

# The Fairness in insurance enigma : exploring the maze of regulation

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## What is fairness ?

“A rate is reasonable and not excessive, inadequate, or **unfairly discriminatory** if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.”

– Casualty Actuarial Society (1988)

“Formally, the principle of **fairness** states that **similar cases should be treated similarly**. [...] The whole problem is to understand what is meant by similar cases.”

– Autorité des marchés financiers (2021), translated

## Where do unfairness can unfairness lurk ?

Accessibility		“Weblining” (Hernandez et al., 2001)
Service		Unconscious bias (Casualty Actuarial Society, 2022)
Underwriting		Systematic refusal in indigenous reserves (Duchaine, 2020)
Rate-making		Solidarity or individualization ? (Barry, 2020)
Business adjustments		Non-risk-based discrimination (Guy Thomas, 2012)
Claims		Inequities in claim settlement (Lin et al., 2022).

## Why should we care ?

The Obama administration released a report in 2016 in which data scientists were urged to analyze “how technologies can deliberately or **inadvertently** perpetuate, exacerbate, or mask discrimination.”

– Kusner et al. (2017)

“Insurance is particularly interesting because the entire industry is based on **discrimination**.”

– Frees and Huang (2023)

Quantity of AI Ethics Guidelines

All fields included

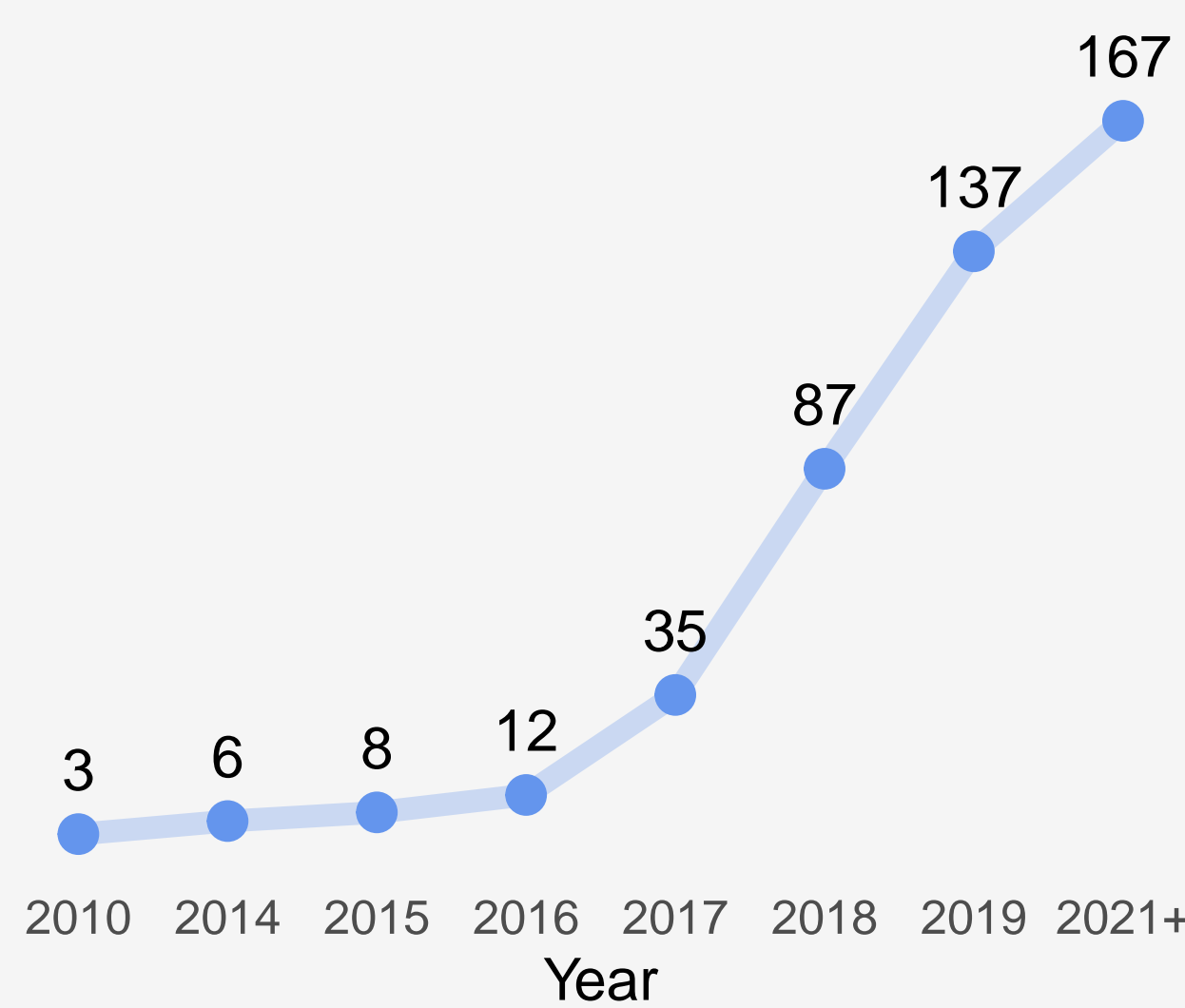


Figure 1 – AlgorithmWatch (2020)

