18th Gulf Heart Association Conference
November 12-14, 2026
Oman Exhibition & Convention Center
Muscat, Sultanate of Oman



POSTER PRESENTATION

Ten-Year Trends in Cardiovascular and Sudden Death Mortality in Oman: A National Population-Based Time-Trend Analysis (2014–2023)

Omar Ali Al-Taei[1], Nuha Al Habsi[1], Mohammed Al Habsi[2], Mohamed Al Rawahi[1,3,4,5*]

[1]Internal Medicine Residency Program, Oman Medical Specialty Board [2]College of Medicine and Health Sciences, SQU [3]Medical Research Center, SQU [4]SQU Hospital, University Medical City [5]Department of Cardiology, National Heart Center, Royal Hospital — Muscat, Oman. ***Corresponding author: Mohamed Al Rawahi, mrawahi@squ.edu.om**

INTRODUCTION

- **Cardiovascular disease (CVD)** causes ~17.9 million deaths a year (≈32% of all deaths worldwide) and about **33% of deaths in Oman** [1,3].
- **Sudden death** — unexpected death within 24 h of symptom onset, cardiac or non-cardiac — is under-studied, and Oman has **no national surveillance or registry** for it [7].
- Risk is high despite a young population (median age 30): hypertension ~25%, obesity 21%, diabetes 13%; road-traffic injuries add to sudden deaths.
- Bystander CPR is <40% and EMS coverage is uneven between urban and rural regions.

AIM

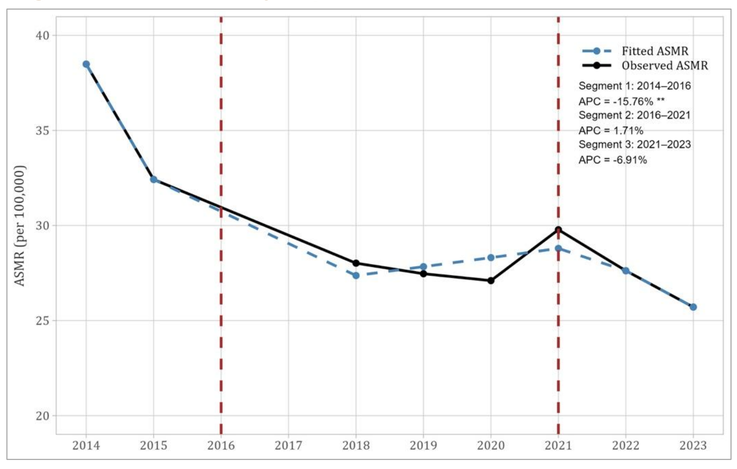
- Quantify circulatory and sudden-death mortality in Oman over 10 years (2014–2023).
- Describe patterns by age, sex and cause (cardiac vs non-cardiac).
- Analyse temporal trends and their implications for public health planning.

Table 1. Age-standardized mortality rates per 100,000

Year	Cardiovascular deaths			Sudden deaths
	Total	Males	Females	Total
2014	38.49	33.91	47.62	74.23
2015	32.42	29.55	40.17	65.15
2018	28.02	26.86	29.78	66.66
2019	27.46	25.93	30.10	72.28
2020	27.10	26.21	28.37	99.12
2021	29.78	28.61	31.50	115.60
2022	27.62	25.00	35.00	96.79
2023	25.71	21.64	38.89	86.88

ASMR = age-standardized mortality rate (WHO world standard population). Source: MoH Annual Health Statistical Reports.

