DIABETES CANADA

2018 Clinical Practice Guidelines

Retinopathy

Chapter 30

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Disclaimer

2018

Key Changes

- New information on
  - The effectiveness of local intraocular pharmacological therapies in improving vision and reducing the level of diabetic retinopathy

Retinopathy Checklist

- ✓**SCREEN** regularly
- ✓**DELAY** onset and progression with glycemic and BP control ± fibrate
- ✓**TREAT** established disease with laser photocoagulation, intra-ocular injection of medications or vitreoretinal surgery

BP, blood pressure

Diabetic Retinopathy Most Common Cause of Blindness Among Working Age

Category	Proliferative Retinopathy	Macular Edema
Type 1 DM	23%	11%
Type 2 DM on insulin	14%	15%
Type 2 DM on non-insulin antihyperglycemic agents	3%	4%

Klein R, *et al*. Diabetes Care 1992;15(12):1875-91
Klein R, *et al*. Ophthalmology 1984;91(12):1464-74

Retinopathy Increases Morbidity and Mortality

- Visual loss is associated with:
  - Increased falls
  - More hip fractures
  - 4-fold increase in mortality
  - Early death (in type 1 diabetes)

Forms of Retinopathy

1. Macular Edema

2. Non-proliferative and Proliferative

3. Retinal Capillary Closure

Macular Edema

- Diffuse or focal vascular leakage at the macula

Non-proliferative/Proliferative Retinopathy

- Blood vessel changes

- Non-proliferative
  - Microaneurysms, intraretinal hemorrhage, vascular tortuosity and vascular malformation

- Proliferative
  - Abnormal vessel growth

Retinal Capillary Closure

- Seen with fluorescein angiography
- Potentially blinding complication
- Currently no treatment options

Screening for Retinopathy

When to initiate screening

- Type 1 diabetes: 5 years after diagnosis in all individuals ≥15 years
- Type 2 diabetes: children, adolescents and adults at diagnosis

Screening methods

- 7-standard field, stereoscopic-colour fundus photography with interpretation by a trained reader (gold standard)
- Direct ophthalmoscopy or indirect slit-lamp fundoscopy through dilated pupil
- Digital fundus photography

Retinopathy (cont'd)

If retinopathy is present

- Diagnose retinopathy severity and establish appropriate monitoring intervals (1 year or less)
- Treat sight-threatening retinopathy with laser, pharmacological or surgical therapy
- Review glycemic, BP and lipid control, and adjust therapy to reach targets as per guidelines*
- Screen for other diabetes complications

If retinopathy is not present

- Type 1 diabetes: rescreen annually
- Type 2 diabetes: rescreen every 1 to 2 years
- Review glycemic, BP and lipid control, and adjust therapy to reach targets as per guidelines*
- Screen for other diabetes complications

Risk Factors for Progression

- Longer duration of diabetes
- Elevated A1C
- Hypertension
- Dyslipidemia
- Low hemoglobin level
- Pregnancy (with type 1 diabetes)
- Proteinuria
- Severe retinopathy itself

