

# Expected risk of death by CKD stage using stochastic linkage between death certificates and the Specific Health Check programme cohort in Japan



Masahide Kondo<sup>1</sup>, Mariko Yamamura<sup>2</sup>, Chiho Iseki<sup>3</sup>, Kunitoshi Iseki<sup>3</sup>, Koichi Asahi<sup>4</sup>, Kunihiro Yamagata<sup>1</sup>, Shouichi Fujimoto<sup>5</sup>, Kazuhiko Tsuruya<sup>6</sup>, Toshiki Moriyama<sup>7</sup>, Ichiei Narita<sup>8</sup> and Tsuyoshi Watanabe<sup>4</sup> for the “Design of the comprehensive health care system for chronic kidney disease (CKD) based on the individual risk assessment by Specific Health Check.”

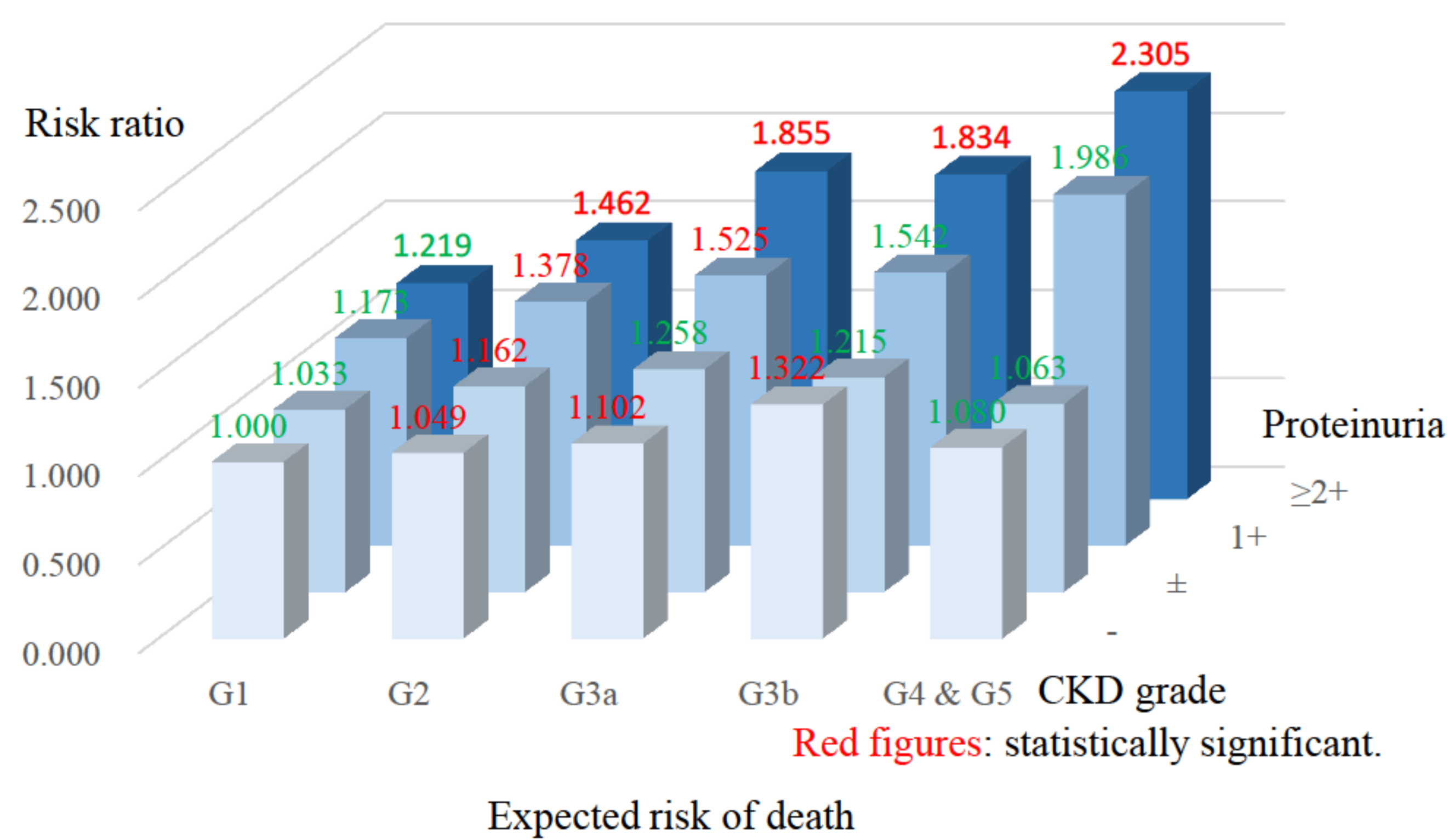
1 University of Tsukuba, 2 Hiroshima University, 3 Okinawa Heart and Renal Association, 4 Fukushima Medical University, 5 University of Miyazaki, 6 Kyushu University, 7 Osaka University, 8 Niigata University

## OBJECTIVES

The Specific Health Check is a nationwide mass screening programme for lifestyle diseases in Japan launched in 2008. The risk of death by CKD stage among those screened has not been reported due to the difficulty in the follow up of subjects to their death, which was posed by the legislation related to the use of personal information.

