T1D Exchange Clinic Registry: 25,000 strong!
What is it and what have we learned to date?

Georgeanna J Klingensmith, MD
Barbara Davis Center
T1D Exchange Mission and Goals

Improve outcomes of people touched by T1D by facilitating better care and accelerating new therapies through a collaborative data collection and sharing network.
What is the T1D Exchange

- Clinic Registry
- Patient Website *Glu*
- Patient Biobank
Clinic Registry Objectives

Collect clinical and laboratory data to:

• Address pertinent clinical issues
• Conduct exploratory/hypothesis-generating analyses
• Identify patients interested participating in additional research studies
• Categorize patients for future clinical studies and biobank studies / analyses
67 Clinical Centers
Clinical Centers

N = 67

Types of Patients

- Adult: 12 (18%)
- Pediatric: 37 (55%)
- Both: 18 (27%)

Setting

- Institution: 52
- Community: 1
- Managed Care: 1
T1D Exchange

• Demographics of Clinic Registry
• Diabetes care and outcomes of participants
  – Recruitment was limited to 25,000 participants
  – Recruitment was directed toward a balance between pediatric and adult participants
  – Some attempt was made to increase racial balance
• Biobank
• Future directions
• Demographic data was provided by Roy Beck and the Jeab Statistical Center
• All other data come from selected abstracts and oral presentations by T1D exchange investigators at scientific meetings over the past year
Age Distribution

24,113 total population

Age (Years)

<6  6-12  13-17  18-25  26-49  ≥ 50

1171  6490  5907  3611  4160  2774
Age at Diagnosis of T1D

- <7: 7455
- 7-12: 7712
- 13-19: 3336
- 20-24: 884
- 25-49: 2018
- 50-64: 311
- ≥65: 53

Age at Diagnosis (Years)
Demographics

Gender
- 50% Female
- 50% Male

Race/Ethnicity
- 83% White
- 8% Black
- 1% Asian
- 3% Other
- 1% Hispanic
Annual Household Income

- < $25,000: 12%
- $25,000 - < $35,000: 8%
- $35,000 - < $50,000: 11%
- $50,000 - < $75,000: 17%
- $75,000 - < $100,000: 18%
- ≥ $100,000: 34%
Mean HbA1c by Age Group

Age (Years) | HbA1c
--- | ---
<6 | 8.3%
6-12 | 8.3%
13-17 | 8.7%
18-25 | 8.5%
26-49 | 7.7%
≥ 50 | 7.6%
A1c Trajectory over Adolescence

Mark A Clements
ISPAD 2011
HbA1c across # of SMBG per Day by insulin therapy

\[ P\text{-value} < 0.001 \text{ for each of the 4 age groups} \]

- Pump Users
- Injection Users

\[ 0-2 \quad 3-4 \quad 5-6 \quad 7-9 \quad \geq 10 \]

- 1-12 year old
- 13-17 year old
- 18-25 years old
- \( \geq 26 \) years old

Garg, ATTD Barcelona 2012
Pump Use by Age in 2010-11

Overall 53% use an insulin pump.

Hirsch, ATTD Barcelona 2012
Racial Disparities in Pump Use Stratified by Age Group

- **White**
- **Black**
- **Hispanic**

* p<0.001 vs White

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total</th>
<th>1-5 yrs</th>
<th>6-12 yrs</th>
<th>13-17 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump %</td>
<td></td>
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<td></td>
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<tr>
<td>0%</td>
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<td>10%</td>
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<td>20%</td>
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<td>30%</td>
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<td>50%</td>
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<td>60%</td>
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</table>

Terri H. Lipman
ISPAD 2011
Fig 2a. Racial Disparity in Pump Use Across Income Levels
Age 1- < 26 yrs

P values for comparison with Non-Hispanic White
+ = P < 0.001
§ = P < 0.05

% Pts Using a Pump

< $50,000
$50,000 - < $100,000
≥ $100,000

White
Black
Hispanic
HbA1c according to Insulin Method
Stratified by Race/Ethnicity

*Means and P value adjusted for confounders

* p<0.001

*Means and P value adjusted for confounders

[Graph showing the HbA1c levels for different races and methods of insulin delivery (Pump and Injections) for White, Black, and Hispanic populations. The graph indicates significant differences among the groups, with * indicating p<0.001.]
Fig 3. Racial Differences in HbA1c Differ by Pump vs. Injection

- Black vs. White pump
- Hispanic vs. White pump
- Black vs. White injection
- Hispanic vs. White injection

Mean Difference in HbA1c

1-<13 yrs old 13-<18 yrs old 18-<26 yrs old ≥ 26 yrs old

+ = P <0.001
# = P <0.01
§ = P <0.05

Klingensmith, GJ ADA 2012
Mean HbA1c by Age Group

Goal A1C < 7.5%

- <6: 8.3%
- 6-12: 8.3%
- 13-17: 8.7%
- 18-25: 8.5%
- 26-49: 7.7%
- ≥50: 7.6%

Goal A1C < 7%
Fig 2a. Percent of Pediatric Participants Meeting ADA A1c Goals by Insulin Administration Method

- **1-<6 Years**
  - Pump: 80%
  - Injection: 80%
  - Mean A1c: Pump = 7.8%
  - Injection = 8.4%

