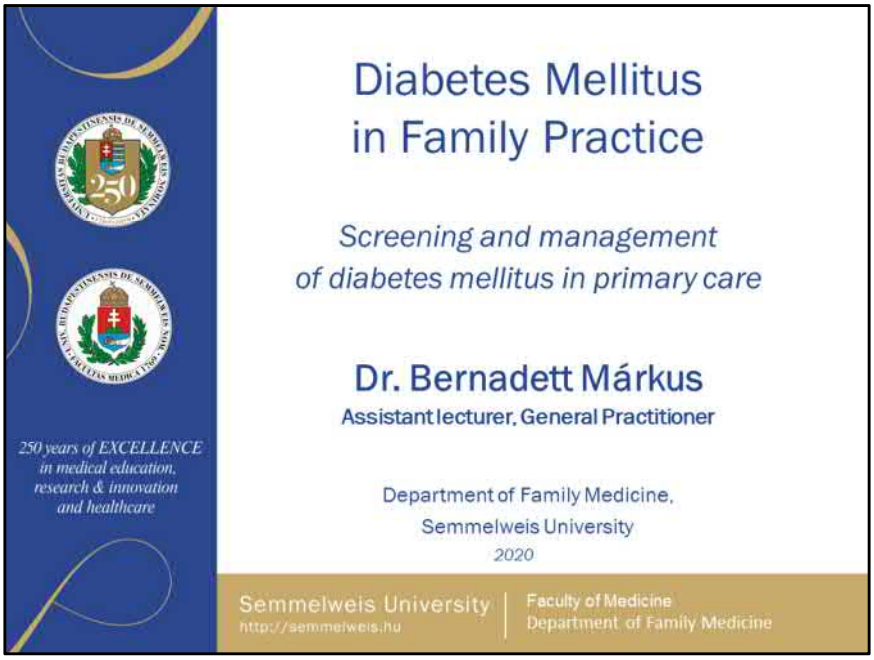
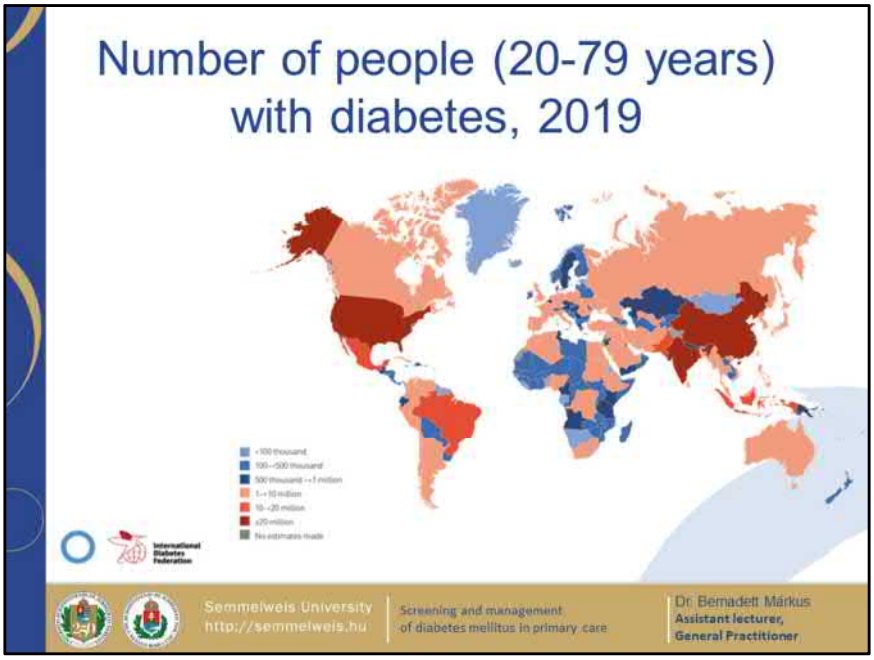
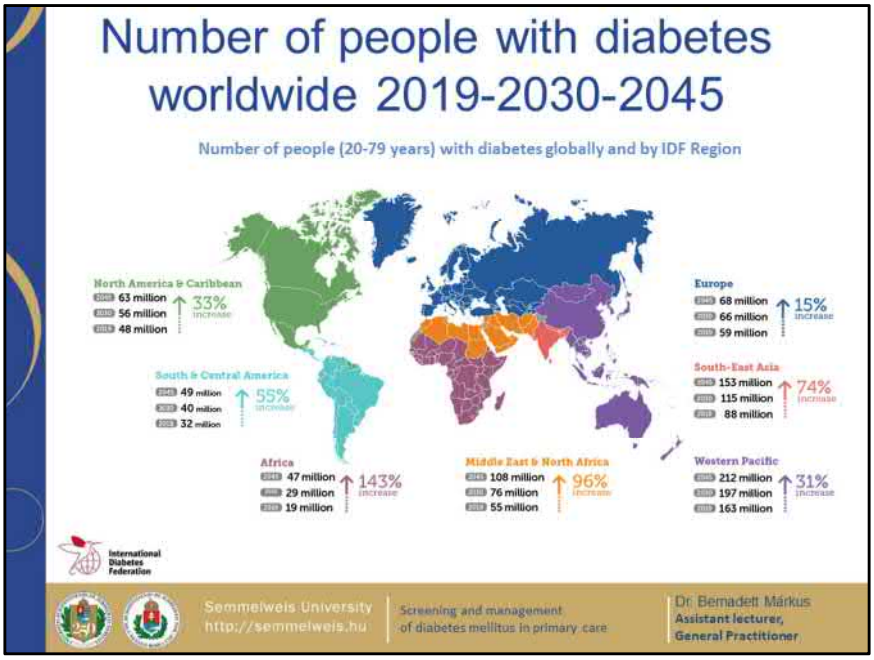
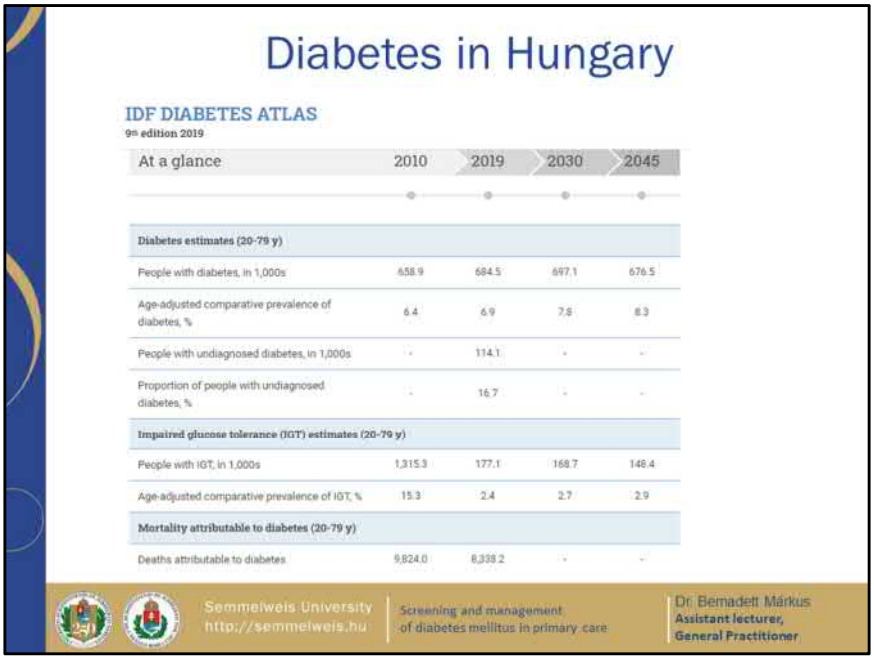

250 years of EXCELLENCE
in medical education,
research & innovation
and healthcare
Diabetes Mellitus
in Family Practice
Screening and management
of diabetes mellitus in primary care
Dr. Bernadett Márkus
Assistant lecturer, General Practitioner
Department of Family Medicine,
Semmelweis University
2020
Semmelweis University
http://semmelweis.hu
Faculty of Medicine
Department of Family Medicine



The latest edition of the IDF Diabetes Atlas shows that 463 million adults are currently living with diabetes.
Diabetes is one of the fastest growing health challenges of the 21st century, with the number of adults living with diabetes having more than tripled over the past 20 years.
https://idf.org/



Diabetes is rising worldwide... and is set to rise even further
IDF estimates that there will be 578 million adults with diabetes by 2030, and 700 million by 2045.
https://idf.org/
Why is diabetes on the rise?
The increasing prevalence of diabetes worldwide is driven by a complex interplay of socioeconomic, demographic, environmental and genetic factors. The continued rise is largely due to an upsurge in type 2 diabetes and related risk factors, which include rising levels of obesity, unhealthy diets and widespread physical inactivity. However, levels of childhood-onset type 1 diabetes are also on the rise.
Growing urbanisation and changing lifestyle habits (e.g. higher calorie intake, increasing consumption of processed foods, sedentary lifestyles) are contributory factors for the increasing prevalence of type 2 diabetes at a societal level. While global prevalence of diabetes in urban areas is 10.8%, in rural areas it is lower, at 7.2%. However, this gap is closing, with rural prevalence on the rise.



https://idf.org/
https://www.diabetesatlas.org/data/en/country/91/hu.html

Definition

Diabetes mellitus is characterized by
metabolic diseases that result in hyperglycemia.

