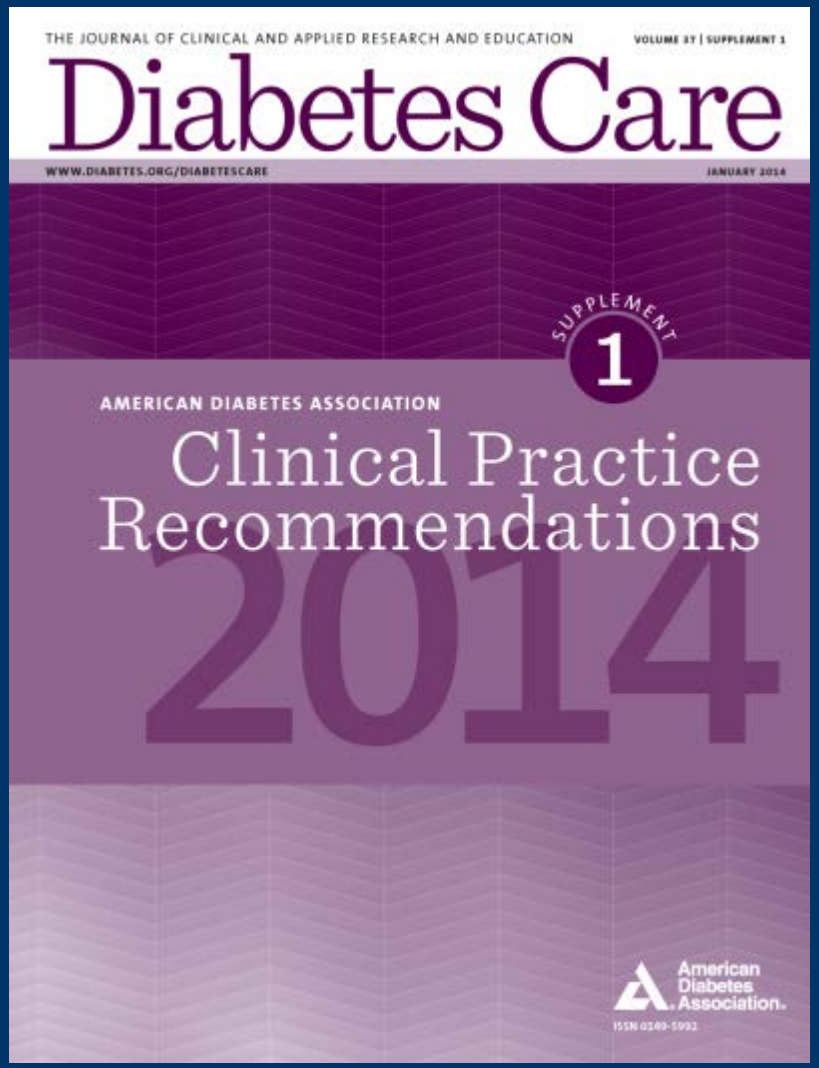
STANDARDS OF MEDICAL CARE IN DIABETES—2014



American Diabetes Association.

I. CLASSIFICATION AND DIAGNOSIS

Classification of Diabetes

- Type 1 diabetes
  - β-cell destruction
- Type 2 diabetes
  - Progressive insulin secretory defect
- Other specific types of diabetes
  - Genetic defects in β-cell function, insulin action
  - Diseases of the exocrine pancreas
  - Drug- or chemical-induced
- Gestational diabetes mellitus (GDM)

ADA. I. Classification and Diagnosis. Diabetes Care 2014;37(suppl 1):S14

Criteria for the Diagnosis of Diabetes

A1C ≥6.5%

OR

Fasting plasma glucose (FPG) ≥126 mg/dL (7.0 mmol/L)

OR

2-h plasma glucose ≥200 mg/dL (11.1 mmol/L) during an OGTT

OR

A random plasma glucose ≥200 mg/dL (11.1 mmol/L)

ADA. I. Classification and Diagnosis. Diabetes Care 2014;37(suppl 1):S15; Table 2

Categories of Increased Risk for Diabetes (Prediabetes)*

FPG 100–125 mg/dL (5.6–6.9 mmol/L): IFG

OR

2-h plasma glucose in the 75-g OGTT 140–199 mg/dL (7.8–11.0 mmol/L): IGT

OR

A1C 5.7–6.4%

*For all three tests, risk is continuous, extending below the lower limit of a range and becoming disproportionately greater at higher ends of the range.

