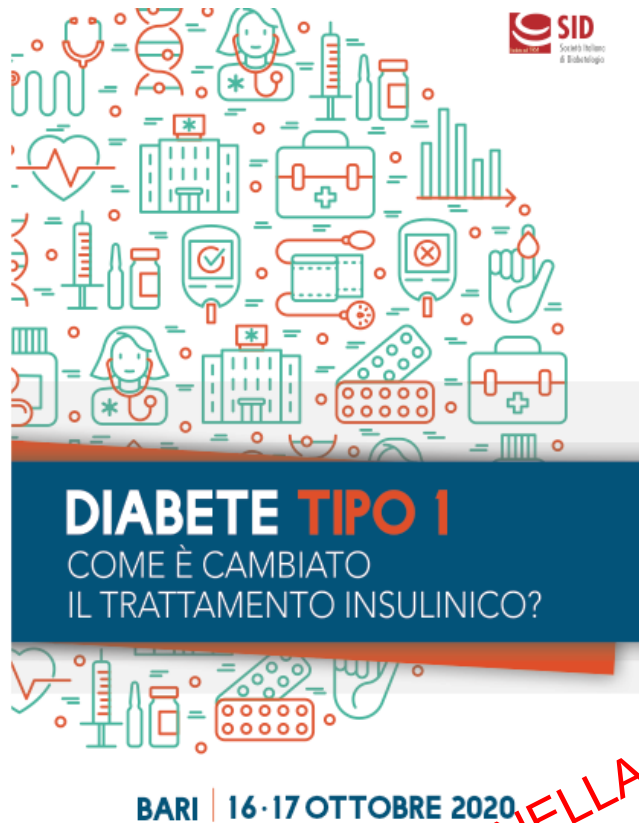




Gestione della terapia nella transizione dall'adolescente all'adulto

il punto di vista del diabetologo dell'adulto



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Dipartimento di Medicina Clinica e Chirurgia
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Diapositiva preparata da BRUNELLA CAPALDO e ceduta alla Società Italiana di Diabetologia.
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Transition of care

“The planned, purposeful movement of young adults from child-centered to adult-oriented health care systems.”



Blum RW, J Adolesc Health. 1993

Critical issues in transition

- Transition occurs at a time when youth with DM1 is undergoing great developmental change and may occur within the context of many other situational changes
- Fear to losing relationships with pediatric providers and forming new relationships with adult providers
- Greater responsibility in care process (*no parental supervision, self-management*)
- Work/school, social, financial demands take precedence over diabetes care
- Barriers to access to health care information (*scheduling appointments, diabetes supplies*)

Poor clinic attendance / discontinuation of care



- Deterioration in glycemic control
- Increased risk of acute complications (*Hypo, DKA*)
- Increased risk of hospitalizations
- Increased risk of unhealthy behaviors (*smoking, alcohol, drug abuse, intentional insulin omission*)