Diabetes mellitus is a **chronic disease** caused by inherited and/or acquired deficiency in production of insulin by the pancreas, or by the ineffectiveness of the insulin produced.

Such a deficiency results in increased concentrations of glucose in the blood, which in turn **damage many of the body's systems**, in particular the blood vessels and nerves.

(https://www.who.int/mediacentre/factsheets/fs138/en/)

Symptoms

The symptoms of diabetes may be pronounced, subdued, or even absent.

- In Type 1 diabetes, the **classic symptoms** are excessive secretion of urine (**polyuria**), thirst (**polydipsia**), **weight loss** (and **tiredness, slow wound healing)**.
- These symptoms may be less marked in Type 2 diabetes. In this form, it can also happen that no early symptoms appear and the disease is only diagnosed several years after its onset, when complications are already present.

Classification

Diabetes mellitus can be categorized into 4 classifications:

- Type 1 diabetes (T1D) mellitus
- Type 2 diabetes (T2D) mellitus
- Gestational diabetes mellitus (GDM)
- Diabetes mellitus due to other causes

Classification

- Diabetes mellitus due to other causes:

monogenic diabetes syndromes (such as neonatal diabetes and maturity-onset diabetes of the young [MODY]),

diseases of the exocrine pancreas (such as cystic fibrosis and pancreatitis),

and drug- or chemical-induced diabetes (such as with glucocorticoid use, in the treatment of HIV/AIDS, or after organ transplantation)

Type 1 Diabetes mellitus

Plasma blood glucose rather than A1C should be used to diagnose the acute onset of type 1 diabetes in individuals with symptoms of hyperglycemia.

Screening for type 1 diabetes risk with a panel of autoantibodies is currently recommended only in the setting of a research trial or in first-degree family members of a proband with type 1 diabetes.

Persistence of two or more autoantibodies predicts clinical diabetes and may serve as an indication for intervention in the setting of a clinical trial.

9

Standards of Medical Care in Diabetes - 2019. Diabetes Care 2019;42(Suppl. 1):S1-52

American Diabetes Association.

Management of Type 1 DM

Management of Type 1 DM is done by an **endocrinologists/diabetologist**.

Role of Primary Care in Type 1 DM management:

- Diagnosis
- Documentation
- Motivate and support the patient
- Treatment of comorbidities

Gestational diabetes mellitus (GDM)

The rise in GDM and type 2 diabetes in parallel with obesity worldwide is of particular concern.

- **Specific risks of uncontrolled diabetes in pregnancy include**:

spontaneous abortion, preeclampsia,

fetal demise, macrosomia, fetal anomalies,

neonatal hypoglycemia and neonatal hyperbilirubinemia.

Sreening of GDM

Screening during early pregnancy: 1st laboratory control

Preferred method: testing fasting plasma glucose or casual check

Diagnostic criteria:

- FPG ≥7.0 mmol/l and/or
- casual sample PG: ≥11.1 mmol/l

Risk factors: advanced age (≥35 yrs.), overweight or obesity,
excessive gestational weight gain, excessive central body fat deposition,
family history of diabetes, short stature (<1.50 m),
excessive fetal growth, polyhydramnios,
hypertension or preeclampsia in the current pregnancy,
history of recurrent miscarriage, offspring malformation, fetal or neonatal death, macrosomia,
GDM during prior pregnancies and polycystic ovary syndrome.

If risk of GDM is increased

- During **16-18 pregnancy week**: 75 g Oral Glucose Tolerance Test (OGTT)

  Gestational hyperglycemia:
  - FPG ≥5.6 mmol/l and/or
  - 2h PG: ≥7.8 mmol/l
- If risk is increased, but OGTT negative, repeat test during **24–28 pregancy week**.
- **Postpartum OGTT: 6 weeks** after delivery to rule out impared glucose tolerance (IGT)
- **Continued prolonged follow-up** is indicated to
  - offer and apply treatment in women with IGT designed to delay or prevent development of type 2 diabetes,
  - follow women with IFG or normal OGTT to detect later conversion to IGT or type 2 diabetes
  - identify diabetes for intensified treatment before a subsequent pregnancy to lower the risk of major congenital malformations in their infants.

MANAGEMENT of Gestational Diabetes Mellitus (GDM)

Teamwork:

General Practitioner

Nurse

Diabetologist

Midewife

Gynecologist

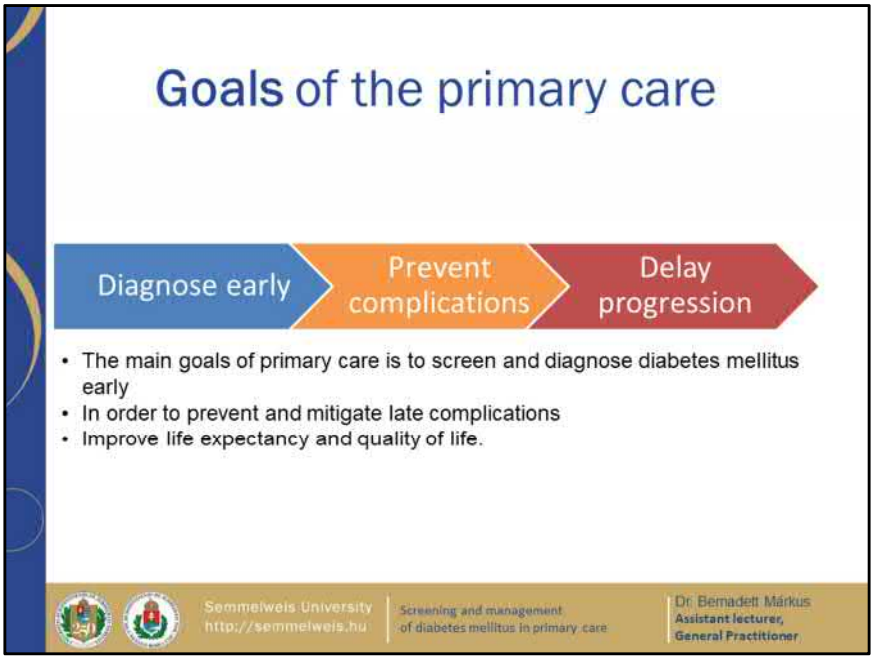
Type 2 diabetes (T2D) mellitus

Non-communicable diseases (NCMs):
CVD, diabetes, cancer, multi-sceletal disorders,
neurological disorders, depression etc.
are major cause of health problems in Europe.

Chronic diseases are largely preventable.

Prevention

- Many of the health risks associated with **increasing body weight first appear in children and young people**.
- To help prevent type 2 diabetes and its complications, people of all ages should achieve and maintain **healthy body weight**; **be physically active, eat a healthy diet and avoid tobacco use** (smoking increases the risk of cardiovascular diseases).
- Individuals with impaired glucose tolerance **IGT**, or impaired fasting glycaemia **IFG** are in the intermediate stage between normality and diabetes and are at **high risk of developing type 2 diabetes**. This risk can be drastically reduced through **intensive lifestyle modification and pharmacological intervention**.
- **The public and private sectors** also have an important role to play in developing and implementing policies and programmes that **increase knowledge about diabetes, its prevalence and consequences, encourage and provide greater opportunities for greater physical activity, and improve the availability and accessibility of healthy foods**.


Goals of the primary care
Diagnose early
Prevent complications
Delay progression
• The main goals of primary care is to screen and diagnose diabetes mellitus early
• In order to prevent and mitigate late complications
• Improve life expectancy and quality of life.
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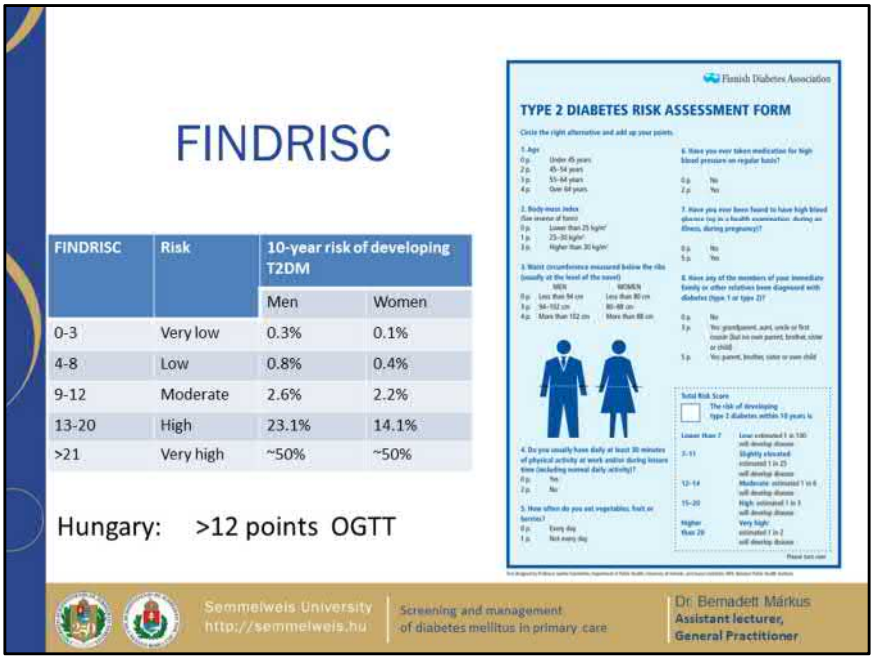
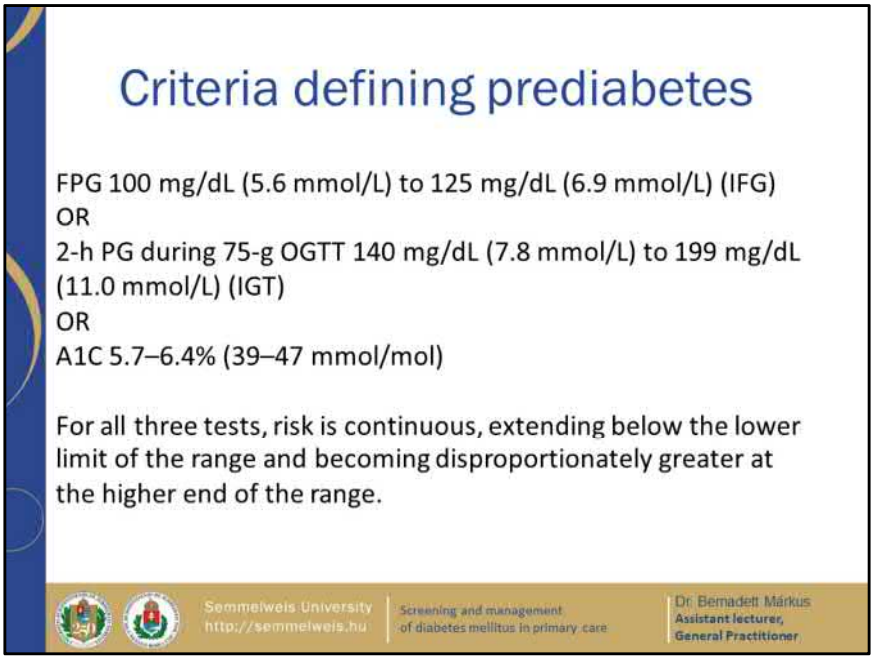
Screening and management of diabetes mellitus in primary care
Dr. Bernadett Márkus
Assistant lecturer,
General Practitioner

