

Risk estimation in high-risk patients in everybody!?

Nationale Lipidendag

17 mei 2018

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Utrecht



Disclosures



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• Research	ZonMw, Wellerdieck-de Goede fonds, Leatare foundation, Vrienden UMC Utrecht, Dutch Heart Foundation
• Honoraria	None
• Stocks	None
• Other ...	Fase II/III clinical research in the field of lipid-lowering (Sanofi, Medicines Company, Amgen, Pfizer, Eli Lilly, Merck, ISIS)
	Guideline committees: CV Risk Management, CV Risk Management in elderly, (Genetic) lipid disorders

State of the Union 2015:

"Precision medicine gives us one of the greatest opportunities for new medical breakthroughs that we have ever seen..."

"...delivering the right treatments, at the right time, every time to the right person..."

"...the possibility of applying medicines more efficiently and more effectively so that the success rates are higher..."

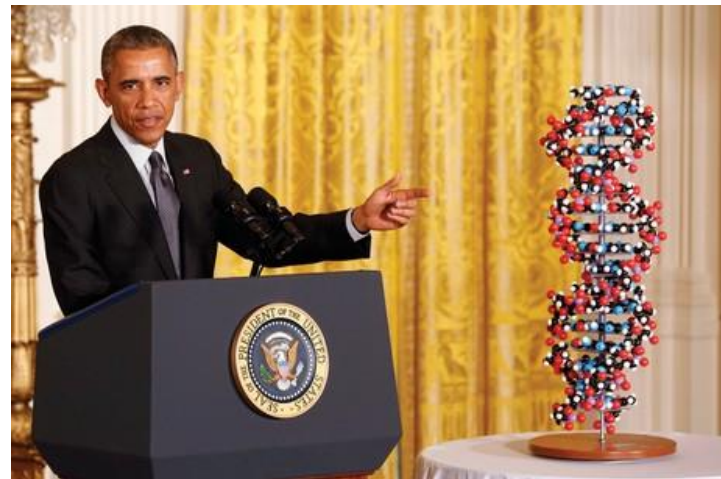
"...a new wave of advances just like genetics 25 years ago..."



State of the Union 2015:

"...what we want is that we can make better life decisions and making sure that we've got a system that focuses on prevention and keeping healthy, not just on curing diseases after they happen."

"...I'm asking researchers to join us in this effort. And I'm asking entrepreneurs and non-profits to help us create tools that give patients the chance to get involved as well."



Greatest challenge for a clinician

Translating the results of (large) randomized clinical trials to treatment of individual patients



CV risk estimation



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- Life is about risks and opportunities. It's all about the future!!
- CV risk estimation should not be limited to specific patients groups, but should be available for all persons/patients.
- Risk estimation is only useful when directly linked to treatment decisions.
- Risk estimation enables shared decision making.

CV risk prediction for everyone!

Apparently healthy people

Patients with vascular disease

Patients with DM2

Elderly people/patients



Vrouwen														Mannen																																									
Niet-rookster														Rookster														Niet-roker														Roker													
18 0	4 14-17	5 17-19	6 20-23	7 24-27	8 29-33	10 35-40	8 28-32	9 32-37	11 37-43	12 44-50	15 53-60	18 64-73	7 14-15	8 16-18	10 20-22	12 24-26	15 29-32	18 36-40	13 26-28	15 30-33	18 36-40	21 43-47	26 52-57	31 63-70	Sterfte Ziekte + Sterfte																														
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New risk chart CVRM 2018 guideline (concept)

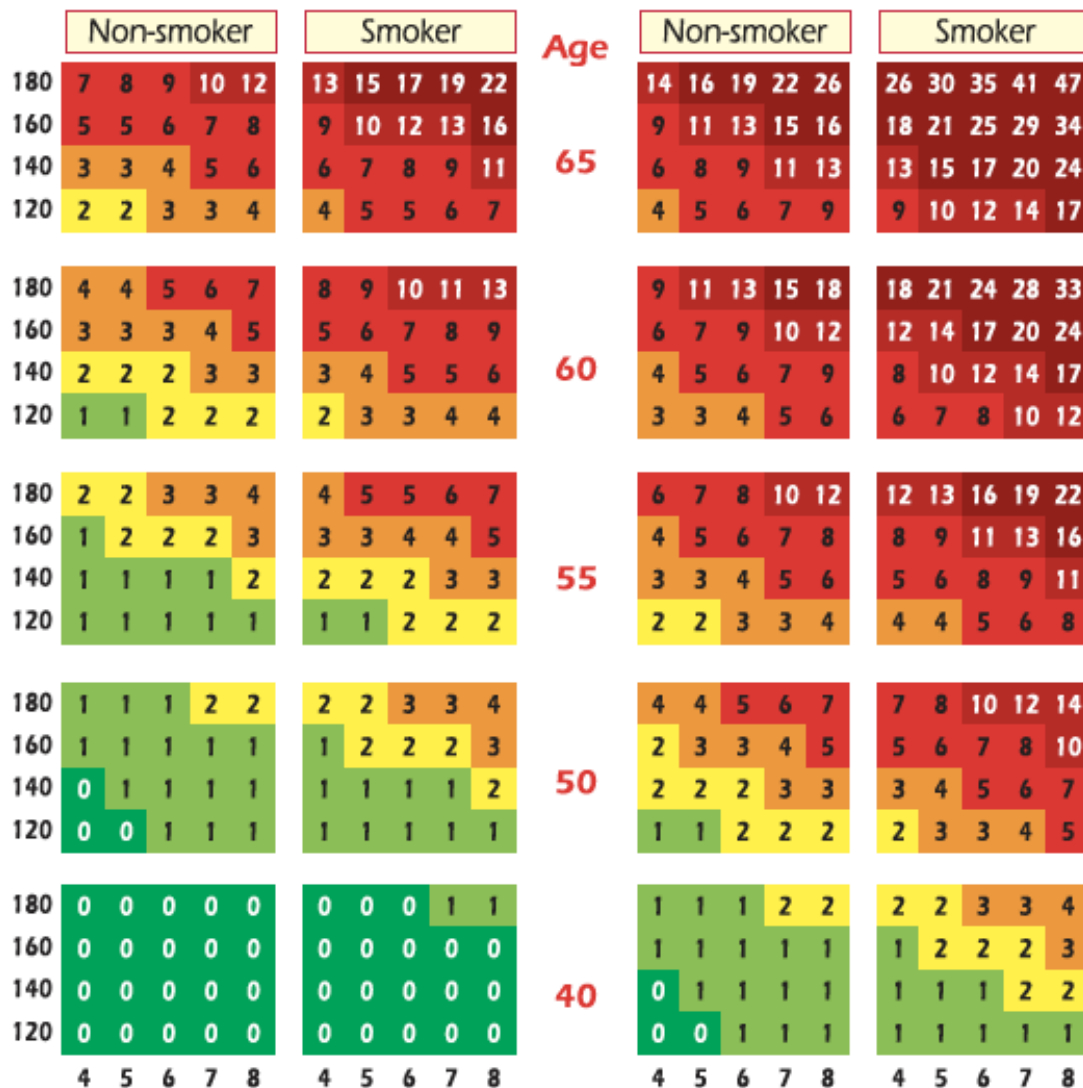
SCORE



10-year risk of
fatal CVD in
populations at
high CVD risk

WOMEN

MEN

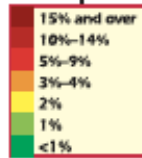


All elderly at very high risk???

© ESC 2016



SCORE



10-year risk of
fatal CVD in
populations at
high CVD risk

WOMEN

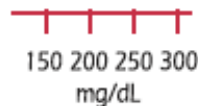
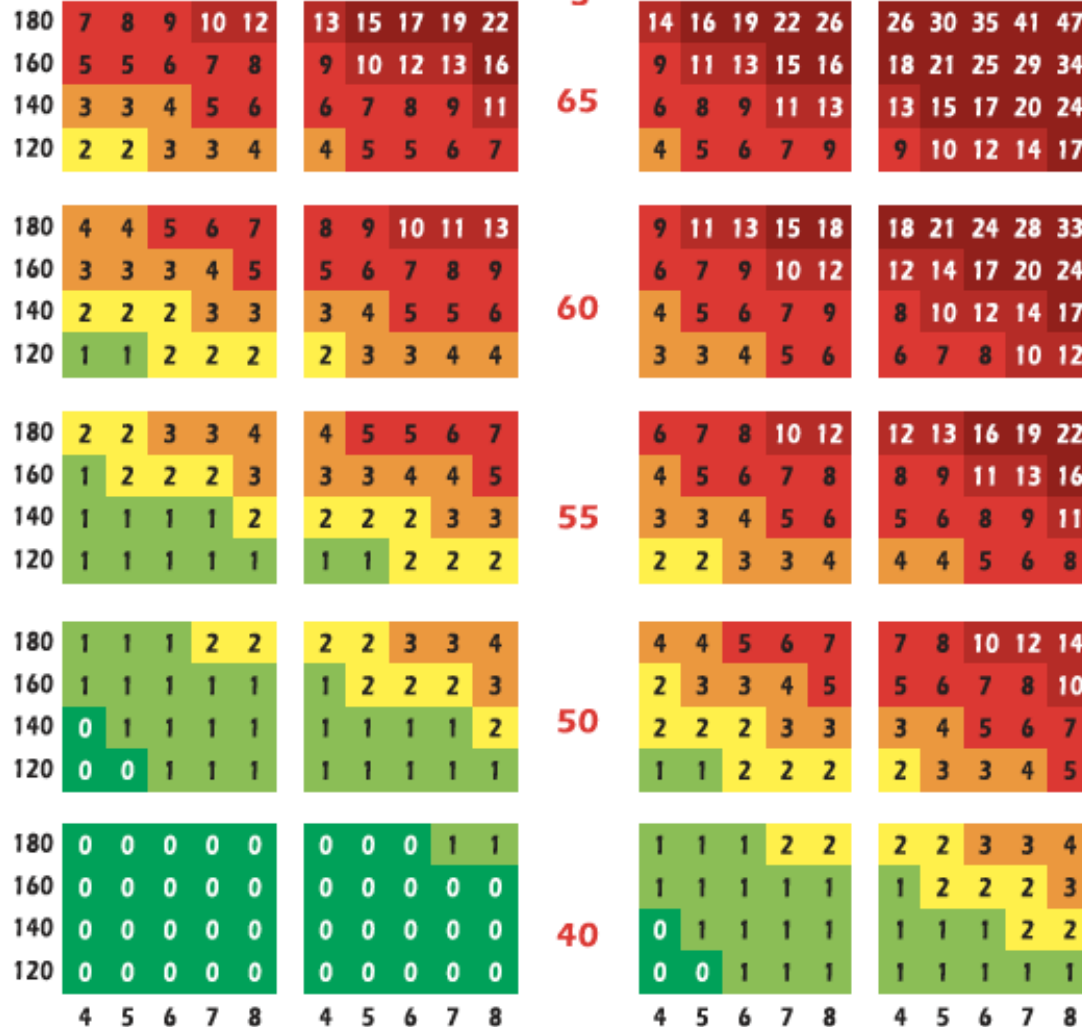
MEN