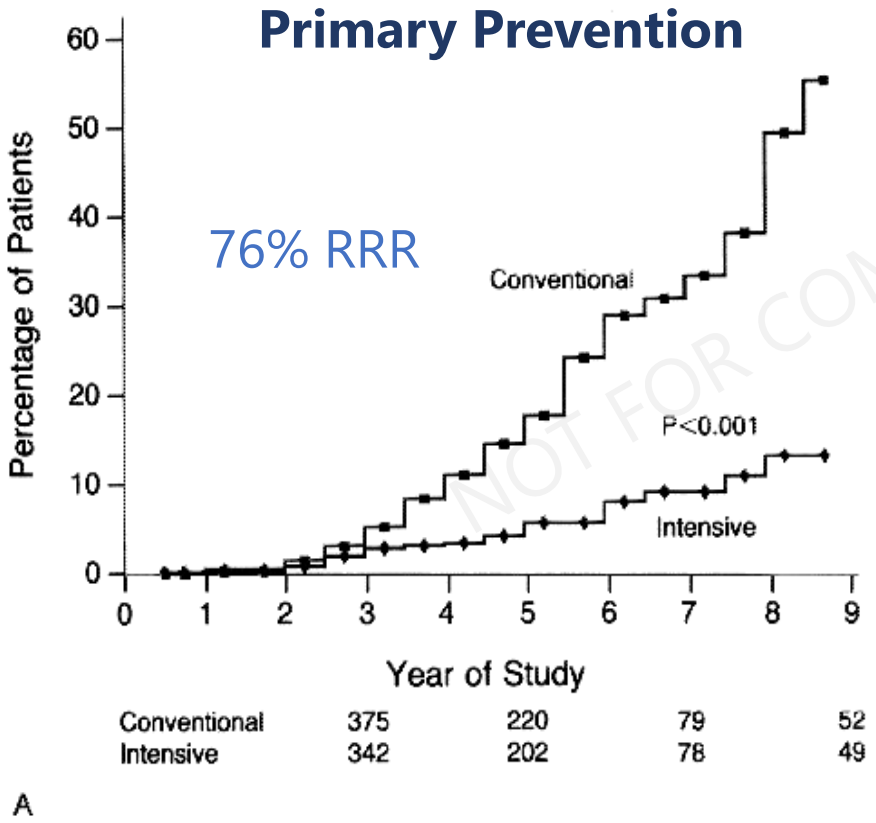
Delay of the Disease

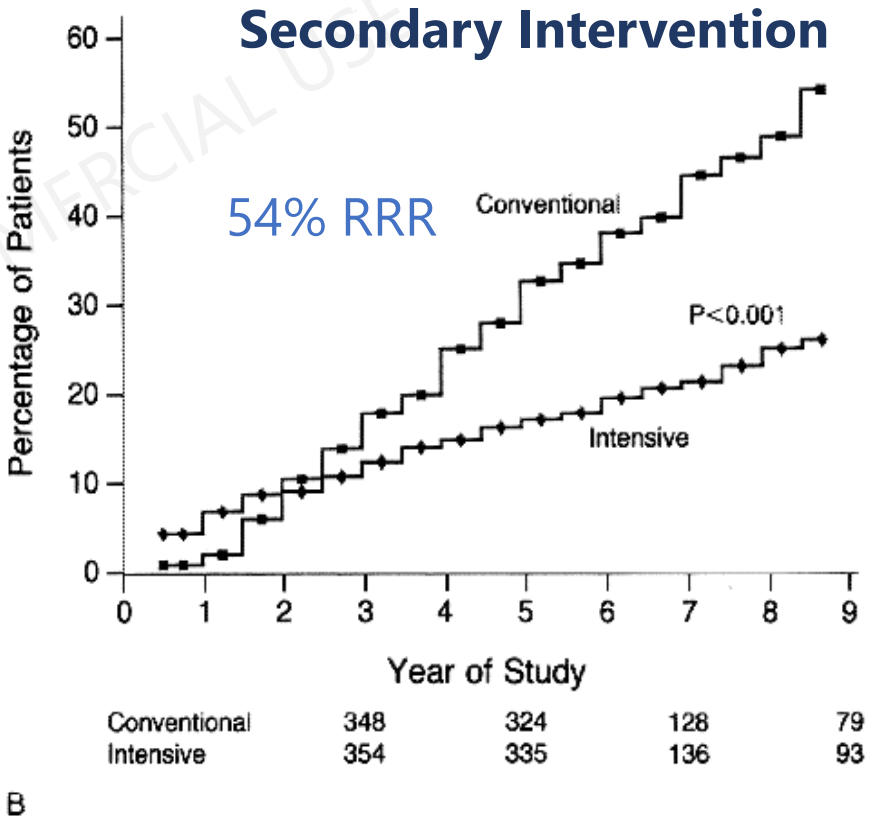
1. **Glycemic** control: target A1C ≤7%

2. **Blood pressure** control: target BP <130/80

3. **Lipid-lowering** therapy: Fibrates have been shown to decrease progression and may be considered