ADA. I. Classification and Diagnosis. Diabetes Care 2014;37(suppl 1):S16; Table 3

II. TESTING FOR DIABETES IN ASYMPTOMATIC PATIENTS

Criteria for Testing for Diabetes in Asymptomatic Adult Individuals (1)

1. Testing should be considered in all adults who are overweight (BMI ≥25 kg/m^2*) and have additional risk factors:

- Physical inactivity
- First-degree relative with DM
- High-risk race/ethnicity
- Women who delivered a baby >9 lb or were dxed with GDM
- HTN (≥140/90 mmHg or on therapy for hypertension)
- HDL chol level <35 mg/dL and/or a trig>250 mg/dL
- PCOS
- A1C ≥5.7%, IGT, or IFG on previous testing
- Conditions: insulin resistance (e.g., severe obesity, acanthosis nigricans)

*At-risk BMI may be lower in some ethnic groups.

ADA. Testing for Diabetes in Asymptomatic Patients. Diabetes Care 2014;37(suppl 1):S17; Table 4

Criteria for Testing for Diabetes in Asymptomatic Adult Individuals (2)

2. In the absence of criteria (risk factors), testing for diabetes should begin at **age 45 years**

3. If results are normal, testing should be repeated at least at 3-year intervals, with consideration of more frequent testing depending on initial results (e.g., those with prediabetes should be tested yearly), and risk status

ADA. Testing for Diabetes in Asymptomatic Patients. Diabetes Care 2014;37(suppl 1):S17; Table 4

III. PREVENTION/DELAY OF TYPE 2 DIABETES

Recommendations: Prevention/Delay of Type 2 Diabetes

- Refer patients with IGT, IFG, or A1C 5.7–6.4% to ongoing support program
  - Targeting wt. loss of 7% of body wt.
  - ↑ physical activity @ least 150 min/wk of moderate activity (eg, walking)
- F/U counseling is important for success
- Based on cost-effectiveness of diabetes prevention, such programs should be covered by third-party payers

ADA. IV. Prevention/Delay of Type 2 Diabetes. Diabetes Care 2014;37(suppl 1):S20

Recommendations: Prevention/Delay of Type 2 Diabetes

- Consider metformin for prevention of type 2 DM if IGT, IFG, or A1C 5.7–6.4%
  - BMI >35 kg/m^2, age <60 years, women with prior GDM
- Prediabetes: monitor annually for development of DM
- Screen for and treat modifiable risk factors for CVD

ADA. IV. Prevention/Delay of Type 2 Diabetes. Diabetes Care 2014;37(suppl 1):S20

IV. DIABETES CARE

Components of the Comprehensive Diabetes Evaluation (1)

Medical history (1)

- Age and characteristics of onset of DM (e.g., DKA, asymptomatic lab. Finding)
- Eating patterns, physical activity habits, nutritional status, wt hx; growth and development in children & adolescents
- Diabetes education history
- Review of previous tx regimens and response to therapy (A1C records)

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Components of the Comprehensive Diabetes Evaluation (2)

Medical history (2)

- Current tx: meds, adherence /barriers, meal plan, physical activity patterns, readiness for behavior change
- Results of BGM, pt's use of data
- DKA frequency, severity, cause
- Hypoglycemic episodes
  - Hypoglycemic awareness
  - Any severe hypoglycemia: freq, cause

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Components of the Comprehensive Diabetes Evaluation (3)

Medical history (3)

- Hx of DM-related complications
  - Microvascular: retinopathy, nephropathy, neuropathy
    - Sensory neuropathy: hx of foot lesions
    - Autonomic neuropathy: sexual dysfunction and gastroparesis
  - Macrovascular: CHD, CVD, PAD
  - Other: psychosocial prblms,* dental dz*

*See appropriate referrals for these categories.

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Components of the Comprehensive Diabetes Evaluation (4)

Physical examination (1)

- Height, weight, BMI
- BP, orthostatic measurements
- Fundoscopic examination*
- Thyroid palpation
- Skin exam (acanthosis nigricans, insulin inject. sites)

*See appropriate referrals for these categories.