Non-smoker

Smoker

Non-smoker

Smoker



© ESC 2016

problem

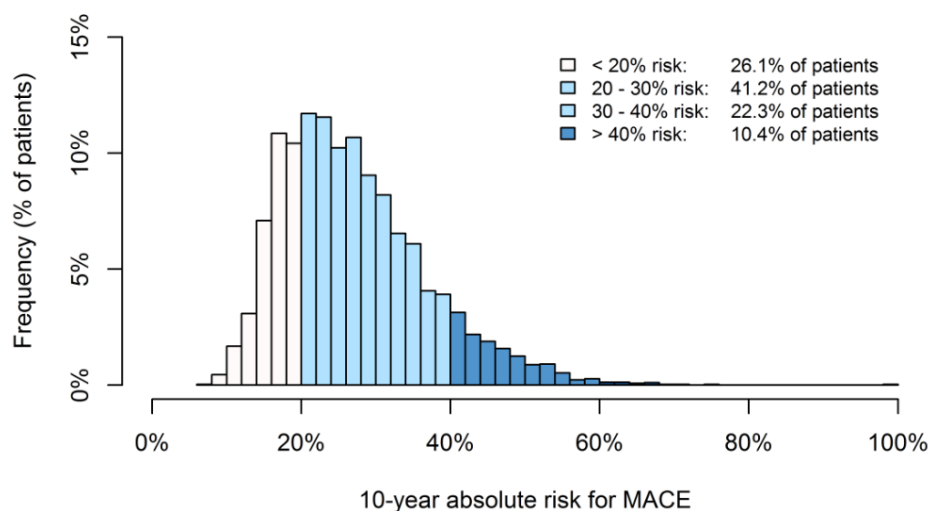
problem



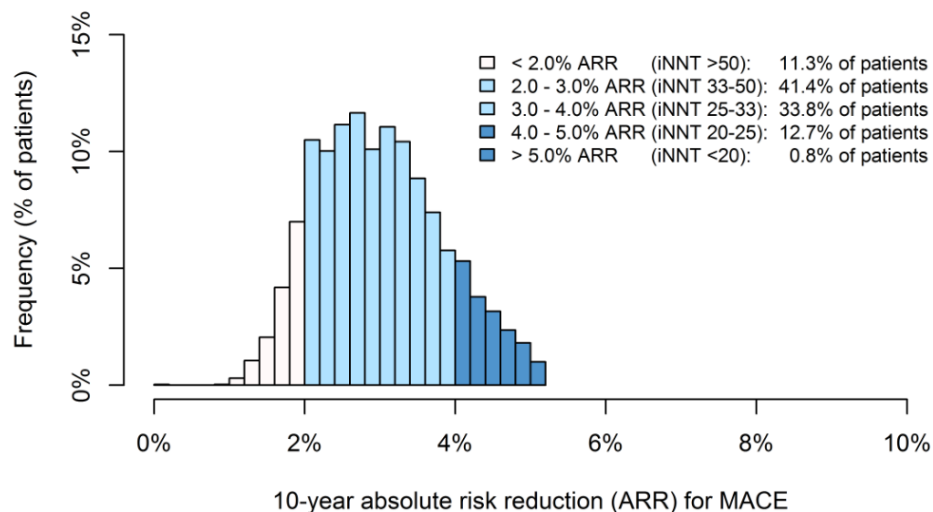
OK

CV risk in elderly (patients) without vascular disease

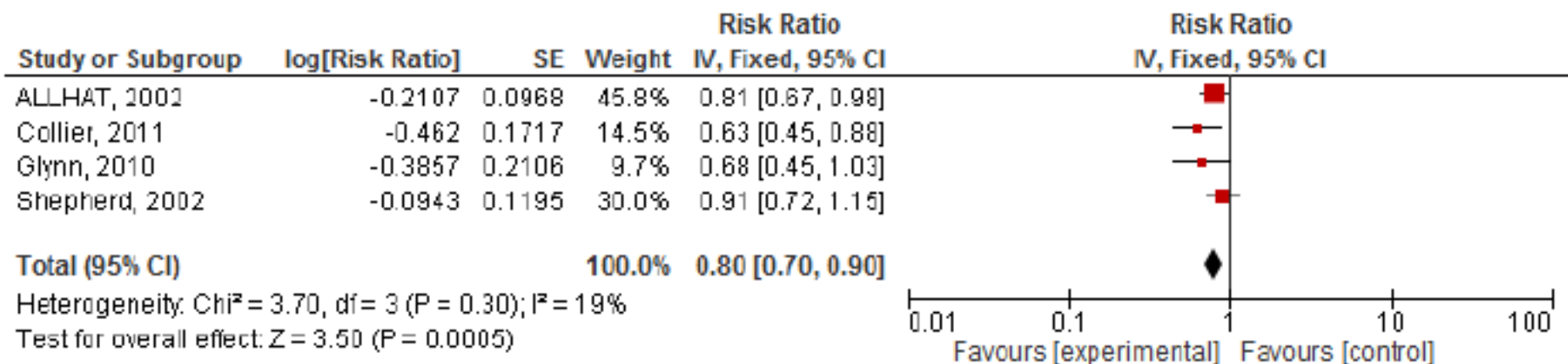
Absolute risk for MACE in 10 years



Absolute risk reduction for MACE in 10 years



Lipid-lowering in elderly and risk of myocardial infarction

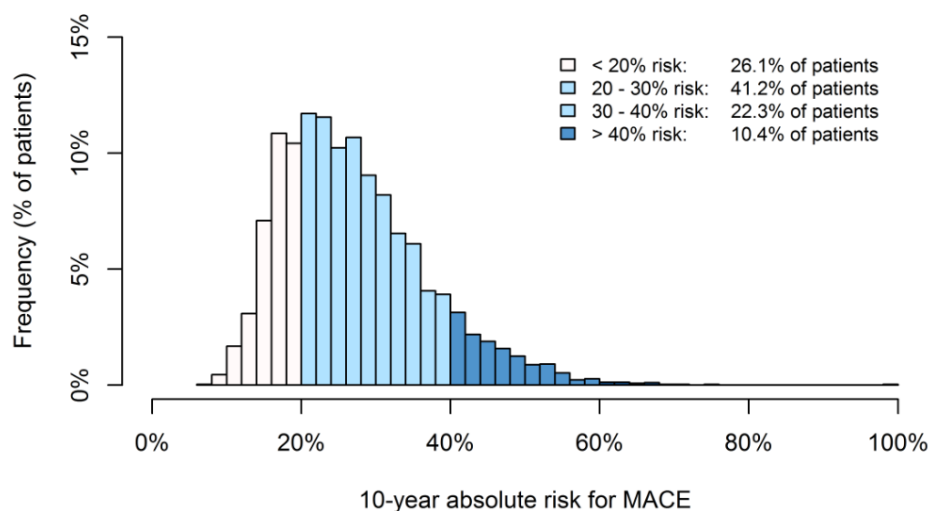


On average 20% CV risk reduction by lipid-lowering in elderly

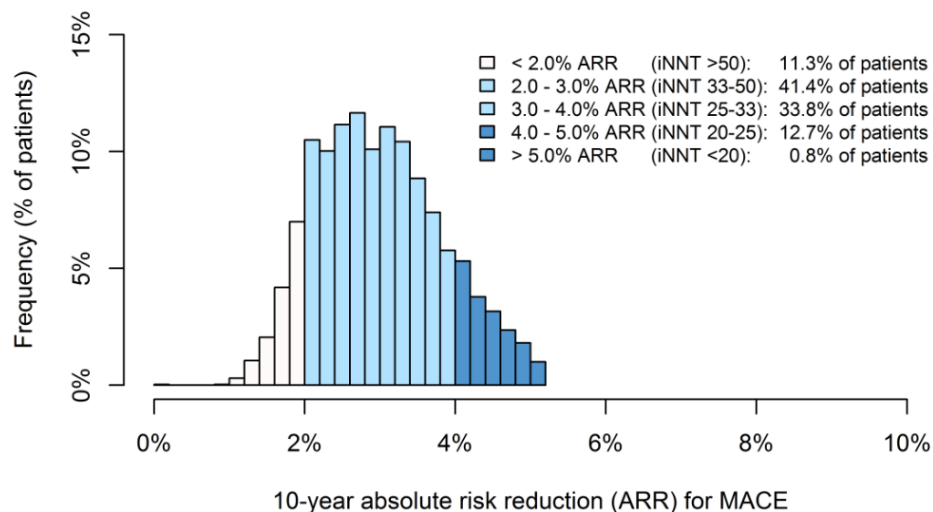


CV risk in elderly (patients) without vascular disease

Absolute risk for MACE in 10 years

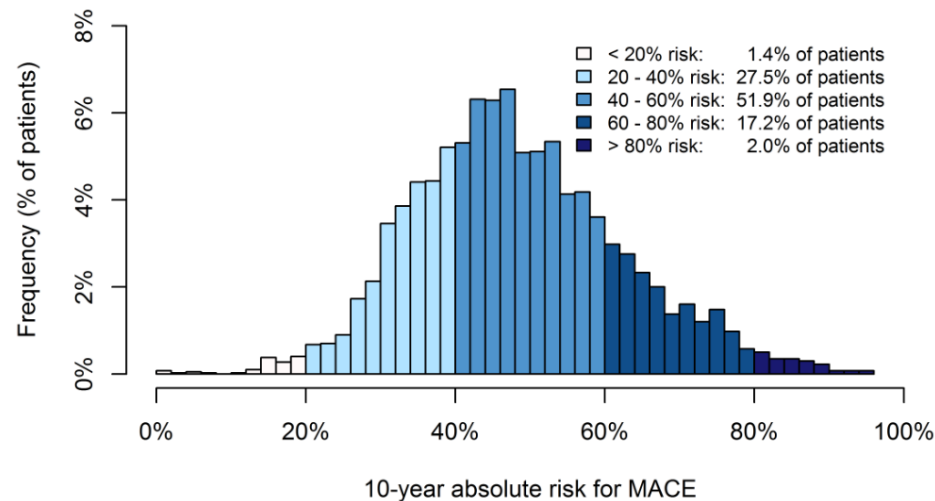


Absolute risk reduction for MACE in 10 years

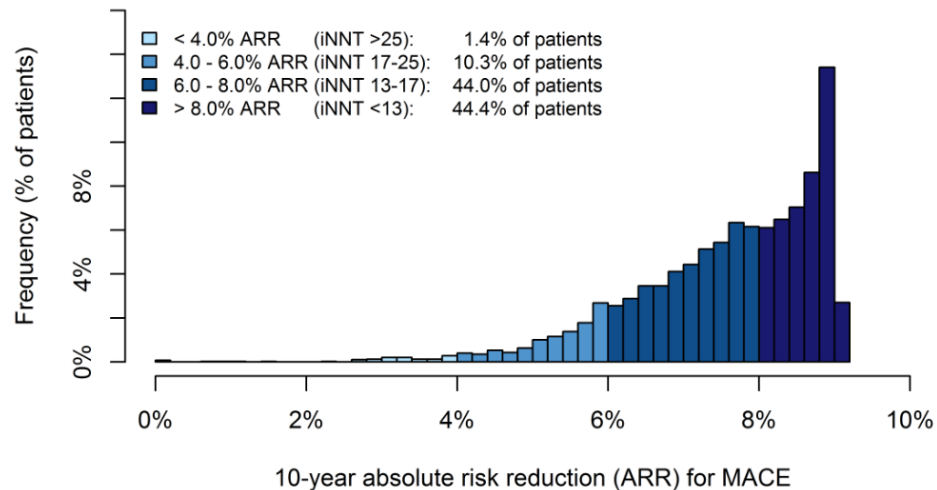


CV risk in elderly patients with vascular disease

Absolute risk for MACE in 10 years



Absolute risk reduction for MACE in 10 years



Risk categories including elderly people/patients (proposal!)

Very high-risk	<p>Subjects with any of the following:</p> <ul style="list-style-type: none"> • Documented CVD, clinical or unequivocal on imaging. Documented clinical CVD includes previous AMI, ACS, coronary revascularization and other arterial revascularization procedures, stroke and TIA, aortic aneurysm and PAD. Unequivocally documented CVD on imaging includes significant plaque on coronary angiography or carotid ultrasound. It does NOT include some increase in continuous imaging parameters such as intima-media