Major Advances for Diabetes with Heart Improvement & NICE & ESC 2023 Guidelines

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Advisor/Lecturer/Appraiser/Research Trial Investigator / Board Declarations / Disclosures – Ameet Bakhai

- NHS
- NICE
- Surrey Heath CCG Board
- Abbott
- ABPI
- Accentus Medical
- Amgen
- Amore Health Ltd
- Astra Zeneca
- Bayer
- Boehringer Ingelheim
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- Daiichi Sankyo
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- Janssen
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- McKinsey
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- Novartis
- Novo Nordisk
- Oxford Outcomes
- OmniaMed
- Pfizer
- Remedica
- Sanofi Aventis
- Tickerfit
- TrusteDoctor
- UCL
- UKRD

William Blake 1757 – 1827 London England Poet
https://en.wikipedia.org/wiki/William_Blake

Auguries of Innocence

- To see the world in a grain of sand
- A heaven in a wild flower
- To hold infinity in the palm of your hand
- And eternity in an hour

Exercise Diabetes CVD 2019 Kemps et al.

European Journal of Preventive Cardiology

ESC European Society of Cardiology

Position paper

European Journal of Preventive Cardiology
2019, Vol. 26(7) 709–727

DOI: 10.1177/2047487318820420
journals.sagepub.com/home/ejpc
SAGE

Exercise training for patients with type 2 diabetes and cardiovascular disease: What to pursue and how to do it. A Position Paper of the European Association of Preventive Cardiology (EAPC)

Hareld Kemps[1], Nicolle Kränkel[2,3], Marcus Dörr[4,5], Trine Moholdt[6,7], Matthias Wilhelm[8], Francesco Paneni[9], Luis Serratosa[10,11], Erik Ekker Solberg[12], Dominique Hansen[13,14], Martin Halle[15,16] and Marco Guazzi[17,18]; on behalf of the European Association of Preventive Cardiology (EAPC)

Exercise Diabetes CVD Aerobic Exercise Training (AET) & Resistance Therapy (RT)

Table 1. Target parameters of exercise training in patients with type 2 diabetes mellitus.

	Parameter	Relevance as a target for ET in T2DM patients with cardiac comorbidity	Effective exercise strategy to address this parameter
Metabolic	Glycaemic control	Major target parameter	Combined AET/RT > AET > RT
	Dyslipidaemia	Relevant target parameter, ET may serve as an adjunct to medication	AET (insufficient data for RT)
	Inflammation	Relevant target parameter, monitoring not feasible	Combined AET/RT > AET or RT alone
Functional	Cardiorespiratory fitness	Major target parameter Motivational role	Combined AET/RT > AET > RT High-intensity > moderate-intensity AET
	Vascular function	Major target parameter, difficult to use for monitoring	AET
	Muscle strength	Potentially relevant target parameter (insufficient data) Motivational role	Combined AET/RT
	Blood pressure	Relevant target parameter, ET may serve as an adjunct to medication. Not an independent target parameter (associated with BMI changes)	AET No or only small effects of RT
	Autonomic regulation	Potentially relevant target parameter (insufficient data)	AET
Structural	Body weight	Relevant target parameter only in severely obese patients and when other reasons recommend weight loss Motivational role	Longer protocols > shorter protocols; combination with diet and good supervision/counselling
	Body composition	Potentially better target parameter than body weight, but insufficient data	High-intensity > moderate-intensity AET Longer protocols > shorter protocols Combination with diet and good supervision/counselling

ET; exercise training; T2DM: type 2 diabetes mellitus; AET: aerobic exercise training; RT: resistance training

Exercise Diabetes CVD Aerobic Exercise Training / Resistance Therapy

Studies in T2DM patients demonstrated favourable-to-superior effects of HIT (i.e. **high intensity work bouts** varying **from one to four minutes**, typically at 90–95% of maximal work rate, maximal heart rate or heart rate reserve) on glycaemic control, CRF, body composition, systolic BP and cardiac function as compared with a continuous training. 16,51,63,153–158

Based on expert opinion mainly, guidelines recommend that **resistance training should be performed involving large muscle groups, 2–3 times per week in combination with AET,** gradually increasing the volume to 2–4 sets per muscle group with intensities suitable to achieve 8–10 repetitions per set (i.e. 75% to 85% of one repetition maximum). Individual studies showed a strength gain superior to AET, but comparable improvements in glycaemic control, body composition, muscle mass and CRF.163

Cardiovascular autonomic neuropathy (CAN), orthostatic hypotension, has been formally defined as a **fall in systolic BP of at least 20 mmHg and/or diastolic BP of at least 10 mmHg within 3 min of standing.166**

Suited to **lower intensity activities** (VO2max<40%, Borg<12) which do not require rapid movements, such as **recumbent cycling or water aerobics**.170,171

ESC
European Society of Cardiology

Europace (2021) **23**, 1873–1891
https://doi.org/10.1093/europace/euab184

REVIEW

Medical therapies for prevention of cardiovascular and renal events in patients with atrial fibrillation and diabetes mellitus

Laurent Fauchier[1]*, Giuseppe Boriani[2], Joris R. de Groot[3], Reinhold Kreutz[4,5], Peter Rossing[6,7], and A. John Camm[8]

Diabetes and AF

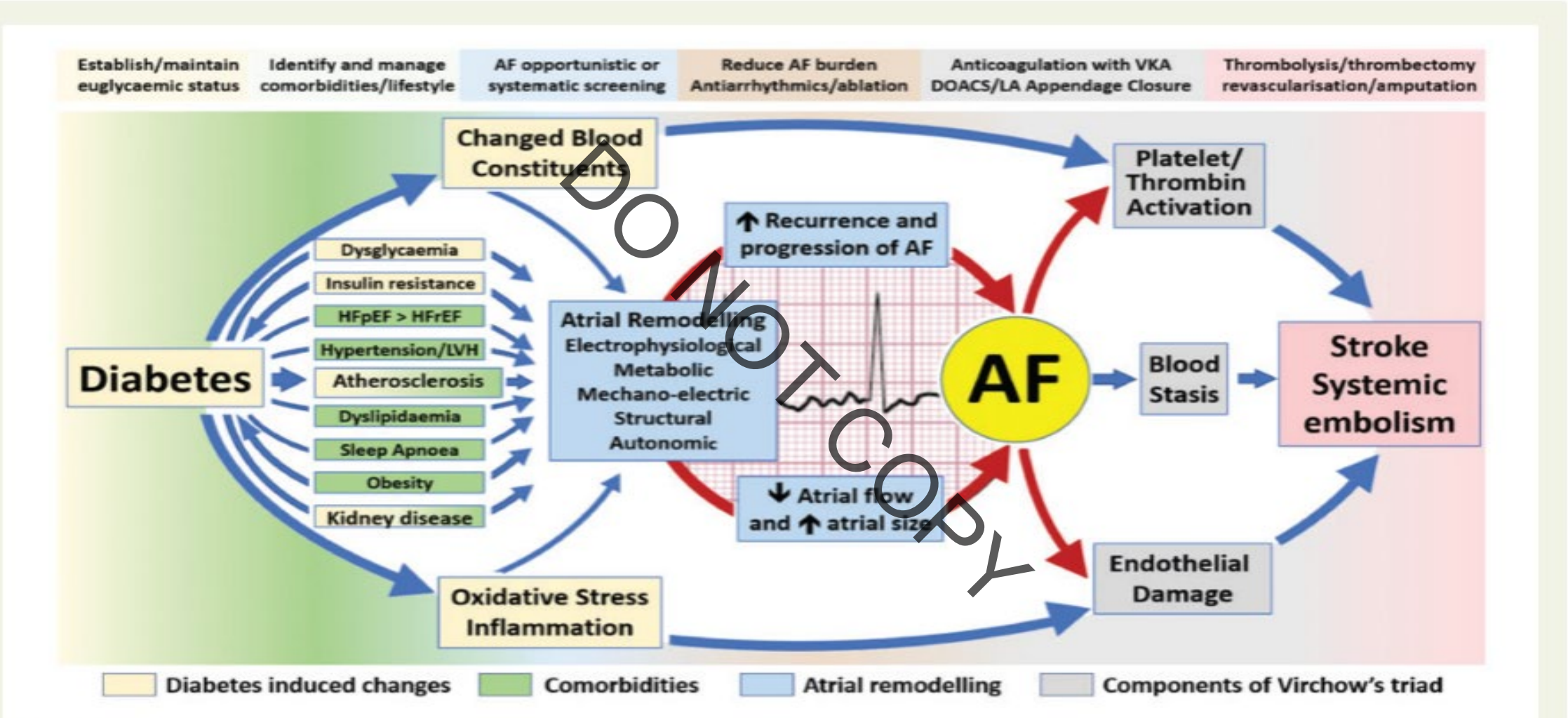


Figure 1 Pathophysiology linking diabetes, AF, and risk of stroke. AF, atrial fibrillation; DOACs, direct oral anticoagulants; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; LA, left atrium; LVH, left ventricular hypertrophy; VKA, vitamin K antagonist.

DM and AF Key Points

• Opportunistic **screening for AF** by pulse taking or ECG rhythm strip is appropriate in patients >_65 years of age, and this needs to be carefully applied in diabetic patients in view of their risk.
• Systematic ECG screening should be considered to detect AF in patients aged >_75 years, or those at high risk of stroke, and this deserves specific consideration in diabetic patients in view of their risk.
• Oral **anticoagulation** should be prescribed for stroke prevention in AF patients with DM and with at least one additional (CHA2DS2-VASc) risk factor for stroke.
• Oral anticoagulation **should be prescribed** for stroke prevention in AF patients with DM and no other risk factors for stroke (according to CHA2DS2-VASc) in case of inadequate glycaemic control
• Oral anticoagulation **may be prescribed** for stroke prevention in AF patients with DM and adequate glycaemic control but no other CHA2DS2-VASc risk factors for stroke. These include **T1DM patients <65 years old.**
• For stroke prevention in AF, **DOACs should be preferred over vitamin K antagonists, with exception of patients with mechanical valve prostheses or mild to moderate mitral stenosis**
• A formal, structured bleeding risk score **(HAS-BLED score)** helps to identify modifiable and non-modifiable risk factors for bleeding in patients with DM and AF, and to identify patients in need of closer follow-up.

Anticoagulants for atrial fibrillation: from warfarin and DOACs to the promise of factor XI inhibitors

Vineet Kumar 1, Leonard Ilkhanoff 1, Frontiers in Cardiovasc Med Feb 2024

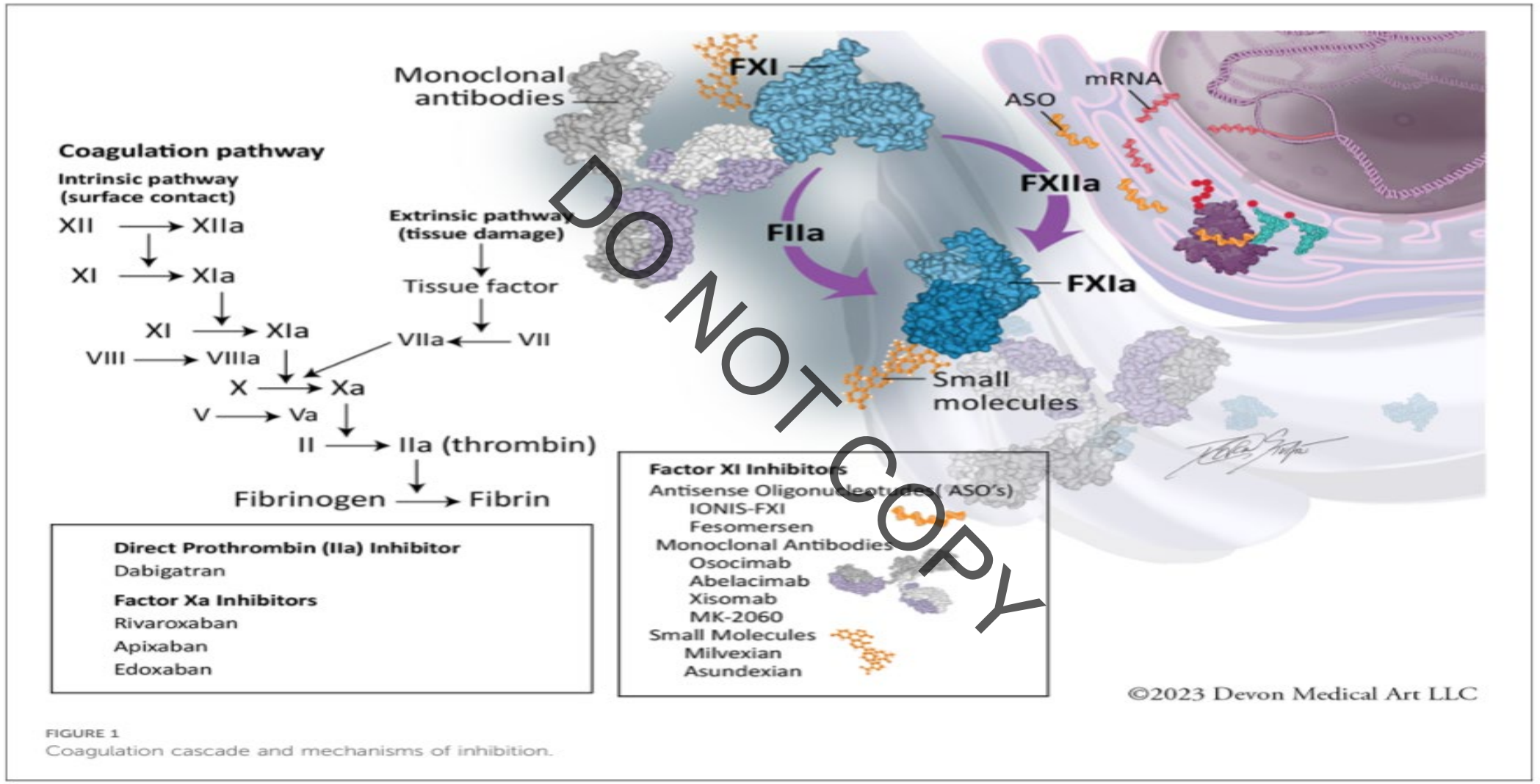


FIGURE 1
Coagulation cascade and mechanisms of inhibition.

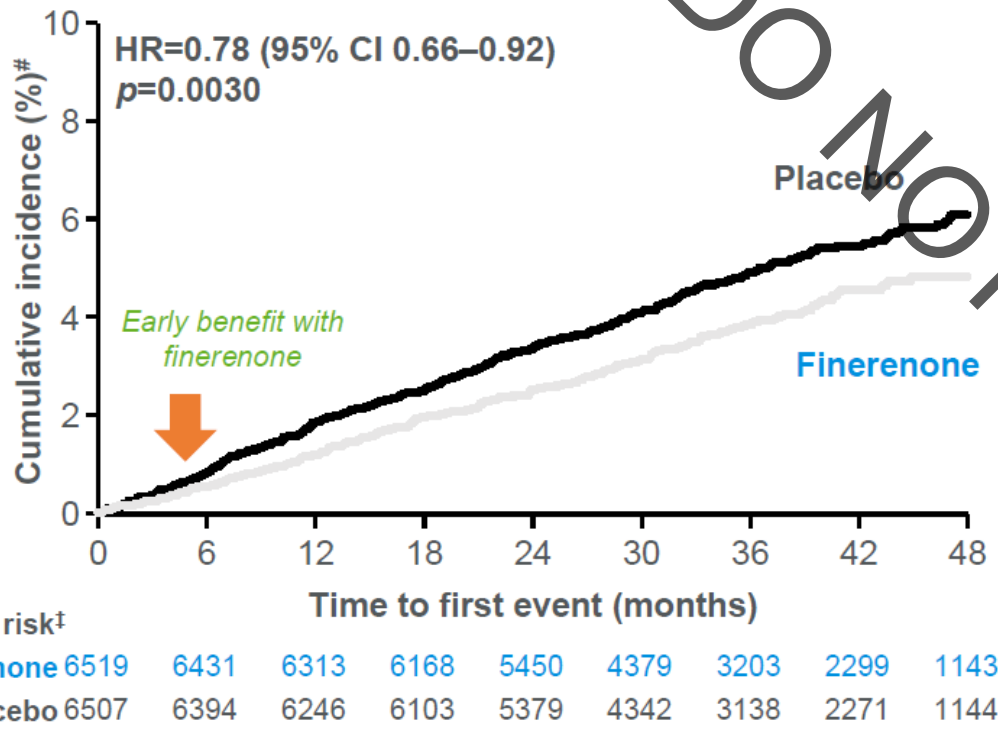
ADDRESSING UNMET NEEDS IN PATIENTS WITH CKD AND T2D & HF

Biykem Bozkurt, MD PhD, FHFSA, FACC, FAHA, FESC
Senior Dean of Faculty, Baylor College of Medicine
The Mary and Gordon Cain Chair in Cardiology & Professor of Medicine
W.A. "Tex" and Deborah Moncrief, Jr., Chair
Director, Winters Center for HF, Cardiology
Baylor College of Medicine, Houston, TX
Editor-in-Chief, *JACC: Heart Failure*

