Updates in the American Diabetes Association's Practice Recommendations

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Utah Diabetes Telehealth Program

Disclosure

- Neither Dr. Dana Clarke nor the Utah Department of Health have financial interests to disclose.

Introduction

Utah Diabetes Practice Recommendations

Diabetes Management for Adults

Updated in 2011

http://health.utah.gov/diabetes/diabetespracticerecommendations/udpr.htm

HealthInsight
a partnership for the future of health care

Purpose of the UDPR

- The UDPRs were developed to provide the busy (often overwhelmed) medical provider with a single source, authoritative guideline for the management of diabetes and the conditions often encountered in a patient with diabetes
- This guideline for management of diabetes in adults addresses:
  - Appropriate therapeutic targets, frequency of assessment and other issues that may impact people with diabetes
    - Glucose
    - Blood pressure
    - Lipids
- There are other UDPRs which address:
  - Management of diabetes in children and adolescents
  - Treatment of hyperglycemia in inpatients
  - Hyperglycemia in pregnancy

What's New in 2012 (part 1)

- Greater emphasis on the importance of individualizing treatment targets
- More emphasis on life-style interventions and the need to pursue these changes more vigorously
  - Step up counseling and encouragement
  - Structured programs for preventing diabetes are effective in those with elevated blood sugar (e.g., pre-diabetes)

What's New in 2012 (part 2)

- DM frequently is complicated by comorbidities
  - The chronic care model (or other coordinated efforts) should be used to improve patient compliance with treatment
    - For example, the Utah Diabetes Prevention and Control Program is planning and preparing to implement the National Diabetes Prevention Program

What's New in 2011

- Diabetes screening protocol
  - Clarifies the role of A1C in diagnosis
- Cardiovascular disease
  - Addresses the controversy concerning ASA
- New insulin protocols for type 2 diabetes
- Updated medication summary
- New sections
  - Depression and vaccinations
- New tools
  - Active links, referral forms, CKD management, updated protocols for lipids, extensive references and blood pressure management

Key Treatment Targets

Measure/Test	Target	Frequency	Comment
A1C	<7.0%	Test at least semi-annually	As low as possible without significant hypoglycemia.
Blood Pressure	<130/80 mmHg	Check at each office visit	
LDL Cholesterol	<70-100 mg/dL (depending on presence of CVD)	Test at least annually	
HDL Cholesterol	Women: >50mg/dL Men: >40 mg/dL		
Triglycerides	<150 mg/dL		
Microalbumin/ Creatinine Ratio	<30 mg/g of creatinine	Test annually	If positive, repeat test one month apart. Use 2 out of 3 results.
Serum Creatinine	See comment	Annually	The serum creatinine should be used to estimate GFR; if <60 mL/min/1.73 m^2 more frequent testing is required. www.kidney.org/professionals/kdoqi/gfr_calculator.cfm
Dilated Eye Exam	Normal	Annually	High risk should be tested more frequently; low risk may require less often.
Comprehensive Foot Exam	Identify level of risk	Annually	Visually inspect every visit if significant vascular disease, foot deformities, or loss of protective sensation is present, or if identified as high risk (see Appendix D).

Case ver 1

You open the exam room door and find a patient you haven't seen in years. You are running late and secretly hope that this visit is routine.

John is 58 years old and wants to discuss several complaints (there goes the easy visit). John relates that he is "wearing out." He is tired, his vision has blurred, and he is "living in the bathroom." His sister was recently diagnosed with diabetes and suggested that he should see his doctor "just in case."

Recorded vital signs: Wt 230 lbs; BMI 38 kg/m^2; BP 146/97 mmHg; HR 88.

Case ver 1

You request a fingerstick glucose, POC A1C and dipstick UA

The results:

Random glucose: 355 mg/Dl

A1C: 11.4%

UA: Protein 1+; glucose 4+; ketones trace

You just got paged…

Is there an easy resource to help you?

Case ver 2

You open the exam room door and find a patient you haven't seen in over a year. You are running late and secretly hope that this visit is routine.