- **6-<13 Years**
  - Pump: 60%
  - Injection: 40%
  - Mean A1c: Pump = 8.0%
  - Injection = 8.5%

- **13-<20 Years**
  - Pump: 40%
  - Injection: 40%
  - Mean A1c: Pump = 8.4%
  - Injection = 9.0%

DiMeglio, L. ADA 2012
Fig 2b. Percent of Adult Participants Meeting ADA A1c Goals By Insulin Administration Method

DiMeglio, L. ADA 2012
ADA Goals in Pediatrics

DiMeglio, L. ADA 2012

30-40% exceed BMI goal
ADA Goals in Adults

- 26% on statins, had elevated Cholesterol
- 44% on ACE/ARB had high BP
- 26% on statins, had elevated Cholesterol
- 40% are overweight and 30% are obese

DiMeglio, L. ADA 2012
Incidence Rates of DKA in Pump vs. Multiple Daily Injections (MDI)

P<0.001 for all age groups

DCCT rate was 2/100 person yrs
Incidence Rate* of SH at various ages

*The rate of seizure/coma in the DCCT was 62 and 19 /100 patient years
## Complications and Co-morbidities by Diabetes Duration

<table>
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<tr>
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<th>T1D Duration</th>
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<tbody>
<tr>
<td></td>
<td>&lt;20 yrs</td>
<td>20-&lt;40 yrs</td>
<td>≥40 yrs</td>
</tr>
<tr>
<td>Treatment for Retinopathy(^a)</td>
<td>2.9%</td>
<td>19%</td>
<td>36%</td>
</tr>
<tr>
<td>Nephropathy(^b)</td>
<td>5.8%</td>
<td>16%</td>
<td>25%</td>
</tr>
<tr>
<td>Neuropathy</td>
<td>6.2%</td>
<td>16%</td>
<td>29%</td>
</tr>
<tr>
<td>Myocardial Infarction (MI)</td>
<td>1.0%</td>
<td>1.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.3%</td>
<td>0.9%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Coronary Artery Disease, no MI</td>
<td>2.2%</td>
<td>6.7%</td>
<td>23%</td>
</tr>
</tbody>
</table>

\(^a\) Known laser, injection therapy, or vitrectomy in either eye  
\(^b\) Current micro or macroalbuminuria, renal failure (receiving dialysis), or post-kidney transplant

Participants >30 years old

Weinstock R  ADA 2012
The T1D Exchange Biobank

- Benaroya Research Institute, Seattle, WA
  – Carla Greenbaum, Director of the Biobank

- Northwest Lipid Metabolism and Diabetes Research Laboratories, Seattle, WA
The T1D Exchange Biobank is being developed to facilitate T1D research by supporting ongoing and future studies by qualified investigators.

The purpose of the T1D Exchange Biobank is:
- To collect, store and distribute biological samples from patients with T1D.
- To share and exchange data with qualified investigators using the Biobank.
The T1D Exchange Biobank
Scientific Review Committee (SRC)

HENRY RODRIGUEZ, MD
PROFESSOR OF PEDIATRICS
CLINICAL DIRECTOR, USF DIABETES CENTER

MICHAEL HALLER, MD
ASSOCIATE PROFESSOR
PEDIATRIC ENDOCRINOLOGY, UNIVERSITY OF FLORIDA

MARTIN J. HESSNER, PHD
PROFESSOR, DEPARTMENT OF PEDIATRICS
DIRECTOR, THE MAX MCGEE NATIONAL RESEARCH CENTER FOR JUVENILE DIABETES THE MEDICAL COLLEGE OF WISCONSIN

DAMIEN CHAUSSABEL, PHD
ASSOCIATE MEMBER AND DIRECTOR OF THE SYSTEMS IMMUNOLOGY DIVISION BENAROYA RESEARCH INSTITUTE

THOMAS W. GARDNER, MD, MS
PROFESSOR
OPHTHALMOLOGY AND VISUAL SCIENCES, PROFESSOR MOLECULAR AND INTEGRATIVE PHYSIOLOGY, KELLOGG EYE CENTER, UNIVERSITY OF MICHIGAN

RODICA POP-BUSUI, MD, PHD
ASSOCIATE PROFESSOR OF INTERNAL MEDICINE
METABOLISM, ENDOCRINOLOGY AND DIABETES UNIVERSITY OF MICHIGAN

ANNE PETERS, MD, FACCP, CDE
DIRECTOR, USC CLINICAL DIABETES PROGRAM

PETER GOTTLIEB, MD
PROFESSOR OF PEDIATRICS AND MEDICINE
BARBARA DAVIS CENTER FOR CHILDHOOD DIABETES, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

THOMAS W. GARDNER, MD, MS
PROFESSOR
OPHTHALMOLOGY AND VISUAL SCIENCES, PROFESSOR MOLECULAR AND INTEGRATIVE PHYSIOLOGY, KELLOGG EYE CENTER, UNIVERSITY OF MICHIGAN

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BARBARA DAVIS CENTER FOR CHILDHOOD DIABETES, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE
T1D Exchange Biobank Clinical Research Protocols with Sample Collection

1. Ancillary Study: Residual C-Peptide in Patients with T1D
   – Ongoing

2. New Onset Cohort Study
   – Planned start in 2012
Acknowledgement

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