



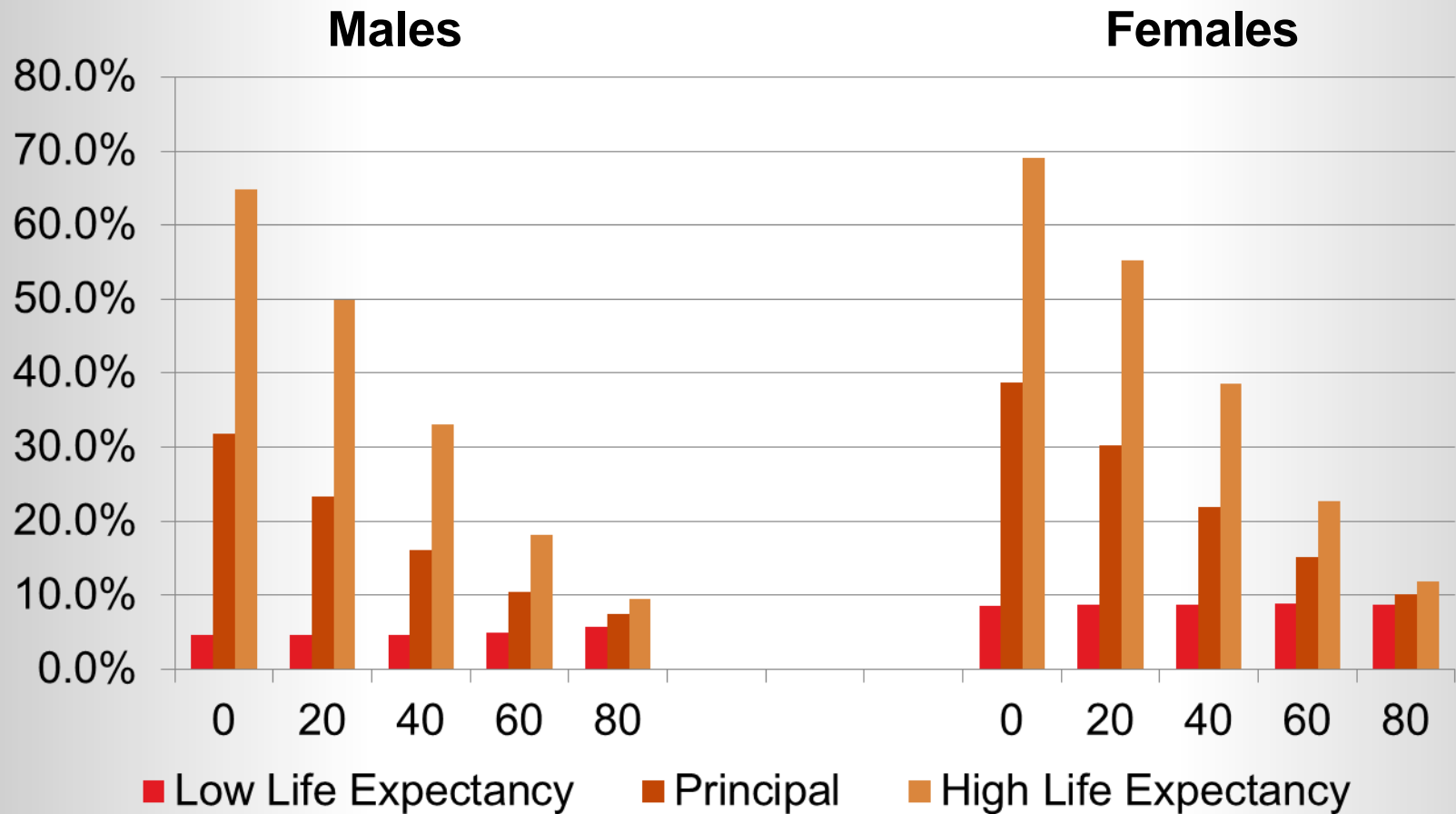
Who will live to 100?

What do you think?

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Who will live to 100?

Probability of Person Aged x in 2012 surviving to 100



Setting the scene – longevity marketplace in the UK

Source	2011 Market Volume
“Standard” Annuities	£8bn ¹
“Enhanced” Annuities	£3bn ¹
Bulk Annuity and Longevity Swaps	£12bn ²
Total	£23bn

- Estimated range of opinion on mortality improvements gives variation in liabilities of 6%....
- ...so range of opinion gives £1.4bn on these volumes.