## METHODS

We stochastically linked 279,593 subjects whose sex, birthdate and municipality of residence were available, to death certificates, taking screened rates by the municipality into account, of the follow up of 4.75 since the launch of the programme. Expected person-years and expected deaths (all causes, ischemic heart disease, stroke, and renal failure) are calculated by CKD grade based on eGFR, or the level of proteinuria. Expected risk ratios are calculated by age stratum and/or sex adjustments by Poisson regression.



## RESULTS

Adjusted expected risk ratios for proteinuria  $\geq 2+$  were significantly high for all causes of death; 1.294 [95% confidence interval: 1.079 1.553], ischemic heart disease 1.996 [1.026 3.769], and stroke 1.843 [1.021 3.324]. Significantly high expected ratios of all causes of death for CKD grade were found for G3a, 1.146 [1.037 1.267], G3b, 1.382 [1.106 1.727], and G4 & G5 1.813 [1.196 2.748], while significant differences were not observed after adjustment.

## Expected risk of death

		All causes of death		Ischemic heart disease	Stroke	Renal failure
		Expected risk ratio [95% C.I.]	Adjusted* expected risk ratio [95% C.I.]	Expected risk ratio [95% C.I.]	Expected risk ratio [95% C.I.]	Expected risk ratio [95% C.I.]
CKD grade	G1	Reference	Reference	Reference	Reference	Reference
	G2	1.061 [0.990 1.138]	0.866 [0.806 0.929]	1.164 [0.868 1.561]	1.160 [0.898 1.499]	1.240 [0.739 2.083]
	G3a	<b>1.146 [1.037 1.267]</b>	0.805 [0.724 0.895]	1.331 [0.887 1.998]	1.271 [0.888 1.821]	1.405 [0.691 2.858]
	G3b	<b>1.382 [1.106 1.727]</b>	0.942 [0.750 1.183]	2.114 [0.982 4.552]	1.836 [0.896 3.765]	1.913 [0.455 8.038]
	G4 & G5	<b>1.813 [1.196 2.748]</b>	1.284 [0.840 1.963]	2.989 [0.781 11.44]	2.272 [0.580 8.901]	4.733 [0.764 29.34]
Proteinuria	-	Reference	Reference	Reference	Reference	Reference
	±	<b>1.145 [1.028 1.275]</b>	1.081 [0.971 1.204]	1.228 [0.804 1.875]	1.146 [0.781 1.681]	1.107 [0.515 2.380]
	1+	<b>1.372 [1.207 1.559]</b>	<b>1.205 [1.060 1.371]</b>	1.395 [0.832 2.337]	1.497 [0.968 2.315]	1.376 [0.563 3.365]
	≥2+	<b>1.566 [1.308 1.876]</b>	<b>1.294 [1.079 1.553]</b>	<b>1.966 [1.026 3.769]</b>	<b>1.843 [1.021 3.324]</b>	1.294 [0.320 5.223]

C.I.: Confidence interval. N.A.: Not available. \* Poisson regression: age stratum and sex are considered.

## CONCLUSIONS

This study demonstrates the feasibility of stochastic linkage between cohort data and death certificates with limited number of key variables. Proteinuria level found in general population is a significant risk factor, while risk differences are not distinguished by the CKD grades. This may be due to the follow up period or the characteristics of Japanese general population. An important implication is the significance of the dipstick which measures proteinuria, compared to eGFR which is based on serum creatinine, in the context of mass screening programme.

## ACKNOWLEDGEMENTS

This study was supported by a Health and Labour Research Grant for “Design of a comprehensive health care system for chronic kidney disease (CKD) based on the individual risk assessment by Specific Health Checkup” (H24-intractable(renal)-ippan-006) from the Ministry of Health, Labour and Welfare of Japan, a grant-in-aid for “Research on Advanced Kidney Disease” (REACH-J) from Japan Agency for Medical Research and Development, AMED, and JSPS KAKENHI Grant Number 16K08860.

