

I C A  
CANCUN  
March 2002

**Mike Wadsworth**  
**Alec Findlater**

**Reinventing Annuities**

**[mike.wadsworth@eu.watsonwyatt.com](mailto:mike.wadsworth@eu.watsonwyatt.com)**



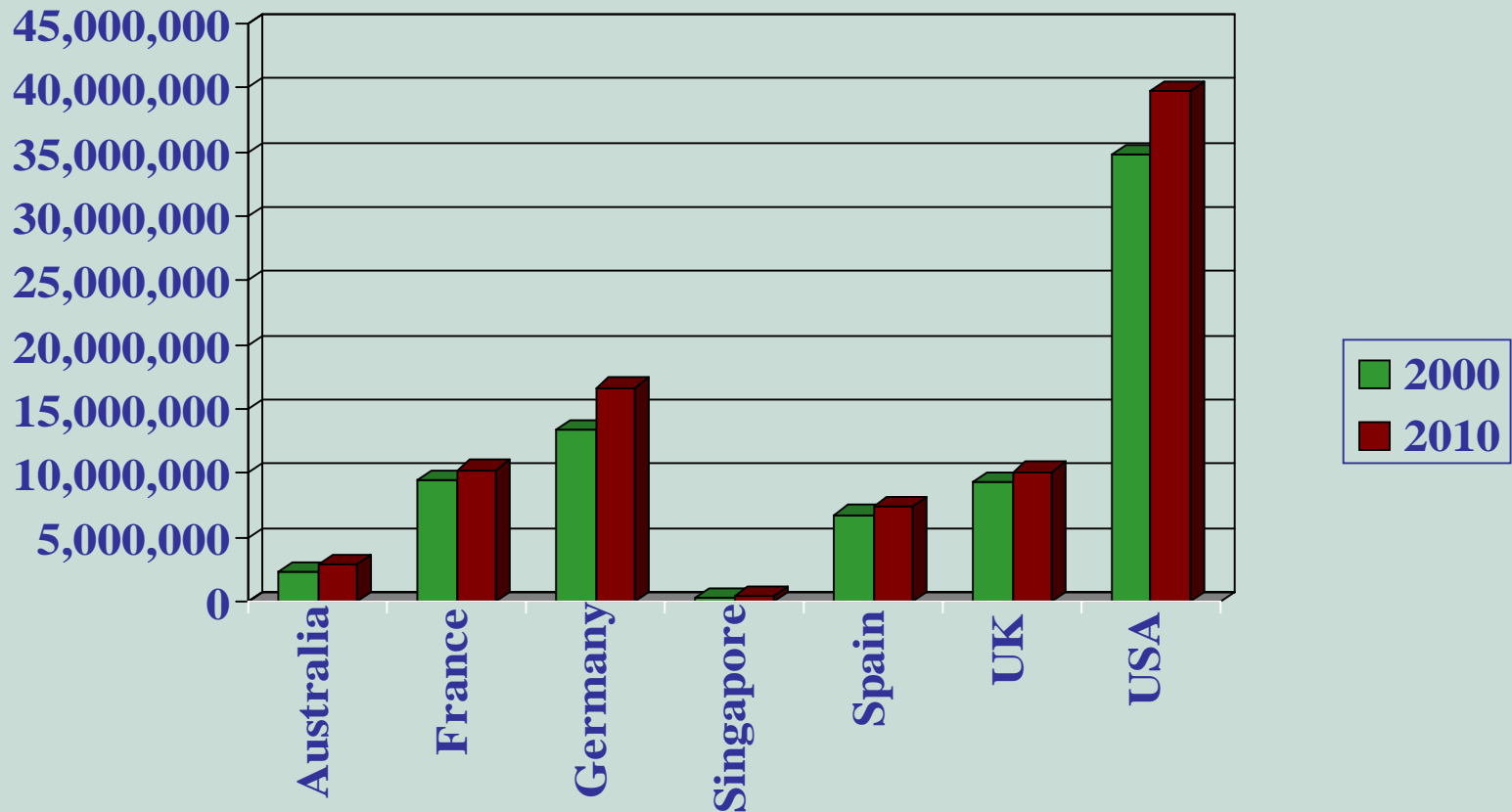
[WWW.WATSONWYATT.COM](http://WWW.WATSONWYATT.COM)