1: ABI Market Statistics

2: Buyout Market Watch – September 2012, JLT

Factors Influencing Mortality Improvements

6 Areas of Interest

- Public Health and population risk factor changes
- Healthcare policy and execution
- Emergence of new or mutated pathogens
- Specific disease based medical interventions
- Regenerative medicine
- Anti-ageing technology

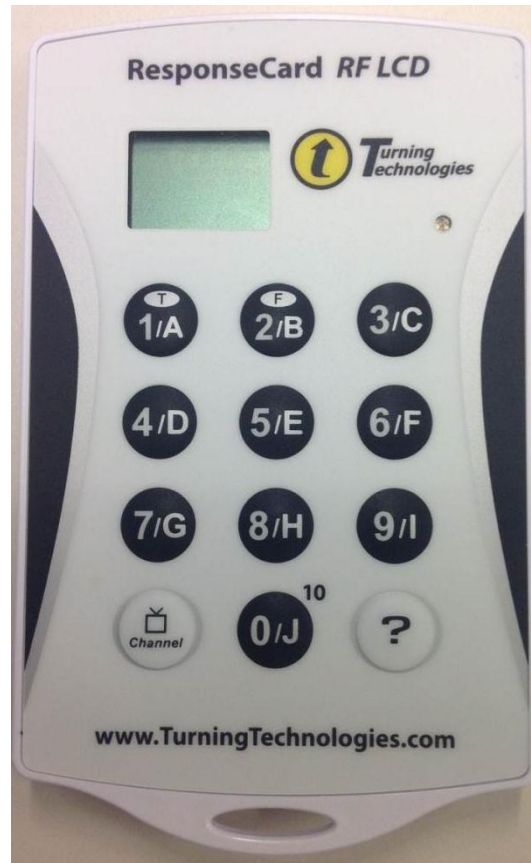
How do we research this topic?

A multi-disciplinary approach is needed:

- Doctors
- Medical Researchers
- Demographers
- Epidemiologists
- Underwriters
- Actuaries

Interactive Session

So please meet your voting pad...





Who will live to 100?

- A. Grandad
- B. Grandma
- C. Mum
- D. Dad
- E. Son



Who will live to 150?

- A. Grandad
- B. Grandma
- C. Mum
- D. Dad
- E. Son

Public Health and Population Risk Factor Changes

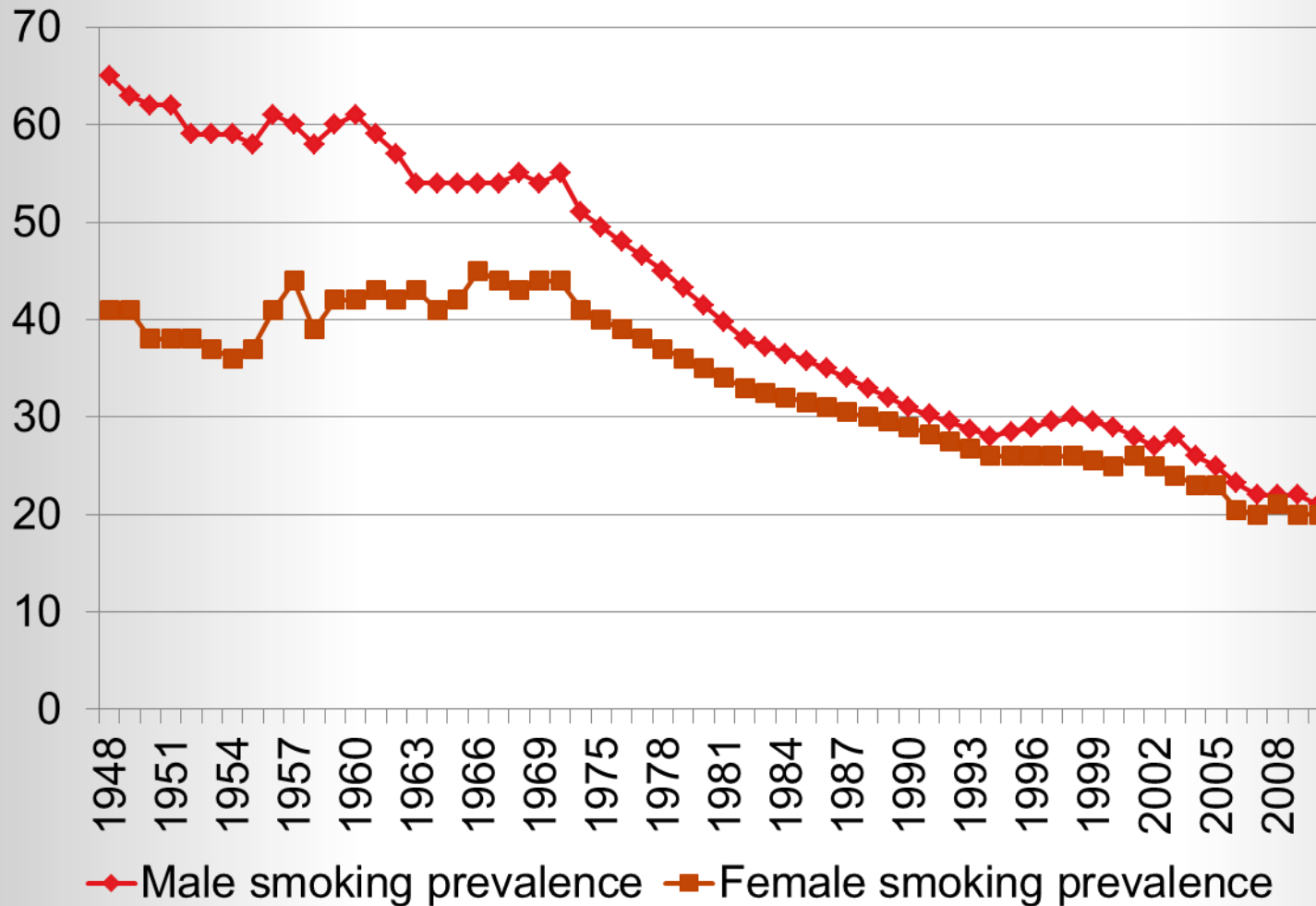
- There are many, for example:
 - Obesity
 - Smoking
 - Cholesterol
 - Blood Pressure
 - Alcohol
 -



