Incidence of type 1 diabetes in China, 2010-13

Weng J, Zhou Z, Guo L, et al on behalf of T1D China Study Group
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Study question What was the incidence of type 1 diabetes in all age groups in China during 2010-13?

Methods The authors carried out a population based, registry study using data from multiple independent sources. A national registration system was set up in all 505 hospitals providing diabetes care, and in communities of patients with diabetes in 13 areas across China. The study population covered more than 133 million person years at risk, approximately 10% of the whole population. 5018 people of all ages with newly diagnosed type 1 diabetes and resident in the study areas were ascertained from 1 January 2010 to 31 December 2013. Type 1 diabetes was doctor diagnosed and further validated by onsite follow-up. Completeness of case ascertainment was assessed using the capture mark recapture method. The study reported the incidence of type 1 diabetes per 100 000 person years by age, sex, and study area.

Study answer and limitations The estimated incidence of type 1 diabetes per 100 000 person years for all ages in China was 1.01 (95% confidence interval 0.90 to 1.04). Incidence per 100 000 person years by age group was 1.93 (0.83 to 3.03) for 0-14 years, 1.28 (0.45 to 2.11) for 15-29 years, and 0.69 (0.00 to 1.51) for ≥30 years, with a peak in age group 10-14 years. To more accurately estimate the low incidence in older age groups, a larger study population is needed.

What this study adds The estimated incidence of type 1 diabetes per 100 000 person years was 1.93 for 0-14 years and 1.01 for all ages. Most new cases of type 1 diabetes in China are in adults. The incidence rates in under 15s were positively correlated with latitude.

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**ORIGINAL RESEARCH** Quasi-experimental study

**Effect of adoption of neoadjuvant chemotherapy for advanced ovarian cancer on all cause mortality**

Melamed A, Fink G, Wright AA, et al

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**Study question** What is the effect of increasing use of neoadjuvant chemotherapy (NACT) in advanced epithelial ovarian cancer on all cause mortality in the US?

**Methods** Use of NACT has increased gradually in the US since 2007, but rates of adoption vary by region. From 2011 to 2012, use of NACT increased by 27% in the New England and east south central regions, but remained unchanged in three control regions (south Atlantic, west north central, and east north central regions). The authors used this discontinuity in treatment approach to assess the causal impact of NACT on all cause mortality, within three years of diagnosis, in a quasi-experimental regression discontinuity design.

**Study answer and limitations** In rapidly adopting regions, patients treated in 2012 compared with 2011 had a

![Annual frequency of neoadjuvant chemotherapy for advanced epithelial ovarian cancer (blue circles) in New England and east south central census division (A), and south Atlantic, west north central, and east north central census divisions (B). Red lines represent linear trends in use of neoadjuvant chemotherapy estimated from 2007 to 2011 and extrapolated for 2012. Shade areas are 95% prediction intervals. After adjustment for secular trends, there was a significant increase in frequency of neoadjuvant chemotherapy in 2012 in the New England and east south central division (odds ratio 1.41, 95% confidence interval 1.25 to 1.72, P<0.001). In south Atlantic, west north central, and east north central divisions, treatment in 2012 was not associated with any deviation from secular trends (odds ratio 0.98, 95% confidence interval 0.86 to 1.12; P=0.78).](image)

**ORIGINAL RESEARCH** Observational study

**Impact of financial incentives on early and late adopters among US hospitals**


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**Study question** What are the effects of pay for performance programmes, implemented over the last decade, on early and late adopting hospitals?

**Methods** This observational study among 1189 hospitals (214 early adopters and 975 matched late adopters) in the US estimated the differences in trends resulting from financial incentives across early and late adopters. The effects of financial incentives on clinical process scores and 30 day mortality were estimated using Hospital Compare data from 2003 to 2013 and 100% Medicare claims data (1 371 364 patients aged 65 years and older).

**Study answer and limitations** Early adopters did not have significantly different (P=0.25) mortality trends for conditions targeted by the programme and for non-targeted conditions, compared with late adopters. The clinical process scores were slightly higher at baseline among early adopters (92) than late adopters (90), but a decade later, both groups reached a ceiling (98). Generalisation of these findings to other populations is limited because this study only used data from the 55 million patients aged 65 and older.

**What this study adds** Hospitals that have been operating under a pay for performance programme for more than a decade did not have better clinical process scores or lower 30 day mortality than hospitals operating under the programme for less than three years. These findings suggest that even among hospitals that volunteer to participate in pay for performance programmes, having additional time is not likely to turn pay for performance programmes into a success in the future.

