2026 **LIMRA AND LOMA CANADA** ANNUAL CONFERENCE

Delivering Value in a Changing Landscape

The Pricing challenge of longer lives:

Actuarial insights on a changing longevity curve

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The potential for longevity acceleration

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Benefits of wearable technology: atrial fibrillation

When a person has atrial fibrillation (AFib), the normal beating in the upper chambers of the heart (the two atria) is irregular, and blood doesn't flow as well as it should from the atria to the lower chambers of the heart (the two ventricles).

– CDC

Apple Watch AFib detection accuracy[1]		Sensitivity	Specificity
	PPG	21.4%	100.0%
	ECG	100.0%	99.1%

Leads to earlier diagnosis/treatment, better mortality

[1] *Source: Inocian et al. Accuracy of the Apple Watch in detecting atrial fibrillation among patients undergoing Holter monitoring. European Heart Journal, 2024*

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Treating root causes: GLP-1 drugs and obesity

Lifestyle intervention approach

- Treats obesity as a behavioral issue
- Levers are diet, exercise, counselling
- **Avg. weight loss 2.6%[1]**

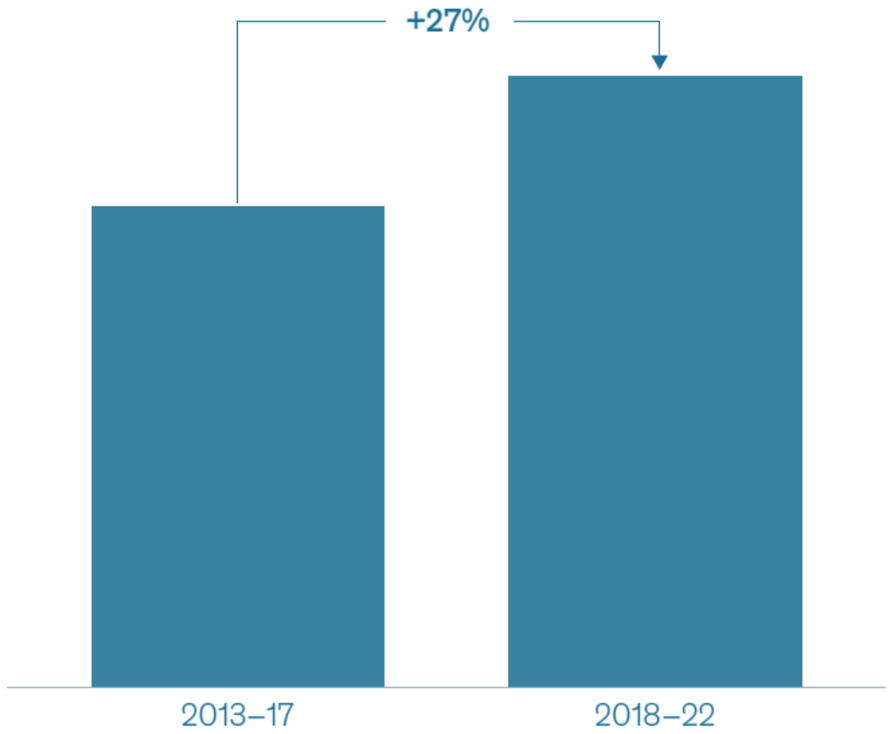
Lifestyle intervention + GLP-1 approach

- Treats obesity as a disease
- Drug paired with lifestyle interventions
- **Avg. weight loss 15.2%[1]**

[1]*Garvey WT et al. Two-year effects of semaglutide in adults with overweight or obesity (STEP 5 Trial). Nature Medicine. 2022.*

Increasing healthspan spending in the USA

Healthspan science clinical trials initiated in 5-year horizons, cumulative, phases I–IV, 2013–22