thickness of the carotid artery. • DM with target organ damage such as proteinuria or with a major risk factor such as smoking or marked hypercholesterolaemia or marked hypertension. • Severe CKD (GFR <30 mL/min/1.73 m²). • A calculated SCORE $\geq 10\%$ <u>at age <70 years</u>
High-risk	<p>Subjects with:</p> <ul style="list-style-type: none"> • Markedly elevated single risk factors, in particular cholesterol >8 mmol/L (>310 mg/dL) (e.g. in familial hypercholesterolaemia) or BP $\geq 180/110$ mmHg. • Most other people with DM (with the exception of young people with type 1 DM and without major risk factors that may be at low or moderate risk). • Moderate CKD (GFR $30-59$ mL/min/1.73 m²). • A calculated SCORE $\geq 5\%$ and $<10\%$ <u>at age <70 years</u>. • <u>A calculated risk $>10\%$ at age >70 years, calculated with elderly risk score</u>
Moderate-risk	<p>SCORE is $\geq 1\%$ and $<5\%$ at 10 years. Many middleaged subjects belong to this category.</p>
Low-risk	<p>SCORE $<1\%$.</p>

Heb ik baat bij intensieve lipidenverlaging?

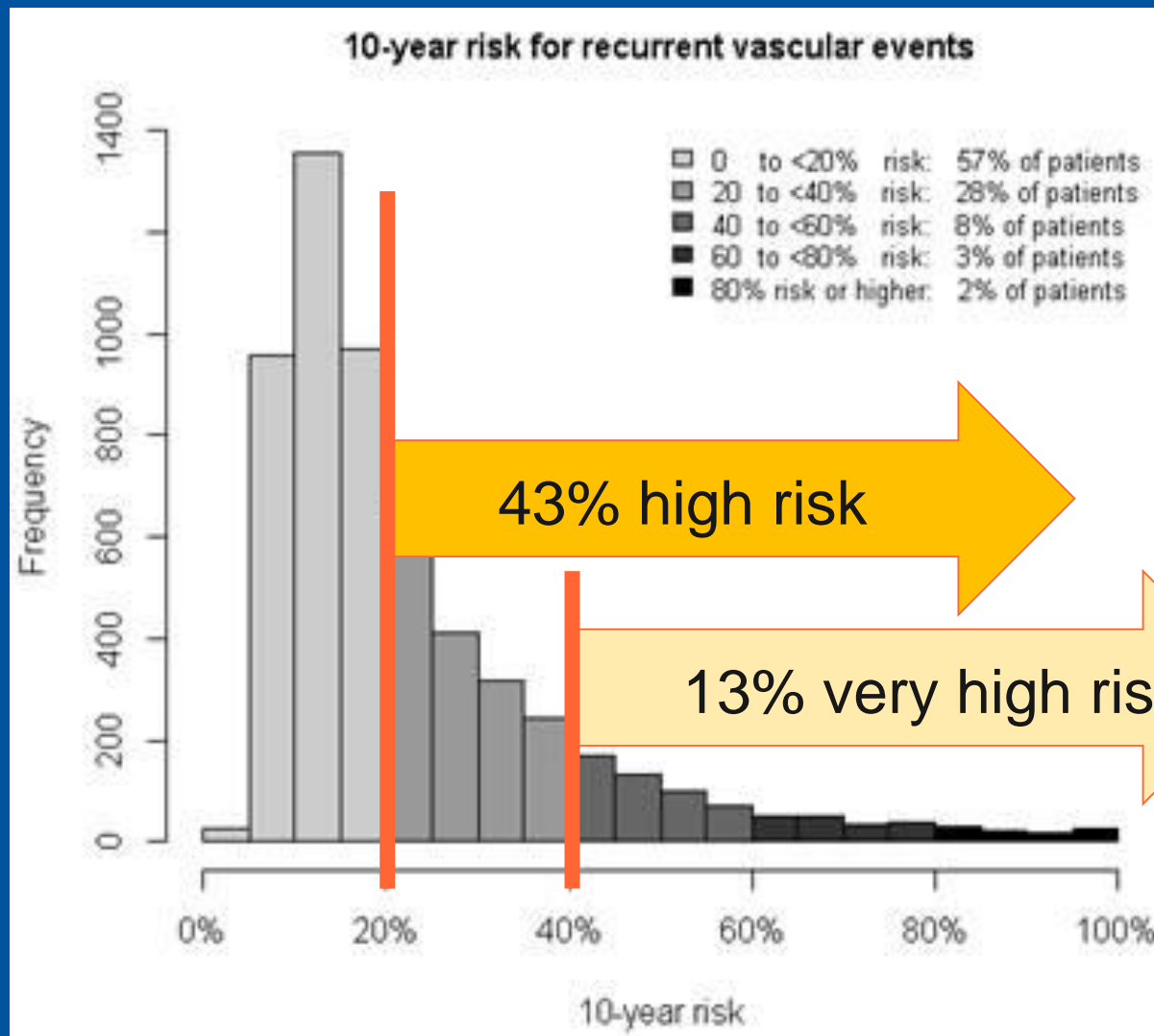
76 jaar	46 jaar
VG: CABG (2014), TIA (2016)	VG: CABG (2014)
Roken: nee	Roken: gestopt
RR 150/65 mmHg	RR 140/90 mmHg
Creatinine 120 umol/L	Creatinine 90 umol/L
TC/HDLc/LDLc 6.0/0.9/3.0 mmol/L	TC/HDLc/LDLc 6.0/1.4/3.0 mmol/L
M/ Atorvastatine 20 mg	M/ Atorvastatine 20 mg



SMART riskscore for estimating 10-year risk for recurrent CV events or death in patients with clinical manifest vascular disease



