



## Untimely applause was a distraction

### Comment on “Shanghai rising: health improvements as measured by avoidable mortality since 2000”

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#### Abstract

The paper published in the January 2015 issue of this journal by Gusmano and colleagues entitled “*Shanghai rising: health improvements as measured by avoidable mortality since 2000*” has spurred this commentary. We discuss controversial issues surrounding the concept of avoidable mortality in health service research in general and Gusmano’s study in particular. The impact of overall social development on mortality may be underappreciated in Gusmano’s report; the innovative efforts of healthcare professionals to use cutting-edge technology and evidence-approved preventive strategies to reduce healthcare cost and improve the life quality of community members may not necessarily come to fruition in death reduction, and might be undervalued, too. More critically, the shape and magnitude of emerging health issues in Shanghai, such as accidents and injuries, pollution-related cancers, may be camouflaged in Gusmano’s report. We conclude this commentary by suggesting the most urgent questions to be addressed in the future studies.

**Keywords:** Global Health, China, Shanghai, Avoidable Mortality, Performance

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The paper by Gusmano and colleagues in the January 2015 issue of this journal is interesting and provoking (1). It “examined the evolution of Shanghai’s healthcare system” by analyzing “avoidable mortality over the period 2000–10 and compared Shanghai’s experience to other mega-city regions”. The main result was that: “the age-adjusted rate of avoidable mortality, per 1,000 population(s), dropped from 0.72 to 0.50. The rate of decrease in age-adjusted avoidable mortality in Shanghai was comparable to New York City and Paris, but lower than London (42%)”. Gusmano *et al.* (1) concluded that: “establishment of the Municipal Center for Disease Control and Prevention and its upgrading of public health and health services are likely to have contributed to the large decrease in the number and rate of avoidable deaths”. We applaud the authors’ efforts to place Shanghai’s unprecedented rise in a unique comparative examination of top megacities in the world. However, we believe that Gusmano and colleagues’ interpretations of their results deserve further discussion.

The chief concerns of Gusmano’s report are rooted in the unavoidable limitations of the concept of avoidable mortality. Created as a tool for medical audit by David Rutstein of Harvard Medical School in the 1970s (2), with various synonyms, the terms attracted considerable interest since then and have been used as measuring instruments to assess the quality of healthcare. The milestone application of avoidable mortality is the publication of the *European Community Atlas of Avoidable Death* in 1988 (3). The report concluded that avertable deaths were relatively common, and improvements of accessibility of healthcare had a measurable impact during the 1980s. The avoidable mortality, however, was much less sensitive to the improvement of healthcare

services when avoidable mortality dropped below a certain level due to floor effects (4). Surprisingly, with a relatively high level of avoidable mortality in the early year, and approximately 50% decline in deaths from coronary heart disease from 1980 through 2000 (5), the United States (U.S.) experienced a much smaller reduction of avoidable mortality during the same period according to Nolte *et al.* (6).

The term of avoidable mortality has been used by the World Health Organization (WHO) (7), and researchers in many countries (8–21), mainly the countries of Organization for Economic Co-operation and Development (OECD). In spite of a steady increase in the number of publications using the term of avoidable mortality since the late 1980s, little progress has been made in advancing the original concept, critically limiting its’ acceptability among health service research community (4,22). The concept of avoidable mortality failed to find its way to be widely used in the country where it originated. The most recent study applying the concept of avoidable mortality to examine healthcare service in the U.S. was actually performed by non-U.S. researchers for an international comparison (6). It is interesting to note that, very often, there were some researchers questioning the validity of a research paper immediately after it was published using the concept of “avoidable mortality”, from the early dialogue between Andreev *et al.* (23) and Holland (22), Alleyne (24) and Nolte *et al.* (6) to the recent debates between Allin and Grignon (25) and Lavergne and McGrail (26,27), and Peter *et al.*’s commentary (28) on papers by Mackenbach *et al.* (29), and Schoenbaum *et al.* (30). This is phenomenal with scientific publications, highlighting a high level of enthusiasm in search for a simple metric to measure health

system performance and a growing dissatisfaction as well. The use of death as an endpoint and focusing on mortality are obvious limitations of the concept of avoidable mortality (4,22). There are likely to be many underlying reasons for an observed declining of amenable mortality. Interpretation of the data must go beyond the aggregate figure to look within populations if these findings are to inform policy. A substantial amount of disease burdens in modern society are disability-related social cost rather deaths, avoidable mortality fails to reflect the efforts that focus primarily on relieving pain and improving quality of life. Death is just the endpoint of a complex chain of events, and it is challenging if not impossible to clearly clarify which causes are avoidable. Most of the avoidable deaths should be partitioned into a proportion to which reductions are attributable, including primordial, primary, secondary, or tertiary preventive efforts. Additionally, emerging health issues, such as road injuries and mental health problems, create significant health burdens in the megacities. Large portions of the resources have been invested to respond to these ever-changing challenges with a limited impact on mortality but substantially on morbidity. After having comprehensively assessed the validity of avoidable mortality against the disease spectrum of modern society, Pérez *et al.* concluded in their recent report that: “avoidable mortality does not seem to appear to be a good indicator for analyzing the performance of healthcare systems” (p180) (28).

