

United Nations Expert Group Meeting on "Methodology and lessons learned to evaluate
the completeness and quality of vital statistics data from civil registration"
New York, 3-4 November 2016

Enhancing Korean Infant Mortality Statistics by Linking Administrative Data and Survey

Ji-Youn Lee
Statistics Korea

Ju-Hwa Song
Statistics Korea

Sun-Jae Hwang
Chungnam National University & Asia Pacific Population Institute

A. INTRODUCTION

In 2015, the infant mortality rate (IMR) of Korea was 2.7 deaths per 1,000 live births. Korea is one of the top ten countries with the lowest infant mortality rates among the OECD countries.

However, for the 20 years ago, the observed IMR was much lower than now because of severe under reporting of infant deaths. For the 1983-1998 period, infant death registration were thought to be only two-thirds of all deaths completed.

Since the 1990s, attention has been focused on improving the coverage of infant mortality statistics and making them more useful. There has been a significant effort made by Statistics Korea to completely collect infant mortality information that were not available from routine civil registration and vital statistics systems. Particularly noticeable is a recent attempt to conduct a statistical data linkage with administrative records and a supplementary survey to support the quality of infant mortality statistics. Mortality data linkage in Korea has been used to improve the coverage of vital statistics as well as to evaluate its coverage.

In this paper, we will assess the coverage of birth and death registration in Korea, identify potential sources of problems in the infant mortality data collection process, and present a novel approach by Statistics Korea to solve the problem. First, we briefly introduce the civil registration and vital statistics systems of Korea. Next, various issues related to the completeness of the birth and death registrations are discussed. In the following section, we present specific methods that Statistics Korea has utilized to improve infant mortality statistics by linking administrative data and supplementary survey. Lastly, summary and some concluding remarks follow.

B. CIVIL REGISTRATION AND VITAL STATISTICS SYSTEM OF KOREA

As illustrated in Figure 1, South Korea has a unique feature in the process of collecting vital statistics on births, deaths, moves, and marriage/divorce. Whenever the vital events occur, the person in charge of reporting the event is required to register the event with the local office within a prescribed period.

There are two main registers in Korea: family register and resident population register. Birth, death, marriage and divorce are legally effective when they are recorded into Family Register which is administered by Supreme Court. Population Register is administered by Ministry of the Interior. A unique and permanent population registration number is issued immediately after the local offices received a birth notification form.

[Figure 1 about here]

Vital statistics data are based on family register. All vital events have been filed in online family register first. And then, registered information directly send to online vital statistical system and demographic characteristics for statistical purpose only are entered in the vital statistics system.

Statistics Korea then collects and disseminates the data in the form of national vital statistics, operating online real-time web-based vital statistics system throughout all local registration offices. Once again, the Rules of Vital Statistics promotes uniformity of collecting, processing, and disseminating practices of vital statistics among provinces in Korea.

The local office processes the information and report to the respective government authorities.

Since individual information on vital statistics and events are collected, by law, as part of the Family Registration in Korea (See Figure 2), this integration in the data collection process has significantly contributed to the completeness of vital events of Korea both in quantity and quality.

One of the general criteria used to judge the quality of vital statistics data is timeliness. Statistics Korea releases provisional birth and death data 1 month after vital events are registered in local offices. Final birth statistics are published 8 months after the close of a data calendar year and cause of death statistics are released 9 months after the end of data year.

[Figure 2 about here]

C. EVALUATION OF THE COMPLETENESS OF BIRTH AND DEATH REGISTRATION IN KOREA

According to the UN principles and recommendations, a complete civil registration and vital statistics systems are achieved when every vital event has been registered in the system within a specified time period. Completeness of the CRVS can be measured in terms of late registration and coverage. In this section, we illustrate the level of completeness of birth and death registration in South Korea.