Three reasons why the actuarial community should care about fairness

- Maintain public trust
  - “The use of AI in finance raises consumer concerns who feel particularly **vulnerable**.” – Autorité des marchés financiers (2021)
- Responsability of the modeller
  - “The statistician cannot evade the **responsibility** for understanding the process he applies or recommends.” – Fisher (1956)
  - “A model's **blind spots** reflect the judgments and priorities of its creators.” – O’Neil (2016)
- Regulation
  - Regulation and recommendations are diversified and numerous around the globe.

## Regulation in the world

- The General Data Protection Regulation (European Union, 2016) specifies prohibited variables in the **European Union**, notably including ethnic origin and gender.
- The **United Kingdom** has adopted a version similar to the GDPR with the Data Protection Act 2018.
- The United States showcases a mosaic of regulatory stances (Xin and Huang, 2023), ranging from stringent anti-discrimination measures (e.g., California) to prohibitions regarding a few highly sensitive variables (e.g., Texas).

## Regulation in Canada

“Auto insurance laws differ by province.

New Brunswick : Prohibition of demanding differentiated rates based on age, gender, or marital status. Link Nova Scotia : Prohibition of demanding differentiated rates based on age or marital status. Link Newfoundland and Labrador : Prohibition of demanding differentiated rates based on non-fault accident history, age, sex, and marital status. Link Ontario : Prohibition of demanding differentiated rates based on credit history, occupation, or homeowner status. Link”

- New Brunswick** : Prohibition of demanding differentiated rates based on **age**, **gender**, or **marital status**.
- Nova Scotia** : Prohibition of demanding differentiated rates based on **age** or **marital status**.
- Newfoundland and Labrador** : Prohibition of demanding differentiated rates based on **non-fault accident history**, **age**, **sex**, and **marital status**.
- Ontario** : Prohibition of demanding differentiated rates based on **credit history**, **occupation**, or **homeowner status**.

The (among many acts) Data Protection Act suggests incoming discussions regarding algorithmic fairness :

“An organization must not use information that has been de-identified [...] to identify an individual except [...] to conduct **testing of the fairness** and accuracy of models, processes and systems that were developed using information that has been de-identified” – Bill C-27 (House of commons of Canada)

## Regulation in Québec

Selon la CDPDJ, toute discrimination sur ces 14 caractéristiques est proscrite :



“Every person has a right to [...] equal recognition [...] of his human rights [...] without distinction [...] based on **race, colour, sex, gender identity or expression, pregnancy, sexual orientation, civil status, age** [...], **religion, political convictions, language, ethnic or national origin, social condition, a handicap** or the use of any means to palliate a handicap.” – Charter of human rights and freedoms, Québec

There are exceptions for **age**, **sex** or **civil status** if

- the “use thereof is warranted” ;
- it is considered a “risk determination factor based on actuarial data”

Is **price optimization** included in “profiling”, which would force companies by law to inform of such practice and of the means available to disable such profiling ? “ **Pro-filing**” means the collection and use of personal information [...] for the purpose of analyzing that person’s [...] economic situation, health, **personal preferences**, interests or behaviour.” – Act respecting the protection of personal information in the private sector, Québec

## Recommandations

Actuarial organizations demonstrate their interest in fairness in insurance operations : from underwriting to claim management

- “Avoiding Unfair Bias in Insurance Applications of AI Models” – Society of Actuaries
- “Request for Proposals on Regulation Related to Algorithmic Bias” – Casualty Actuarial Society
- “CAS Approach to Race and Insurance Pricing” – Casualty Actuarial Society
- “Bias and Fairness in Pricing and Underwriting of Property and Casualty (PC) Risks” – Canadian Institute of Actuaries

Autorité des marchés financiers (2021) is consistent with international reports :

- Bengio et al. (2018)
- Monetary Authority of Singapore (2018)
- European commission (2019)
- IEEE (2019)
- OECD (2019)



Recent reports of Autorité des marchés financiers (2024) also place “treating consumers with fairness” as an pivotal best practice (4 out of 30).

Academic community focuses on indirect discrimination Frees and Huang (2023); Lindholm et al. (2023); Araiza Iturria et al. (2022) to improve fairness.

Regardless of the angle, the goal is for actuaries to be trusted references for both their expertise on quantitative analysis and socially responsible modeling.

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