readouts.

mortality, on four qubits.

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One published claim about quantum computing for insurers, read against the evidence in the same paper.

in brief.

The claim. The paper calls its mortality-model run the first time an insurance problem with real data was solved on real quantum computers.

What the paper shows. Recorded mortality data, a table of 4 × 4 numbers, fitted on four qubits of a quantum processor.

What it does not show. Fitted values or a tolerance for "solved"; evidence for "first" beyond its own statement about earlier work; a forecast; a measured speed-up or an advantage over an ordinary computer.

Verdict. Cannot be determined.

What would change the verdict. The fitted values printed beside the exact ones, with a tolerance set in advance; and a reading of the seven earlier studies the paper cites.

the claim.

> *"Note that this is the first time an insurance-specific real-world data problem is experimentally solved with real quantum computers."*
>
> p. 10

It closes the paper's account of fitting the Lee-Carter mortality model on a quantum processor; the introduction says the same in other words: "the first implementation of an insurance-specific quantum algorithm on a quantum processor using real datasets" (p. 2).

the rules.

The claim holds if the paper shows all four; it does not hold if the paper, or another published source, contradicts any one; otherwise it cannot be determined.

1. **Real data.** The numbers come from a real population record, not generated for the test, and the task is an insurance one.
2. **Real hardware.** The calculation ran on a physical quantum processor, not in a simulation.
3. **Solved.** The paper reports the answer and how close it is to the exact one, within a stated tolerance.
4. **First.** The paper shows that no earlier study ran an insurance problem with real data on a quantum processor.

the evidence.

1. **Real data: shown.** Mortality rates from a database the paper's footnote names (www.mortality.org, its data free of charge to registered users), for the years 2014 to 2017 and ages "from 0 to 10–14": a table of 4 × 4 numbers (p. 9), for a mortality model the paper places under life insurance (p. 3).
2. **Real hardware: shown.** Four superconducting qubits of a processor the paper calls "Wukong", in 200 optimization steps (pp. 7, 9). Four of the ten authors list Origin Quantum Computing among their affiliations (p. 1); the paper's footnote for the processor gives the address originqc.com.cn (p. 2).
3. **Solved: not shown.** The evidence is four curves over the 200 steps (Figure 5, p. 10): the loss, the distance between the data and the fitted model, and the divergence of each fitted vector from the exact one. All four end lower than they start; one, for the time-varying index, rises first, while the text says all decrease. No fitted values, tolerance, error bars or shot count are printed. The fit is the step before a forecast ("these data can be used for further predictions", p. 9); no forecast is made.
4. **First: not shown.** The support is the paper's own statement that experimental demonstrations "have not been implemented on current quantum computers" (p. 2), made after it cites seven earlier insurance studies (references 26–32) without saying how any was run. Two, by their titles, apply quantum machine learning to fleet insurance premiums and to claim fraud. One of the seven, Adam 2022 (reference 26), states in its abstract that an example circuit for dynamic lapse "is evaluated both on a simulator and on real quantum hardware"; the abstract does not say whether recorded data were used.

The paper measures no speed-up and claims no advantage for this run or for its two other demonstrations.

the verdict.

Cannot be determined.

The run is real: recorded mortality data, fitted on four qubits of a quantum processor. Whether it "solved" the problem rests on curves without fitted values or a tolerance, and whether it came first rests on the paper's own statement about earlier work, which a reader cannot check from the paper. What the paper shows is a small mortality model fitted on a quantum processor. It does not show a forecast, a measured speed-up or an advantage over an ordinary computer.

the five uses.

Five insurance uses, and what this paper shows for each:

use	what the paper does	in short
mortality forecasting	Fits a small mortality model on four qubits; makes no forecast (pp. 9–10).	run on a quantum processor
reinsurance allocation	Chooses between two kinds of reinsurance on six qubits, using randomly generated numbers in place of real data (pp. 8–9).	run on a quantum processor
risk assessment	Mentions it as a problem where optimization matters, and points to quantum optimization methods developed by others (p. 6). No calculation.	mentioned only
pricing	Says quantum machine learning could be used for pricing (p. 6). No calculation.	mentioned only
claims and fraud analysis	Claims: one sentence on what might be possible later (p. 11). Fraud: work by others, cited (p. 2). No calculation.	a future possibility; others' work

The paper's other demonstration, a reinsurer's payment above a threshold, is a numerical simulation, not a run on a quantum processor (p. 7).

what would change the verdict.