John is 58 years old and has had diabetes and hypertension for many years. His medications include metformin, glimepiride, sitagliptin, lisinopril, and HCTZ.

He wants to discuss several complaints (there goes the easy visit). John relates that he is "wearing out." He is tired, his vision has blurred, and he is "living in the bathroom."

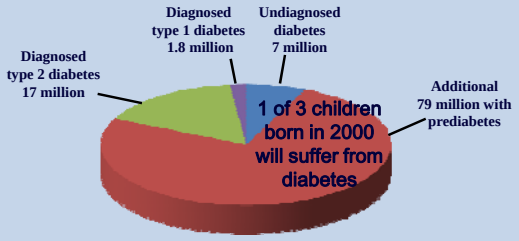
Case ver 2

- Recorded vital signs: Wt 230 lbs; BMI 38 kg/m2; BP 146/97 mmHg; HR 88.
- You request a fingerstick glucose, POC A1C and dipstick UA
- The results:
  - Random glucose: 355 mg/Dl
  - A1C: 11.4%
  - UA: Protein 1+; glucose 4+; ketones trace
- You just got paged…
- Is there an easy resource to help you?

Diagnosis of Diabetes

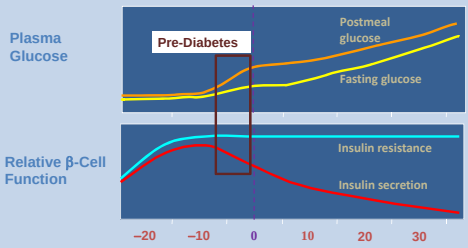
Distribution of Glycemic Abnormalities in US

US Population: 308 million in 2010



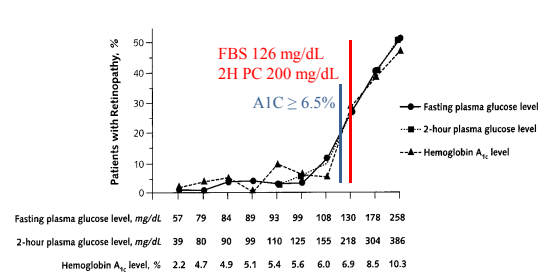
CDC. Available at: http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2011.pdf
ADA. Facts and Figures. Available at: www.diabetes.org/main/application/commercewf?origin=*.jsp&event=link(B1)

Natural History of Type 2 Diabetes



Adapted from International Diabetes Center (IDC). Minneapolis, Minnesota.

Prevalence of Retinopathy



ADA Consensus Statement on the Diagnosis of Diabetes (2011)

Diagnostic Criteria for Diabetes

Diagnosis	FPG (mg/dl)	2 Hour Postglucose Load (75 gm OGTT)	Hemoglobin A1C (%)*
Normal	< 100	< 140	<5.7
Pre-Diabetes	100-125	140-199	5.7-6.4
Diabetes Mellitus**	≥ 126	≥ 200***	≥6.5

*Measured according to DCCT methodology
**Must be repeated on a separate day
***Or a random glucose ≥ 200 mg/dl with symptoms

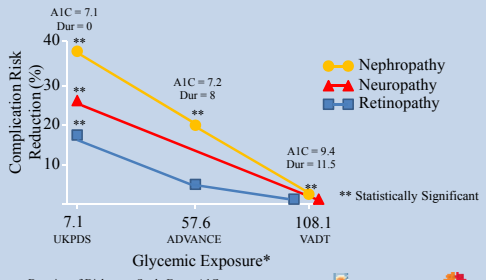
ADA. Diabetes Care 2011;34 (suppl 1):S13-S61.

Pitfalls in the Diagnosis

- Random glucose levels
  - Not standardized and rarely diagnostic
  - Use ICD code 790.29 (hyperglycemia) or 790.6 (abnormal chemistry) to justify repeating (DO NOT use 250.XX)
- Method of A1C measurement
- Don't rely on fingerstick determinations
- Repeat testing prior to a formal diagnosis
- Avoid prematurely labeling a patient

Glucose Control

Pre-Study Glycemic Exposure & Microvascular Outcomes



*Glycemic Exposure=Duration of Diabetes x Study Entry A1C

Wadwekar D, Jones RE. Focus: Diabetes in Women, 2011.

