# TRANSLATING MORTALITY

## into

## Debits, Credits and Flats

## AAIM 2023

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# 4 Questions we will answer

1. 200% of what exactly?
2. If it is $10 for 3, why not $5 for 6?
3. Can I use a +50 rating to cover the tail on a cancer risk?
4. Where do ratings come from?

# First, are we talking the same talk?

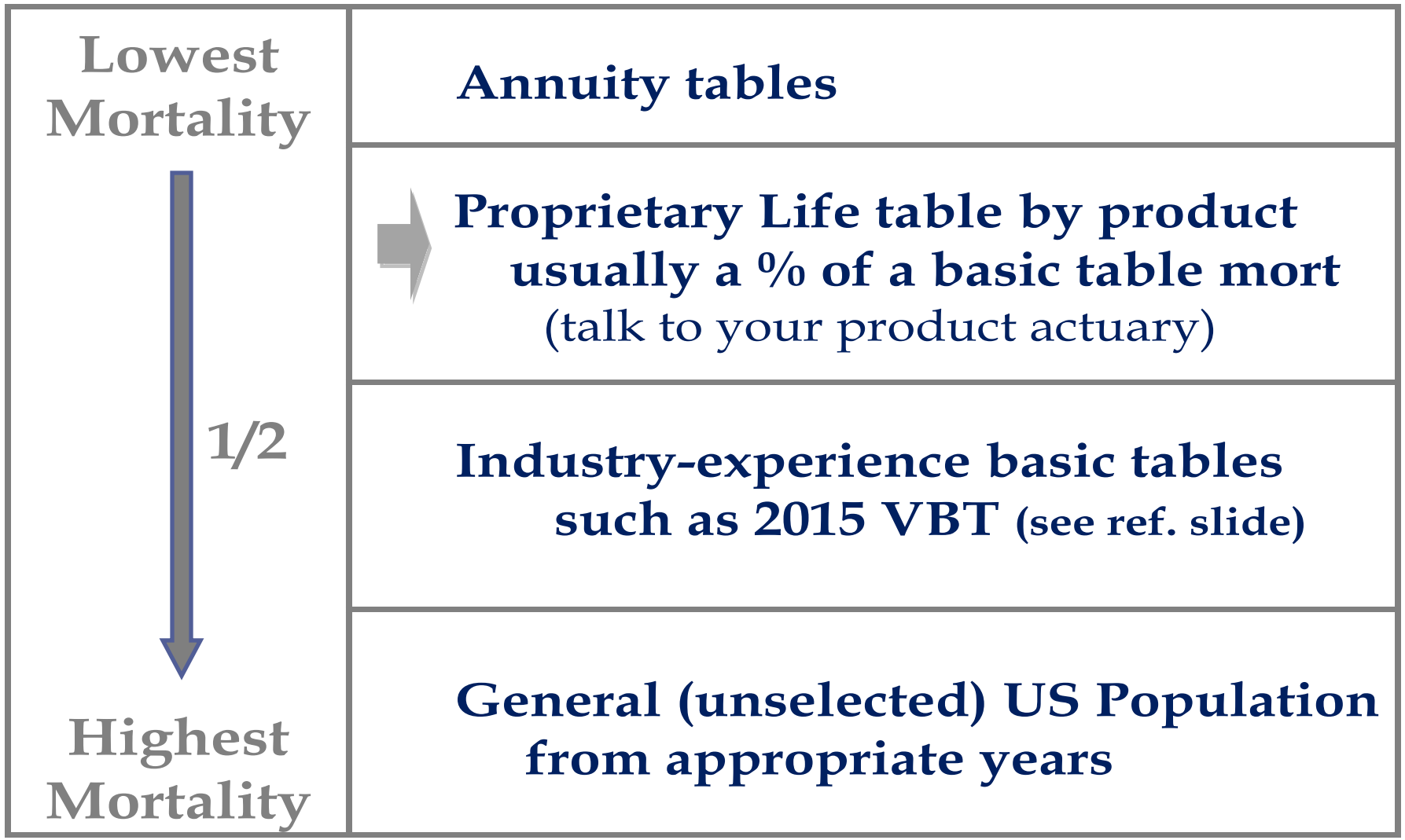
- Descriptors of extra Mortality as a % of expected

| Mortality % (Ratio) | 100% | 150% | 200% | 300% | 400% | 500% |
|---|---|---|---|---|---|---|
| Debits | 0 | 50 | 100 | 200 | 300 | 400 |
| Table | STD | T-2 | T-4 | T-8 | T-12 | T-16 |
| | STD | T-B | T-D | T-H | T-L | T-P |