**Watson Wyatt**  
Worldwide

# Table 1

## Scale of opportunities: people over 65

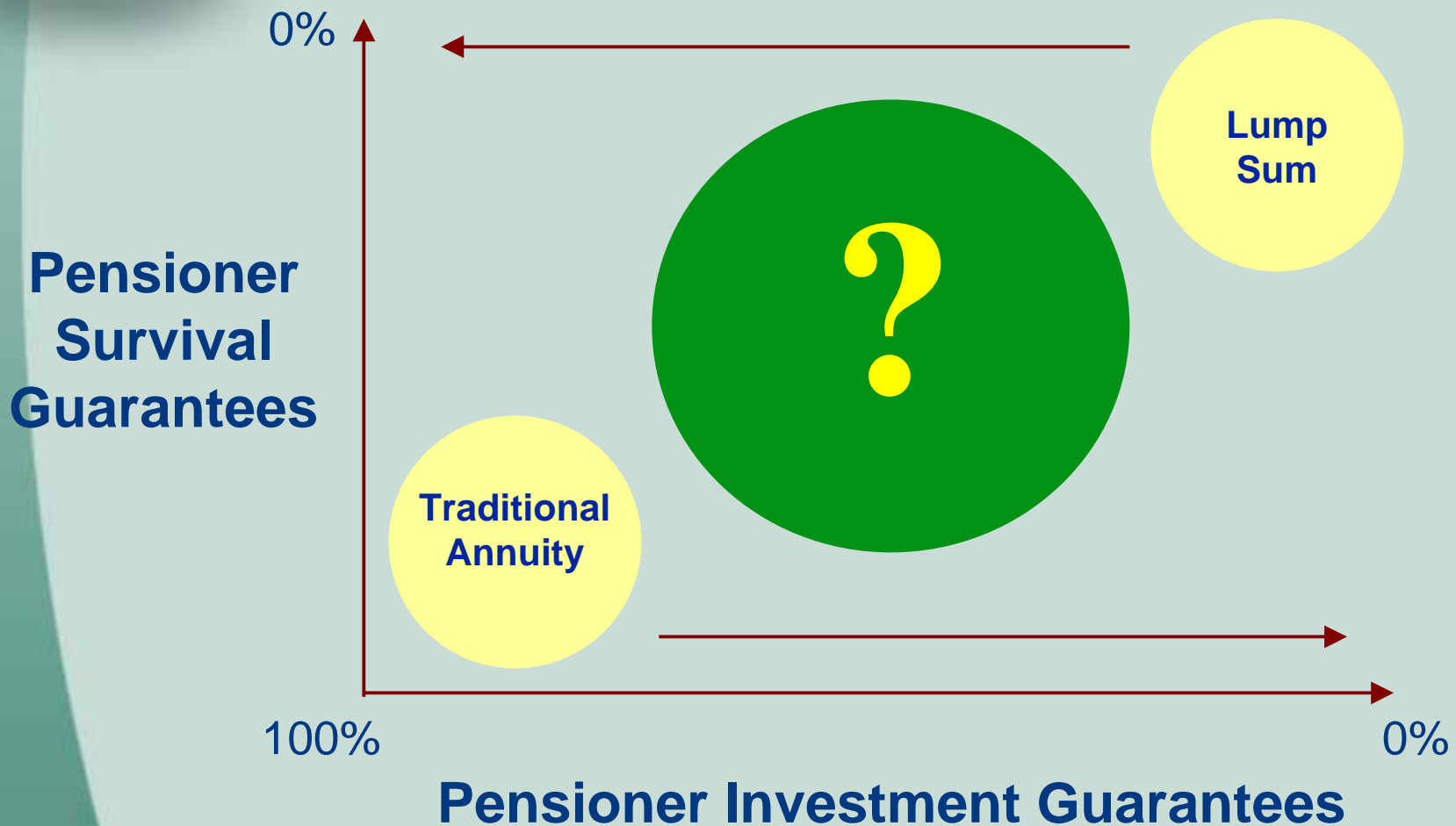


Source: US Bureau of the Census



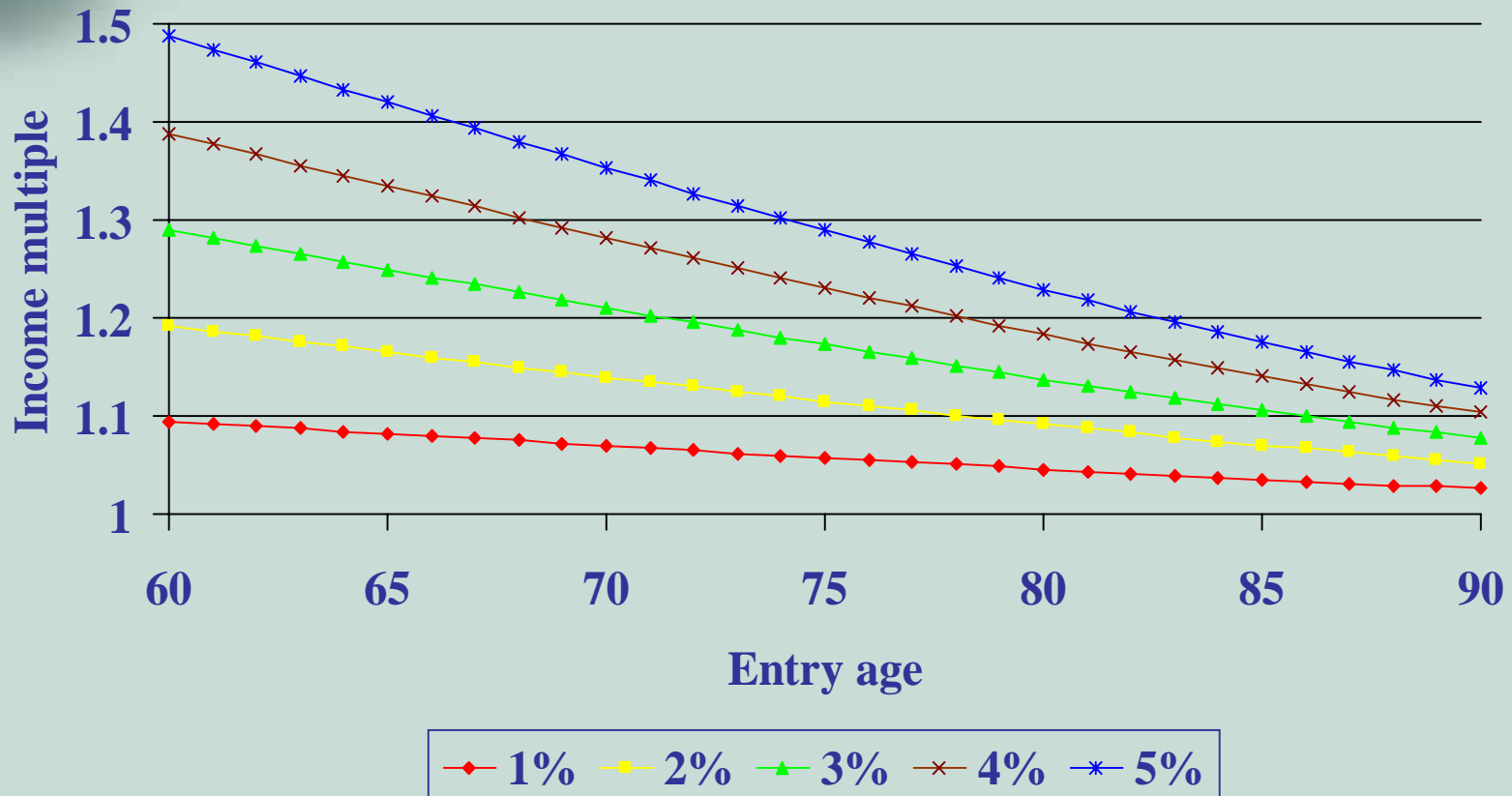
# Table 2

## Options for retirement income



# Table 3

## Effect of investment growth on supportable income: males

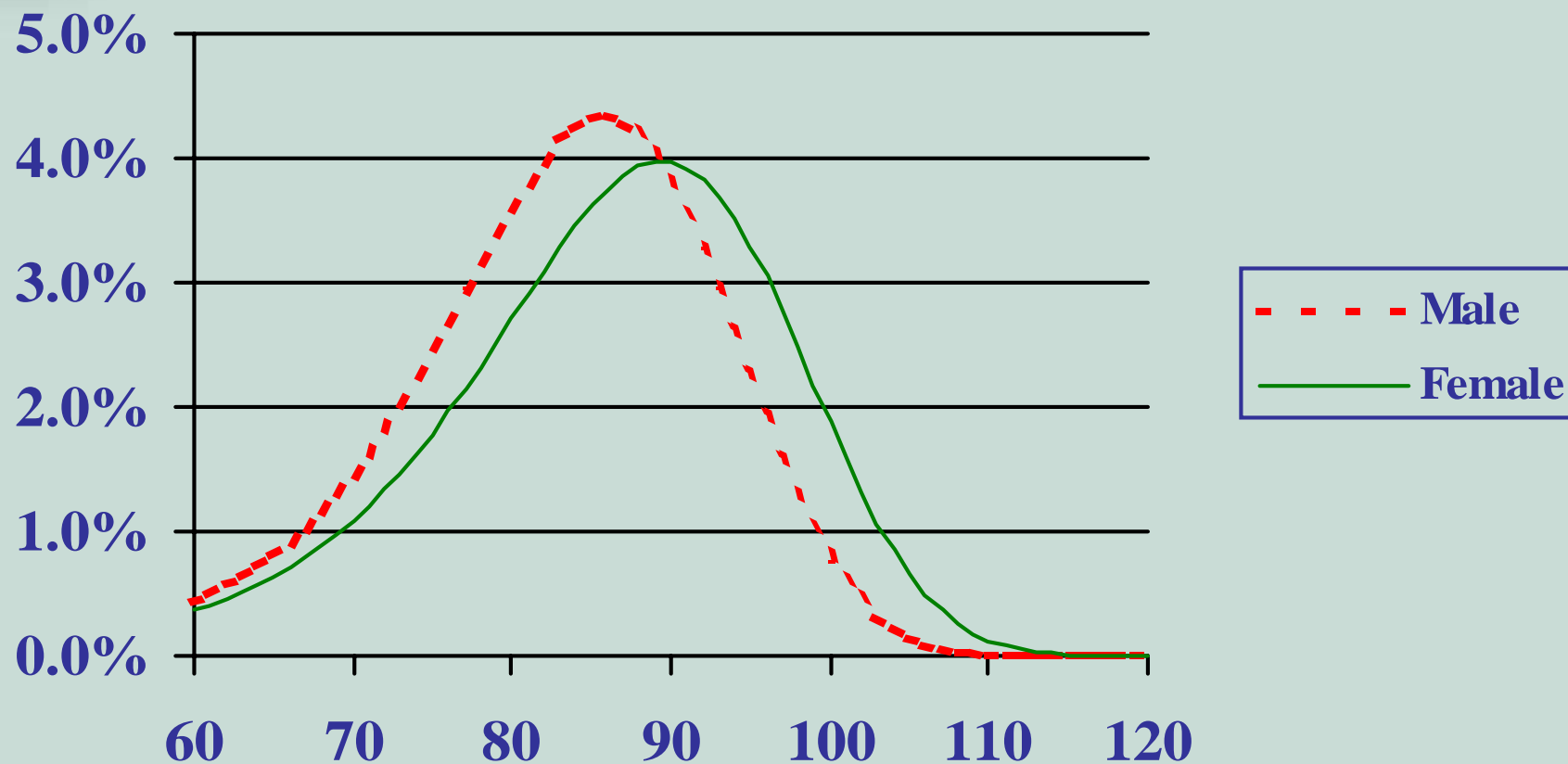


Base income supportable calculated at 5%.  
Income multiple = income supportable assuming extra investment return resulting from equity investment of 1, 2, 3, 4 or 5% pa after charges, divided by base income. Mortality: PMA/PFA92 Year of Use 2001