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Components of the Comprehensive Diabetes Evaluation (5)

Physical examination (2)

- Comprehensive foot examination
- Inspection
- Palpation of dorsalis pedis, post. tibial pulses
- Presence/absence:patellar, Achilles reflexes
- Determination of proprioception, vibration, and monofilament sensation

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Components of the Comprehensive Diabetes Evaluation (6)

Laboratory evaluation

- A1C, if no results past 2–3 months
- If not available within past year
  - Fasting lipid profile: LDL, HDL, trig
  - Liver function tests
  - Urine albumin excretion with spot urine albumin-to-creatinine ratio
  - Serum creatinine and calculated GFR
  - TSH: type 1 DM, dyslipid, women over age 50 years

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Components of the Comprehensive Diabetes Evaluation (7)

Referrals

- Eye care: annual dilated eye exam
- Family planning: reproductive age
- Registered dietitian for MNT
- DSME
- Dentist for comp. periodontal examination
- Mental health professional, if needed

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21; Table 7

Recommendations: Glucose Monitoring

- Pts on multiple-dose insulin (MDI) or insulin pump therapy should do SMBG
  - Prior to meals and snacks
  - Occasionally postprandially
  - At bedtime
  - Prior to exercise
  - Suspect low blood glucose
  - After treating low blood glucose until they are normoglycemic
  - Prior to critical tasks such as driving

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S21

Recommendations:A1C
<7% (ADA), <6.5% (AACE)

- Perform A1C test at least two times/yr in pts meeting tx goals (have stable glycemic control)
- Perform A1C test quarterly in pts whose therapy has changed or who are not meeting glycemic goals
- Use of point-of-care (POC) testing for A1C provides the opportunity for more timely tx changes