- Flat Extras

  One extra death/1,000 lives roughly equals $1/ $1,000 of risk amount

# Tables of Expected Mortality



# Industry Experience Life tables

## Valuation Basic Tables (VBT)

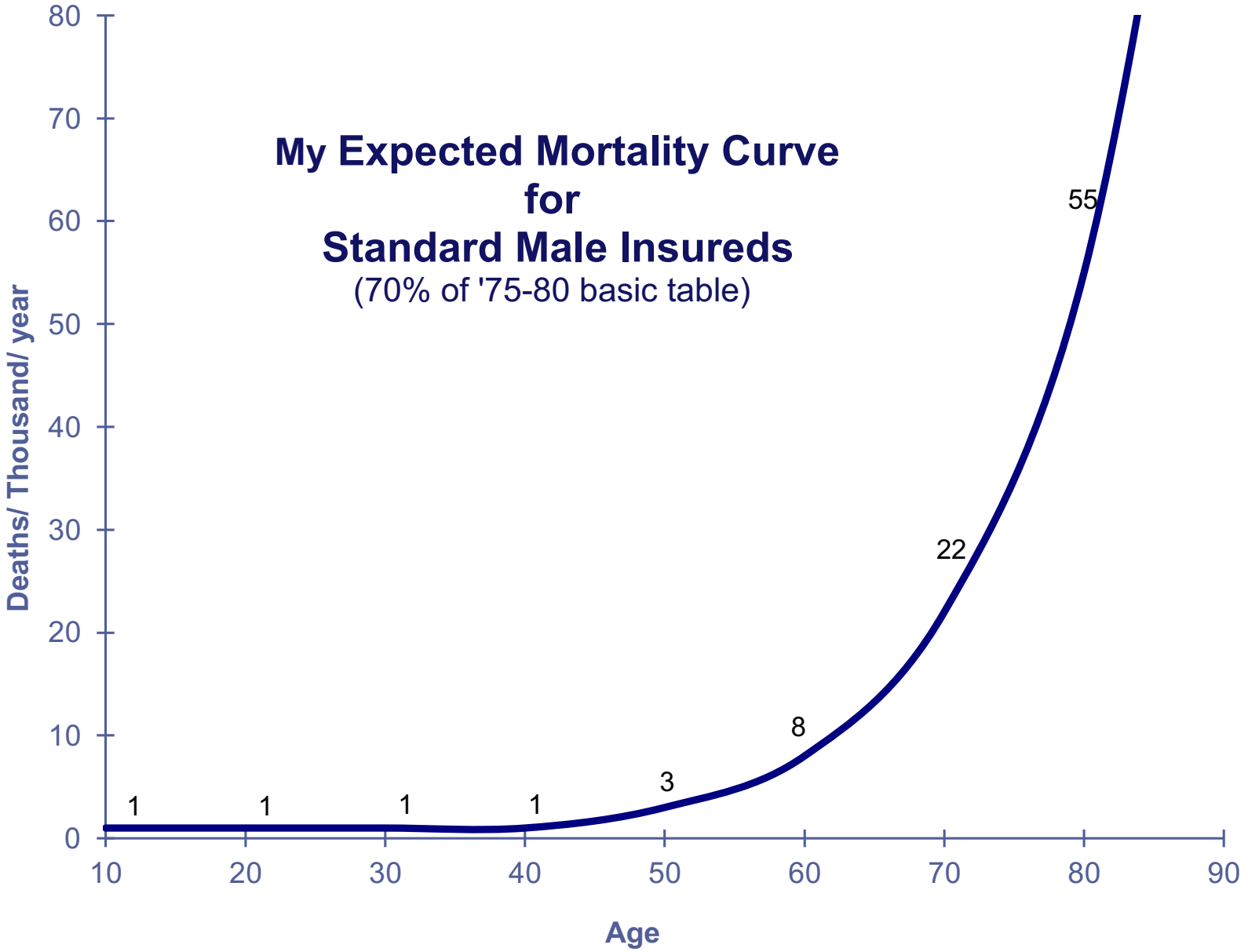
- https://www.soa.org/member select Tools & Resources then Mortality tables and search for “2015 VBT”
- Based on experience studies and projected improvement
- 25 year select period where impact of underwriting diminishes year by year to “ultimate” after which it remains stable
- 50% to 150% of expected, ANB, ALB, smoker/NS, etc.
- See also additional insurance and population tables in *Mortality and Rate Tables* menu from the website

# Select and Ultimate Mortality

Effects of selection on mortality, male insured lives 1955-60.

