



# Developing and pricing an underwritten annuity product

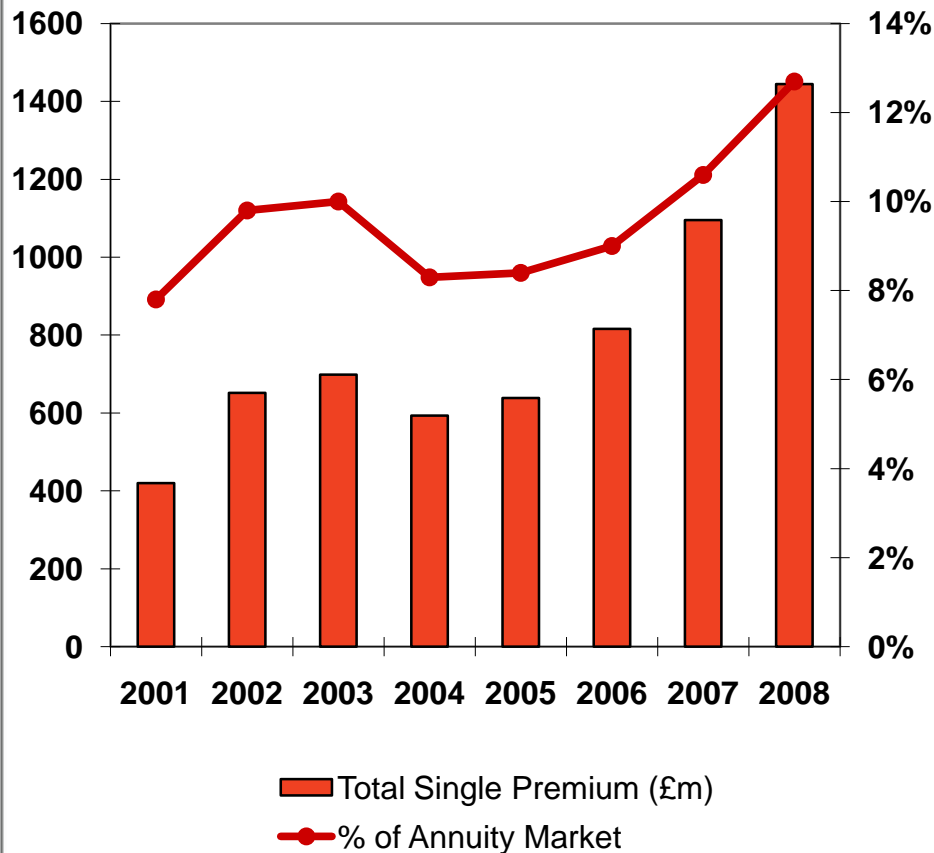
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PartnerRe

# UK underwritten annuity market

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## Historic volumes



- Product launched in 1995
- Favourable market features
  - Significant annuity tax incentives
  - Medical info freely available
- Future development of market
  - 12%  $\Rightarrow$  40% of market?
  - Market dominated by specialists