Funding, competing interests, data sharing This study was not externally funded. The authors have no competing interests. No additional data are available.
mortality hazard ratio of 0.81 (95% confidence interval 0.71 to 0.94) after adjusting for mortality time trends, whereas no difference was observed in control regions (1.02, 0.93 to 1.12). Compared with control regions, the authors observed larger declines in 90 day surgical mortality (7.0% to 4.0% v 5.0% to 4.3%, P=0.01) and in the proportion of women who did not receive both surgery and chemotherapy (20.0% to 17.4% v 19.0% to 19.5%, P=0.04) in rapidly adopting regions. The causal effect estimated in this study could be biased if an unmeasured factor affecting survival coincided with the adoption of NACT from 2011 to 2012 in rapidly adopting regions.

**What this study adds** Increased use of NACT for advanced ovarian cancer was associated with a mortality benefit, which appears to be mediated by reduced postoperative morbidity and mortality. These findings should reassure clinicians and policy makers who have greeted increasing acceptance of NACT with concern.

**Funding, competing interests, data sharing**
This study was supported by the National Cancer Institute and Massachusetts General Hospital. Authors disclosed no competing interests. Data are available through the National Cancer Database.
RESEARCH METHODS AND REPORTING  Testing effects on functional outcomes “truncated due to death”

Statistical methods to compare functional outcomes in randomised controlled trials with high mortality


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Mortality is a common primary endpoint in randomised controlled trials evaluating interventions for patients with a high severity of illness, such as critically ill patients. However, researchers are increasingly evaluating functional outcomes, such as quality of life. An important challenge posed in such trials is that some patients die before the assessment of a functional outcome, resulting in this outcome being “truncated due to death.” In this setting, what special considerations should be addressed when defining and testing treatment effects on functional outcomes? Colantuoni and colleagues used data from a completed randomised controlled trial of critically ill patients to highlight key differences among three distinct statistical approaches used to evaluate functional outcomes truncated due to death: survivors analysis, survivor average causal effect, and composite endpoint approach.

Each statistical approach relies on certain assumptions, some of which can be informed by patient preferences with respect to death versus survival with functional impairment and others that are untestable using observed data from the randomised controlled trial. When the treatment does not affect mortality, the three statistical approaches yield similar conclusions about the treatment effect on functional outcomes. However, when the treatment affects mortality, conclusions can differ among these methods, with each method having advantages and disadvantages that researchers should carefully consider. When studying functional outcomes that may be “truncated due to death,” researchers must be mindful of the possible effect of a treatment intervention on mortality, and weigh the advantages and disadvantages of existing statistical approaches.

<table>
<thead>
<tr>
<th>Statistical approach</th>
<th>Target patient population</th>
<th>Advantages</th>
<th>Disadvantages</th>
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</table>
| Survivors analysis   | Patients who survive in each treatment group | • Simple to compute  
• If mortality is independent of treatment, provides an estimate of the causal effect of the treatment on the always survivors | • If the effect of the treatment is to sustain frail patients, then the estimated treatment effect is a biased estimate of the causal effect of the treatment on the always survivors and may be misleading: Randomisation is not guaranteed to be preserved within the subset of survivors  
• Does not include all randomised patients, violating the intention to treat principle for randomised trials |
| SACE                 | Always survivors—that is, patients who would survive regardless of which treatment they receive | • Estimates the causal effect of the treatment on the functional outcome among always survivors  
• Randomisation is preserved within the subset of always survivors so the comparison of randomised treatment groups is unbiased  
• When the intervention does not affect mortality, SACE is identified from the observed data (ie, all survivors are always survivors) without making any untestable assumptions | • Comparison of the functional outcome is made among a subset of patients (ie, those who would survive regardless of which treatment they received) that is not directly identifiable  
• Requires eliciting expert opinion on assumptions that are not testable within the observed data (eg, there are no patients who would survive under control but who would die under intervention)  
• Does not include all randomised patients, violating the intention to treat principle for randomised trials |
| Composite endpoint   | All randomised patients | • Simple to compute (both quantities of and the rank statistic for the distribution of the composite outcome)  
• All randomised patients are included in the analysis, consistent with the intention to treat principle  
• Randomisation is preserved so the comparison of randomised treatment groups is unbiased  
• Provides a hypothesis test for comparing the distribution or a specific quantile (eg, median) of the composite endpoint across treatment groups that has a causal interpretation  
• The distribution of the composite endpoint in each treatment group can be examined to identify if treatment groups differ in mortality and/or the functional outcome | • Requires eliciting expert opinion on ordering mortality and the functional outcome  
• The size of the rank statistic may be difficult to interpret |

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