0.00)	
Positive (≥36)	86 (42.4)	96 (68.1)	49 (83.1)	28 (87.5)	12 (100.0)	
FSI Categories						<0.001[c]
Negative (<23)	174 (85.7) [2345]	36 (25.5) [1]	6 (10.2) [1]	1 (3.1) [1]	0 (0.00) [1]	
Positive (≥23)	29 (14.3)	105 (74.5)	53 (89.8)	31 (96.9)	12 (100.0)	

*Metabolic factors: HTN, DM, HDL<40 (M) or <50 (F), fasting TG>150, and BMI>30 (substituted for waist circumference)
p-values: b=Kruskal-Wallis test, c=Pearson's chi-square test. Post-hoc pairwise comparisons were done using Bonferroni adjustment: [1]: Significantly different from 1, [2]: Significantly different from 2, [3]: Significantly different from 3, [4]: Significantly different from 4, [5]: Significantly different from 5

Predictors of Steatosis by HSI

Table 6. Features of patients by HSI score category

	Hepatic Steatosis Index Score Category		
	Negative (<30) (N=29)	**Positive (≥36) (N=271)**	**p-value**
Age (years)	29.5 ± 7.9	40.5 ± 14.7	<0.001[a2]
Female Gender	9 (31.0)	158 (58.3)	0.005[c]
BMI (kg/m^2)*	21.0 ± 1.8	30.9 ± 5.7	<0.001[a2]
BMI Category			<0.001[b]
18-24.9 Normal	29 (100.0)	33 (12.2)	
25-29.9 Overweight	0 (0.00)	113 (41.7)	
30-34.9 Obese Class I	0 (0.00)	63 (23.2)	
35-39.9 Obese Class II	0 (0.00)	40 (14.8)	
40+ Obese Class III	0 (0.00)	22 (8.1)	
Hypertension	2 (6.9)	91 (33.6)	0.003[c]
Hyperlipidemia	6 (20.7)	113 (41.7)	0.028[c]
Cardiovascular Disease	0 (0.00)	25 (9.2)	0.15[d]
HbA1c (%)	9.0 ± 2.2	8.4 ± 1.7	0.16[a2]
Triglycerides (mg/dL)	74.5 [56.0, 99.0]	82.5 [59.0, 125.0]	0.40[b]
HDL (mg/dL)	65.5 ± 23.9	58.0 ± 18.8	0.049[a1]
Triglyceride/HDL ratio	1.3 [1.02, 1.6]	1.4 [0.93, 2.6]	0.25[b]
Metabolic syndrome	1 (3.4)	89 (32.8)	0.001[c]
Aminotransferase elevation (either >30 U/L)	12 (41.4)	66 (24.4)	0.047[c]

*BMI, gender, and ALT/AST are used to calculate HSI
Statistics presented as Mean ± SD, Median [P25, P75], N (column %).
p-values: a1=t-test, a2=Satterthwaite t-test, b=Wilcoxon Rank Sum test, c=Pearson's chi-square test, d=Fisher's Exact test.

Predictors of Steatosis by FSI

Table 8. Features of patients by FSI score category

	Framingham Steatosis Index Score Category		
	Steatosis unlikely (<23) (N=217)	**Steatosis likely (≥23) (N=230)**	**p-value**
Age (years)*	33.0 ± 11.7	43.9 ± 14.8	<0.001[a2]
Female Gender*	121 (55.8)	120 (52.2)	0.45[c]
BMI (kg/m^2)*	24.2 ± 2.9	31.6 ± 5.8	<0.001[a2]
BMI Category			<0.001[b]
18-24.9 Normal	125 (57.6)	23 (10.0)	
25-29.9 Overweight	89 (41.0)	85 (37.0)	
30-34.9 Obese Class I	3 (1.4)	60 (26.1)	
35-39.9 Obese Class II	0 (0.00)	40 (17.4)	
40+ Obese Class III	0 (0.00)	22 (9.6)	
Hypertension*	21 (9.7)	109 (47.4)	<0.001[c]
Hyperlipidemia	43 (19.8)	120 (52.2)	<0.001[c]
Cardiovascular Disease	4 (1.8)	27 (11.7)	<0.001[c]
HbA1c (%)	8.3 ± 2.0	8.5 ± 1.6	0.20[a2]
Triglycerides (mg/dL)*	65.0 [51.5, 81.5]	94.2 [63.0, 142.0]	<0.001[b]
HDL (mg/dL)	65.7 ± 19.6	54.4 ± 17.6	<0.001[a1]
Triglyceride/HDL ratio	1.06 [0.71, 1.5]	1.8 [1.1, 3.0]	<0.001[b]
Metabolic syndrome	7 (3.2)	96 (41.7)	<0.001[c]
Aminotransferase elevation (either <30 U/L)	44 (20.3)	59 (25.7)	0.177[c]