First, Figure 3 shows the degree of timely and delayed registration of births and deaths with year 2005 as an example. In case of birth registration, 99.1 percent of births that occurred in 2005 was actually reported and registered in 2005 while the rest of 0.9 percent was reported in the following ten years. The proportion of delayed registration is even smaller for deaths: while 99.7 percent of deaths that occurred in 2005 was timely registered, only 0.3 percent was added in the following ten years. Although the late registration rate of vital events is quite low, Statistics Korea has monitored the extent of late registration to ensure that it is decreasing.

[Figure 3 about here]

Since we are particularly interested in the completeness of death registration in this paper (i.e., infant mortality to be specific), we will further examine the completeness and nature of death registration in Korea.

As mentioned earlier, registration of death is legally required in Korea. When a death occurs, the person in charge of reporting is supposed to fill in the registration form at the local administrative office within a month with a medical certificate attached. Due to these legal requirements, under-reporting of all deaths is minimal in Korea with more than 99 percent of deaths are registered in a timely manner.

One of the reasons for the high level of death registration in Korea is its utilization of multiple data sources in the collection of death statistics. In addition to the conventional birth registration form, Korea has recently added two unique sources of death statistics to complement the conventional method: Crematory Registration and the Infant and Maternal Mortality Supplementation Survey.

What is significant about these two extra sources of death information from the Crematory Registration and the Survey is that this information can be effectively utilized to complement and estimate the fetal and infant deaths, which traditionally have been under-reported and less accurate in Korea.

D. IMPROVEMENTS OF INFANT MORTALITY STATISTICS BY LINKING ADMINISTRATIVE DATA AND SURVEY

In Korea, infant deaths were traditionally under-reported with less accurate information due to cultural and administrative reasons. For instance, between 1983 and 1998, only two-thirds of all infant deaths were known to be officially registered. In order to improve the coverage and quality of infant mortality statistics, therefore, Statistics Korea has devised and implemented a novel method that can be effectively utilized to complement the conventional source of infant mortality statistics from civil registration (See Figure 4).

[Figure 4 about here]

First, since 1999, Statistics Korea has collected extra information on infant deaths from crematories. Because most of infant deaths are cremated in Korea, more accurate and extra information on infant deaths can be collected at the crematory site albeit not officially reported to the civil registration system.

Second, since 2009, Statistics Korea has conducted the Infant and Maternal Mortality Supplementary Survey that expands on the information about birth, fetal death, maternity care, and demographic and health risk factors of infants and mothers. The Survey is a follow-back survey for hospitals and other medical care providers involved in the production of death certificates and the Mother-Child Health Registration.

A record linkage between registered infant deaths and administrative data marked a turning point in the history of Korea's infant mortality statistics. As a result, the completeness and accuracy of infant mortality statistics has been dramatically improved since 1999. IMR increased from 2.3 deaths per 1,000 births in 1998 to 4.5 deaths in 1999. After some yearly fluctuations, IMR was steadily decreased to 2.7 deaths in 2015 (See Figure 5).

[Figure 5 about here]

As can be seen in Figure 6, the proportion of infant death statistics from the two extra sources is not insignificant: In 2015, 62.4 percent of all infant deaths was registered through the conventional civil registration system while 27.4 percent and the rest of 10.2 percent of death registration come from the Crematory Registration and the Supplementary Survey. Through the linkage of death registration with other registries in Korea, it was possible to improve the coverage of the infant mortality statistics and to correctly identify underreporting cases.

[Figure 6 about here]

Along with the improvements in infant mortality statistics from the novel methods, statistics from the conventional death registration has also been improved over recent years. Due to the improvements in public consciousness and public health insurance coverage, the proportion of infant deaths from the civil registration increased from 44.6 percent in 2005 to 62.4 percent in 2015 (See Figure 7).

[Figure 7 about here]

One of the (unintended) consequences of the improvements in infant mortality statistics has been increased completeness of birth registration. Now we have extra information about births from the infant death statistics, which was gone unnoticed beforehand, the coverage of birth registration in Korea, as seen in Figure 8, has reached to almost 100 percent recently.