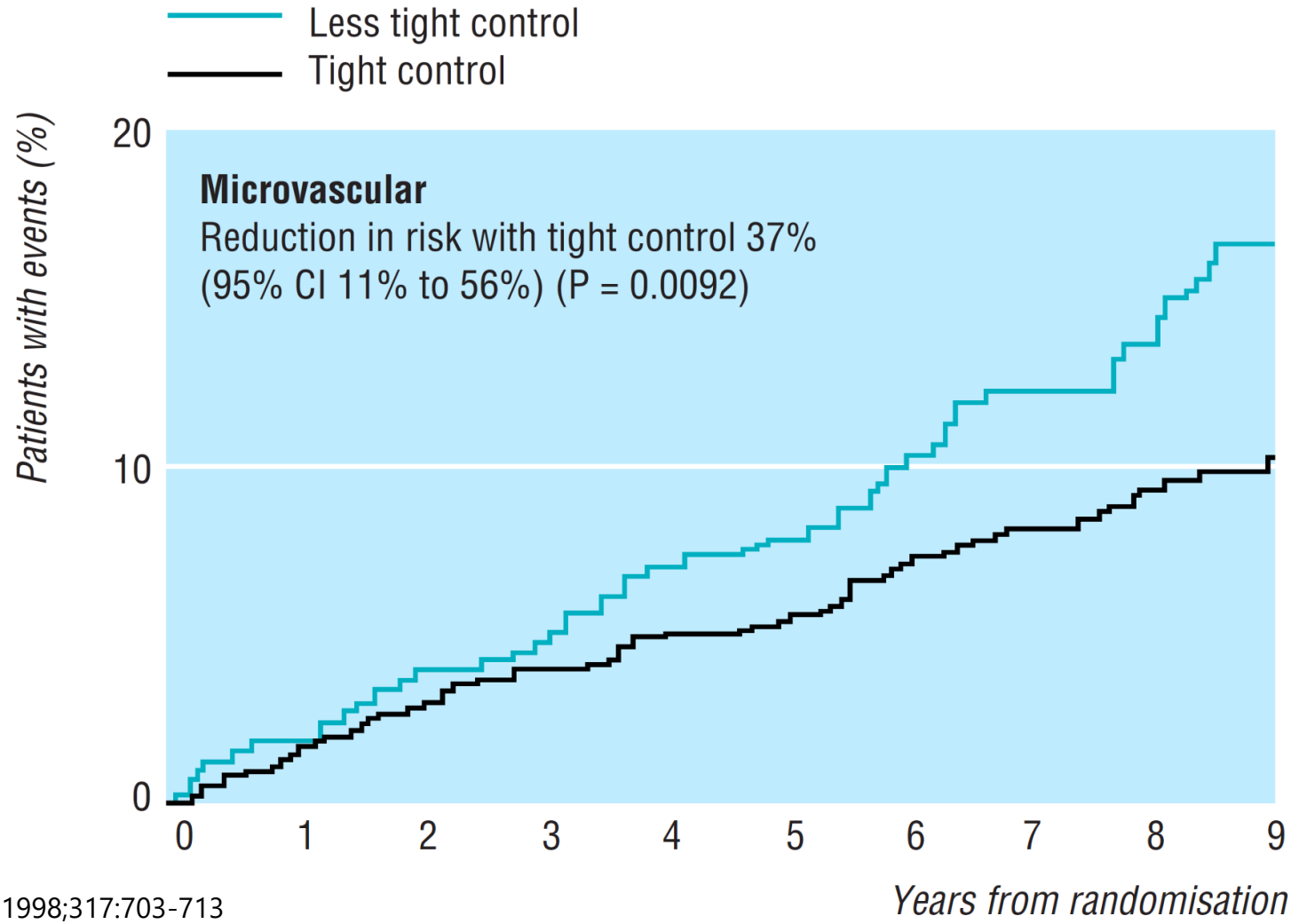
DCCT: Reduction in Retinopathy with Intensive Glycemic Control





The Diabetes Control and Complications Trial Research Group. N Engl J Med 1993;329:977-986.

