patterning of health, or trends, or pathways. Better instead to delineate explicitly persisting and changing structural and political determinants of these persisting—and changing—inequalities, including who deliberately or inadvertently benefits from these inequalities, so as to inform efforts to secure social equity in health. Staying grounded in history can help us both avoid notions of a technocratic ‘quick fix’ and deepen the meaningful contributions social epidemiologists can make to public democratic debate over social determinants of well-being.

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Preventing disability and death in old age

From ANDREAS STUCK and JOHN C BECK

Sir—The Spotlight section of the Journal1 raised questions with regard to a randomized controlled study of preventive home visits conducted in Berne, Switzerland.2 The first, whether ‘area effects accounted for differences in outcomes’ can be answered with ‘no’ for all main outcomes. Main outcomes were analysed on an intention-to-treat basis for all project areas combined, and significant favourable effects were found for people at low baseline risk. For persons at high baseline risk, the analyses showed a significantly higher number of nursing home admissions in subjects of the intervention group as compared to controls.

There was an unfavourable, but statistically non-significant trend towards a higher 3 year mortality rate in subjects of the intervention group as compared to controls among subjects at high risk ($P = 0.10$, based on adjusted multivariate logistic regression analysis). Sensitivity analysis based on a survival analysis without adjustment for baseline factors revealed a $P$-value of 0.06. We also collected survival data for 4 additional months and conducted a 40-month follow-up analysis. At 40 months, the difference in mortality between intervention and control groups was non-significant, with $P$-values of $P = 0.20$ for adjusted logistic regression analysis, and $P = 0.16$ for unadjusted survival analysis. Thus, the Spotlight hypothesis that the intervention killed high-risk patients due to delay in seeking appropriate specialist care is unwarranted since the...
implementation of the intervention did not interfere with the delivery of specialist care and since mortality differences were not statistically significant.

The Spotlight also addressed potential confounding in subgroup analyses of this study. We reported subgroup analyses that were based on the observation that one nurse’s professional performance appeared to differ from that of the other two nurses. Study conclusion analyses revealed that one nurse detected significantly fewer problems in older people as compared to the other nurses, despite comparable population characteristics between nurses. We found no favourable intervention effects among people at low baseline risk visited by this nurse; and among people at high baseline risk visited by this nurse, there was a statistically significant higher number of nursing home admissions as compared to controls. In contrast, for people at low baseline risk visited by the other nurses, effects were favourable, and for persons at high baseline risk visited by the other nurses, there was no increase of nursing home admissions. It is very unlikely that these differences in outcomes between nurses might be explained by confounding with area effects. Nurse performance differences were major, but socio-economic and health status differences between areas were minor and adjustment of analyses for these baseline factors did not affect the results.

The Spotlight also addressed why doctors refuse to accept satisfaction as a valid outcome for chronic conditions, yet continue to measure it. This study revealed that more than 90% of older people responded that they were satisfied with the visits. We collected this information because we think it is an important factor determining future programme implementation. However, the finding that subjects at high baseline risk were as satisfied with the project as subjects with low baseline risk emphasizes that satisfaction alone does not differentiate between cost-effective and non cost-effective programmes.

We cannot answer the question as to whether only particular or all instrumental activities of daily living were improved by the project, due to the limited power of the study of conducting these analyses. The statistically significant effects on basic activities of daily living observed among subjects visited by the nurses with a high level of professional competence as compared to control subjects suggests that in-home prevention has favourable effects on both instrumental and basic activities of daily living. The analyses conducted in this study suggested that this was achieved by an improvement of mobility, but not of cognitive function.

In summary, (1) this study suggests that in contrast to currently held beliefs, low-risk older people might benefit more from in-home prevention as compared to high-risk people, and (2) in interventions of this type, professional competence of the intervention personnel is likely to be a key factor responsible for programme effects which can be monitored by measuring the number and type of problems identified by the home visitor, as well as the recommendations and adherence to recommendations for tracer conditions (such as vaccination rate, appropriateness of medication use, patients’ physical activity, etc.) and by experts conducting case discussions or observing home visits in selected older people.

References


A compound catalytic model

From XIANGMING LIU, XIAODONG HAN and ZONGLE YANG

Sir—the model constructed by Yangxi Zhang does not strictly capture the processes involved in the epidemiological pattern under study but it is now cited by some other researcher to fit and analyse the epidemiological data and has been introduced by some monographs, so we think it is necessary to correct the error in his model to avoid the spreading of inaccurate results.

Yangxi Zhang combined a reversible catalytic model with a two-stage catalytic model, and proposed that a compound catalytic model with both reversible and two-stage types should be used to analyse the distribution characteristics of the age-specific infection rate of certain parasites. According to some characteristics of the data surveyed, by means of simplification he constructed the model and estimated parameters. Based on Yangxi Zhang’s proposal, we attempt to reconstruct a compound catalytic model with both reversible and two-stage types in order to exactly describe the epidemic processes.

Denote by A the susceptibles, by B the people with infective indications and by C the people whose infective indications have gone and who will not be infected any longer. A can covert into B at the rate of a, and B into A at the rate of b and into C at the rate of c. Only B can reverse into susceptibles. This is a compound relationship that a reversible situation coexists with a two-stage situation, which can be illustrated as follows

\[
\begin{align*}
A & \underset{b}{\overset{a}{\rightleftharpoons}} B \rightarrow C \\
\end{align*}
\]

Consider a population in which all people are susceptibles at time \( t = 0 \). Denote by \( x \) the fraction of the population who are

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