



Primary and Secondary Prevention: Pediatric Type 2 Diabetes

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Faculty/Presenter Disclosure

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Learning Objectives

By the end of this presentation, the audience members will be able to:

1. Describe primary prevention strategies for pediatric type 2 diabetes.
2. Support and advocate for primary prevention strategies in their communities.
3. Describe secondary prevention strategies for pediatric type 2 diabetes and ways to incorporate these strategies in their communities.



Pediatric Type 2 Diabetes in Saskatchewan

Regions	Population estimate*	Incidence rates (per 100,000 children per year)			Total and participating family physicians, pediatricians, and adult endocrinologists					
		T2D	M1D	M2D	FP	P	Peds	P	TS	P
Canada	7,398,935	1.94	0.4	0.2	31,127	98	2,835	2,567	368	49
Alberta	775,175	0.7	0.15	0.2	3,176	8	353	288	29	4
British Columbia	846,140	1.2	0.2	0.25	4,525	6	304	264	31	5
Manitoba	276,923	12.45	0.9	0.55	1,060	9	130	123	6	3
Ontario	2,720,310	1.7	0.8	0.2	10,556	50	1,131	888	147	17
Quebec	1,549,215	0.55	0.2	0.3	8,147	5	664	662	136	12
Atlantic Provinces†	1,149,045	0.7	0.1	0.05	3,321	10	188	166	16	8
Saskatchewan	233,800	0.4	0	0	948	10	53	31	3	0
Territories‡	31,235	0	0	0	94	0	3	3	0	0

SK: 1 new case of T2DM per year, age > 18, Apr 2006-March 2008

MB: 34 new cases per year, based on this data from 2006-2008

Amed et al, Diabetes Care, 2010



Why Pediatric Type 2 Diabetes Matters?

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	15.7	14.4	1.2 (-1.1 to 6.3)	.62	0.98 (0.57-1.67)	.93
Autonomic neuropathy	47.4	11.6	35.9 (29.0 to 42.9)	<.001	1.07 (0.63-1.84)	.80
Arterial stiffness	21.6	10.1	11.5 (6.8 to 16.9)	<.001	0.85 (0.50-1.45)	.55

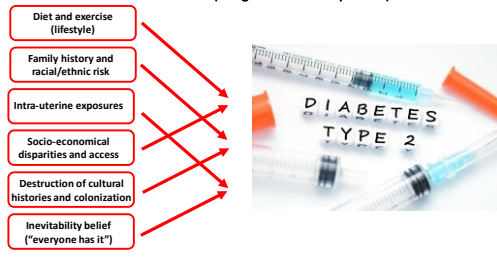
Rates 2-4X higher: kidney disease, eye disease, nerve damage, and poorer cardiovascular health – The gap is widening

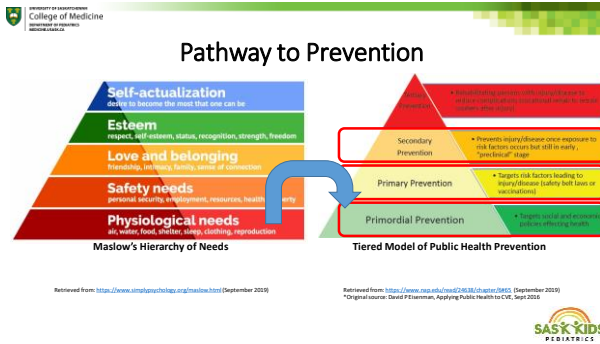
Mean duration of diabetes: 7.9 years Average age: 17.9 years

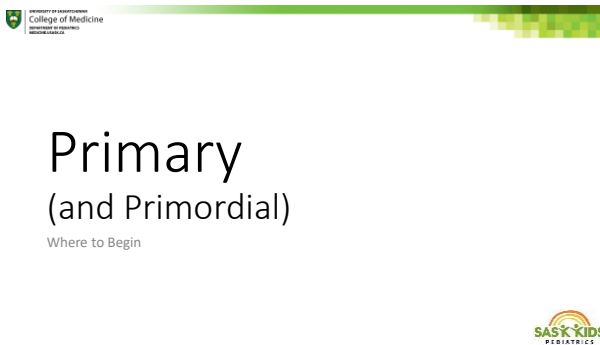
Dubalies et al, JAMA, 2017.