Glucose Targets

- A1C < 7.0% or lower without undo hypoglycemia
- Consider individualizing targets
- Nonglycemic effects on A1C
  - Anemia
  - Hemolysis
  - Erythropoetin
  - Transfusion
  - Pregnancy

Correlation of A1C with Estimated Average Glucose Levels[1]		
A1C (%)	Estimated Average Glucose (mg/dL)†	95% Confidence Intervals (mg/dL)
5	97	76-120
6	126	100-152
7	154	123-185
8	183	147-217
9	212	170-249
10	240	193-282
11	169	217-314
12	298	240-347

1. Nathan DM et al. *Diabetes Care* 2008;31:1473-1478.
†Estimated Average Glucose = 28.7 x A1C – 46.7

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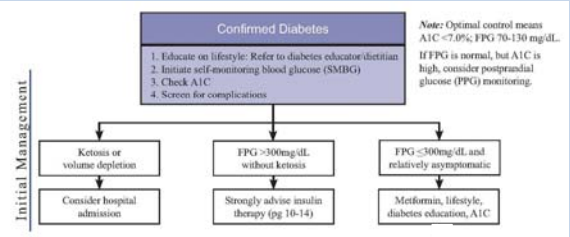
VA/DoD Guidelines

Major Comorbidity [d] or Physiologic Age	Microvascular Complications		
	Absent or Mild [b]	Moderate [b]	Advanced [c]
Absent >10 years of life expectancy	<7%	<8%	8-9% *
Present [e] 5 to 10 years of life expectancy	<8 %	<8%	8-9% *
Marked [f] <5 years of life expectancy	8-9% *	8-9% *	8-9% *

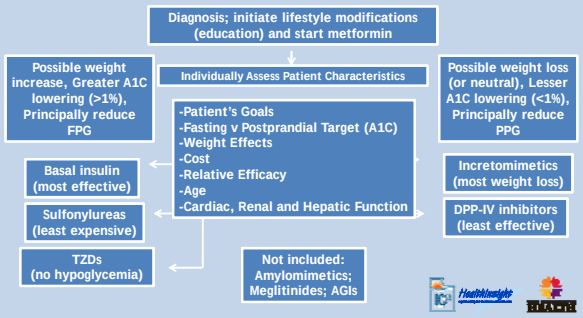
(d) Major comorbidity includes, but is not limited to, any or several of the following active conditions: significant cardiovascular disease, severe chronic kidney disease, severe chronic obstructive pulmonary disease, severe chronic liver disease, recent stroke, and life-threatening malignancy.

http://www.healthquality.va.gov/diabetes/DM2010_SUM-v4.pdf
Accessed Jan 2011

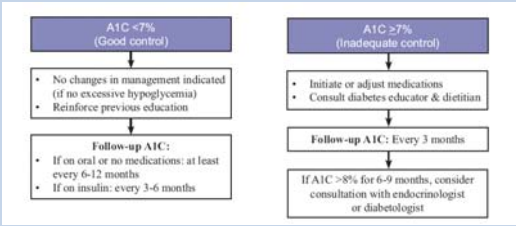
Initial Therapy



UDPR Glycemic Algorithm



Using A1C Levels



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Effectiveness of Different Therapeutic Strategies

