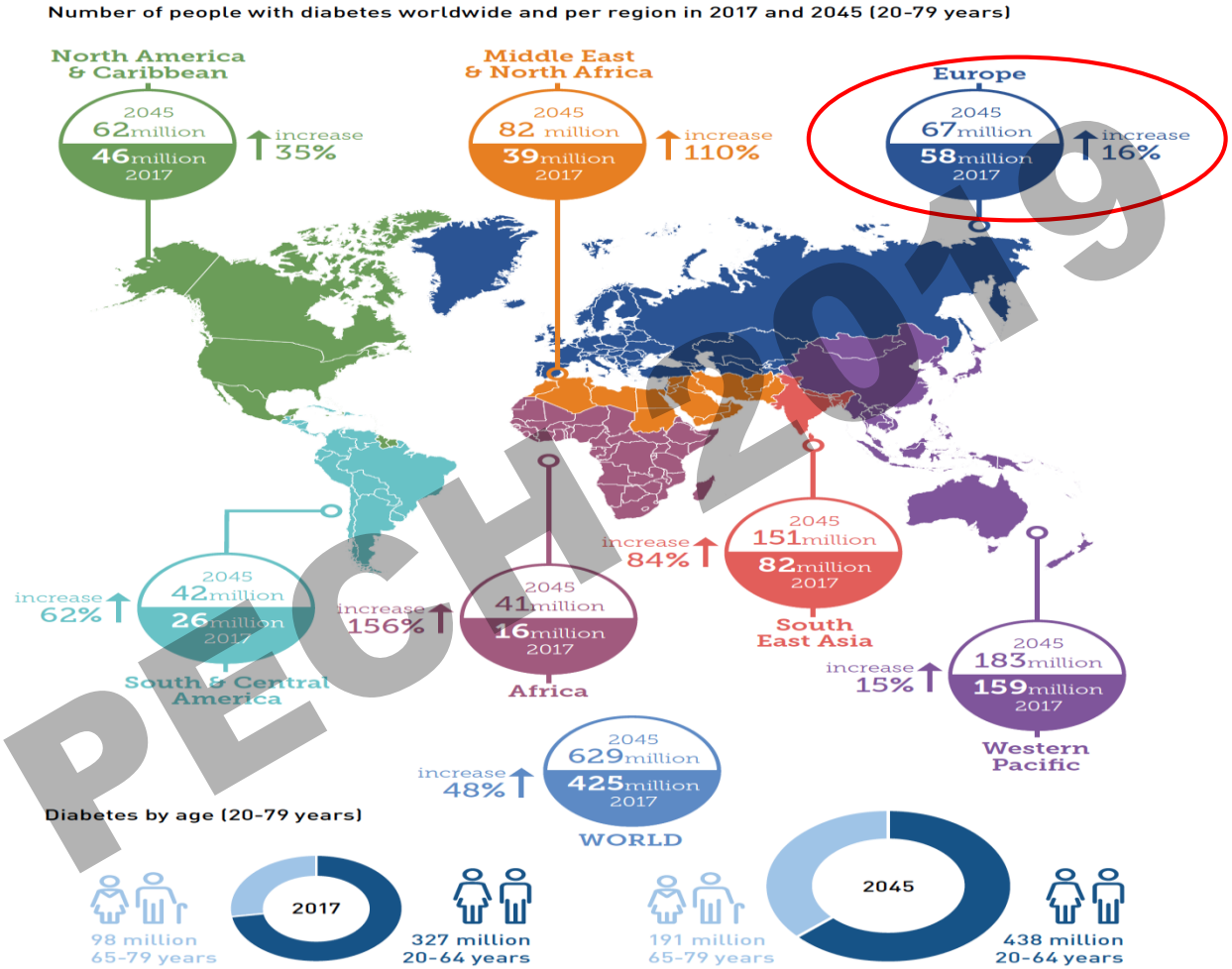
Régi és új szempontok a 2-es típusú diabétesz kezelésében

Új korszak tanúi vagyunk…

dr. Kocsis Győző

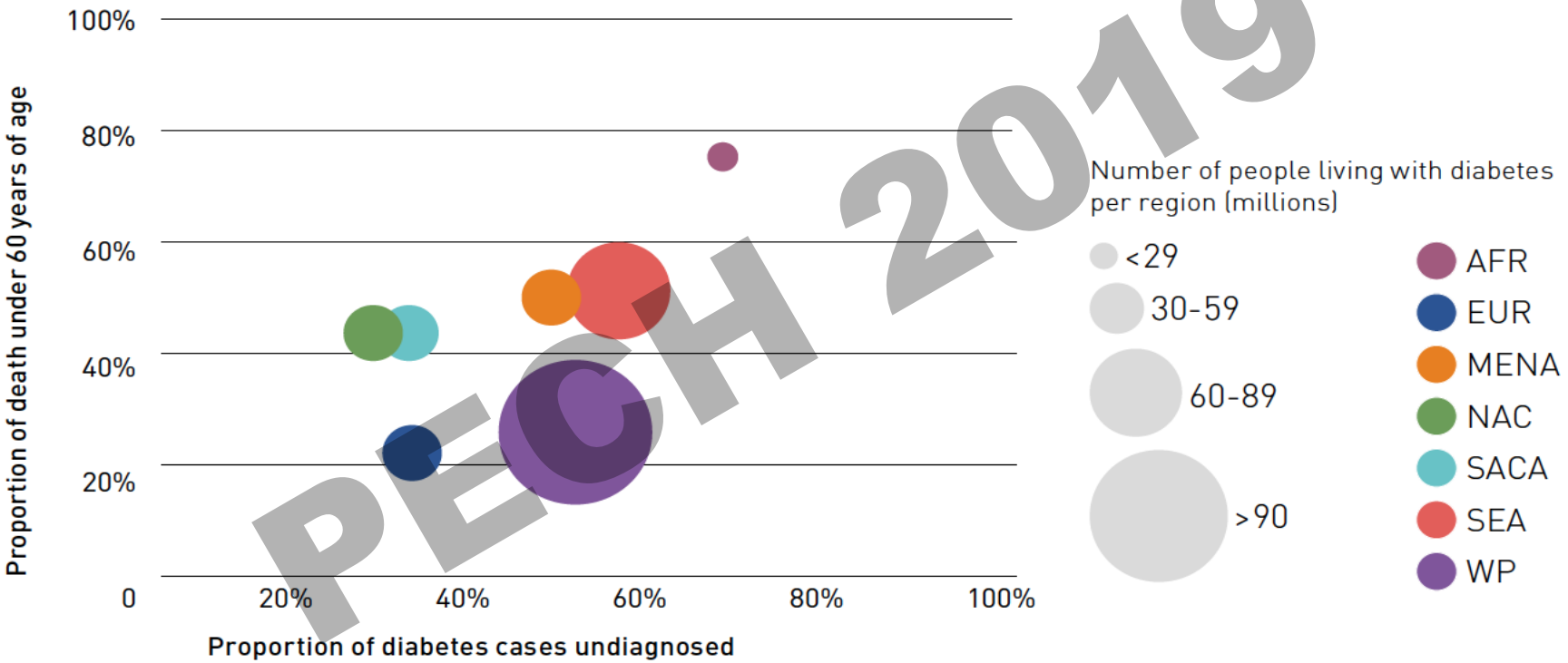
Péterfy Kórház és Manninger Jenő Országos Traumatológiai Intézet (PMJOTI)

II. Kardiovaszkuláris Belgyógyászat és Diabetes Szakrendelő


Number of people with diabetes worldwide and per region in 2017 and 2045 (20-79 years)
North America & Caribbean
2045 62million
46million 2017
increase 35%
Middle East & North Africa
2045 82 million
39million 2017
increase 110%
Europe
2045 67million
58million 2017
increase 16%
South & Central America
2045 42million
26million 2017
increase 62%
Africa
2045 41million
16million 2017
increase 156%
South East Asia
2045 151million
82million 2017
increase 84%
Western Pacific
2045 183million
159million 2017
increase 15%
WORLD
2045 629million
425million 2017
increase 48%
Diabetes by age (20-79 years)
2017
98 million 65-79 years
327 million 20-64 years
2045
191 million 65-79 years
438 million 20-64 years

The hidden diabetes epidemic

Proportion of early deaths, undiagnosed diabetes and number of diabetes per region.

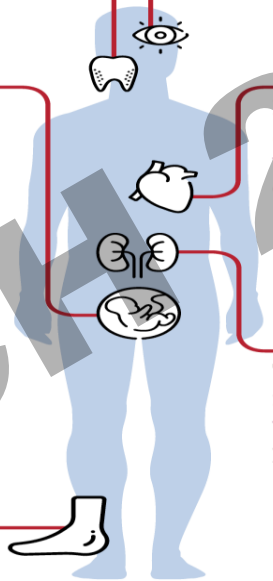


IDF Diabetes Atlas – 8th Edition 2017

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 long-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