Jacobson AM, J Pediatr 1997

Holmes-Walker DJ, Diabetic Med 2007

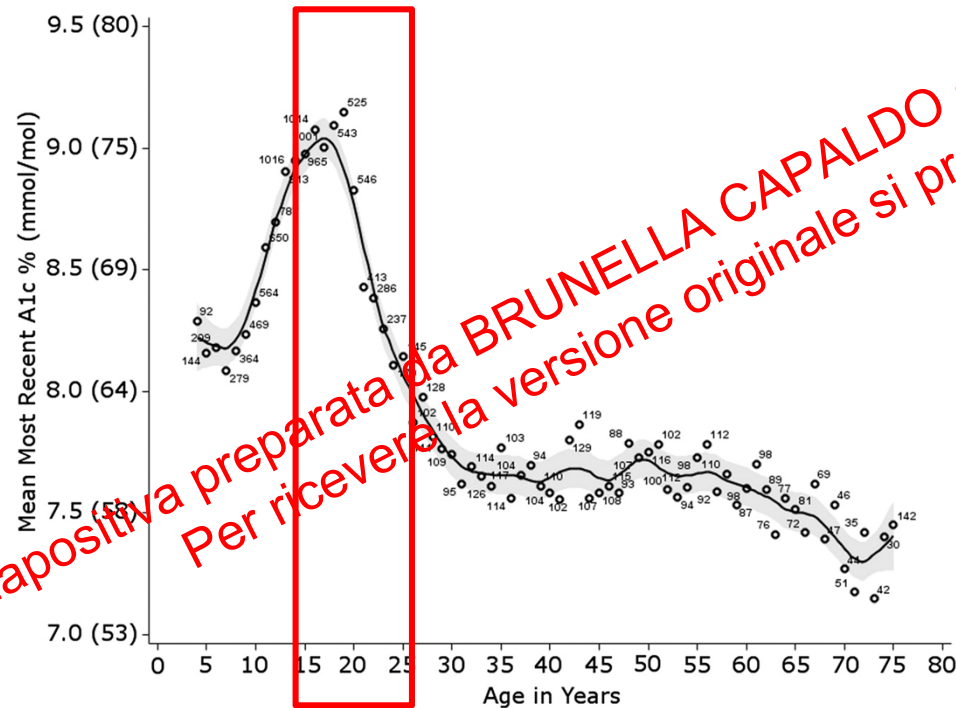
Nakhla M, Pediatrics 2009

Tracy EL, Child Health Care. 2019

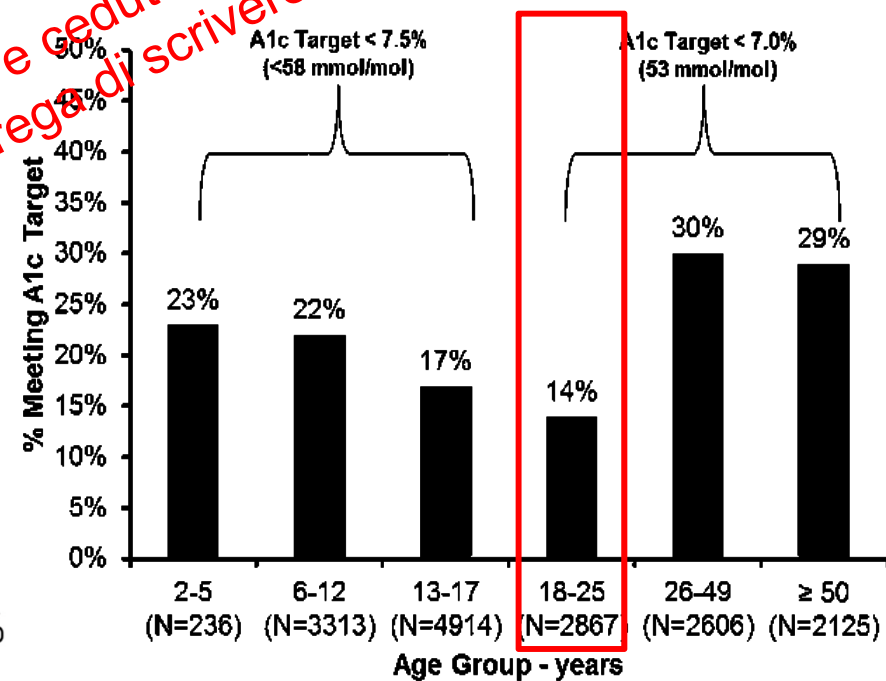
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Current State of Type 1 Diabetes Treatment in the U.S.: Updated Data From the T1D Exchange Clinic Registry

Mean HbA1c levels by age



% pts achieving HbA1c target by age group





Differences between pediatric and adult approach to diabetes care

Approach to caring

(individualized-approach not family-centered approach)

Therapeutic targets

(more stringent objectives to prevent CVD and chronic complications)

Psychosocial issues

(anxiety, depression, eating disorders, dependance)

Sexual and reproductive health issues

(sexuality, contraception, pregnancy)

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Diabetes Care for Emerging Adults: Recommendations for Transition From Pediatric to Adult Diabetes Care Systems

A position statement of the American Diabetes Association, with representation by the American College of Osteopathic Family Physicians, the American Academy of Pediatrics, the American Association of Clinical Endocrinologists, the American Osteopathic Association, the Centers for Disease Control and Prevention, Children with Diabetes, The Endocrine Society, the International Society for Pediatric and Adolescent Diabetes, Juvenile Diabetes Research Foundation International, the National Diabetes Education Program and the Pediatric Endocrine Society (formerly Lawson Wilkins Pediatric Endocrine Society)

ADA
Diabetes Care 2011

Diabetes in the Adolescent: Transitional Issues

Sarah K. Lyons, Ingrid M. Libman, and Mark A. Sperling

Department of Pediatrics, Division of Pediatric Endocrinology, Children's Hospital of Pittsburgh of the University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania 15224

The Endocrine Society
JCEM 2013

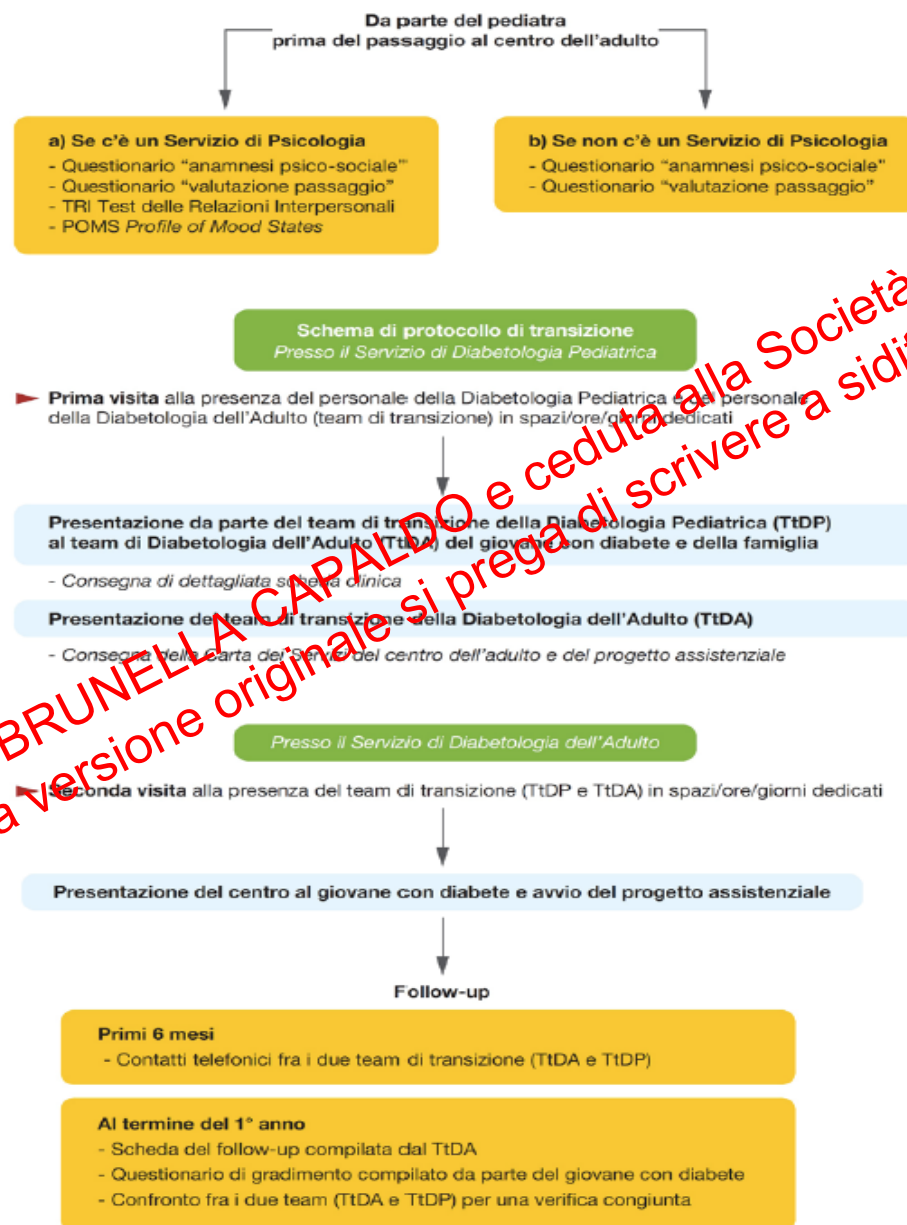
Transizione dei giovani con diabete mellito verso l'età adulta