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Utrecht



SMART riskscore



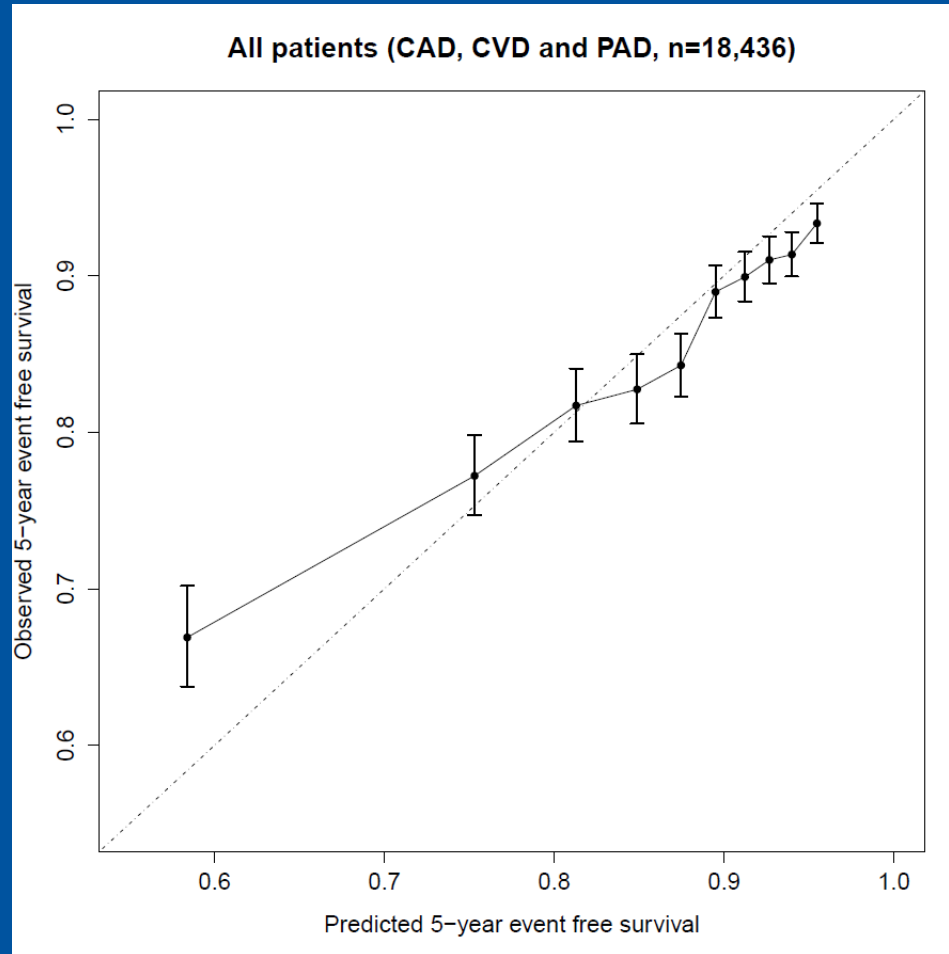
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Utrecht

10-year cardiovascular disease risk (%) = $(1 - 0.81066 \exp[A + 2.099]) \times 100\%$

Where A* =

$-0.0850 \times \text{age in years} + 0.00105 \times (\text{age in years})^2 + 0.156 [\text{if male}] + 0.262 [\text{if current smoker}] + 0.00429 \times \text{systolic blood pressure in mmHg} + 0.223 [\text{if diabetic}] + 0.140 [\text{if history of coronary artery disease}] + 0.406 [\text{if history of cerebrovascular disease}] + 0.558 [\text{if abdominal aortic aneurysm}] + 0.283 [\text{if peripheral artery disease}] + 0.0229 \times \text{years since first diagnosis of vascular disease} - 0.426 \times \text{HDL-cholesterol in mmol/L} + 0.0959 \times \text{total cholesterol in mmol/L} - 0.0532 \times \text{eGFR in mL/min/1.73m}^2 + 0.000306 \times (\text{eGFR in mL/min/1.73m}^2)^2 + 0.139 \times \log(\text{hs-CRP in mg/L})$

SMART riskscore external validation in TNT/IDEAL, SPARCL, CAPRIE ($n = 18,436$)



SMART risk score



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DISCOVER ESC PREVENTION OF CVD PROGRAMME

EPIDEMIOLOGY OF IHD

Epidemiology of ischaemic heart disease (IHD)

SEE MORE >

THE SMART RISK SCORE

An easy-to-use on-line tool using standard measures that gives immediate results to improve treatment strategies and patient adherence.

SEE MORE >

RISK ASSESSMENT

Specific interventions at individual level and risk assessment in secondary prevention of cardiovascular disease with the SMART risk score.

SEE MORE >

TREATMENT GOALS

Find out more about risk factor management and the use of cardio protective drugs in secondary prevention.

SEE MORE >

REHABILITATION

Rationale, indications and core components of Cardiac Rehabilitation.

SEE MORE >

ACKNOWLEDGEMENTS

www.escardio.org/Education/ESC-Prevention-of-CVD-Programme/Risk-assessment

EDUCATIONAL

EJPC SUPPLEMENT





10-jaars risico (hartinfarct, beroerte, sterfte)

76 jaar	46 jaar
VG: CABG (2014), TIA (2016)	VG: CABG (2014)
Roken: nee	Roken: gestopt
RR 150/65 mmHg	RR 140/90 mmHg
Creatinine 120 umol/L	Creatinine 90 umol/L
TC/HDLc/LDLc 6.0/0.9/3.0 mmol/L	TC/HDLc/LDLc 6.0/1.4/3.0 mmol/L
M/ Atorvastatine 20 mg	M/ Atorvastatine 20 mg

46%

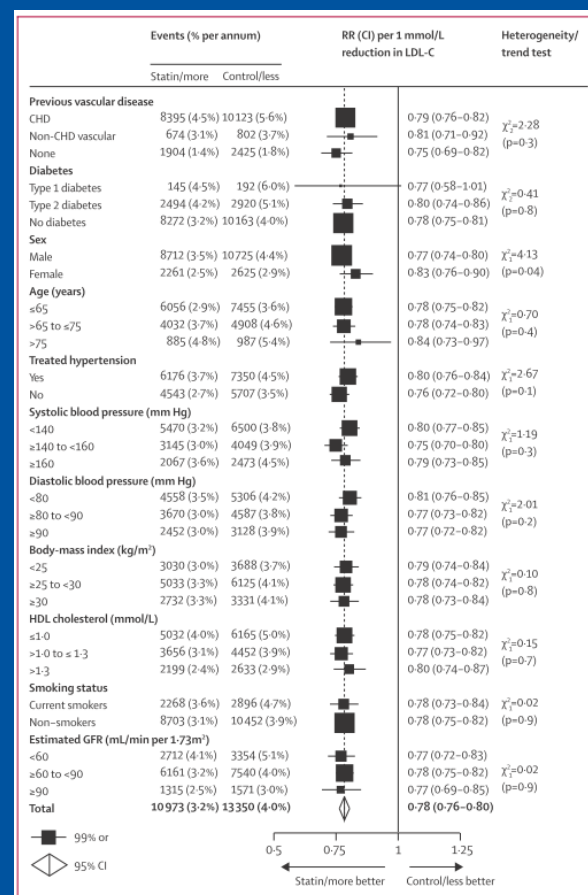
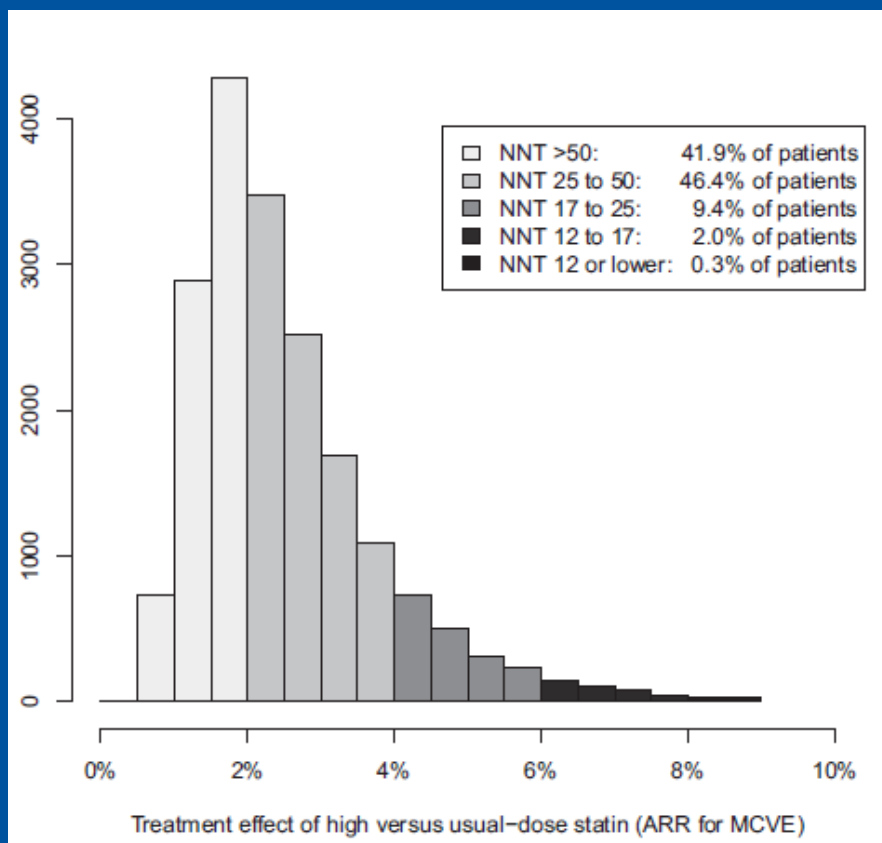
9%



individual Risk Reduction

iARR: large variation

iRRR: no variation



Therapieadvies?