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

T2DM vs Control	Number of population			Number of events			Hazard ratio (95% CI)	p value
Mortality	**T2DM**		**Control**	**T2DM**		**Control**		
71 and over	30 082	vs.	60 164	6 753	vs.	9 875	1.29(1.24-1.34)	p<0.0001
61-70	42 243	vs.	84 486	3 571	vs.	5 716	1.20(1.14-1.26)	p<0.0001
51-60	46 659	vs.	93 318	2 379	vs.	3 699	1.22(1.14-1.30)	p<0.0001
41-50	21 827	vs.	43 654	621	vs.	783	1.48(1.30-1.69)	p<0.0001
31-40	8 621	vs.	17 242	85	vs.	70	1.98(1.34-2.92)	p=0.0002
19-30	2 852	vs.	5 704	6	vs.	10	1.20(0.44-3.30)	p=0.725
Total	152 678	vs.	305 356	13 417	vs.	20 154	1.26(1.22-1.29)	p<0.0001
Interaction								p=0.01
Myocardial Infarction	**T2DM**		**Control**	**T2DM**		**Control**		
71 and over	30 082	vs.	60 164	1 041	vs.	872	1.78(1.59-2.00)	p<0.0001
61-70	42 243	vs.	84 486	948	vs.	763	1.57(1.39-1.79)	p<0.0001
51-60	46 659	vs.	93 318	922	vs.	628	1.85(1.62-2.11)	p<0.0001
41-50	21 827	vs.	43 654	360	vs.	162	2.76(2.16-3.52)	p<0.0001
31-40	8 621	vs.	17 242	55	vs.	16	3.50(1.70-7.23)	p=0.0002
19-30	2 852	vs.	5 704	4	vs.	1	8.02(0.90-71.71)	p=0.0627
Total	152 678	vs.	305 356	3 330	vs.	2 442	1.81(1.69-1.94)	p<0.0001
Interaction								p=0.003
Stroke	**T2DM**		**Control**	**T2DM**		**Control**		
71 and over	30 082	vs.	60 164	3 326	vs.	4 220	1.31(1.24-1.39)	p<0.0001
61-70	42 243	vs.	84 486	2 707	vs.	3 114	1.30(1.21-1.39)	p<0.0001
51-60	46 659	vs.	93 318	1 958	vs.	1 799	1.62(1.49-1.76)	p<0.0001
41-50	21 827	vs.	43 654	440	vs.	319	2.12(1.77-2.55)	p<0.0001
31-40	8 621	vs.	17 242	68	vs.	21	4.64(2.55-8.45)	p<0.0001
19-30	2 852	vs.	5 704	3	vs.	2	3.00(0.50-7.96)	p=0.229
Total	152 678	vs.	305 356	8 502	vs.	9 475	1.40(1.35-1.46)	p<0.0001
Interaction								p<0.0001

Fig. 2 Adjusted hazard ratios for all-cause mortality, myocardial infarction and stroke according age cohorts comparing T2DM with matched control. Age-dependent interactions: mortality: $p_{interaction} = 0.01$, myocardial infarction: $p_{interaction} = 0.003$ and stroke: $p_{interaction} < 0.0001$

Male vs Female	Number of population			Number of events			Hazard ratio (95% CI)	Interaction p value
Mortality	**T2DM**		**Control**	**T2DM**		**Control**		
Male	73 440	vs.	146 880	6 725	vs.	10 905	1.17(1.12-1.21)	p<0.000
Female	79 238	vs.	158 476	6 692	vs.	9 249	1.37(1.31-1.42)	
Myocardial infarction								
Male	73 440	vs.	146 880	2 042	vs.	1 473	1.83(1.68 -2.00)	p=0.64
Female	79 238	vs.	158 476	1 288	vs.	969	1.77(1.59-1.98)	
Stroke								
Male	73 440	vs.	146 880	4 171	vs.	4 688	1.33(1.26-1.41)	p=0.01
Female	79 238	vs.	158 476	4 331	vs.	4 787	1.47(1.40-1-55)	

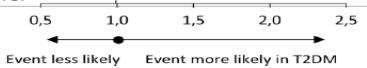


Fig. 3 Adjusted hazard ratios for all-cause mortality, myocardial infarction and stroke according male and female within T2DM and Control population

Vezérfonal…

Távolabbról kell elindulni, ha akarunk tenni valamit....

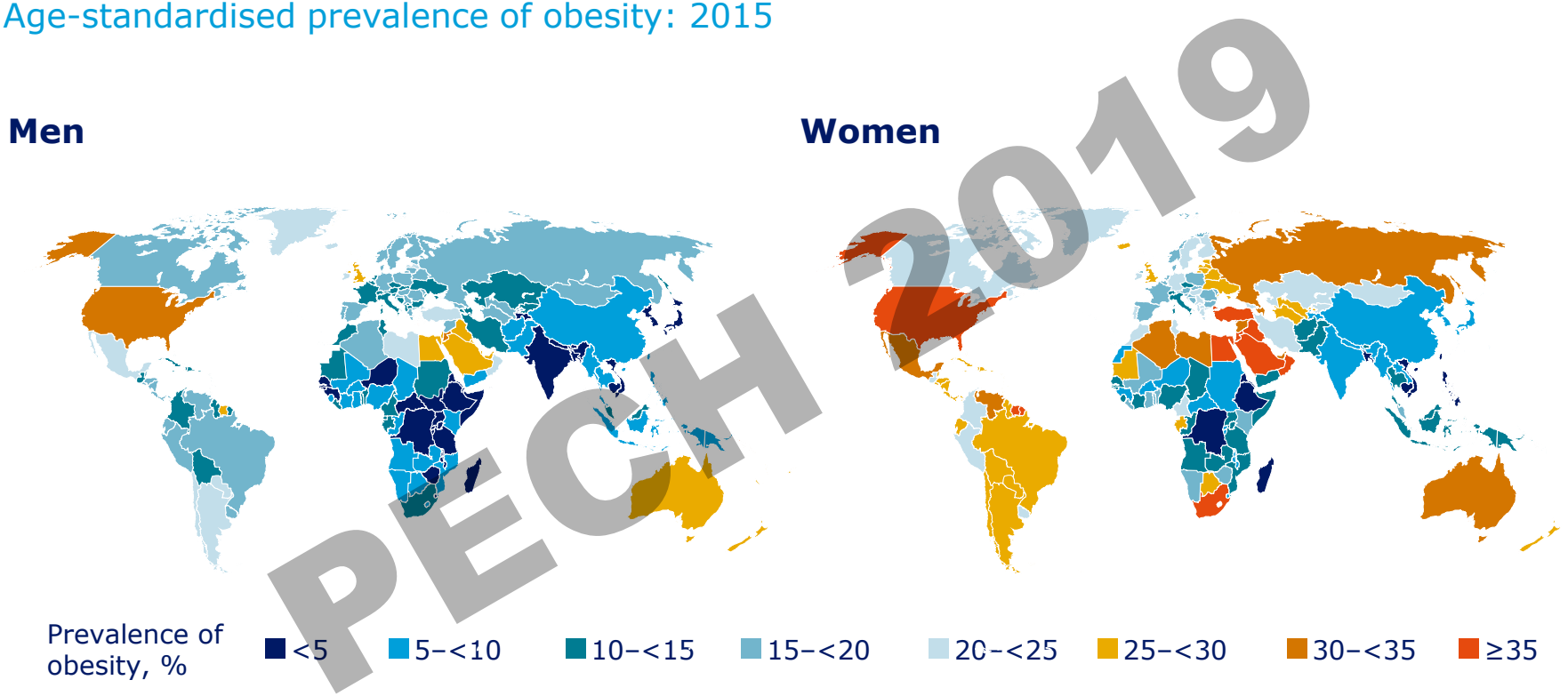
A 2-es típusú diabétesz pathofiziológiája

Az eddig publikált CVOT vizsgálatok adatai megváltoztatják a gondolkodásunkat…?!

Hogyan illesszük a jelen kezelési ajánlásaiba az új szemléletet?

The Obesity Pandemic

Age-standardised prevalence of obesity: 2015



GBD 2015 Obesity Collaborators. *N Engl J Med* 2017;377:13–27

Obesity is

Metabolic, Mechan

Metabolic

Mechanical

Mental

Cancers*

Physical functioning

orbidities

diseases

a
ery disease
eart failure

mbolism

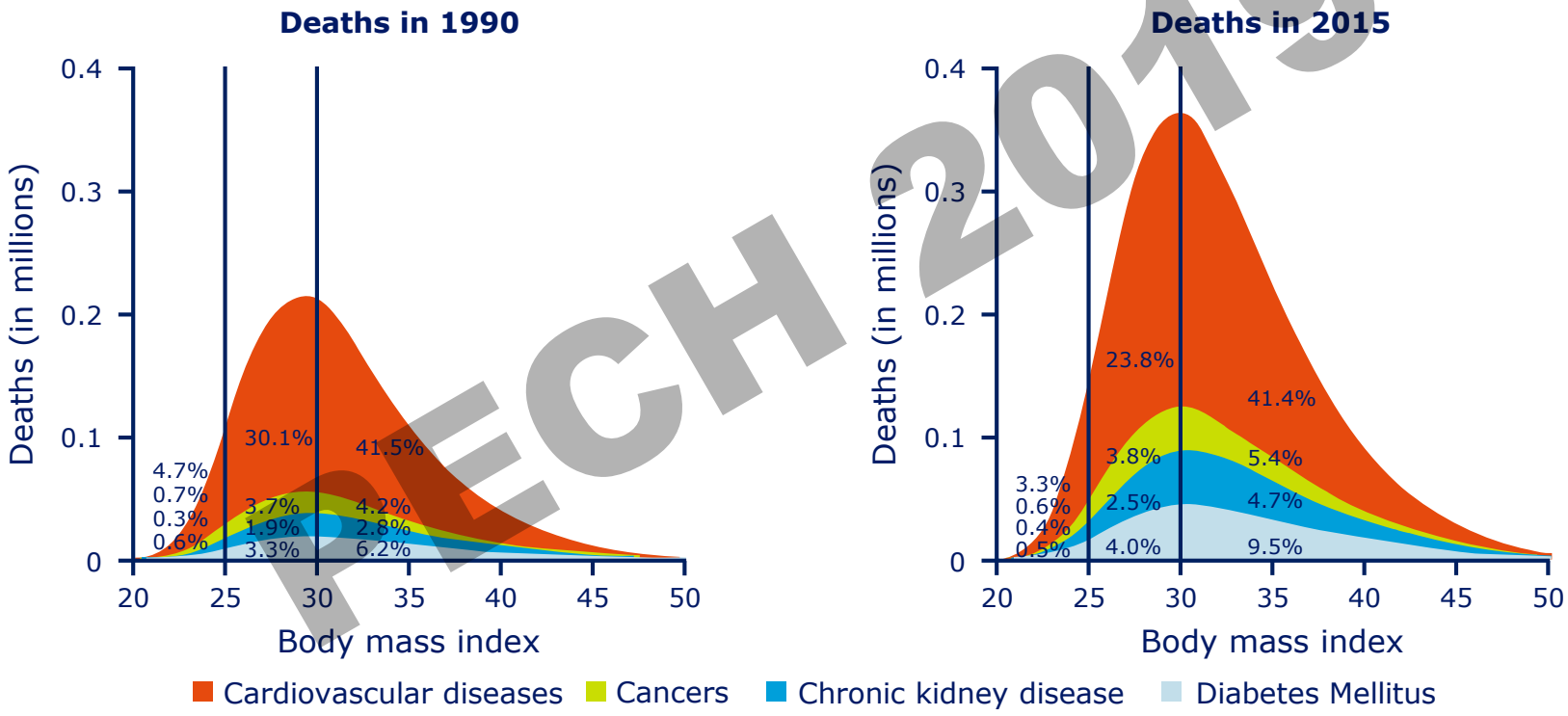
pain

es

NAFLD, non-alcoholic fatty li
*Including breast, colorectal

Adapted from Sharma AM. *Obes Re* ;67:220–9; Simon *et al. Arch Gen Psychiatry* 2006;63:824–30; C *hronic Dis* 2009;6:A48

CV death contributes to the majority of deaths associated with high BMI



GBD 2015 Obesity Collaborators *N Engl J Med* 2017;377:13–27

Vezérfonal…

Távolabbról kell elindulni, ha akarunk tenni valamit....