UKPDS38: Reduction in Microvascular Complications with Blood Pressure Control

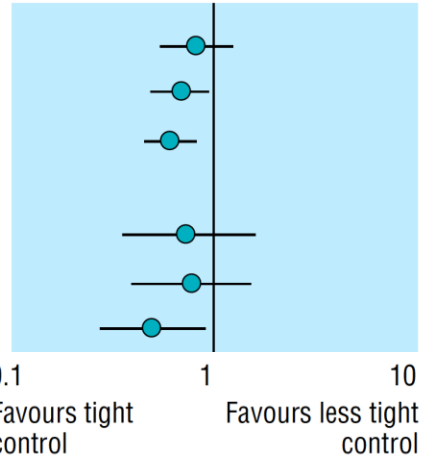


UKPDS. BMJ 1998;317:703-713

UKPDS38: Reduction in Retinopathy with Blood Pressure Control

Surrogate end point	No of patients: Tight control	No of patients: Less tight control	No of patients with progression: Tight control	No of patients with progression: Less tight control	% of patients with progression: Tight control	% of patients with progression: Less tight control	P value	Relative risk for tight control (99% CI)
Progression of retinopathy by ≥2 steps								
Median 1.5 years	461	243	93	56	20.2	23.1	0.38	0.88 (0.60 to 1.29)
Median 4.5 years	411	207	113	76	27.5	36.7	0.019	0.75 (0.55 to 1.02)
Median 7.5 years	300	152	102	78	34.0	51.3	0.0038	0.66 (0.50 to 0.89)
Deterioration in vision by ≥3 ETDRS lines								
Median 1.5 years	575	293	31	20	5.4	6.8	0.39	0.79 (0.39 to 1.62)
Median 4.5 years	523	257	39	23	7.5	8.9	0.47	0.83 (0.44 to 1.59)
Median 7.5 years	332	180	34	35	10.2	19.4	0.0036	0.53 (0.30 to 0.93)

ETDRS = early treatment of diabetic retinopathy study



UKPDS. BMJ 1998;317:703-713

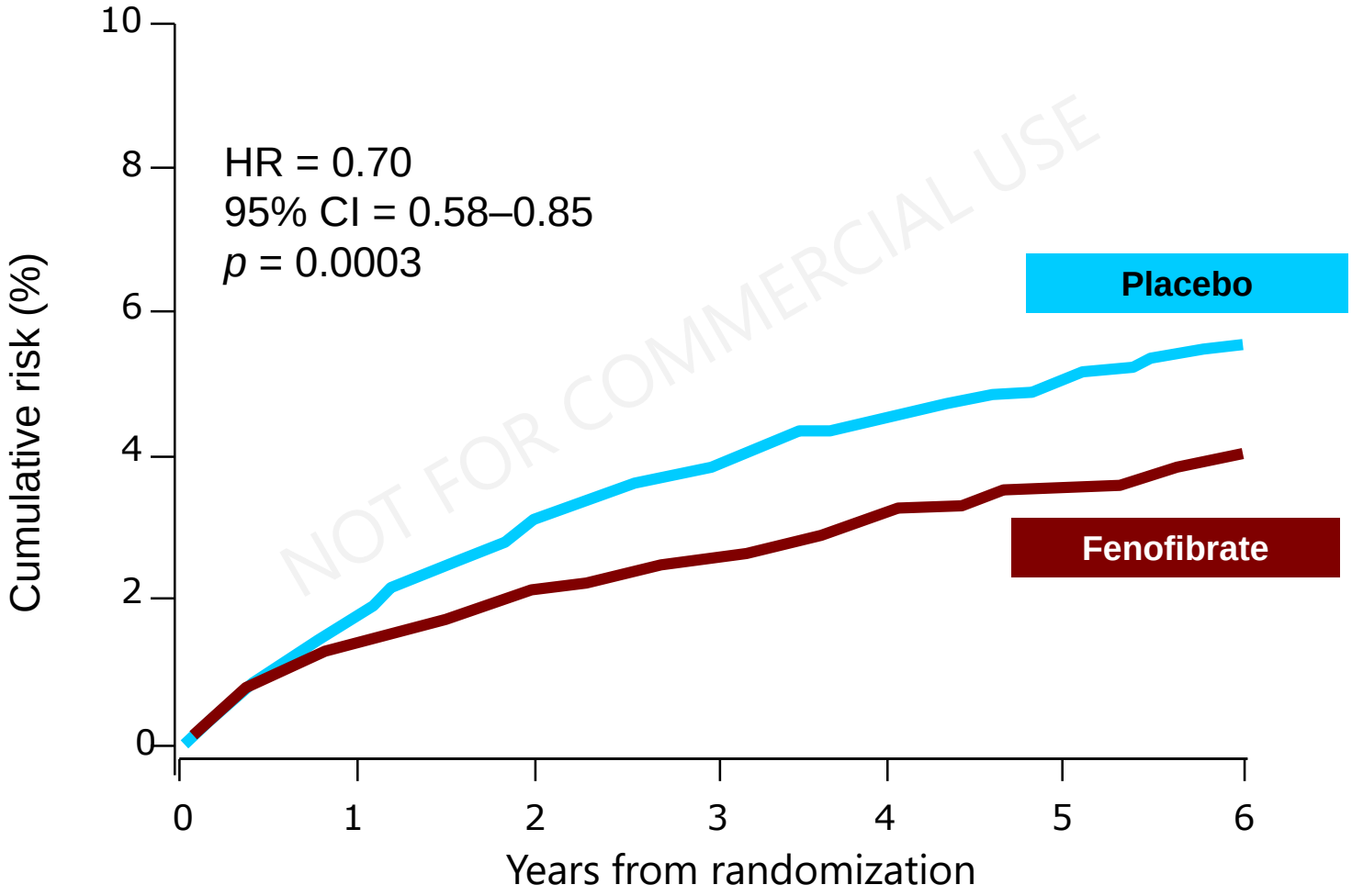
ACCORD Eye: Glycemic control and Combo of fenofibrate and simvastatin reduced progression