76 jaar
VG: CABG (2014), TIA (2016)
Roken: nee
RR 150/65 mmHg
Creatinine 120 $\mu\text{mol/L}$
TC/HDLc/LDLc 6.0/0.9/3.0 mmol/L
M/ Atorvastatine 20 mg



46 jaar
VG: CABG (2014)
Roken: gestopt
RR 140/90 mmHg
Creatinine 90 $\mu\text{mol/L}$
TC/HDLc/LDLc 6.0/1.4/3.0 mmol/L
M/ Atorvastatine 20 mg



Lifetime CV risk estimation for patients with clinical manifest vascular disease

SMART-REACH riskscore



How to translate clinical trial results into gain in healthy life expectancy for individual patients

Jannick A N Dorresteijn,¹ Lotte Kaasenbrood,¹ Nancy R Cook,² Rob C M van Kruisdijk,¹ Yolanda van der Graaf,³ Frank L J Visseren,¹ Paul M Ridker²

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²Harvard Medical School, Boston, MA, USA; Centre for Cardiovascular Disease Prevention, Division of Preventive Medicine, Brigham and Women's Hospital, Boston, MA Division of Cardiovascular Medicine, Brigham and Women's Hospital, Boston, MA, USA

³Julius Centre for Health Sciences and Primary Care, University Medical Centre Utrecht, Utrecht, Netherlands

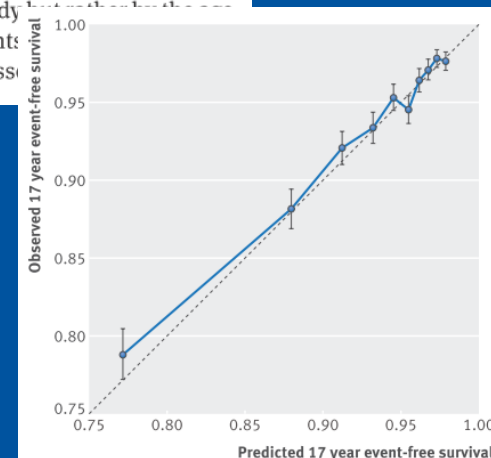
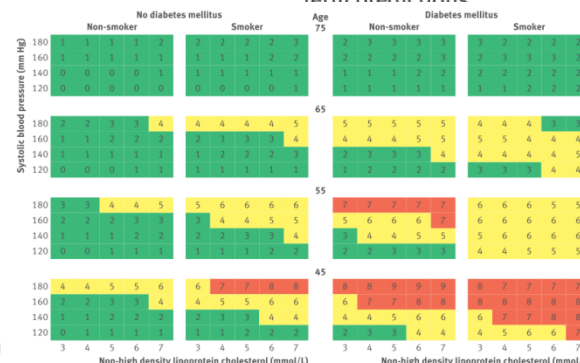
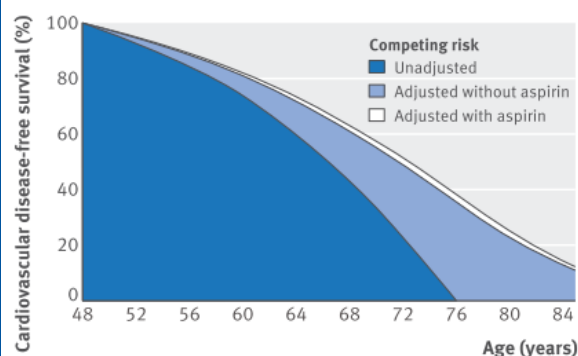
Correspondence to: J A N Dorresteijn J.A.N.Dorresteijn2@umcutrecht.nl

Additional material is published online only. To view please visit the journal online.

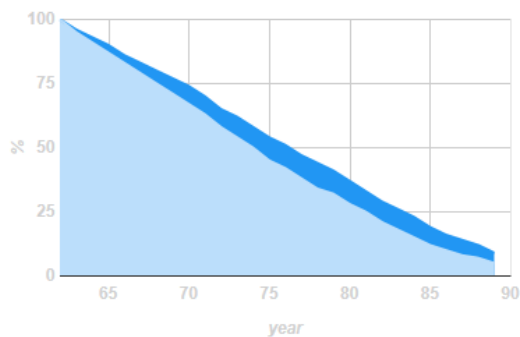
Cite this as: *BMJ* 2016;352:i1548
<http://dx.doi.org/10.1136/bmj.i1548>

Treatment effects from randomised trials are typically expressed as numbers needed to treat to prevent one adverse disease event during a fixed time interval (eg, five or 10 years). In the actual patient, however, many diseases are chronically progressive, despite treatment. Examples are diabetic nephropathy, some types of malignancies, osteoporosis, and atherosclerosis. In these examples, the aim of treatment is not to prevent but to delay the occurrence of symptomatic disease. Thus the actual effect of treatment is gain in disease-free life expectancy

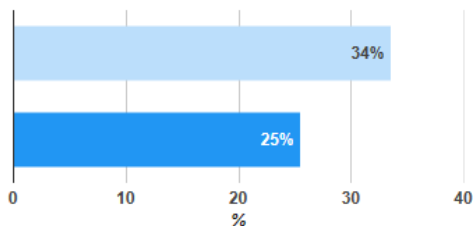
before the end of follow-up.⁵⁶ Conventional statistical models can then suffice for making lifetime predictions. Usually, however, the remaining life expectancy of study participants is much longer than the follow-up duration of studies. Many participants are still healthy and alive at the end of the study. Simple extrapolation of risk predictions beyond the follow-up time of the original study is often precarious. Therefore, lifetime models compared with traditional survival models use age instead of follow-up time as the underlying timescale. A participant does not enter the study at time 0 but rather at his or her age at study entry. Similarly, the time to event or censoring is defined by the age of study exit. This is called left truncation and right censoring, respectively. Each study participant contributes data to the survival model from the age of entry until the age of censoring or disease event.⁷⁸ As a result, predictions of lifetime models are not limited by the follow-up time of the study. In elderly patients, however, the distribution of study participants' remaining life expectancy is essential for making lifetime predictions.



Chance of survival without a recurrent cardiovascular event



10-year risk of myocardial infarction, stroke, cardiovascular death



Treatment start age

62

CVD-free years gain

2.3

Expected CVD-free survival

76

Current risk

34%

Change with treatment

-8%

Number needed to treat

12

Intended treatment

Statin

Atorvastatin 40 mg

☒ Ezetimibe☐ PCSK9-inhibitor

Systolic blood pressure

No treatment target



Anticoagulants

Aspirin or equivalent



Intervention Start age

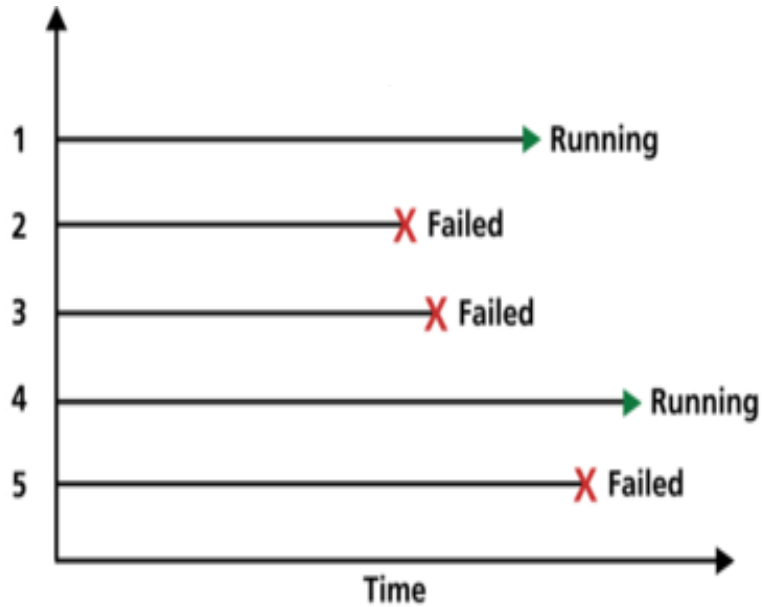
62

Print results

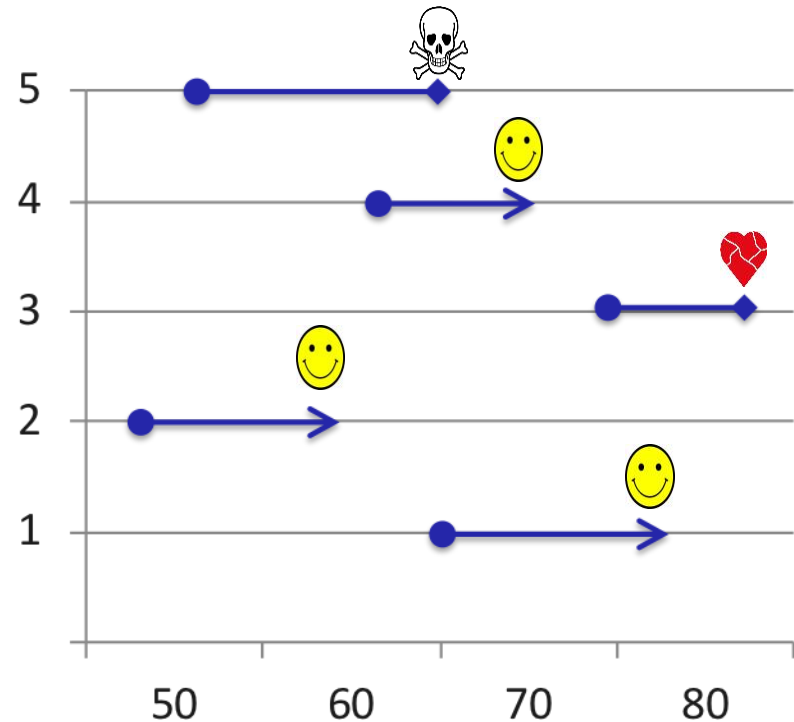
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Lifetime risk estimation: Age as Time-Scale