# Table 4

## Distribution of deaths by age now: age 60 now



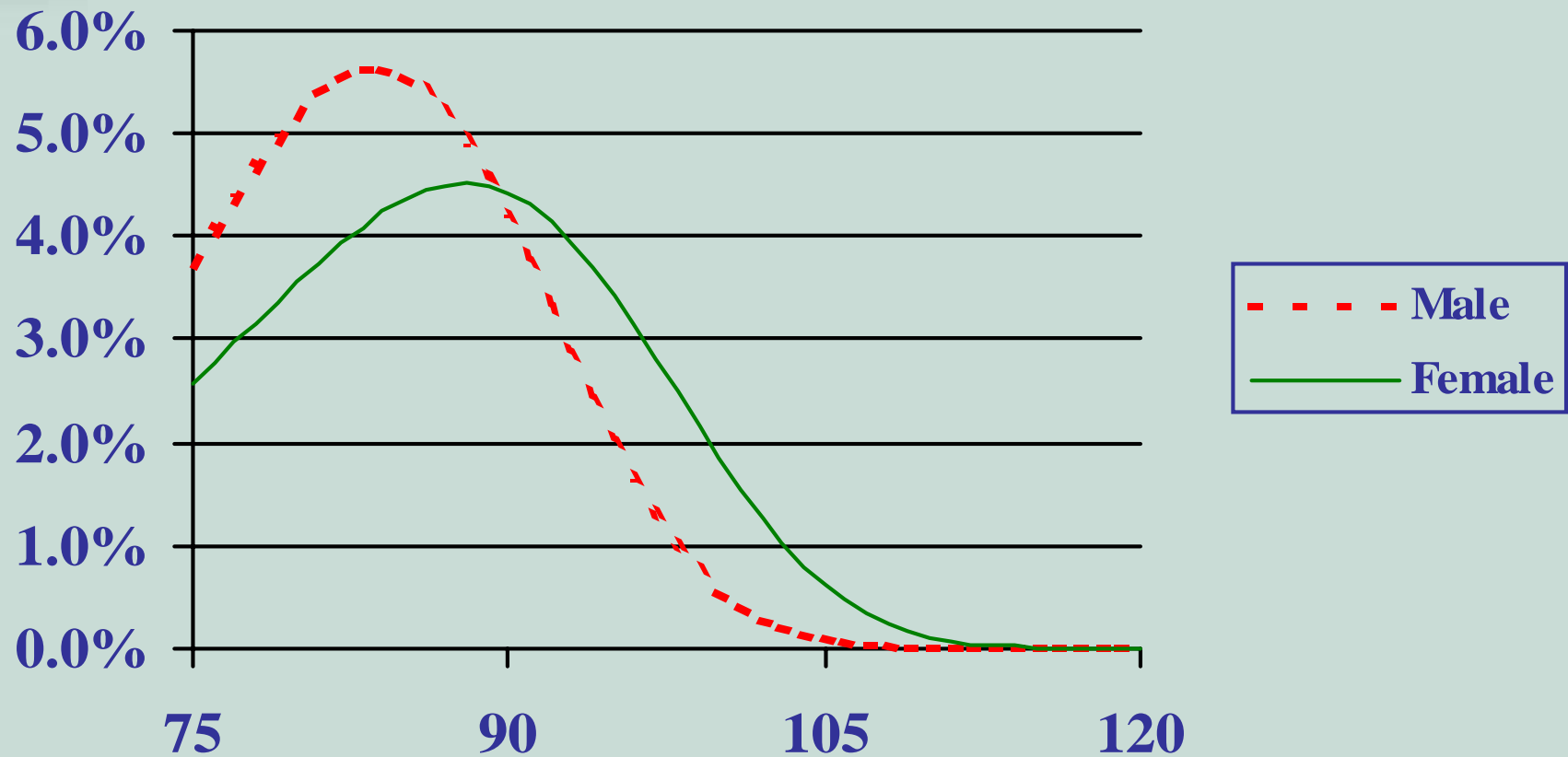
Mortality: PMA92/PFA92 Year of use 2001



# Table 5

## Distribution of deaths by age now: age 75 now

---



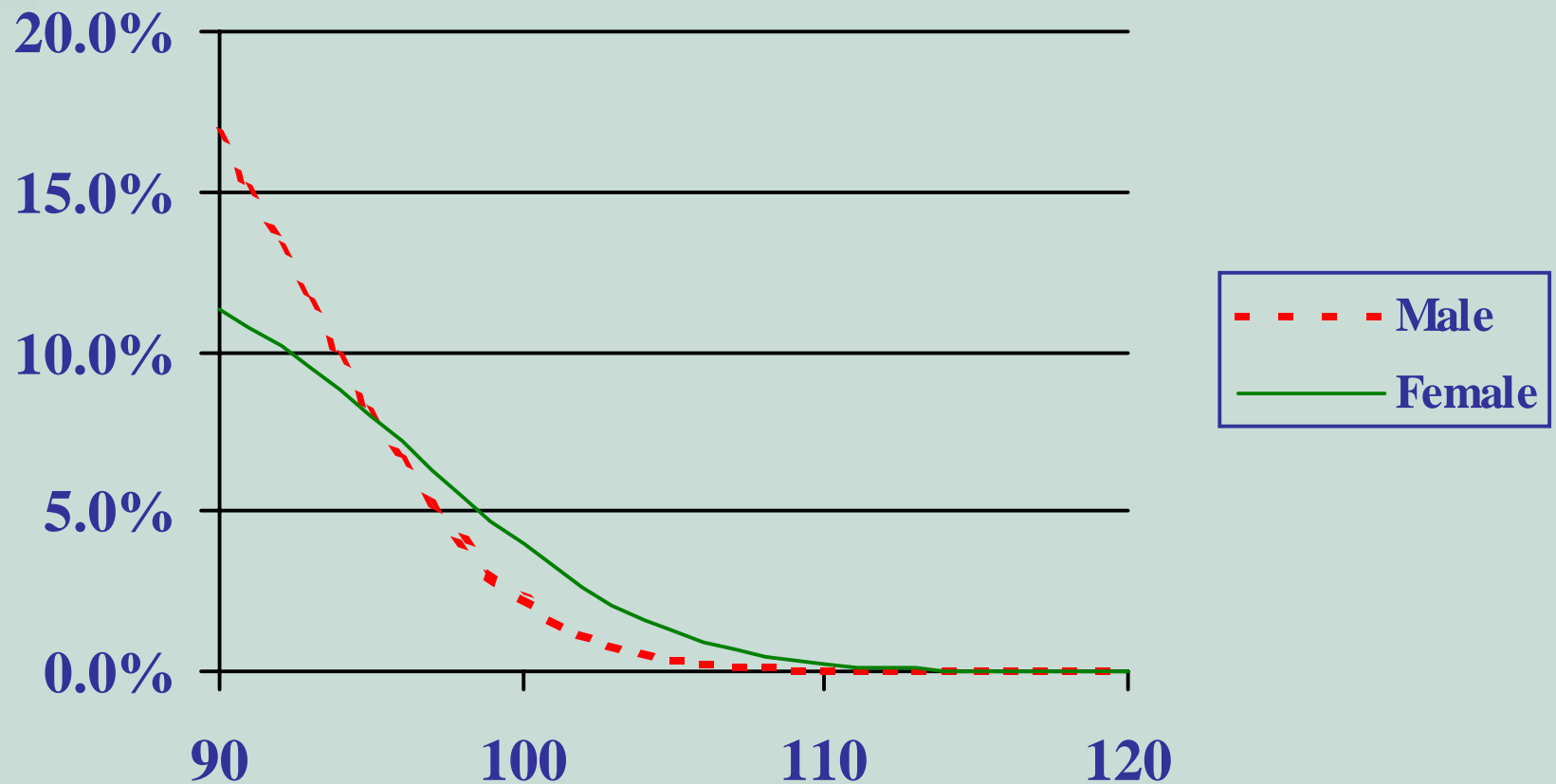
Mortality: PMA92/PFA92 Year of use 2001



# Table 6

## Distribution of deaths by age now: age 90 now

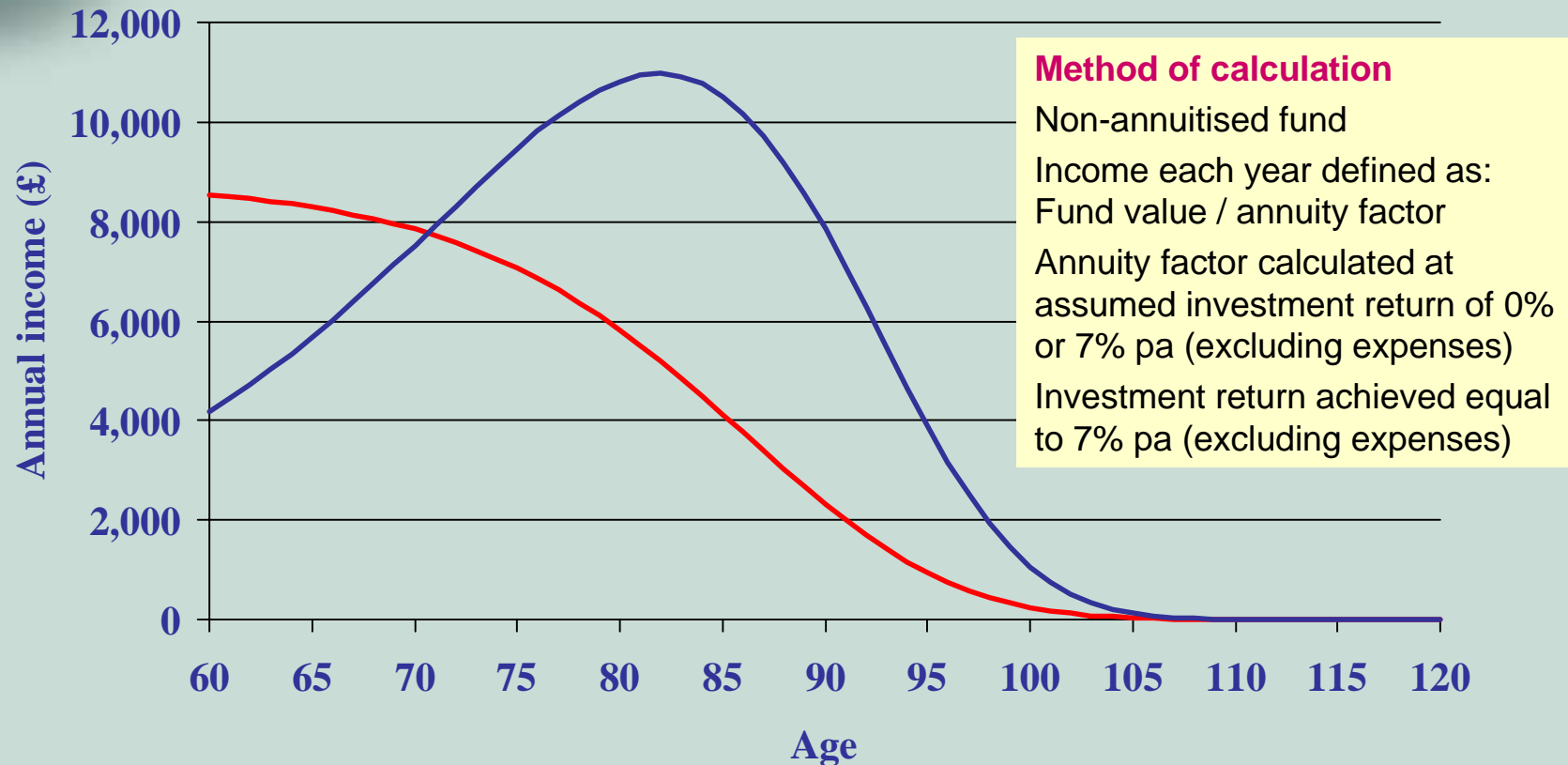