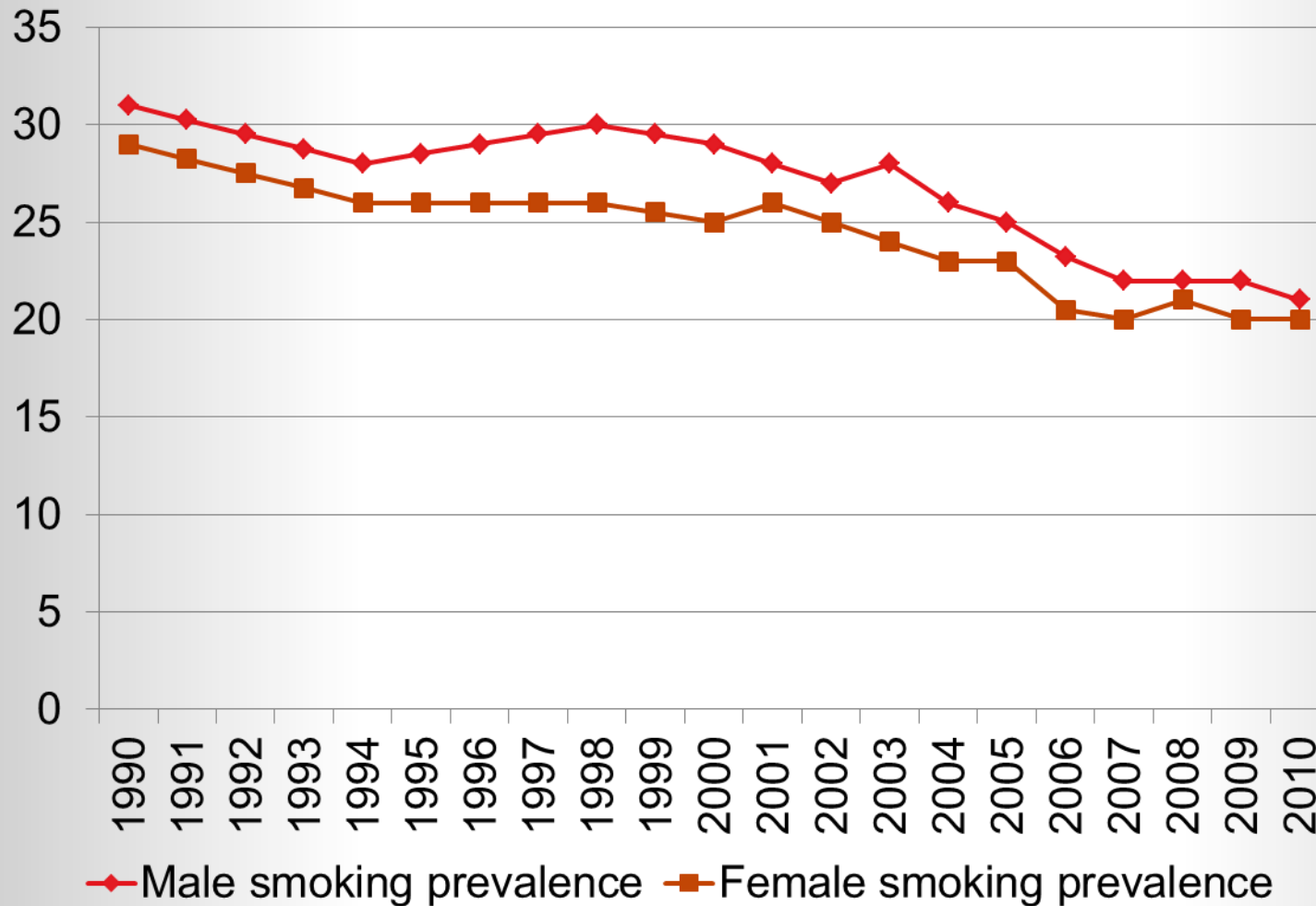
Source: Int. J. Epidemiol. (2011) 40 (4): 985-996.