Traditional Survival Analysis



Age as Time-Scale

Lifetime benefit of further LDL-c lowering with PCSK9-i



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	Initiation age ≥40-<50			Initiation age ≥50-<60			Initiation age ≥60-<70		Initiation age ≥70
	Lifetime	20 years	10 years	Lifetime	20 years	10 years	20 years	10 years	10 years
Risk <10%									
LDL<1.8	8	3	1	5	3	1	2	1	0
LDL 1.8-2.6	10	4	1	7	4	1	3	1	1
LDL ≥2.6	14	6	2	9	6	2	4	2	1
Risk 10-20%									
LDL<1.8	10	4	1	7	5	1	3	1	1
LDL 1.8-2.6	15	6	2	10	6	2	4	2	1
LDL ≥2.6	22	9	2	14	9	3	5	3	2
Risk 20-30%									
LDL<1.8	15	6	2	10	8	2	5	2	2
LDL 1.8-2.6	22	10	3	15	10	3	7	3	2
LDL ≥2.6	34	13	4	19	14	4	9	5	4
Risk >30%									
LDL<1.8	21	11	4	12	10	4	7	3	2
LDL 1.8-2.6	23	11	4	16	13	5	9	5	3
LDL ≥2.6	NA	NA	NA	32	22	8	16	7	5

Median values were shown based on the estimates in the study population. NA means there were no or only one patients in the study population with this combination of characteristics to derive a reliable median. Importantly, expected benefit is also determined by a patient's risk of other causes of mortality. For the individual patient, expected benefit should thus be estimated using a calculator and should not be derived from this table. NOTE: as treatment effects were truncated at age 80, in patients aged ≥ 70, the lifetime, 20-year and 10-year predictions are similar. Therefore, only 10-year predictions were shown. For patients aged 60-70, the lifetime and 20-year predictions are similar. Therefore, only 20-year and 10-year predictions were shown. The subgroup of patients aged ≥70 consists of patients aged 70-75 due to inclusion criteria.

SMART-REACH lifetime score

Age (years)	76	Diabetes Mellitus	No
Sex	Male	Coronary Artery Disease	Yes
Current Smoking	No	Cerebrovascular Disease	Yes
Systolic Blood Pressure (mmHg)	150	Peripheral Artery Disease	No
Total cholesterol (mmol/L)	6,0	Atrial Fibrillation	No
Creatinine (umol/L)	120	Congestive Heart Failure	No
LDL-cholesterol (mmol/L)	3	Residence	Netherlands

Current treatment		Intended treatment	
Statin	Atorvastatin 20 mg	Statin	Atorvastatin 80 mg
Ezetimib	No	Ezetimib	Yes
PCSK9 inhibitor	No	PCSK9 inhibitor	No
Systolic blood pressure (mmHg)	150	Systolic blood pressure (mmHg)	150
Anticoagulation	Aspirin or equivalent	Anticoagulation	Aspirin or equivalent
Canakinumab (if Hs-CRP >2.0)	No	Canakinumab (if Hs-CRP >2.0)	No

Chance of survival without a (new) stroke or myocardial infarction

Age (years)	Current (%)	With intended treatment (%)
76	100	100
78	90	95
80	80	85
82	70	75
84	60	65
86	50	55
88	40	45
90	30	35

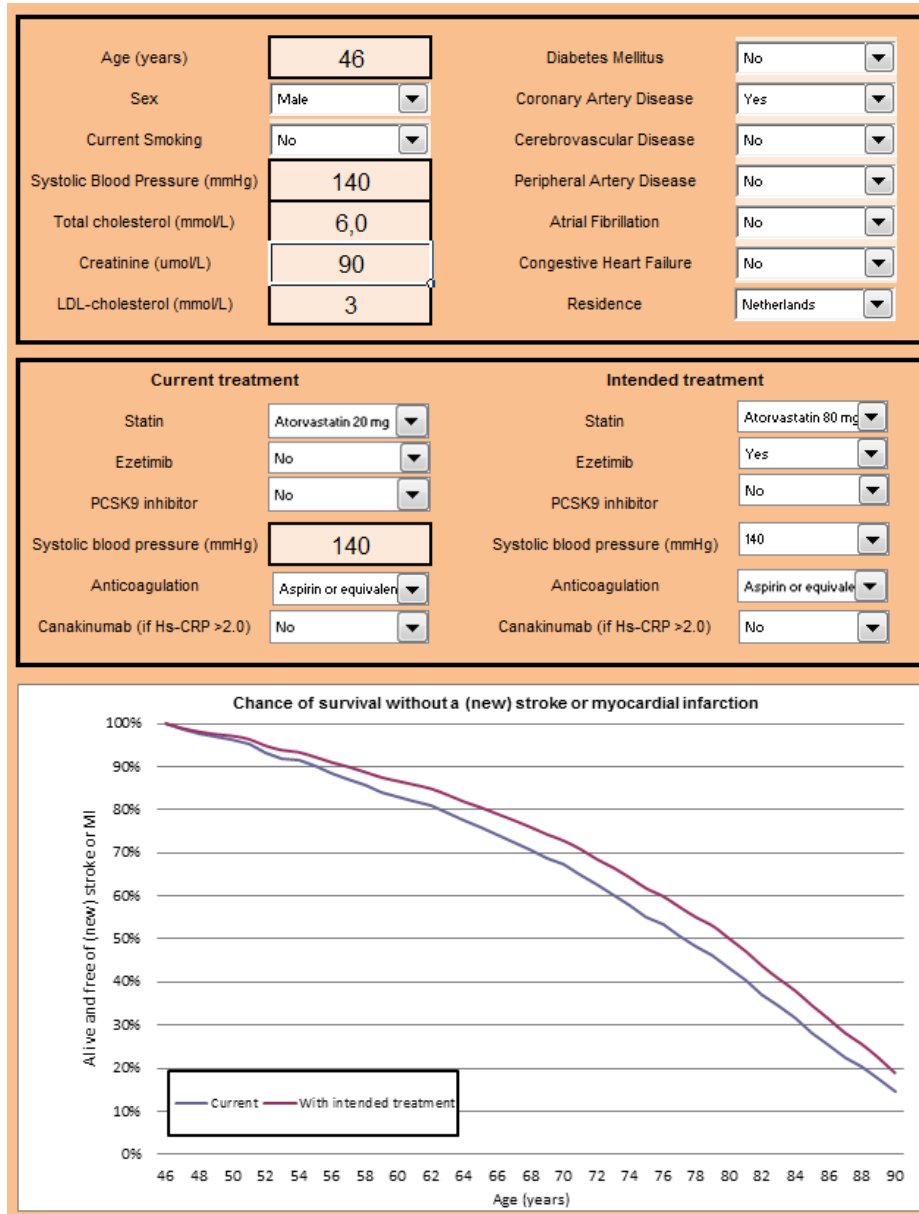
0.9 jaar HVZ-vrije levenswinst



9 jaar behandeling



SMART-REACH lifetime score



2,7 jaar HVZ-vrije levenswinst



34 jaar behandeling



Estimation of individual lifetime benefit of lipid-lowering enables shared decision making



University Medical Center
Utrecht

Open Access

Research

BMJ Open Variation in minimum desired cardiovascular disease-free longevity benefit from statin and antihypertensive medications: a cross-sectional study of patient and primary care physician perspectives

Nicole E M Jaspers,¹ Frank L J Visseren,¹ Mattijs E Numans,² Yvo M Smulders,³ Fere A van Loenen Martinet,⁴ Yolanda van der Graaf,⁵ Jannick A N Dorresteyn¹

Estimation of individual lifetime benefit of lipid-lowering enables shared decision making