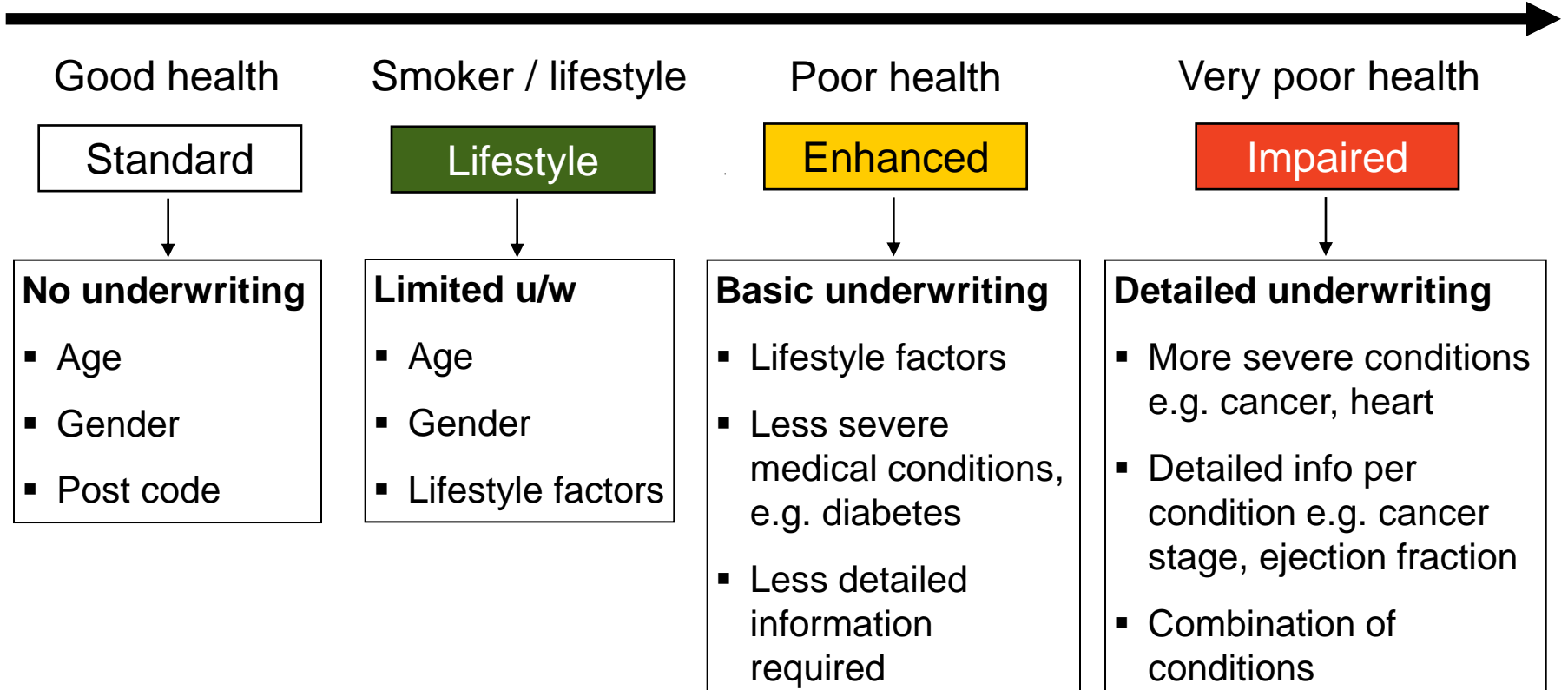
# Product design

# Product design



- Annuity rate depends on health condition and level of u/w

Health condition



# Underwriting

# Underwriting



- Medical information provided via industry-wide form
  - Questions & answers
  - Free text

## Section 2: Medical Assessment Form - To be completed by the Annuitant

Please disclose as much information about your health as possible before signing this form. An annuity may commence on the basis of the medical information supplied. Failure to disclose material facts about your health may result in any annuity enhancement being reduced or removed in full. Material facts are those that an insurer would regard as likely to influence the assessment and acceptance of a proposal. If you are unsure whether certain facts for your case are material, they should be disclosed.

**Please enclose copies of any available hospital letters and a copy of your latest repeat prescription form, if possible.**

Height: ft  ins  or cms  Weight: st  lbs  or kgs

**Smoking** - we may ask you to undergo a simple non-invasive test and require you to confirm your consumption and the extent of your smoking habit to verify the information you give.

Do you smoke?  Yes  No  Never

Please advise of the years you started and, where applicable, stopped:  to

Please indicate the average **daily** level.

Manufactured cigarettes  Cigars  ozs of tobacco  Hand-rolled cigarettes  Pipe

**Drinking** - How many units of alcohol do you drink weekly?

(a unit of alcohol is equivalent to half a pint of normal strength beer, lager or cider, one standard glass of wine or a single measure of spirit)

Do you have high blood pressure (Hypertension) -  Yes  No

If yes, please specify last reading:  Date of reading:  dd  mm  yyyy

Number and name(s) of medication(s) taken (e.g. Atenolol, Ramipril):

# Underwriting



- Various possible underwriting solutions:
  - Outsource to reinsurer  $\Rightarrow$  Full in-house
  - Fully automated  $\Rightarrow$  Fully underwritten
  - Partially automated  $\Rightarrow$  Partially underwritten
- A skilled underwriter will beat an automated system in the long run
- Decided to use an expert system
  - Operated by underwriter
  - Vetting by administration staff where possible

# Underwriting



- Expert underwriting system
  - Rules based on complex tree structure
  - Output is bespoke mortality curve