Up to 50% of the people with T2D remain undiagnosed (and untreated) for a variable length of time and may develop complications during that period.
Therefore, most guidelines recommend screening for T2D in people above 40 to 45 years of age and/or with high risk factors such as family history of diabetes, excess weight (obesity), abdominal obesity (increased waist circumference) and hypertension.



This test is used in primary care in Hungary to evaluate risk factors.
There are differences in the screening tool. Ideally screening should not include blood tests because one of its purpose is to reduce the number of people needing a laboratory test.
Screening questionnaires are becoming widely used because they include the main risk factors and can be easily performed by trained personnel and even by the subject being screened. One such tool is the FINDRISC, which is an 8-item questionnaire that provides a measure of the probability of developing T2D over the following 10 years.



FPG: fasting plasma glucose.
IFG: impared fasting glucose.
PG: plasma glucose.
OGTT: oral glucose tolerance test
IGT: impared glucose tolerance
A1C: glycated haemoglobin (A1c)

The purpose of the NGSP is to standardize Hemoglobin A1c test results to those of the Diabetes Control and Complications Trial (DCCT) and United Kingdom Prospective Diabetes Study (UKPDS) which established the direct relationships between HbA1c levels and outcome risks in patients with diabetes.
http://www.ngsp.org/

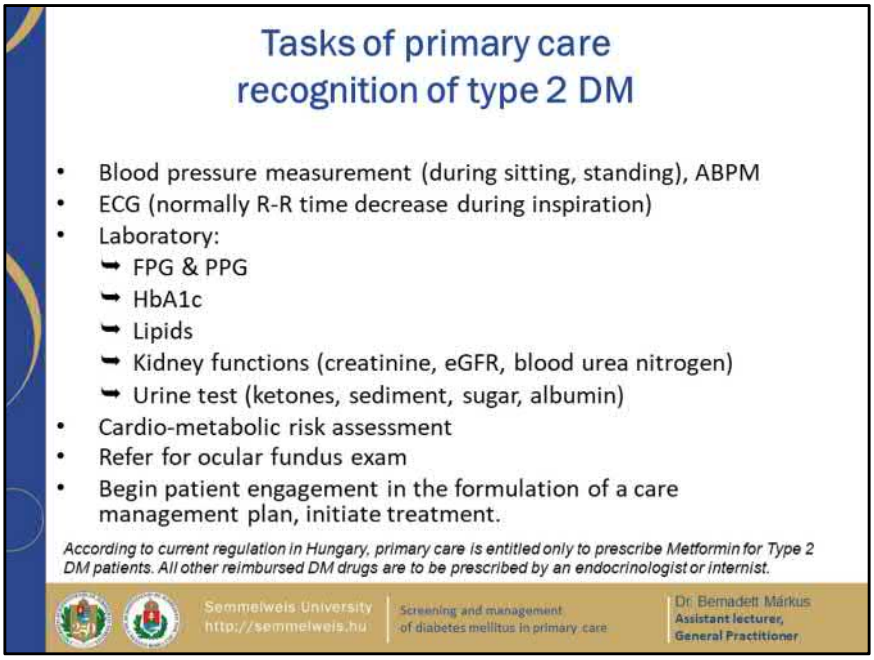
FPG: fasting plasma glucose.
IFG: impared fasting glucose.
PG: plasma glucose.
OGTT: oral glucose tolerance test
IGT: impared glucose tolerance
A1C: glycated haemoglobin (A1c)

Tasks of primary care
recognition of type 2 DM

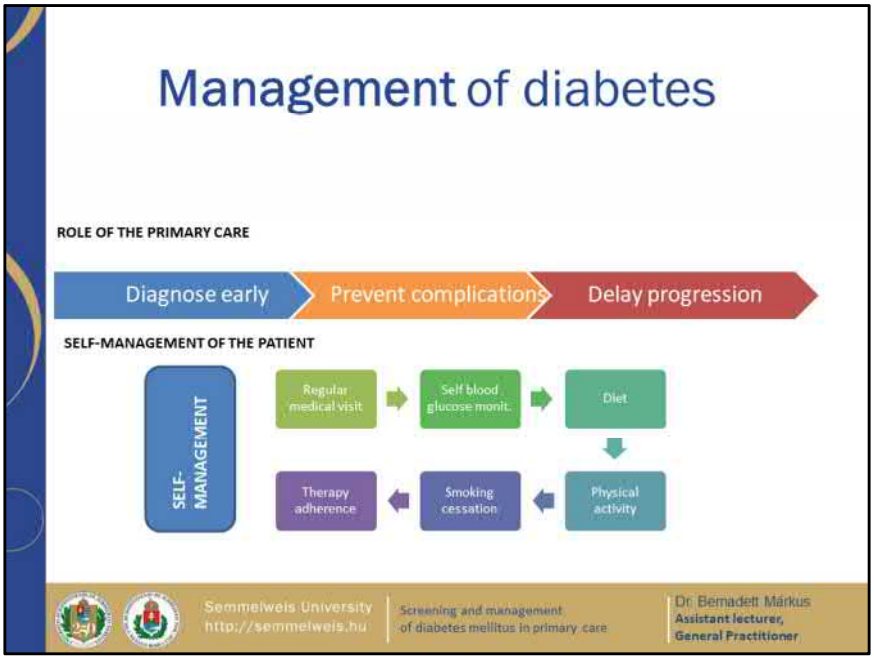
Assess key patient characteristics:
current lifestyle, comorbidities,
clinical characteristics, current medications

Physical examination:

- BMI, waist-to-hip,
- Foot examination (deformations, ulcerations, vascular assessment)
- Assessment for distal symmetric polyneuropathy (temperature, pinprick, vibration, 10-g monofilament testing)
- Assessment of peripherial vascular status (pulse inspection, Doppler, ankle-brachial index [normal range: 0.91-1.39])



According to current regulation in Hungary, primary care is entitled only to prescribe Metformin for Type 2 DM patients.
All other reimbursed DM drugs are to be prescribed by an endocrinologist or internist.


Management of diabetes
ROLE OF THE PRIMARY CARE
Diagnose early
Prevent complications
Delay progression
SELF-MANAGEMENT OF THE PATIENT
SELF-MANAGEMENT
Regular medical visit
Self blood glucose monit.
Diet
Physical activity
Smoking cessation
Therapy adherence
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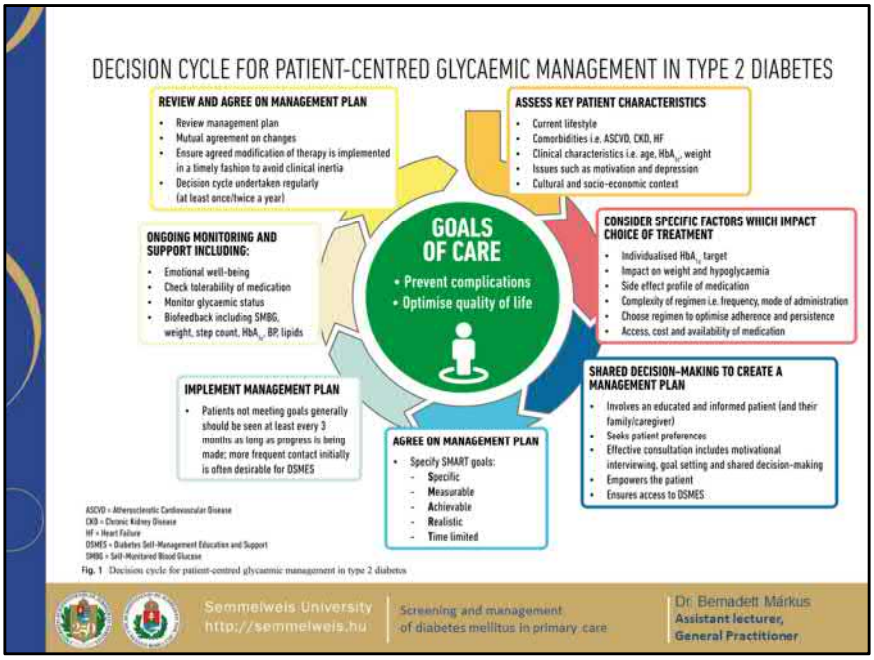
Screening and management of diabetes mellitus in primary care
Dr. Bernadett Márkus
Assistant lecturer,
General Practitioner

Lifestyle management

- All people with type 2 diabetes should be offered access to ongoing **DSMES - Diabetes self-management education and support programmes**.
- Facilitating **medication adheren**ce should be specifically considered when selecting glucose-lowering medications.
- An individualised programme of MNT- **Medical nutrition therapy** should be offered to all patients
- **All overweight and obese patients with diabetes should be advised** of the health benefits of weight loss and encouraged to engage in a programme of intensive lifestyle management, which may include food substitution.
- **Increasing physical activity** improves glycaemic control and should be encouraged in all people with type 2 diabetes.