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Utrecht

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6

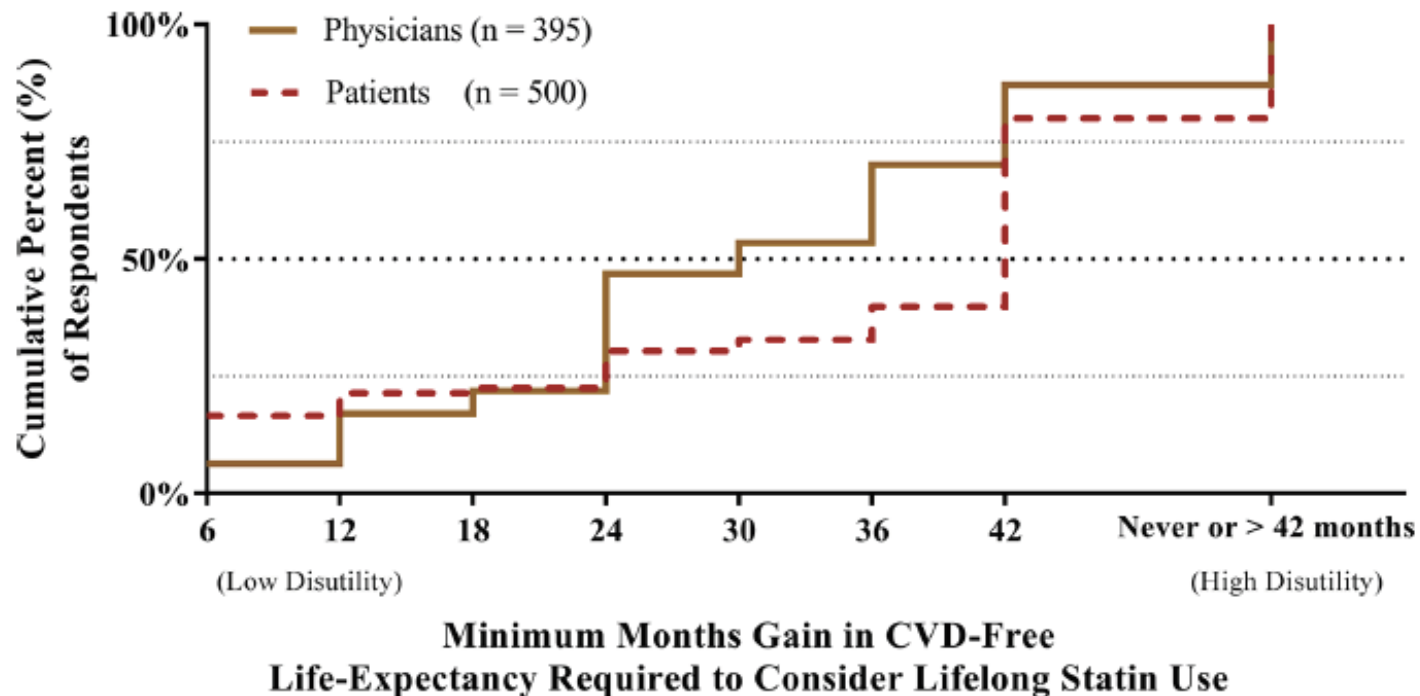


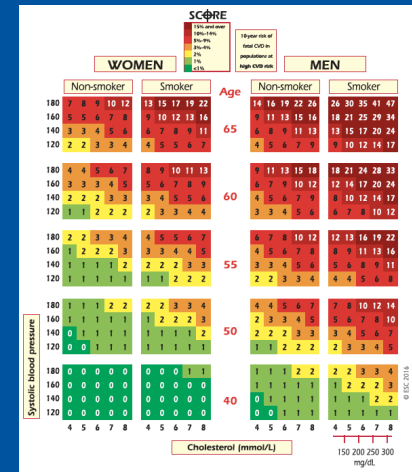
Figure 1 Months gain in CVD-free life expectancy above which physicians (as users) and patients perceive lifelong statin therapy as meaningful. Missing responses were seen in 5 physicians (1%) and 23 patients (4.4%). CVD, cardiovascular disease.

Precision medicine in clinical practice; coming soon!



University Medical Center
Utrecht

- Risk estimating not only in 'primary prevention' but also in patients with:
 - *Diabetes Mellitus*
 - *Vascular diseases*
 - *Elderly*
- Estimating life-time risk
- Estimating life-time benefit of (lipid-lowering) treatment expressed as disease-free life years gained





University Medical Center
Utrecht

**COMING
SOON!**

U-Prevent⁺

you are in control



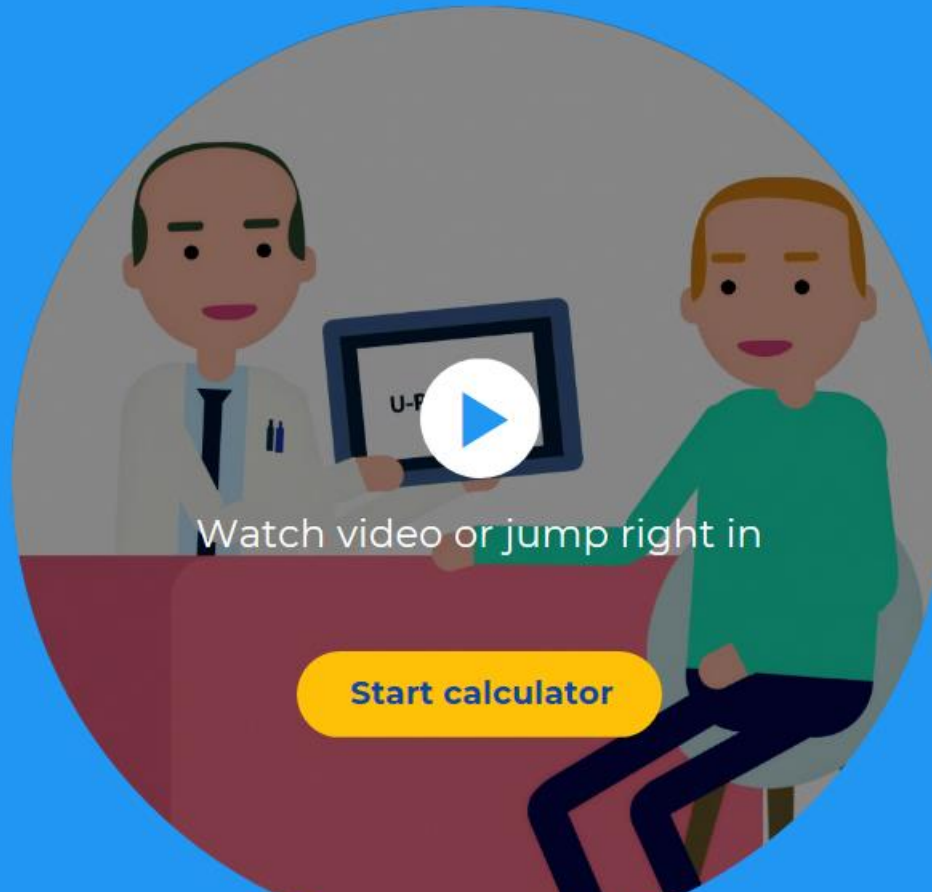
ZonMw



Hartstichting

U-Prevent you are in control

We provide tools for personalized Vascular Medicine. Get more insights by calculating individual cardiovascular risk and the effect of preventive treatment.



Watch video or jump right in

Start calculator

Patient
Group

Calculate 5 or 10-year
cardiovascular risk^{*}

Calculate lifetime
treatment effect

Previous
cardiovascular disease



SMART risk
score



SMART-REACH
model

Type 2 Diabetes
Mellitus



ADVANCE risk
score



DIABETES
model

< 70 years

No previous cardiovascular disease or type 2
diabetes mellitus



SCORE/
ASVCD



HEALTHY PEOPLE
model

≥ 70 years



ELDERLY risk score

USE ONE
of the above



SMART-REACH model



Personal Risk Profile



Gender

Male

Female

Age (Years)

62



Residence

Western Europe

N-America

Other

Netherlands

Next



Personal Risk Profile



- ☐ Smoking
- ☒ Diabetes Mellitus
- ☒ Coronary artery disease
- ☐ Cerebrovascular disease
- ☐ Peripheral artery disease
- ☐ Atrium fibrillation
- ☐ Heart failure

[Previous](#)[Next](#)



Personal Risk Profile



Systolic blood pressure

150

Total cholesterol

6.2

mmol/L ▾

LDL cholesterol

3.7



Creatinine

100

Previous

Next



Current Treatment



Statin

Simvastatin

Atorvastatin

Fluvastatin

Lovastatin

Pravastatin

Rosuvastatin

No statin

Dose (mg)