*Passaggio dal pediatra al medico
dell'adulto. Una proposta operativa nazionale*

SIEDP-AMD-SID
Il Giornale di AMD 2010

Diapositiva preparata da BRUNELLA CRIPALDO e ceduta alla Società Italiana di Diabetologia.
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Transition program by SIEDP-AMD-SID



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Heterogeneity of transition programs

Types of studies (observational, non randomized intervention studies, small sample, short duration of follow-up, different settings (outpatient, hospitals, academic centers))

Models of transition care (educational programs, transition coordinator to assist in the transition process, joint transition clinic)

Outcomes (loss to follow-up, number of visits /year, HbA1c, hypoglycemia, hospitalizations, patients' satisfaction, quality of life)

Transition of care for adolescents from paediatric services to adult health servicesCochrane Systematic Review - **Intervention** | Version published: 29 April 2016<https://doi.org/10.1002/14651858.CD009794.pub2>

Campbell F 2016

Authors' conclusions

The available evidence (four small studies, $N = 238$), covers a limited range of interventions developed to facilitate transition in a limited number of clinical conditions, with only four to 12 months follow-up. These follow-up periods may not be long enough for any changes to become apparent as

transition is a lengthy process. There was evidence of improvement in patients' knowledge of their condition in one study, and improvements in self-efficacy and confidence in another, but since few studies were eligible for this review, and the overall certainty of the body of this evidence is low, no firm conclusions can be drawn about the effectiveness of the evaluated interventions. Further

research is very likely to have an important impact on our confidence in the intervention effect and likely could change our conclusions. There is considerable scope for the rigorous evaluation of other models of transitional care, reporting on clinical outcomes with longer term follow-up.



Closing the Gap: Results of the Multicenter Canadian Randomized Controlled Trial of Structured Transition in Young Adults With Type 1 Diabetes

<https://doi.org/10.2337/dc18-2187> 2019

Tamara Spaic,^{1,2,3} Tracy Robinson,⁴
Ellen Goldbloom,^{5,6} Patricia Gallego,^{3,4,7}
Irene Hramiak,^{1,2,3} Margaret Lawson,^{5,6}
Janine Malcolm,^{6,8} Jeffrey Mahon,^{1,2,3}
Deric Morrison,^{1,2} Amish Parikh,⁹
Angelo Simone,⁹ Robert Stein,^{4,7}
Artem Uvarov,^{2,10} and Cheril Clarson,^{3,4,7}
for the JDRF Canadian Clinical Trial
CCTN1102 Study Group

OBJECTIVE

To determine if a structured transition program for young adults with type 1 diabetes improves clinic attendance, glycemic control, diabetes-related distress, quality of life, and satisfaction with care.

RESEARCH DESIGN AND METHODS

In this multicenter randomized controlled trial, young adults (17–20 years) with type 1 diabetes were randomly assigned to a transition program with a transition coordinator or to standard care. The intervention lasted 18 months (6 in pediatric and 12 in adult care). The primary outcome was the proportion of participants who failed to attend at least one adult diabetes clinic visit during the 12-month follow-up after completion of the intervention.