Baylor College of Medicine

Finerenone Reduced the Risk of HFH and CV Death, in Patients with DM and CKD

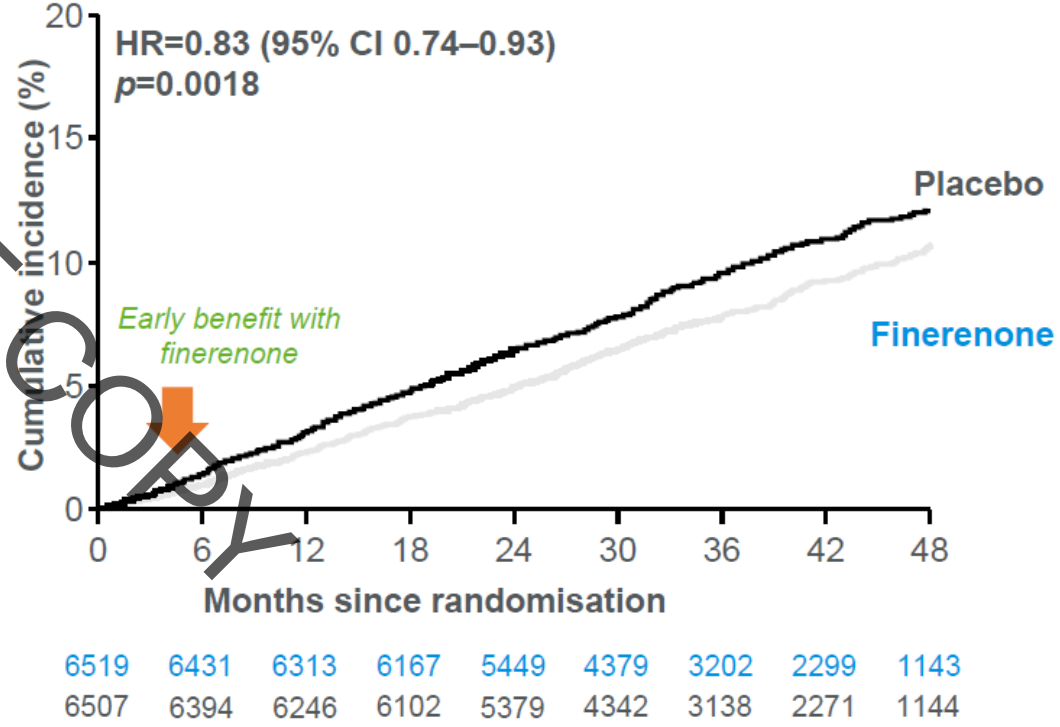
- Time to first HHF



No. at risk‡

Finerenone	6519	6431	6313	6168	5450	4379	3203	2299	1143
Placebo	6507	6394	6246	6103	5379	4342	3138	2271	1144

- Time to CV death and first HHF



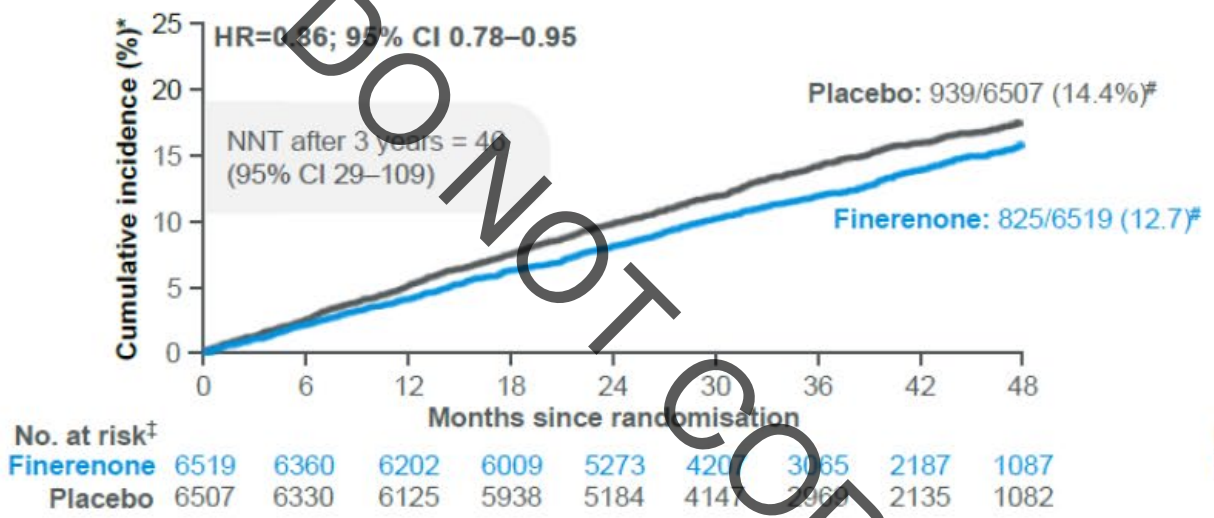
	6519	6431	6313	6167	5449	4379	3202	2299	1143
	6507	6394	6246	6102	5379	4342	3138	2271	1144

FIGARO DKD N Engl J Med 2021;385:2252-63; Filippatos G, *et al. JACC HF* 2022;103:860–70.

Finerenone: Reduction in CVD Events

CV composite

Time to CV death, non-fatal MI, non-fatal stroke or HHF



14% reduced **risk of CV morbidity and mortality** versus placebo (HR=0.86; 95% CI 0.78–0.95); *p*=0.0018

Agarwal R et al. *Eur Heart J*. 2022;43(6):474-484. FIDELITY Pooled Analysis (FIDELIO-DKD + FIGARO DKD in Patients with DM and CKD)

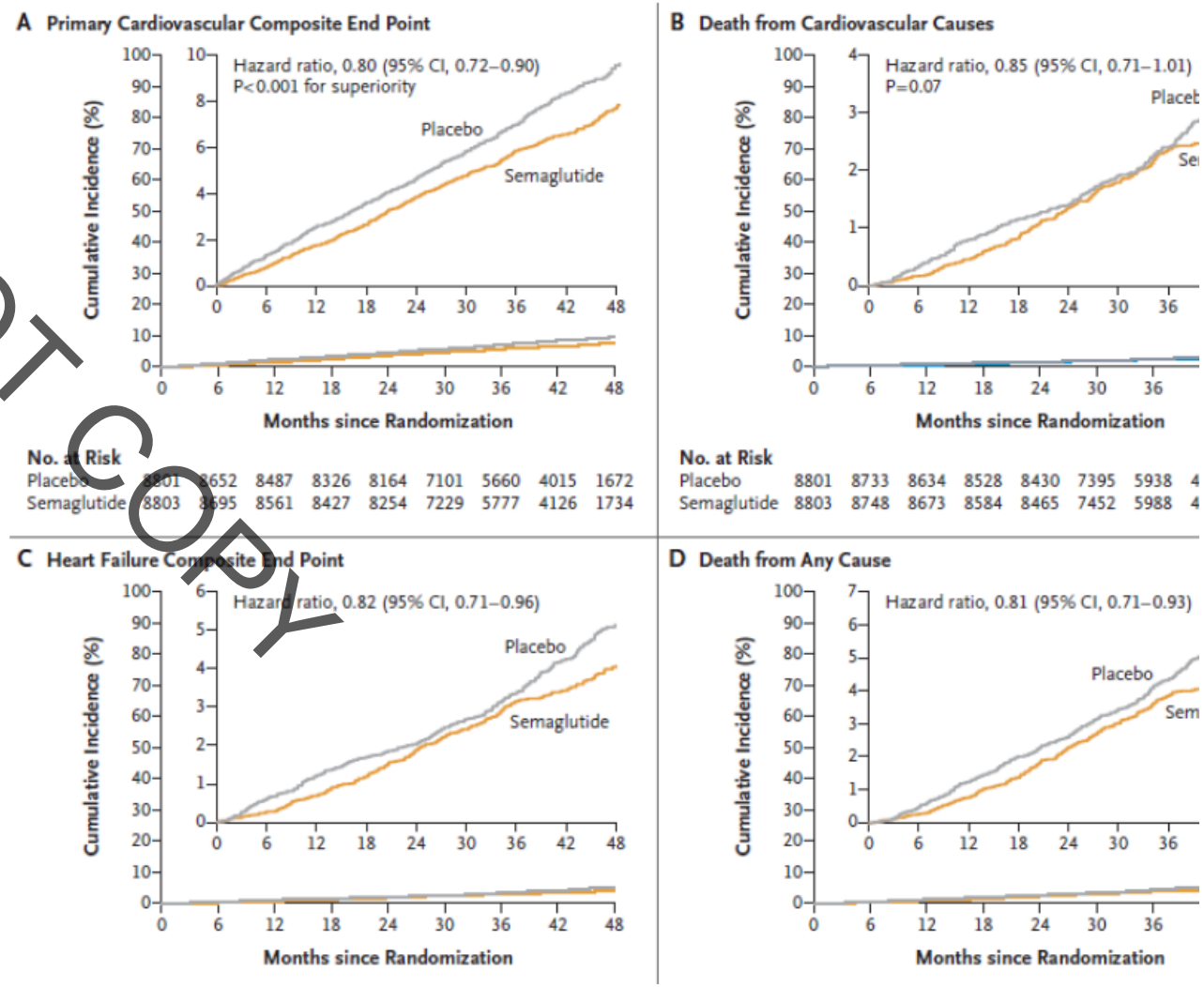
SELECT Trial: Effect of s.c. Semaglutide in CVOT in **Obesity and CVD**

ORIGINAL ARTICLE

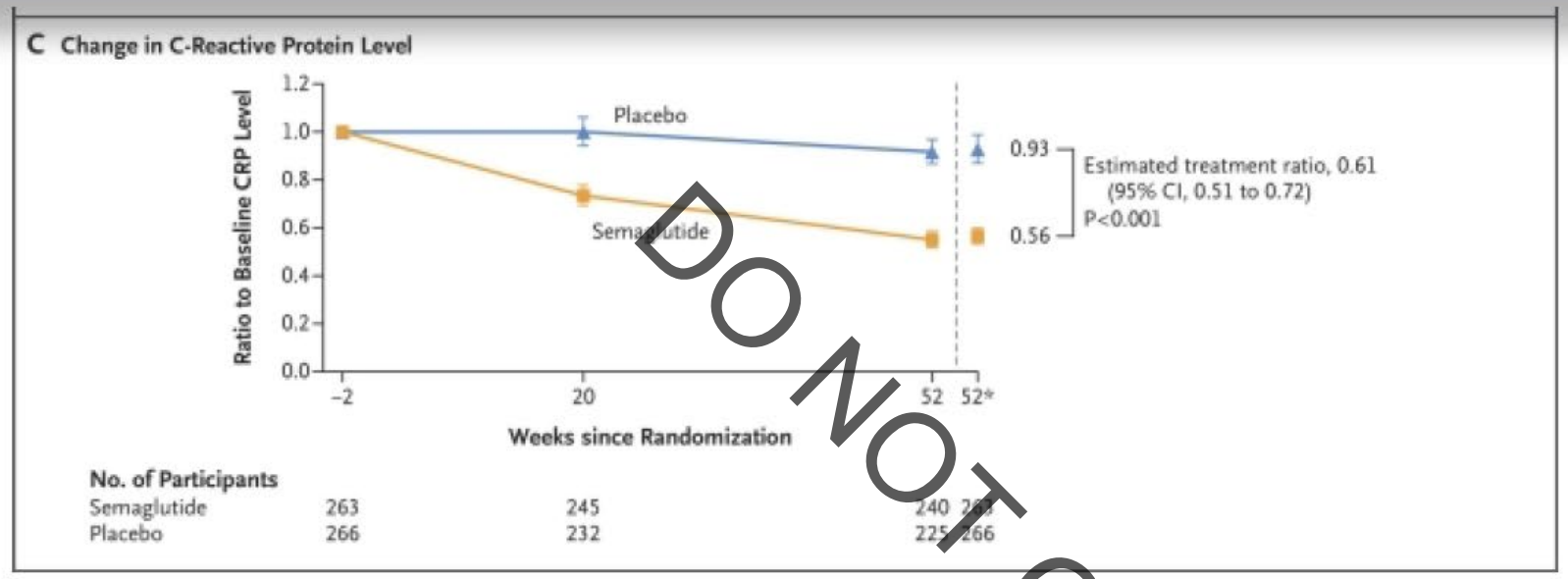
Semaglutide and Cardiovascular Outcomes in Obesity without Diabetes

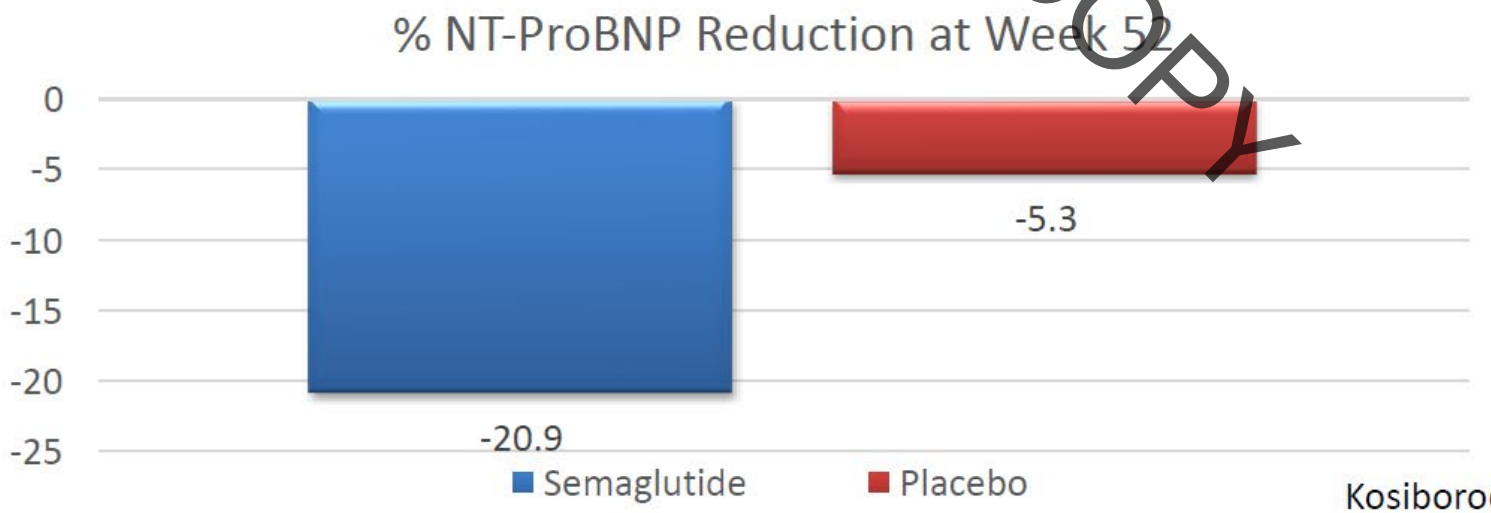
A. Michael Lincoff, M.D., Kirstine Brown-Frandsen, M.D., Helen M. Colhoun, M.D., John Deanfield, M.D., Scott S. Emerson, M.D., Ph.D., Søren Hardt-Lindberg, M.D., Ph.D., G. Kees Hovingh, M.D., Ph.D., Steven E. Kahn, M.B., Ch.B., Robert F. Kushner, M.D., Ildiko Lingvay, M.D., M.P.H., Tugce K. Oral, M.D., Marie M. Michelsen, M.D., Ph.D., Jorge Plutzky, M.D., Christoffer W. Tornøe, Ph.D., and Donna H. Ryan, M.D., for the SELECT Trial Investigators*

- Semaglutide 2.4 mg reduced composite CV death, non-fatal MI or nonfatal stroke) **by 20% over** five years in adults with overweight or obesity
- 17,604 adults **aged ≥ 45 years with overweight or obesity and established CVD with no prior history of diabetes.**
- **All three components of the primary endpoint contributed to the superior MACE reduction**



STEP-HFpEF: NT-proBNP and CRP Reduction





Kosiborod et al. N Engl J Med. 2023 Aug 25

Current Strategies for Screening and Treatment of Pre-HF

At-risk for HF

- Hypertension
- Diabetes
- CAD
- Obesity
- Genetic CMP
- Cardiotoxicity

Screen

Annual Biomarker Screening

All Patients At-Risk for HF

- NT-proBNP or BNP
- Troponin

Patients with Diabetes

- UACR
- eGFR

Patients with Hereditary CMP

- Genetic testing
- Imaging

Imaging Screening

Patients At-Risk for HF

- ECG

Select Patients

e.g. patients with CAD, abnormal ECG or biomarkers, exposure to cardiotoxicity, hereditary/genetic CMP, arrhythmia, high risk features

- Echocardiography
- CMR or other imaging

Pre-HF

Patients with rEF

- ACEi/ARB
- Beta blockers
- ICD

Patients with DM and Elevated NP

- SGLT-2i

Patients with DM and High UACR

- ACEi/ARB
- SGLT-2i
- Finerenone

All patients at risk for pre-HF: Healthy lifestyle modification

Bozkurt B. It Is Time to Screen for Heart Failure: Why and How? JACC Heart Fail. 2022 Aug;10(8):598-600. PMID: 35902165.