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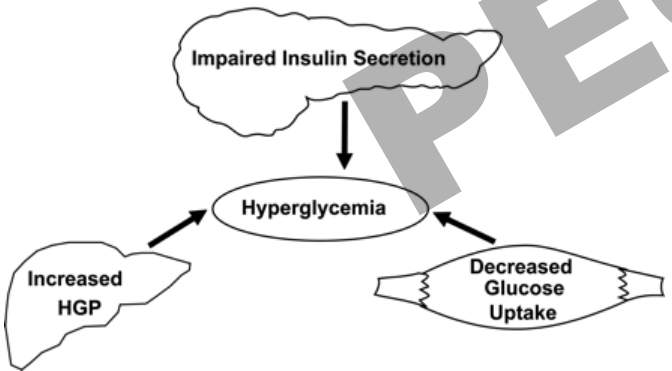
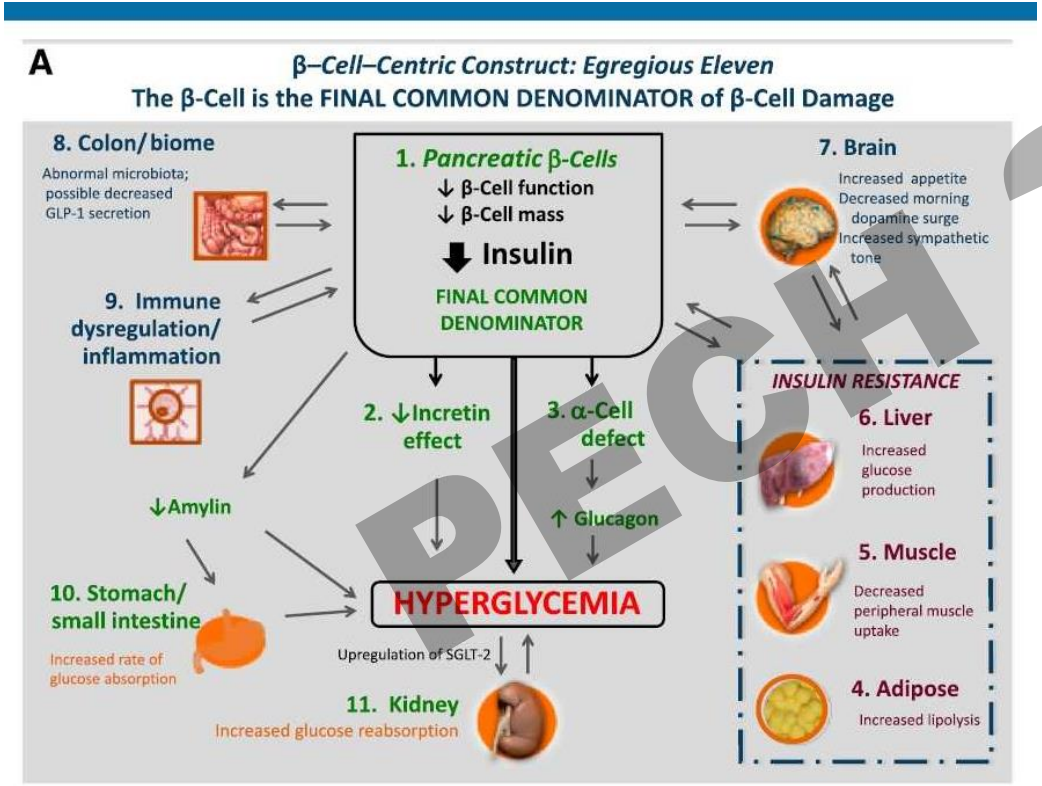
Hogy illesszük a jelen kezelési ajánlásaiba az új szemléletet?

2-es típusú diabétesz régen és ma: a triumvirátustól a baljós 11-ig



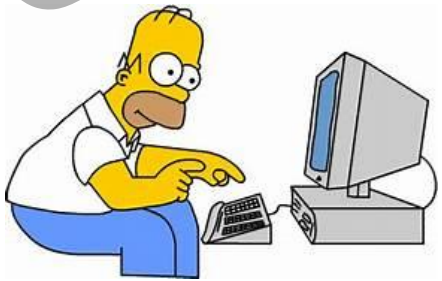
2018: árnyaltabb a kép…



Béta-sejt
Alfa-sejt
Inkretin tengely
Inzulin rezisztencia (máj, izom, zsírszövet)
Vese
Agy
Immunrendszer
Gyomor -és vékonybél
Vastagbél flóra

Stanley S. Schwartz és mtsai, *Diabetes Care*, 2016.

2-es típusú diabétesz:
Nagyon erős genetikai faktorok, környezeti faktorokkal kiegészülve



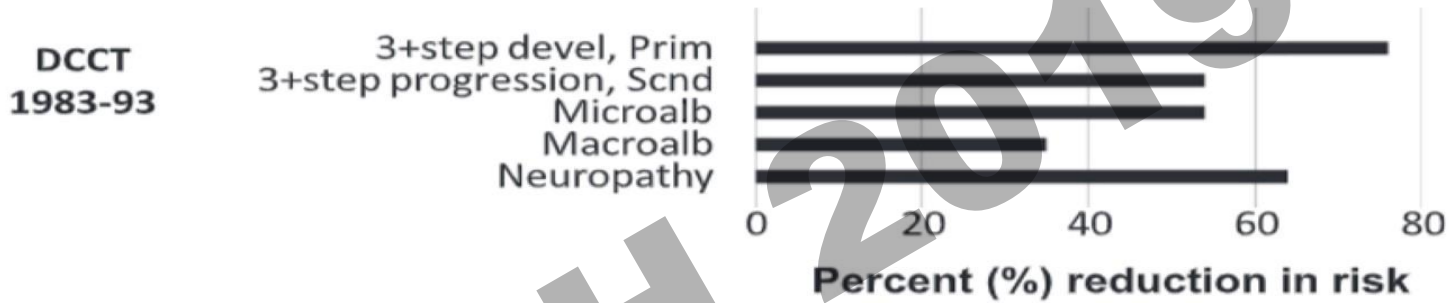
Prevalence Rates of CV Comorbidities in Persons With T2DM: Results of a Systematic Literature Review

Sex	CV Outcome	Studies	N	Rate (%)	95% Confidence Interval (%)
Both	Stroke	39	3,901,505	7.6	6.6, 8.6
	MI	13	3,518,833	10.0	7.5, 12.5
	Angina pectoris	4	354,743	14.6	12.0, 17.3
	Heart failure	14	601,154	14.9	13.0. 16.7
	Atherosclerosis	4	1153	29.1	21.7, 36.4
	Coronary artery disease	42	3,833,200	21.2	20.3, 22.2
	CVD (any)	53	4,289,140	32.2	30.0, 34.4

Globally, more than 30% of persons with T2DM have some form of CV disorder. CVD is a major cause of mortality in patients with T2DM.

Einarson TR, et al. *Cardiovasc Diabetol*. 2018;17:83.

