S1 Table. Input parameters used in the discrete event simulation model

Parameter	Estimate	Source
Screening		
Re-invitation	0.1360	MASS (1)
Attendance proportion	0.750	NAAASP (2015/16)
Non-visualisation proportion	0.0121	MASS
Age and AAA size distribution at baseline		
Invited cohort[§]	65-year old, AAA distribution obtained from first 700,000 men screened	NAAASP (2009-2014)(2)
Surveillance cohort	Age and AAA distribution obtained from NAAASP surveillance cohort	NAAASP (May 2020)
AAA growth *[§]	Mean growth rates: 1.8mm/yr for 3.0cm AAA 2.3mm/yr for 4.0cm AAA 2.9mm/yr for 5.0cm AAA	MASS
AAA rupture †[§]	3.0cm AAA: 0.03 per 100 p-years 4.0cm AAA: 0.17 per 100 p-years 5.0cm AAA: 0.64 per 100 p-years 5.5cm AAA: 1.13 per 100 p-years	RESCAN (3) (11 studies) that record rupture rates for men
Surveillance		
Dropout rate	5.72 per 100 p-years	MASS
Incidental detection rate	4.59 per 100 p-years	Glover et al.(4)
Delay from 5.5+cm scan to consultation	71 days	MASS
Consultation scan	CT diameter: Mean = US + 0.244cm, SD 0.19cm	RESCAN & Singh et al.(5)
Non-intervention proportion	0.125	MASS
Delay from consultation to surgery	59 days	MASS
Elective operations		
Proportion receiving EVAR vs. Open	0.74 at age 80, AAA diameter 6.0cm. Odds ratio 1.10 per year increase in age, 0.74 per cm increase in diameter	National Vascular Registry(6)
Elective EVAR 30-day mortality	0.008 at age 80, AAA diameter 6.0cm. Odds ratio 1.10 per year increase in age, 1.33 per cm increase in diameter	National Vascular Registry
Elective Open 30-day mortality	0.051 at age 80, AAA diameter 6.0cm. Odds ratio 1.09 per year increase in age, 1.12 per cm increase in diameter.	National Vascular Registry
Re-intervention rate after successful elective EVAR	13.5 and 3.6 per 100 person-years during 31-120 and >120 days respectively	EVAR-1(7)
Re-intervention rate after successful elective open repair	1.6 and 1.3 per 100 person-years during 31-120 and >120 days respectively	EVAR-1
Long-term AAA mortality after elective EVAR	0.8 per 100 person-years	EVAR-1
Long-term AAA mortality after elective Open	0.07 per 100 person-years	EVAR-1
Emergency operations		
Proportion operated after rupture	0.368	MASS
Proportion receiving EVAR vs. Open	0.22 at age 80. Odds ratio 1.05 per year increase in age	National Vascular Registry
Emergency EVAR 30-day mortality	0.22 at age 80. Odds ratio 1.05 per year increase in age	National Vascular Registry
Emergency Open 30-day mortality	0.44 at age 80. Odds ratio 1.07 per year increase in age	National Vascular Registry
Re-intervention rate after	10.9 per 100 person-years	IMPROVE(8, 9)

successful emergency EVAR		
Re-intervention rate after successful emergency open repair	6.1 per 100 person-years	IMPROVE
Long-term AAA mortality after emergency EVAR	1.0 per 100 person-years	IMPROVE
Long-term AAA mortality after emergency open repair	1.4 per 100 person-years	IMPROVE
Miscellaneous		
Non-AAA mortality rate	UK population age/sex specific	Office for National Statistics(10)
QoL utilities	Annual utilities from 0.81 at age 65, 0.77 at age 75, 0.74 at age 85	Love-Koh et al.(9)
Discounting rates	3.5% per year for life-years and costs	

MASS – Multicentre Aneurysm Screening Study
NAAASP – National Abdominal Aortic Aneurysm Screening Programme
§ Assumed the same for non-attenders

* Longitudinal linear mixed model for log AAA diameter: Slope ($\beta_1 = 0.058$), Intercept ($\beta_0 = 1.27$), Slope log SD ($\log(\sigma_1) = -3.32$), Intercept log SD ($\log(\sigma_0) = -1.74$), Arctanh correlation ($atanh(\rho) = 0.46$), Residual log SD ($\log(\sigma_w$¿$) = -2.59$¿)

** $N(\mu, \Sigma)$ where $\mu = (0.058 \quad 1.27 \quad -3.32 \quad -1.74 \quad 0.46 \quad -2.59)$, and

$$\Sigma = \begin{pmatrix} 2.0 \times 10^{-6} & ¿ & ¿ & ¿ & 1.7 \times 10^{-6} & 0.000030 & ¿ & ¿ \\ 0 & 0 & 0.001714 & ¿ & ¿ & 0 & 0 & ¿ \end{pmatrix} 0.000528¿¿¿0¿0¿0.000483¿0.000048¿0.$$

† Data for rupture rates obtained from 11 RESCAN studies (Western Australia, Chichester, Gloucestershire, Huntingdon, MASS, Manchester, Tromso, Galdakao, Stirling, UKSAT, Viborg). See eTable 2 of (3) for further information on these studies. Joint model for log rupture rates and log underlying AAA diameter were fitted to each study separately then combined using multivariate meta-analysis: association with diameter ($\gamma_1 = 5.92$), Intercept ($\gamma_0 = -14.57$¿

‡ $N(\mu, \Sigma)$ where $\mu = (5.92, -14.57)$, and $\Sigma = \begin{pmatrix} 0.8282 & -1.1190 \\ -1.1190 & 1.5391 \end{pmatrix}$

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