To settle the claim: a reading of the seven earlier studies, since one that ran an insurance problem with real data on a quantum processor would mean the claim does not hold; and the fitted values printed beside the exact ones, with a tolerance set in advance.

The seven earlier studies, as the paper lists them (references 26–32, p. 12), each with a line of ours on what it did, from its title and abstract:

[26] Adam M. Potential applications of quantum computing for the insurance industry. 2022. ArXiv:2210.06172

A pre-study by an insurer and a research institute of where quantum computing could help, with the valuation of insurance contracts as its worked case; one example circuit, for policy lapse, was run on a simulator and on real quantum hardware.

the paper on arXiv, free to read

[27] Zhuang X N, Chen Z Y, Xue C, et al. Quantum encoding and analysis on continuous time stochastic process with financial applications. Quantum, 2023, 7: 1127

A quantum method for preparing and analysing random processes in continuous time, with option pricing and an insurer's probability of ruin among its worked examples.

article page, free to read · free copy on arXiv

[28] Tamturk M, Carenzo M. Quantum computing in insurance capital modelling under reinsurance contracts. AppliedMath, 2023, 3: 741–757

A quantum circuit for an insurer's surplus under two kinds of reinsurance contract, designed for gate-based quantum computers, with numerical results.

article page, free to read

[29] Tamturk M. Quantum computing in insurance capital modelling. Mathematics, 2023, 11: 658

A quantum circuit for an insurer's capital over time, from its reserve, premiums and claims, developed and implemented with Qiskit for an IBM superconducting quantum computer.

article page, free to read

[30] Naik K S, Bhise A. Risk identification using quantum machine learning for fleet insurance premium. In: Proceedings of International Conference on Computing, Communication and Learning, 2023. 277–288

Driving (telematics) data turned into a risk score and classified with a hybrid quantum and classical neural network, compared with classical networks, toward premiums set for each driver.

article page, with the abstract (the full text by purchase or subscription)

[31] Lefévre C, Tamturk M, Utev S, et al. Cyber risk in insurance: a quantum modeling. Risks, 2024, 12: 83

A quantum model of cyber risk in insurance, relating reported cyber claims to the attacks behind them, with classification and loss calculation for dependent claims.

article page, free to read

[32] Pushpak S N, Jain S. An implementation of quantum machine learning technique to determine insurance claim fraud. In: Proceedings of the 10th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), 2022. 1–5

Quantum support vector machines to detect fraudulent housing insurance claims, compared with a classical support vector machine.

article page, with the abstract (the full text by purchase or subscription)

For results like this to matter to an insurer, the milestones to watch:

- A forecast made on a quantum processor and checked against later years held back.
- Tables of the size actuaries use, with a measured comparison against an ordinary computer on cost and accuracy.
- Error-corrected processors, the paper's next stage, which it expects to bring "more realistic quantum insurance applications" (pp. 10–11).
- Efficient loading of real data, which the paper names as an obstacle that "demands exponential resources" (p. 11).

questions to discuss.

1. Where in our pricing, reserving or capital work would a faster or more precise calculation change a decision?
2. What would we require before a quantum result enters a decision: the same data, our current method beside it, and the rules for success written down first?
3. The paper names quantum computing itself as a new source of risk to model (p. 11). Where would that risk enter what we underwrite and how we operate, and who would own it?

our overlap.

None. We have no tie to the paper's authors or to the processor's maker. Our own work is in error-correction technology; this paper applies error mitigation, not error correction, and names error correction only as a later stage (pp. 8, 10).

how this was done.

- We read the journal version of the paper in full, and compared it with its free preprint (arXiv:2410.20841, version 2). The two do not differ in content.
- We stated four conditions under which the claim would hold, and judged each against the paper's own evidence.
- Every quotation was checked word for word against its source (the journal's text; for Adam 2022, its arXiv record), and every figure against its page. Figure 5 was read at high resolution.
- The paper's bibliographic details, and those of the seven earlier studies it cites, were confirmed at Crossref and arXiv.
- We made no calculation of our own.
- The analysis was checked a second time, independently, before publication.

source.

H.-Y. Liu et al., "Quantum computational insurance and actuarial science", *Science China Information Sciences* 68, 202501 (2025). Page numbers are the journal version's.

The journal version, on the publisher's page (by purchase or subscription).

The free preprint, on arXiv (version 2), with the same content as the journal version.

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