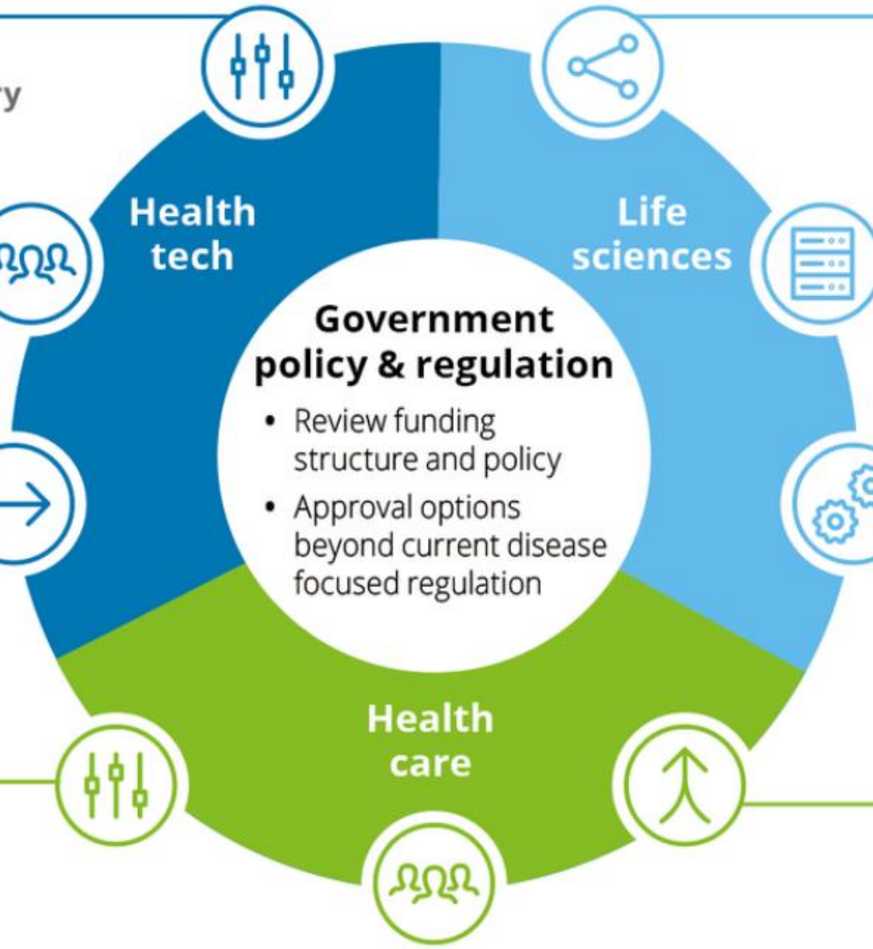
Biotech financing in the healthspan field, 5-year average

4×
increase from $1 billion during 2013–17 to

$3.9 billion
in 2018–22

Source: McKinsey Health Institute

Longevity ecosystem



Nanotech

- Use of **nanotechnology to deliver targeted therapies and ensure efficacy of drug delivery**
- Nanobots, nano-cosmeceuticals, targeted repair and nano-surgery

AI-based diagnostics

- Use of omics data to **identify preventative methods and provide diagnoses**
- At-home monitoring devices, diagnostics

Wearables and robotics

- **Use of robotics to improve emotional, mental, and physical wellness**
- Social robots, caregiving robots

Age-Tech

- Solutions that **support the multi-faceted needs of an aging population**
- Insurtech, medication management

Hallmarks of aging research

- Focused on addressing the **underlying biological causes of aging**
- Treatments targeting cellular senescence, mitochondrial **dysfunction, etc.**

Aging therapeutics

- **Therapies to slow or reverse changes** arising from biological aging process
- Senolytic drugs, nutrient regulators, drugs for novel targets (e.g., IGF-1)

Cell and gene therapy

- **Cell and gene therapies to treat aging** and age-related diseases
- Gene editing, stem cell therapy, CAR T-cell therapytherapy

Wellness and prevention

- **Mobility, smart home, and fall prevention** to decrease disability and hospitalization
- Mobility solutions, fall prevention, smart home technologies

Age-reversal

- **Reversing the aging-related damage** to organs and other tissues
- Tissue regeneration, 3D organ printing, growth hormones

Source: Deloitte

What if mortality improved dramatically?

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The cumulative effects of mortality improvement

Probability of death within 10 years Female non-smoker, age 35	
Using mortality rates from CIA 2014 tables	**1 in 355**
Applying 1.3% annual mortality improvement from 2014 to 2026	**1 in 448**
Applying 2.6% annual mortality improvement from 2014 to 2056	**1 in 1248**

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Challenges with significantly reduced mortality