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S22–S23

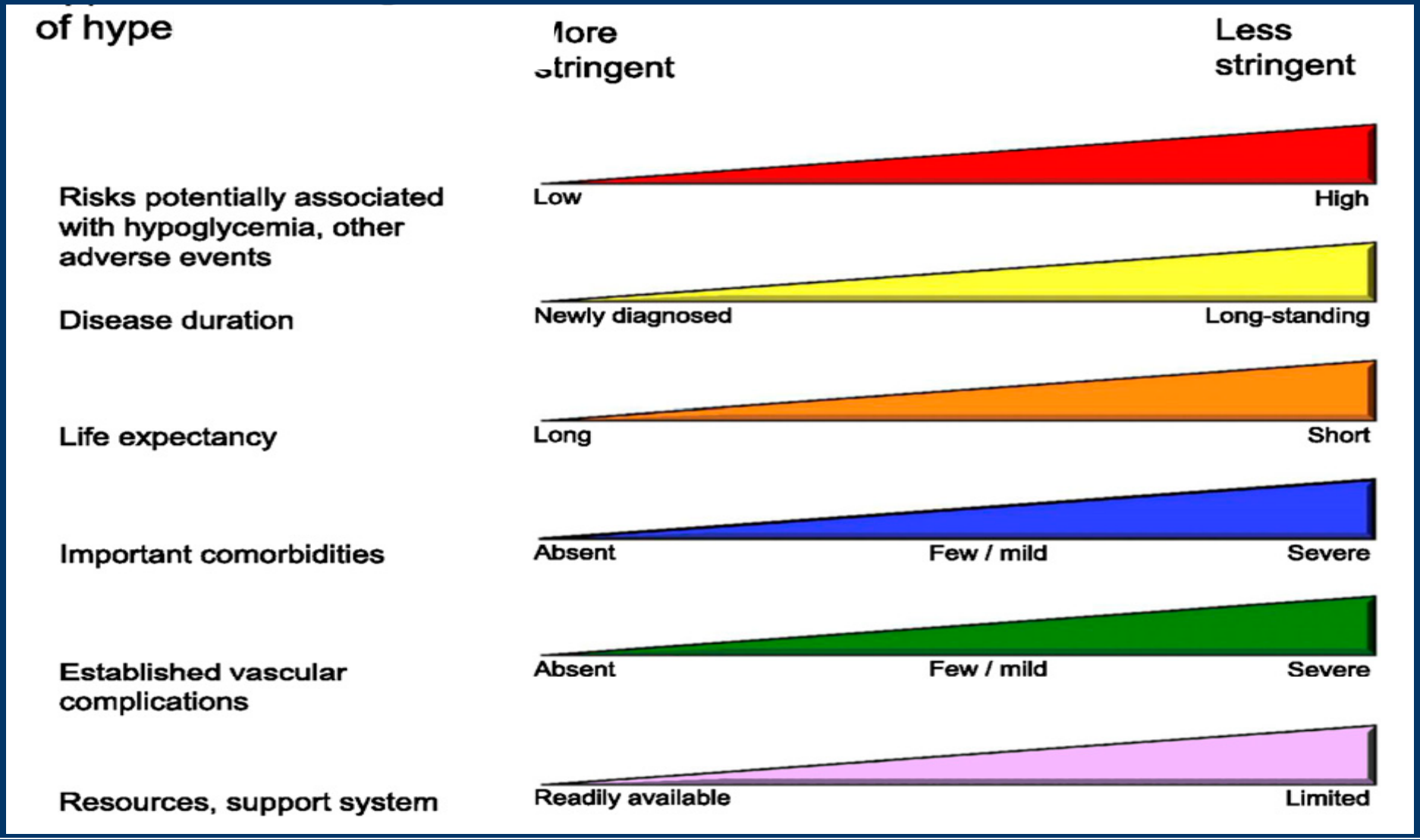
Correlation of A1C with Average Glucose

A1C (%)	Mean plasma glucose mg/dL	Mean plasma glucose mmol/L
6	126	7.0
7	154	8.6
8	183	10.2
9	212	11.8
10	240	13.4
11	269	14.9
12	298	16.5

These estimates are based on ADAG data of ~2,700 glucose measurements over 3 months per A1C measurement in 507 adults with type 1, type 2, and no diabetes. The correlation between A1C and average glucose was 0.92. A calculator for converting A1C results into estimated average glucose (eAG), in either mg/dL or mmol/L, is available at http://professional.diabetes.org/eAG.

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S23; Table 8

Approach to Management of Hyperglycemia



ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S25. Figure 1; adapted with permission from Ismail-Beigi F, et al. Ann Intern Med 2011;154:554-559

Glycemic Recommendations for Nonpregnant Adults with Diabetes

A1C	<7.0%*
Preprandial capillary plasma glucose	70–130 mg/dL* (3.9–7.2 mmol/L)
Peak postprandial capillary plasma glucose†	<180 mg/dL* (<10.0 mmol/L)

*Goals should be individualized based on these values.
†Postprandial glucose measurements should be made 1–2 h after the beginning of the meal, generally peak levels in patients with diabetes.

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S26; Table 9

Glycemic Recommendations for Nonpregnant Adults with Diabetes

- Goals:individualized based on
  - Duration of diabetes
  - Age/life expectancy
  - Comorbid conditions
  - Known CVD or advanced microvascular complications
  - Hypoglycemia unawareness
  - Individual patient considerations

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S26; Table 9

Recommendations: Insulin Therapy for Type 1 Diabetes

People with type 1 DM should

- Be treated with 3–4 inject/day of basal, prandial insulin or CSII
- Be educated in how to match prandial insulin dose to carb intake, premeal bld glu,anticipated activity
- Use insulin analogs to ↓ hypoglycemia risk

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S26

Recommendations: Therapy for Type 2 Diabetes

- Metformin: preferred initial pharmacological agent
- In newly dxed type 2 DM pts with markedly symptomatic and/or ↑ bld glu levels or A1C, consider insulin therapy, with or without add'l agents, from the outset

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S27

Recommendations: Therapy for Type 2 Diabetes (2)

- If noninsulin monotherapy at max. tolerated dose does not achieve or maintain the A1C target over 3 mo.
- Add a 2nd oral agent, a GLP-1 receptor agonist, or insulin