---



Mortality: PMA92/PFA92 Year of use 2001

# Table 7

## Progression of income: spreading fund over future life expectation



Investment return assumed: — 7% pa — 0% pa (excl expenses)

Investment return achieved: 7% pa (excl expenses)

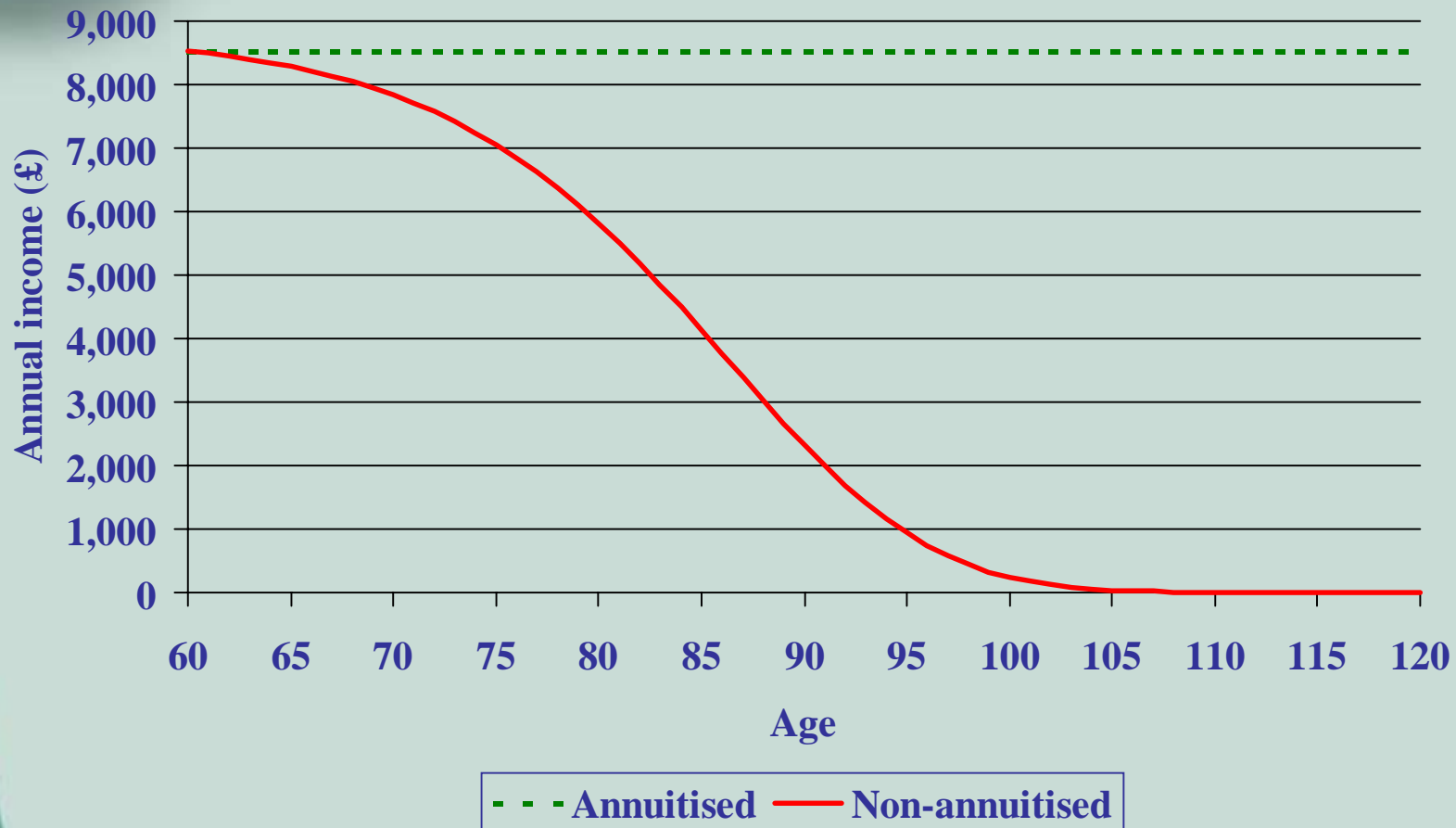
Initial fund £100,000 Male aged 60 at outset