With these limitations inherited, Gusmano *et al.*'s (1) report may under appreciate the impact of overall social development on mortality. For example, Tuberculosis (TB) has been listed in almost all versions of avoidable death list, including the one used by Gusmano *et al.* However, the acquisition of TB is largely driven by socio-economic conditions (31,32). Simply attributing an outcome to a particular aspect of healthcare, such as consolidating multiple pre-existing institutions into one agency, is intrinsically arguable. Overstretching the connection between declining mortality from selected diseases and institutional reorganization or improvement of public health or healthcare services *per se* may divert resources from investment outside the healthcare system that more directly targets underlying causes.

The innovative efforts of healthcare community in Shanghai in using cutting-edge technology and evidence-approved preventive strategies to improve the life quality of community members may be undervalued in Gusmano *et al.*'s report. Partnered with business communities, a regionally integrated health networks has been set up in Minghang of Shanghai, linking hospitals, community health centers, nursing homes and households to enhance early detection of non-communicable disease using telemedicine and wireless technology (33). These efforts may not necessarily reduce mortality substantially but they dramatically reduce disability, increase independence and satisfaction with life for patients, and ultimately lower the emotional and financial cost to the family and society as a whole. More critically, the shape and magnitude of emerging health issues in Shanghai may be masked in Gusmano *et al.*'s report. There were 2,176 traffic accidents reported in Shanghai in the year 2010, resulting in 1,009 deaths (34), more than the death numbers from

nephritis and nephrosis, malignancy of cervix and uterus, and pneumonia combined in Gusmano *et al.*'s report. Shanghai has the highest incidence of cancer in the nation (35). About 54,000 incident cases were reported in the year 2013, representing an increase of 13% from 48,000 cases in the year 2011 (36). The dangerously high level of pollution is taking an increasingly devastating toll in Shanghai as well as other parts of China. Unfortunately, Gusmano *et al.*'s report failed to convey the sense of urgency and magnitude of these emerging issues.

The novel contributions of Gusmano *et al.*'s work are the questions stimulated rather the answers offered. In addition to “the steep decline of avoidable mortality among Shanghai's registered population”, the thought-provoking figure in Gusmano *et al.*'s report also clearly demonstrates that the same trends occurred in other megacities, and the avoidable mortality was plummeting in London. The Gusmano *et al.* (1) were correct that: “these city-level differences reflect the fact that avoidable mortality is influenced by a combination of population characteristics, socio-economic status” and “healthcare related variables related to health system performance”. Without examining these explanatory variables, in particular, health policy, spending and institutional reorganization, it might be disputable to jump to the conclusion that: “investments in public health infrastructure and increasing access to health services in megacities – both in China and worldwide – can produce significant mortality declines”. Comparisons beyond the mortality among four megacities in Gusmano *et al.*'s report would certainly generate robust conclusions. What were the factors driving the impressive decline of avoidable mortality in London, which was doing better than Shanghai as Gusmano *et al.* pointed out? A “comparable” decrease was also obtained in New York City. How much of the decline of avoidable mortality in New York City and London was attributed to revving-up health spending or institutional reorganization? Have mayor Bloomberg's innovative public health policies, from cracking down on soda serving sizes to implementing a trans-fat ban in restaurants, added years to New Yorkers' lives? Why Paris saw a slower-than-other decline? Where did Tokyo stand, one of the “big four”, and also sharing more similarities with Shanghai than anyone of the three cities included in Gusmano *et al.*'s study? Seeking the answers to these questions would greatly advance the Healthy Cities Movement globally.

As the crown jewel of the Chinese economy, and one of the world's most dynamic cities, Shanghai has been making a great stride in both health and overall social development in the past decades, offering a unique lens to scrutinize sustainable and scalable solutions to translate economic growth into better health. The wealth of the successful stories and costly lessons as well from Shanghai rising need to be systematically reviewed. Certainly, Gusmano *et al.*'s efforts are a part of this endeavor; they are to be congratulated for looking at Shanghai rising from a global health perspective.

#### Ethical issues

Not applicable.

#### Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

FY and JZ discussed the framework, drafted and revised the manuscript.

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