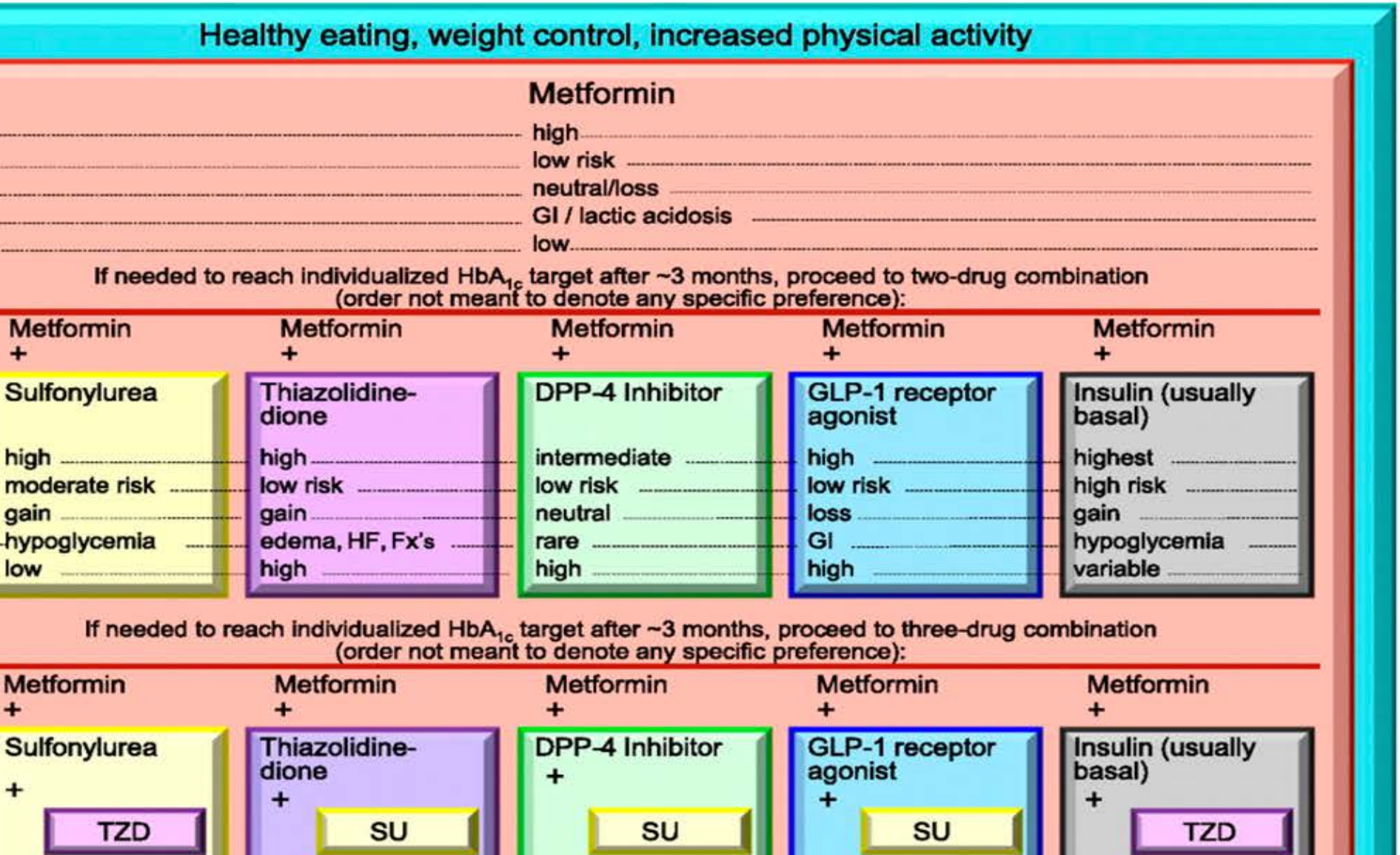
ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S27

Recommendations: Therapy for Type 2 Diabetes

- Pt centered approach should be used to guide choice of pharmacological agents
  - Consider: efficacy, cost, potential SE, effects on wt, comorbidities, hypoglycemia risk, pt preferences
- D/t progressive nature of type 2 DM, insulin therapy will be eventually indicated

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S27

Antihyperglycemic Therapy in Type 2 Diabetes



Recommendations: Medical Nutrition Therapy (MNT)

- Recommended for all people with type 1 and type 2 DM
- Individualized MNT as needed to achieve treatment goals, preferably provided by RD/CDE familiar with the components of DM MNT

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S28

Recommendations: Hypoglycemia

- Individuals at risk for hypoglycemia should be asked about symptomatic and asymptomatic hypoglycemia at each encounter
- Conscious: Glucose (15–20 g), BGM in 15 min
- Glucagon should be prescribed for all individuals at significant risk of severe hypoglycemia and caregivers/family members instructed in administration

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S33

Recommendations: Immunization

- Flu vaccine annually to pts ≥6 months
- Pneumococcal polysaccharide vaccine to patients ≥2 years
  - One-time revaccination recommended >65 yrs age if immunized >5 yrs ago
  - Repeat vaccination: nephrotic syndrome, CKD, post transplantation
- Hepatitis B