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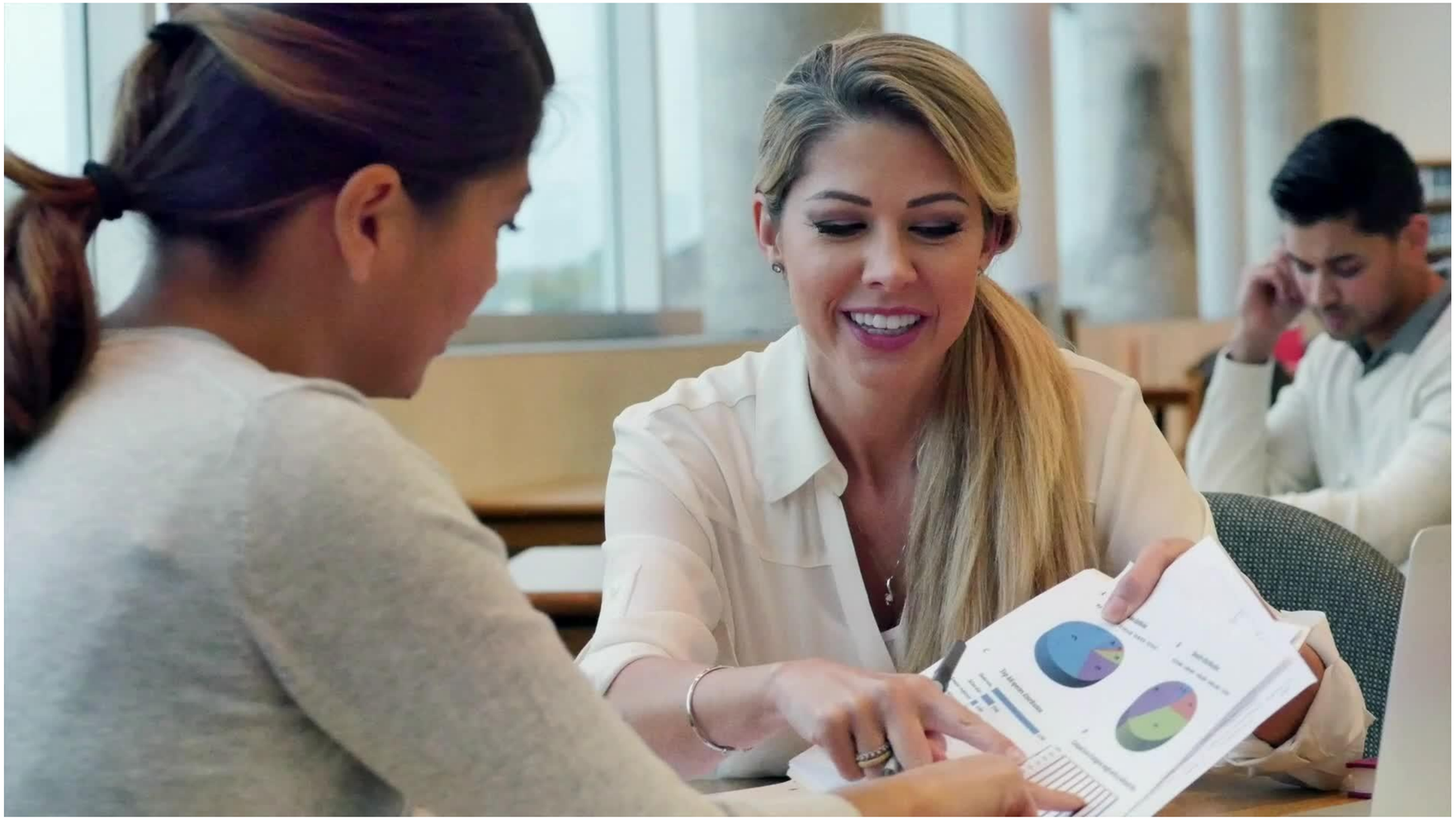
Advisor compensation



Source: www.mynextmove.org

Administration expenses

Source: Dream

Consumer demand

Source: johnpapa.net

Possible mitigations

Bundle with other covered perils

Expand alternative distribution channels

Differentiate offering

Mortality Improvement in Practice

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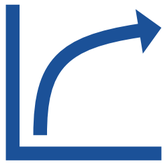
Traditional Approach To FMI Assumptions

Estimate historical mortality improvement

- Identify long-term patterns
- Smooth short-term volatility
- Reflect combined impact of medical, and societal change



Project improvements forward

- Apply actuarial judgment to extend observed experience
- Assume short-term continuation of recent trends
- Assume Long-term convergence to an ultimate improvement rate

FMI assumptions are fundamentally grounded in historical mortality improvement experience

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Limitations of HMI

Is HMI always appropriate?

- Medical innovations are not homogeneous
- HMI only reflects specific past innovations
- Is it reasonable to assume future innovations will behave similarly?