| Age Group | U.S. white male Deaths/ 1,000 | 1st policy year Deaths/ 1,000 | 1st policy year Ratio to US pop | 16th policy year (ult) Deaths/ 1,000 | 16th policy year (ult) Ratio to US pop |
|---|---|---|---|---|---|
| 35-39 | 2.5 | 0.9 | 36% | 1.6 | 64% |
| 40-44 | 4.1 | 1.5 | 37% | 2.7 | 66% |
| 45-49 | 6.9 | 2.2 | 32% | 5.1 | 74% |
| 50-54 | 11.6 | 3.2 | 28% | 8.3 | 72% |
| 55-59 | 17.3 | 4.3 | 25% | 13.3 | 77% |
| 60-64 | 26.9 | 6.7 | 25% | 21.6 | 80% |
| 65-69 | 39.3 | 10.2 | 26% | 33.0 | 84% |
| 70-74 | 56.2 | 14.8 | 26% | 50.0 | 89% |

Adapted from Medical Selection of Life Risks, 4th edition


My Expected Mortality Curve
for
Standard Male Insureds
(70% of '75-80 basic table)
Deaths/ Thousand/ year
Age
0
10
20
30
40
50
60
70
80
90
1
1
1
1
3
8
22
55

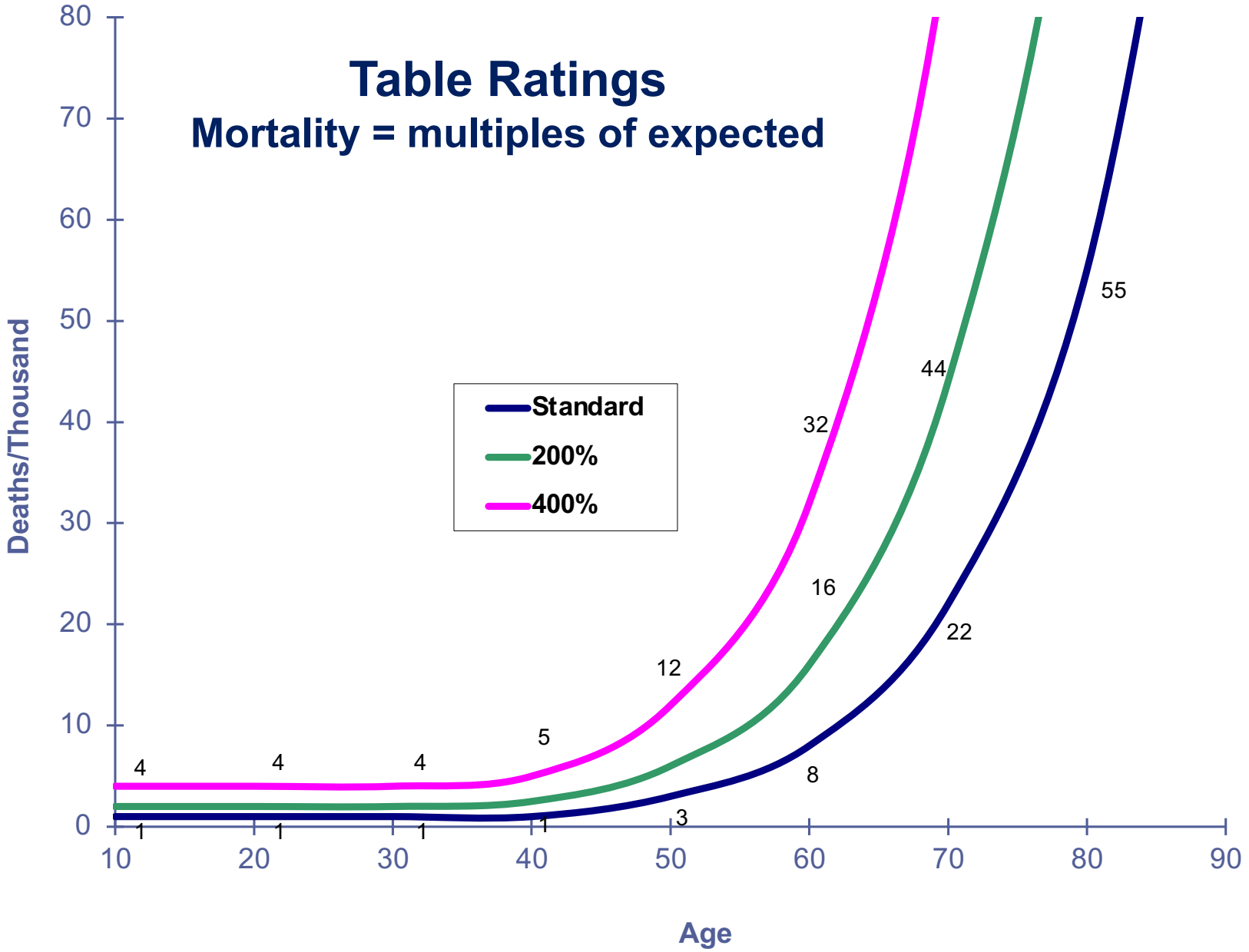


Table Ratings
Mortality = multiples of expected
Deaths/Thousand
Age
Standard
200%
400%
0
10
20
30
40
50
60
70
80
90
1
1
1
1
3
8
22
55
4
4
4
5
12
32
16
44