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Table 2—Primary outcome of clinic attendance

	Intervention period (0–18 months)			Follow-up period (18–30 months)		
	Intervention group (n = 104)	Control group (n = 101)	P value	Intervention group (n = 104)	Control group (n = 101)	P value
Number of scheduled visits			0.002*			0.846
0	—	—		21 (20.1%)	20 (19.8%)	
1	1 (1.0%)	1 (1.0%)		32 (30.8%)	34 (33.7%)	
2	4 (3.9%)	6 (5.9%)		51 (49.0%)	47 (46.5%)	
3	2 (1.9%)	13 (12.9%)		—	—	
4	18 (17.3%)	17 (16.8%)		—	—	
5	28 (26.9%)	38 (37.6%)		—	—	
6	51 (49.0%)	26 (25.7%)		—	—	
Mean (SD)	4.1 (1.1)	3.6 (1.2)		1.3 (0.8)	1.3 (0.8)	
Median	4.0	4.0		1.0	1.0	

Table 3—Glycemic control

Last (central) laboratory HbA _{1c}					
	Intervention group		Control group		P value
		n		n	
Baseline					
% HbA _{1c}	8.46 (1.30)	103 (99%)	8.61 (1.57)	99 (98%)	
mmol/mol	69 (14.2)		71 (17.2)		
Intervention period (0–18 months)					
% HbA _{1c}	8.59 (1.47)	63 (61%)	8.63 (1.49)	50 (50%)	0.758
mmol/mol	70 (16.1)		71 (16.3)		
Follow-up period (18–24 months)					
% HbA _{1c}	8.33 (1.21)	73 (70%)	8.80 (1.55)	71 (70%)	0.057
mmol/mol	68 (13.2)		73 (16.9)		



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for the JDRF Canadian Clinical Trial
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Table 4—Questionnaires' scores over study duration

	Intervention group (n = 104)	Control group (n = 101)	Between-group difference in change from enrollment	P value
CSQ (total score)				
Enrollment	[101] 29.1 (2.8)	[99] 29.3 (2.9)		
Intervention	[71] 29.0 (2.7)	[52] 27.9 (2.4)	−1.17 (−2.24, −0.10)	0.032*
Follow-up	[71] 28.6 (3.0)	[67] 27.9 (4.6)	−1.21 (−2.49, 0.07)	0.064
DDS				
Total score				
Enrollment	[99] 2.00 (0.79)	[95] 2.01 (0.86)		
Intervention	[68] 2.95 (0.76)	[55] 2.18 (0.83)	0.26 (0.00, 0.51)	0.049*
Follow-up	[66] 2.16 (0.90)	[65] 2.22 (0.94)	0.06 (−0.20, 0.32)	0.642
Emotional burden of diabetes				
Enrollment	[101] 2.43 (1.11)	[101] 2.44 (1.27)		
Intervention	[70] 2.32 (1.06)	[59] 2.68 (1.17)	0.36 (0.04, 0.69)	0.027*
Follow-up	[70] 2.57 (1.21)	[67] 2.64 (1.26)	0.05 (−0.28, 0.39)	0.756

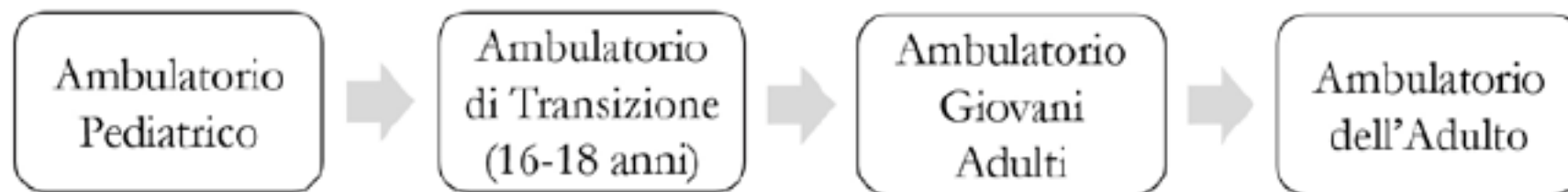
CSQ: client satisfaction questionnaire

DDS: diabetes distress scale

Transition experience at Diabetes Clinic AOU Federico II

We adopted the method of joint clinic with pediatric and adult providers working together:

1. the adult provider participates in the last visit(s) of the young patient in Pediatrics and welcomes him in the adult's diabetes clinic together with the pediatric diabetologist
2. The diabetologist of the adult diabetes clinic acts as a **transition coordinator**, facilitating the access and contacts with the new care setting



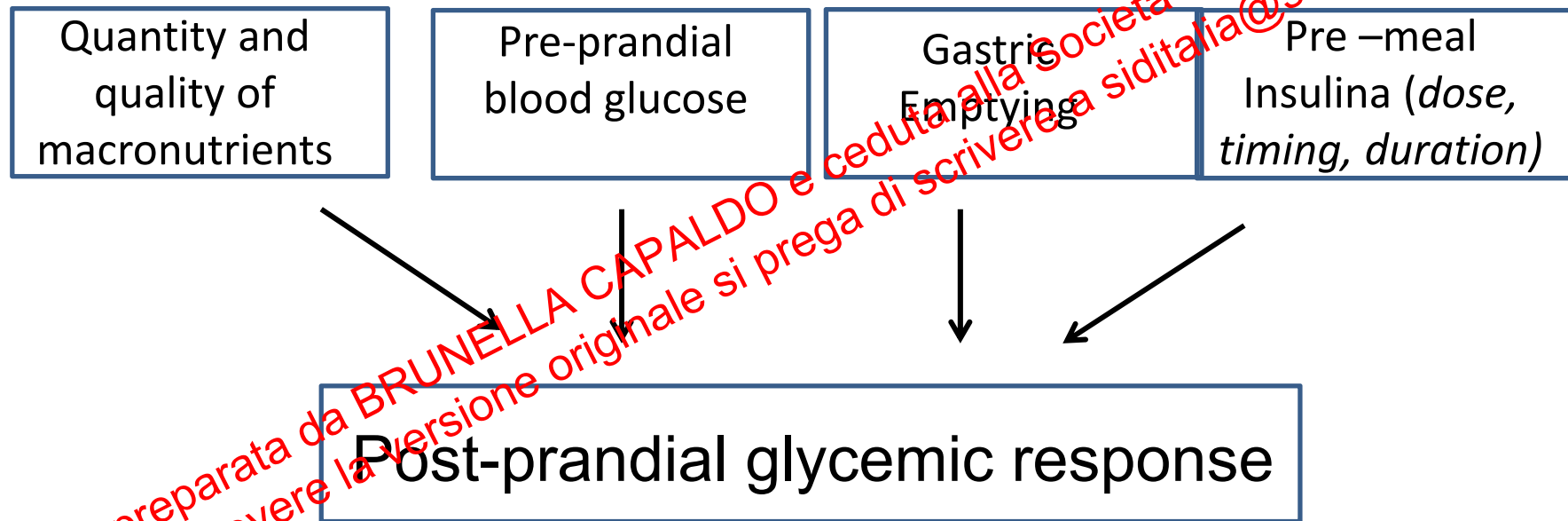
Transition experience at Diabetes Clinic AOU Federico II

