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COMMENTARY

Response to comments by Hoyer and Brinks (2017) on: 'Diabetes incidence and projections from prevalence surveys in Samoa over 1978–2013'

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We respond to the comments of Hoyer and Brinks (2017) on our article on diabetes incidence estimations in Samoa (Lin et al. 2017) from multiple population prevalence surveys over time, and on a similar previous article on Fiji (Morrell et al. 2016).

We adapted and applied a method previously developed by Stýblo et al. (1969) for estimating the incidence of tuberculosis infection from multiple representative population surveys of Mantoux positive skin test prevalence (indicating infection with mycobacterium tuberculosis).

The Stýblo method was employed because of its operationalization in similar epidemiological circumstances, its use of coherent statistical and mathematical logic (with soluble integral calculus), and its basis in empirical population prevalence sample surveys. Application of approaches from other fields of disease control in different contexts does not invalidate the method.

As Hoyer and Brinks relate, they have constructed a hypothetical (micro-simulated) population, and have used assumptions for general mortality and diabetes hazard ratios from Denmark. Such a model generates a linear increase of diabetes incidence to age 70 years. Their attempt to replicate the Stýblo et al. (1969) method does not reproduce the age-specific incidence pattern (Fig. 1) published as tabulated data in Lin et al. (2017).

Although not mentioned by Hoyer and Brinks, we offer, as external validation of our approach, a value for the actual measured incidence of diabetes in Samoa (1991–1995) from an empirical cohort study ($n = 734$) of 5.3/1000 person-years (McGarvey 2001), compared to incidence estimates from the Stýblo model of 4.2/1000 person-years (for 1993) (Lin et al. 2017).

We have estimated age-specific diabetes incidence rates from empirical independent reasonably representative population prevalence surveys, with designation of diabetes based on individual testing for plasma glucose or known diabetes on medications, which is the standard method employed in empirical cross-sectional surveys of diabetes prevalence (e.g., Lin et al. 2017), or cohort studies of diabetes incidence (e.g., McGarvey 2001; Pavkov et al. 2007; Soderberg et al. 2004). The independent prevalence surveys (Lin et al. 2017) are of (live) subjects who are survivors of the prevailing rates and causes of death, and are analysed by birth cohort across sequential period surveys, by age group.

In the very unlikely event that the secular trend in risk of contracting diabetes is precisely zero, and then, the mathematical calculations using the Stýblo technique will not

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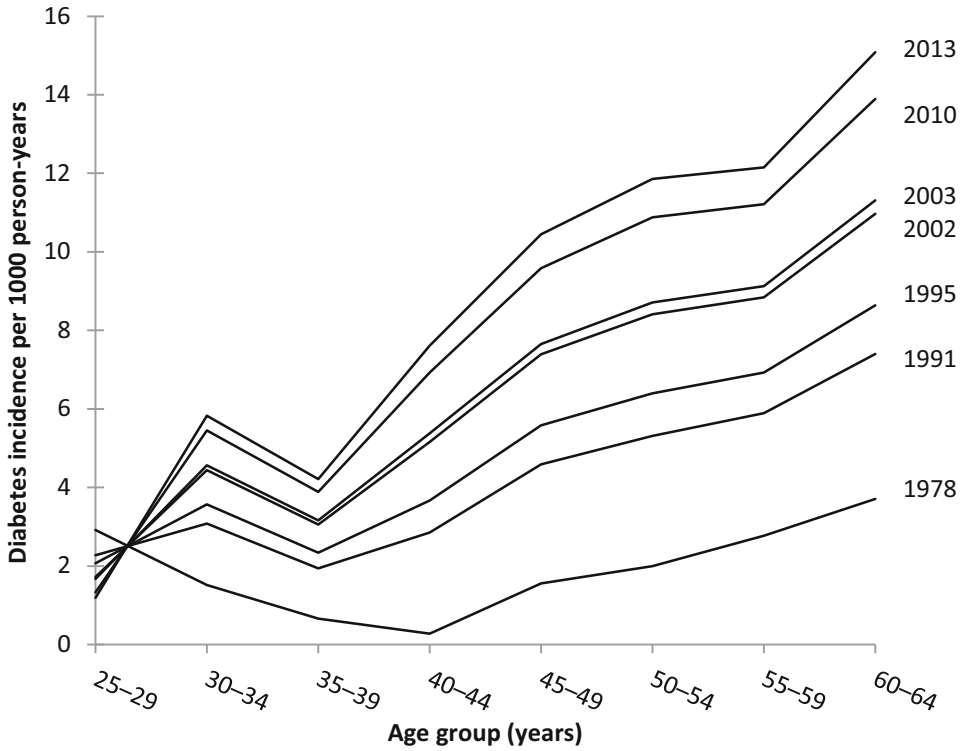

Fig. 1 Estimated age-specific diabetes incidence in Samoa 1978–2013. Diabetes incidence (both sexes) per 1000 person-years estimated from prevalence surveys

compute; this occurs in all calculations involving zero divisors and is easily rectified by substitution with a very small number.

Compliance with ethical standards

This paper does not involve human participants and/or animals.

Conflict of interest The authors declare that they have no conflict of interest.

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