Controlling Glycemia Reduces Microvascular Complications: DCCT

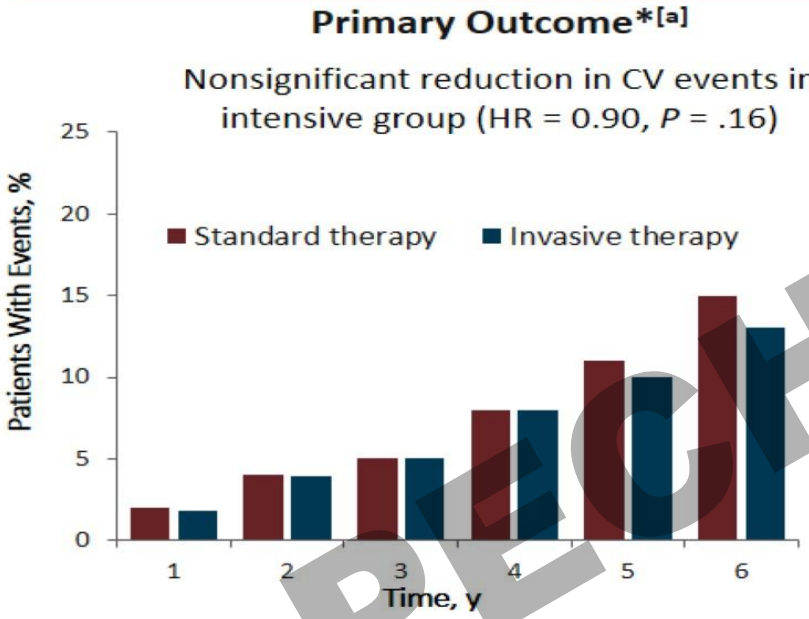


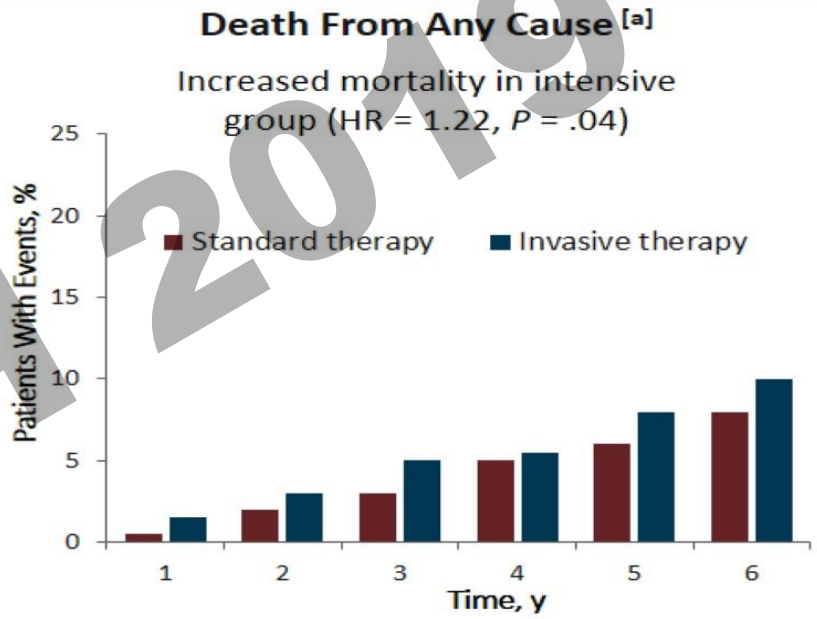
3+step devel, Prim: three-step or more development of retinopathy based on Early Treatment of Diabetic Retinopathy scale in the primary prevention group. Scnd: secondary intervention group. Microalb: microalbuminuria defined as albumin excretion ≥ 40 mg/24 h. Macroalb: macroalbuminuria defined as albumin excretion > 300 mg/24 h.

- In the Diabetes Control and Complications Trial (DCCT), intensive therapy, which featured 3 or more daily insulin injections or insulin pump therapy, and which achieved a median HbA1c of 7.0%, reduced the early stages of microvascular complications by 35% to 76% compared with conventional therapy, with which the median HbA1c was 9.0%

Nathan DN, et al. *Diabetes Care*. 2014;37:9-16.

Intensive Glycemic Control Increased All-Cause Mortality (ACCORD)





Mortality did not increase in other outcome trials (eg, VADT and ADVANCE)[b,c]

*MACE: nonfatal MI, nonfatal stroke, or CV death

a. ACCORD Study Group. *N Engl J Med*. 2008;358:2545-2559; b. Duckworth W, et al. *N Engl J Med*. 2009;360:129-139; c. ADVANCE Collaborative Group. *N Engl J Med*. 2008;358:2560-2572.

Vezérfonal…

Távolabbról kell elindulni, ha akarunk tenni valamit....

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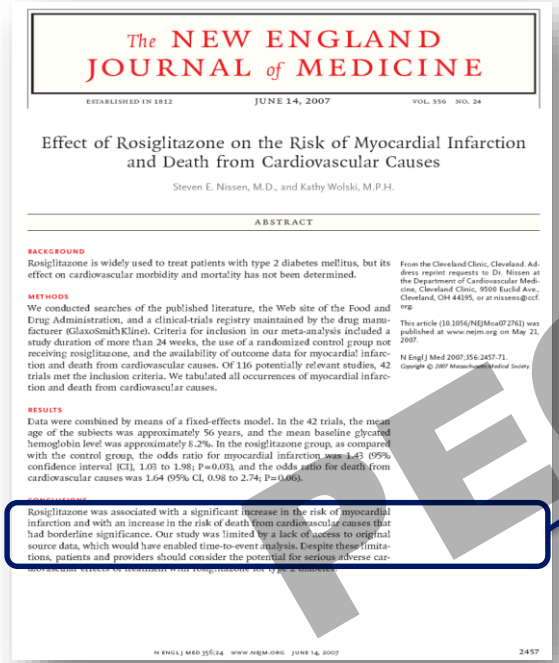
Az eddig publikált CVOT vizsgálatok adatai megváltoztatják a gondolkodásunkat…?!

Hogy illesszük a jelen kezelési ajánlásaiba az új szemléletet?

Experience with rosiglitazone: Are diabetes medications associated with increased CV risk?



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 14, 2007 VOL. 356 NO. 24

Effect of Rosiglitazone on the Risk of Myocardial Infarction and Death from Cardiovascular Causes

Steven E. Nissen, M.D., and Kathy Wolski, M.P.H.

ABSTRACT

BACKGROUND

Rosiglitazone is widely used to treat patients with type 2 diabetes mellitus, but its effect on cardiovascular morbidity and mortality has not been determined.

METHODS

We conducted searches of the published literature, the Web site of the Food and Drug Administration, and a clinical-trials registry maintained by the drug manufacturer (GlaxoSmithKline). Criteria for inclusion in our meta-analysis included a study duration of more than 24 weeks, the use of a randomized control group not receiving rosiglitazone, and the availability of outcome data for myocardial infarction and death from cardiovascular causes. Of 116 potentially relevant studies, 42 trials met the inclusion criteria. We tabulated all occurrences of myocardial infarction and death from cardiovascular causes.

RESULTS

Data were combined by means of a fixed-effects model. In the 42 trials, the mean age of the subjects was approximately 56 years, and the mean baseline glycated hemoglobin level was approximately 8.2%. In the rosiglitazone group, as compared with the control group, the odds ratio for myocardial infarction was 1.43 (95% confidence interval [CI], 1.03 to 1.98; P=0.03), and the odds ratio for death from cardiovascular causes was 1.64 (95% CI, 0.98 to 2.74; P=0.06).

CONCLUSIONS

Rosiglitazone was associated with a significant increase in the risk of myocardial infarction and with an increase in the risk of death from cardiovascular causes that had borderline significance. Our study was limited by a lack of access to original source data, which would have enabled time-to-event analysis. Despite these limitations, patients and providers should consider the potential for serious adverse car-

From the Cleveland Clinic, Cleveland. Address reprint requests to Dr. Nissen at the Department of Cardiovascular Medicine, Cleveland Clinic, 9500 Euclid Ave., Cleveland, OH 44195, or at nissens@ccf.org.

This article (10.1056/NEJMoa072761) was published at www.nejm.org on May 21, 2007.

N Engl J Med 2007;356:2457-71.

Copyright © 2007 Massachusetts Medical Society.

N ENGL J MED 356;24 WWW.NEJM.ORG JUNE 14, 2007 2457

"Rosiglitazone was associated with a significant increase in the risk of myocardial infarction and with an increase in the risk of death from cardiovascular causes that had borderline significance"

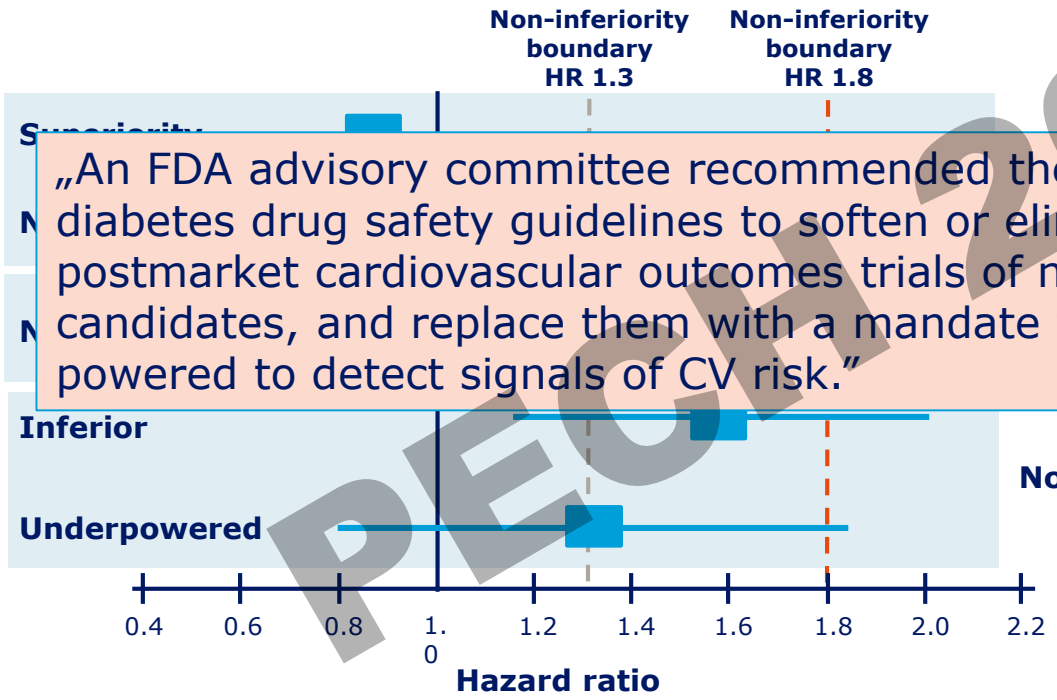
Addressing the need for CVOTs in T2D

- Meta-analyses have raised the question of increased CV risk
- To date, clinical trial designs have not included CV outcomes assessments
- Need to assess non-inferiority versus placebo and versus standard of care

"Demonstrate that a new anti-diabetic therapy is not associated with **unacceptable increase** in cardiovascular risk"

CV, cardiovascular; CVOT, cardiovascular outcome trials; T2D, type 2 diabetes
Hiatt WR et al. *N Engl J Med* 2013;369:1285–1287