[Figure 8 about here]

Lastly, the contents of infant mortality statistics have become richer due to the Infant and Maternal Mortality Supplementary Survey. Compared to the conventional death registration, the Survey contains additional information on infant, mother, and delivery (See Figure 9), which is also useful to support policies related to healthy pregnancy and delivery.

[Figure 9 about here]

E. SUMMARY AND CONCLUDING REMARKS

In this paper, we have examined, identified, and provided some solutions to the issues related to infant mortality statistics based on the experiences of Korea. The level of infant mortality has substantially declined in South Korea over the past fifty years due to the improvements in overall living standards and advancements in data collection on infant death statistics.

Statistics Korea has made considerable efforts to enhance the infant mortality statistics, particularly by diversifying the sources of infant deaths, such as Crematory Registration, and implementing the Infant and Maternal Mortality Supplementary Survey that complements to the conventional death registration by rearranging all existing data on infant deaths. Combining information from several data collection sources could be used to improve the coverage of vital statistics as well as to directly identify the under reporting cases.

Administrative data, such as the conventional civil registrations, and survey data have its own advantages and disadvantages. By linking the administration data and survey, therefore, not only were data on vital statistics, such as infant mortality, enhanced but they become richer with additional information not available in civil registration systems.

Figure 1. Civil Registration and Vital Statistics System of Korea

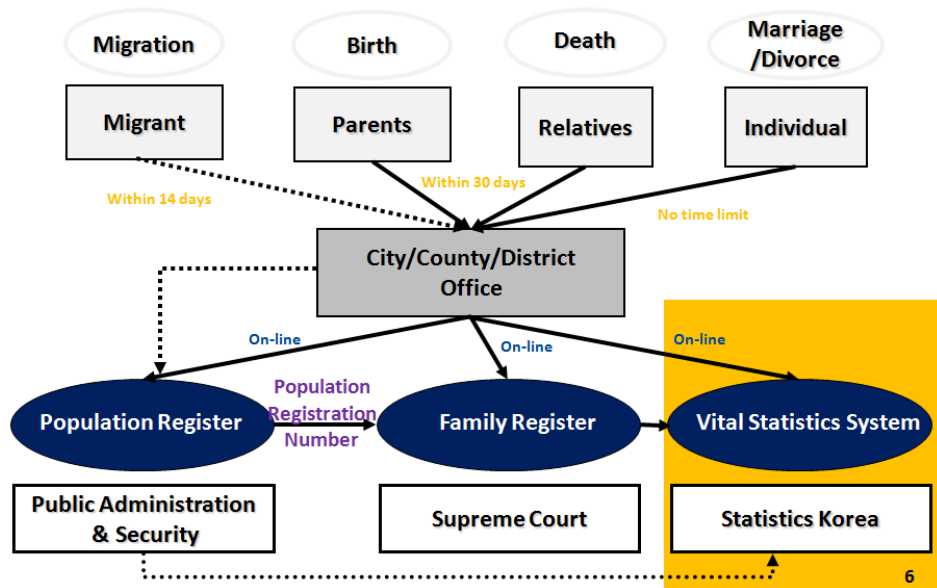


Figure 2. Birth Registration Form of Korea

[illegible]

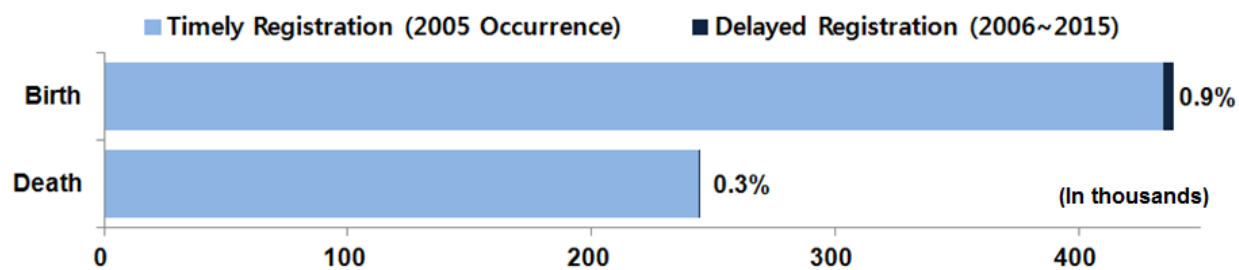
Birth Registration Form

Family Registration Items

→ The following information is required for national population policy. You are obliged to provide accurate information in a faithful manner according to Articles 32 and 33 of the Statistics Act. All personal information will be strictly protected.