DECISION CYCLE FOR PATIENT-CENTRED GLYCAEMIC MANAGEMENT IN TYPE 2 DIABETES
REVIEW AND AGREE ON MANAGEMENT PLAN
Review management plan
Mutual agreement on changes
Ensure agreed modification of therapy is implemented in a timely fashion to avoid clinical inertia
Decision cycle undertaken regularly (at least once/twice a year)
ASSESS KEY PATIENT CHARACTERISTICS
Current lifestyle
Comorbidities i.e. ASCVD, CKD, HF
Clinical characteristics i.e. age, HbA1c, weight
Issues such as motivation and depression
Cultural and socio-economic context
GOALS OF CARE
Prevent complications
Optimise quality of life
CONSIDER SPECIFIC FACTORS WHICH IMPACT CHOICE OF TREATMENT
Individualised HbA1c target
Impact on weight and hypoglycaemia
Side effect profile of medication
Complexity of regimen i.e. frequency, mode of administration
Choose regimen to optimise adherence and persistence
Access, cost and availability of medication
ONGOING MONITORING AND SUPPORT INCLUDING:
Emotional well-being
Check tolerability of medication
Monitor glycaemic status
Biofeedback including SMBG, weight, step count, HbA1c, BP, lipids
SHARED DECISION-MAKING TO CREATE A MANAGEMENT PLAN
Involves an educated and informed patient (and their family/caregiver)
Seeks patient preferences
Effective consultation includes motivational interviewing, goal setting and shared decision-making
Empowers the patient
Ensures access to DSMES
IMPLEMENT MANAGEMENT PLAN
Patients not meeting goals generally should be seen at least every 3 months as long as progress is being made; more frequent contact initially is often desirable for DSMES
AGREE ON MANAGEMENT PLAN
Specify SMART goals:
Specific
Measurable
Achievable
Realistic
Time limited
ASCVD = Atherosclerotic Cardiovascular Disease
CKD = Chronic Kidney Disease
HF = Heart Failure
DSMES = Diabetes Self-Management Education and Support
SMBG = Self-Monitored Blood Glucose
Fig. 1 Decision cycle for patient-centred glycaemic management in type 2 diabetes
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Dr. Bernadett Márkus
Assistant lecturer,
General Practitioner

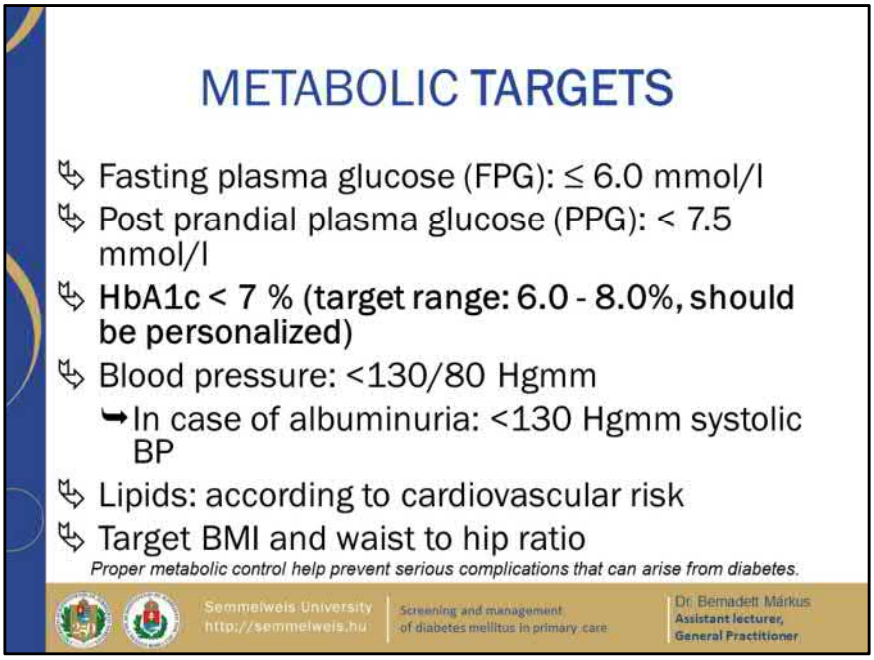
Annual lab control type 2 DM

- HbA1c – (every 3 months)
- FPG & PPG (OGTT)
- Se Cholesterol,
- HDL-cholesterol,
- LDL-cholesterol
- Triglyceride
- Creatinine
- eGFR
- Urine sugar, ketones, sediment
- Urine culture (if needed)
- Quantitative albumin measurement (24h urine sample or Albumin to Creatinine Ratio).

Annual control type 2 DM

Control of the complications, comorbidities

Control of the self-management



Proper metabolic control help prevent serious complications that can arise from diabetes.

Treatment TARGETS

Table 9 Summary of treatment targets for the management of patients with diabetes

Risk factor	Target
BP	• Target SBP 130 mmHg for most adults, <130 mmHg if tolerated, but not <120 mmHg • Less stringent targets, SBP 130–139 in older patients (aged >65 years)
Glycaemic control: HbA1c	• HbA1c target for most adults is <7.0% (<53 mmol/mol) • More-stringent HbA1c goals of <6.5% (48 mmol/mol) may be suggested on a personalized basis if this can be achieved without significant hypoglycaemia or other adverse effects of treatment • Less-stringent HbA1c goals of <8% (64 mmol/mol) or <9% (75 mmol/mol) may be adequate for elderly patients (see section 6.2.1)
Lipid profile: LDL-C	• In patients with DM at very high CV risk,* target LDL-C to <1.4 mmol/l. (<55 mg/dL) • In patients with DM at high risk,* target LDL-C to <1.8 mmol/l. (<70 mg/dL) • In patients with DM at moderate CV risk,* aim for an LDL-C target of <2.5 mmol/l. (<100 mg/dL)
Platelet inhibition	In DM patients at high/very high CV risk
Smoking	Cessation obligatory
Physical activity	Moderate-to-vigorous, ≥150 min/week, combined aerobic and resistance training
Weight	Aim for weight stabilization in overweight or obese patients with DM, based on calorie balance, and weight reduction in subjects with IGT, to prevent the development of DM.
Dietary habits	Reduction of caloric intake is recommended in obese patients with T2DM to lower body weight; there is no ideal percentage of calories from carbohydrate, protein, and fat for all people with DM.

BP = blood pressure; CV = cardiovascular; DM = diabetes mellitus; HbA1c = haemoglobin A1c; IGT = impaired glucose tolerance; LDL-C = low-density lipoprotein cholesterol; SBP = systolic blood pressure; T2DM = type 2 diabetes mellitus.
*See Table 7.