Objectives

1. **Improve young patients' ability to manage insulin therapy to optimize glycemic control, especially in the postprandial period**
2. **Reinforce the awareness of young patients on the importance of glycemic control as a tool for the prevention of chronic complications and CVD risk**

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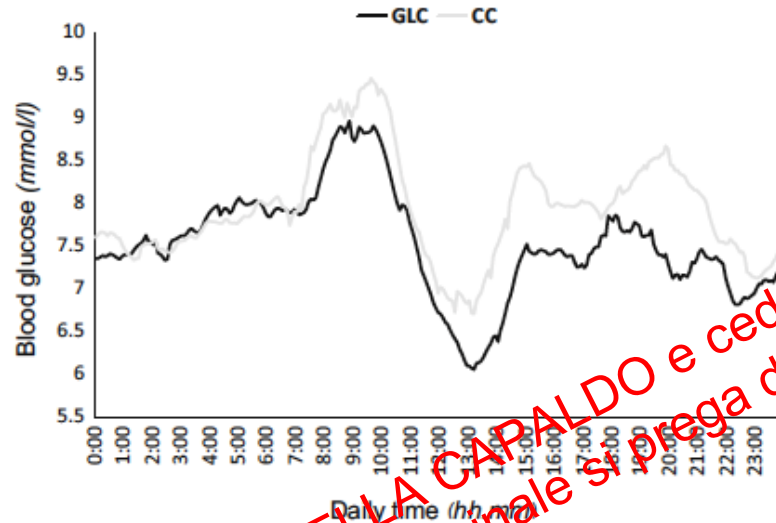
Factors influencing post-prandial glycemic response



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Glycaemic load versus carbohydrate counting for insulin bolus calculation in patients with type 1 diabetes on insulin pump

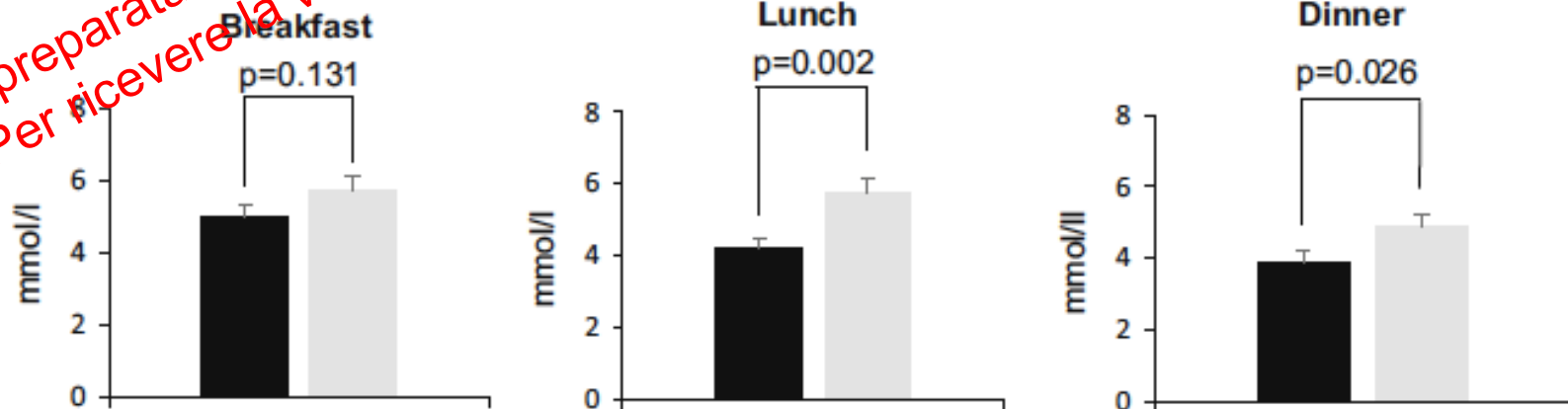
L. Bozzetto · M. Giorgini · A. Alderisio ·
L. Costagliola · A. Giacco · G. Riccardi ·
A. A. Rivellese · G. Annuzzi



CGM during
GL counting
or
CHO counting

(b)