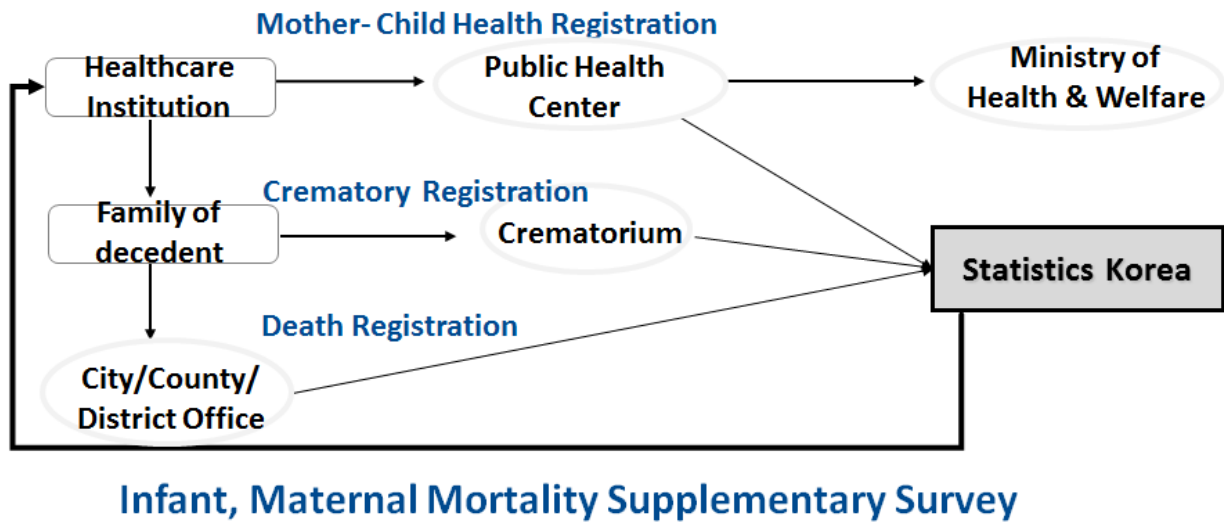
Vital Events Items

Figure 3. An Example of the Timely vs. Delayed Registration of Births and Deaths



Birth (in thousands); Death (in thousands)

Figure 4. The Data Collection System on Infant Deaths in Korea



- Source : Death Statistics in 2015 (STATISTICS KOREA)