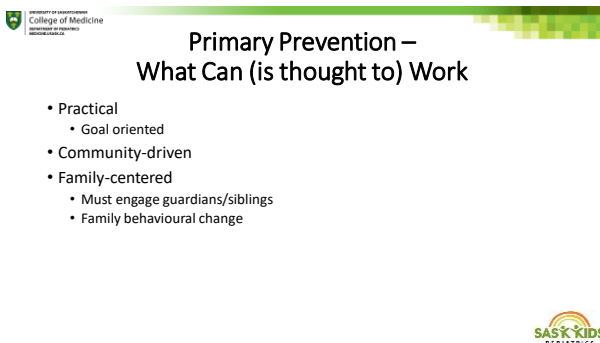


Pediatric Type 2 – What's to Blame (to figure out how to prevent)









PRIMORDIAL & PRIMARY

What to Address

- Type 2 Diabetes Education
 - Expectation setting
 - Addressing misconceptions
 - Recognition of limitations
- Pre-conception and pre-natal care
 - Reducing maternal GDM burden
 - Improving maternal T2DM pre-conception care
- Lifestyle Factors
 - Diet
 - Exercise
 - Mental health
 - Sleep
- Socioeconomical, political, and cultural influences



Prevention...and What You Can Do

In Practicality

how you can help



Pediatric Type 2 – Prevention Strategies

- Reducing maternal burden of T2DM/GDM +
- Encouraging breastfeeding +/-
- Reducing obesity risk/reducing obesity ?
- Improved sleep +
- Increase exercise and reduced sedentary activity +
- Reducing sugar sweetened beverage intake +
- Optimize family meal time ?
- Mental health supports (screen for depression and disordered eating)
- Engaging schools, communities, and other 'influencers'

EVIDENCE
 + = MILD
 ++ = MODERATE
 +++ = SIGNIFICANT



Secondary (and Screening)

How to Identify and How to Stop the Train Moving Down the Tracks



When to Consider Diabetes: Screening and Diagnosis



Screening – When and Who?

1. Risk factor accumulation
 - Age "8" with 3+ risk factors
 - Post-pubertal (i.e. age 12-13) with 2+ risk factors
2. PCOS
3. IFG (6.1-6.9)/IGT (7.8-11) → A1C 6-6.4% are high risk
4. Use of atypical antipsychotic medications

Screen every 2 years

***More often if symptomatic or pre-diabetes**



Screening – When and Who?

Risk Factor	Details
Obesity	BMI > 95 th percentile (age/gender)
High risk ethnic group	Indigenous, African American, South Asian, Hispanic, Asian, Arab
First Degree Relative/Exposure	Parent or sibling with type 2 diabetes; diabetes exposure in utero
Signs/Symptoms of insulin resistance	Acanthosis, hypertension, dyslipidemia, NAFLD

Age 8: 3 risk factors
 Age 12 (post-pubertal): 2 risk factors

2018 Diabetes Canada CPG – Chapter 35. Type 2 Diabetes in Children & Adolescents



Screening – How?

1st Line

- Fasting BG (≥ 7 mmol/L) and HbA1C ($\geq 6.0\%$) *Screening, asymptomatic
- Fasting BG only (confirm by 2 fasting ≥ 7)
- Random ≥ 11.1 with signs & symptoms *Symptomatic (+ A1C to stratify)

2nd Line

- OGTT (1.75g/kg up to 75g) \rightarrow 2hr BG > 11.0 mmol/L

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Secondary Prevention (Pre-Clinical to Early Clinical Stage)

- Cornerstone strategies
 - Dietary changes
 - Exercise prescriptions
 - Sedentary time
- Family engagement
- Early monitoring and treatment
 - Blood glucose testing
 - Complication screening
 - Metformin
- Referral to health care provider(s)





What's to Come – in Saskatchewan

- Improved coordination and delivery of care
- Assessment of current state of pediatric type 2 diabetes in SK
 - Joint LiveWell Pediatrics Diabetes/Sask Prevention Institute initiative
- Resource development and care algorithm(s)
- Roles for:
 - Education
 - Advocacy





Thank You for Your Attention and Participation

LiveWell Pediatric Diabetes Clinic

Tel: 306-655-2199

Fax: 306-655-6758

Urgent Referral: 306-655-1000 (RUH Switchboard)

Dr. Mark Inman

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SHA Pediatric Diabetes Website:

<https://saskhealthauthority.libguides.com/diabetespediatric>





Type 2 Specific Resources

- "Type 2 Diabetes – Your Guide to Getting Started"
- "Beyond the Basics"
 
- Exercise Guidelines: <http://csepguidelines.ca/children-and-youth-5-17/#resources>
- Saskatchewan Health Authority website: <https://saskhealthauthority.libguides.com/diabetespediatric>

What do you use?