Effect	Odds Ratio	95% CI	P-value
Glycemia	0.67	(0.51 - 0.87)	0.0025
Lipid	0.60	(0.42 - 0.86)	0.0056
BP	1.23	(0.84 - 1.79)	0.29

Intensive glycemic control and **combination of fenofibrate and simvastatin**, but not intensive blood pressure control, reduced the rate of progression of diabetic retinopathy in this older, high-risk population.

ACCORD Study Group. *N Engl J Med* 2010; 363(3):233-244.

FIELD: Fenofibrate reduced retinopathy requiring laser



FIELD Study Investigators. Lancet 2005 ; 366 (9500): 1849-61

Diabetic Retinopathy CAN be Treated

1. Pan-retinal photocoagulation → laser therapy
   - Reduces blindness by 90% in severe non-proliferative or proliferative retinopathy
2. Local (intra-ocular) pharmacologic intervention → VEGF antagonists
   - Aflibercept, ranibizumab, bevacizumab (off-label use in Canada) improve vision
3. Surgical intervention → vitrectomy

Sight-threatening Retinopathy MUST be

✓**Prevented** with good blood glucose and blood pressure control (± fenofibrate)

✓**Detected** through screening

✓**Treated** with laser therapy, anti-VEGF medications or vitrectomy

to save VISION

Recommendation 1

1. In individuals **>15 years of age** with **type 1 diabetes**, screening and evaluation for retinopathy should be performed **annually** by an experienced vision care professional (optometrist or ophthalmologist) **starting 5 years after the onset** of diabetes [Grade A, Level 1] (for screening recommendation for children and adolescents <15 years with type 1 diabetes see Type 1 Diabetes in Children and Adolescents chapter; for screening recommendations for pregnant women, see Diabetes and Pregnancy chapter)

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Recommendation 2

2. In individuals with **type 2 diabetes**, screening and evaluation for diabetic retinopathy should be performed by an experienced vision care professional (optometrist or ophthalmologist) at the **time of diagnosis** of diabetes [Grade A, Level 1]. The interval for follow-up assessments should be tailored to the severity of the retinopathy [Grade D, Consensus]. In those with **no or minimal retinopathy**, the recommended interval is **1-2 years** [Grade A, Level 1] (for screening recommendations for children and adolescents with type 2 diabetes see Type 2 Diabetes in Children and Adolescents chapter)

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Recommendation 3

3. Screening for diabetic retinopathy should be performed by an **experienced vision care professional** (optometrist or ophthalmologist), either in person or through interpretation of retinal photographs taken through dilated pupils [Grade A, Level 1] or undilated pupils with high-resolution ultra-wide field imaging [Grade D, Consensus]

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Recommendation 4

4. Results of eye examinations and the follow-up interval and plan should be **clearly communicated** to all members of the diabetes health-care team to promote optimal care [Grade D, Consensus]

Recommendation 5

5. To prevent the onset and delay the progression of diabetic retinopathy, people with diabetes should be treated to achieve **optimal control of BG** [Grade A, Level 1A for type 1 diabetes; Grade A, Level 1A for type 2 diabetes] and **BP** [Grade A, Level 1A for type 2 diabetes; Grade D, Consensus for type 1 diabetes]