*Age, gender, BMI, triglycerides, and hypertension are variables in the FSI calculation

Statistics presented as Mean ± SD, Median [P25, P75], N (column %).

p-values: a1=t-test, a2=Satterthwaite t-test, b=Wilcoxon Rank Sum test, c=Pearson's chi-square test, d=Fisher's Exact test.

Predictors of Fibrosis by FIB-4

Table 9. Features of patients by FIB-4 score category

	FIB-4 Category		
	Likely or Indeterminate (N=55)	**Negative (N=166)**	**p-value**
Age (years)*	55.0 ± 10.8	49.2 ± 10.6	<0.001[a]
Female Gender	32 (58.2)	94 (56.6)	0.840[c]
Weight (kg)	80.4 ± 17.0	85.0 ± 20.2	0.102[a]
BMI (kg/m^2)	28.1 ± 4.7	29.0 ± 6.2	0.267[a]
Hypertension	27 (49.1)	84 (50.6)	0.846[c]
Hyperlipidemia	31 (56.4)	86 (51.8)	0.557[c]
Cardiovascular Disease	6 (10.9)	23 (13.9)	0.65[d]
HbA1c (%)	8.3 ± 1.6	8.3 ± 1.7	0.784[a]
Triglycerides (mg/dL)	88.3 [59.7, 127.3]	80.0 [60.0, 122.7]	0.35[b]
HDL (mg/dL)	64.2 ± 19.8	60.1 ± 20.5	0.190[a]
Triglyceride/HDL ratio	1.3 [0.82, 2.3]	1.4 [0.89, 2.3]	0.99[b]
Metabolic syndrome	18 (32.7)	53 (31.9)	0.912[c]
Aminotransferase elevation (either >30 U/L)	19 (34.5)	36 (21.7)	0.056[c]

*Age is a variable in the FIB-4 calculation.
Statistics presented as Mean ± SD, Median [P25, P75], N (column %).
p-values: a1=t-test, a2=Satterthwaite t-test, b=Wilcoxon Rank Sum test, c=Pearson's chi-square test, d=Fisher's Exact test.

Investigation for NAFLD

Table 10. Investigation for NAFLD

	Total Cohort (N=447)
Any Imaging	94 (21.0)
CT Abdomen	58 (13.0)
US Abdomen or Liver	56 (12.5)
MRI Abdomen	11 (2.5)
Referral to Hepatology	8 (1.8)
Liver Biopsy	6 (1.3)

- Of those who had imaging, 21.3% of reports noted hepatic steatosis, none of these patients referred for further imaging nor hepatology clinic

Medical treatment for NAFLD

Lifestyle and weight loss interventions are first line for NAFLD
Evidence supports that anti-diabetic agents thiazolidinediones (TZD) and glucagon-like peptide 1 receptor agonists (GLP-1 RA) are effective at preventing and reversing NAFLD damage[20-22]

Table 11. Use of medical therapies for preventing and reversing NAFLD

	Total Cohort (N=447)
TZD use	16 (3.6)
GLP-1 RA use	24 (5.4)