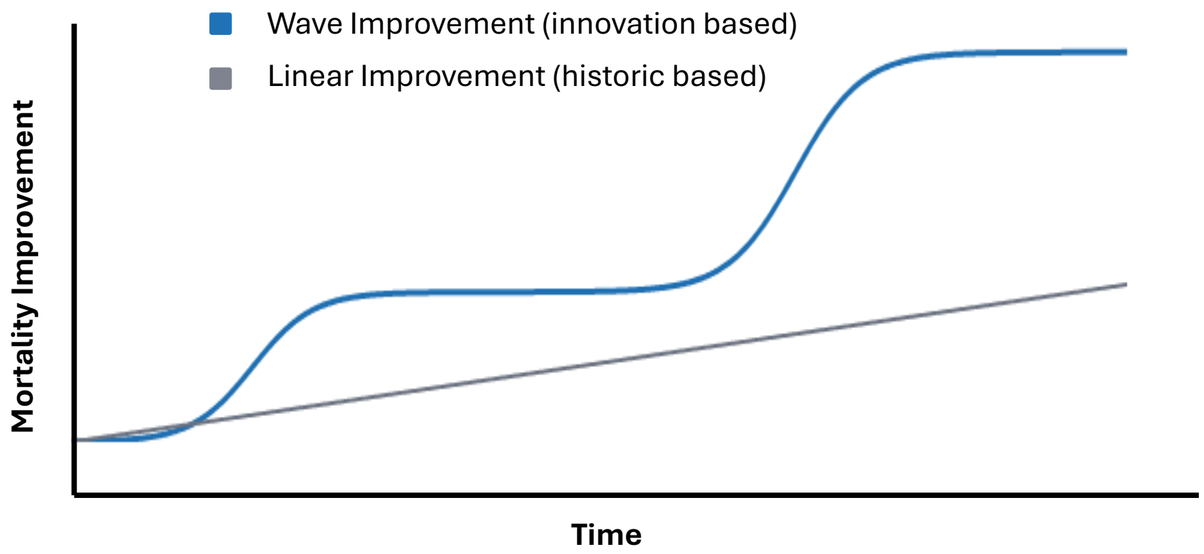
Traditional models historically underestimated FMI[1]

- Historical actuarial projections (1990-2000) underestimated mortality improvement by ~0.8% annually on average
- Results in underestimating life expectancy at age 65 by 2.7 years by 2020

[1]*Antolin, Pablo, and Hans J. Blommestein. 2007. Governments and the Market for Longevity-Indexed Bonds. OECD Working Paper on Insurance and Private Pensions No. 4*

Non-linear mortality improvements

- Traditional mortality models assume gradual improvement over time
  - Assumes future improvement will resemble past trends
- However, innovation-driven change may arrive in waves:
  - Slow early progress
  - Periods of rapid acceleration
  - Eventual leveling off