Intervention	Expected Decrease in A1C (%)	Advantages	Disadvantages
Tier 1: Well-Validated Core			
Step 1: Initial therapy			
Lifestyle changes to decrease weight and increase activity	1–2	Broad benefits	Insufficient for most in first year
Metformin	1–2	Weight neutral	Gastrointestinal side effects, contraindicated with renal insufficiency
Step 2: Additional therapy			
Insulin	1.5–3.5	No dose limit, rapidly effective, improved lipid profile	1–4 injections daily, monitoring, weight gain, hypoglycemia, high cost of analog insulin products
Sulfonylurea	1–2	Rapidly effective	Weight gain, hypoglycemia (especially with glibenclamide or chlorpropamide)
Tier 2: Less Well Validated			
Thiazolidinedione	0.5–1.4	Improved lipid profile and potential decrease in myocardial infarction (with pioglitazone)	Fluid retention, congestive heart failure, weight gain, bone fractures, high cost, potential increase in myocardial infarction (with rosiglitazone)
GLP-1 agonist	0.5–1.0	Weight loss	Two injections daily, frequent gastrointestinal side effects, long-term safety not established, high cost

Adapted from Nathan DM et al. *Diabetes Care*. 2009; 32:193-203.

Hypoglycemic Agents

Medication Class	Expected A1C Lowering (%)[1,2]	Comments
Biguanides (metformin)	1.5	Contraindicated in renal, cardiac, and respiratory failure. Unless contraindications or side effects develop, metformin should be continued through pharmacological escalation
Sulfonylureas	1.5	Hypoglycemia, weight gain
Thiazolidinediones (pioglitazone)	0.8-1.0	Weight gain, edema, CHF (especially with insulin); There may be an increase in myocardial infarction with use of Rosiglitazone.
DPP-IV Inhibitors	0.5-0.9	Initially reduce sulfonylurea dose by 50%; do ***not*** use with GLP-1 analogs
GLP-1 Analogs	0.6	Generally associated with weight loss; not FDA approved for use with insulin although this combination is effective
Insulin	≥2.5	Most effective; possible hypoglycemia, weight gain

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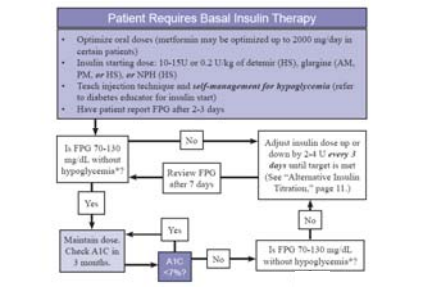
Initiating a Basal Insulin



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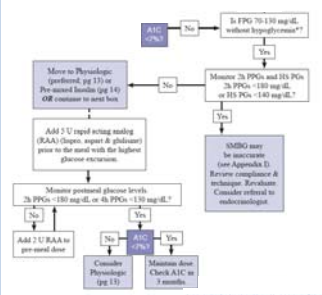
Adding a Prandial Insulin

- Role of Premix
  - Premixed insulins provide both a basal and prandial insulin in a fixed combination
  - Premix regimens do not encourage meal flexibility and are associated with more weight gain and hypoglycemia
  - Easier and requires less patient involvement



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Reducing Cardiovascular Risk

Case ver 1

John has aggressively adopted lifestyle modifications and has been adherent with his medications. His A1C is 6.3%, blood pressure is 126/78 mmHg, and his lipid profile has improved. His sister just had an MI and he is frightened.

Circumstance	Total Cholesterol (mg/dL)	Triglycerides (mg/dL)	HDL Cholesterol (mg/dL)	LDL Choesterol (mg/dL)
At diagnosis of diabetes	230	568	32	?
Current	203	220	38	121

John is prescribed a statin but develops fatigue, weakness and myalgias. What next and are there other measures to reduce the risk of CHD? Should he be screened for CHD?

Case ver 2

John has aggressively adopted lifestyle modifications and has been adherent with his medications. His A1C is 7.3%, blood pressure is 126/78 mmHg, and his lipid profile has improved. His sister just had an MI and he is frightened.

Circumstance	Total Cholesterol (mg/dL)	Triglycerides (mg/dL)	HDL Cholesterol (mg/dL)	LDL Choesterol (mg/dL)
6 months ago	230	568	32	?
Current	203	220	38	121

John is prescribed a statin but develops fatigue, weakness and myalgias. What next and are there other measures to reduce the risk of CHD? Should he be screened for CHD?