- Public Health England – from 1 April 2013

Historic levels of smoking prevalence in the UK



Historic levels of smoking prevalence in the UK



Reducing smoking prevalence

- Taxation
- Advertising bans
- Health warnings on packs
- Ban in smoking in public places
- Vending machine bans
- Displays in shops
- Plain packs
- Health campaigns, backed with availability of stop smoking aids
 - Stoptober
 - Current “15 cigarettes = 1 mutation” campaign

What is the long term prevalence of smoking in the UK?

- A. Smoke free by 2025
- B. Smoke free by 2040
- C. Long term rate
between 0% - 10%
- D. Long term rate
between 10% - 20%

Emergence of New and Mutated Pathogens

Influenza, SARS, Ecoli, Antibiotic resistance.

- Resistance to antibiotics could bring "the end of modern medicine as we know it", Director-General of the World Health Organization claims (March 2012):

"We are losing our first-line antimicrobials. Replacement treatments are more costly, more toxic, need much longer durations of treatment, and may require treatment in intensive care units."

"Some sophisticated interventions, like hip replacements, organ transplants, cancer chemotherapy, and care of preterm infants, would become far more difficult or even too dangerous to undertake."

"From an industry perspective, why invest considerable sums of money to develop a new antimicrobial when irrational use will accelerate its ineffectiveness before the R&D investment can be recouped?"

- Similar comments Nov 2012 from England's CMO;

Which of the following risks is going to lead to the most deaths over the next 10 years?

- A. Anti-biotic resistant bacteria
- B. Influenza Pandemic
- C. Dancing Gangnam Style
- D. GM Food
- E. Nanoparticles