Mortality: PMA92 Year of use 2001



# Table 8

## Progression of income: annuitised versus non-annuitised fund

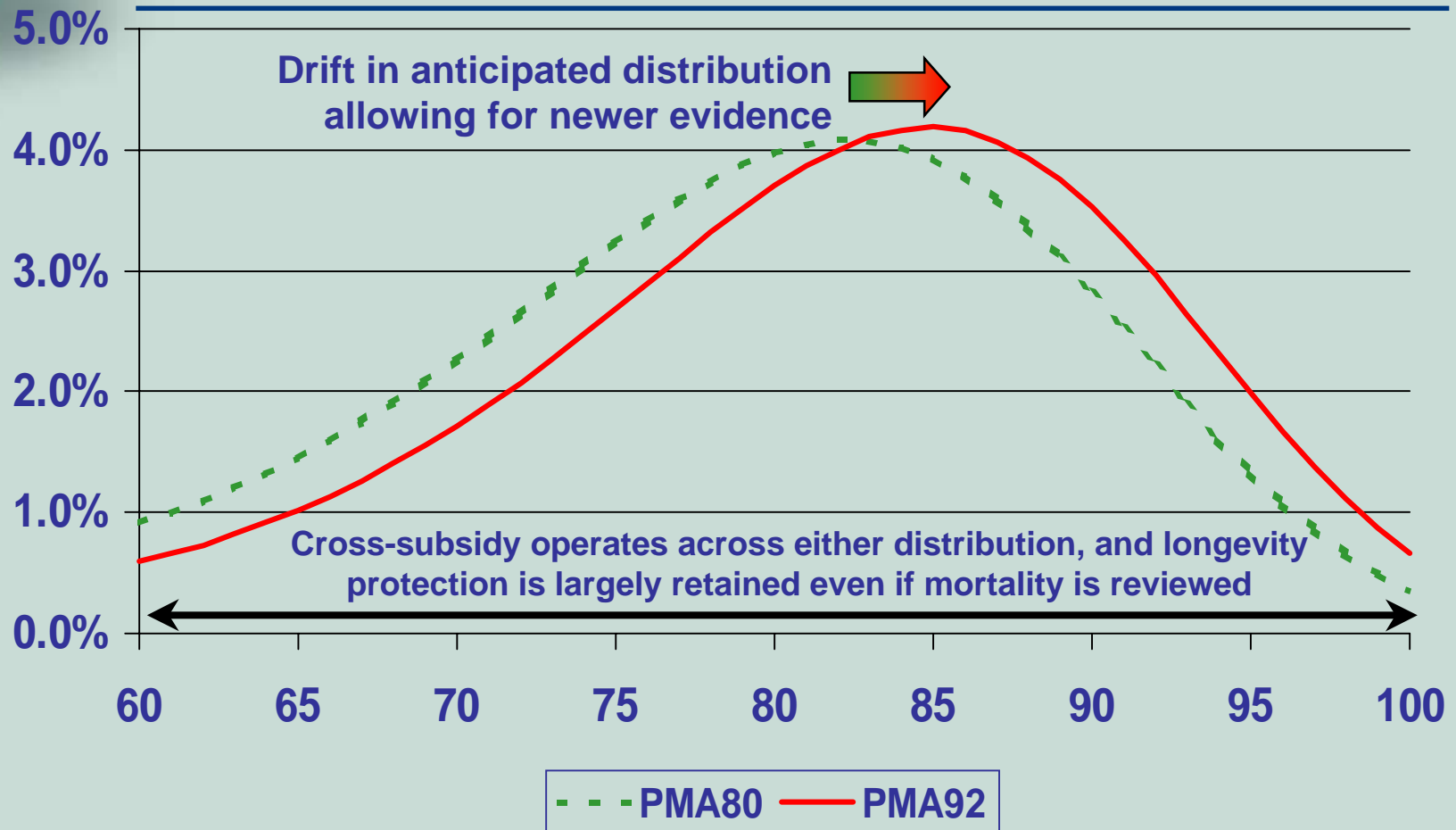


Male aged 60 at outset

Mortality: PMA92 Year of use 2001

# Table 9

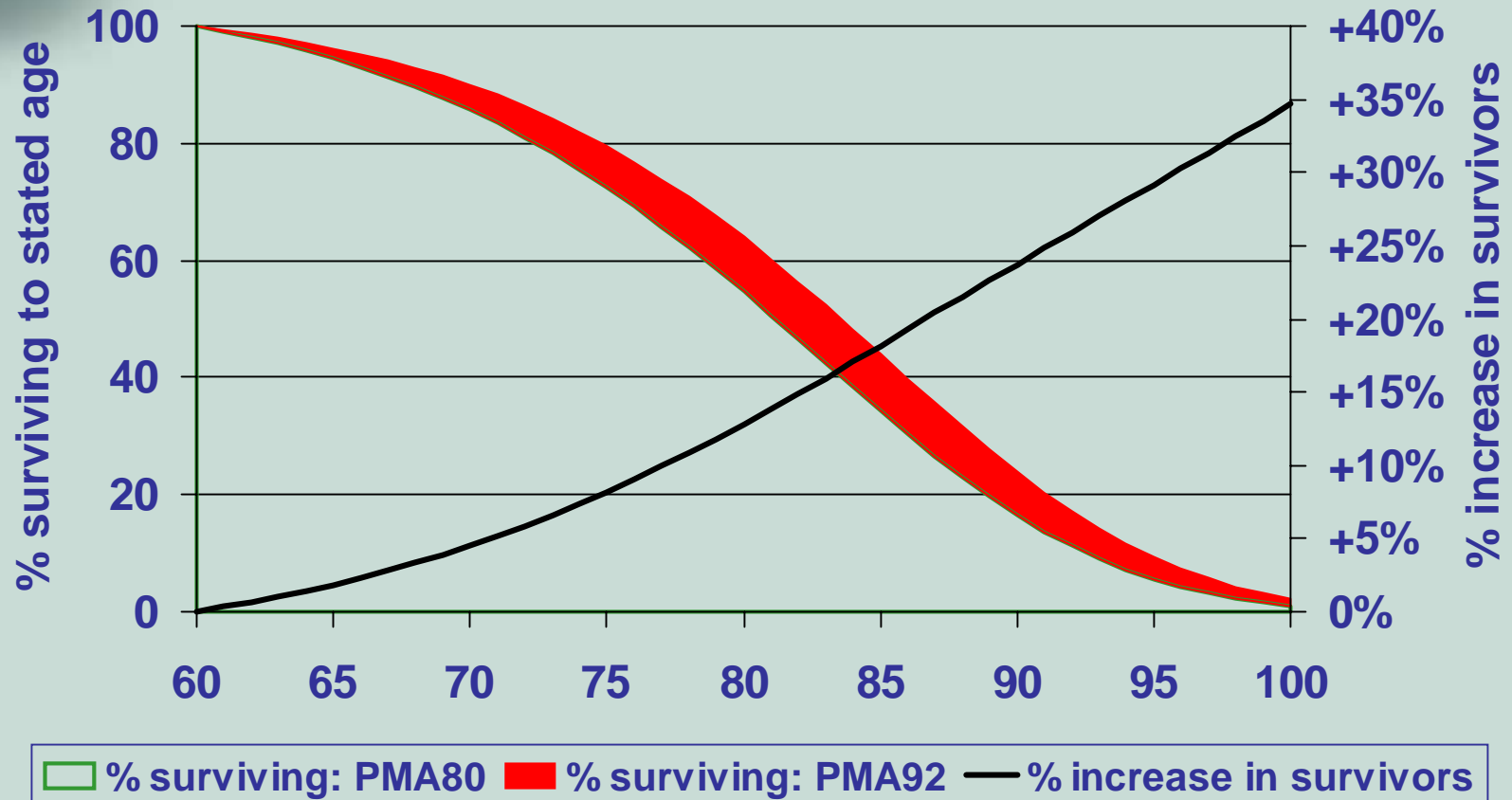
## Mortality drift: uncertain future improvements



Both charts show expected distribution of deaths for male aged 60 in 1992, allowing for future improvements. PMA92 represents the more recent estimate

# Table 10

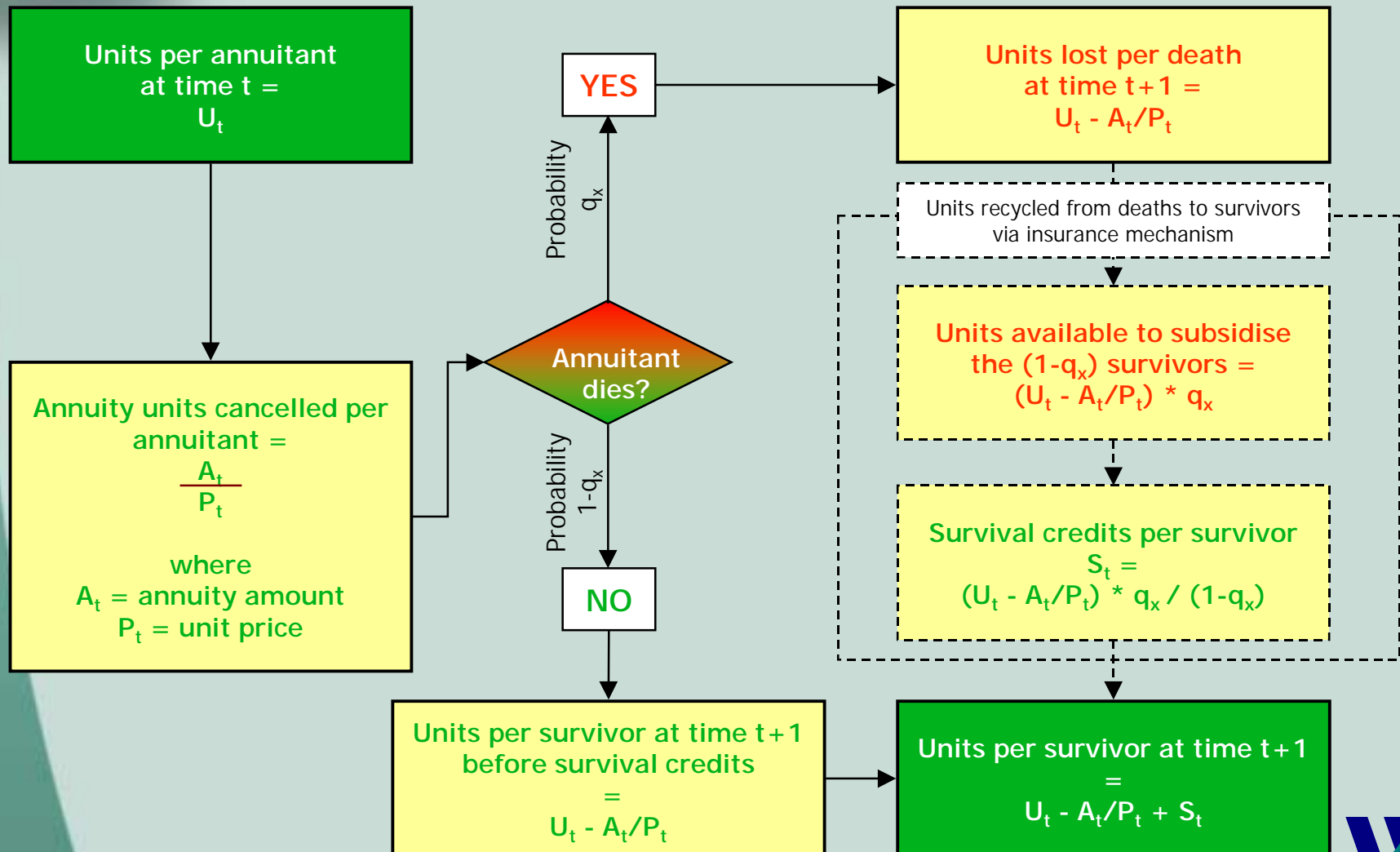
## Excess survivors: PMA92 compared with PMA80