ADA. V. Diabetes Care. Diabetes Care 2014;37(suppl 1):S35

V. PREVENTION AND MANAGEMENT OF DIABETES COMPLICATIONS

Recommendations: Hypertension/Blood Pressure Control

Screening, diagnosis and treatment

- BP measure at every routine visit
- ↑ BP, confirm on a separate day
- **Goal: 130/80**
- ACE inhibitors or ARB
- Multiple drug therapy (two or more agents at maximal doses)
- If ACE inhibitors, ARBs, or diuretics are used, monitor serum creatinine/eGFR, K

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S36

Recommendations: Dyslipidemia/Lipid Management (1)

Screening

- Annual fasting lipid profile
- In adults with low-risk lipid values
  - LDL cholesterol <100 mg/dL
  - HDL cholesterol >50 mg/dL
  - Triglycerides <150 mg/dL)
- Repeat lipid assessments every 2 years

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S38

Recommendations: Dyslipidemia/Lipid Management

Treatment recommendations & goals

- Lifestyle modification focusing on
  - ↓ of sat fat, trans fat, chol. intake
  - ↑ Omega-3 fatty acids, viscous fiber, plant stanols/sterols
  - Weight loss (if indicated)
  - Increased physical activity

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S38

Recommendations: Glycemic, Blood Pressure, Lipid Control in Adults

A1C	<7.0%*
Blood pressure	<140/80 mmHg†
Lipids: LDL cholesterol	<100 mg/dL (<2.6 mmol/L)‡ Statin therapy for those with history of MI or age >40+ or other risk factors

*More or less stringent glycemic goals may be appropriate for individual patients. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations.

†Based on patient characteristics and response to therapy, lower SBP targets may be appropriate.

‡In individuals with overt CVD, a lower LDL cholesterol goal of <70 mg/dL (1.8 mmol/L), using a high dose of a statin, is an option.

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S40; Table 10

Recommendations: Antiplatelet Agents

- Aspirin therapy (75–162 mg/day)
  - Secondary prevention strategy in those with DM with a hx of CVD
- For pts with CVD and aspirin allergy
  - Clopidogrel (75 mg/day)
- Dual antiplatelet therapy is reasonable for up to a year after an acute coronary syndrome

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S40

Recommendations: Nephropathy

Screening

- Assess urine albumin excretion annually
  - –Type 1 after 5 years
  - –Type 2 at diagnosis

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S42

Recommendations: Nephropathy

Treatment

- ACE inhibitor, ARB not recommended in patients with normal BP, albumin excretion <30 mg/24 h for primary prevention of kidney disease
- Modestly ↑ (30–299 mg/day) or higher levels (>300 mg/day) of urinary albumin excretion
  - Use either ACE inhibitors or ARBs (not both), monitor K and Cr levels

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S42

Recommendations: Nephropathy

Treatment

- Monitor urine albumin excretion to assess response to therapy, dz progression
- eGFR is <60 mL/min/1.73 m2, evaluate, manage potential complications of CKD
- Consider referral to a nephrologist
  - Uncertainty about etiology; difficult mgnt issues; advanced kidney disease

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S43

Definitions of Abnormalities in Albumin Excretion

Category	Spot collection (µg/mg creatinine)
Normal	<30
Increased urinary albumin excretion*	≥30

*Historically, ratios between 30 and 299 have been called microalbuminuria and those 300 or greater have been called macroalbuminuria (or clinical albuminuria).

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S44; Table 11

Stages of Chronic Kidney Disease

Stage	Description	GFR (mL/min per 1.73 m^2 body surface area)
1	Kidney damage* with normal or increased GFR	≥90
2	Kidney damage* with mildly decreased GFR	60–89
3	Moderately decreased GFR	30–59
4	Severely decreased GFR	15–29
5	Kidney failure	<15 or dialysis

GFR = glomerular filtration rate

*Kidney damage defined as abnormalities on pathologic, urine, blood, or imaging tests.

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S44; Table 12

Recommendations: Retinopathy

Screening

- Initial dilated and comprehensive eye examination by an ophthalmologist or optometrist
  - Adults with type 1 diabetes
    - Within 5 years after dz onset
  - Patients with type 2 diabetes
    - Shortly after dx.