Cardiovascular disease: risk assessment and reduction, including lipid modification
NICE guideline Published: 14 December 2023 www.nice.org.uk/guidance/ng238

- QRISK 3 do not use if Type 1 DM High Risk or if eGFR<60
- Type 1 Offer Atorvastatin if Age > 40, CKD, 10 yr or other CVD risks
- Use the QRISK3 tool for people with type 2 diabetes aged between 25 and 84. [May 2023]
- Offer atorvastatin 20 mg for the primary prevention of CVD to people who have a 10-year QRISK3 score of 10% or more. [May 2023]
- Do not rule out treatment with atorvastatin 20 mg for the primary prevention of CVD just because the person's 10-year QRISK3 score is less than 10% if they have an informed preference for taking a statin or there is concern that risk may be underestimated. [May 2023]

“What does the current mHealth research on diabetes management apps reveal?”.

healthcare

MDPI

Review

Evaluation of Mobile Applications for Patients with Diabetes Mellitus: A Scoping Review

Jung Lim Lee [1] and Youngji Kim [2,*]

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[2] Department of Nursing, College of Nursing and Health, Kongju National University, Gongju 32588, Republic of Korea
* Correspondence: yjkim19@kongju.ac.kr

Diabetes mobile apps

- **ISO9241-11 usability definition or MARS** (mobile application rating scale)
- **HbA1C and self-management should be included as evaluation variables**, and
- **more RCT studies on the effectiveness of apps**

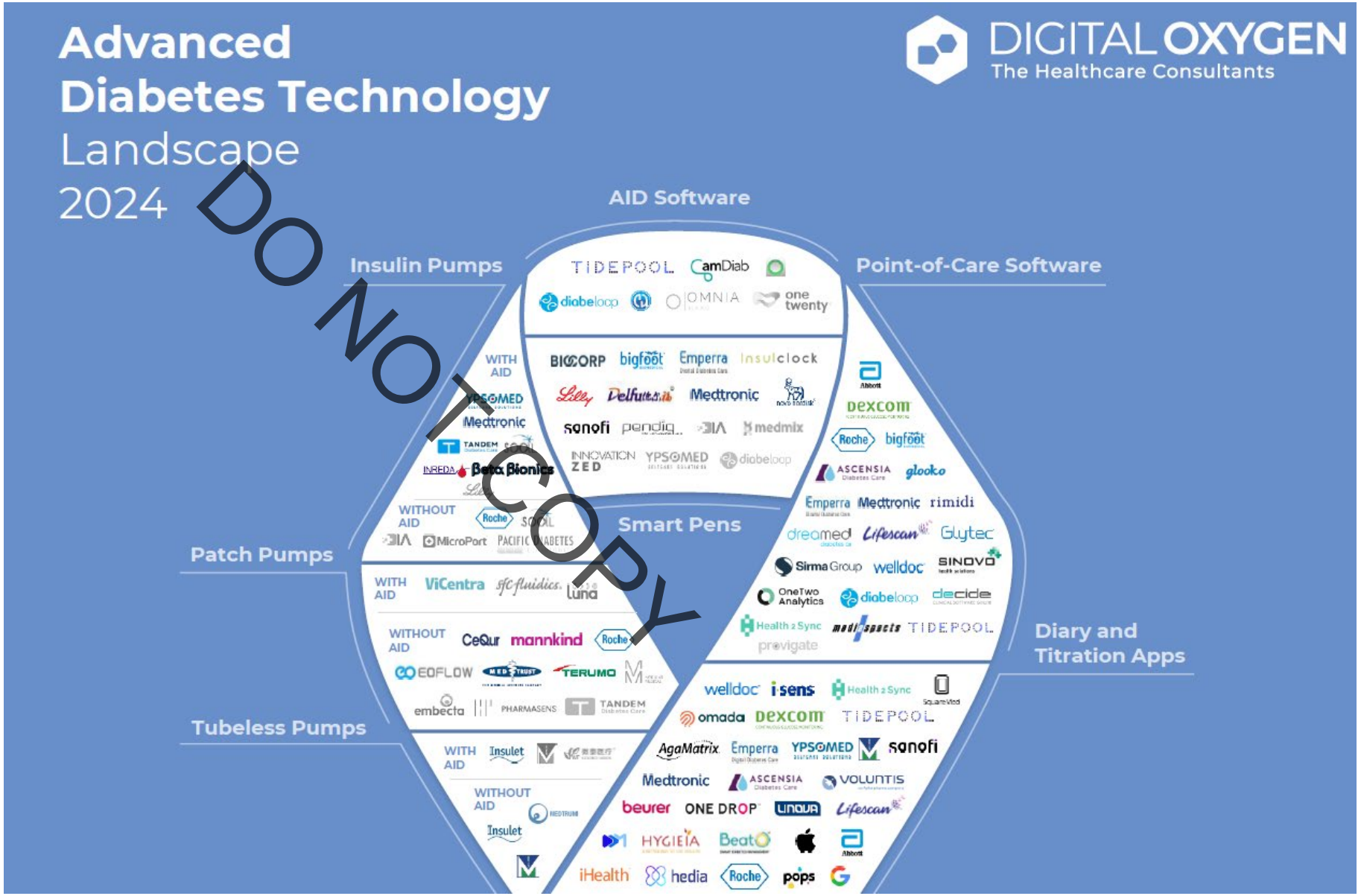
“What does the current mHealth research on diabetes management apps reveal?”.

Functions of mobile apps for patients with diabetes.

App Name/Function	Goal Tracking	Monitoring or Recording			Health Parameter	Education	Communication Platform	Recommendation	Reminder
		Diet	Medication	Exercise					
Gamelet	□	√	√	√	□	√	□	□	□
DIABETEYAR	□	□	□	□	□	√	□	√	□
MyT1DHero	□	□	□	□	√	□	√	□	√
Medisafe	□	□	√	□	√	□	□	□	□
Switch	□	□	□	□	√	□	□	□	□
Intelligent Diabetes Management (IDM)	□	□	□	□	√	□	□	√	□
BetaMe/Melon	√	□	□	□	□	□	□	□	□
SocialDiabetes app (SDA)	□	□	□	□	√	□	□	√	□
the Smart Glucose Manager (SGM)	□	√	√	□	√	□	□	□	√
BlueStar mobile	□	√	√	□	√	□	□	√	□
My Care Hub (MCH)	□	√	□	√	√	√	□	√	□
Prototype *		√		√	√				

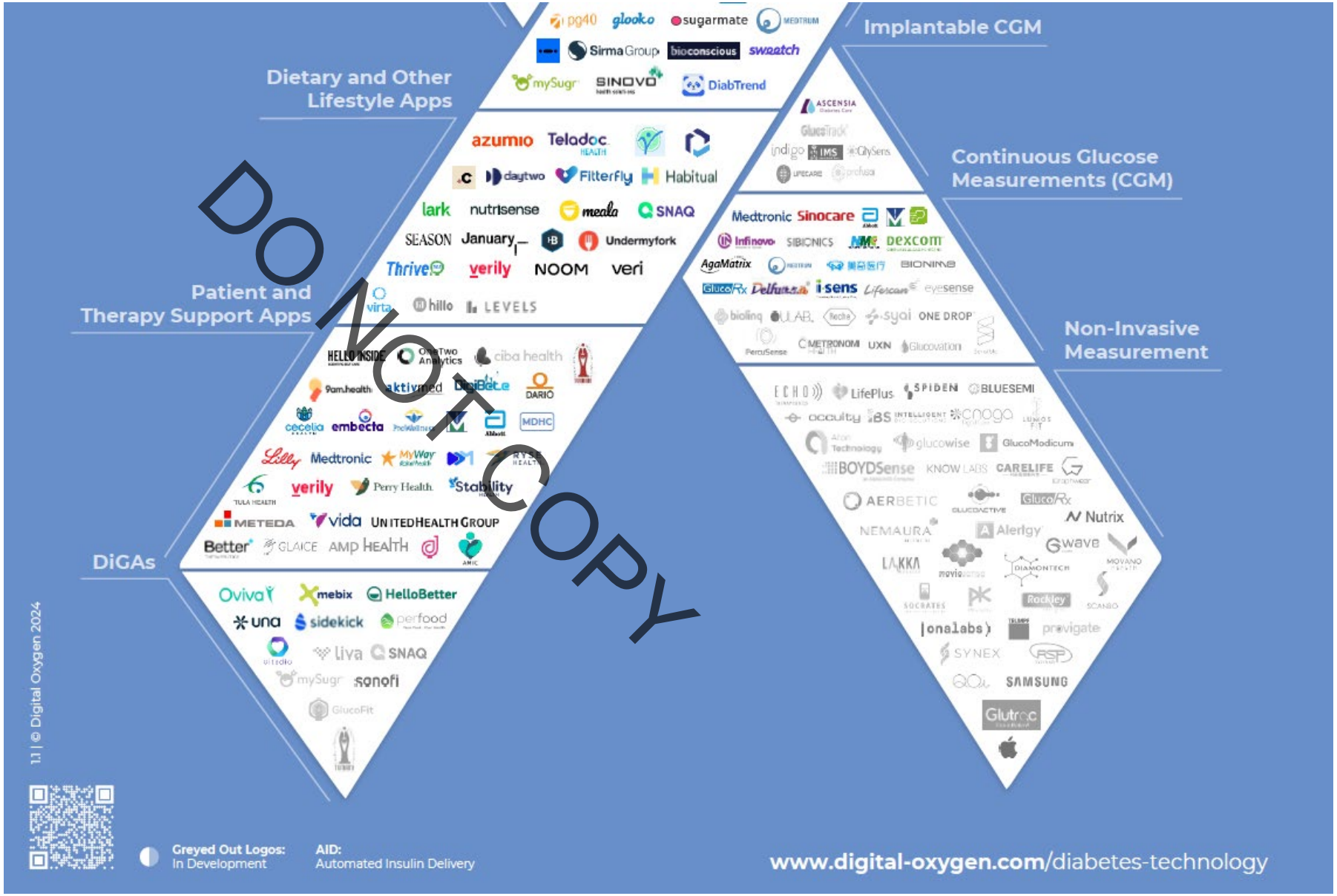
* Study ID: S4.

Digital Therapies – Digital Oxygen 2024 Report



Digital Therapies

- Oviva



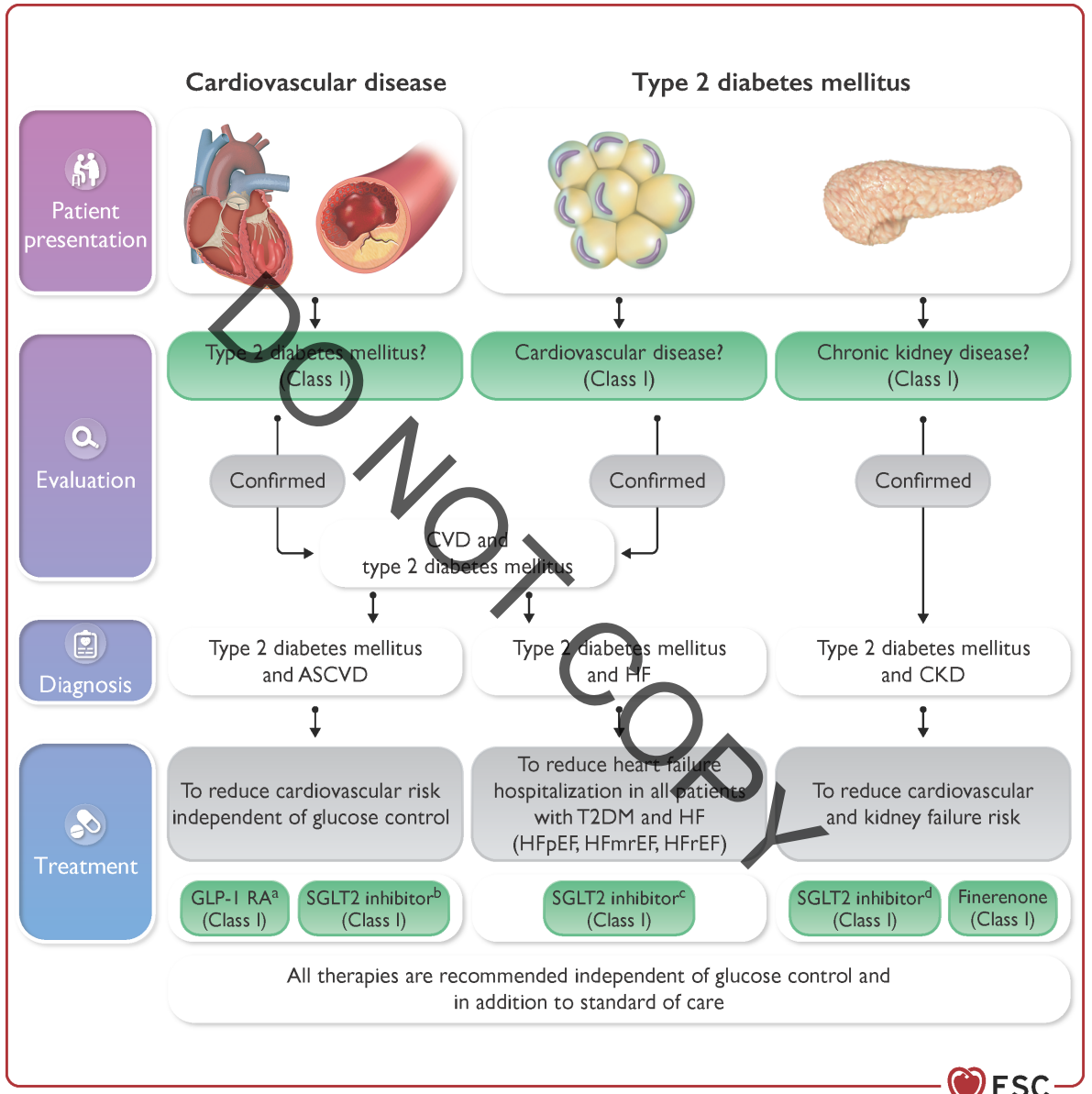
2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes

Official ESC Guidelines slide set

ESC
European Society of Cardiology

Figure 1

Management of cardiovascular disease in patients with type 2 diabetes: clinical approach and key recommendations



2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

ESC European Society of Cardiology

European Heart Journal (2023) **44**, 2544–2556
https://doi.org/10.1093/eurheartj/ehad260

CLINICAL RESEARCH
Epidemiology, prevention, and health care policies

SCORE2-Diabetes: 10-year cardiovascular risk estimation in type 2 diabetes in Europe

SCORE2-Diabetes Working Group and the ESC Cardiovascular Risk Collaboration[*†]

Received 10 June 2022; revised 6 April 2023; accepted 17 April 2023; online publish-ahead-of-print 29 May 2023

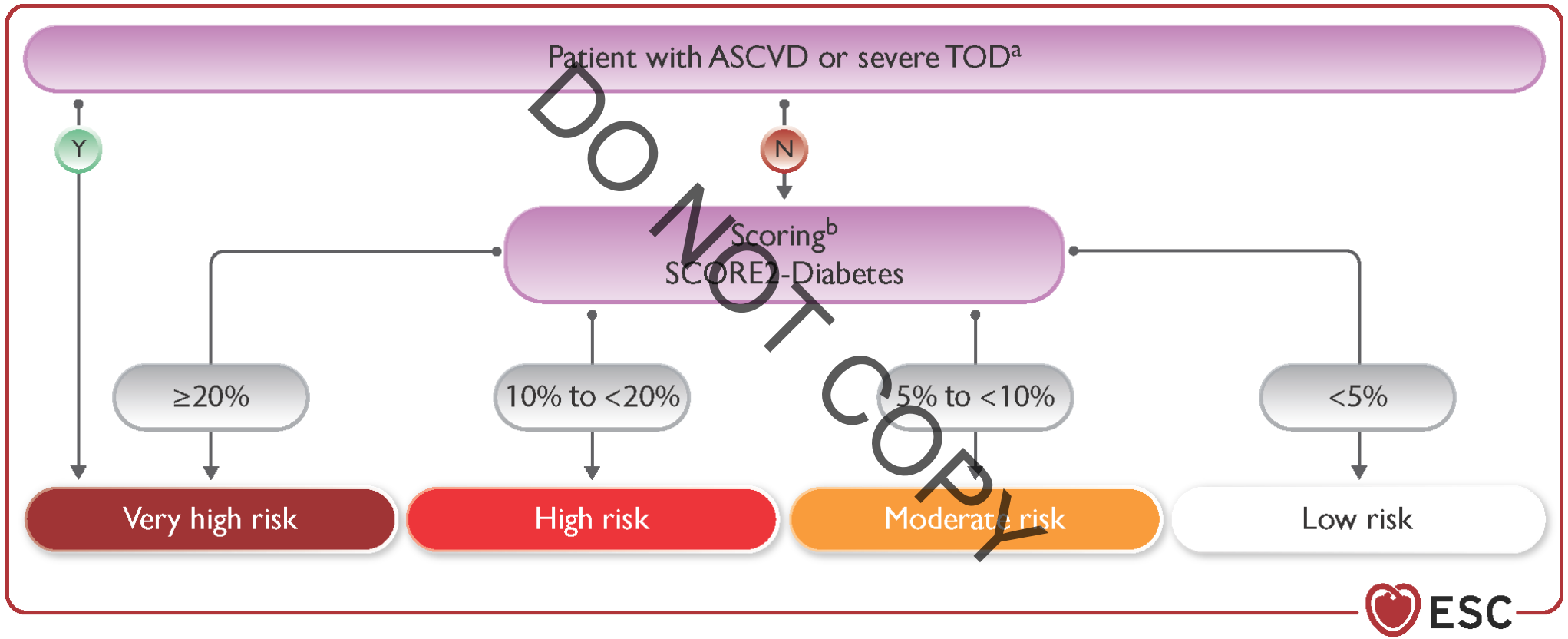
See the editorial comment for this article 'Risk prediction in patients with diabetes: is SCORE 2D the perfect solution?', by L. Rydén *et al.*, https://doi.org/10.1093/eurheartj/ehad263.

ESC Score-2 Diabetes Algorithm May 2023

- Methods and results SCORE2-Diabetes was developed by extending SCORE2 algorithms using individual-participant data from four large-scale datasets comprising 229 460 participants (43 706 CVD events) with type 2 diabetes and without previous CVD.
- Sex-specific competing risk-adjusted models were used including conventional risk factors (i.e. age, smoking, systolic blood pressure, total, and HDL-cholesterol), as well as diabetes-related variables (i.e. age at diabetes diagnosis, glycated haemoglobin [HbA1c] and creatinine-based estimated glomerular filtration rate [eGFR]).
- For example, in the moderate-risk region, the estimated 10-year CVD risk was 11% for a 60-year-old man, non-smoker, with type 2 diabetes, average conventional risk factors, HbA1c of 50 mmol/mol, eGFR of 90 mL/min/1.73 m2, and age at diabetes diagnosis of 60 years.
- By contrast, the estimated risk was 17% in a similar man, with HbA1c of 70 mmol/mol, eGFR of 60 mL/min/ 1.73 m2, and age at diabetes diagnosis of 50 years.
- For a woman with the same characteristics, the risk was 8% and 13%, respectively.