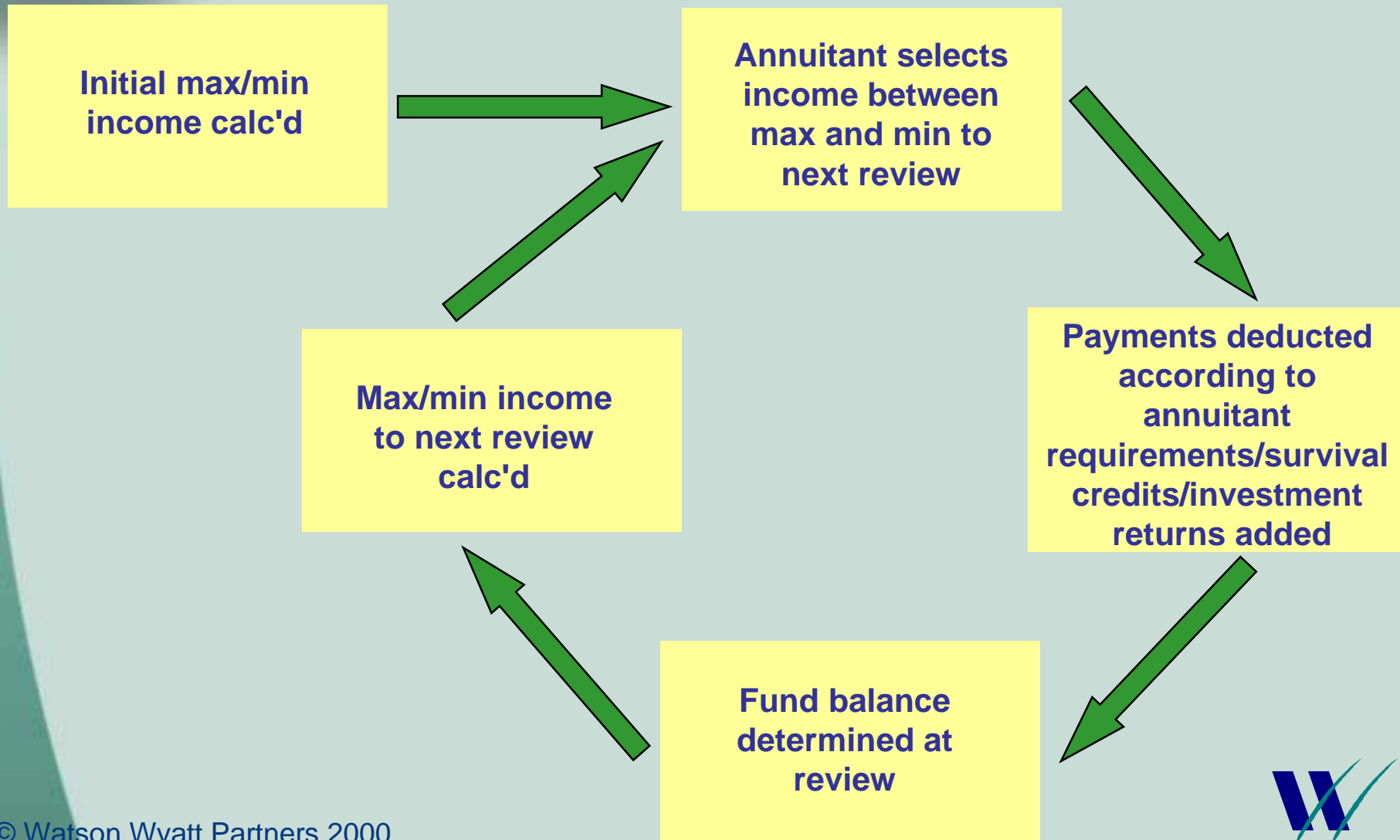
Cost to annuity provider of not reviewing mortality relates to payments made to those survivors who were not expected to live so long - **the red zone**

# Table 11

## Operation of an annuitised fund



## Flexible annuity review cycle



# Table 13

## Maximum income at review

$$\text{Annuity at Review Time (At)} = \frac{U_t \times P_t}{\bar{a}_x}$$

where  $\bar{a}_x$  = cost of annuity purchase on current market terms at review time, but permitting an interest rate higher than that implied by current annuity rates to allow for asset mix of units over life expectancy of annuity



# Table 14

## Lifetime income model: benefit statement

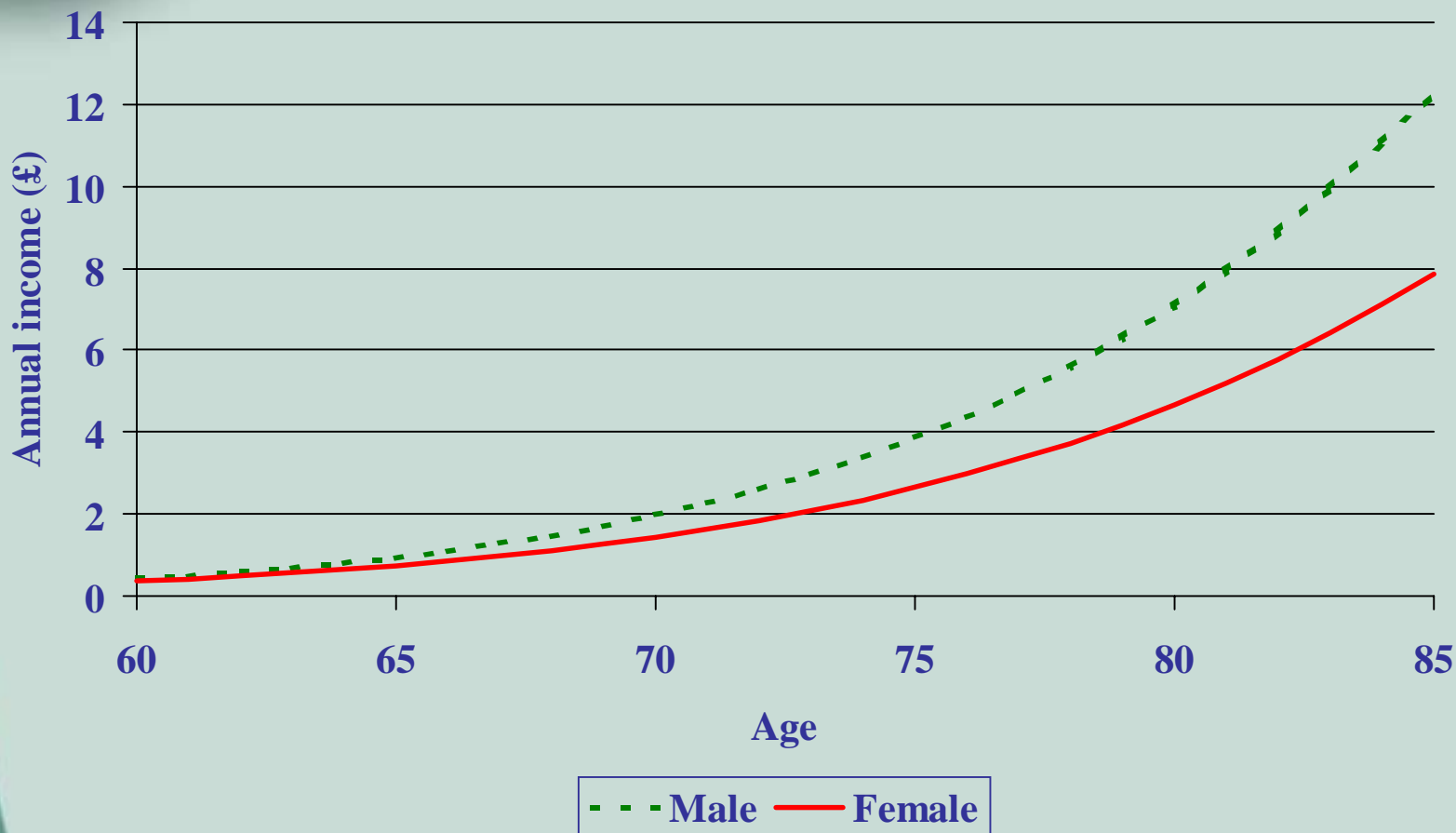
---

	Units	Unit Price £	Value £
Start of Year	10,000	10.00	100,000
Annuity Payments	(975)		(10,000)
Survival Bonus	295		3,000
Effect of Changes in Unit Price			4,860
End of Year	9,320	10.50	97,860
Target Income for Next Year			10,000