Figure 1. Total CVD: joinpoints and APC



*Joinpoints at 2016 and 2021. Significant decline 2014–2016 (p = 0.03); non-significant rise 2016–2021 and fall 2021–2023. ***p<0.01, **p<0.05, *p<0.10.*

Table 2. Poisson regression: annual trend

Outcome	Year coefficient (SE)
Total CVD deaths	−0.035 (0.004)***
CVD deaths — males	−0.036 (0.005)***
CVD deaths — females	−0.034 (0.006)***
Total sudden deaths	+0.043 (0.002)***

*Population offset used. ***p < 0.01.*

LIMITATIONS

- Aggregated national data: no individual-level adjustment for risk factors, comorbidity or access to care.
- Sudden deaths could not be split into cardiac and non-cardiac causes.
- Death-certification misclassification is possible, especially in older adults and women.
- Reporting and health-service use may have changed over time, notably during COVID-19.

METHODS

Design & data

Retrospective, population-based time-trend analysis of national mortality, 1 Jan 2014 – 31 Dec 2023, from the Ministry of Health Annual Health Statistical Reports [13]; aggregated deaths by age group and sex.

Outcomes

- **CVD deaths:** ICD-10 circulatory-system chapter.
- **Sudden deaths:** unexpected, within 24 h of symptom onset or of last being seen well; cardiac or non-cardiac.

Stratification & rates

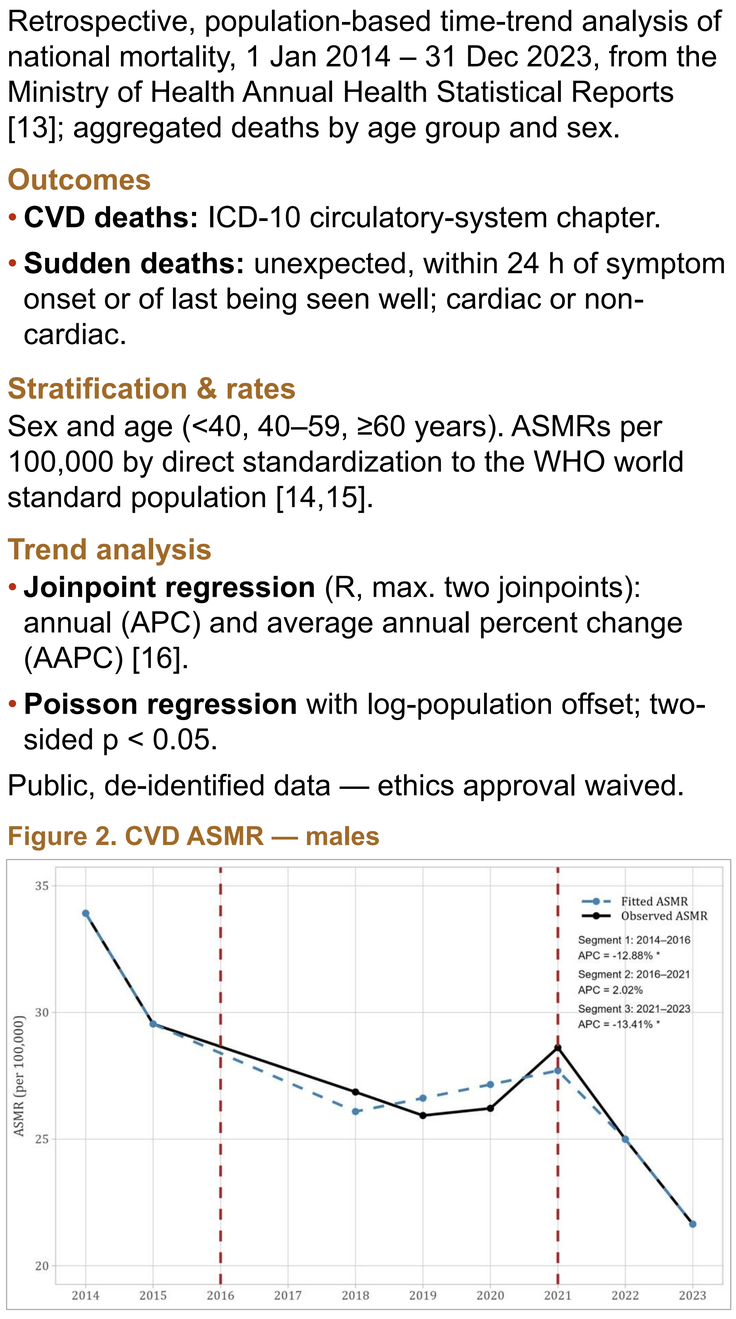
Sex and age (<40, 40–59, ≥60 years). ASMRs per 100,000 by direct standardization to the WHO world standard population [14,15].