- Very few patients with T1DM are prescribed medications with benefit for NAFLD

Discussion - Prevalence

- NALFD is under-investigated and most patients with T1DM and NAFLD have normal liver transaminases
- In T1DM patients, 50-60% have steatosis and 3-4% have fibrosis (24.9% at-risk) by NAFLD liver scores
- The prevalence of NAFLD steatosis is greatest in patients with obesity and/or metabolic syndrome, and is associated with older age, HTN, HLD, high TG/HDL ratio, and CVD

Discussion - Screening

- Our data supports screening T1DM patients for NAFLD if BMI ≥25 or age ≥40 as they are increasingly likely to have positive liver scores
- Liver scores are easy to calculate and are a great way to screen for NAFLD, but should be followed by multi-step sequential testing strategy
- We need to do more to investigate our patient population for NAFLD/NASH -- only 21% of patients had any liver imaging and only 1% had a liver biopsy

Limitations/Future Directions

- Prevalence of NALFD is imprecisely determined by liver scores (but too few patients had better studies)
- Cross sectional study does not allow us to look at the rate of progression of NAFLD alongside other complications in T1DM
- Future areas:
  - Interventional studies (pioglitazone, GLP-1, weight loss interventions, etc. in T1DM NAFLD)

Conclusions

- There is a high prevalence of NAFLD (mostly steatosis) by liver scores in the T1DM population
- NAFLD is under-investigated in T1DM. Consider screening for BMI ≥25 or age ≥40
- Without investigation, we cannot adequately respond and treat. Medications with suggested benefit are rarely used. More research is needed

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Cleveland Clinic

Every life deserves world class care.

Clinical Presentation:

T1D Exchange QI:

The OHSU Experience

July 13th, 2023

Caleb Schmid, MD
Andrew Ahmann, MD

Department of Endocrinology, Diabetes, and Metabolism
Oregon Health and Sciences University

The Harold Schnitzer Diabetes Health Center At OHSU

The Harold Schnitzer Diabetes Health Center Facts

Opened in 2007 due to the generosity of Harold Schnitzer, grateful patient and passionate philanthropist in Portland.

Combined pediatric and adult diabetes patients

Includes:

- 6300 adult patients (increased from 1300 in 2007)
  - Recent estimate of 53% with type 1 diabetes
  - Approximately 63% on insulin pumps with sensor
  - 27% MDI with sensors

Joined the T1D Exchange in 2008.

The Harold Schnitzer Diabetes Health Center Facts

7 adult CDCES (3 RNs and 4 RDs)

Psychologist

Social worker

Pharm D

Exercise specialist

12 MDs and 2 outpatient APPs plus 4 inpatient APPs (glycemic team)

68 total personnel associated with the diabetes center


OREGON HEALTH & SCIENCE UNIVERSITY

Objectives

Discuss the overall timeline of OHSU in the T1D Exchange

Define “diabetes distress”

Review the use of the Diabetes Distress Scale

Pre-Test

The subscales of the Diabetes Distress Scale include:

A. Anxiety, Depression, Stress, and Coping
B. Emotional Burden, Physician-Related Distress, Regimen-Related Distress, and Interpersonal Distress
C. Compliance, Medication Adherence, Diet, and Exercise
D. Self-Efficacy, Motivation, Social Support, and Well-being.

The Diabetes Distress Scale can be used in clinical settings to:

A. Screen for diabetes distress.
B. Monitor changes in diabetes distress over time.
C. Evaluate the effectiveness of interventions aimed at reducing diabetes distress.
D. All of the above.

The higher the score on the DDS, the:

A. Lower the level of diabetes distress.
B. Higher the level of diabetes distress.
C. More accurate the diagnosis of diabetes distress.
D. More likely the individual is to develop diabetes-related complications.