Multifactorial Interventions

Table: Interventions to Reduce Cardiovascular Risk in Diabetes	
	Relative Risk Reduction
Statins	≥ 20%
Antihypertensive therapy	≥ 20%
Glycemic control	10-15%
Aspirin:	
2° prevention	20%
1° prevention	Approximately 10%
Smoking cessation	7-47%
ACE-inhibitors/ARBs	Unknown
Beta-blockers:	
Post-MI, 1st 2y	30%
Stable coronary heart disease	Unknown

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Aspirin Use

Aspirin is **reasonable** if:
- >10% 10-year CVD risk*

or for
- Most men age >50 years and women age >60 years who have one or more of the following risk factors:
  - Smoking
  - Hypertension
  - Albuminuria
  - Dyslipidemia
  - Family history of premature CVD

Aspirin may be **considered** if:
- 5-10% 10-year CVD risk*,

or for
- Men age >50 years or woman age >60 years with none of the risk factors noted above

or for
- Men age ≤50 years or women age ≤60 years with ≥ one risk factor

ASA Dosage Recommendation 75-162 mg/day

Aspirin is **not** recommended for adults with:
- <5% 10-year CVD risk*

or for
- Men age ≤50 years and women age ≤60 years who have no risk factors

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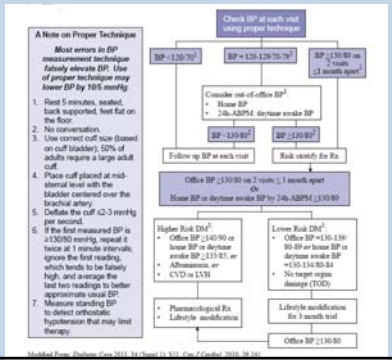
*10 year CVD risk may be calculated at:
http://zunis.org/FHS_CVD_Risk_Calc_2008.htm

Screening for CHD

- There is little evidence that screening for CHD in asymptomatic patients with diabetes has any positive effect on outcomes
- Patients with atypical (or typical) symptoms or an abnormal ECG should be screened
  - Stress echo is cost effective
  - Cardiology referral
- Aggressively treat CV risk factors and reassess them at least annually

Hypertension

Diagnosing Hypertension



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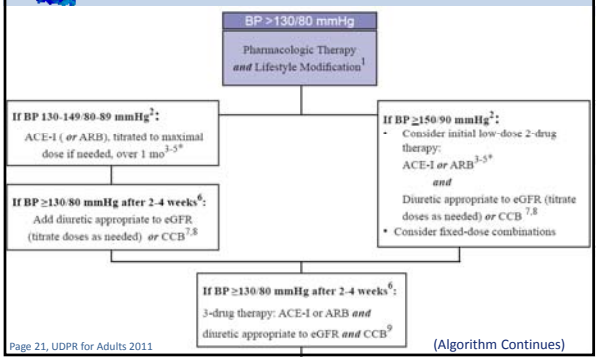
Treating Hypertension



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(Algorithm Continues)

Diabetic Dyslipidemia

Managing Lipids: Who to Treat

Lipid profile at Dx and annually
- Total-C, HDL-C, TG
  - -Calculate LDL-C if TG < 400 mg/dL
  - -Measure LDL-C if TG ≥ 400 mg/dL[1]
- Calculate non-HDL-C: Total-C minus HDL-C

Lifestyle modification[2]

CVD
- Statin Rx[3]
- LDL-C goal <70 mg/dL

- No CVD *and*
- Age ≥40y *and*
- ≥1 CVD risk (pg 16)

- Statin Rx[3]
- LDL-C goal <100 mg/dL

- No CVD *and*
- Age <40y *and*
- LDL-C ≥100 mg/dL *or* ≥2 CVD risk factors (pg 16)

- ***Consider*** Statin Rx[3]
- LDL-C goal <100 mg/dL

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Managing Lipids: Therapies

Statin Rx: lower LDL-C ≥30% *and* achieve goal LDL-C[3]
- <70 mg/dL if CVD
- <100 mg/dL if no CVD