Figure 3

Cardiovascular risk categories in patients with type 2 diabetes



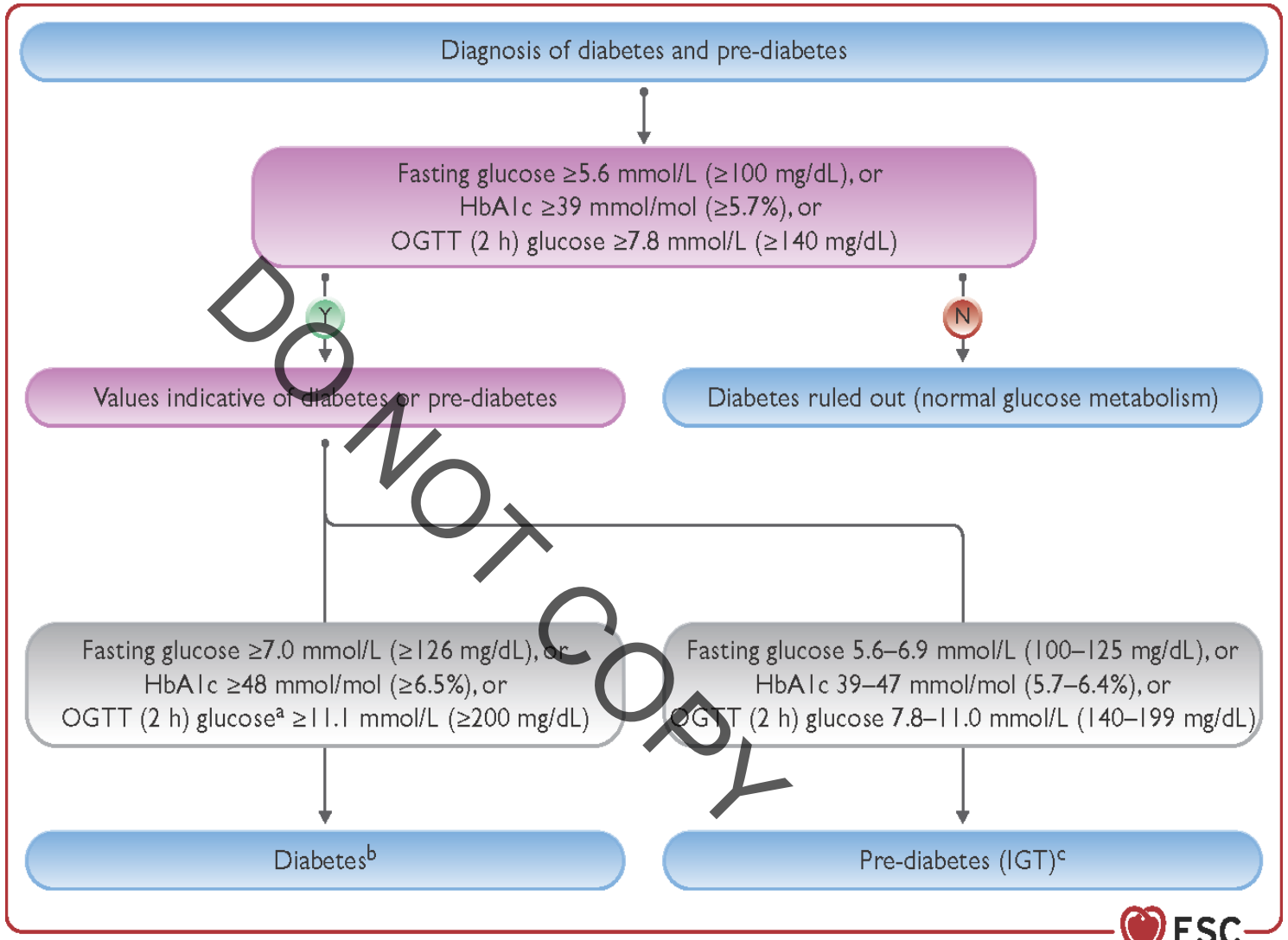
2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

Figure 2

Diagnosis of diabetes and pre-diabetes

HbA1c

=/< 38 OK
39 – 47 Pre
=/< 48 DM



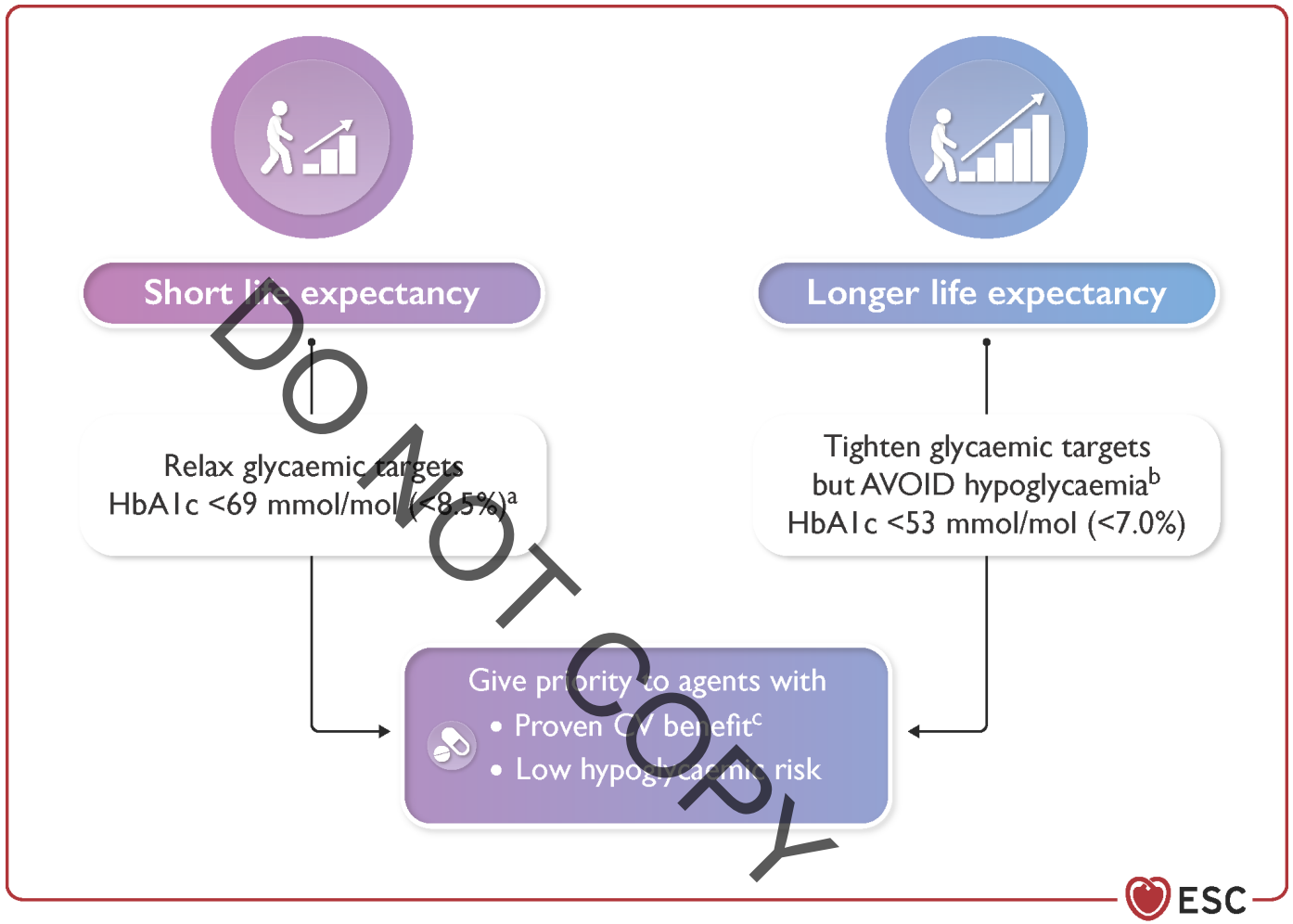
2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

Figure 4

Simple guide to glycaemic targets in patients with type 2 diabetes and cardiovascular disease

HbA1c

<53 Aggressive
<69 Lenient



2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

ESC European Society of Cardiology

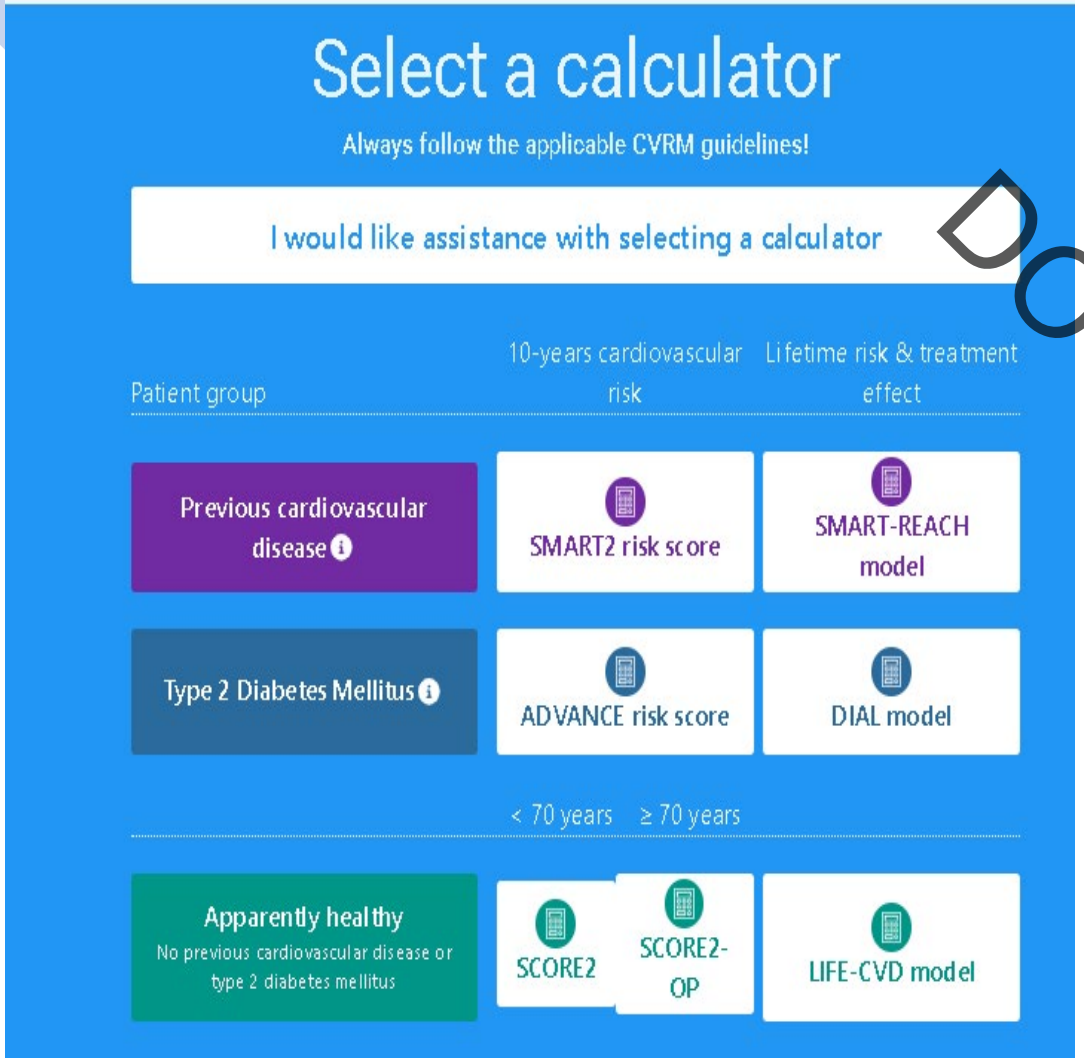
European Heart Journal (2019) **40**, 2899–2906
doi:10.1093/eurheartj/ehy839

CLINICAL RESEARCH
Prevention and epidemiology

Prediction of individual life-years gained without cardiovascular events from lipid, blood pressure, glucose, and aspirin treatment based on data of more than 500 000 patients with Type 2 diabetes mellitus

Gijs F.N. Berkelmans[1], Soffia Gudbjörnsdottir[2], Frank L.J. Visseren[1]*, Sarah H. Wild[3], Stefan Franzen[2], John Chalmers[4], Barry R. Davis[5], Neil R. Poulter[6], Annemieke M. Spijkerman[7], Mark Woodward[4,8,9], Sara L. Pressel[5], Ajay K. Gupta[6,10], Yvonne T. van der Schouw[11], Ann-Marie Svensson[2], Yolanda van der Graaf[11], Stephanie H. Read[3], Bjorn Eliasson[2], and Jannick A.N. Dorresteijn[1]

www.U-prevent.com



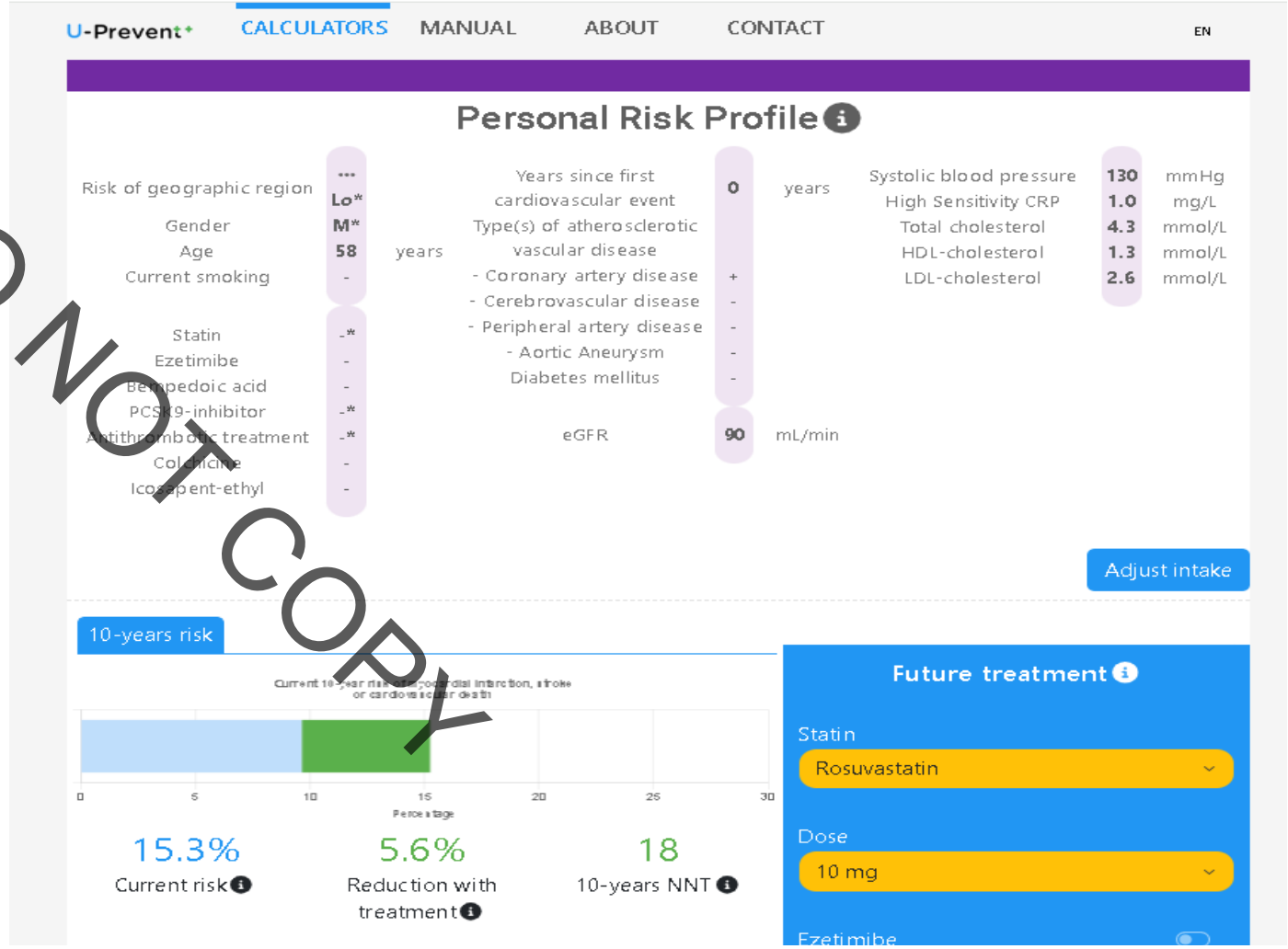
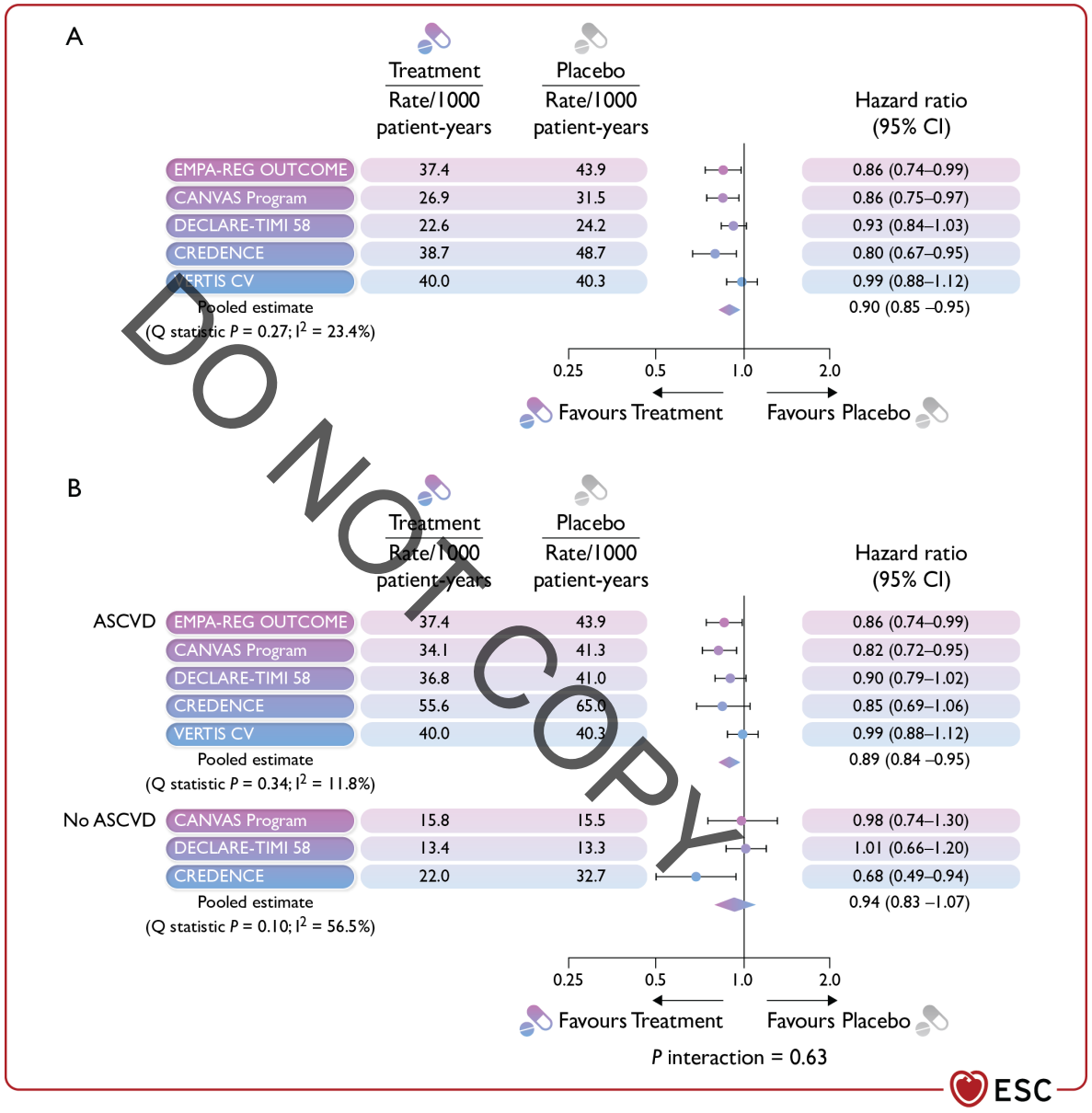