OHSU Timeline

Our Timeline

March 2022 – OHSU IRB submission for T1D Exchange QI collaborative

April 2022 – Initial entry to T1D Exchange QI collaborative

- 1st Security Assessment Submitted

May 2022 – OHSU IRB Approved

July 2022 – 2nd Security Assessment Submitted as an exemption

August 2022 – 2nd Security Assessment Approved

Our Timeline

November 2022

- Submitted request to start data mapping with Tegria
- 1st T1D Exchange QI Learning Session in Miami

January/February 2023

- Issues with Data Committee
  - Requested update on status of T1D Exchange request for data mapping
  - Had not been scheduled, reviewed, or approved by the OHSU ITG Data Governance Committee

February/March 2023

- Worked on learning more about use of Epic Reports and SlicerDicer for data retrieval from Epic.
- Communicated with Internal Medicine QI department chair regarding getting useful data about type 1 diabetes patients in the clinic.
  - Required QI Analyst support to retrieve the necessary data.
  - QI Analyst visiting family in India, will not be back until April
- OHSU IT Staff focused on Epic integration with sister hospital system – Adventist Health for the next 6-8 weeks.
  - OHSU ITG Data Governance Committee has not reviewed

April 2023

Began brainstorming in March small projects to implement change while awaiting ITG committee and support.

Identified with our psychologist, Dr. Ryan Tweet, that a higher proportion of patients are referred to psychology by only a subset of providers.

- Psychology services have been available for at least 3 years
  - Has been discussed at multiple departmental meetings
- More patients may benefit from psychology services

Goals

- Find the patients that need psychology services.
- Increase referral to diabetes psychologist.

Plan:

Discussed implementation of Diabetes Distress Scale with anonymous survey to measure initial level of distress in our clinic patients.

Diabetes Distress (DD)

"Refers to the worries, concerns, and fears among individuals with diabetes as they struggle to manage their disease over time."

(Fisher, Gonzalez & Polonzky, 2014)

Occurs in 40-50% of people living with diabetes.

Considered a subclinical mental health issue

- Low-level, short-lived
- **Not** a mental health diagnosis, but interferes with patient's ability to function

Associated with poor self-care, reduced glycemic control, and difficulty with adherence.

- Screening may also detect other barriers (e.g. mental illness, disordered eating patterns)

Responsive to clinical interventions.

T1-REDEEM: A Randomized Controlled Trial to Reduce Diabetes Distress Among Adults With Type 1 Diabetes

Lawrence Fisher,[1] Danielle Hessler,[1] William H. Polonsky,[2] Umesh Masharani,[1] Susan Guzman,[3] Vicky Bowyer,[1] Lisa Strycker,[4] Andrew Ahmann,[5] Marina Basina,[6] Ian Blumer,[7] Charles Chloe,[8] Sarah Kim,[1] Anne L. Peters,[9] Martha Shumway,[1] Karen Weihs,[10] and Patricia Wu[11]

Diabetes Care 2018;41:1862–1869 | https://doi.org/10.2337/dc18-0391

Diabetes Distress can be successfully reduced among distressed individuals with T1D with elevated HbA1c using both education/behavioral and emotion-focused approaches

213-OR: ADA Presidents' Select Abstract: EMBARK—A Randomized, Controlled Trial Comparing Three Approaches to Reducing Diabetes Distress in Adults with Type 1 Diabetes

DANIELLE M. HESSLER; LAWRENCE FISHER; LISA A. STRYCKER; WILLIAM H. POLONSKY; SUSAN GUZMAN; GRAZIA ALEPPO; ELIZABETH STEPHENS; SARAH KIM; NICHOLAS B. ARGENTO; ANDREW AHMANN; UMESH MASHARANI

An integrated educator-led education and management program with a psychologist-led program was most effective.

Diabetes Distress Scale (DDS)

Developed by Polonsky and Fisher (*Diabetes Care* 2005)

- Goal was to address limitations of prior scales developed for measurement of the range of emotional response to diabetes.
  - E.g. Questionnaire on Stress in Patients with Diabetes-Revised (QSD-R), ATT39, and Problem Areas in Diabetes (PAID) scales
- Initially a 28-item scale including 7 items from 4 domains
  1. Emotional burden (EB)
  2. Physician-related distress (PD)
  3. Regimen-related distress (RD)
  4. Diabetes-related interpersonal distress (ID)
- Shortened to 17-item scale
  - 5 EB, 5 RD, 4 PD, and 3 ID items
  - Correlated well with 28-item scale
- 6-point Likert scale
  - 1 = no problem to 6 = serious problem

https://diabetesdistress.org/

Polonsky et al, Diabetes Care 2005

DDS

DIRECTIONS: Living with diabetes can sometimes be tough. There may be many problems and hassles concerning diabetes and they can vary greatly in severity. Problems may range from minor hassles to major life difficulties. Listed below are 17 potential problem areas that people with diabetes may experience. Consider the degree to which each of the 17 items may have distressed or bothered you DURING THE PAST MONTH and circle the appropriate number.