Statin intolerance[4]

LDL-C > goal

Consider combination Rx:[5]
- Niacin
- Bile acid sequestrant
- Ezetimibe

If unable to achieve target goals, consider referral to a specialist

LDL-C ≤ goal ***but***: [6]
- HDL-C <50 mg/dL in women or <40 mg/dL in men
  and/or
- Triglycerides significantly elevated[7]

Consider combination Rx:
- Fish oil
- Niacin
- Fenofibrate (not gemfibrozil)

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Managing Lipids: Statin Intolerance

- Statin intolerance may occur in up to 5-10% of patients
- Options:
  - Trial of a different statin (fluvastatin, pravastatin, rosuvastatin)*
  - Rosuvastatin 1-3 times per week*
  - Gemfibrozil (not fenofibrate) especially if triglycerides are elevated, HDL is low and LDL is minimally increased
  - Niacin often in combination with bile acid sequestrants*
  - Ezetimibe (no outcomes data)

*These regimens may lower LDL 20-30%

Assessing Complications

Foot Examination

- Visual inspection
  - Deformities, pressure points, ulceration
- Vascular assessment
- Neurologic evaluation
  - Protective sensation
  - Monofilament
  - 128 Hz tuning fork

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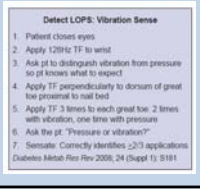

Detect LOPS: Vibration Sense

1. Patient closes eyes
2. Apply 128Hz TF to wrist
3. Ask pt to distinguish vibration from pressure so pt knows what to expect
4. Apply TF perpendicularly to dorsum of great toe proximal to nail bed
5. Apply TF 3 times to each great toe: 2 times with vibration, one time with pressure
6. Ask the pt. "Pressure or vibration?"
7. Sensate: Correctly identifies ≥2/3 applications

Diabetes Metab Res Rev 2008; 24 (Suppl 1): S181

Foot Care: Risk Stratification

Table 1: Foot Ulcer Risk Management

Risk Level	Definition	% Ulcer per Year	Education	Visual Inpection	Podiatry
3	Prior amputation or ulcer	20-30 %	Diabetes educator Test knowledge	q visit	q 1-2 mo Insoles ± shoe gear; Vasc Surg if PAD
2	PAD ± LOPS	6%	Diabetes educator Test knowledge	q visit	q 2-3 mo Insoles ± shoe gear; Vasc Surg if PAD
1	LOPS ± Deformity	4%	Enhanced pt education Footwear advice	q visit	q 3-6 mo Insoles ± shoe gear
0	No LOPS, PAD, or deformity	<2%	Basic patient education	annual exam*	Not needed

Diabetes Care 2008 31:1679 *see appendix D

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Microalbumin Screening

- Screen yearly
  - Microalbumin/creatine ratio and serum creatinine
- False positives
  - UTI, hyperglycemia, exercise, hypertension, fever
- When to treat
  - Screening tests are positive (ratio > 30) on 2 or more occasions
  - eGFR < 60 mg/min/1.73 m^2
  - ACE-I vs ARB
- Caution: women of reproductive age