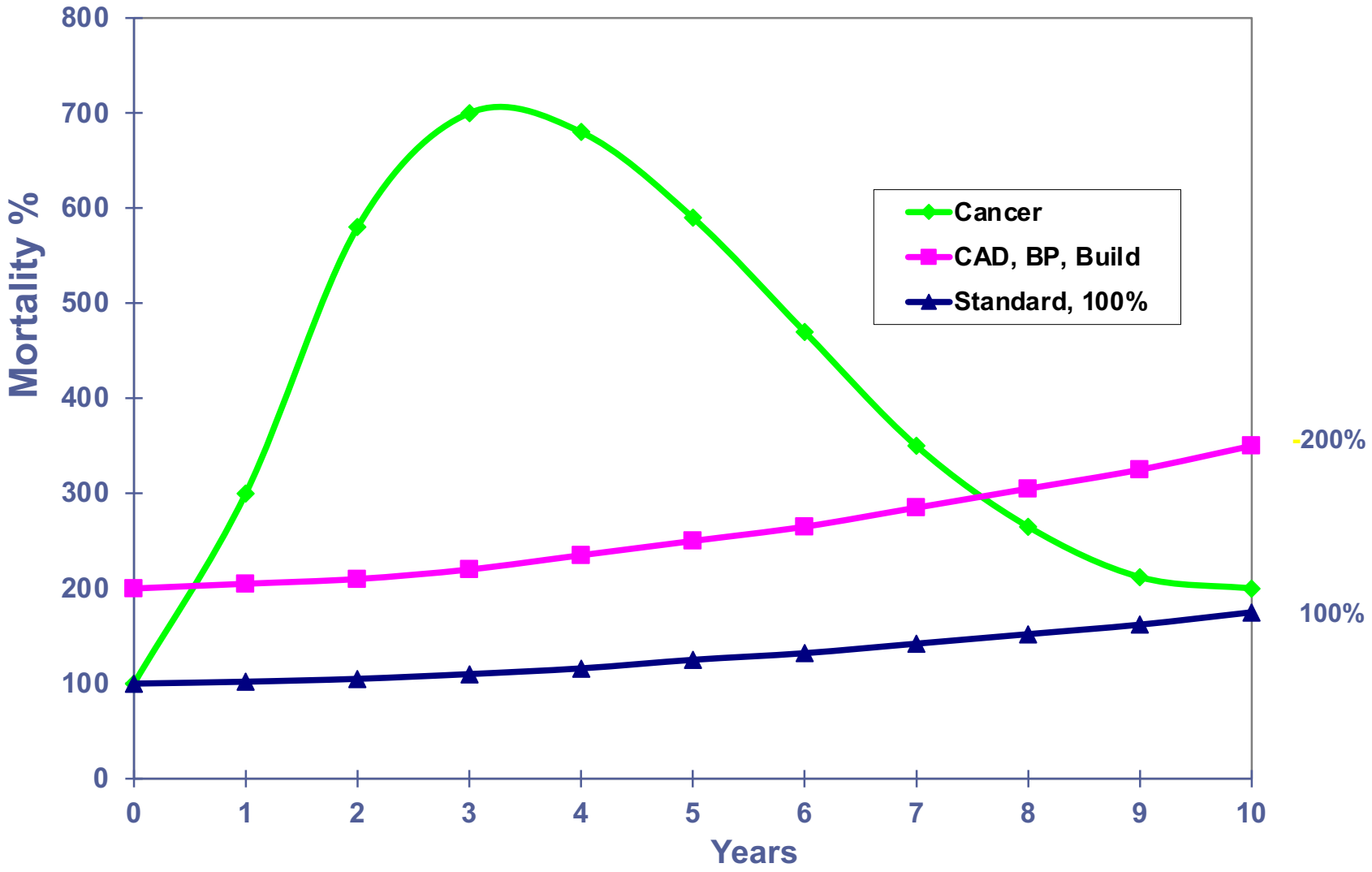
# Life Expectancy, years remaining

## Male Insureds (70% of '75-80 basic table)

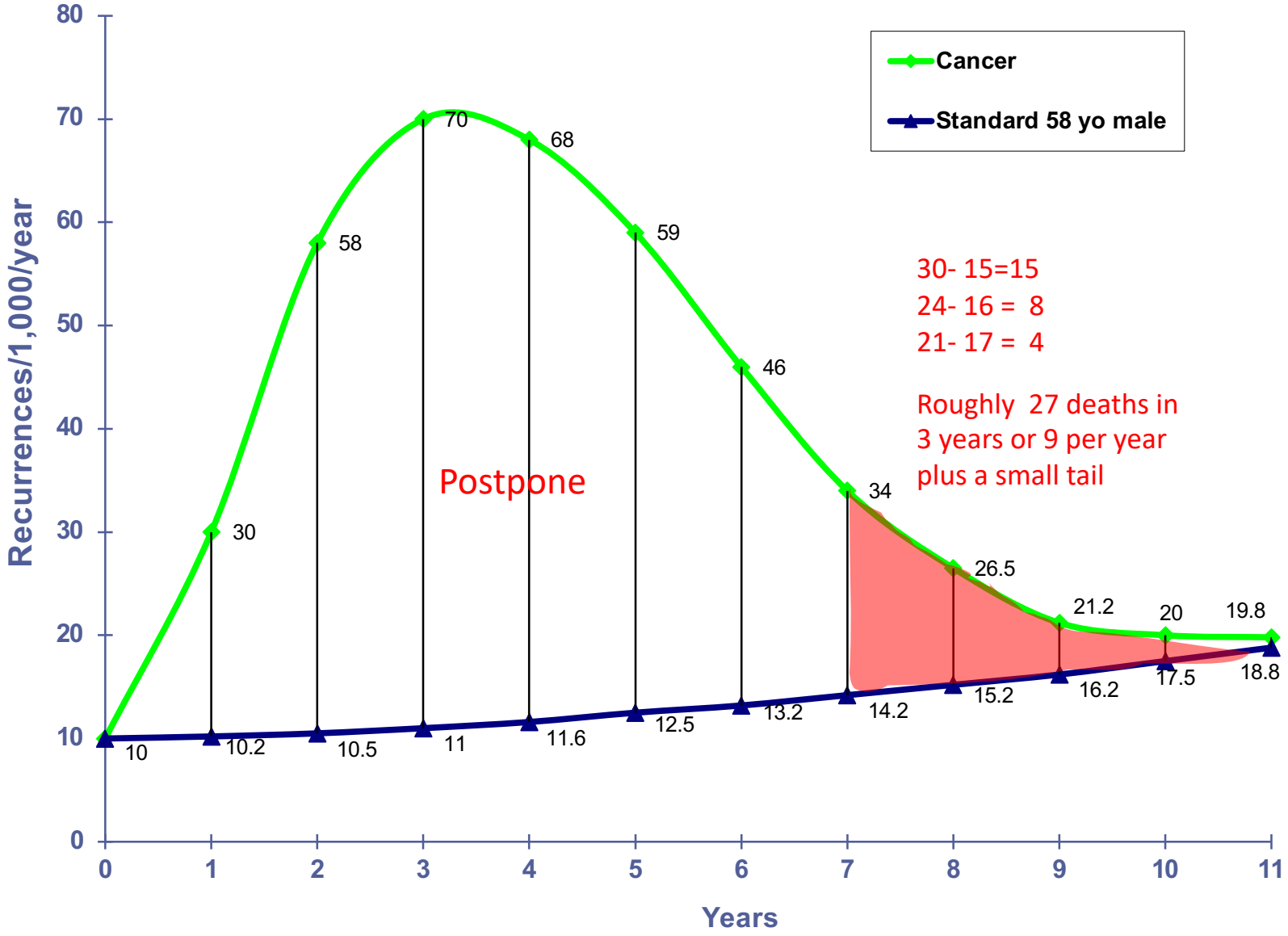
| Age | *STD* *100%* | *T2* *150%* | *T4* *200%* | *T6* *250%* | *T8* *300%* | *T12* *400%* | *T16* *500%* |
|---|---|---|---|---|---|---|---|
| **60** | 23 | 19 | 17 | 15 | 14 | 12 | 11 |
| **65** | 19 | 15.5 | 14 | 12 | 10.5 | 9 | 8 |
| **70** | 15 | 12 | 11 | 9 | 8 | 6.5 | 5.5 |
| **75** | 12 | 9 | 8 | 6.5 | 6 | 4.5 | 4 |
| **80** | 9 | 7 | 5.5 | 5 | 4 | 3 | 2.5 |
| **85** | 7 | 5 | 4 | 3.5 | 3 | 2 | 1.5 |
| **90** | 5 | 3.5 | 3 | 2.5 | 2 | 1.5 | 1 |