Figure 5. Trends in Infant Mortality Statistics of Korea: 1983-2015

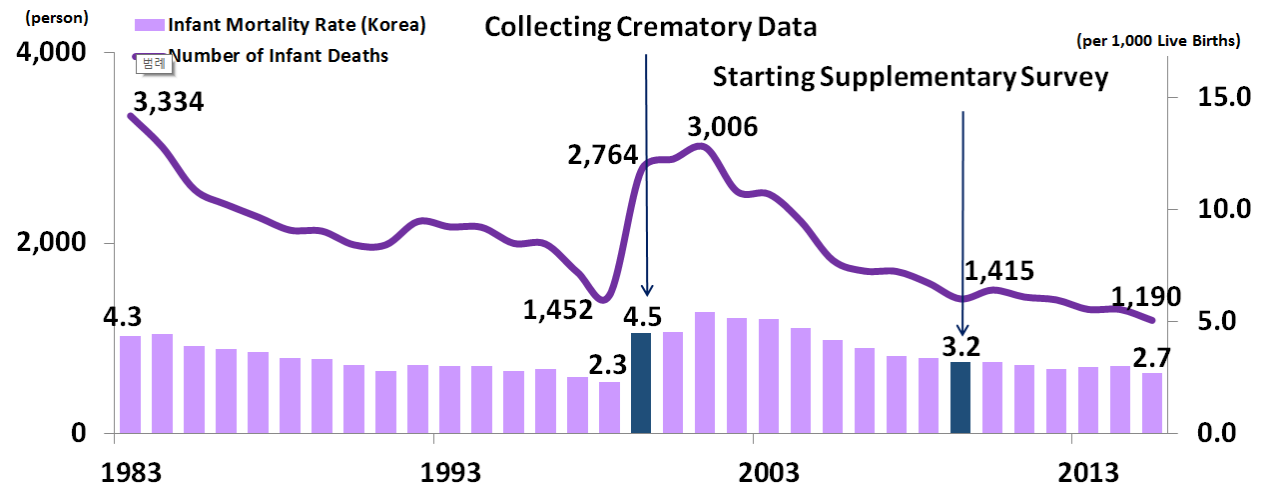
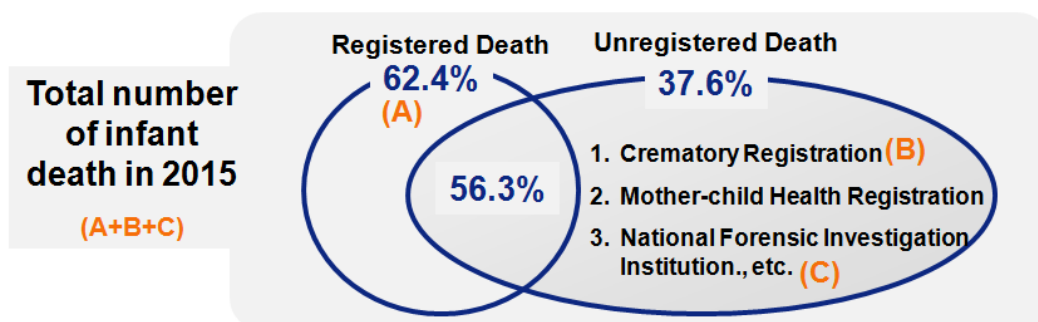


Figure 6. The Linkage System of Infant Deaths in Korea



Data Linkage Source	Linkage Key	Coverage of each source	Total Coverage
(A) Death Registration	Population Registration No. Date of death, address/ name of Infant	62.4%	62.4%
(B) Crematory Registration	Name of hospital/ Doctor, Hospital Charts No.	27.4%	89.8% (A+B)
(C) Mother-child Health Registration + National Forensic Investigation Institution, etc.	Name of mother Date of death, address of Infant Name of hospital	10.2%	100% (A+B+C)

Figure 7. Trends in the Infant Death Statistics from Death Registration and the Supplementary Survey: 2005-2015