BG, blood glucose; *BP,* blood pressure

Recommendation 6

6. Though not recommended for CVD prevention or treatment, **fenofibrate**, in **addition to statin** therapy, may be used in people with **type 2 diabetes** to **slow the progression** of established retinopathy [Grade A, Level 1A]

CVD, cardiovascular disease

Recommendation 7

7. Individuals with **sight-threatening diabetic retinopathy** should be assessed by a qualified **ophthalmologist** and/or **retina specialist** [Grade D, Consensus]. **Pharmacological** intervention [Grade A, Level 1A], **laser** therapy and/or **vitrectomy** [Grade A, Level 1A] may be used to manage the diabetic retinopathy

Recommendation 8

8. **Visually disabled** people should be referred for **low-vision evaluation and rehabilitation** [Grade D, Consensus]

Key Messages

- **Regular screening** is important for early detection of treatable diabetic retinopathy. Screening intervals for diabetic retinopathy vary according to the individual's age and type of diabetes
- **Optimal glycemic control** reduces the onset and progression of sight-threatening diabetic retinopathy
- **Local intraocular pharmacological therapies** have the potential to improve vision and reduce the level of retinopathy

Key Messages for People with Diabetes

- Diabetic retinopathy involves changes to retinal blood vessels that can cause them to bleed or leak fluid, distorting vision
- With good glycemic control, regular eye exams and early treatment, the risk of vision loss is reduced
- Diabetic retinopathy often goes unnoticed until vision loss occurs, therefore people with diabetes should get a comprehensive dilated eye exam regularly. Discuss the recommended frequency with your diabetes healthcare team and experienced vision care professionals (optometrists or ophthalmologists)
- Diabetic retinopathy can be treated with several therapies used alone or in combination

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News & Highlights

The Canadian Diabetes Association has changed it's name to Diabetes Canada!
Find out more

November 2016 Interim Update to the Guidelines
Updated recommendations to the Pharmacologic Management of Type 2 Diabetes

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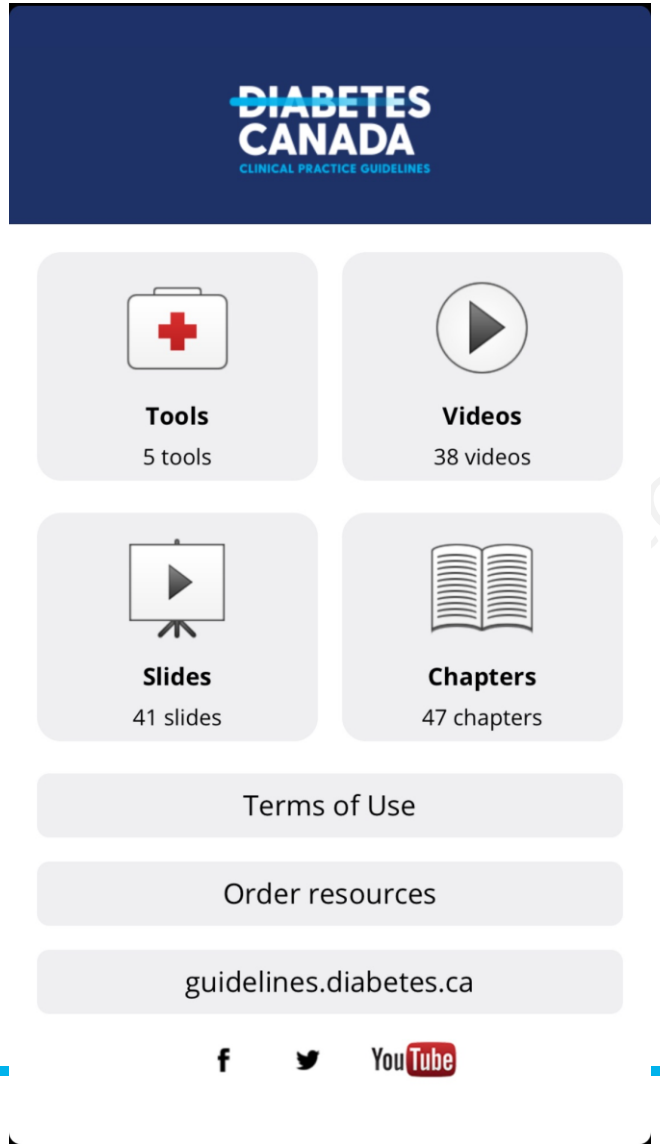

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