# Underwriting Principle #1

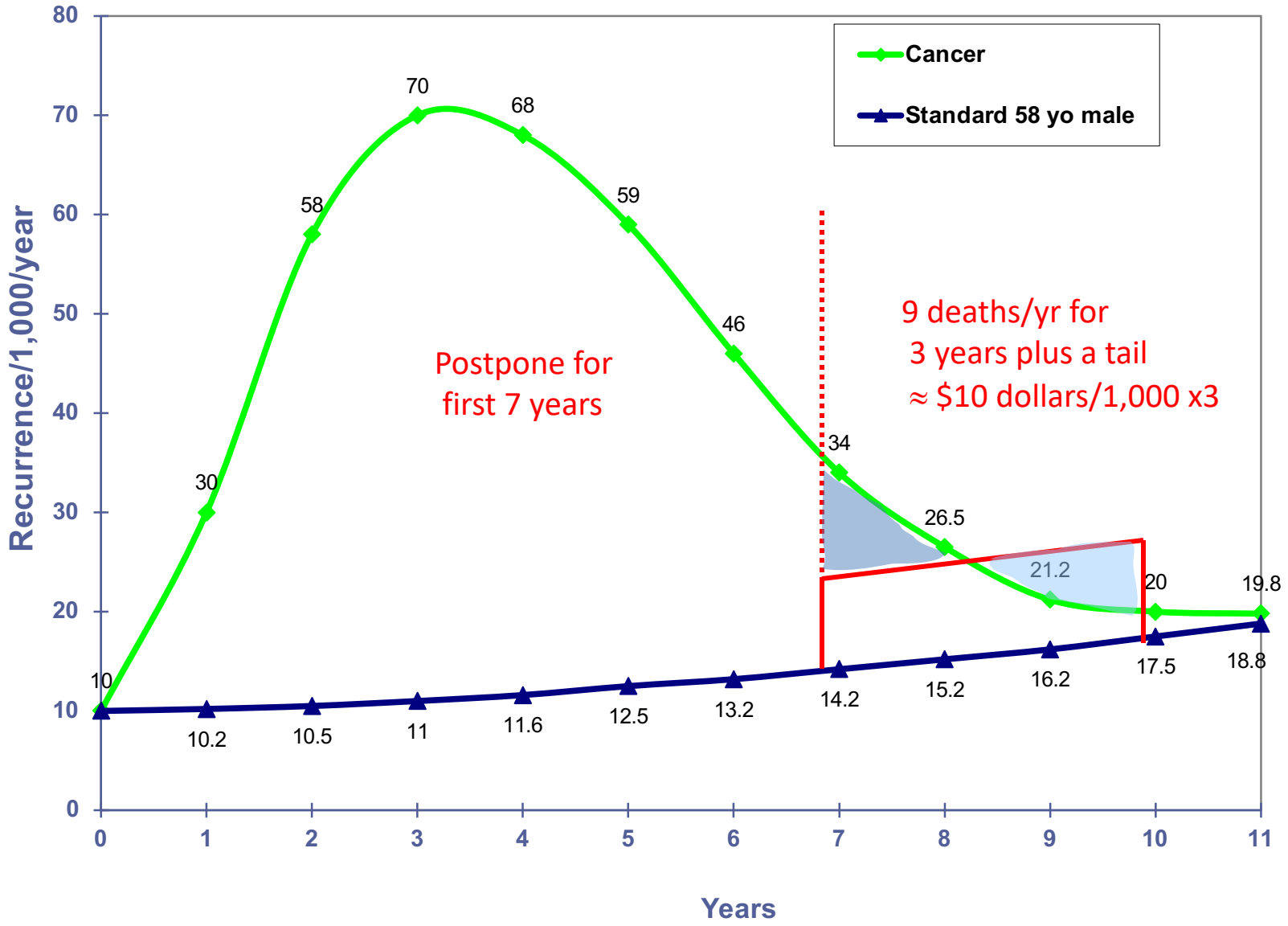
## Pricing Early vs. Ongoing mortality



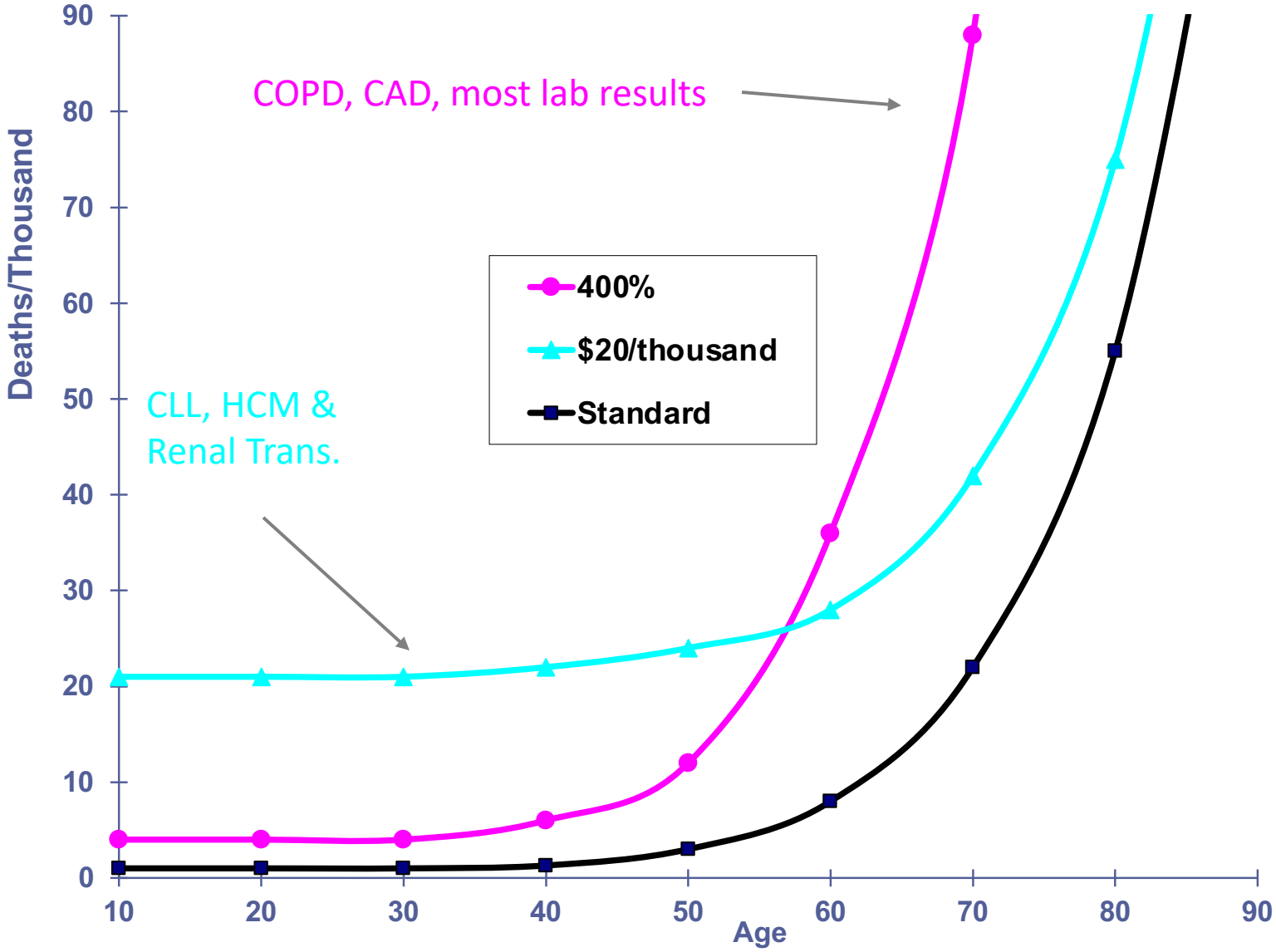
# Flat extras for Cancer Mortality



# Flat extras for Cancer Mortality



# Principle #2 Table rating vs. Permanent Flat Extras

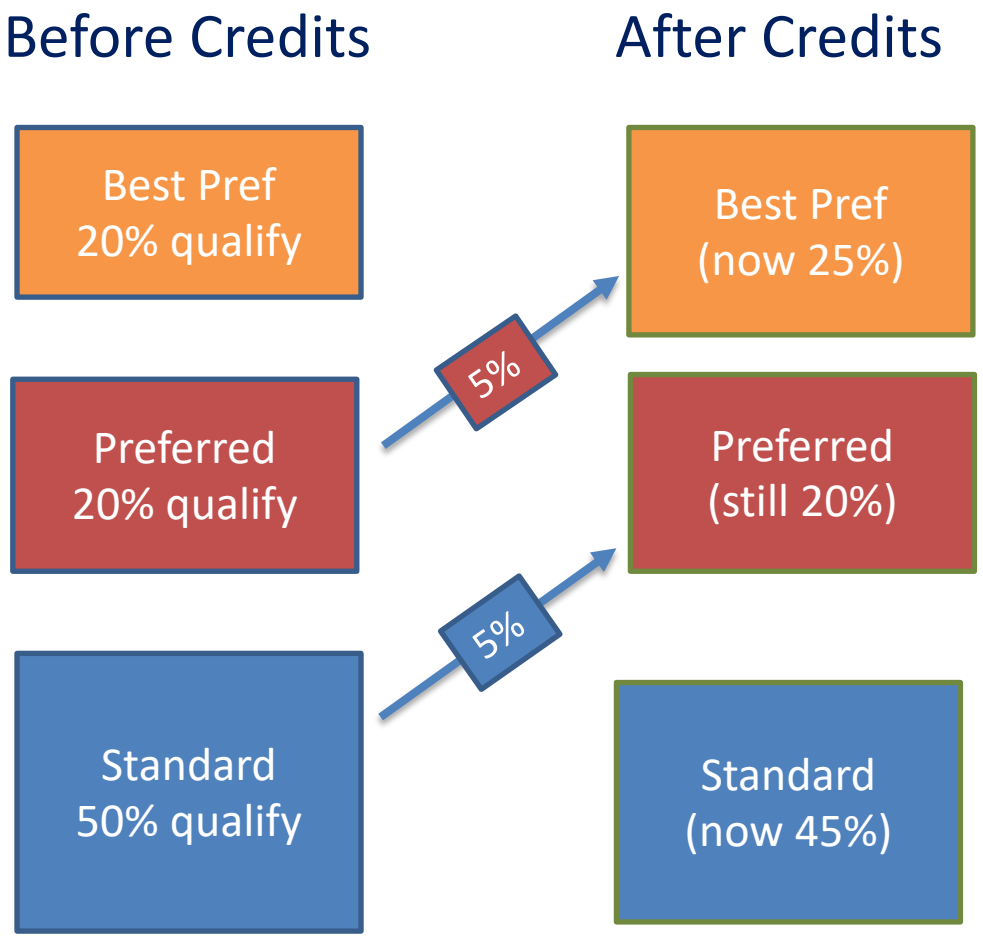


# Underwriting Principle #3
## Knowing when to make an offer based on limited information

- What is the potential range of risk for this finding or disease based on <u>your</u> assessment of currently available information?
  - **Narrow**, where more info not making a big risk difference;
  - **Wide** range.  But can't you still just average the risk?

# A credit program - utilizes reduced risk findings to balance identified minor risks for an applicant

## Example of a credit program




## Considerations

- Generating new low-risk applicants **or just getting** same # deaths but less total premium?
- How much real risk reduction from those credit criteria?