Maximal amplitude of postprandial blood glucose excursion



Original article

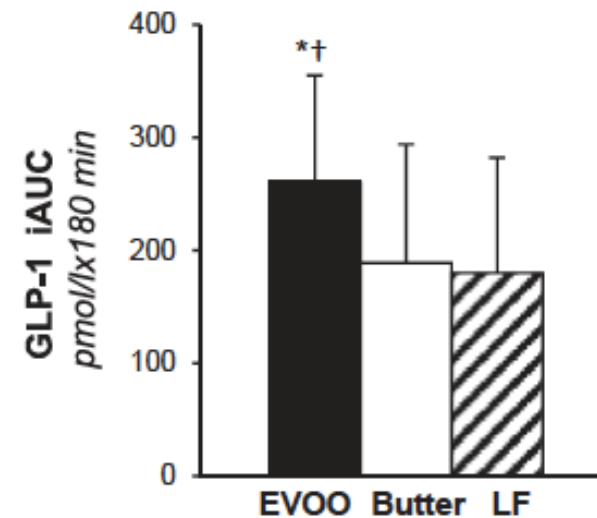
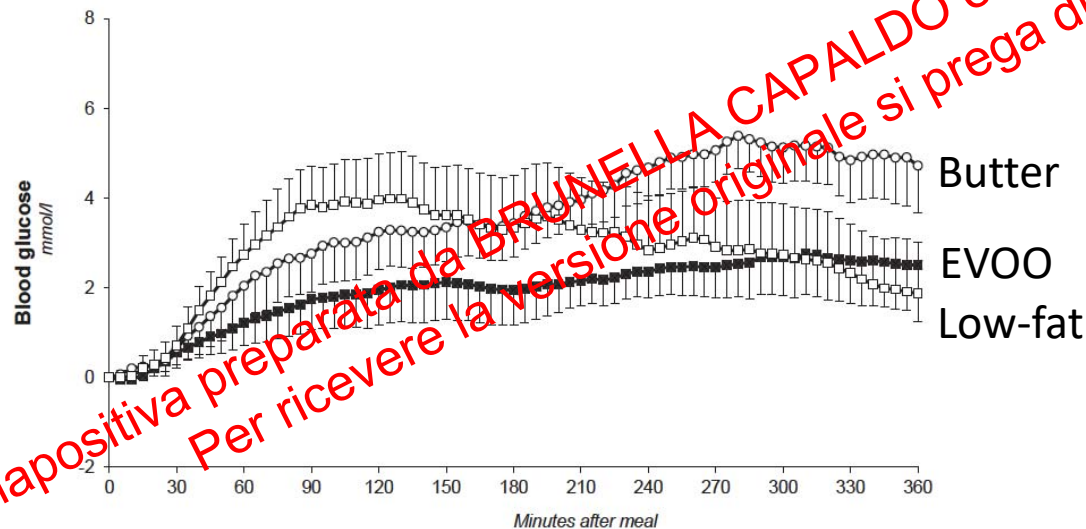
Gastrointestinal effects of extra-virgin olive oil associated with lower postprandial glycemia in type 1 diabetes

Lutgarda Bozzetto ^a, Antonio Alderisio ^a, Gennaro Clemente ^b, Marisa Giorgini ^a,
Francesca Barone ^a, Ettore Griffo ^a, Giuseppina Costabile ^a, Claudia Vetrani ^a,
Paola Cipriano ^a, Angela Giacco ^a, Gabriele Riccardi ^a, Angela Albarosa Rivellese ^a,
Giovanni Annuzzi ^{a,*}