FDA criteria for requirement of a postmarketing CV outcomes trial



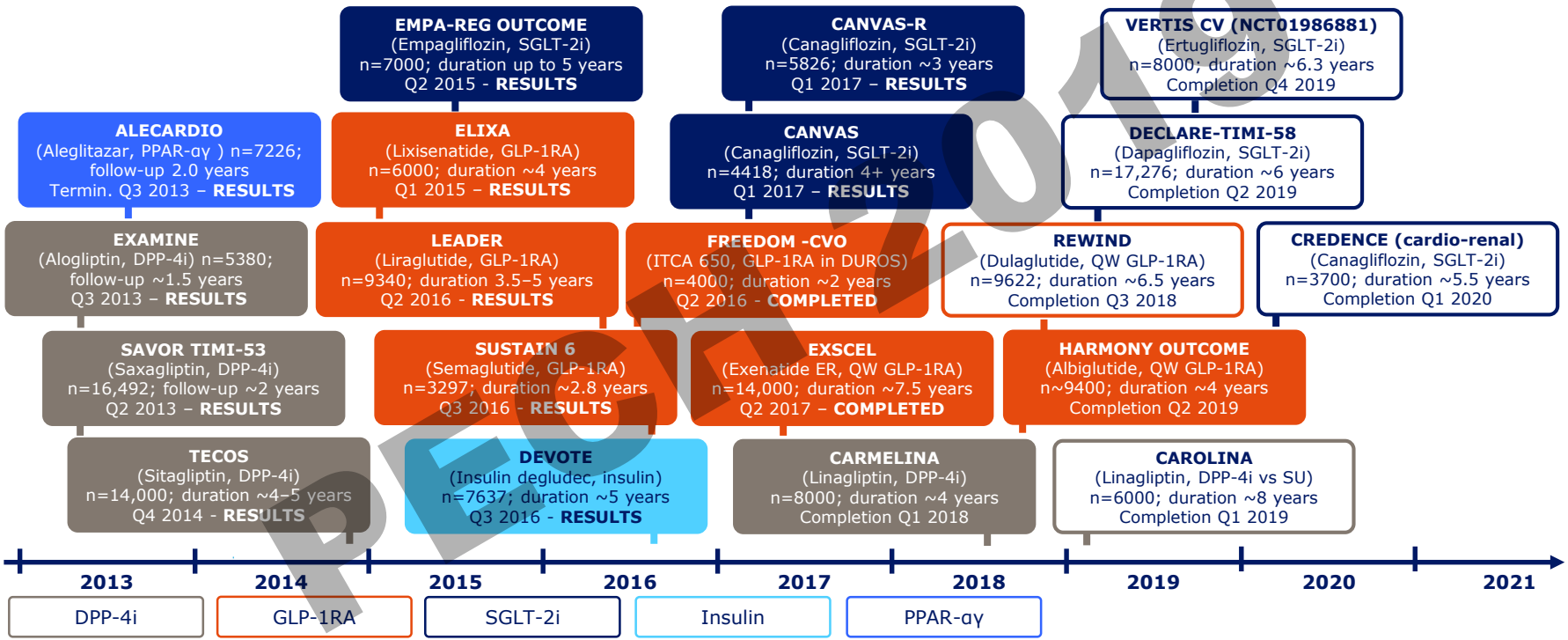
„An FDA advisory committee recommended the agency modify diabetes drug safety guidelines to soften or eliminate requirements for postmarket cardiovascular outcomes trials of new Type 2 diabetes drug candidates, and replace them with a mandate for **premarket** studies powered to detect signals of CV risk."

All phase 2 and 3 should e a ctive ndent tion of ents

A minimum of 2 years' CV safety data must be provided

CI, confidence interval; CV, cardiovascular; FDA, US Food and Drug Administration; HR, hazard ratio
Hirshberg B, Raz I. *Diabetes Obes Metab* 2011;34(Suppl. 2):S101–S106

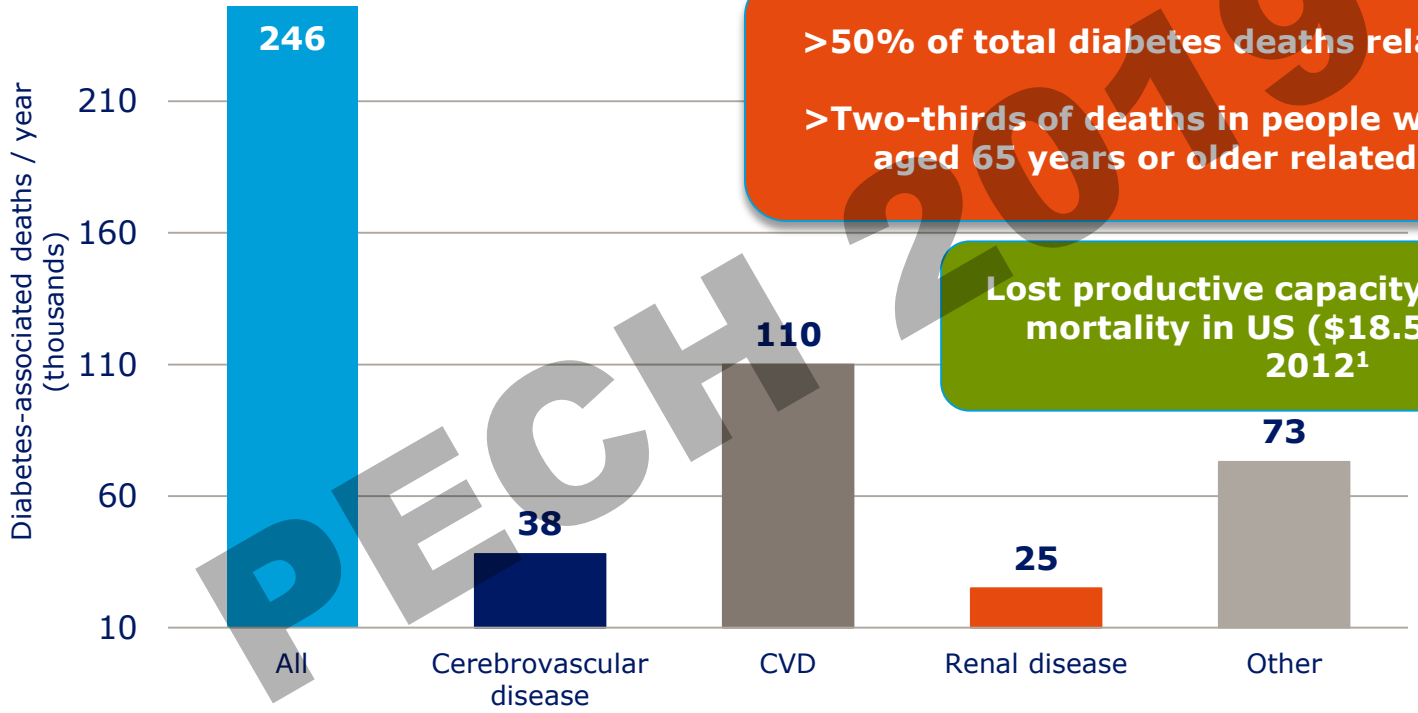
CVOTs in T2D



CVOT, cardiovascular outcomes trial; DPP-4i, dipeptidyl peptidase-4 inhibitor; ER, extended release; GLP-1RA, glucagon-like peptide-1 receptor agonist; ITCA 650, continuous subcutaneous delivery of exenatide; PPAR- receptors-αγ, peroxisome proliferator-activated receptors-α and γ; QW, once weekly; SGLT-2i, sodium-glucose cotransporter 2 inhibitor; SU, sulphonylurea; T2D, type 2 diabetes

ClinicalTrials.gov. Accessed June 2017

CVD remains the leading cause of diabetes-associated death 1,2



>50% of total diabetes deaths related to CVD.

>Two-thirds of deaths in people with diabetes aged 65 years or older related to CVD[2]

Lost productive capacity due to early mortality in US ($18.5 billion) in 2012[1]

Data source: USA Centers for Disease Control and Prevention National Vital Statistics Reports for total deaths in 2009 by primary cause of death, scaled to 2012 using the annual diabetes population growth rate from 2009 to 2012 for each age, sex, and race/ethnicity group
CVD, cardiovascular disease

1. ADA. *Diabetes Care* 2013;36:1033–1046; 2. Centers for Disease Control and Prevention. National Diabetes Fact Sheet 2011. Available at: http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2011.pdf

Vezérfonal…

Távolabbról kell elindulni, ha akarunk tenni valamit....

A 2-es típusú diabétesz pathofiziológiája

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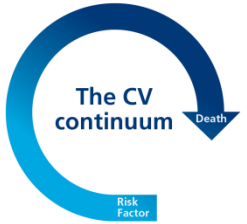
Hogyan illesszük a jelen kezelési ajánlásaiba az új szemléletet?



Loose definition

A chain of events originating from risk factors, which ultimately leads to end-stage CV disease[1]

Neurohormonal activation

Myocardial infarction

Arrhythmias and loss of cardiac muscle

Atherothrombosis

Sudden death

Left ventricular remodelling

Myocardial ischaemia

Symptomatic heart failure

Coronary artery atherosclerosis

Terminal heart disease

Risk factors
(dyslipidaemia, hypertension, diabetes, obesity, smoking)

Death

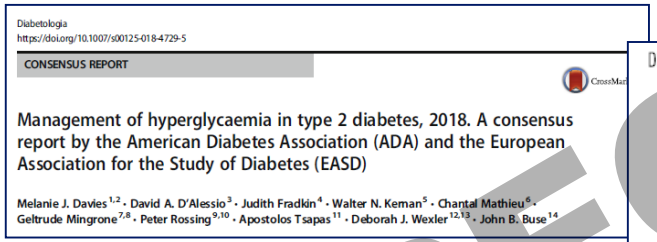
ADA/EASD consensus document 2018

Expert panel

- The writing group for the 2018 consensus report consisted of 10 experts (five from EU and five from the US) selected by ADA and EASD, with limited disclosures

Presented and published

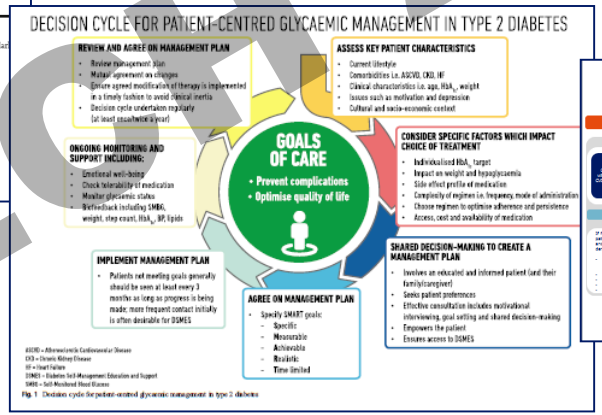
- The updated 2018 consensus report was presented at the EASD congress on 5 October 2018 in Berlin, with simultaneous publication in *Diabetes Care*[3] and *Diabetologia*[4]