Figure 5

Meta-analysis of cardiovascular outcomes trials with sodium–glucose co-transporter-2 inhibitors. (A) Overall major adverse cardiovascular events; (B) Major adverse cardiovascular events by atherosclerotic cardiovascular disease status



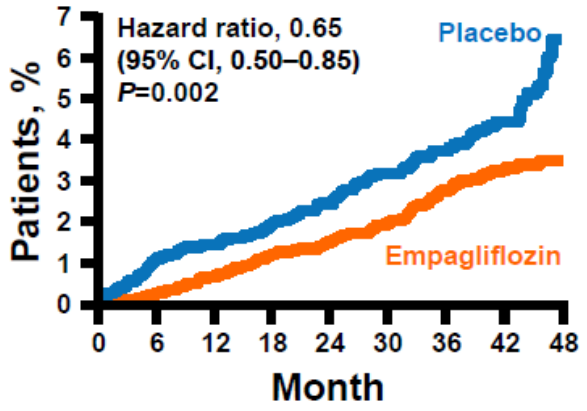
2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

SGLT2i Prevents HF in Patients with DM with CV Risk

EMPA-REG OUTCOME TRIAL

~ 10% preexisting HF,
43% on loop diuretics baseline

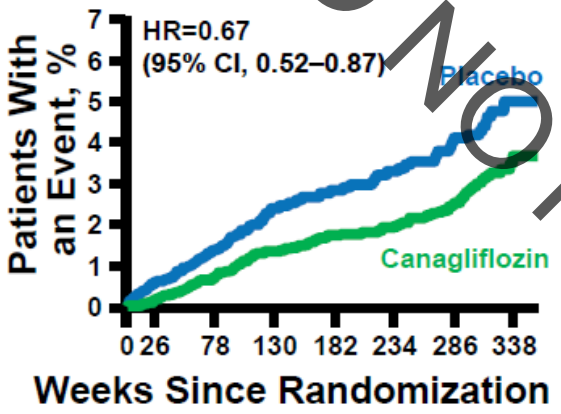
Hospitalization for HF



CANVAS TRIAL

14% had preexisting HF

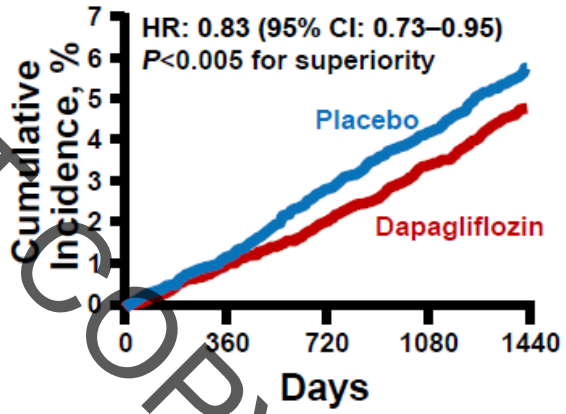
Hospitalization for HF



DECLARE TRIAL

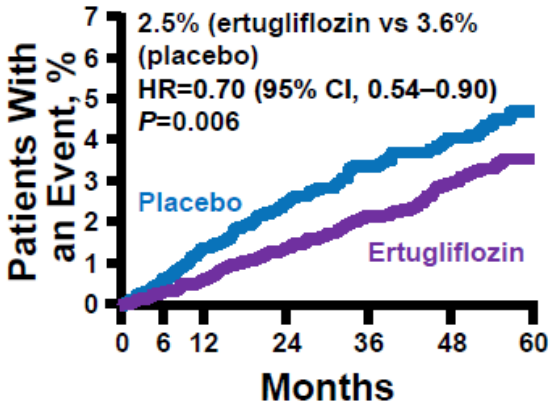
10% had preexisting HF

CVD and HFH



VERTIS CV TRIAL

Hospitalization for HF

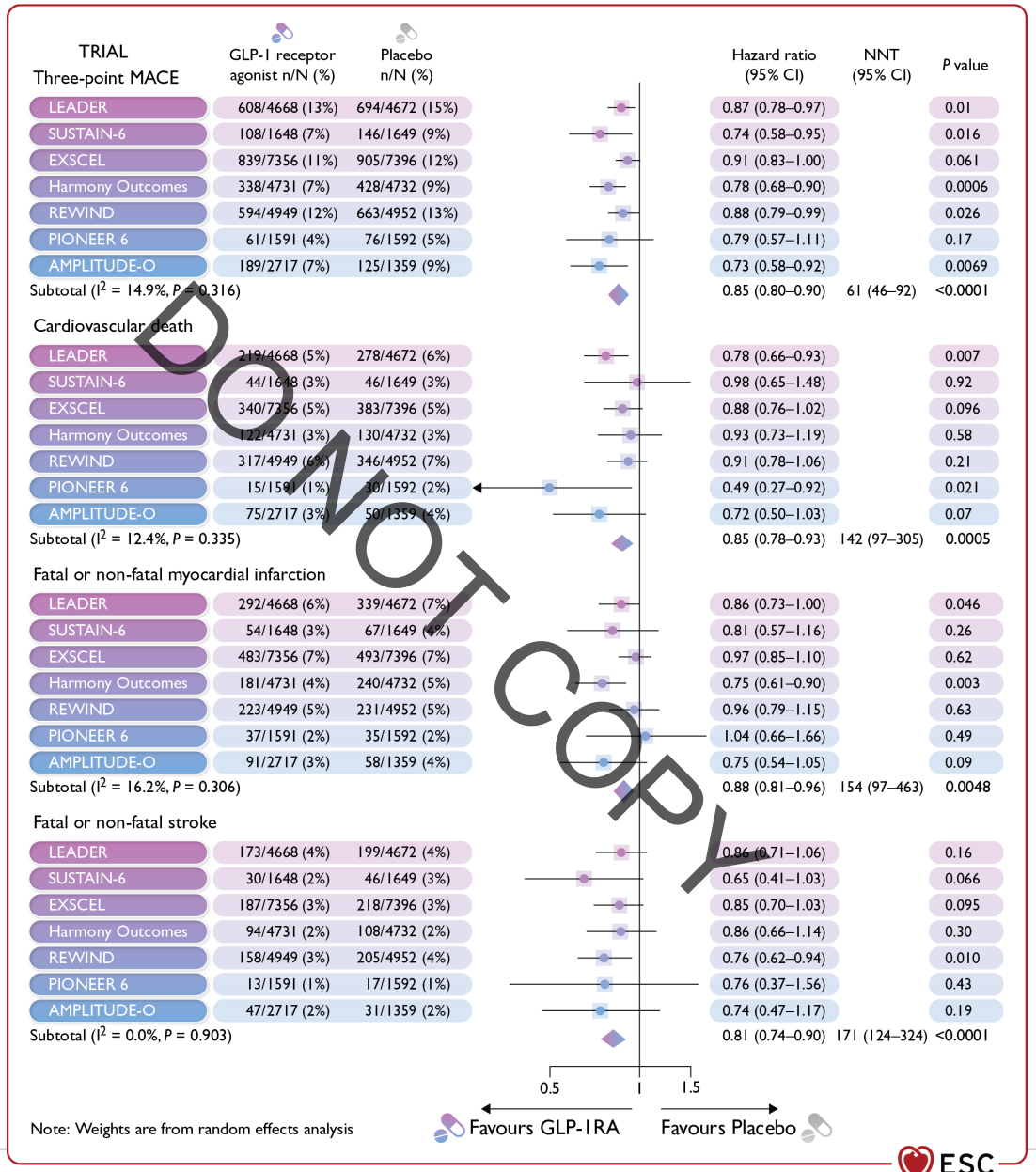


30-35 % RRR in HFH

Zinman B, et al. *N Engl J Med*. 2015;373(22):2117-2128; Neal B, et al. *N Engl J Med*. 2017;377(7):644-657; Wiviott SD, et al. *N Engl J Med* 2019;380(4):347-357; Consentino F, et al. *Circulation*. 2020;142(23):2205-2215; Provenzano M, et al. *Front Med (Lausanne)*. 2021;8:654557

Figure 6

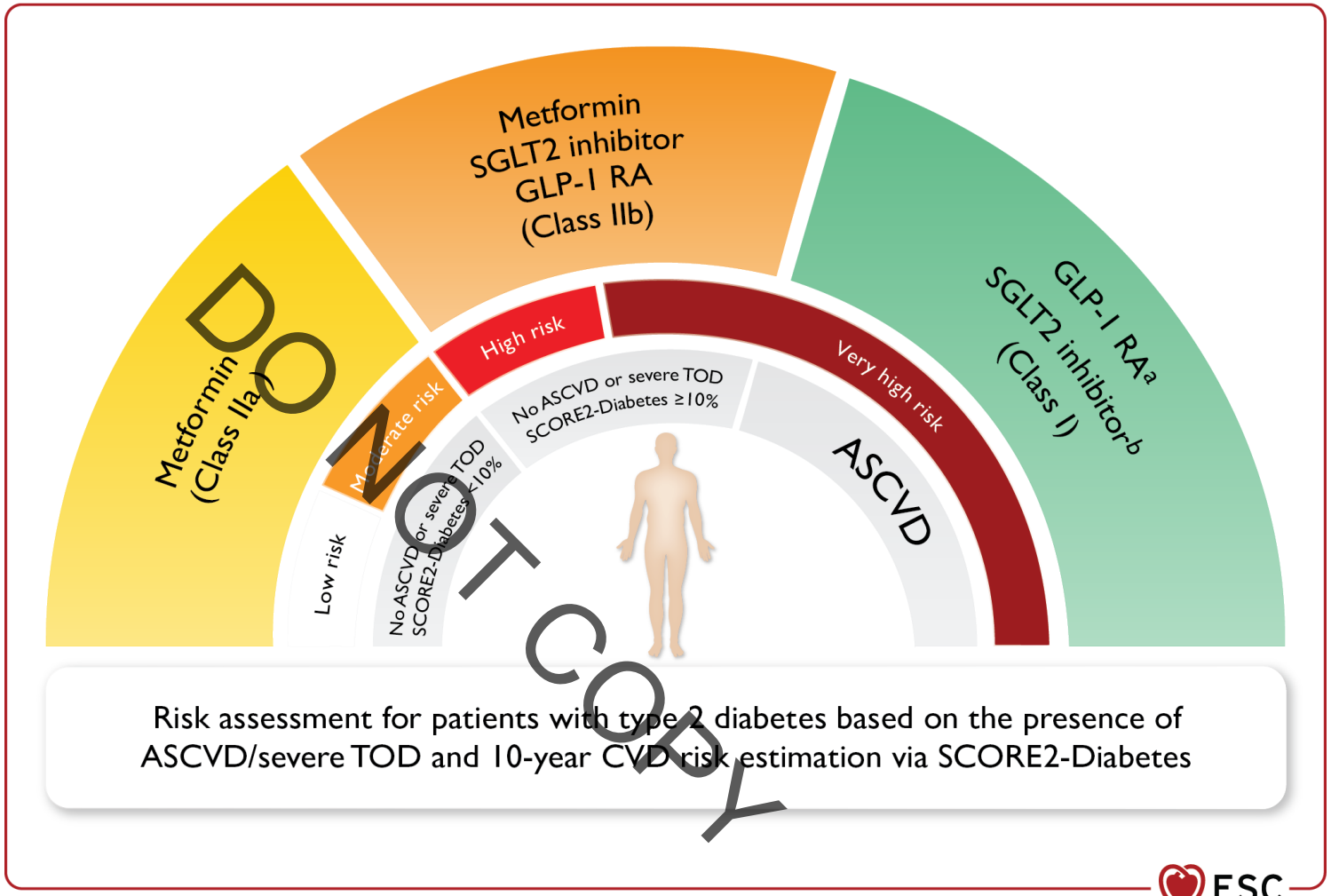
Meta-analysis of cardiovascular outcomes trials with glucagon-like peptide-1 receptor agonists (sensitivity analysis removing ELIXA). Risk of major adverse cardiovascular events and its components



2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

Figure 7

Glucose-lowering treatment for patients with type 2 diabetes to reduce cardiovascular risk based on the presence of ASCVD/severe target-organ damage and 10-year cardiovascular disease risk estimation via SCORE2-Diabetes



2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Figure 10

Recommended low-density lipoprotein-cholesterol targets by cardiovascular risk categories in patients with type 2 diabetes

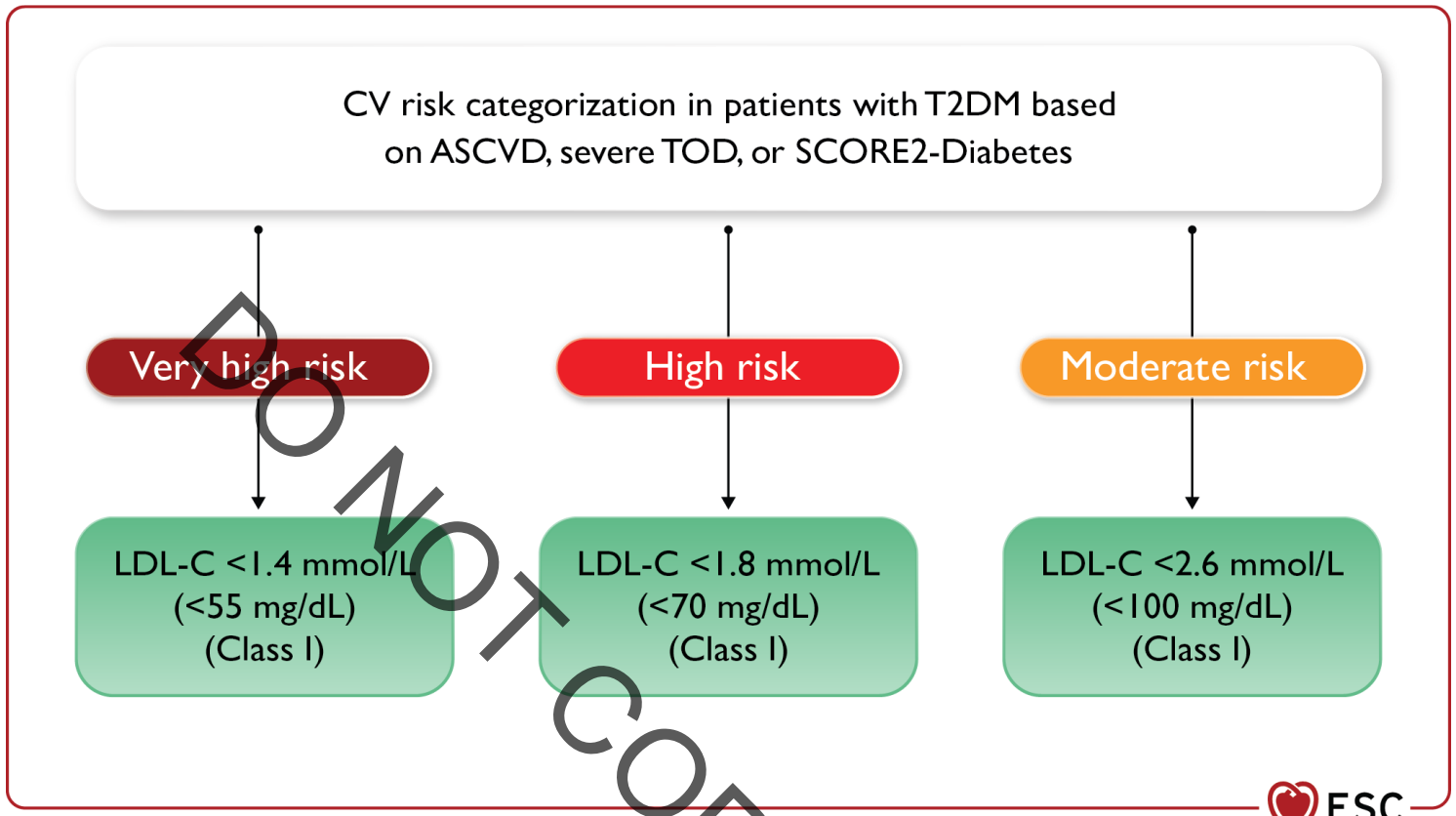

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Figure 11

Mechanisms contributing to altered platelet activation and atherothrombosis in patients with diabetes

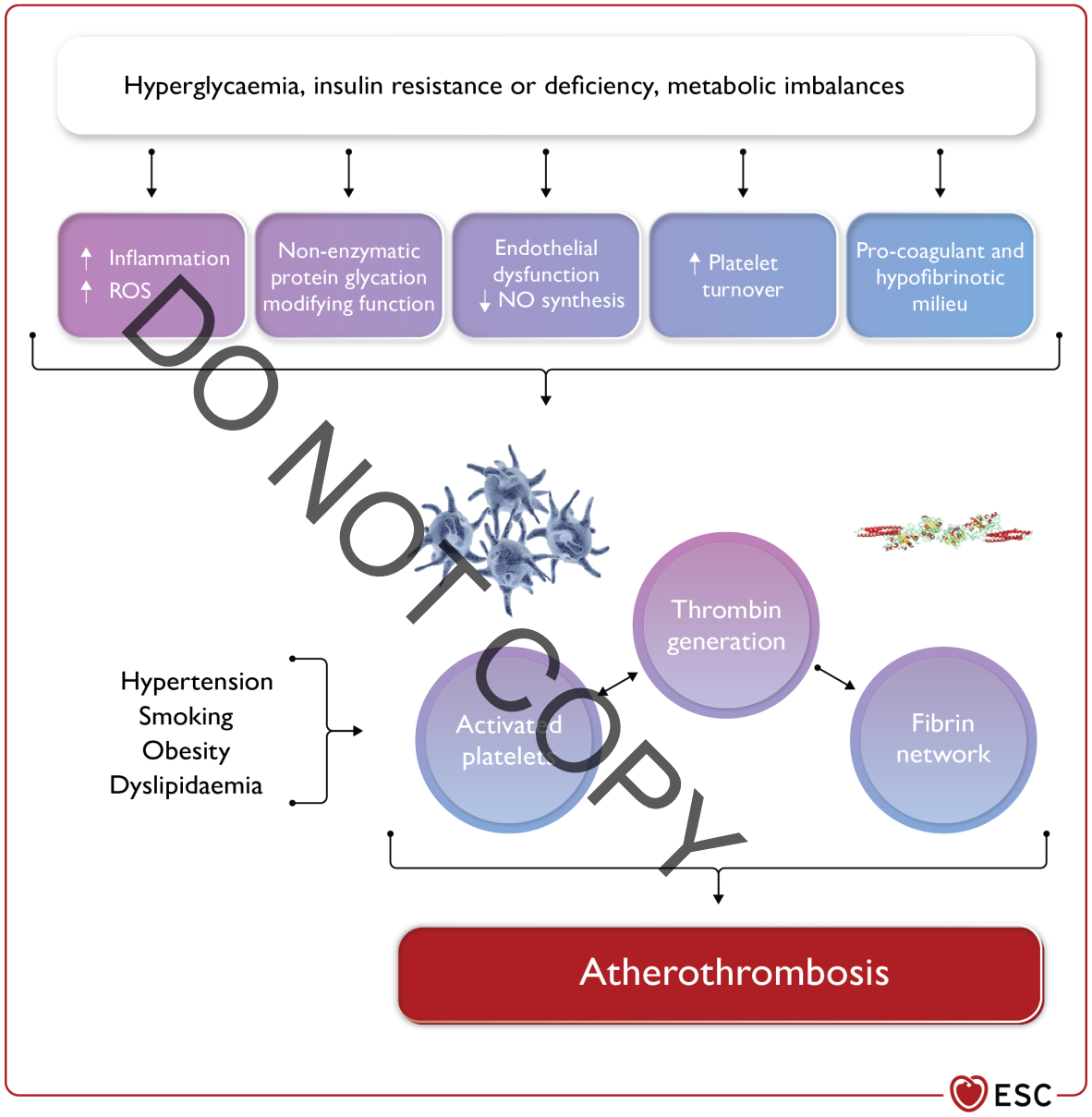

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Figure 12

Recommendations for antiplatelet therapy in patients with diabetes with acute or chronic coronary syndrome undergoing percutaneous coronary intervention or coronary artery bypass grafting without indications for long-term oral anticoagulation