High fat EVOO 37 g

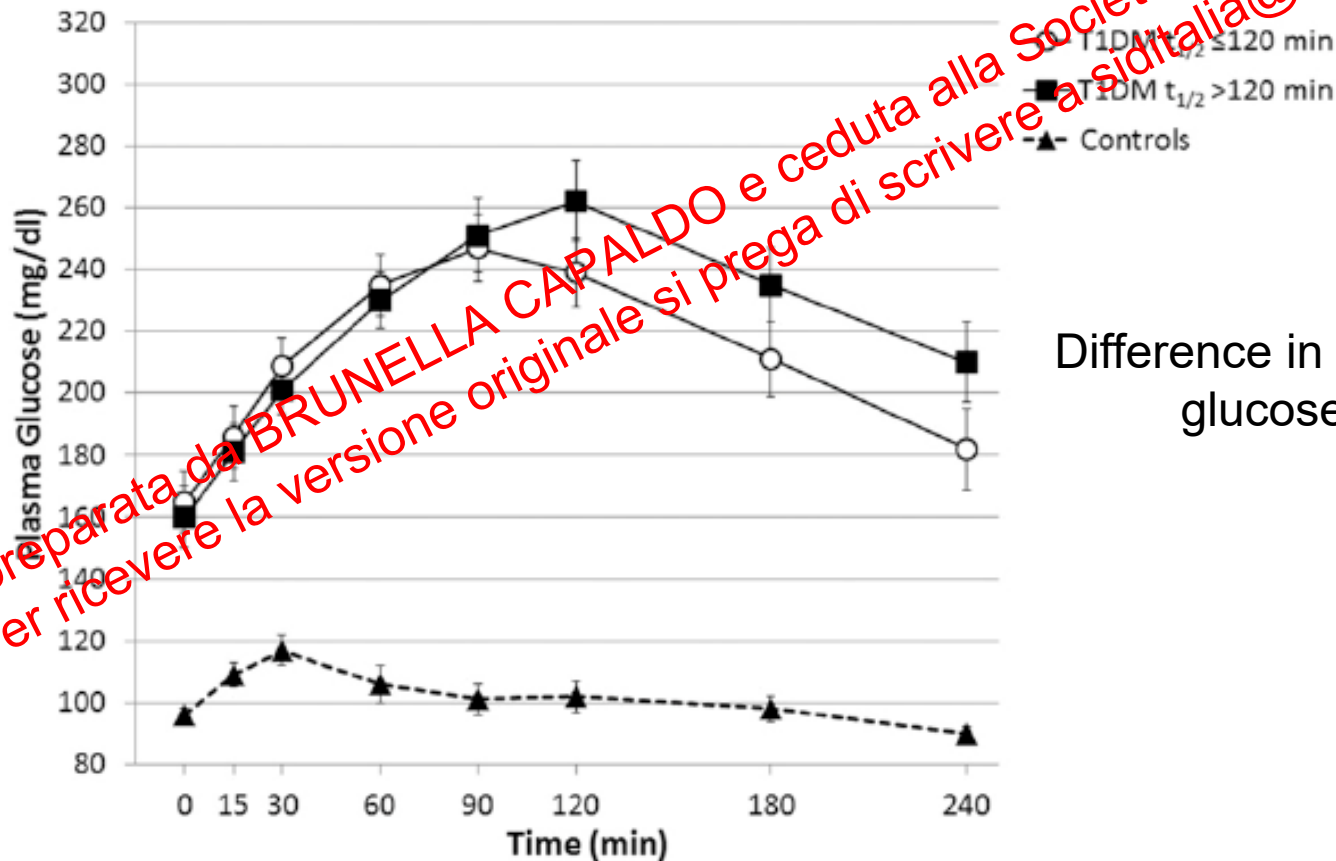
High fat butter 43

Low fat 10 g



Gastric Emptying Impacts the Timing of Meal Glucose Peak in Subjects With Uncomplicated Type 1 Diabetes

Roberta Lupoli,¹ Annalisa Creanza,² Ettore Griffo,² Gerardo Nardone,² Alba Rocco,² Lutgarda Bozzetto,² Giovanni Annuzzi,² Gabriele Riccardi,² and Brunella Capaldo²



Difference in Time to- peak-glucose: 27 min

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*Corso di educazione alimentare e
addestramento all'utilizzo del
Carico Glicemico per ottimizzare
la terapia insulinica
e migliorare il controllo della
glicemia*

Two group education
classes for a total of 5 h

1° meeting

Macronutrients. CHO classification. Acquire skills to recognize low/medium/high glycemic index food. Glycemic load. Dietary fibers.

2° meeting

Estimate visually and with the use of home measurements the weight of food and the amount of CHO. Calculation of pre-meal insulin bolus.

Transition experience at Diabetes Clinic AOU Federico II

Objectives

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Association of Type 1 Diabetes vs Type 2 Diabetes Diagnosed During Childhood and Adolescence With Complications During Teenage Years and Young Adulthood

Dabalea 2017

Table 2. Characteristics of Study Participants With Type 1 and Type 2 Diabetes (N = 2018)

Characteristic	Type 1 (n = 1746)	Type 2 (n = 272)	P Value ^a
Current age, mean (SD), y	17.9 (4.1)	22.1 (3.5)	<.001
Age at diagnosis, mean (SD), y	10.0 (3.9)	14.2 (2.6)	<.001
Male sex, No. (%)	879 (50.3)	91 (33.5)	<.001
Race/ethnicity, No. (%)			
Non-Hispanic white	1327 (76.0)	72 (26.5)	
Non-Hispanic black	136 (7.8)	116 (42.6)	
Hispanic	211 (12.1)	24 (20.6)	<.001
American Indian	5 (0.3)	19 (7.0)	
Other, including multiple	67 (3.8)	4 (3.3)	
No. of visits, mean (SD)	2.2 (1.2)	3.0 (1.1)	.01
Diabetes duration at outcome visit, mean (SD), y	7.9 (1.9)	7.9 (2.0)	.66
HbA _{1c}			
Current, mean (SD), %	9.2 (1.8)	9.1 (3.0)	.82

Complication	Age-Adjusted Prevalence, %		Absolute Difference, % (95% CI)	P Value	Adjusted Odds Ratio (95% CI)	P Value
	Type 2 Diabetes	Type 1 Diabetes				
Diabetic kidney disease	19.9	5.8	14.0 (9.1 to 19.9)	<.001	2.58 (1.39-4.81)	.003
Retinopathy	9.1	5.6	3.5 (0.4 to 7.7)	.02	2.24 (1.11-4.50)	.02
Peripheral neuropathy	17.7	8.5	9.2 (4.8 to 14.4)	<.001	2.52 (1.43-4.43)	.001
Cardiovascular autonomic neuropathy	15.7	14.4	1.2 (-3.1 to 6.5)	.62	0.98 (0.57-1.67)	.93
Arterial stiffness	47.4	11.6	35.9 (29.0 to 42.9)	<.001	1.07 (0.63-1.84)	.80
Hypertension	21.6	10.1	11.5 (6.8 to 16.9)	<.001	0.85 (0.50-1.45)	.55