Please note that we are asking you to indicate the degree to which each item may be bothering you in your life, NOT whether the item is merely true for you. If you feel that a particular item is not a bother or a problem for you, you would circle "1". If it is very bothersome to you, you might circle "6".

	Not a Problem	A Slight Problem	A Moderate Problem	Somewhat Serious Problem	A Serious Problem	A Very Serious Problem
1. Feeling that diabetes is taking up too much of my mental and physical energy every day.	1	2	3	4	5	6
2. Feeling that my doctor doesn't know enough about diabetes and diabetes care.	1	2	3	4	5	6
3. Not feeling confident in my day-to-day ability to manage diabetes.	1	2	3	4	5	6
4. Feeling angry, scared and/or depressed when I think about living with diabetes.	1	2	3	4	5	6
5. Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	1	2	3	4	5	6

Diabetes Distress Scale QI Project

Initial Plan:

- Administer anonymous DDS to all new diabetes patients for 1 month.
- Determine initial rate of diabetes distress and to reduce burden of scoring.

Early April 2023 - Submitted to IRB for approval

- Was ruled to be “research” since we were not using retrospective data.

- Meetings and emails regarding the use of anonymous data and our QI goals for this project.

May 2023 – IRB Approval for anonymous prospective data collection

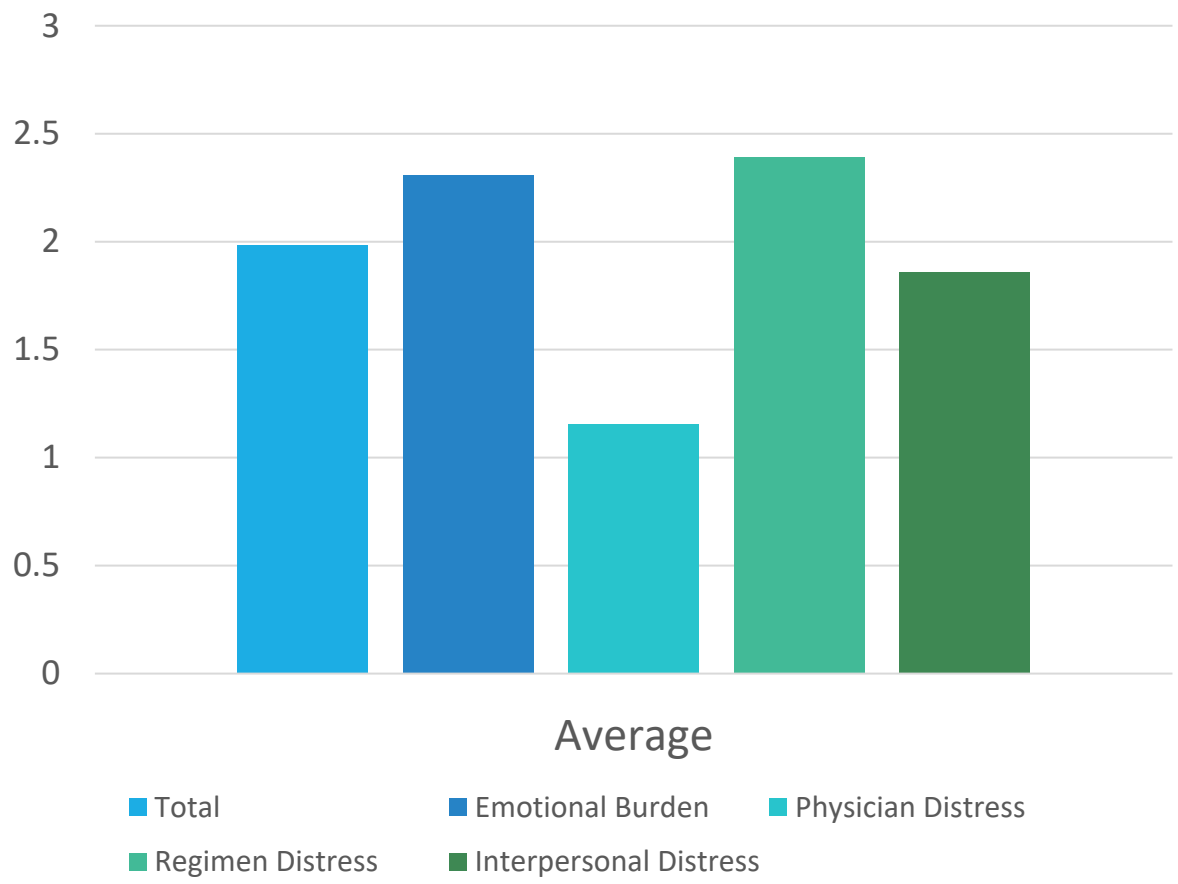
- Clinical Supervisor transfers to a different department.
- Director of Clinic Operations – Unable to administer to clinic patients at this time due to staffing changes.