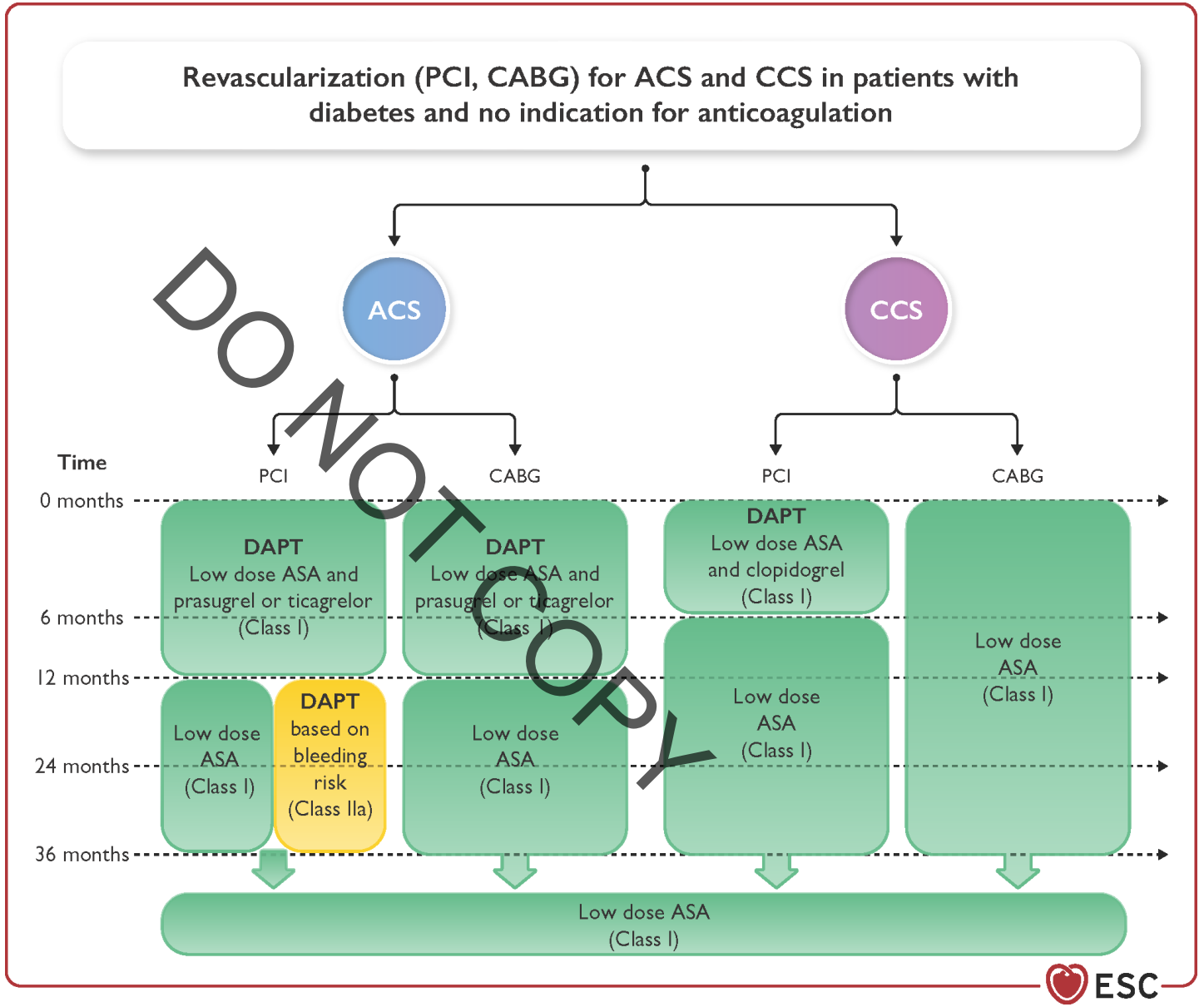

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Figure 14

Diagnostic algorithm for heart failure in patients with diabetes

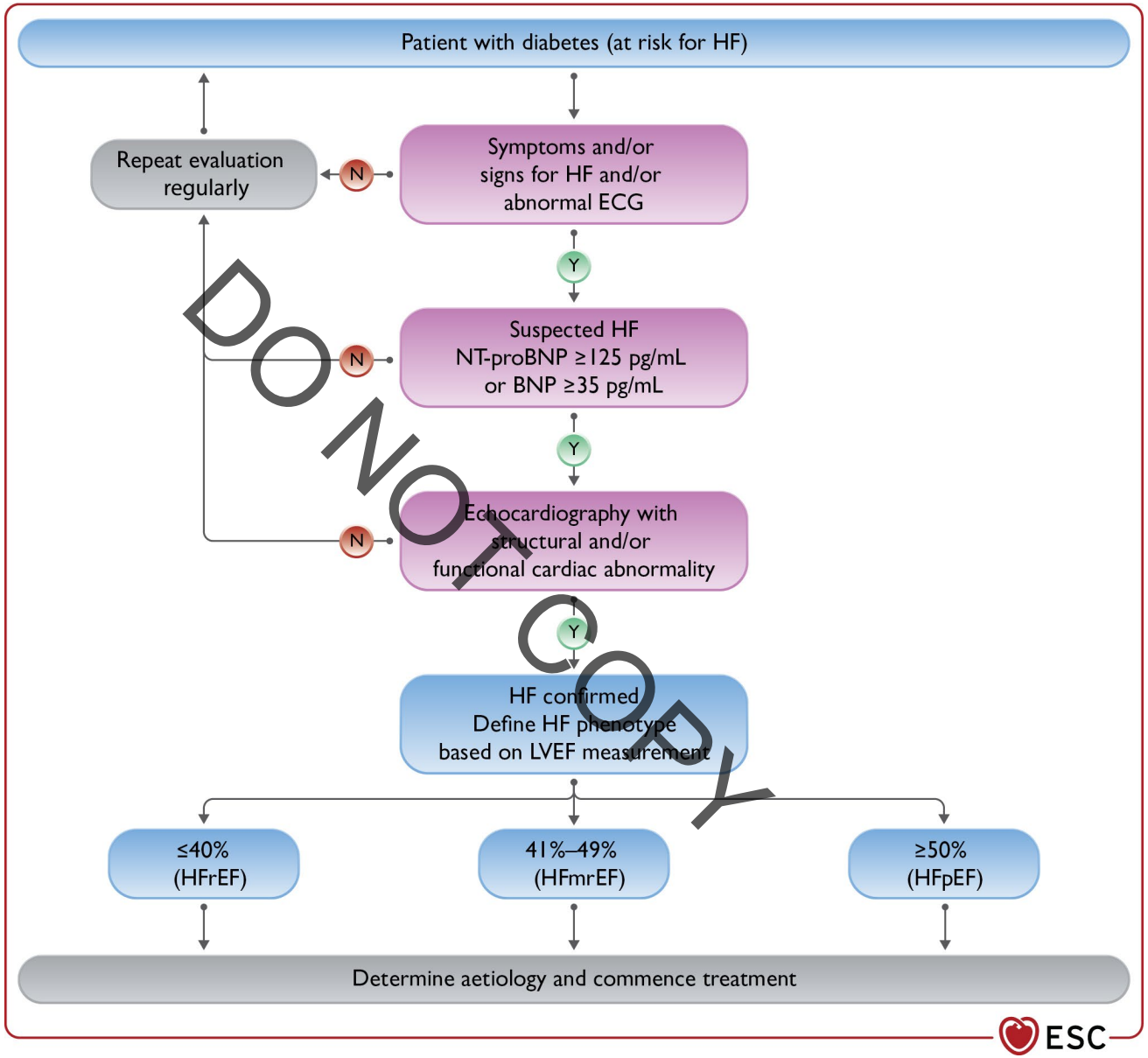

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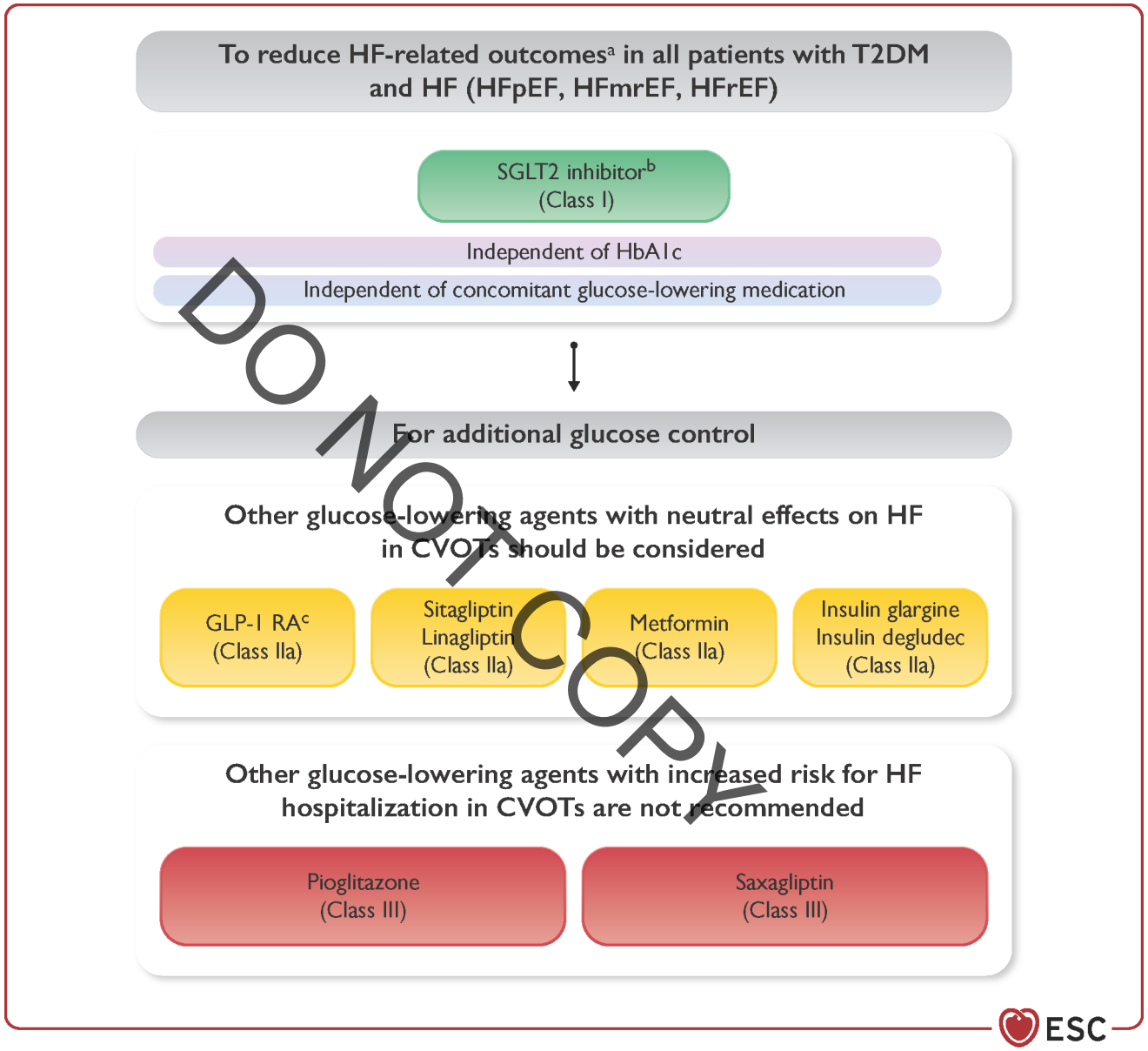
Figure 16

Glucose-lowering treatment of patients with heart failure and type 2 diabetes



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(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

Figure 17

Screening for atrial fibrillation in patients with diabetes

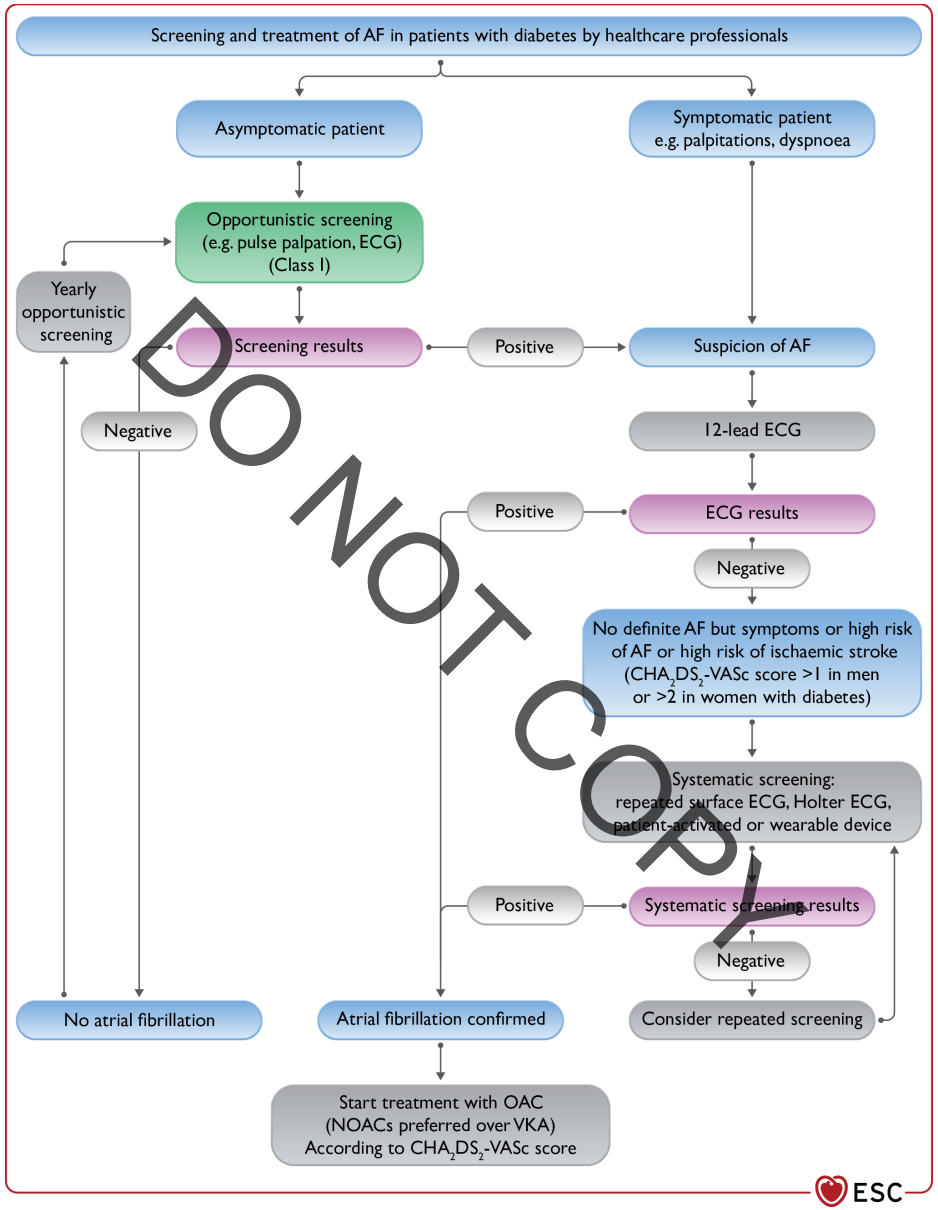

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Figure 18

Pharmacological management to reduce cardiovascular or kidney failure risk in patients with type 2 diabetes and chronic kidney disease