Retinopathy

Recommended Eye Examination Schedule for Type 1 and Type 2 Diabetes

Type of Patient	Minimum Routine Follow-up
Type 1 patients (adults and children 10 years old and older) should have a dilated eye exam by an optometrist or ophthalmologist within five years after diagnosis. (Some evidence suggests that microvascular complications may develop before age 10 among those diagnosed as infants and toddlers.) **Type 2** patients should have a dilated eye exam shortly following diagnosis of diabetes.	**Annually for most patients** with non-proliferative diabetic retinopathy (NPDR) or microaneurysms **Biennially for patients in good control**, prior normal exam and with advice of an eye care professional **More frequent examination** is required if NPDR is progressing
Pregnancy: Women should have a dilated eye exam when planning pregnancy if possible, and also during the first trimester. (Does not apply to women with gestational diabetes since they are not at increased risk for diabetic retinopathy.)	**First trimester**, with continued close follow-up and for one year postpartum. Patients with diabetes who become pregnant may experience accelerated diabetic retinopathy and should be monitored closely by an ophthalmologist.
Patients with any type of macular edema, severe non-proliferative diabetic retinopathy (NPDR) or any proliferative diabetic retinopathy (PDR)	**Refer promptly** to an ophthalmologist experienced in the treatment of diabetic retinopathy.*
Patients with vision loss from diabetes should be encouraged to pursue visual rehabilitation.	**Refer** to an ophthalmologist or an optometrist who is trained or experienced in low-vision care.

*Do not delay referral to an ophthalmologist until PDR develops. Early referral is very important for patients with type 2 diabetes and severe NPDR, since laser photocoagulation at this stage is associated with a 50% reduction in risk of severe visual loss and vitrectomy.

Source: ADA Clinical Practice Recommendations, *Diabetes Care* 2011;34 (Suppl 1).

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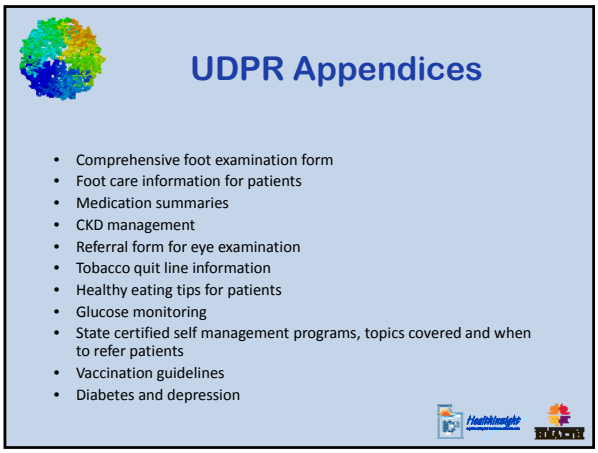
Diabetes and Depression

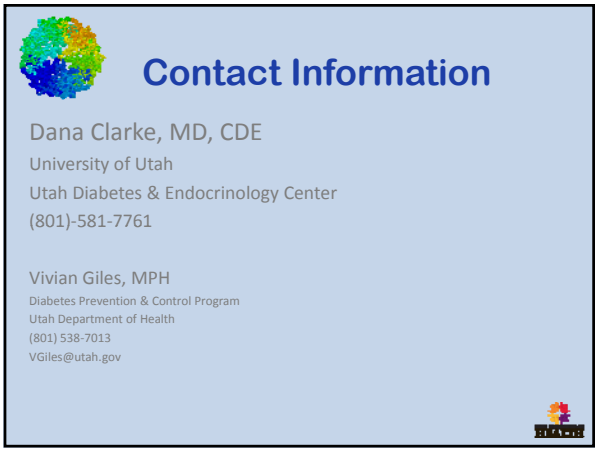
- Prevalence 8-27% in people with diabetes
- Twice as common in people with DM as in the general population
- Undiagnosed depression leads to:
  - -Poorer glycemic control
  - -Less adherence to medications and SMPG
  - -More missed appointments
  - -2 times risk of foot ulcer
  - -Increased resource utilization

Screening for Depression

- PHQ-9 screening tool has been validated in people with diabetes
- Simple screening questions:
  - "Over the past 2 weeks have you felt down, depressed or hopeless?"
  - "Over the past 2 weeks have you felt little pleasure or interest in doing things?"
- Appropriate therapy may help improve glycemic control and quality of life

Appendices


UDPR Appendices
Comprehensive foot examination form
Foot care information for patients
Medication summaries
CKD management
Referral form for eye examination
Tobacco quit line information
Healthy eating tips for patients
Glucose monitoring
State certified self management programs, topics covered and when to refer patients
Vaccination guidelines
Diabetes and depression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