PartnerRe

Print Email **UW Workbench**

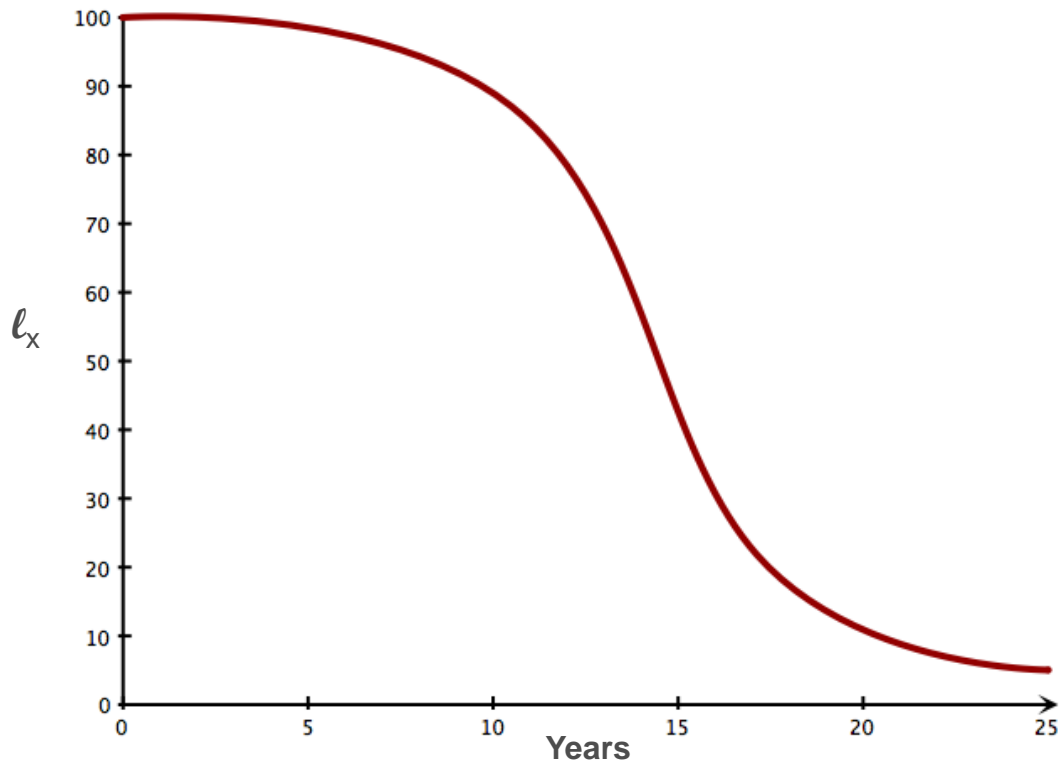
Cedant IDs: Test12345 PartnerRe IDs: Case: Person: Gender: Male Amount: Age: 52 Product: Life Term Status: Married Update

	P50	P95	Case History
Standard mortality	35.25	52.08	
▶ Lifestyle	36.25	52.58	
▼ Type 2 Diabetes Retinopathy grade moderate retinopathy - Grade 2 HbA1c > or = 8% Proteinuria >1+ Neuropathy	24.00	39.50	
▶ MI	33.58	51.25	
Summary	23.42	39.25	Underwriter's comments
▶ Soft factors to consider.		0	
Results	v0.88		