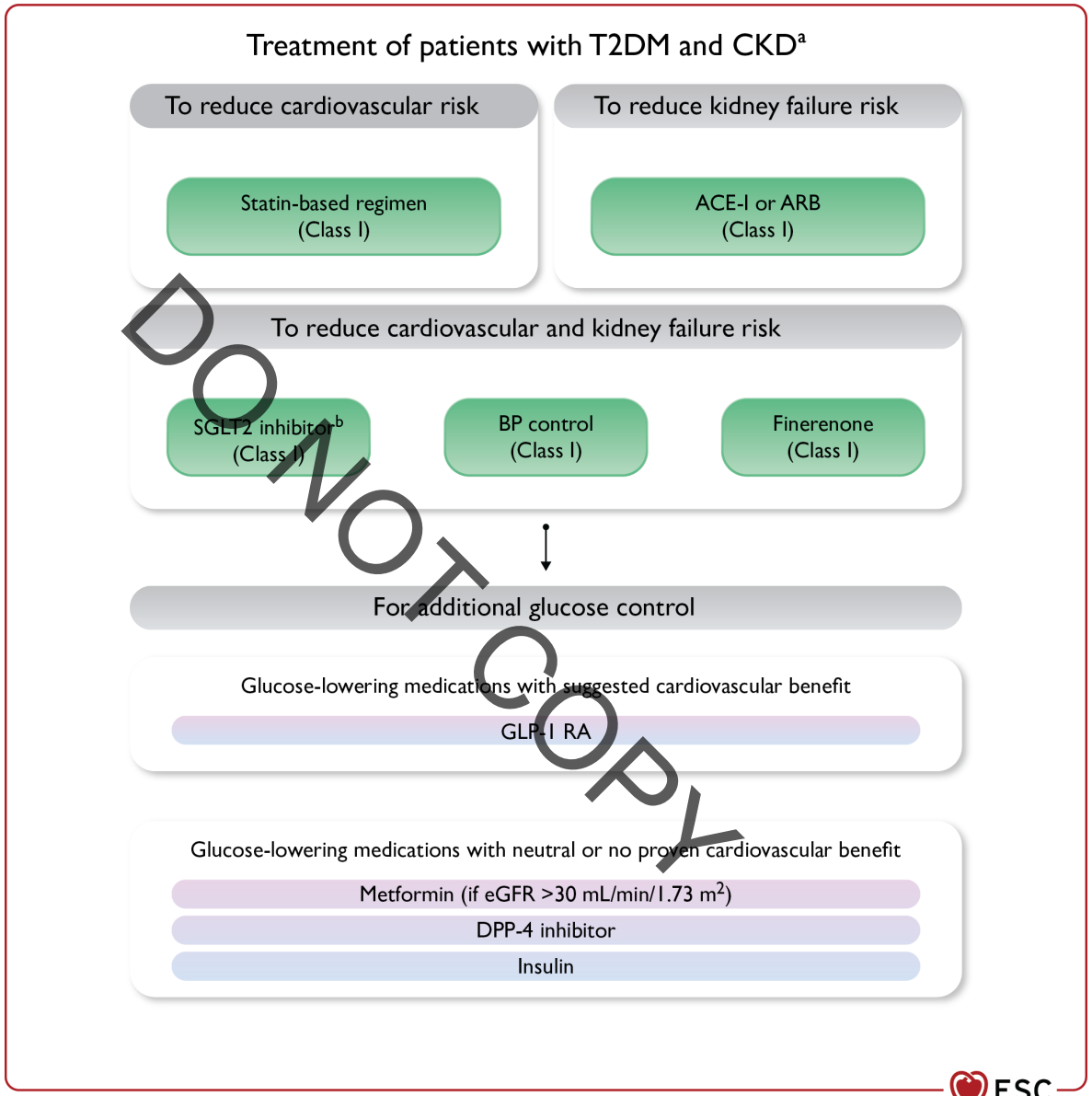

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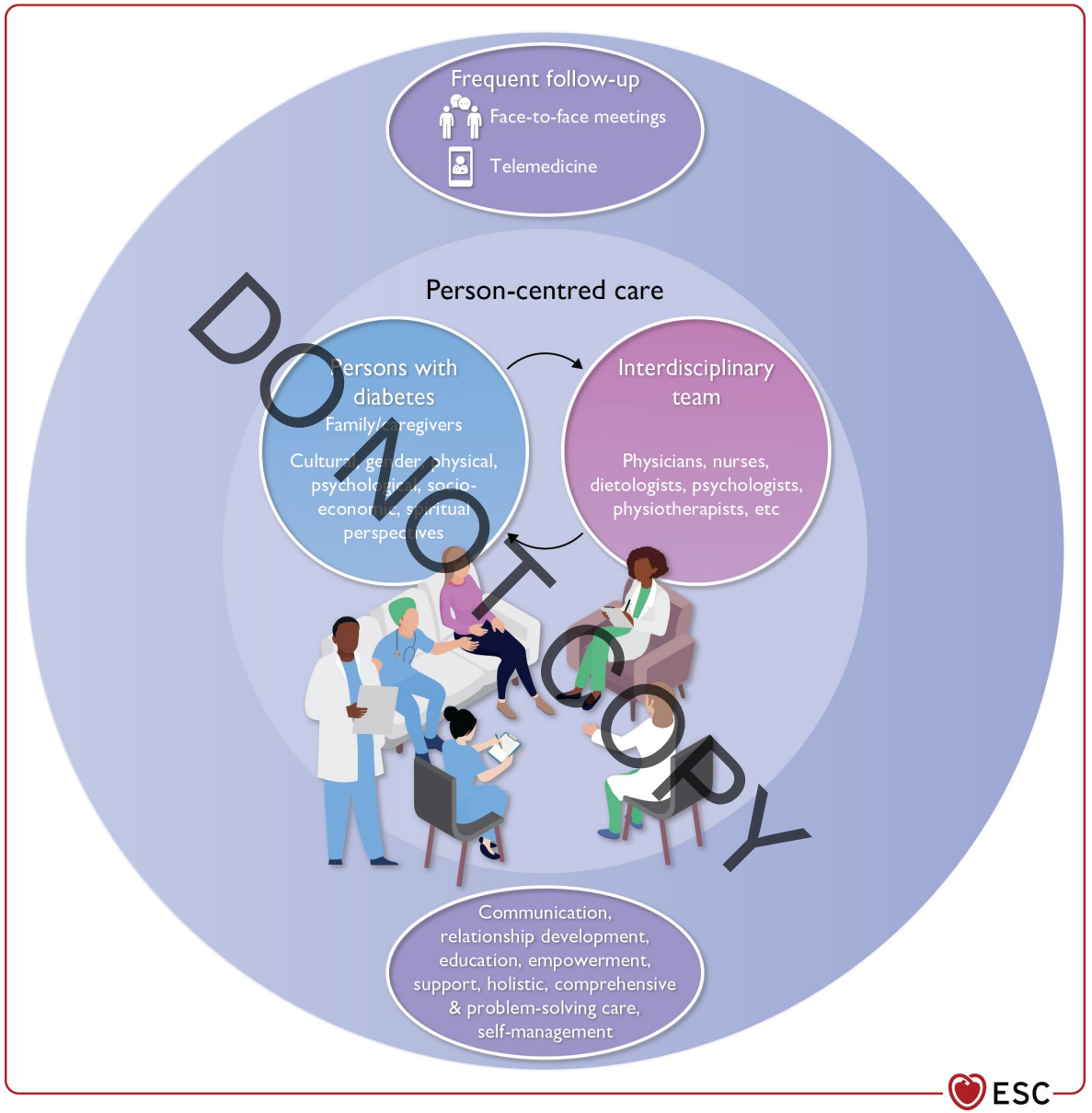
Figure 21

Person-centred care approach for patients with diabetes with or without cardiovascular disease



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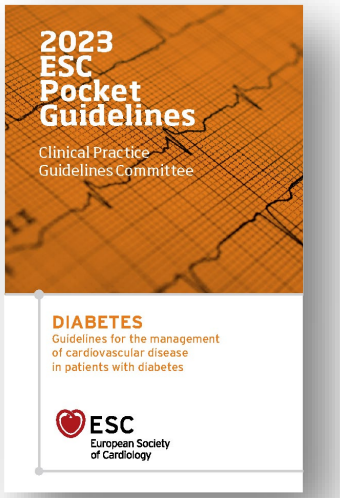
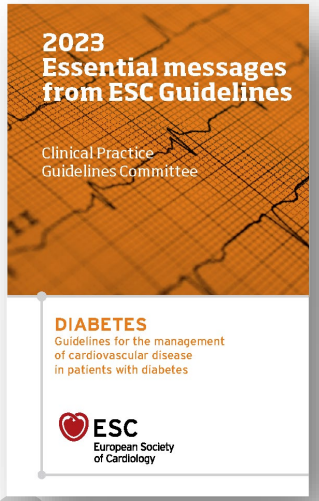
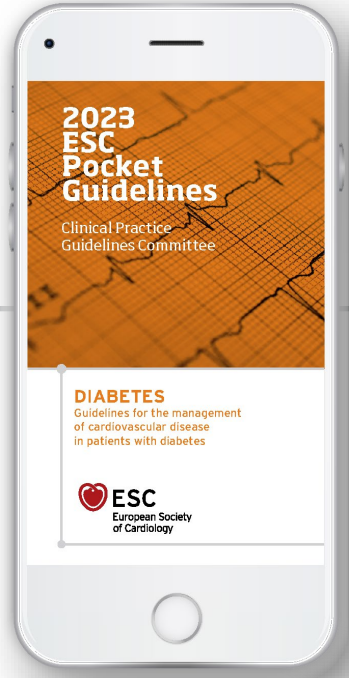
Pocket Guidelines



Essential Messages





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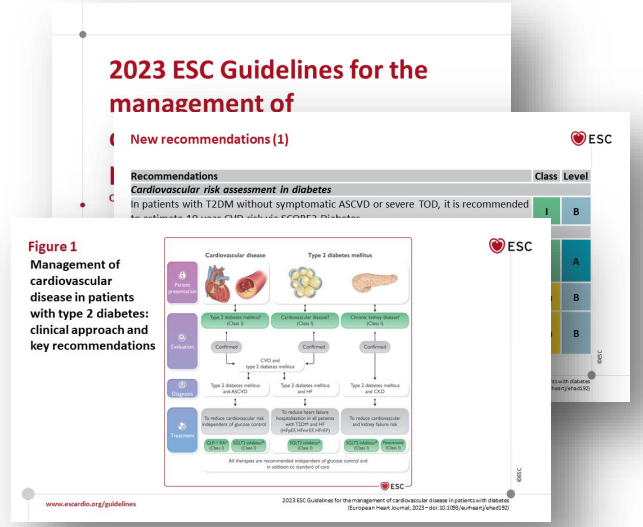
- Essential messages

Official Guidelines slide set



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William Blake 1757 – 1827 London England Poet
https://en.wikipedia.org/wiki/William_Blake

Auguries of Innocence

- To see the world in a grain of sand
- A heaven in a wild flower
- To hold infinity in the palm of your hand
- And eternity in an hour

CVD Risk Considerations – 1 SLIDE TAKE HOME – CEREBRAL GLOVED

ALSO IDEAL FOR DIABETES MELLITUS TYPE 2 – RISK FACTOR MANAGEMENT

- Coronary Event Status
- Exercise levels
- Risk Estimate for Death / Stroke / MI
- Education and Concordance
- Blood Pressure
- Renal function protection
- Anti-platelets / Anti-coagulants
- Lipids management
- GLucose and HBA1c optimisation
- Oedema and weight gain
- Vascular Events screening
- Depression / Mental Wellbeing

There are several drivers of remaining CV risk[1,2]

Key pathways modulating additional risk in secondary prevention

Biological issue	Critical biomarker	Potential intervention
Residual cholesterol risk	LDL-C ≥2.60 mmol/L	Targeted LDL/Apo B reduction
Residual inflammatory risk	hsCRP ≥2.0 mg/L	Targeted inflammation reduction
Residual thrombotic risk	No simple biomarker	Targeted antithrombotic reduction
Residual TG risk	TG ≥1.50 mmol/L	Targeted TG reduction
Residual Lp(a) risk	Lp(a) ≥50 mg/dL	Targeted Lp(a) reduction
Residual diabetes risk	HbA1c fasting glucose	SGLT2 inhibitors GLP-1 agonists

As the limits of benefit from currently available therapies are reached, it will be important to investigate new approaches to managing the remaining CV risk[3]

Adapted from Mason RP, *et al. Arterioscler Thromb Vasc Biol.* 2020[1] and Lawler PR, *et al. Heart J.* 2021.[2]

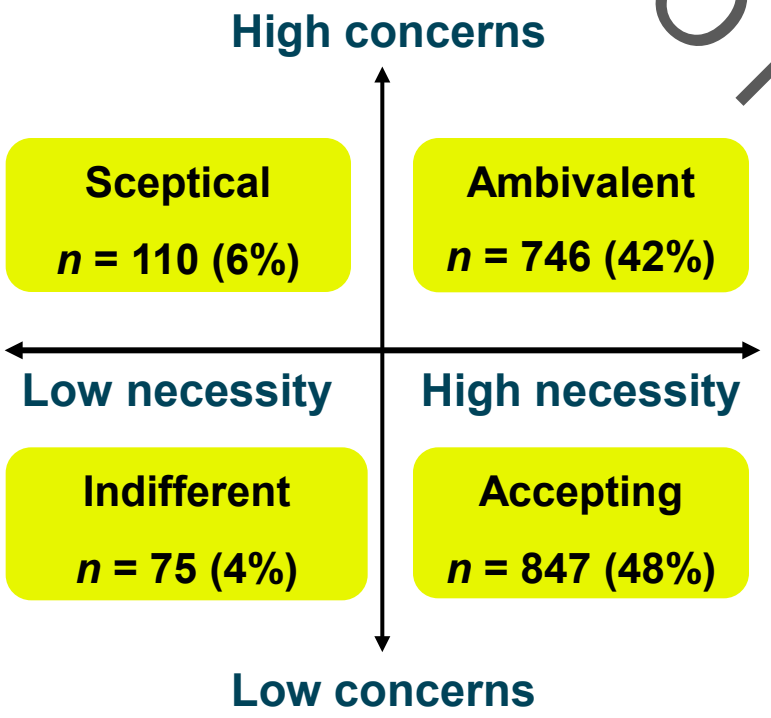
Apo B, apolipoprotein B; ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CV, cardiovascular; GLP-1, glucagon-like peptide 1; HbA1C, glycated haemoglobin; hsCRP, high-sensitivity C-reactive protein; Lp(a), Lipoprotein (a); LDL-C, low-density lipoprotein cholesterol; SGLT2, sodium-glucose co-transporter-2; TG, triglyceride.

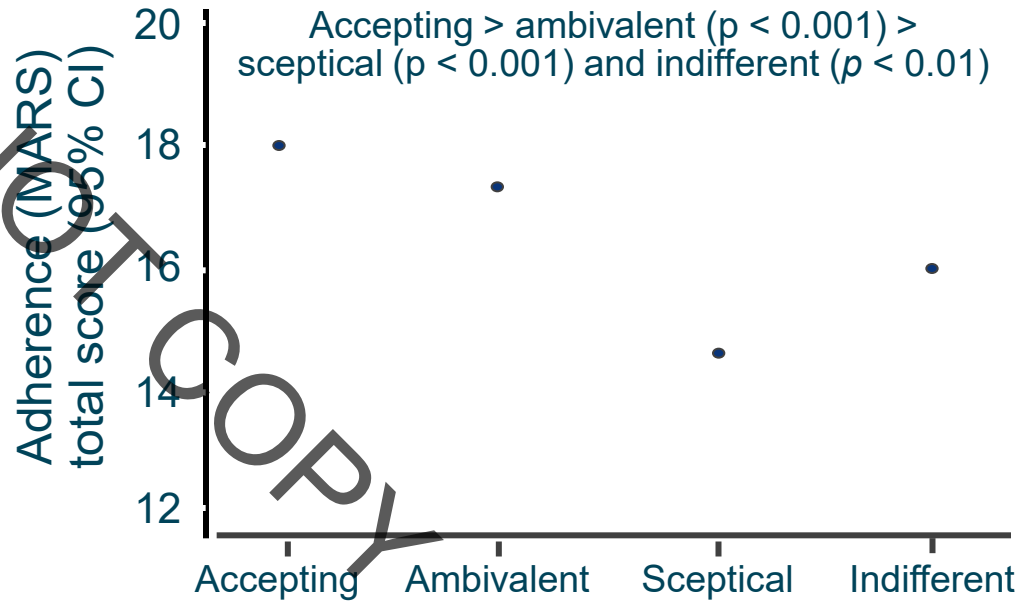
1. Mason RP, *et al Arterioscler Thromb Vasc Biol.* 2020;40(5):1135–1147; **2.** Lawler PR, *et al. Eur Heart J.* 2021;42(1):113–131; **3.** Dhindsa DS, *et al. Front Cardiovasc Med.* 2020;7:88.