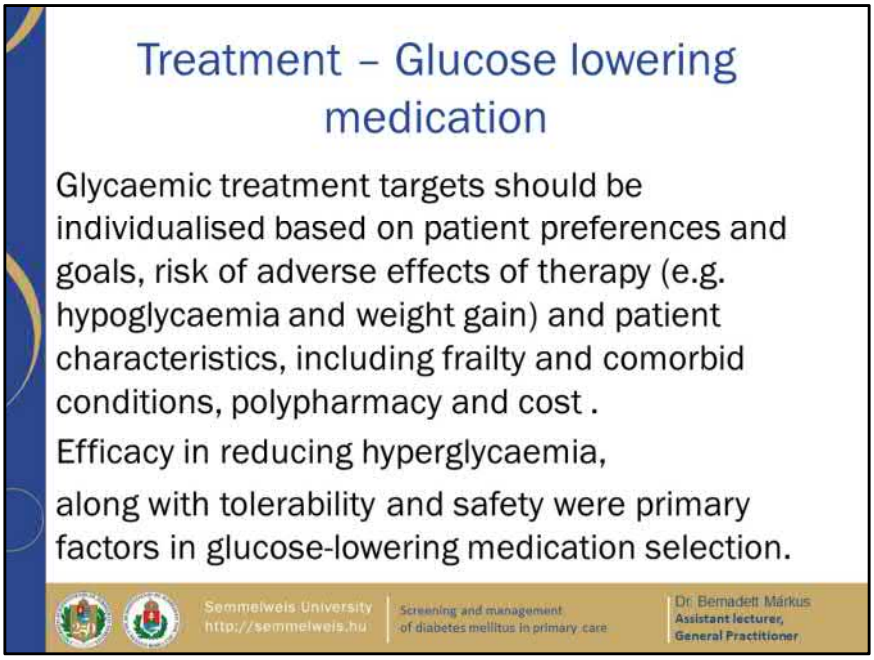

Patient self-management is an important part of successfully preventing or delaying diabetes complications.
Semmelweis University
http://semmelweis.hu
Screening and management of diabetes mellitus in primary care
Dr. Bernadett Márkus
Assistant lecturer,
General Practitioner

Glucose-lowering treatments

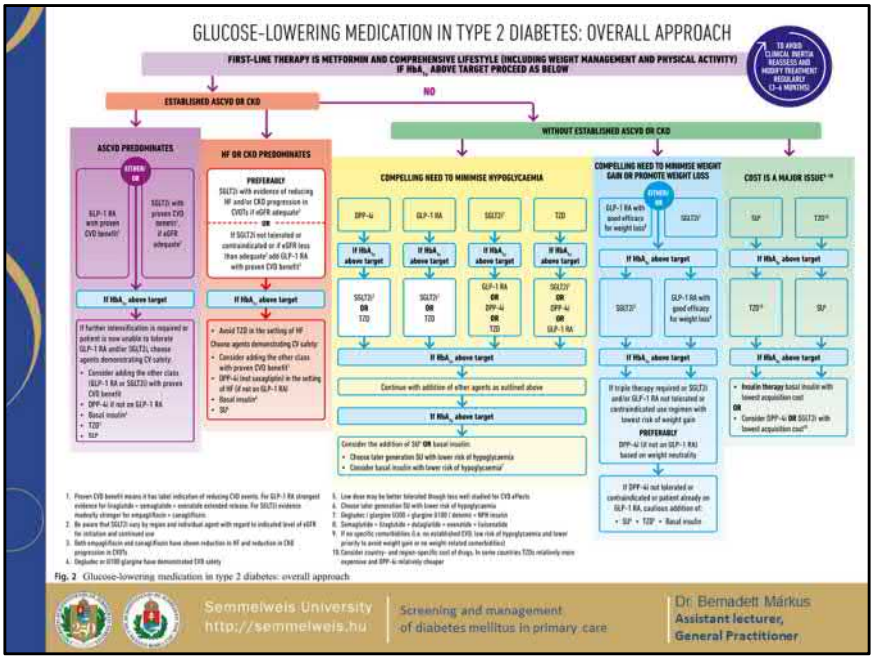
Lifestyle management, including medical nutrition therapy, physical activity, weight loss, counselling for smoking cessation, and psychological support,often delivered in the context of diabetes self-management education and support (DSMES), are fundamental aspects of diabetes care.

The expanding number of glucose-lowering treatments — from behavioural interventions to medications and surgery — and growing information about their benefits and risks provides more options for people with diabetes and providers, but can complicate decision making.

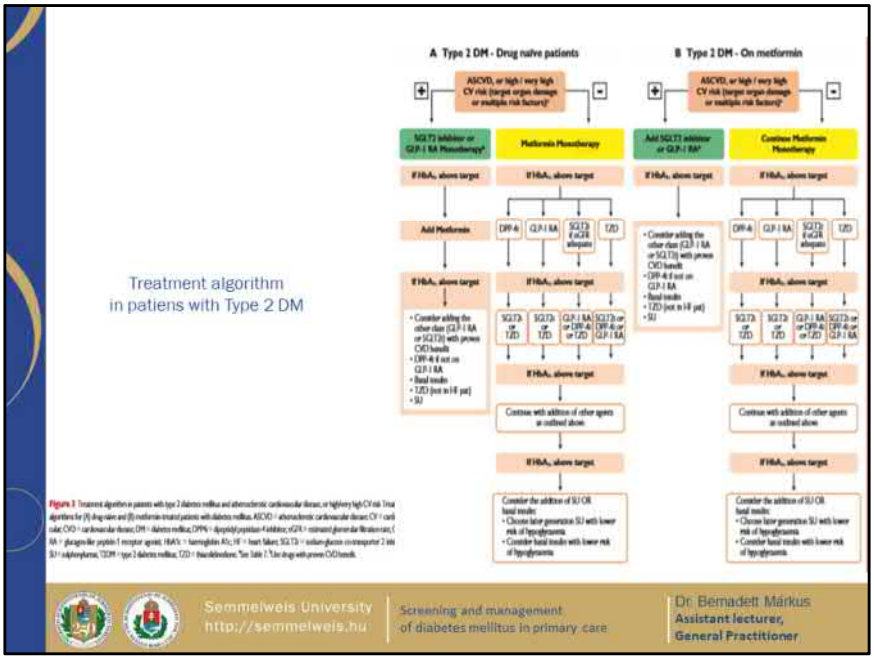
DSMES Diabetes self-management education and support



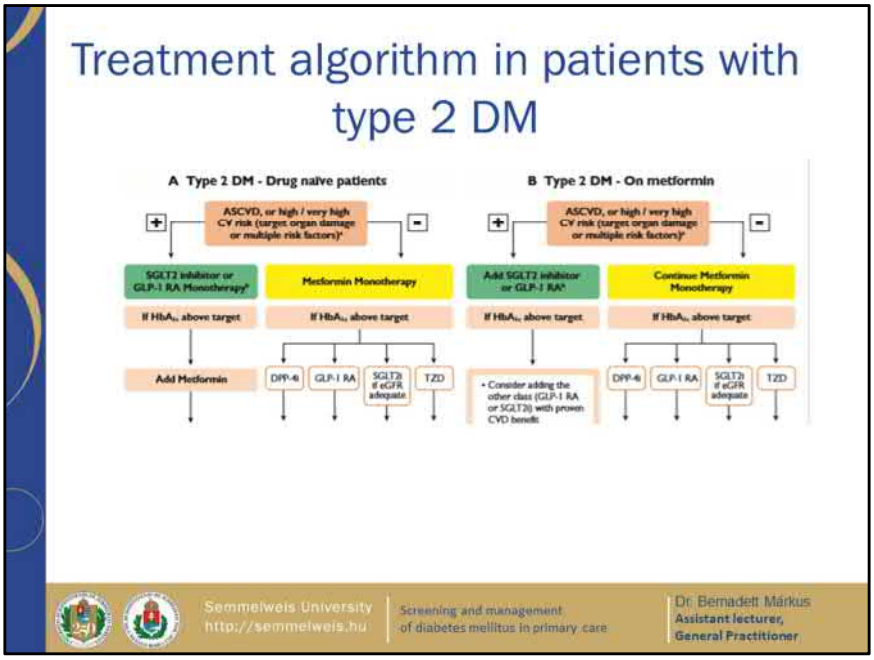
DSMES Diabetes self-management education and support



New consensus approach to glucose lowering with medications in type 2 diabetes
According to current regulation in Hungary, primary care is entitled only to prescribe Metformin for Type 2 DM patients.
All other reimbursed DM drugs are to be prescribed by an endocrinologist or internist.



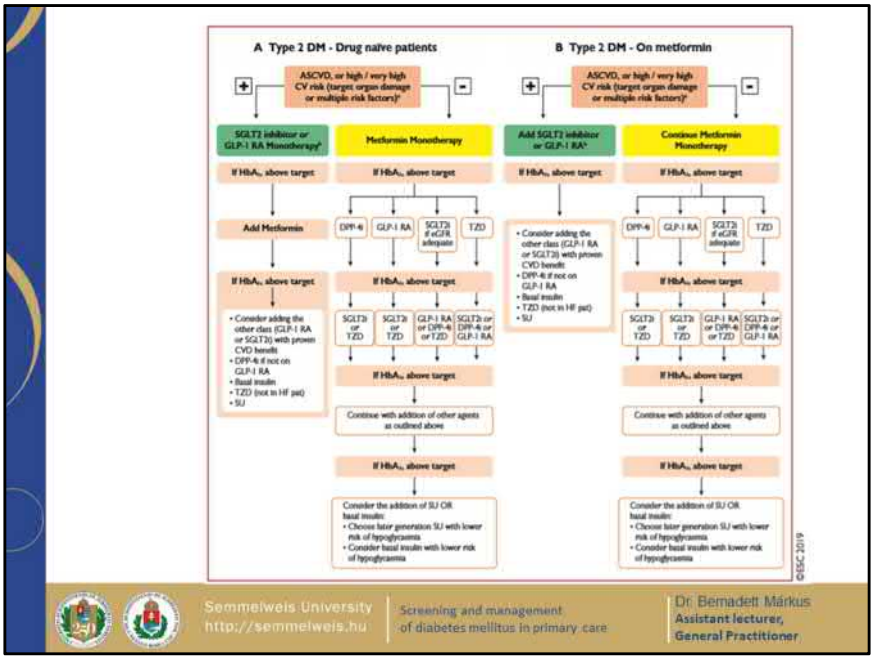
The major change from prior consensus reports is based on new evidence that specific sodium–glucose cotransporter-2 (SGLT2) inhibitors or glucagon-likepeptide-1(GLP-1) receptor agonists improve cardiovascular outcomes, as well as secondary outcomes such as HF and progression of renal disease, in patients with established CVD or CKD.