Trend analysis

- **Joinpoint regression** (R, max. two joinpoints): annual (APC) and average annual percent change (AAPC) [16].
- **Poisson regression** with log-population offset; two-sided p < 0.05.

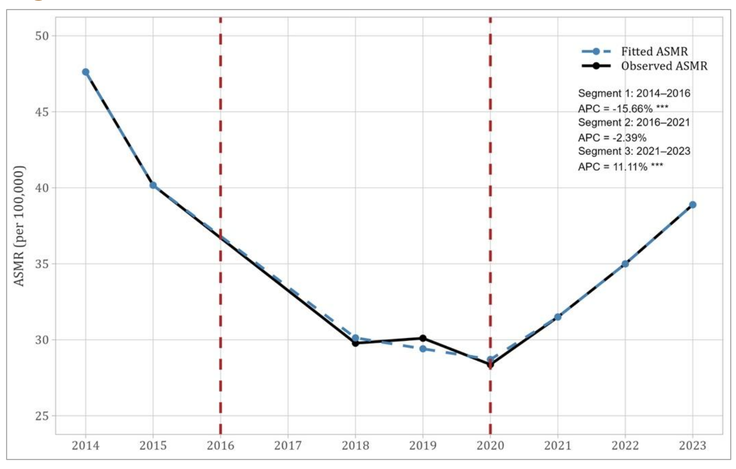
Public, de-identified data — ethics approval waived.

Figure 2. CVD ASMR — males



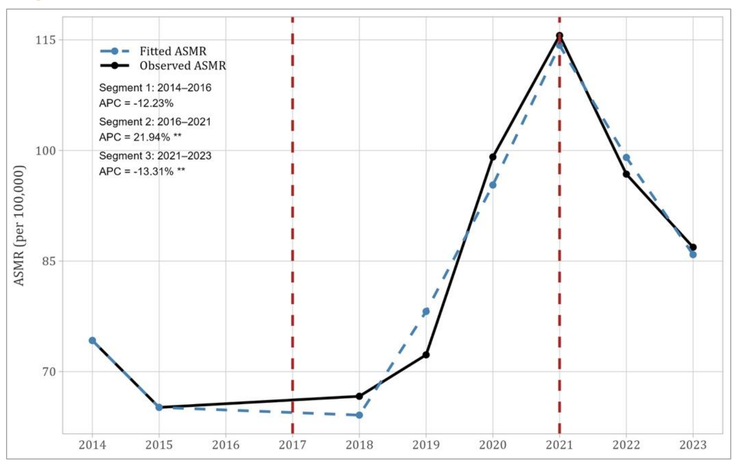
Early decline 2014–2016, stabilization 2016–2021, further decline 2021–2023.

Figure 3. CVD ASMR — females



Significant decline 2014–2016 (p<0.01), then a significant increase 2020–2023 (p<0.01).

Figure 4. Sudden-death ASMR



Significant rise 2017–2021 (p = 0.01), significant fall 2021–2023 (p = 0.03).