5

10

20

40

80



Ezetimibe



PCSK9-inhibitor

Previous

Next



Current Treatment



Anticoagulants

No anticoagulation

Aspirin or equivalent

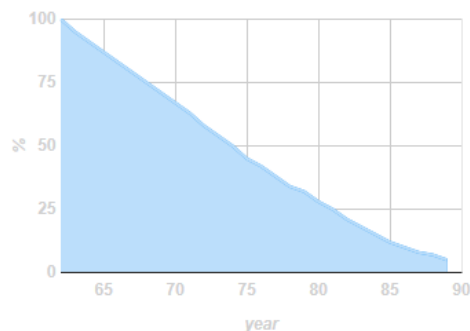
Dual Antiplatelet Therapy

Aspirin + low dose DOAC

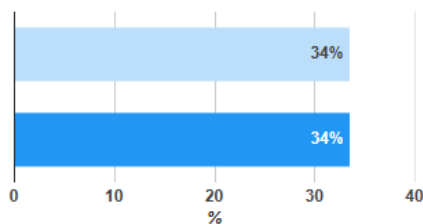
Previous

Calculate

Chance of survival without a recurrent cardiovascular event



10-year risk of myocardial infarction, stroke, cardiovascular death



Treatment start age

62

CVD-free years gain

0.0

Expected CVD-free survival

74

Current risk

34%

Change with treatment

0%

Number needed to treat

-Infinity

Intended treatment

Statin

Simvastatin 20 mg



☐ Ezetimibe

☐ PCSK9-inhibitor

Systolic blood pressure

No treatment target



Anticoagulants

Aspirin or equivalent



Intervention Start age

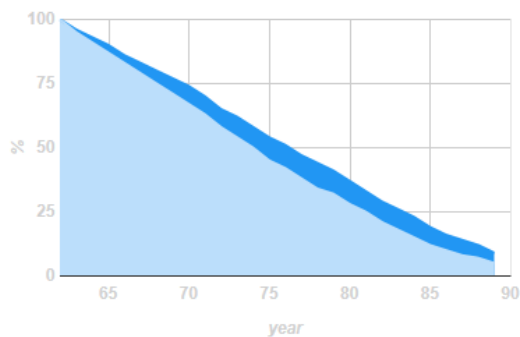
62

Print results

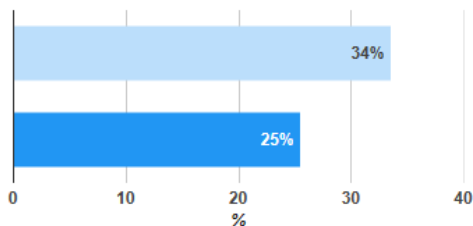
Copy to Clipboard

Show profile

Chance of survival without a recurrent cardiovascular event



10-year risk of myocardial infarction, stroke, cardiovascular death



Treatment start age

62

CVD-free years gain

2.3

Expected CVD-free survival

76

Current risk

34%

Change with treatment

-8%

Number needed to treat

12

Intended treatment

Statin

Atorvastatin 40 mg

☒ Ezetimibe☐ PCSK9-inhibitor

Systolic blood pressure

No treatment target



Anticoagulants

Aspirin or equivalent



Intervention Start age

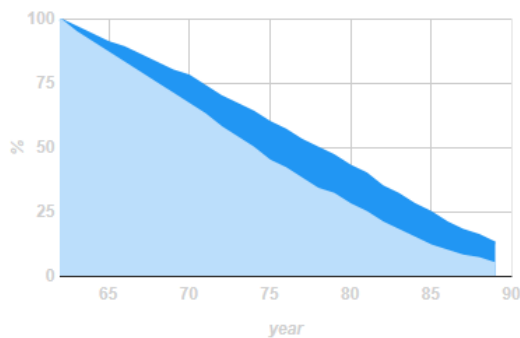
62

Print results

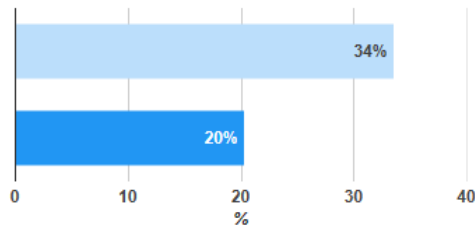
Copy to Clipboard

Show profile

Chance of survival without a recurrent cardiovascular event



10-year risk of myocardial infarction, stroke, cardiovascular death



Treatment start age

62

CVD-free years gain

4.1

Expected CVD-free survival

78

Current risk

34%

Change with treatment

-13%

Number needed to treat

8

Intended treatment

Statin

Atorvastatin 40 mg

☒ Ezetimibe☒ PCSK9-inhibitor

Systolic blood pressure

No treatment target



Anticoagulants

Aspirin or equivalent



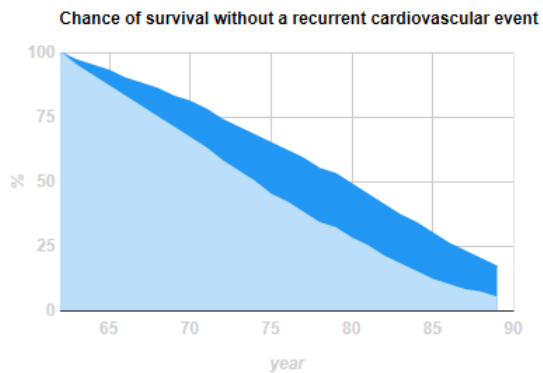
Intervention Start age

62

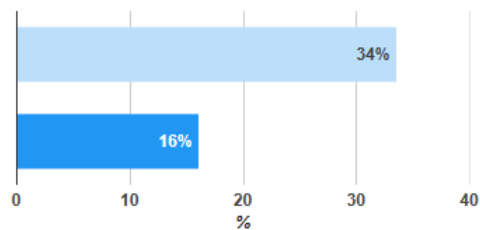
Print results

Copy to Clipboard

Show profile



10-year risk of myocardial infarction, stroke, cardiovascular death



Treatment start age

62

CVD-free years gain

5.8

Expected CVD-free survival

80

Current risk

34%

Change with treatment

-17%

Number needed to treat

6

Print results

Copy to Clipboard

Intended treatment

Statin

Atorvastatin 40 mg



☐ Ezetimibe

☐ PCSK9-inhibitor

Systolic blood pressure

140 mmHg

Anticoagulants

Aspirin or equivalent

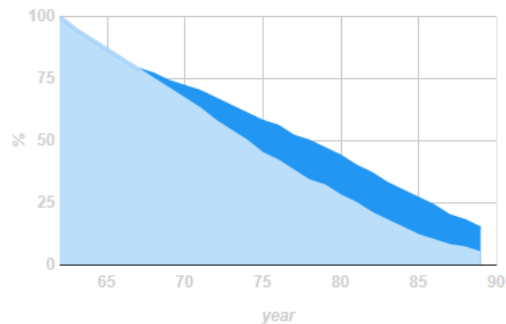


Intervention Start age

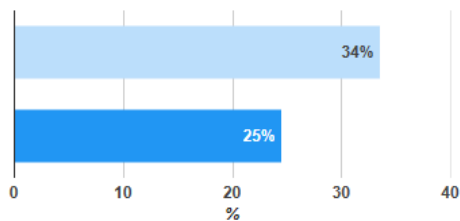
62

Show profile

Chance of survival without a recurrent cardiovascular event



10-year risk of myocardial infarction, stroke, cardiovascular death



Treatment start age

67

CVD-free years gain

3.7

Expected CVD-free survival

78

Current risk

34%

Change with treatment

-9%

Number needed to treat

11

Print results

Copy to Clipboard

Intended treatment

Statin

Atorvastatin 40 mg

☒ Ezetimibe☒ PCSK9-inhibitor

Systolic blood pressure

140 mmHg

Anticoagulants

Aspirin or equivalent

Intervention Start age

67

Show profile



SMART-REACH model



Personal risk profile

Age (yrs)

62

Gender

Male

Residence

Western Europe



Smoking



Diabetes Mellitus



Coronary artery disease



Cerebrovascular disease



Peripheral artery disease



Atrium fibrillation



Heart failure

Total-Cholesterol

6.2 mmol/L

LDL-cholesterol

3.1 mmol/L

Creatinin

100 umol/L

Current Treatment

Statin

Simvastatin 20 mg



Ezetimibe



PCSK9-inhibitor

Systolic Blood Pressure

150 mmHg

Anticoagulants

Aspirin or equivalent

Edit

Intended treatment

Statin

Atorvastatin 40 mg



Ezetimibe



PCSK9-inhibitor

Systolic blood pressure

140 mmHg



Anticoagulants

Aspirin or equivalent



Intervention Start age

67



Patient resources

Antihypertensives, anticoagulants and cholesterol lowering drugs are used by many for the prevention of cardiovascular diseases. However, not everybody benefits equally. Some benefit more than average, while others do not. U-Prevent intends to help you and your doctor to make the right decisions on the use of these types of medication. With U-Prevent, you are in control! We recommend that you use U-Prevent together with your doctor. Your doctor can provide your personal health details that are needed to use the calculation tools and help you interpret the calculator's output. A comprehensive overview of your personal details and results can be printed for you to keep and discuss with your family or friends. Watch the videos below to learn more.



U-Prevent: you
are in control



What is
cardiovascular
disease?



What is
cholesterol?



What does a
statin do?



Do statins have
side-effects?

Researcher resources

Scientific publications on personalized medicine and prediction by the Vascular Medicine research group of the University Medical Center Utrecht, The Netherlands (update 13-11-2017):

1. Berkelmans GF, Gudbjörnsdottir S, Franzen S, Svensson AM, van der Graaf Y, Eliasson B, Visseren FL, Dorresteijn JA. Development and validation of a decision support tool for individualizing lifelong lipid, blood pressure, and aspirin treatment in adults with type 2 diabetes mellitus. Submitted
2. Kaasenbrood L, Bhatt DL, Dorresteijn JA, Wilson PW, D'Agostino RB, Massaro JM, van der Graaf Y, Cramer MJ,

Risk scores

Individual risk estimations for (recurrent) major cardiovascular events can be used for patient education. These tools may allow patients to gain more insight into their personal prognosis, thereby increasing their health-motivation and positively impacting adherence to prescribed therapy.

Individual risk estimations can also guide medical decision-making about preventive treatment. High-risk individuals are more likely to benefit from preventive treatment, such as cholesterol-lowering, blood pressure-lowering ([BMJ 2011](#)). High-risk patients experience a larger absolute risk reduction (ARR) and subsequently have a lower number needed to treat (NNT) from any type of preventive treatment ([Eur Heart J 2014](#)).

U-Prevent provides online calculation tools of the following risk scores:

SMART risk score



ADVANCE risk score



SCORE chart



Pooled cohort ASCVD risk equation



Elderly risk score



Lifetime treatment effect estimators

In [BMJ](#) 2016 we explained the methodological principles that the lifetime treatment effect estimators are based on. A video-abstract of this article can be viewed below.



The U-Prevent lifetime scores are described below. All scores were derived from multiple, large, observational population-based cohorts and can be used for estimating risk and cardiovascular event-free life-expectancy. For estimation of individual treatment effect, the lifetime score estimates are combined with hazard ratios from trials or meta-analyses. Below, we also summarize which hazard ratios were applied to each of the scores. The effects of these treatments are assumed to be independent and multiplicative. Estimates of (gain) in cardiovascular-free life-expectancy are based on (differences in) median predicted survival for an individual patient.

SMART-REACH score



Patient resources

Antihypertensives, anticoagulants and cholesterol lowering drugs are used by many for the prevention of cardiovascular diseases. However, not everybody benefits equally. Some benefit more than average, while others do

U-Prevent knowledge base

Need some help? Here you will find the answers to questions you might have.

General questions

Can patients also use the U-Prevent calculation tools?



Are the calculators applicable to anyone?



Can I also estimate the effect of lifestyle changes with the U-Prevent calculators?



Which calculator should I use?



What happens with my personal health details?



Why do the risk score calculators not report preventive treatment effect?



Getting in touch is easy

We welcome your feedback on U-Prevent. Please e-mail us using the contact form below.

Name

What is your name?



E-mail

E-mail Address



Confirm e-mail

Confirm e-mail



Message

Please note: do not send us any personal medical details.
Please consult your doctor for any questions about
personal medical advice.



CV risk estimation

- Life is about risks and opportunities. It's all about the future!!
- CV risk estimation should not be limited to specific patients groups, but should be available for all persons/patients.
- Risk estimation is only useful when directly linked to treatment decisions.
- Risk estimation enables shared decision making.

Thank you