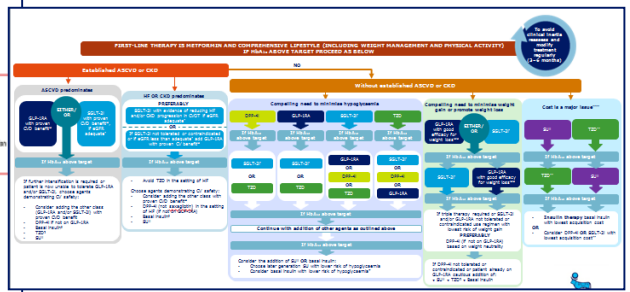

Diabetologia
https://doi.org/10.1007/s00125-018-4729-5

CONSENSUS REPORT

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)

Melanie J. Davies[1,2] · David A. D'Alessio[3] · Judith Fradkin[4] · Walter N. Kernan[5] · Chantal Mathieu[6] · Geltrude Mingrone[7,8] · Peter Rossing[9,10] · Apostolos Tsapas[11] · Deborah J. Wexler[12,13] · John B. Buse[14]





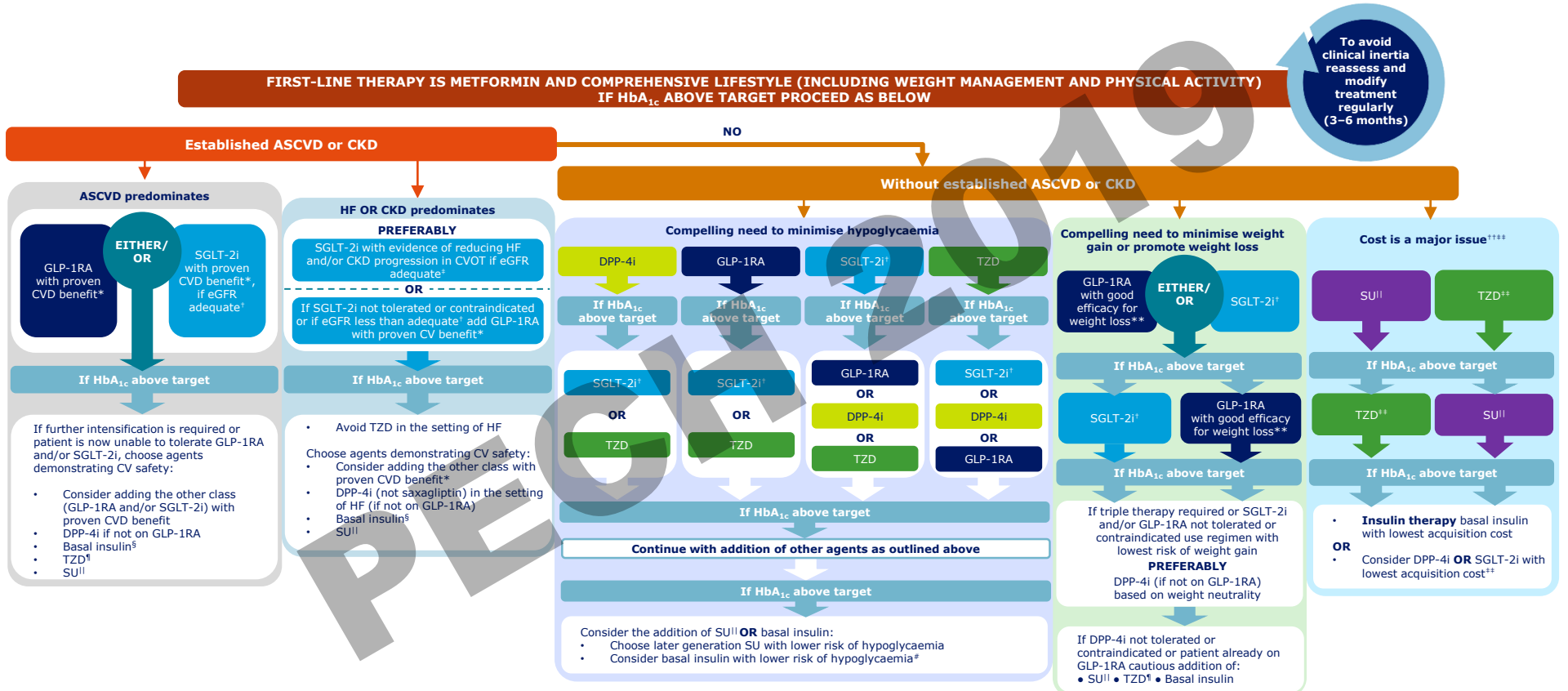
ADA, American Diabetes Association; EASD, European Association for the Study of Diabetes

1. Inzucchi SE et al. *Diabetologia* 2012;55:1577–1596; 2. Inzucchi SE et al. *Diabetologia* 2015;58:429–442; 3. Davies MJ et al. Diabetes Care 2018. dci180033;
4. Davies MJ et al. Diabetologia 2018. DOI: https://doi.org/10.1007/s00125-018-4729-5

Key points to consider

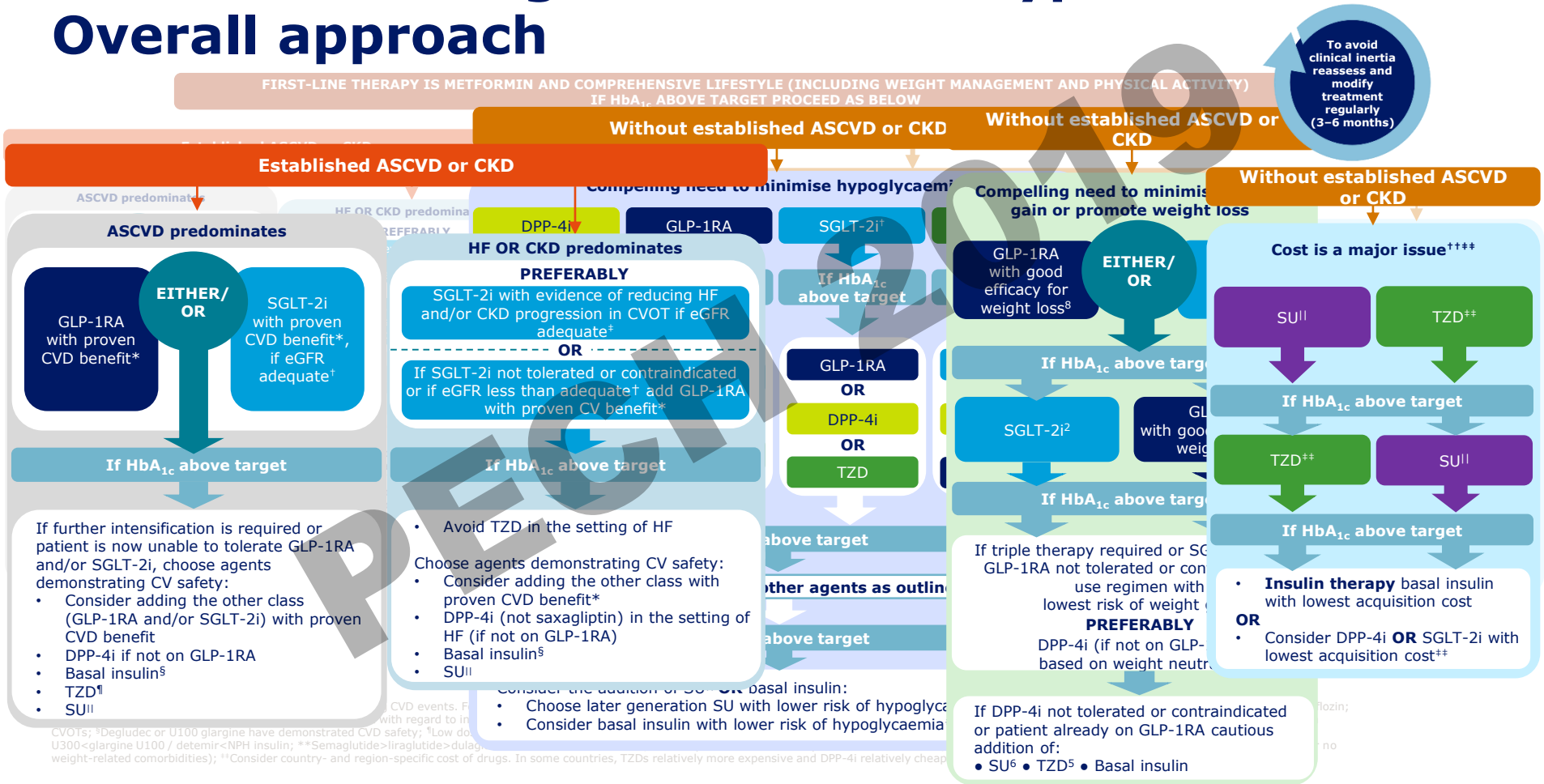
*Between 1 January 2014 and 28 February 2018

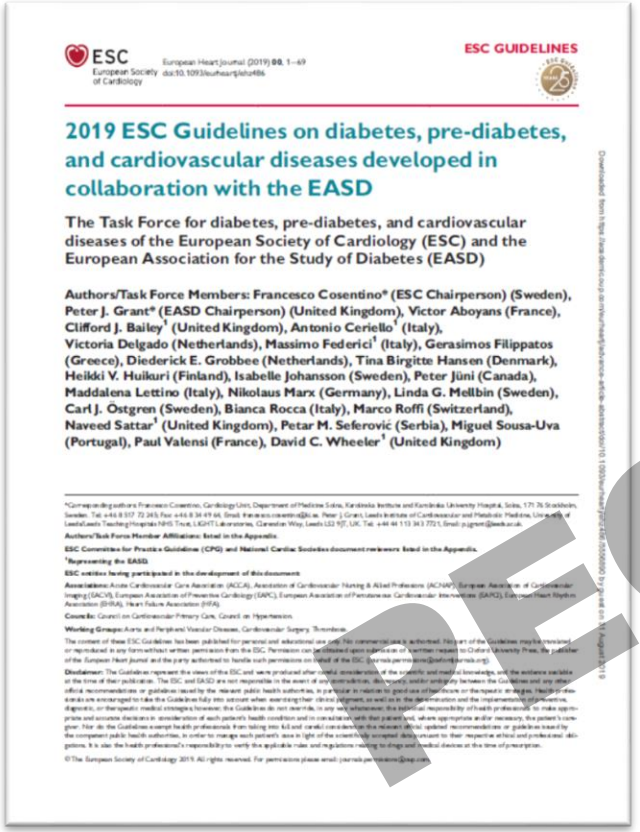
ADA, American Diabetes Association; CVOT, cardiovascular outcomes trial; EASD, European Association for the Study of Diabetes