# Table 15

## Equivalent additional fund growth from mortality cross-subsidy



Mortality: PMA92/PFA92 Year of use 2001





# Table 16

## Equivalent additional fund growth

	M % pa	F % pa
75	4.1	2.8
85	13.1	8.4
95	33.2	21.2

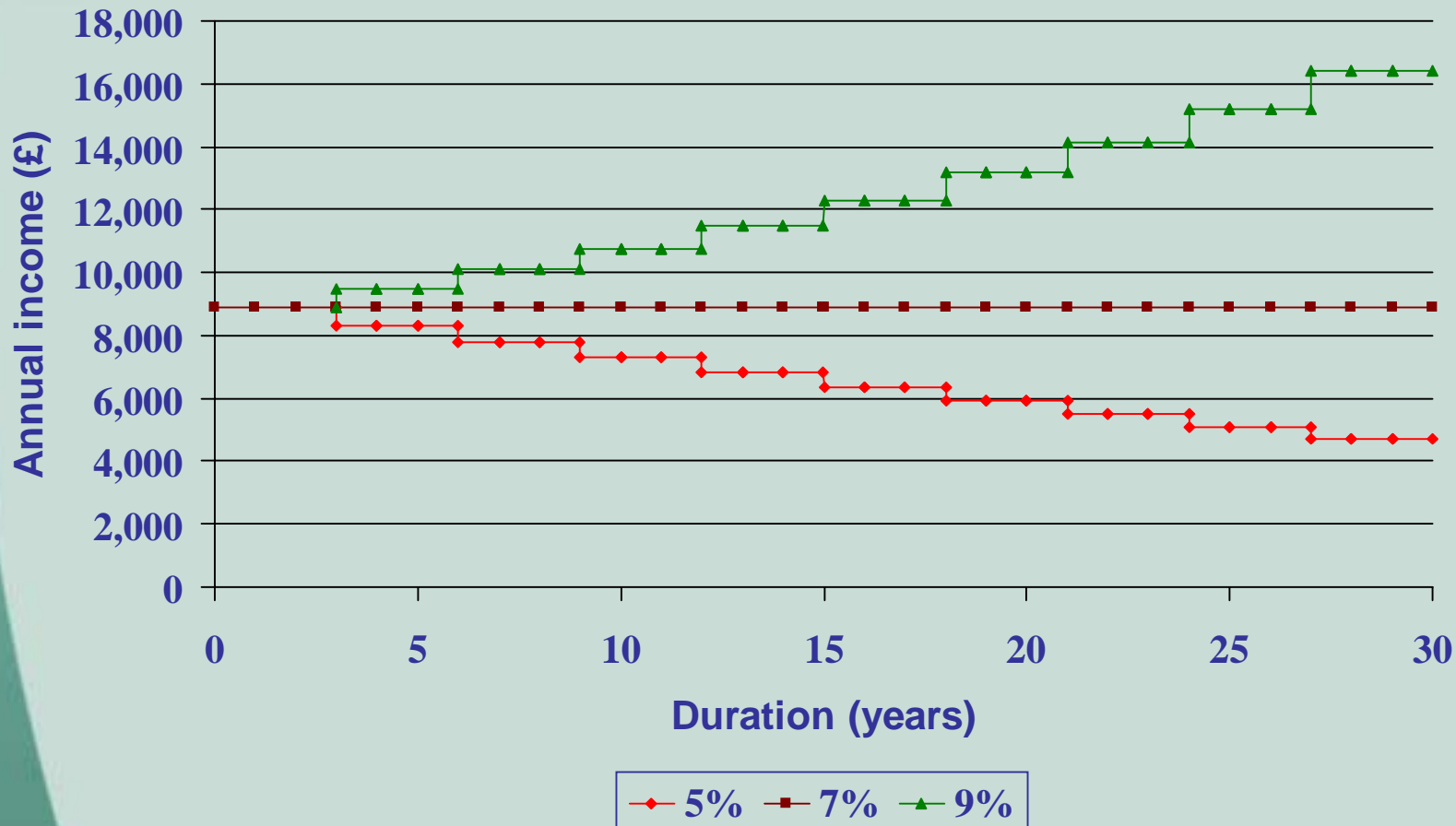
NB: Partial survival protection possible