# Answer to Question #3

**Breast Cancer tail =**

**≈2 deaths/1,000 extra regardless of age**

**57 yo women have expect mort of 4 deaths/1,000**

**2 deaths/4 deaths = 150% of expected**

**75 yo women have expect mort of 20 deaths/1,000**

**2 deaths/20 deaths = 110% of expected, not 150%**

# Ratings come from:

- **“Expert Opinion” of a senior underwriter or medical dir.**
- **Medical director(s) or team usually including a medical director using:**
  - **General or selected population studies** from medical literature (comparable selection for reference pop?)
  - **Insured lives studies** often using MIB classification comparing to expected mortality based on VBT
  - **Applicant studies** often from industry labs utilizing Social Security DMF or other source for deaths

    https://www.crlcorp.com/about/industry-leading-research/

# Case #1

**56 yo male with a PTCA 2 months ago (no MI) now back at work.**

A. Temp flat and table rating
B. Table rating only
C. Permanent flat

# Case #2

**56 yo female with 3 cm. grade 2 breast cancer including one positive axillary node 6 years ago, without recurrence, now off hormonal therapy.**

A. PP (what risk criteria would require case to be postponed?)
B. Table rating only
C. Permanent flat only
D. Temp flat and table rating (same for all ages)
E. Temp flat and smaller perm. flat (or age-adj. table rating)

# Case #3 & 3a

**56 & 78 yo males with clinical T2b Gleason 6 prostate cancer treated with radiotherapy 8 months ago with PSA now reduced to 0.3 ng/mL .**

A. PP
B. Temp flat
C. Table rating
D. Standard offer (what is the consideration?)

# Case #4

**66 yo female smoker with an insurance-screening CEA level of 13 ng/mL** (values >10 ng/mL will sometimes be associated with advanced malignancy)

A. Table rating
B. Permanent flat
C. Temporary flat
D. PP for evaluation

# Selected Resources

- *Medical Selection of Life Risks*, 5th ed., Brackenridge, 2006
- *Medical Risks, 1991 Compend*, Singer, Kita and Avery, 1991
- *Medical Risks*, *Vol 1&2*, Lew and Gajewski, 1990
- *Multiple Medical Impairment Study*, CMAS, 1998
- *Jour. Insurance Medicine, (*AAIM) & *OTR* (AHOU)
- AAIM Mortality Methodology classes and AAIM Triennial courses and meetings www.aaimedicine.org
- Other industry meetings- med., und., actuarial, business
- Actuaries at your company
- Reinsurance manuals and guides