Therefore, an important early step in this new approach is to consider the presence or absence of ASCVD, HF and CKD, conditions in aggregate affecting 15–25% of the population with type 2 diabetes.

Consensus recommendations ADA, EASD

- Among patients with type 2 diabetes who have established ASCVD, SGLT2 inhibitors or GLP-1 receptor agonists with proven cardiovascular benefit are recommended as part of glycaemic management.
- Among patients with ASCVD in whom HF coexists or is of special concern, SGLT2 inhibitors are recommended
- For patients with type 2 diabetes and CKD, with or without CVD, consider the use of an SGLT2 inhibitor shown to reduce CKD progression or, if contraindicated or not preferred, a GLP-1 receptor agonist shown to reduce CKD progression


A Type 2 DM - Drug naïve patients
B Type 2 DM - On metformin
ASCVD, or high / very high CV risk (target organ damage or multiple risk factors)*
SGLT2 inhibitor or GLP-1 RA Monotherapy†
Metformin Monotherapy
Add SGLT2 inhibitor or GLP-1 RA^
Continue Metformin Monotherapy
If HbA1c above target
Add Metformin
DPP-4
GLP-1 RA
SGLT2i if eGFR adequate
TZD
SGLT2i or TZD
GLP-1 RA or DPP-4i or TZD
SGLT2i or DPP-4i or GLP-1 RA
• Consider adding the other class (GLP-1 RA or SGLT2i) with proven CVD benefit
• DPP-4i if not on GLP-1 RA
• Basal insulin
• TZD (not in HF pat)
• SU
Continue with addition of other agents as outlined above
Consider the addition of SU OR basal insulin:
• Choose later generation SU with lower risk of hypoglycaemia
• Consider basal insulin with lower risk of hypoglycaemia
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Screening and management of diabetes mellitus in primary care
Dr. Bernadett Márkus
Assistant lecturer,
General Practitioner

Atherosclerotic cardiovascular disease

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of death in people with type 2 diabetes.

Diabetes confers substantial independent ASCVD risk, and most people with type 2 diabetes have additional risk factors such as hypertension, dyslipidaemia, obesity, physical inactivity, chronic kidney disease (CKD) and smoking.

Cardiovascular risk categories

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

CV = cardiovascular; CVD = cardiovascular disease; DM = diabetes mellitus; T1DM = type 1 diabetes mellitus; T2DM = type 2 diabetes mellitus.
[a]Modified from the 2016 European Guidelines on cardiovascular disease prevention in clinical practice.[27]
[b]Proteinuria, renal impairment defined as eGFR ≥30 mL/min/1.73 m^2, left ventricular hypertrophy, or retinopathy.
[c]Age, hypertension, dyslipidemia, smoking, obesity.

PREVENTION OF **COMPLICATIONS**

- How to prevent or delay the onset of compliactions?

- Which complications can we screen?
- When to screen?
- How to screen?

- How to manage those complications which we were able to test?

Acute and chronic (late) complications

Acute complications:

- Hypoglycemia
- Diabetic Ketoacidosis (DKA)
- Hyperosmolar Hyperglycemic Syndrome (HHS)
- Metformin Associated Lactic Acidosis (MALT)

Late complications:

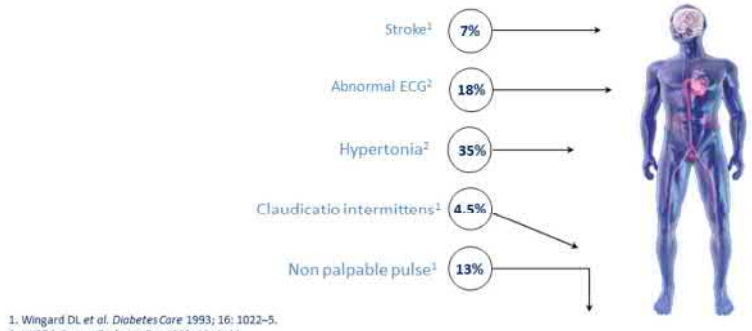
Microvascular

- Retinopathy
- Nephropathy
- Neuropathy

Macrovascular

- coronary heart disease
- cerebrovascular disease
- peripheral arterial disease

LATE complications at the time of diagnosis of DM



1. Wingard DL *et al. Diabetes Care* 1993; 16: 1022–5.
2. UKPDS Group. *Diabetes Res* 1990; 13: 1–11.

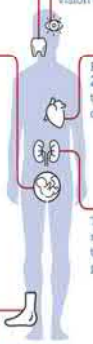
Dr. Bernadett Márkus
Assistant lecturer, General Practitioner

Complications

People with diabetes are at **higher risk** of developing periodontal disease

Diabetic retinopathy affects over **one-third** of all people with diabetes and is the leading cause of vision loss in working-age adults

Pregnant woman with diabetes or at high risk for GDM should manage their glycaemia throughout their pregnancy to avoid lond-term consequences for themselves and their children, and **trasgenerational effects** (higher risk of obesity, diabetes, hypertension and kidney disease in the offspring)



People with diabetes are **2 to 3 times** more likely to have cardiovascular disease (CVD)

The prevalence of end-stage renal disease (ESRD) is up to **10 times higher** in people with diabetes

International Diabetes Federation

Every **30 seconds** a lower limb or part of a lower limb is lost to amputation somewhere in the world as a consequence of diabetes

PREVENTION OF COMPLICATIONS

- Which complications can we screen?
- When to screen?
- How to screen?

- How to manage those complications which we were able to test?

Screening of Diabetic Retinopathy

Role of primary care:
refer all diabetic patients for *annual* eye examination.

Optimize glycemic control to reduce the risk or slow the progression of diabetic retinopathy.

Optimize blood pressure and serum lipid control to reduce the risk or slow the progression of diabetic retinopathy.

Patients with type 2 diabetes should have **an initial dilated and comprehensive eye examination**.

Women with preexisting type 1 or type 2 diabetes who are **planning pregnancy or who are pregnant** should be counseled on the risk of development and/or progression of diabetic retinopathy.
Eye examinations should occur before pregnancy or in the first trimester. Patients should be monitored every trimester and for 1-year postpartum.

Screening of Chronic Kidney Disease / Diabetic nephropathy

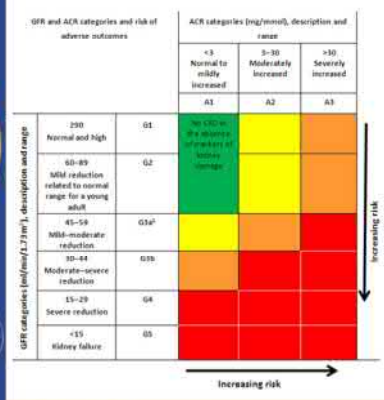
Screening

- At least once a year, assess urinary albumin (e.g., spot urinary albumin-to-creatinine ratio) and eGFR
- in patients with type 1 diabetes with duration of ≥5 years,
- in all patients with type 2 diabetes,
- and in all patients with comorbid hypertension.

Treatment

- Optimize glucose control
- Optimize blood pressure control (RAAS)
- Dietary protein intake should be approximately 0.8 g/kg body weight per day

Screening of CKD /Stages



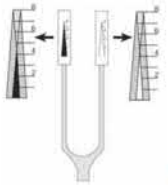
- Patients with CKD can be classified depending on their level of kidney function, or eGFR, and the amount of protein present in the urine.
- This information forms the basis of CKD staging which is useful for planning follow up and management.
- The higher the stage (G1->G5) and the greater the amount of protein present in the urine (A1->A3) the more "severe" the CKD.

Dr. Bernadett Márkus
Assistant lecturer, General Practitioner

CKD MONITORING

- **When eGFR is <60 mL/min/1.73 m2, evaluate and manage potential complications of CKD.**
- Patients should be referred for evaluation for renal replacement treatment if they have an eGFR <30 mL/min/1.73 m2.
- Promptly refer to a physician experienced in the care of kidney disease for uncertainty about the etiology of kidney disease, difficult management issues, and rapidly progressing kidney disease (signs of chronic pyelonephritis, hematuria 2 times or more, nephrotic patient, anemia, secondary hyperparathyroidism, metabolic bone disease, resistant hypertension, or electrolyte disturbances).

DIABETIC NEUROPATHY



DIABETIC NEUROPATHY

- All patients should be assessed for diabetic peripheral neuropathy **starting at diagnosis of type 2 diabetes** and 5 years after the diagnosis of type 1 diabetes and at least annually thereafter.
- Assessment for **distal symmetric polyneuropathy** should include a careful history and assessment of either temperature or pinprick sensation (small-fiber function) and vibration sensation using a 128-Hz tuning fork (for large fiber function).
- All patients should have annual 10-g monofilament testing to identify feet at risk for ulceration and amputation.
- **Up to 50% of diabetic peripheral neuropathy (DPN) may be asymptomatic.**

If not recognized and if preventive foot care is not implemented, patients are at risk for injuries to their insensate feet.

DIABETIC NEUROPATHY

Distal symmetric polyneuropathy (DSPN):

75% of diabetic neuropathies.