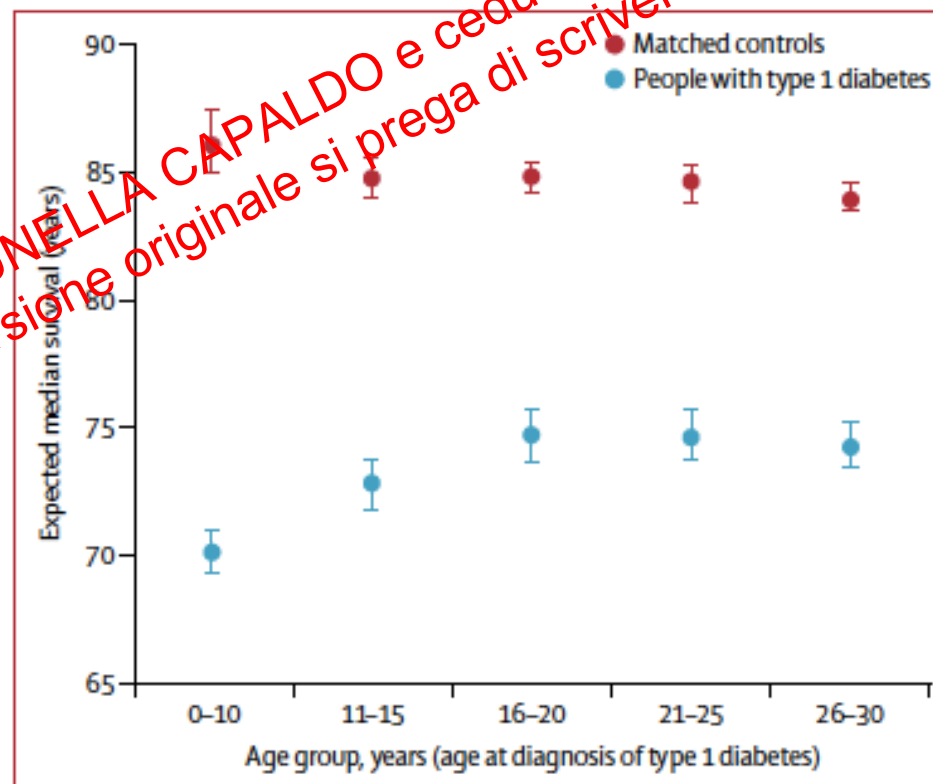
Excess mortality and cardiovascular disease in young adults
with type 1 diabetes in relation to age at onset: a nationwide,
register-based cohort study

Rawashani, Lancet 2018

27195 T1D and 135178 matched controls

Life-years lost in relation to age at onset of type 1 diabetes

Early onset T1D (before
10 y of age) resulted in
a loss of 17.7 life-years
for women and 14.2 for
men.



Cardiovascular risk factors and microvascular complications in young adults (age < 35 y) with T1D

	Total n=321	Females n=157	Males n=164	P
Age (years)	26.6±4.0	26.5±3.8	26.7±4.2	0.657
T1D duration (years)	14.3±7.2	14.4±6.9	14.1±7.4	0.670
Early onset T1D (1-10 y of age) (%)	141 (44%)	76 (48%)	65 (40%)	0.117
Waist circumference (cm)	83 ±11	80±10	86±10	0,000
BMI (kg/m ²)	24.6±3.5	24.3±3.7	24.8±3.2	0,183
BMI 25-30 (kg/m ²)	108 (34%)	45 (27%)	65 (39%)	0.073
BMI>30 (kg/m ²)	20 (6%)	11 (7%)	9 (5%)	0.073
HbA1c (%)	7.8±1.3	7.8±1.3	7.9±1.3	0.903
HbA1c>7% (%)	233 (73%)	114 (73%)	119 (73%)	0.995
SBP (mmHg)	118±14	114 ±15	121±13	0.000
DBP (mmHg)	74±10	72±10	76±9	0.002
Total cholesterol (mg/dl)	172±34	175±35	169±32	0.101
LDL- cholesterol (mg/dl)	96±28	97±28	96±27	0.766
HDL- cholesterol (mg/dl)	61±15	66±15	57±14	0.000
Triglycerides (mg/dl)	75±48	77±33	82±57	0.005
Microvascular complications (%)	41 (13%)	22 (13%)	19 (12%)	0.725
Smokers (%)	105 (33 %)	45 (29%)	60 (37%)	0.130
Hypertension (%)	31 (10%)	10 (6 %)	21 (13%)	0.051
Hypercholesterolemia (%)	129 (40%)	63 (40%)	66 (40%)	0.983

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Classification of CV risk according to ESC 2019

Very high risk	Patients with DM and established CVD or other target organ damage ^b or three or more major risk factors ^c or early onset T1DM of long duration (>20 years)
High risk	Patients with DM duration ≥ 10 years without target organ damage plus any other additional risk factor
Moderate risk	Young patients (T1DM aged <35 years or T2DM aged <50 years) with DM duration <10 years, without other risk factors

© ESC 2019

CVD risk classification of our T1D cohort	n (%)
Very high risk	94 (29.3)
High risk	202 (62.9%)
Moderate risk	25 (7.8%)

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Take home messages

Transition is **not a mere transfer** from pediatric to adult care services but a **process** that aims to enable young patients with T1D to self-manage their condition. A structured transition program can support young adults and help them maintain regular contact with their health care providers.

Transition represents “a window of opportunity” for young patients to achieve greater independence and improve self-management skills.

Particular attention should be paid to young patients with early-onset T1D in whom a regular assessment of CV risk factors is recommended.

Grazie per l'attenzione

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