*Proven CVD benefit means it has label indication of reducing CVD events. For GLP-1RA strongest evidence for liraglutide>semaglutide>exenatide extended release. For SGLT-2i evidence modestly stronger for empagliflozin>canagliflozin; †Be aware that SGLT-2i vary by region and individual agent with regard to indicated level of eGFR for initiation and continued use; ‡Both empagliflozin and canagliflozin have shown reduction in HF and reduction in CKD progression in CVOTs; §Degludec or U100 glargine have demonstrated CVD safety; ¶Low dose may be better tolerated though less well studied for CVD effects; ||Choose later generation SU with lower risk of hypoglycaemia; #Degludec / glargine U300<glargine U100 / detemir<NPH insulin; **Semaglutide>liraglutide>dulaglutide>exenatide>lixisenatide; ††If no specific comorbidities (i.e. no established CVD, low risk of hypoglycaemia and lower priority to avoid weight gain or no weight-related comorbidities); ‡‡Consider country- and region-specific cost of drugs. In some countries, TZDs relatively more expensive and DPP-4i relatively cheaper

Glucose-lowering medication in type 2 diabetes: Overall approach





ESC European Society of Cardiology

European Heart Journal (2019) 00, 1–69 doi:10.1093/eurheartj/ehz486

ESC GUIDELINES

2019 ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD

The Task Force for diabetes, pre-diabetes, and cardiovascular diseases of the European Society of Cardiology (ESC) and the European Association for the Study of Diabetes (EASD)

Authors/Task Force Members: Francesco Cosentino* (ESC Chairperson) (Sweden), Peter J. Grant* (EASD Chairperson) (United Kingdom), Victor Aboyans (France), Clifford J. Bailey[1] (United Kingdom), Antonio Ceriello[1] (Italy), Victoria Delgado (Netherlands), Massimo Federici[1] (Italy), Gerasimos Filippatos (Greece), Diederick E. Grobbee (Netherlands), Tina Birgitte Hansen (Denmark), Heikki V. Huikuri (Finland), Isabelle Johansson (Sweden), Peter Jüni (Canada), Maddalena Lettino (Italy), Nikolaus Marx (Germany), Linda G. Mellbin (Sweden), Carl J. Östgren (Sweden), Bianca Rocca (Italy), Marco Roffi (Switzerland), Naveed Sattar[1] (United Kingdom), Petar M. Seferović (Serbia), Miguel Sousa-Uva (Portugal), Paul Valensi (France), David C. Wheeler[1] (United Kingdom)

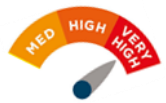
2019 ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD

EASD, European Association of the Study of Diabetes; ESC, European Society of Cardiology

Cosentino F et al. *Eur Heart J* 2019;00:1–69

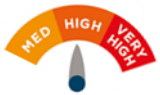
CV risk categories in patients with diabetes in the new 2019 ESC guidelines

The 2019 ESC guidelines[1a] build upon the SCORE risk from the 2016 European Guidelines on CVD prevention in clinical practice[2] to stratify CV risk in patients with diabetes and pre-diabetes



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 T1D 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 (T1D aged <35 years or T2D aged <50 years) with DM duration <10 years, without other risk factors

[a]Modified from the 2016 European guidelines on cardiovascular disease prevention in clinical practice[2]
[b]Proteinuria, renal impairment defined as eGFR ≥30 mL/min/1.73 m^2, left ventricular hypertrophy or retinopathy
[c]Age, hypertension, dyslipidaemia, smoking, obesity
CV, cardiovascular; CVD, cardiovascular disease; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; ESC, European Society of Cardiology; SCORE, Systematic Coronary Risk Estimation; T1D, type 1 diabetes; T2D, type 2 diabetes

1. Cosentino F et al. *Eur Heart J* 2019;00:1–69; 2. Piepoli MF et al. *Eur Heart J* 2016;37:2315–2381

Targeted preventions strategies to reduce CVD in patients with diabetes and pre-diabetes

Lifestyle changes

- Reduced calorie intake is recommended to lowering excessive body weight (**IA**)
- Moderate-to-vigorous physical activity for ≥150 min/week is recommended for the prevention and control of DM (**IA**)

Glucose

- Apply tight glucose control, targeting a near-normal HbA_{1c} (<7.0% or <53 mmol/mol), to decrease microvascular complications (**IA**)

Blood pressure

- Target SBP to 130 mmHg 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 (**IA**)

Lipids

- Very high CV risk, target LDL-C to <1.4 mmol/L (<55 mg/dL) or LDL-C reduction ≥50% (**IB**)
- High CV risk, target LDL-C of <1.8 mmol/L (<70 mg/dL) or LDL-C reduction ≥50% (**IA**)
- Moderate CV risk, an LDL-C target of <2.5 mmol/L (<100 mg/dL) (**IA**)

Platelets

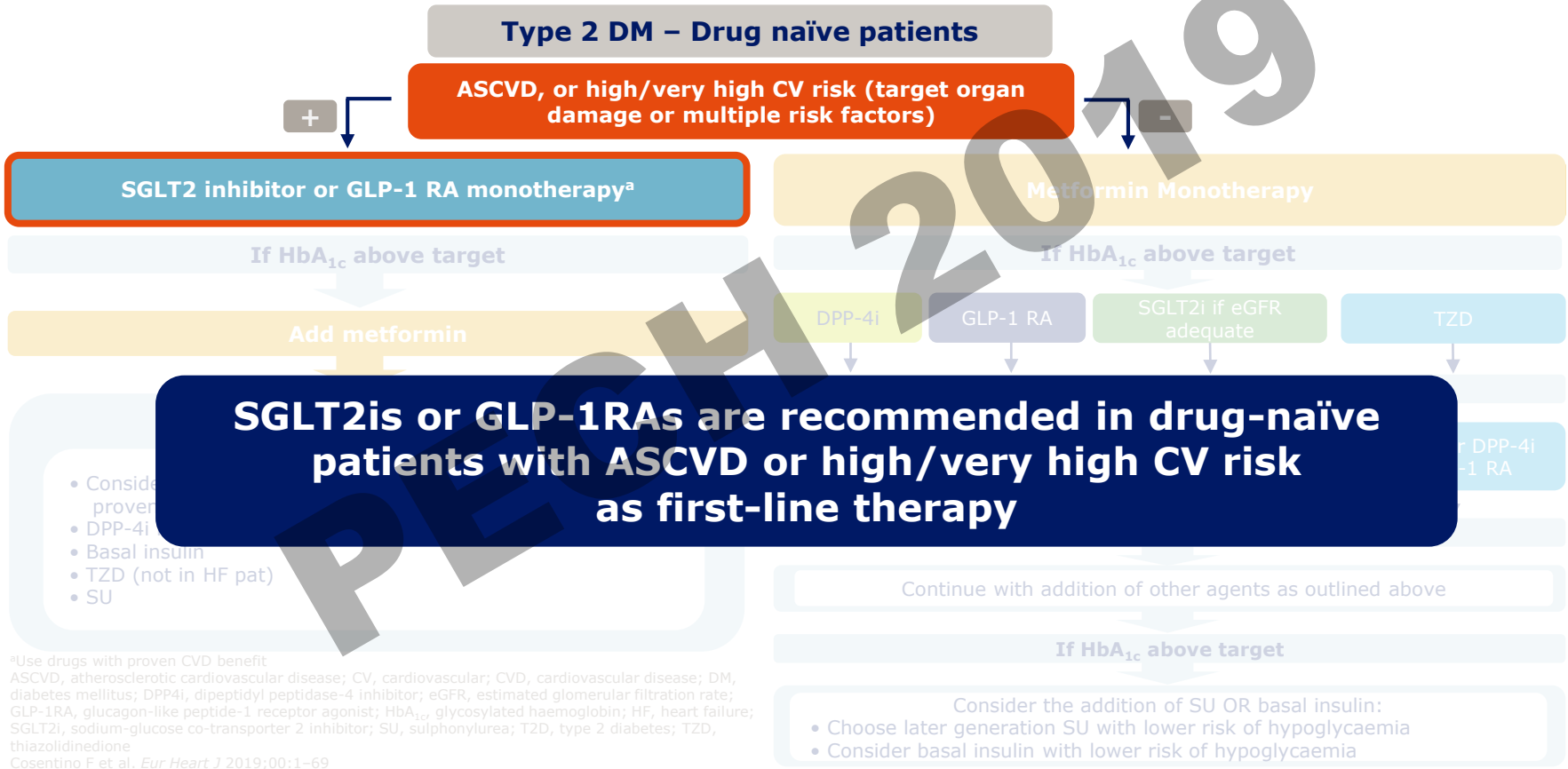
In patients with DM at:

- High/very high risk, aspirin may be considered in primary prevention (**IIbA**)
- Moderate CV risk, aspirin for primary prevention is not recommended (**IIIB**)

Class of recommendation and level of evidence shown in brackets for each targeted prevention strategy. CV, cardiovascular; CVD, cardiovascular disease; DM, diabetes mellitus; HbA_{1c}, glycosylated haemoglobin; LDL-C, low density lipoprotein-cholesterol; SBP, systolic blood pressure; T2D, type 2 diabetes