Diabetic **autonomic** neuropathies: In type 2 diabetes, the prevalence of CAN also increases with diabetes duration and may be present in up to 60% of patients with type 2 diabetes after 15 years

Other, atypical forms

Symptoms and signs of DSPN

	Large myelinated nerve fibers	Small myelinated nerve fibers
Function	Pressure, balance	Nociception, protective sensation
Symptoms	Numbness, tingling, poor balance	Pain: burning, electric shocks, stabbing
Examination (clinically diagnostic)	Ankle reflexes: reduced/absent Vibration perception: reduced/absent 10-g monofilament: reduced/absent Proprioception: reduced/absent	Thermal (cold/hot) discrimination: reduced/absent Pinprick sensation: reduced/absent

Diabetic Neuropathy: A Position Statement by the American Diabetes Association. Diabetes Care 2017 Jan; 40(1): 136-154.

Symptoms and signs associated with diabetic autonomic neuropathy

Cardiovascular AN	Gastrointestinal	Urogenital	Sudomotor
Resting tachycardia	Gastroparesis (Gastropathy)	Bladder dysfunction	Dry skin
Abnormal blood pressure regulation	Nausea Bloating Loss of appetite Postprandial vomiting	Frequency, urgency Nocturia Hesitancy Weak stream Incontinence	Anhidrosis Gustatory sweating
Orthostatic hypotension	Esophageal dysfunction	Sexual dysfunction	
Orthostatic tachycardia or bradycardia and chronotropic incompetence	Diabetic diarrhea		

FOOT CARE

Perform a comprehensive **foot evaluation at least annually to identify risk factors for ulcers and amputations**.

Patients with evidence of sensory loss or prior ulceration or amputation should have their **feet inspected at every visit**.

The examination should include **inspection of the skin, assessment of foot deformities, neurological assessment** (10-g monofilament testing with at least one other assessment: pinprick, temperature, vibration), and **vascular assessment including pulses in the legs and feet.**

Patients with symptoms of claudication or decreased or absent pedal pulses should be referred for ankle-brachial index and for further vascular assessment as appropriate.

Hypertension/Blood Pressure Control

Blood pressure should be measured at **every routine clinical visit**.

- Patients found to have elevated blood pressure (**≥130/80 mmHg**) should have blood pressure confirmed using multiple readings.
- For individuals with diabetes and hypertension at **higher cardiovascular risk** (existing ASCVD or 10-year ASCVD risk >15%), a blood pressure target of **<130/80 mmHg** may be appropriate, if it can be safely attained.

Hypertension/Blood Pressure Control

Change in recommendations	
2013	**2019**
BP targets	
BP target <140/85 mmHg for all	Individualized BP targets are recommended SBP to 130 mmHg and, if well tolerated, <130 mmHg, but not <120 mmHg In older people (>65 years) target SBP to a range of 130 - 139 mmHg DBP to <80 mmHg but not <70 mmHg
	On-treatment SBP to <130 mmHg should be considered for patients at high risk of cerebrovascular events or diabetic kidney disease

Key messages

- The BP goal is to target systolic BP (SBP) to 130 mmHg in patients with DM and <130 mmHg if tolerated, but not <120 mmHg. In older people (aged >65 years), the SBP goal is to a range of 130 - 139 mmHg.
- The diastolic BP (DBP) target is <80 mmHg, but not <70 mmHg.
- Optimal BP control reduces the risk of micro- and macrovascular complications.
- Guidance on lifestyle changes must be provided for patients with DM and hypertension.
- Evidence strongly supports the inclusion of an angiotensin-converting enzyme inhibitor (ACEI), or an angiotensin receptor blocker (ARB) in patients who are intolerant to ACEI.
- BP control often requires multiple drug therapy with a renin–angiotensin–aldosterone system (RAAS) blocker, and a calcium channel blocker or diuretic. Dual therapy is recommended as first-line treatment.
- The combination of an ACEI and an ARB is not recommended.
- In pre-DM, the risk of new-onset DM is lower with RAAS blockers than with beta-blockers or diuretics.
- Patients with DM on combined antihypertensive treatments should be encouraged to self-monitor BP.

Blood pressure

Dr. Bernadett Márkus
Assistant lecturer,
General Practitioner

Cardiovascular risk categories

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

CV = cardiovascular; CVD = cardiovascular disease; DM = diabetes mellitus; T1DM = type 1 diabetes mellitus; T2DM = type 2 diabetes mellitus.
[a]Modified from the 2016 European Guidelines on cardiovascular disease prevention in clinical practice.[27]
[b]Proteinuria, renal impairment defined as eGFR ≥30 mL/min/1.73 m^2, left ventricular hypertrophy, or retinopathy.
[c]Age, hypertension, dyslipidemia, smoking, obesity.

Lipid management

In patient with T2DM **at moderate CV risk**,

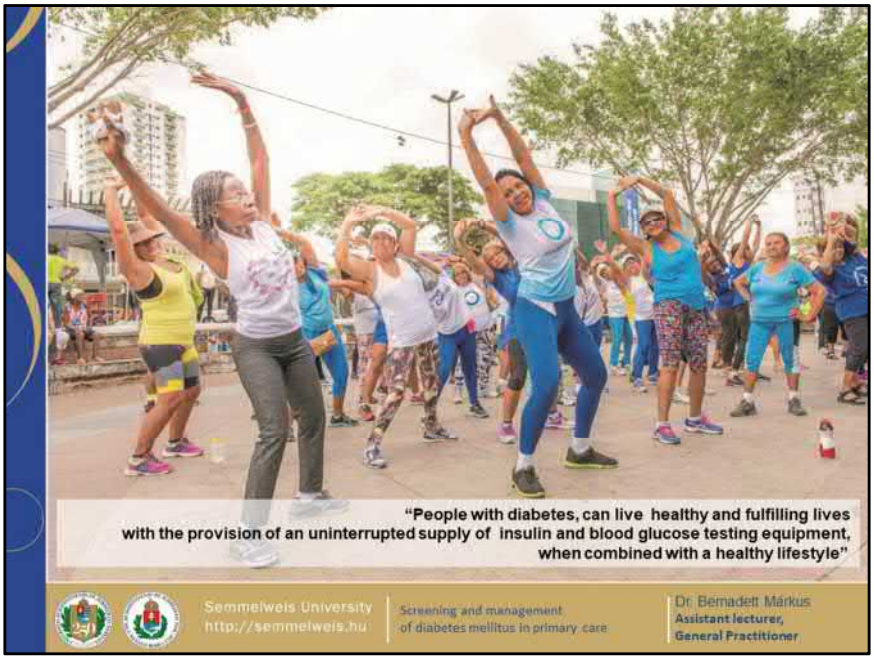
an **LDL-C target of <2.5 mmol/l** (<100 mg/dl) is recommended

In patient with T2DM **at high CV risk**,

an **LDL-C target of <1.8 mmol/l** (<70 mg/dl) is recommended

In patient with T2DM **at very high CV risk**,

an **LDL-C target of <1.4 mmol/l** (<55 mg/dl) is recommended


"People with diabetes, can live healthy and fulfilling lives with the provision of an uninterrupted supply of insulin and blood glucose testing equipment, when combined with a healthy lifestyle"
Semmelweis University
http://semmelweis.hu
Screening and management of diabetes mellitus in primary care
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Assistant lecturer,
General Practitioner

The European Association for the Study of Diabetes e.V. (EASD) is a non-profit, medical scientific association.
It was founded in 1965 and its headquarters is based in Duesseldorf, Germany.
The aims of the Association are to encourage and support research in the field of diabetes, the rapid diffusion of acquired knowledge and to facilitate its application.
https://www.easd.org/

Empower e-Learning platform to expand the reach of EASD's educational goal to disseminate knowledge and proficiency in diabetes research and care worldwide. You can access for free! Try it!

AIM

To educate, inform and engage healthcare professionals around the world by addressing standard themes in practical diabetology as well as novel and complex themes in modern diabetology that overlap with other medical disciplines.

FORMAT

Comprehensive online courses divided into a series of modules which have been built and reviewed with experts from around the world and provide case based online education with engaging interactive multi-media content including expert videos, audios, animations and more.

Virtual Patients

EASD e-learning courses

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Virtual Consultation Room

Meet Eva

Patient information

- **Occupation:** Beautician
- **Age:** 52 years old
- **Height:** 165 cm
- **Weight:** 79kg
- Diagnosed with T2DM 6 months ago at occasion of myocardial infarction
- Recently ex-smoker

Blood pressure:

- 145/90 mmHg

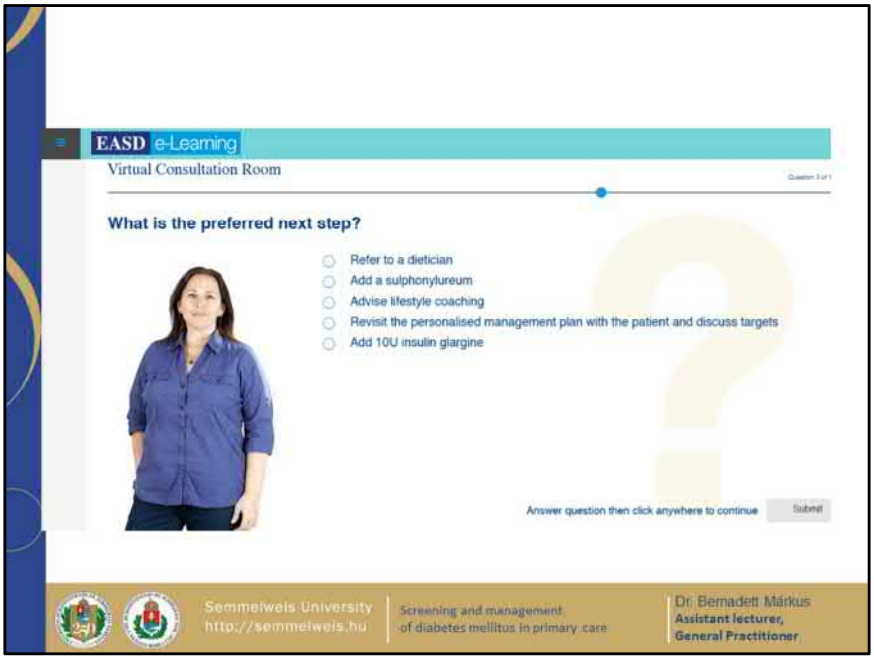
BMI:

- 29.0 kg/m²

- **HbA1c:** 8.0%
- **FPG:** 8.0–9.1 mmol/L (144–163 mg/dL)
- **PPG:** 12.5–13.5 mmol/L (225–243 mg/dL)
- **HDL cholesterol:** 0.9 mmol/L (36 mg/dL)
- **LDL cholesterol:** 2.3 mmol/L (89 mg/dL)
- **Triglycerides:** 4.2 mmol/L (370 mg/dL)
- **eGFR:** 88 mL/min/1.73 m²

Current medication

- Antihyperglycemic therapy
  - Metformin 1000 mg QD
- Concomitant medications
  - Atorvastatin 40 mg QD
  - Enalapril 5mg QD


EASD e-Learning
Virtual Consultation Room
What is the preferred next step?
Refer to a dietician
Add a sulphonylureum
Advise lifestyle coaching
Revisit the personalised management plan with the patient and discuss targets
Add 10U insulin glargine
Answer question then click anywhere to continue
Submit
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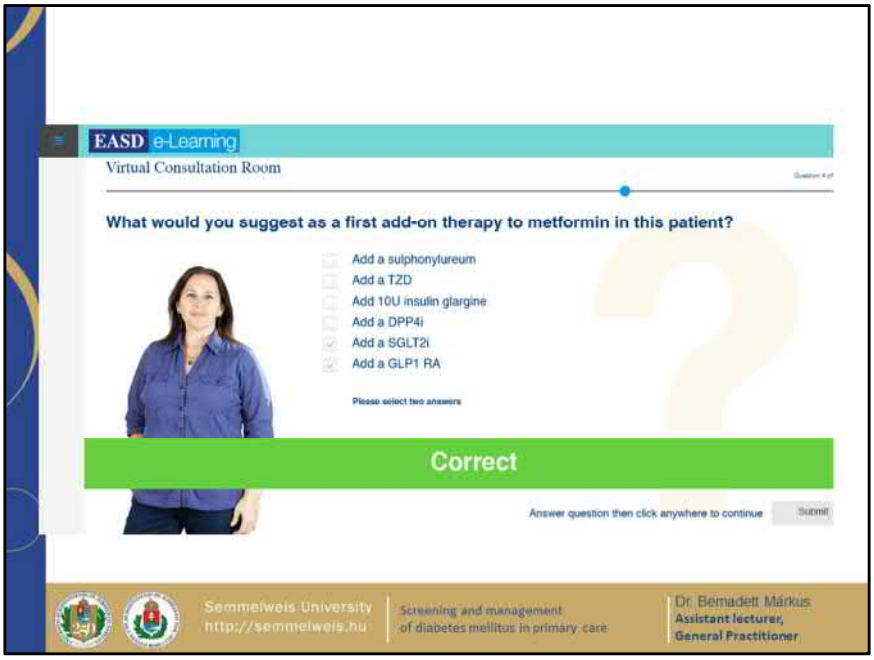
EASD e-Learning
Virtual Consultation Room
What would you suggest as a first add-on therapy to metformin in this patient?
Add a sulphonylureum
Add a TZD
Add 10U insulin glargine
Add a DPP4i
Add a SGLT2i
Add a GLP1 RA
Please select two answers
Correct
Answer question then click anywhere to continue
Submit
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EASD e-Learning
Virtual Consultation Room
Under what conditions would you consider prescribing insulin for this patient?
If she had symptoms of catabolism (polyuria, polydipsia, weight loss, fatigue...)
Never
Answer question then click anywhere to continue
Submit
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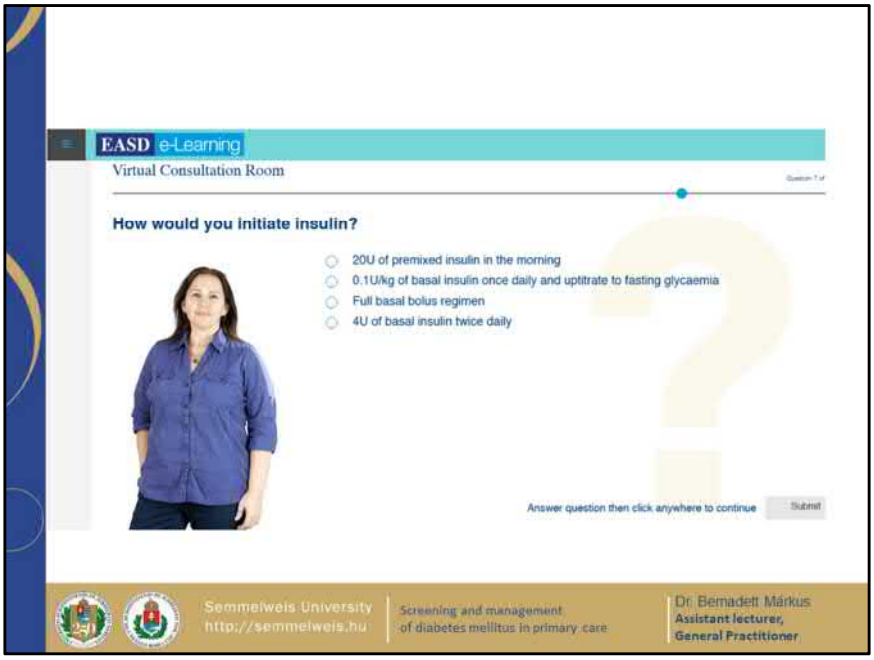
EASD e-Learning
Virtual Consultation Room
How would you initiate insulin?
20U of premixed insulin in the morning
0.1U/kg of basal insulin once daily and uptitrate to fasting glycaemia
Full basal bolus regimen
4U of basal insulin twice daily
Answer question then click anywhere to continue
Submit
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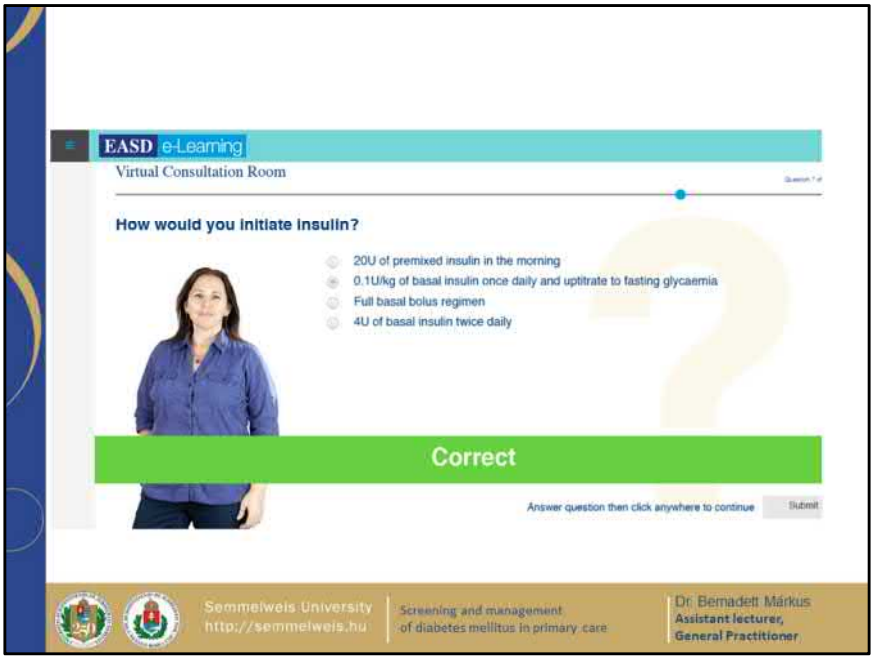
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Full basal bolus regimen
4U of basal insulin twice daily
Correct
Answer question then click anywhere to continue
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Virtual Consultation Room

Would your choice of first add-on therapy to metformin differ if the patient's HbA1c was >9.5%?

- No
- Yes, if he had symptoms of catabolism (polyuria, polydipsia, weight loss, fatigue…)

Answer question then click anywhere to continue

Submit

EASD e-learning courses

ADDITIONAL RESOURCES

- American Diabetes Association - **Standards of Medical Care in Diabetes**—2019. https://doi.org/10.2337/cd18-0105
- **Management of hyperglycaemia in type 2 diabetes**, 2018. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetologia. https://doi.org/10.1007/s00125-018-4729-5
- Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes—2019 American Diabetes Association Diabetes Care 2019 Jan; 42(Supplement 1): S13-S28. https://doi.org/10.2337/dc19-S002
- EASD E-Learning: https://elearning.easd.org/
- International Diabetes Federation https://idf.org/

Thank you for your attention!

Dr. Bernadett Márkus
markus.bernadett@med.semmelweis-univ.hu