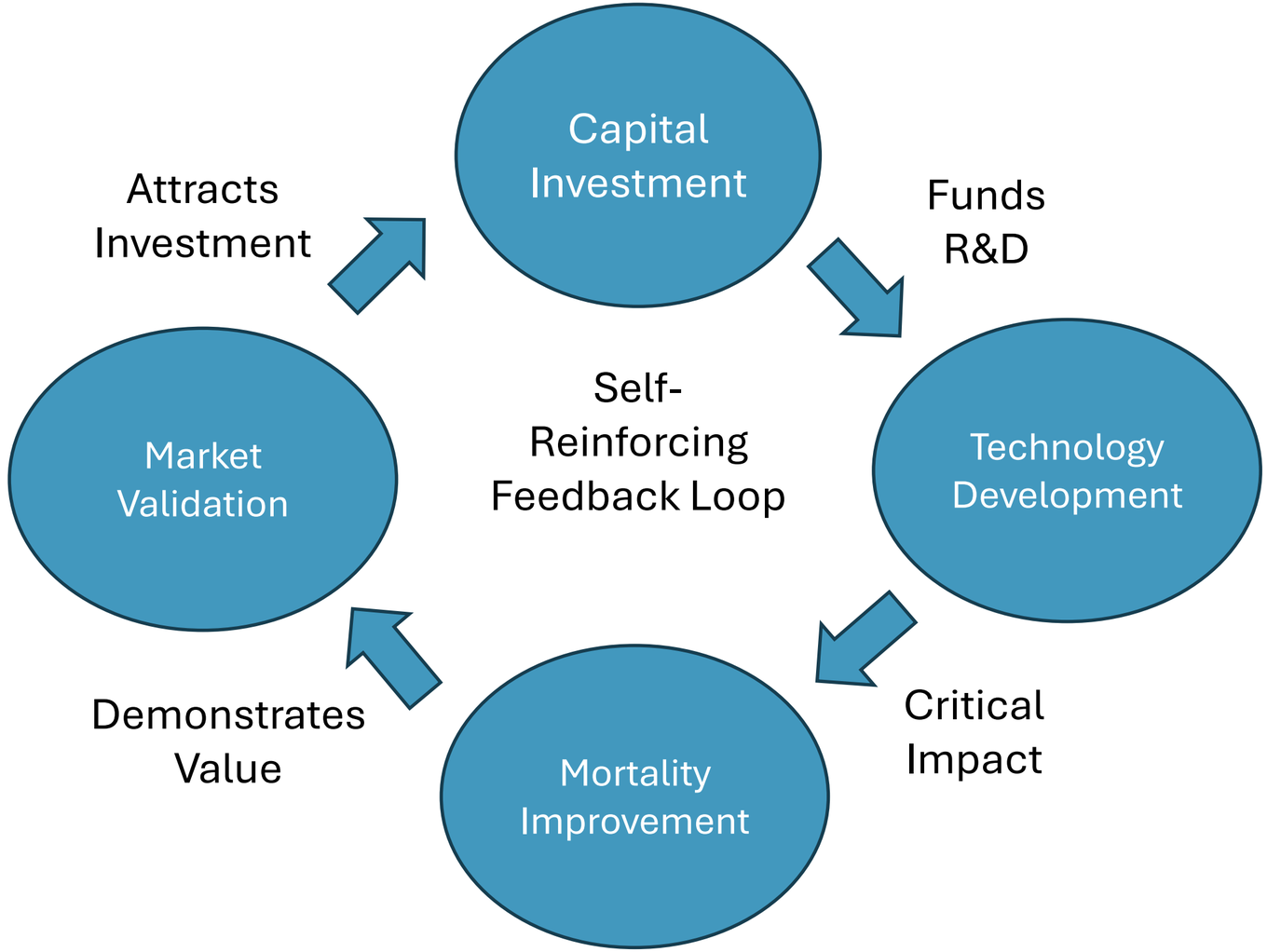


Based on analysis by Dror, David M. (2025). Breaking the Mortality Curve: Investment-Driven Acceleration in Life Expectancy and Insurance Innovation. Risks, 13(122). https://doi.org/10.3390/risks13070122

Experiment With New FMI Drivers

Ex: Investment as a driver of FMI

- Sustained capital investment can accelerate medical discovery and deployment
- Investment activity can act as a leading indicator of mortality improvement
- Creates potential feedback loop between innovation, outcomes, and further investment



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CIA Guidance & Practical Challenges

Canadian Institute of Actuaries | Institut canadien des actuaires

CIA guidelines:

- Assumptions may be based on:
  - Historical mortality improvement
  - Drivers of future improvement
  - Or a blend of the two
- In practice, CIA has relied on historical experience

Challenges of using future drivers:

- Which innovations will matter?
- When will they emerge?
- What will their impact on mortality be?
- Predicting future drivers requires speculation beyond observed experience.

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Size Of Current FMI Assumption

Ex: Estimated FMI from GLP1

- How do current FMI assumptions compare against the expected impact of recent innovations?

Source	Estimated Annual Mortality Improvement
Swiss Re	0.1% ~ 0.3%[1]
Munich Re	0.2% ~ 0.5%[2]
Current FMI Assumption	~1.3%[3]

Even major innovations like GLP1 explains only a fraction of assumed mortality improvement.

[1]*Swiss Re (2025). GLP-1 drugs may reduce mortality by up to 6.4% by 2045.*
[2]*Munich Re (2026). GLP-1 therapies and mortality risk: Implications for life insurers..*
[3]*Canadian Institute of Actuaries (2024). Mortality Improvements Research.*

Potential Costs Of FMI Increases

Pricing risk of optimistic FMI assumptions

- Overstated FMI assumptions can lead to systematic underpricing
- Mortality improvements that fail to emerge create higher-than-expected claims
- Sustained losses ultimately require premium increases
- Increases the cost of annuity products

Mortality improvement ≠ health improvement

- Medical innovation may:
  - Extend life without reducing morbidity
  - Shift deaths to later ages while increasing time spent in poor health
- Gains for life insurance blocks may coincide with greater strain on living benefits blocks