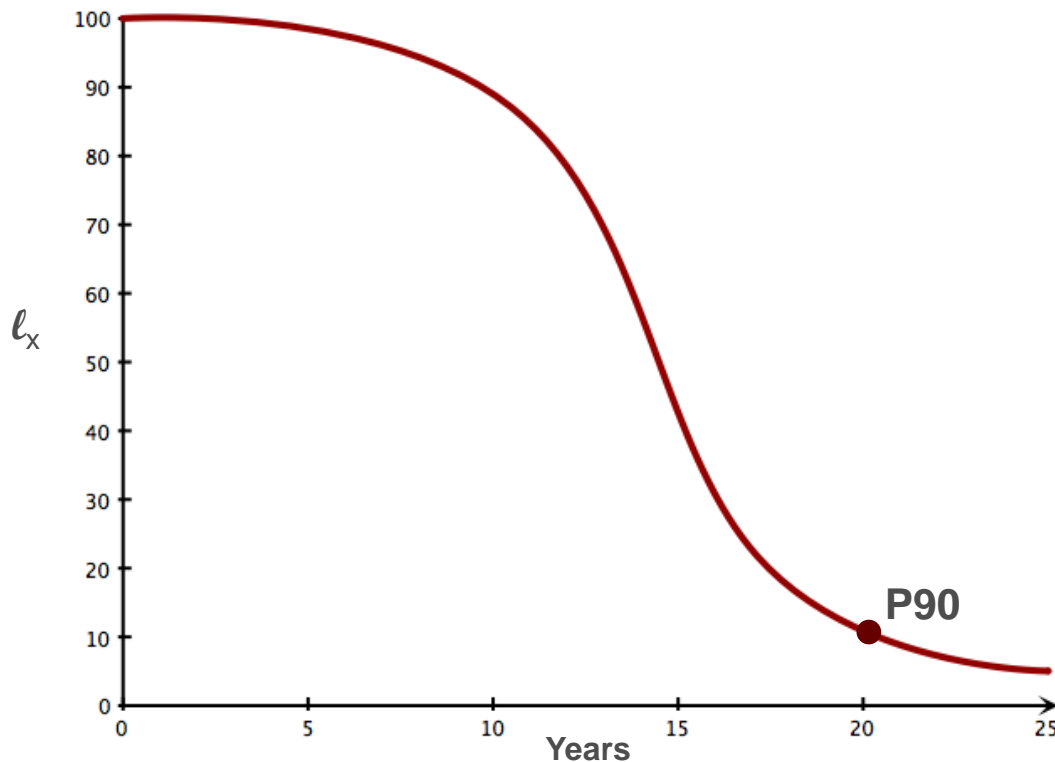
Save Finalise Abandon Archive Case

# Pricing

# Pricing – The Survival Curve

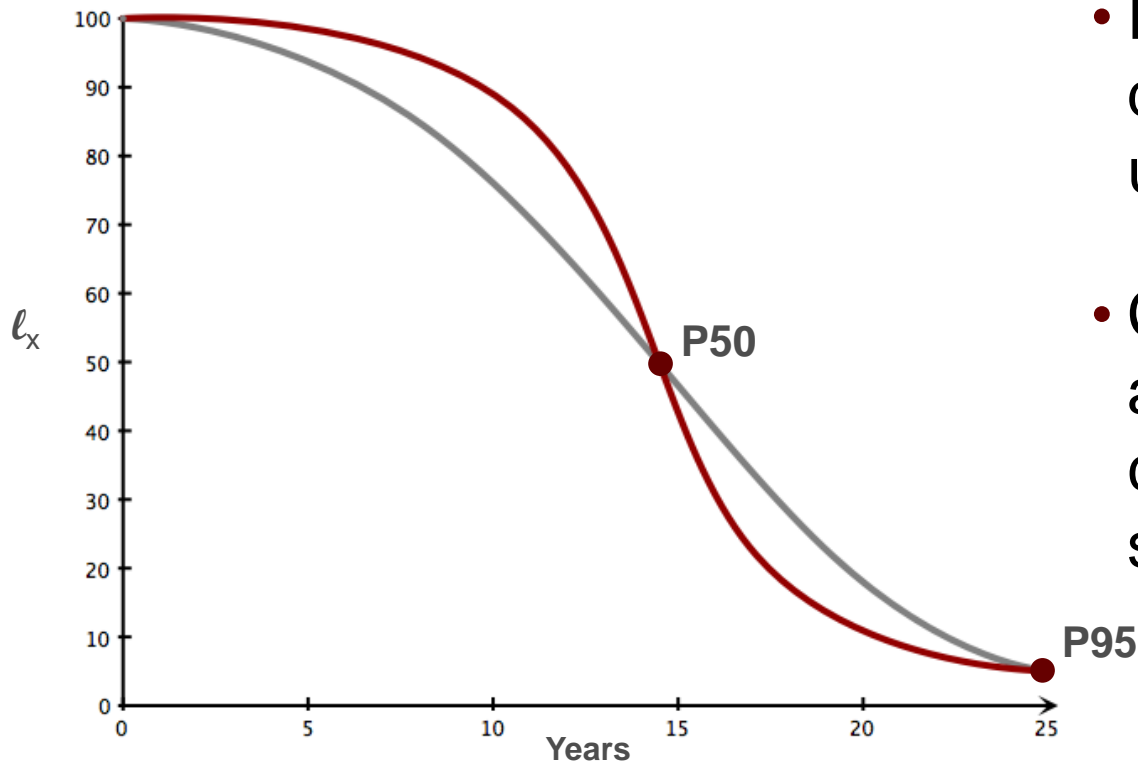


# Pricing – Using 1 rating point



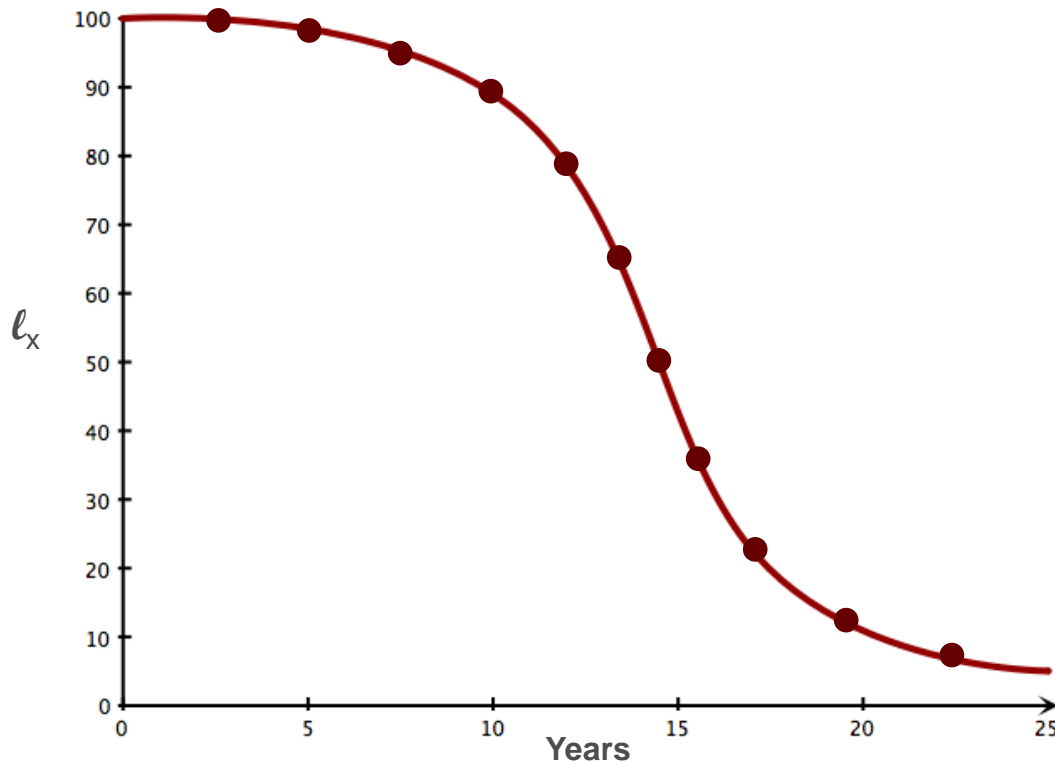
- P90 determined by medical underwriting
- Combined with type and severity of condition to determine shape

# Pricing – Using 2 rating points



- P50 and P95 determined by medical underwriting
- Combined with type and severity of condition to determine shape

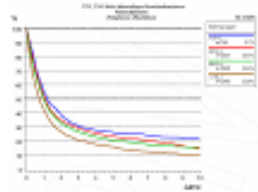
# Pricing – Using a bespoke curve



- Survival curve determined by applying a bespoke extra mortality vector to a base mortality curve
- Extra mortality vector derived using multivariate models

➡ DEMO

# Pricing control cycle



Medical statistics,  
raw data

Articles,  
papers

Expertise/  
Experience

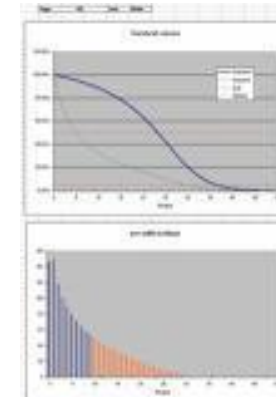
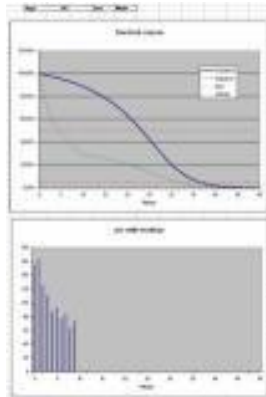
Actuarial  
tables

Process of analysing and discussing between medical experts and actuaries

Various treatments to obtain curve  
(extrapolation, smoothing, etc)

Best estimate curves

Continuously updating knowledge and  
going through this process



# Conclusion

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- Characteristics of successful underwritten annuity market
  - Annuity products have significant tax incentives
  - Easy access to detailed medical information
- UK underwritten annuity market has seen strong growth in recent years – believe this will continue
- Sophisticated underwriting and pricing techniques are required to avoid anti-selection
- Developing these skills and keeping them up-to-date is the key to success in this market

# Contact details



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