Diabetes Distress Scale QI Project

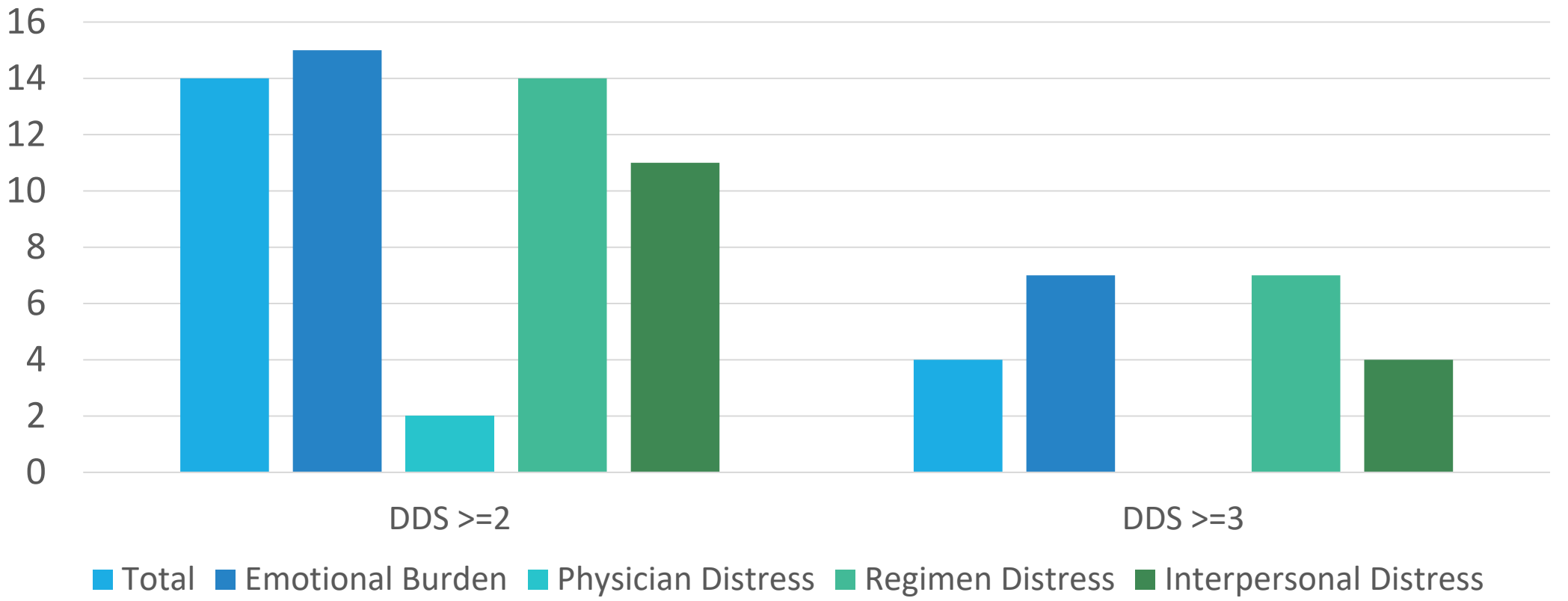
June 22, 2023 – Started administering to all new patients