Insurers must assess FMI assumptions through a holistic lens, considering implications across both mortality and morbidity-driven products

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Alternative Pricing Strategies

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Account For FMI Upfront

Price for the risk of mis-estimating FMI rather than speculate what future innovations will be

- FMI is uncertain

- Incorporate conservatism directly into pricing
  - Explicit margins for uncertainty
  - Stress testing different FMI scenarios

- Treat FMI as a risk to manage, not a guaranteed benefit
  - Reduces likelihood of systematic underpricing
  - Improves resilience of in-force blocks

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Adjust As Experience Is Observed

Allow dynamic repricing as experience emerges

Shift from assumed future improvement to experience-based outcomes

- Apply discounts or pricing adjustments after improvement materializes
  - Reduces reliance on long-term speculative assumptions
  - Aligns pricing more closely with realized mortality risk
- Transfers uncertainty from assumption setting to ongoing experience monitoring

Ex: Usage-based auto insurance

- Drivers are monitored and granted discounts for exhibiting safe driving habits

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Driving FMI Through Dynamic Pricing

Technology and behavior change

- **Recall:** Roughly 1 in 4 users reconsider their intended level of care after using a symptom-checking tool[1]
- Technology can inform healthier choices but can't force someone to make them
- Ex: Science has proven that smoking is bad, but smokers still exist
- Behavior change is driven through engagement and persistence

From prediction to influence

- Insurers can influence FMI through dynamic pricing
- Ex: Manulife Vitality

[1]*Winn et al., Association of Use of Online Symptom Checkers With Patients' Plans for Seeking Care, JAMA Network Open, analysis of 158,000+ user interactions.*

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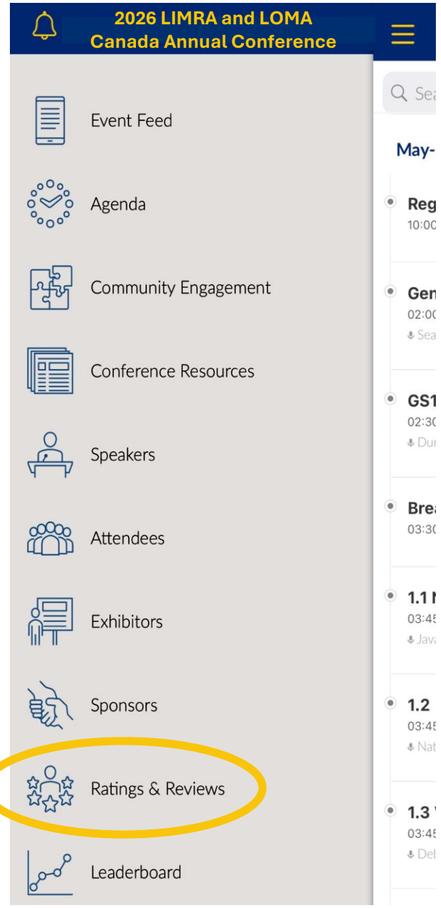
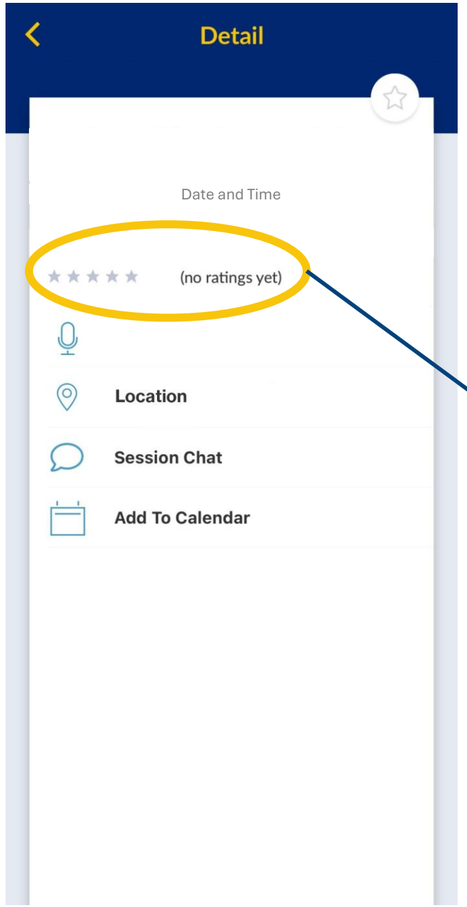
Module Option



Agenda Option



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Thank You

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