Cosentino F et al. *Eur Heart J* 2019;00:1–69

Recommended treatment pathway in drug-naïve patients



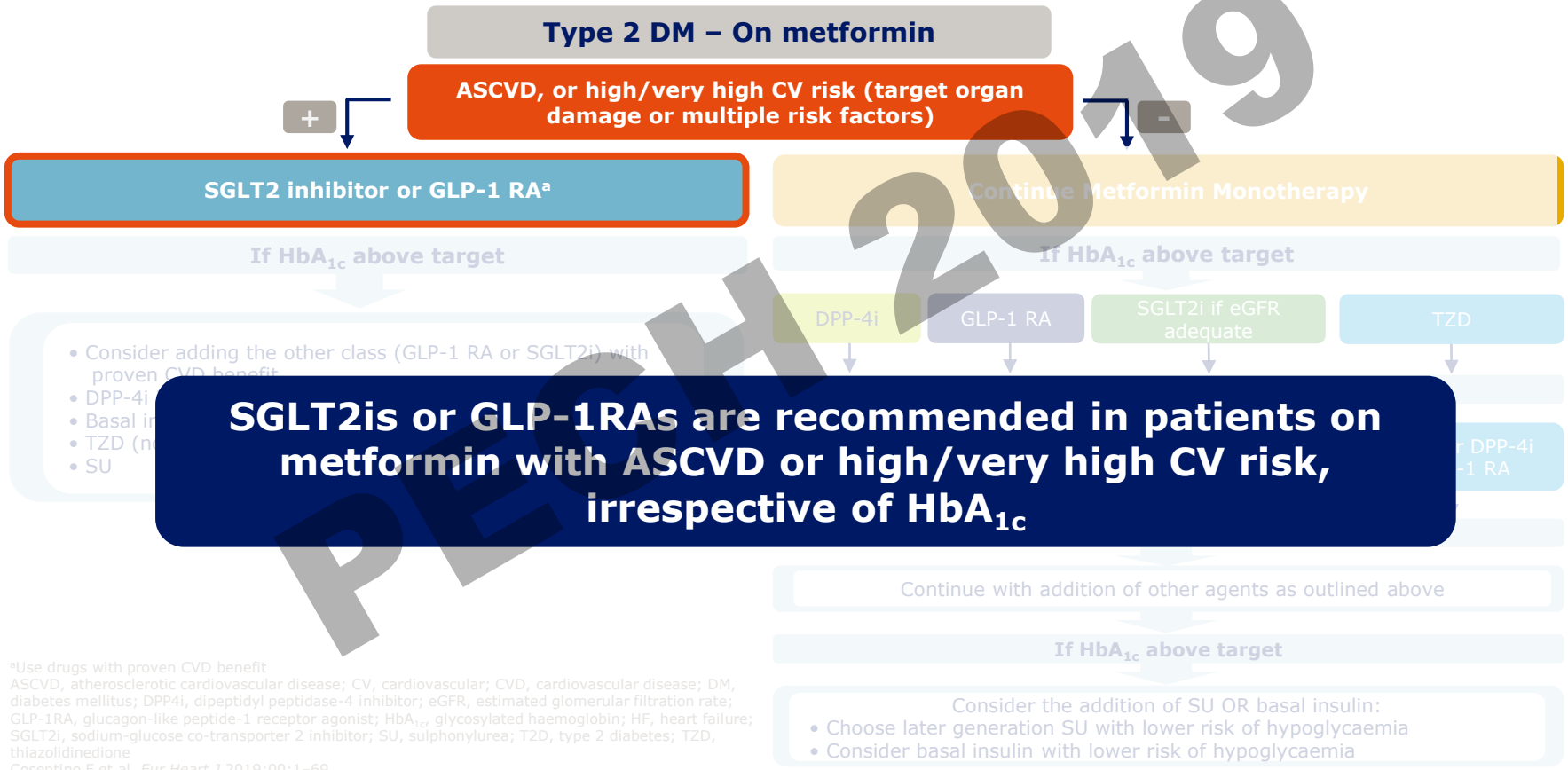
SGLT2is or GLP-1RAs are recommended in drug-naïve patients with ASCVD or high/very high CV risk as first-line therapy

[a]Use drugs with proven CVD benefit

ASCVD, atherosclerotic cardiovascular disease; CV, cardiovascular; CVD, cardiovascular disease; DM, diabetes mellitus; DPP4i, dipeptidyl peptidase-4 inhibitor; eGFR, estimated glomerular filtration rate; GLP-1RA, glucagon-like peptide-1 receptor agonist; HbA_{1c}, glycosylated haemoglobin; HF, heart failure; SGLT2i, sodium-glucose co-transporter 2 inhibitor; SU, sulphonylurea; T2D, type 2 diabetes; TZD, thiazolidinedione

Cosentino F et al. *Eur Heart J* 2019;00:1–69

Recommended treatment pathway in patients on metformin



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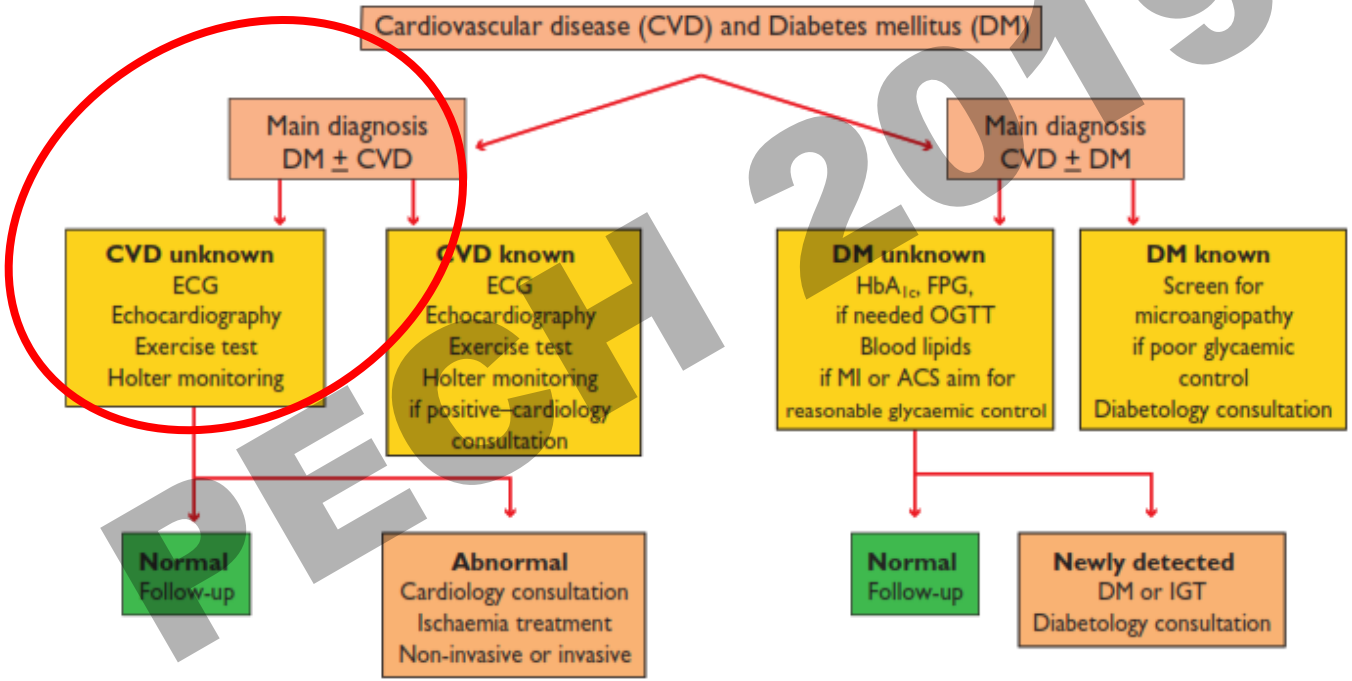
ASCVD, atherosclerotic cardiovascular disease; CV, cardiovascular; CVD, cardiovascular disease; DM, diabetes mellitus; DPP4i, dipeptidyl peptidase-4 inhibitor; eGFR, estimated glomerular filtration rate; GLP-1RA, glucagon-like peptide-1 receptor agonist; HbA_{1c}, glycosylated haemoglobin; HF, heart failure; SGLT2i, sodium-glucose co-transporter 2 inhibitor; SU, sulphonylurea; T2D, type 2 diabetes; TZD, thiazolidinedione

Cosentino F et al. *Eur Heart J* 2019;00:1–69

Miért küldjük kardiológiára betegünket?



ESC+EASD CV – diabetes guideline 2019

Kit irányítsunk kardiológiára?

Tünetes betegek

- Típusos angina
- Fulladás (szívelégtelenség vs. angina ekvivalens)
- Megszédülés, eszméletvesztés
- Palpitatio

↓

KARDIOLÓGIA

Ami fontos...

Izgalmas időket élünk a T2DM kutatásában és kezelésében

Számos új gyógyszercsoport egyes képviselői anyagcsere és direkt kardiovaszkuláris hatással is rendelkeznek

Kiemelkedően fontos, hogy ezeket az új készítményeket olyan betegeknél használjuk, akik a legtöbbet profitálnak belőle

Az inzulin 1921-es felfedezése óta ezek a legfontosabb új eredmények a diabetes kezelésében.

Abbreivations

ADA = American Diabetes Association
ASCVD = atherosclerotic cardiovascular disease
BP = blood pressure
CI = confidence interval
CV = cardiovascular
CVD = cardiovascular disease
CVOT = cardiovascular outcomes trial
DPP-4 = dipeptidyl peptidase-4
DPP-4i = dipeptidyl peptidase-4 inhibitor
FPG = fasting plasma glucose
GLP-1 RA = glucagon-like peptide-1 receptor agonist
HbA1c = glycated hemoglobin
HR = hazard ratio
LDL-C= low-density lipoprotein cholesterol
MACE = major adverse cardiovascular events
MET = metformin
MI = myocardial infarction
N/A = not available
PK = pharmacokinetics

Abbreviations (cont)

PPG = postprandial glucose
RA = receptor agonist
SD = standard deviation
SU = sulphonylurea
SGLT2 = sodium glucose co-transporter2
$t_{½}$ = half-life
T2DM = type 2 diabetes mellitus