- Only 3 surveys returned in 1 week

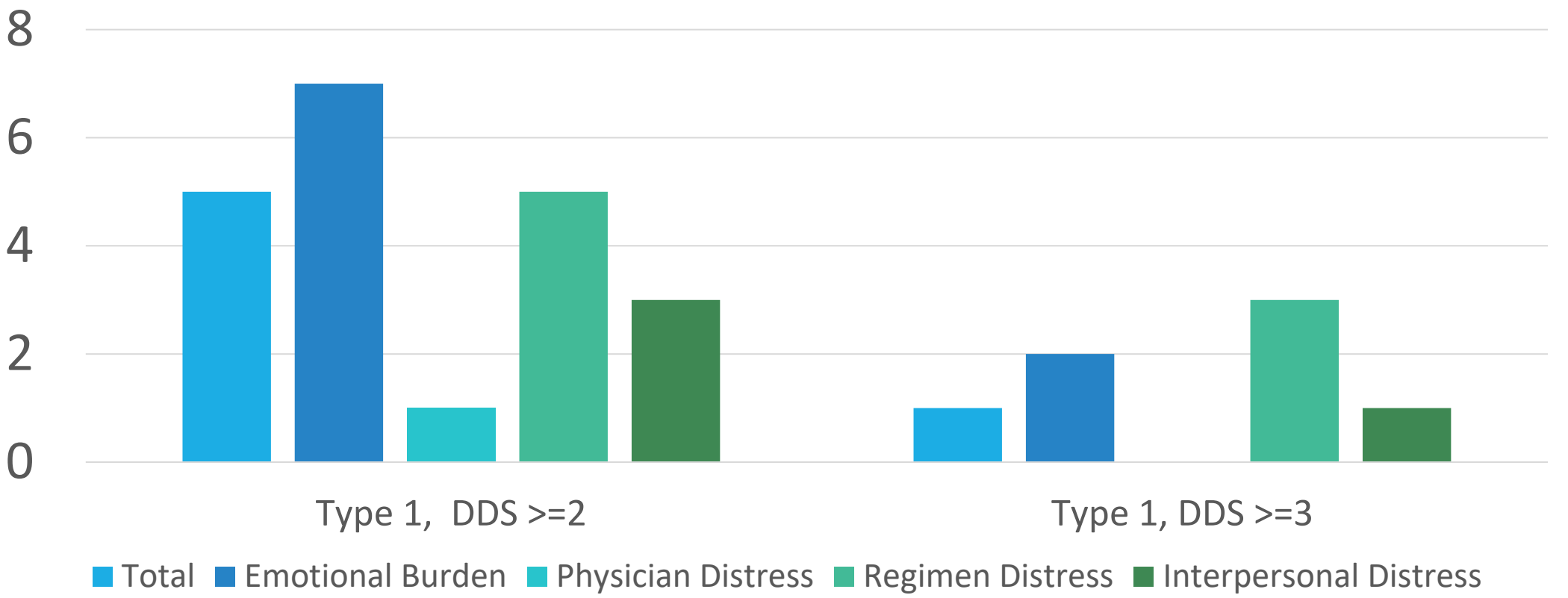
June 29, 2023 – Opened up to all diabetes patients.