RESULTS

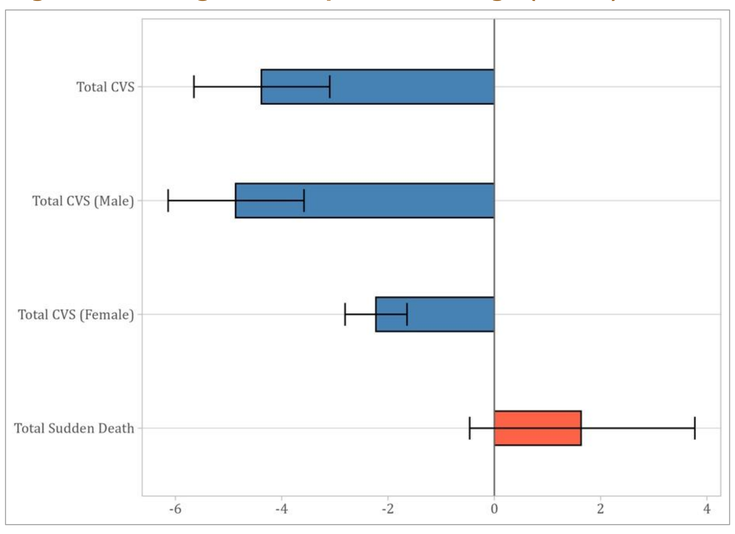
−4.38%
AAPC in CVD mortality (95% CI −5.65 to −3.10)

115.6
sudden-death ASMR at its 2021 peak (per 100,000)

38.9 vs 21.6
female vs male CVD ASMR in 2023

- **CVD mortality fell** from 38.49 to 25.71 per 100,000 (2014→2023), steeper in males (AAPC −4.87%) than females (−2.23%).
- **Females had higher CVD ASMR** than males in most years (2014: 47.62 vs 33.91), with a **significant rise after 2020**.
- **Sudden-death ASMR** was higher and more variable (65–116 per 100,000); AAPC +1.63% (not significant).
- **Poisson models:** year coefficient negative for all CVD outcomes (−0.035) and positive for sudden death (+0.043); all p < 0.01.

Figure 5. Average annual percent change (AAPC)



Blue = CVD (total, male, female); red = sudden deaths. Bars show AAPC with 95% CI.

DISCUSSION

- The CVD decline is consistent with Gulf and high-income trends (better risk-factor control, acute cardiac services, guideline-directed therapy) but is more modest than in some neighbouring countries.
- **Higher female CVD mortality** contrasts with global patterns; possible drivers include atypical presentation, delayed diagnosis, less access to invasive care and certification misclassification.
- The post-2020 female rise and the sudden-death peak around 2021 mirror pandemic-era reports of delayed care, stress and caregiving burden.
- Joinpoint and Poisson results differ for sudden deaths: the recent decline has not yet offset the earlier rise.

CONCLUSIONS

- Oman cut age-standardized CVD mortality by about a third in ten years, reflecting progress in prevention and care.
- **Sudden deaths stay high and volatile** (surge 2017–2021, partial recovery after) and **female CVD mortality is rising since 2020**.
- **Priorities:** national sudden-death surveillance, gender-responsive cardiovascular care, and community CPR/AED and EMS expansion — in line with Oman Vision 2040.

BIBLIOGRAPHY

[1] Al-Mawali A. Shining a light on cardiovascular disease, Oman's biggest killer. Oman Med J. 2015;30(3):167–8.
[3] AlMahrouqi F, et al. Prevalence of cardiometabolic risk factors in Oman. Oman Med J. 2019;34(5):404–12.
[7] Maddali MM, et al. Sudden cardiac death in patients under 49 years: single-centre study from Oman. SQU Med J. 2023;23:16–21.
[13] Ministry of Health, Oman. Annual Health Statistical Reports. moh.gov.om/en/statistics/annual-health-reports
[14] Ahmad OB, et al. Age standardization of rates: a new WHO standard. Geneva: WHO; 2001.
[16] Clegg LX, et al. Estimating average annual per cent change in trend analysis. Stat Med. 2009;28(29):3670–82.

ACKNOWLEDGEMENTS

No specific funding was received; the authors declare no competing interests. Data are publicly available from the Ministry of Health, Oman.