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S44

Recommendations: Retinopathy

Screening

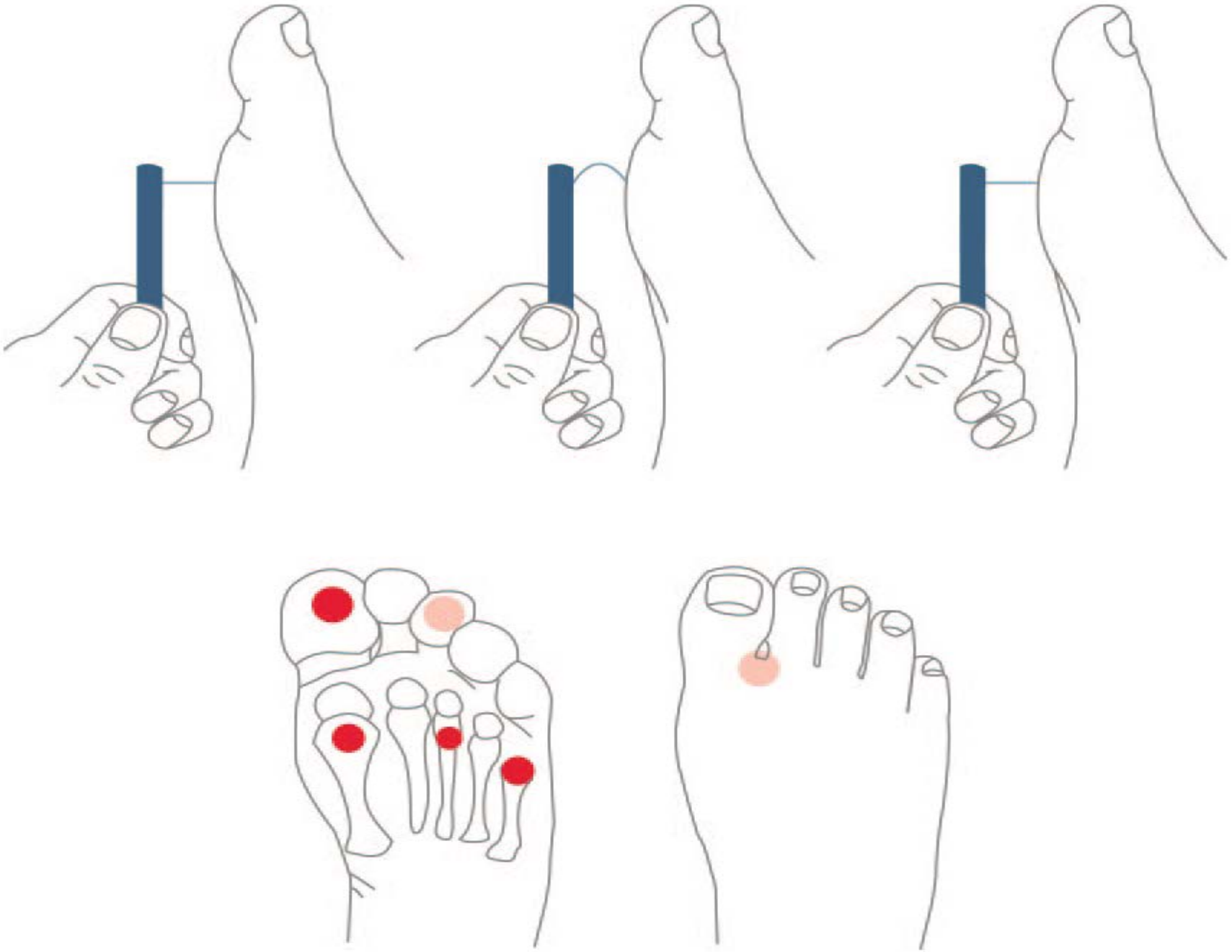
- No retinopathy: 1 or > eye exam
  - F/U every 2 years may be considered
- If diabetic retinopathy if present
  - Subsequent examinations for type 1 and type 2 DM pts should be repeated annually by an ophthalmologist or optometrist
- If retinopathy is progressing, more frequent exams required

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S44–S45

Recommendations: Foot Care

- Perform an annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations
  - Inspection
  - Assessment of foot pulses
  - Test for loss of protective sensation: 10-g monofilament plus testing any one of
    - Vibration using 128-Hz tuning fork
    - Pinprick sensation
    - Ankle reflexes
    - Vibration perception threshold

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S47



Recommendations: Foot Care

- Initial screening for PAD
  - Include a hx for claudication, assessment of pedal pulses
  - Obtain ankle-brachial index (ABI); many patients with PAD are asymptomatic
- Refer patients with significant claudication or a positive ABI for further vascular assessment
  - Consider exercise, medications, surgical options

ADA. VI. Prevention, Management of Complications. Diabetes Care 2014;37(suppl 1):S48