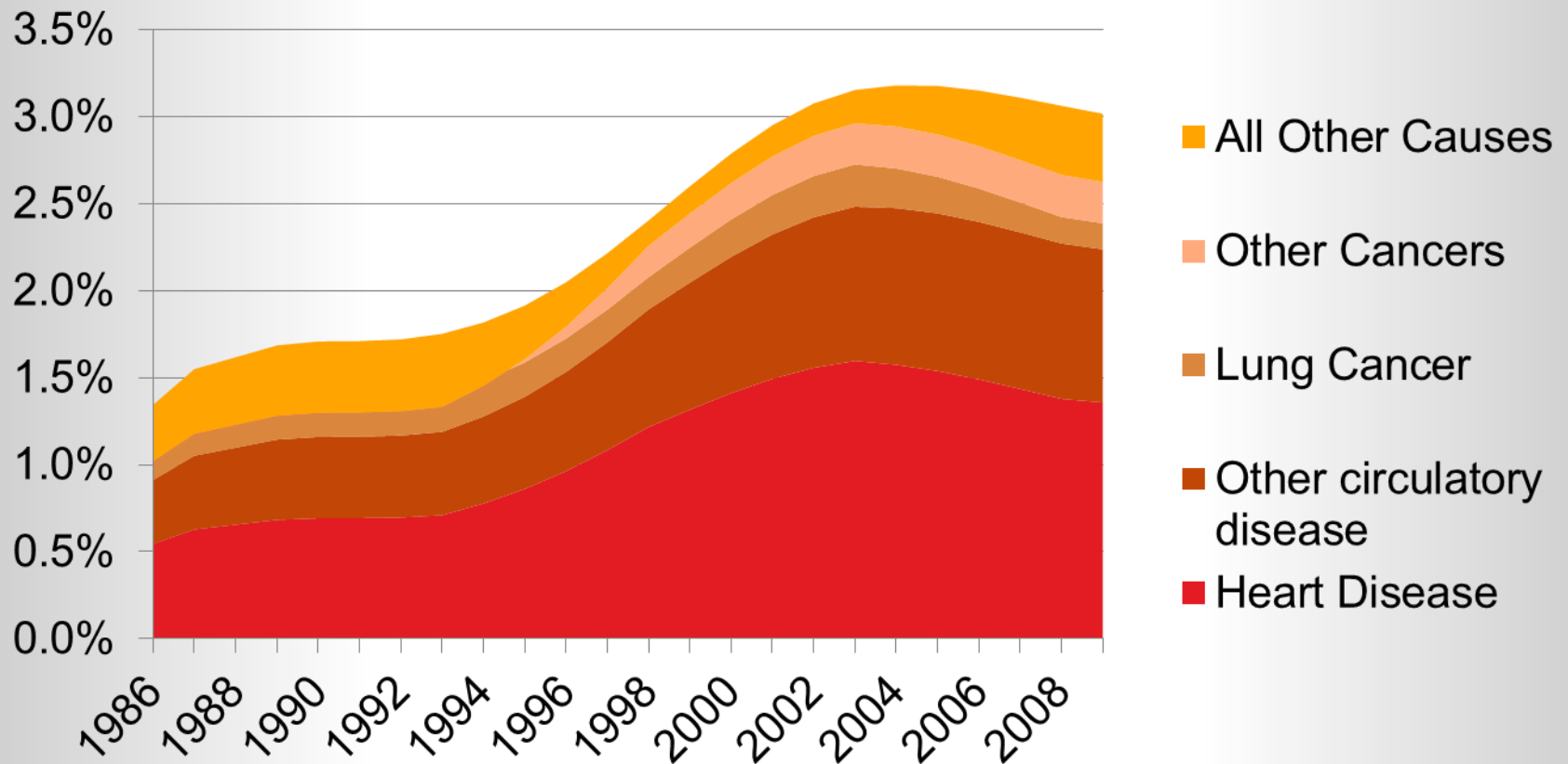
Specific Disease Based Interventions

Many avenues for mortality reduction

- Prevention
 - Lifestyle changes
 - Vaccination
- Early detection, including screening programmes
- Improved treatments
- Post treatment care

Historic Improvements by Cause of Death

Males aged 60 – 89 , Breakdown of annual improvement rate



Cardio-vascular deaths

- Significant improvements historically
 - Better risk factor management
 - Faster diagnosis and treatment of conditions
- Drugs are now widely used, very effective and increasingly generic
- Few new drugs in pipeline
- Research into treating inflammation as the cause of CVD only just starting;
- No drug to reverse atherosclerosis in research
 - Significant atherosclerosis seen at Autopsy

By how much will deaths from cardiovascular causes reduce over the next 20 years?

A. They won't reduce

B. 0%-20%

C. 21%-40%

D. 40%-60%

E. 60%-100%

Cancer Deaths

So many avenues for advancement....

- c900 drugs in pipeline for cancer
- Some very significant advances in individual uncommon cancers
 - Glivec (Imatinib) in CML
 - GIST and chemotherapy in germ cell tumours
- New approaches being researched
 - Blood and Urine Tests
 - Genetic profiling to guide treatment strategies
 - Personalised medicine
 - Genetically modified T Cells
 - Virotherapy
 - CD47
- Huge advancements in the understanding of cancers.

Cancer Deaths

...but so far progress has been slow

- Cancer is a very broad term and covers a multitude of illnesses;
- Even within a cancer site, there is considerable cell heterogeneity;
- Cancer cells develop immunity to treatments;
- Some older patients may not tolerate optimum treatments;

- Almost overwhelming amounts of genetic and clinical data to analyse:
 - How do we turn the huge amount of data into clinical benefits....
 - ...in timescales which benefit a cancer suffer.

By how much will deaths from cancer reduce over the next 20 years?

A. They won't reduce

B. 0%-20%

C. 21%-40%

D. 40%-60%

E. 60%-100%

Regenerative Medicine

- Stem Cell Therapy, Xenotransplantation or Nanomedicine;
- Stem Cells are most advanced but still substantial amounts of basic scientific research is still being done;
- Various encouraging early phase trials;
- iPS cells from a patient's own blood announced November 2012.

How long will it be before we grow a replacement heart and successfully implant it in a (living) human (who survives)?

- A. 5 – 15 years
- B. 16 – 25 years
- C. 26 – 35 years
- D. 36 – 45 years
- E. More than 45 years

Conclusion

- Wide range of views on the level of future mortality;
- Wide range of areas to consider...
- ...so a wide range of expertise needed;



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Thank you for your attention.