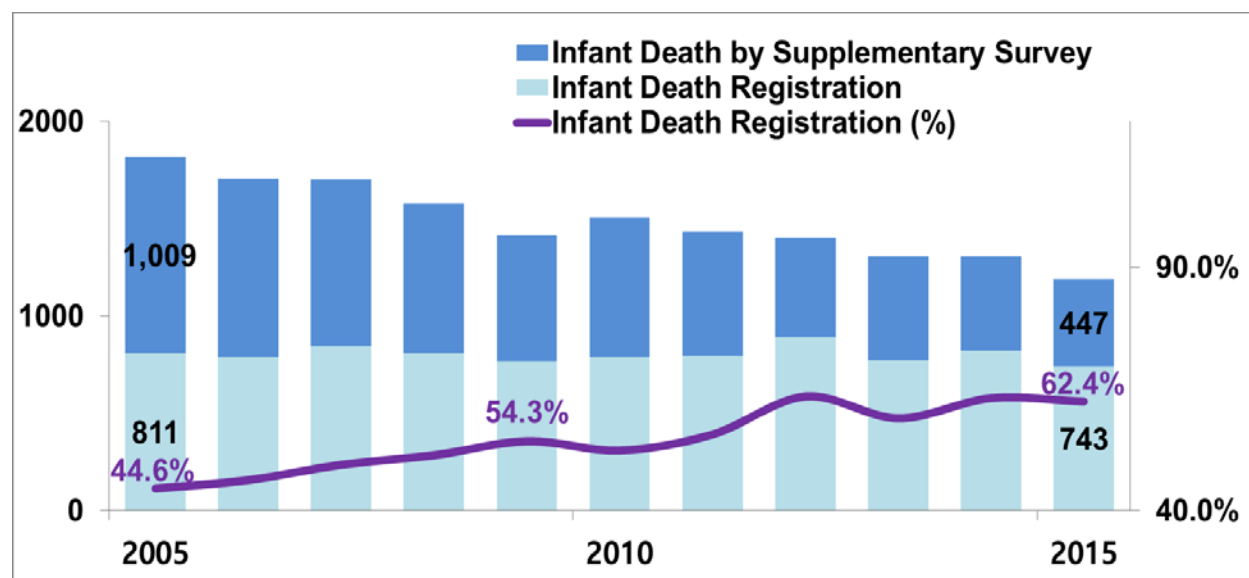


Figure 8. Trends in the Sources of Birth Statistics: 2005-2015

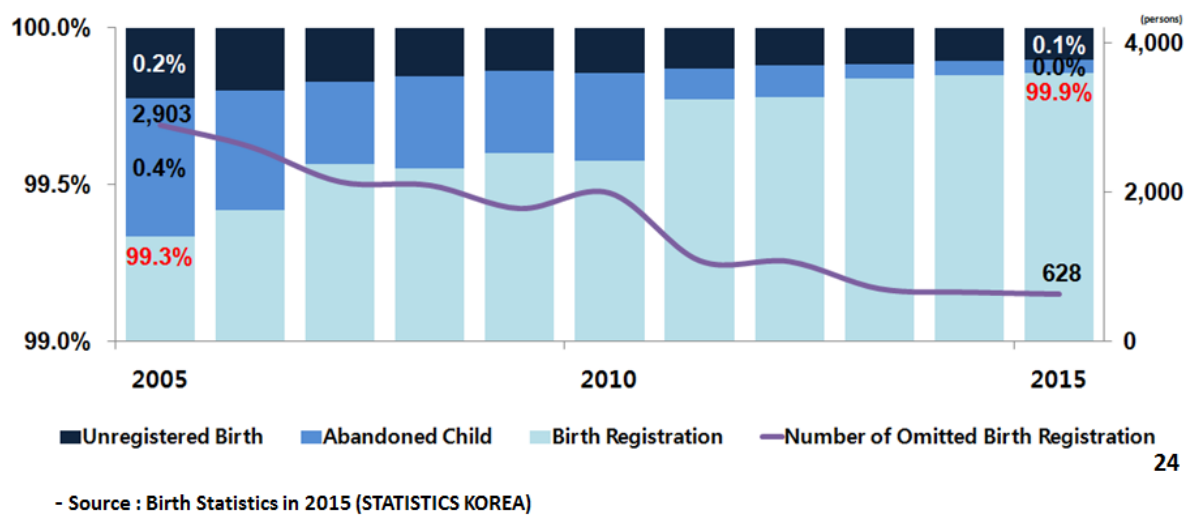


Figure 9. Item Comparisons between the Conventional Registrations and the Infant Mortality Supplementary Survey

Registration items	※ Common Items between Normal Death Registration : Name of the Infant, Population Registration No. , Time/Date/Place/Cause of Death			
Survey items	Nationality	Resident registration No.	Duration of pregnancy	Multiple birth
	Education level	Diseases during pregnancy	Time of delivery	Birth order
	Occupation	Height	Method of delivery	Height, Weight
	Marital status	Weight	Antenatal care	Girth of the head
	Blood pressure	Smoking status	Previous pregnancy result	Appgar score
	▲ Mother Info		▲ Delivery Info	▲ Infant Info