# Table 17

## Communication of benefits:

income taken initially = income supportable at 7% pa

**Income projections at assumed asset growth rates: 5%, 7%, 9% pa**



# Table 18

## Communication of benefits

income taken initially = 1.1 x income supportable at 7% pa

**Income projections at assumed asset growth rates: 5%, 7%, 9% pa**

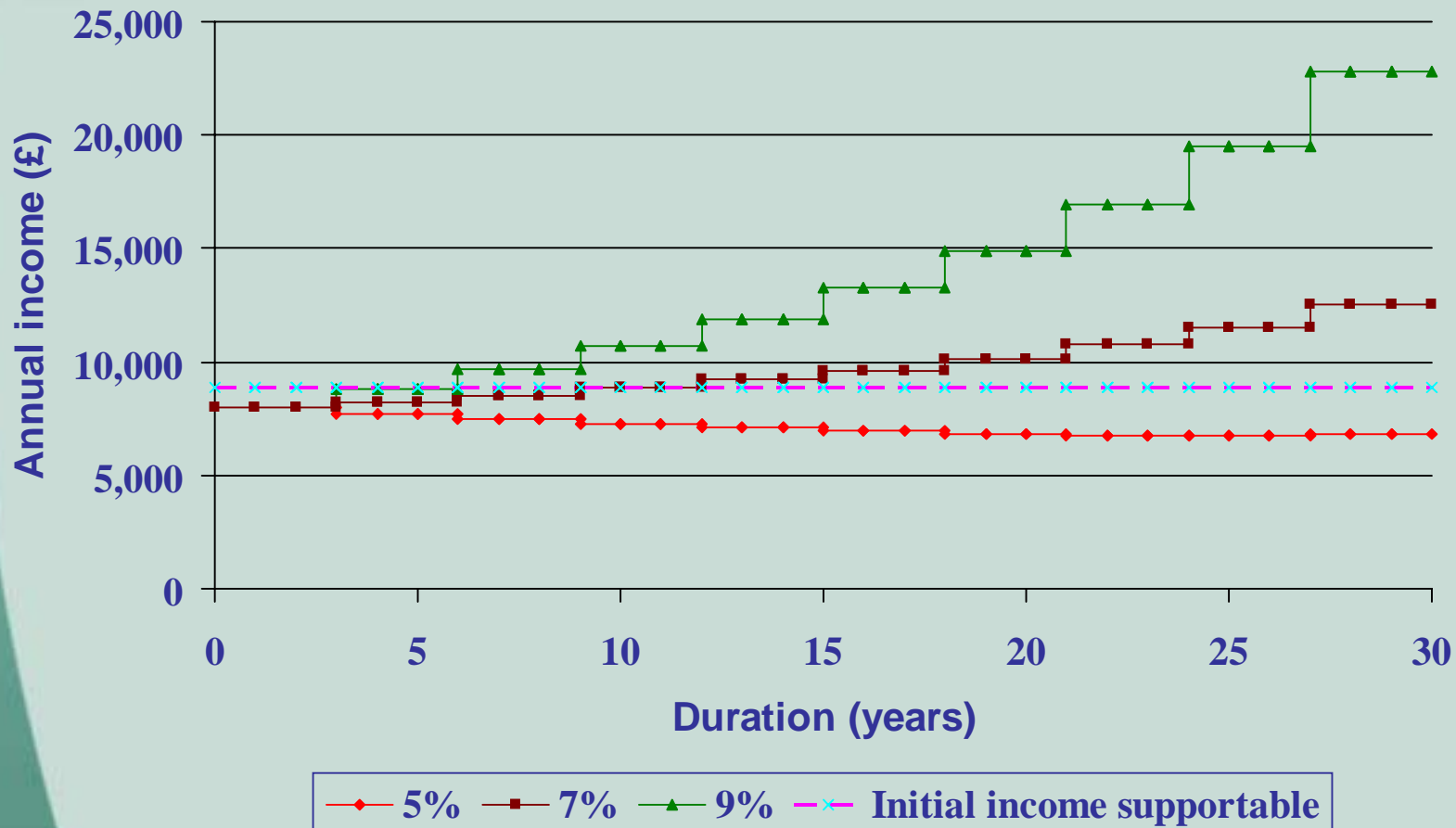


# Table 19

## Communication of benefits

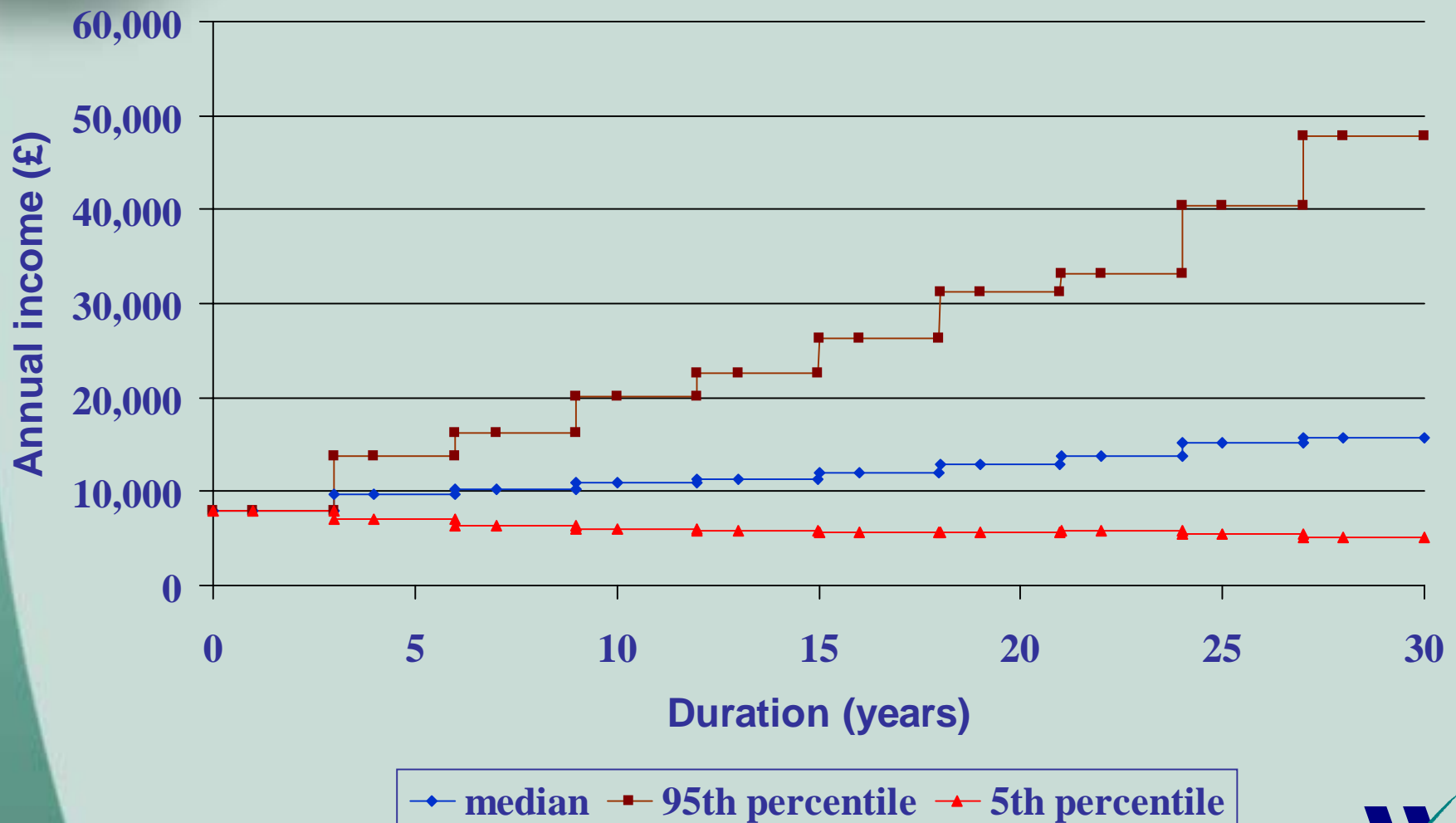
income taken initially = 0.9 x income supportable at 7% pa

**Income projections at assumed asset growth rates: 5%, 7%, 9% pa**



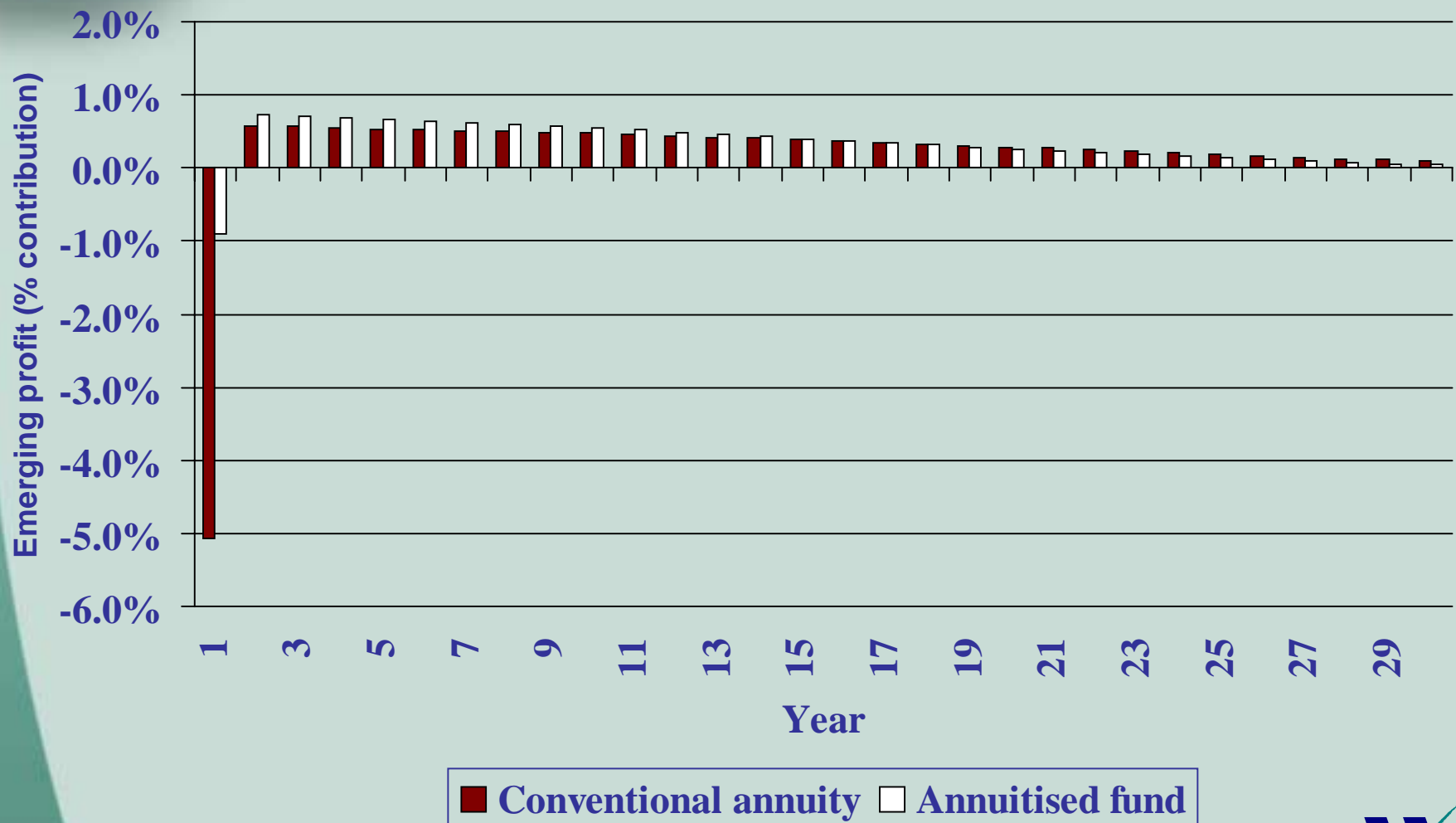
# Table 20

## Income projections: variable investment model



# Table 21

## Profit signature: conventional annuity versus annuitised fund



I C A  
CANCUN  
March 2002

**Mike Wadsworth**  
**Alec Findlater**

**Reinventing Annuities**

**[mike.wadsworth@eu.watsonwyatt.com](mailto:mike.wadsworth@eu.watsonwyatt.com)**



**[WWW.WATSONWYATT.COM](http://WWW.WATSONWYATT.COM)**



**Watson Wyatt**  
*Worldwide*