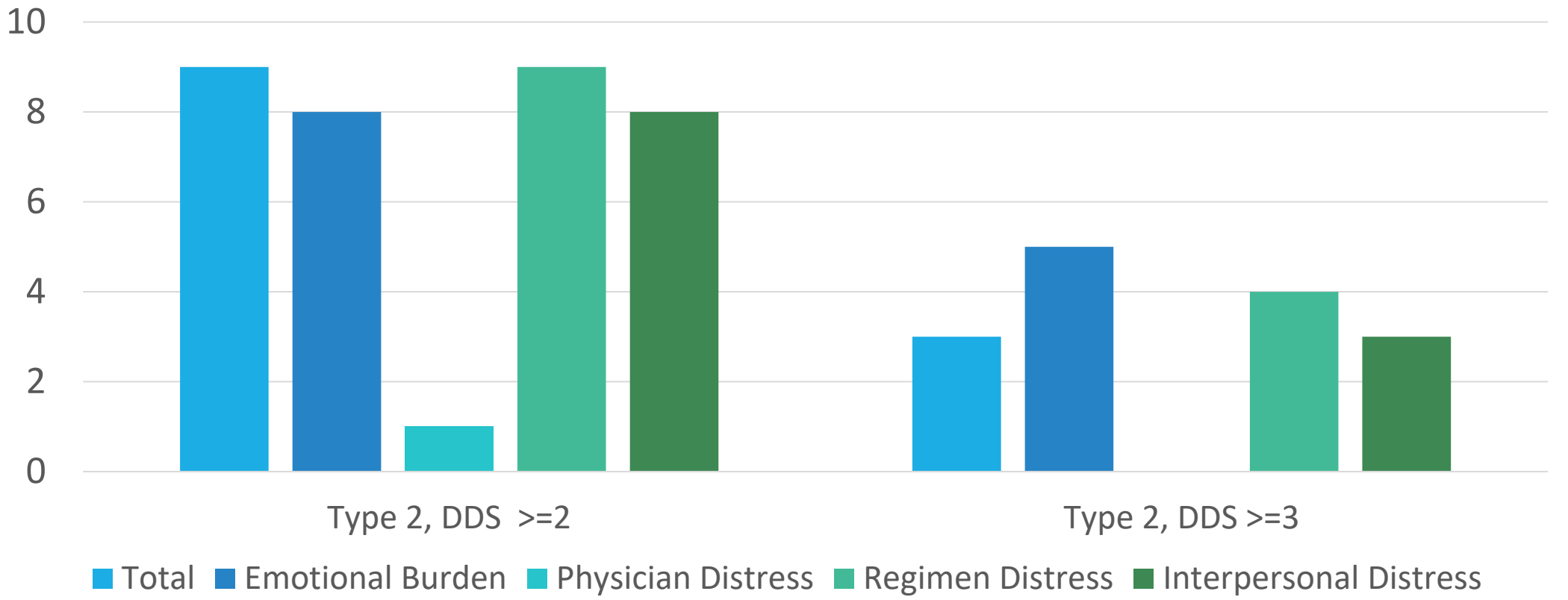
Total of All Patients



Type 1 Diabetes



Type 2 Diabetes



Future Plans

Translate to other languages commonly spoken at our clinic

- Already available in Spanish on diabetesdistress.org
- Russian, Ukrainian, Arabic, Mandarin, Farsi, Vietnamese, etc.

Delivery to patients prior to clinic visits to be used by provider in clinic discussion.

Sending the DDS to patients virtually.

Working with Dr. Larry Fisher – Workshop in September.

Strategic planning committee meeting in Fall 2023 with all diabetes providers.

Post-Test

The subscales of the Diabetes Distress Scale include:

A. Anxiety, Depression, Stress, and Coping
B. Emotional Burden, Physician-Related Distress, Regimen-Related Distress, and Interpersonal Distress
C. Compliance, Medication Adherence, Diet, and Exercise
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C. More accurate the diagnosis of diabetes distress.
D. More likely the individual is to develop diabetes-related complications.

Questions?

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Our QI Team:

- Andrew Ahmann, MD
- Alex Castro Berrelleza, MA
- Ashley Klees, RD, CDCES
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- Ryan Tweet, PsyD
- Melanie Abrahamson-Sohmer, Senior Clinical Research Associate
- Brittany Caswell, Clinical Research Assistant
- Brianna Moralez Gomez, Administrative Coordinator

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