NICE Lipid Modification Recommendation summary

Summary	Comment
Identify + Assess People for CVD Risk	QRISK2 / GFR< 60 / >84yo
Communicate Risks	Document Discussion/ Lifestyle changes/ Therapy
Lifestyle Modification	Diet/ Activity/ Weight/ Alcohol/ Smoking/ Plant Stanols & Sterols
Lipid Modification Therapy	Lipid Profile/ Atorva 20mg (Pri Prev)/ Atorva 80mg (sec prev)
Specialist Assessment	Non-HDL>9 mM/7.5mM with no FH URGENT referral: Triglyceride>20mM
Type 1 Diabetes	Start Atorva 20mg for pri prev in all adults>40yo/>10yrs of DM/nephropathy/CVD risk factors
Type 2 Diabetes	QRISK2 >=10% Offer Atorva 20mg for pri prev
Chronic Kidney Disease	Offer atorva 20 mg for pri and sec prevention <40% reduction in non-HDL: Increase dose with renal specialist if GFR<30ml/min/1.73m^2
Follow Up of Patients Started on Statin	3/12 assess adherence/tolerance Annual medication review Discuss benefits & risks of high-intensity statin

Segmentation: Belief Groups and Adherence





Reported adherence differed significantly between groups, with the accepting group having higher adherence than all other groups ($F(3,210.44) = 36.99$, $p < 0.001$).

n = 1871 (A survey of 1 in 10 members of the National Association of Crohn's and Colitis)

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Auguries of Innocence

- To see the world in a grain of sand
- A heaven in a wild flower
- To hold infinity in the palm of your hand
- And eternity in an hour

- To see a lifetime with an ophthalmoscope
- The future in a retinal scan
- To change risks and offer hope
- And protect a fulfilling, loving lifespan

Summary – Ameet Bakhai – DM, BP and CVD
Treat the Eye – Protect the Heart

- Case Study
- European Society of Cardiology DM CV Risk guidance
- NICE Hypertension guidance

- Survival assessment – Vascular Beds – Risk
- Risk Communication / History Taking / Beliefs

- Can see in the Eye the Triads of Heart Disease
- DM – Hypertension – CVD triad
- DM – Hypertension - Heart Function Triad

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Major Advances for Diabetes with Heart Improvement & NICE & ESC 2023 Guidelines

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Recommendations for blood pressure management in patients with diabetes (1)

Recommendations	Class	Level
Screening for hypertension		
Regular BP measurements are recommended in all patients with diabetes to detect and treat hypertension to reduce CV risk.	I	A
Treatment targets		
Anti-hypertensive drug treatment is recommended for people with diabetes when office BP is ≥140/90 mmHg.	I	A
It is recommended to treat hypertension in patients with diabetes in an individualized manner. The BP goal is to target SBP to 130 mmHg and <130 mmHg if tolerated, but not <120 mmHg. In older people (age >65 years), it is recommended to target SBP to 130–139 mmHg.	I	A

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

New recommendations (4)

Recommendations	Class	Level
Atherosclerotic cardiovascular disease risk reduction by glucose-lowering medications in diabetes (continued)		
If additional glucose control is needed, pioglitazone may be considered in patients with T2DM and ASCVD without HF.	IIb	B
Blood pressure and diabetes		
Regular BP measurements are recommended in all patients with diabetes to detect and treat hypertension to reduce CV risk.	I	A
Lipids and diabetes		
A PCSK9 inhibitor is recommended in patients at very high CV risk, with persistently high LDL-C levels above target despite treatment with a maximum tolerated statin dose, in combination with ezetimibe, or in patients with statin intolerance.	I	A
If a statin-based regimen is not tolerated at any dosage (even after re-challenge), a PCSK9 inhibitor added to ezetimibe should be considered.	IIa	B

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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New recommendations (2)

Recommendations	Class	Level
Increasing physical activity and exercise in patients with diabetes		
It is recommended to adapt exercise interventions to T2DM-associated comorbidities, e.g. frailty, neuropathy, or retinopathy.	I	B
It is recommended to introduce structured exercise training in patients with T2DM and established CVD, e.g. CAD, HFpEF, HFmrEF, HFrEF or AF to improve metabolic control, exercise capacity, and quality of life, and to reduce CV events.	I	B
The use of behavioural theory-based interventions, such as goal-setting, re-evaluation of goals, self-monitoring, and feedback, should be considered to promote physical activity behaviour.	IIa	B
It may be considered to use wearable activity trackers to increase physical activity behaviour.	IIb	B

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

New recommendations (5)

Recommendations	Class	Level
Lipids and diabetes (continued)		
If a statin-based regimen is not tolerated at any dosage (even after re-challenge), ezetimibe should be considered.	IIa	C
High-dose icosapent ethyl (2 g b.i.d.) may be considered in combination with a statin in patients with hypertriglyceridaemia.	IIb	B
antithrombotic therapy in patients with diabetes		
Clopidogrel 75 mg o.d. following appropriate loading (e.g. 600 mg or at least 5 days already on maintenance therapy) is recommended in addition to ASA for 6 months following coronary stenting in patients with CCS, irrespective of stent type, unless a shorter duration is indicated due to the risk or occurrence of life-threatening bleeding.	I	A
In patients with diabetes and ACS treated with DAPT who are undergoing CABG and do not require long-term OAC therapy, resuming a $P2Y_{12}$ receptor inhibitor as soon as deemed safe after surgery and continuing it up to 12 months is recommended.	I	C

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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New recommendations (7)

Recommendations	Class	Level
multifactorial approach in patients with diabetes		
Identifying and treating risk factors and comorbidities early is recommended.	I	A
Multidisciplinary behavioural approaches that combine the knowledge and skills of different caregivers are recommended.	I	C
Principles of motivational interviewing should be considered to induce behavioural changes.	IIa	C
Telehealth may be considered to improve risk profile.	IIb	B
Management of coronary artery disease in patients with diabetes		
Myocardial revascularization in CCS is recommended when angina persists despite treatment with anti-anginal drugs or in patients with a documented large area of ischaemia (>10% LV).	I	A
Complete revascularization is recommended in patients with STEMI without cardiogenic shock and with multi-vessel CAD.	I	A

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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New recommendations (9)

Recommendations	Class	Level
Heart failure and diabetes		
Evaluation for heart failure in diabetes		
If HF is suspected, it is recommended to measure BNP/NT-proBNP.	I	B
Systematic survey for HF symptoms and/or signs of HF is recommended at each clinical encounter in all patients with diabetes.	I	C
Diagnostic tests in all patients with suspected heart failure		
12-lead ECG is recommended.	I	C
Transthoracic echocardiography is recommended.	I	C
Chest radiography (X-ray) is recommended.	I	C
Routine blood tests for comorbidities are recommended, including full blood count, urea, creatinine and electrolytes, thyroid function, lipids, and iron status (ferritin and TSAT).	I	C

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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New recommendations (10)

Recommendations	Class	Level
Pharmacological treatment indicated in patients with HFrEF (NYHA class II–IV) and diabetes		
SGLT2 inhibitors (dapagliflozin, empagliflozin, or sotagliflozin) are recommended in all patients with HFrEF and T2DM to reduce the risk of HF hospitalization and CV death.	I	A
An intensive strategy of early initiation of evidence-based treatment (SGLT2 inhibitors, ARNI/ACE-Is, beta-blockers, and MRAs), with rapid up-titration to trial-defined target doses starting before discharge and with frequent follow-up visits in the first 6 weeks following a HF hospitalization is recommended to reduce re-admissions or mortality.	I	B

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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New recommendations (13)

Recommendations	Class	Level
Chronic kidney disease and diabetes		
Intensive LDL-C lowering with statins or a statin/ezetimibe combination is recommended.	I	A
A SGLT2 inhibitor (canagliflozin, empagliflozin, or dapagliflozin) is recommended in patients with T2DM and CKD with an eGFR ≥20 mL/min/1.73 m^2 to reduce the risk of CVD and kidney failure.	I	A
Finerenone is recommended in addition to an ACE-I or ARB in patients with T2DM and eGFR >60 mL/min/1.73 m^2 with a UACR ≥30 mg/mmol (≥300 mg/g), or eGFR 25–60 mL/min/1.73 m^2 and UACR ≥3 mg/mmol (≥30 mg/g) to reduce CV events and kidney failure.	I	A
Low-dose ASA (75–100 mg o.d.) is recommended in patients with CKD and ASCVD.	I	A

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Revised recommendations (1)

2019	Class	Level	2023	Class	Level
Change in diet and nutrition in patients with diabetes					
A Mediterranean diet, rich in polyunsaturated and monounsaturated fats, should be considered to reduce CV events.	IIa	B	It is recommended to adopt a Mediterranean or plant-based diet with high unsaturated fat content to lower CV risk.	I	A

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Revised recommendations (2)

2019	Class	Level	2023	Class	Level
ASCVD risk reduction by glucose-lowering medications in diabetes					
Empagliflozin, canagliflozin, or dapagliflozin are recommended in patients with T2DM and CVD, or at very high/high CV risk to reduce CV events.	I	A	SGLT2 inhibitors with proven CV benefit are recommended in patients with T2DM and ASCVD to reduce CV events, independent of baseline or target HbA1c and independent of concomitant glucose-lowering medication.	I	A
			In patients with T2DM without ASCVD or severe TOD but with a calculated 10-year CVD risk ≥10%, treatment with a SGLT2 inhibitor or GLP-1 RA may be considered to reduce CV risk.	IIb	C

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Revised recommendations (3)

2019	Class	Level	2023	Class	Level
ASCVD risk reduction by glucose-lowering medications in diabetes (continued)					
Liraglutide, semaglutide, or dulaglutide are recommended in patients with T2DM and CVD, or at very high/high CV risk to reduce CV events.	I	A	GLP-1 RAs with proven CV benefit are recommended in patients with T2DM and ASCVD to reduce CV events, independent of baseline or target HbA1c and independent of concomitant glucose-lowering medication.	I	A
			In patients with T2DM without ASCVD or severe TOD but with a calculated 10-year CVD risk ≥10%, treatment with a SGLT2 inhibitor or GLP-1 RA may be considered to reduce CV risk.	IIb	C

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Revised recommendations (4)

2019	Class	Level	2023	Class	Level
Antithrombotic therapy in patients with diabetes					
When low-dose aspirin is used, proton pump inhibitors should be considered to prevent gastrointestinal bleeding.	IIa	A	When antithrombotic drugs are used in combination, proton pump inhibitors are recommended to prevent gastrointestinal bleeding.	I	A
			When a single antiplatelet or anticoagulant drug is used, proton pump inhibitors should be considered to prevent gastrointestinal bleeding, considering the bleeding risk of the individual patient.	IIa	A

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Revised concepts 2023 Guidelines (1)

Focus of the Guidelines is prevention and management of cardiovascular disease in diabetes
The aspect of pre-diabetes is no longer covered in this Guideline.
Cardiovascular risk assessment in diabetes
For patients without ASCVD or severe target-organ damage, a novel T2DM-specific risk score (SCORE2-Diabetes) is introduced.
CV risk categories in T2DM are now defined based on the presence of ASCVD or severe target-organ damage or the 10-year CVD risk using SCORE2-Diabetes.
Atherosclerotic cardiovascular risk reduction by glucose-lowering medications in diabetes
Based on various meta-analyses including data from CVOTs with SGLT2 inhibitors and GLP-1 RAs, the current guidelines give separate recommendations for patients with and without ASCVD/severe target-organ damage.
Special attention is given on the aspect of proven CV benefit and/or safety of glucose-lowering medications.

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Revised concepts 2023 Guidelines (2)

Heart failure and diabetes
Detailed recommendations are given on HF screening and diagnosis in patients with diabetes.
Based on data from outcome trials in patients with HF (HFrEF, HFmrEF, HFpEF) with and without diabetes, the current guidelines provide recommendations for the treatment of HF in patients with diabetes across the whole spectrum of left ventricular ejection fraction.
Detailed recommendations are given for the use of glucose-lowering medications in patients with HF and diabetes.
Arrhythmias and diabetes
Given that patients with diabetes exhibit a higher AF frequency at a younger age, the concept of opportunistic screening for AF by pulse taking or ECG in patients with diabetes <65 years of age (particularly when other risk factors are associated) is introduced.
Chronic kidney disease and diabetes
A dedicated section on managing CV risk in patients with CKD and diabetes is introduced covering aspects of screening (including regular screening with eGFR and UACR) and treatment.

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
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Recommendations for the management of dyslipidaemia in patients with diabetes (1)

Recommendations	Class	Level
Lipid targets		
In patients with T2DM at moderate CV risk, an LDL-C target of <2.6 mmol/L (<100 mg/dL) is recommended.	I	A
In patients with T2DM at high CV risk, an LDL-C target of <1.8 mmol/L (<70 mg/dL) and LDL-C reduction of at least 50% is recommended.	I	A
In patients with T2DM at very high CV risk, an LDL-C target of <1.4 mmol/L (<55 mg/dL) and LDL-C reduction of at least 50% is recommended.	I	B
In patients with T2DM, a secondary goal of a non-HDL-C target of <2.2 mmol/L (<85 mg/dL) in very high CV-risk patients and <2.6 mmol/L (<100 mg/dL) in high CV-risk patients is recommended.	I	B

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Recommendations for the management of dyslipidaemia in patients with diabetes (3)

Recommendations	Class	Level
Lipid-lowering treatment (continued)		
If a statin-based regimen is not tolerated at any dosage (even after re-challenge), a PCSK9 inhibitor added to ezetimibe should be considered.	IIa	B
If a statin-based regimen is not tolerated at any dosage (even after re-challenge), ezetimibe should be considered.	IIa	C
High-dose icosapent ethyl (2 g b.i.d.) may be considered in combination with a statin in patients with hypertriglyceridaemia.	IIb	B

2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes
(European Heart Journal; 2023 – doi:10.1093/eurheartj/ehad192)

Recommendations for patients with chronic kidney disease and diabetes (2)

Recommendations	Class	Level
Finerenone is recommended in addition to an ACE-I or ARB in patients with T2DM and eGFR >60 mL/min/1.73 m^2 with a UACR ≥30 mg/mmol (≥300 mg/g), or eGFR 25–60 mL/min/1.73 m^2 and UACR ≥3 mg/mmol (≥30 mg/g) to reduce CV events and kidney failure.	I	A
A GLP-1 RA is recommended at eGFR >15 mL/min/1.73 m^2 to achieve adequate glycaemic control, due to low risk of hypoglycaemia and beneficial effects on weight, CV risk, and albuminuria.	I	A
Low-dose ASA (75–100 mg o.d.) is recommended in patients with CKD and ASCVD.	I	A
It is recommended that patients with diabetes are routinely screened for kidney disease by assessing eGFR defined by CKD-EPI and UACR.	I	B

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William Blake 1757 – 1827 London England Poet
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Auguries of Innocence

- To see the world in a grain of sand
- A heaven in a wild flower
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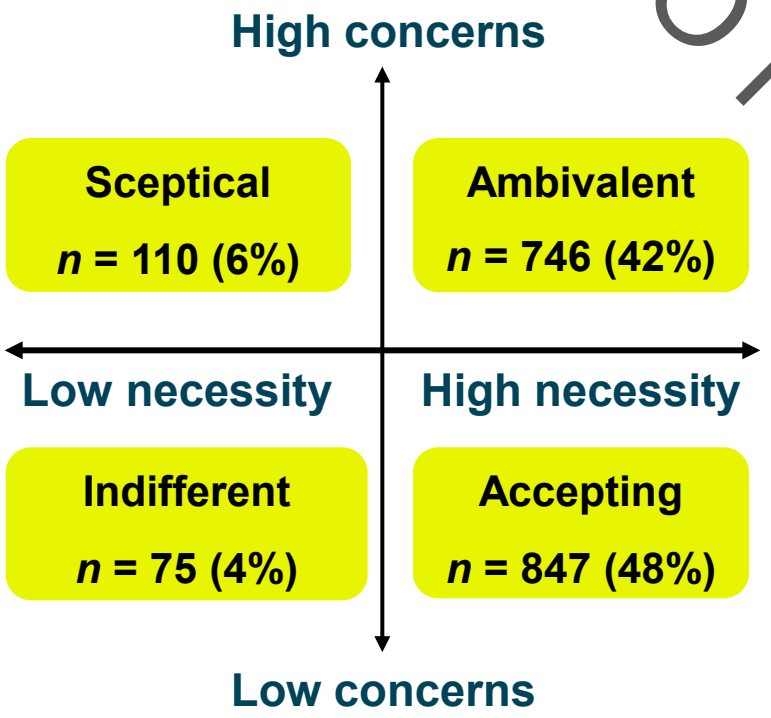
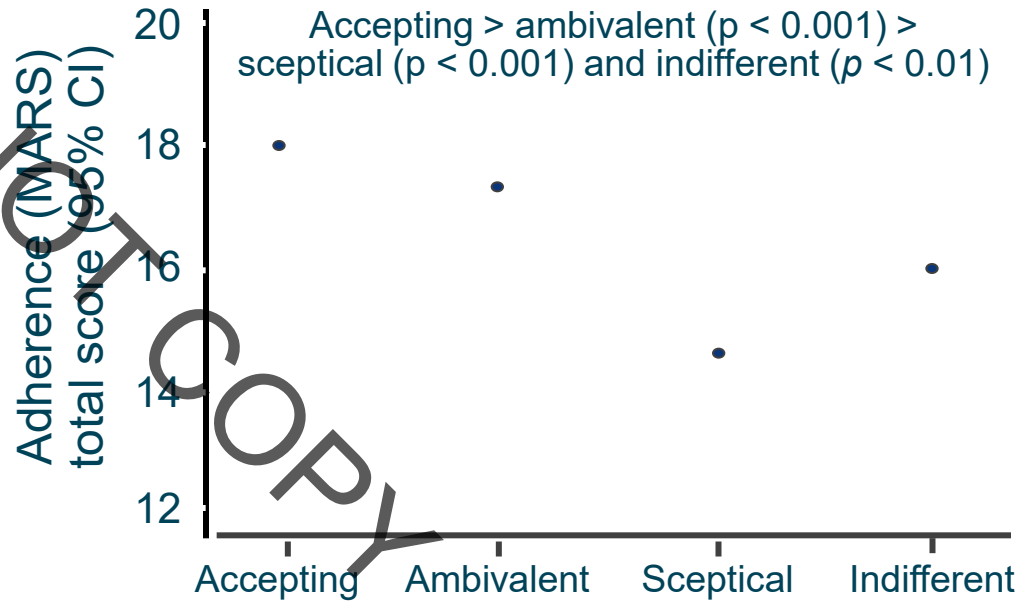
- And eternity in an hour

NICE Lipid Modification Recommendation summary

Summary	Comment
Identify + Assess People for CVD Risk	QRISK2 / GFR< 60 / >84yo
Communicate Risks	Document Discussion/ Lifestyle changes/ Therapy
Lifestyle Modification	Diet/ Activity/ Weight/ Alcohol/ Smoking/ Plant Stanols & Sterols
Lipid Modification Therapy	Lipid Profile/ Atorva 20mg (Pri Prev)/ Atorva 80mg (sec prev)
Specialist Assessment	Non-HDL>9 mM/7.5mM with no FH URGENT referral: Triglyceride>20mM
Type 1 Diabetes	Start Atorva 20mg for pri prev in all adults>40yo/>10yrs of DM/nephropathy/CVD risk factors
Type 2 Diabetes	QRISK2 >=10% Offer Atorva 20mg for pri prev
Chronic Kidney Disease	Offer atorva 20 mg for pri and sec prevention <40% reduction in non-HDL: Increase dose with renal specialist if GFR<30ml/min/1.73m^2
Follow Up of Patients Started on Statin	3/12 assess adherence/tolerance Annual medication review Discuss benefits & risks of high-intensity statin

Segmentation: Belief Groups and Adherence





Reported adherence differed significantly between groups, with the accepting group having higher adherence than all other groups ($F(3,210.44) = 36.99$, $p < 0.001$).

n = 1871 (A survey of 1 in 10 members of the National Association of Crohn's and Colitis)

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- To see a lifetime with an ophthalmoscope
- The future in a retinal scan
- To change risks and offer hope
- And protect a fulfilling, loving lifespan

Summary – Ameet Bakhai – DM, BP and CVD
Treat the Eye – Protect the Heart

- Case Study
- European Society of Cardiology DM CV Risk guidance
- NICE Hypertension guidance

- Survival assessment – Vascular Beds – Risk
- Risk Communication / History Taking / Beliefs

- Can see in the Eye the Triads of Heart Disease
- DM – Hypertension – CVD triad
- DM – Hypertension - Heart Function Triad

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Major Advances for Diabetes with Heart Improvement & NICE & ESC 2023 Guidelines

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