Although it is not certain when malaria began to appear in Korea, malaria is believed to have been an endemic disease from ancient times. The historical record of its outbreak appears as early as in the 12th century. The authentic chronicles of Koryo Dynasty (918-1392 CE) reports its outbreak in 1152 and 1283. A medical handbook called *Emergency Prescriptions with Native Herbs* (郷薬救急方), which had been published in the 13th century, provides a prescription for malaria. This proves that malaria was an urgent health problem at the time.

The situation seems to have remained the same throughout the Chosen Dynasty (1392-1910 CE). The authentic chronicles of the dynasty which covers the whole period provide hundred reports of malaria cases. Kings, royal families, high and low officials, Confucian scholars and peasants alike were caught with malaria. The reports testify that malaria was rampant in Korea. So rampant that it was also named “Chekusil”, which means one can truly become a member of the society after experiencing the disease. Since malaria became a part of life, it entered everyday expression. The common expression “to detach malaria” is used to describe a situation when one is undergoing a hard trouble that is difficult to get rid of. A lot of people died of malaria, although the exact mortality is not known, and it debilitated the patients severely. Unlike other diseases, the difficulty of retrospective diagnosis which one inevitably faces in studying
history of diseases is relatively small in malaria for it has a very characteristic and
typical pattern of periodic fever spikes.

It was Dr. H. N. Allen (1858-1932) who made the first description and diagnosis of malaria in terms of Western medicine. Dr. Allen was the first medical missionary in Korea who came to Korea in 1884 via China and opened a hospital with the help of the Korean government. He mentioned malaria patients in his first year report (1885) of Korean Government Hospital. According to his report, “One of the most prevalent of the diseases treated has been Ague [malaria] in its various forms, 1061 cases having come before us, about one-tenth of the whole number of patients. These have come from all parts of the country, often coming five hundred li (135 mile).”(Allen and J. W. Heron, 1886). The treatment seems to have been successful for he reported as follows: “We have only one or two cases had a patient return to us.” He gave “the grains quinine on the day the chill is expected, and follow this up by the use of Fowler’s solution of Arsenic Compound Solution and Iodine.” The effects of quinine must have impressed the Koreans. He reports that they had many applications from persons who were anxious to buy it. And a famous Confucian scholar of the time, who was named Whang Hyun (黃玹, 1855-1910), testified that after quinine had been introduced into Korea from the Western world, those who were suffering from malaria recovered from it immediately after taking quinine. He also reports that even a song became popular among people which says: “Thanks to smallpox vaccination children grow well and thanks to quinine old persons enjoy long life.”

Although quinine proved very effective in treating malaria, still a large part of public was caught with superstitious ideas of malaria and as a consequence had recourse to numerous superstitious measures. For example, they believed that if one catches a
swallow or her eggs, he would get malaria. Still more various measures against malaria were proposed: eating eggs which had been left in urine for one day; jumping over an old tomb several times; kissing a road idol etc. Sometimes such superstitious ideas and measures resulted in a tragic outcome. It is reported that an old lady was treaded to death by a heavy cow because she believed that she can get rid of malaria by making a cow stepping over her body (Dong-A Daily 1935.7.29).

After Japan had annexed Korea in 1910, policies for public health system were fundamentally revised. Japan assumed control of Korean medical institutions and built high-quality Western hospitals for the health care of Japanese residents. They eliminated Korean traditional medicine in the public sectors by expelling all the traditional practitioners working in the government including hospitals and armies. The Japanese also strengthened the control of infectious diseases by civil and military policing. In the name of hygiene, police powers and surveillance intervened in the daily life of Koreans. The infectious diseases which were under special surveillance were cholera, typhoid fever, dysentery, typhus, scarlet fever, smallpox, and paratyphoid fever. Among chronic infectious diseases tuberculosis and leprosy were those under special control. Malaria, however, was not one of these specially controlled infectious diseases although it was widely spread throughout the peninsula.

But serious studies on malaria were carried out by Japanese medical scientists. In particular, a Japanese parasitologist Kobayasi (小林晴治郎, 1884-1969) carried out extensive studies on human parasites, including malaria, in Korea. According to his study, most of the malaria in Korea turned out to be tertian fever. In spite of its high prevalence, malaria did not draw much attention from the colonial authorities and no
serious measure was taken since tertian fever is a mild form of malaria caused by *Plasmodium vivax* and is not so much fatal as tropical malaria caused by *P. falciparum*. And tertian malaria was easily controlled by taking quinine. Although the majority of malaria in Korea was tertian fever, other types were not absent. Quartan fever was not rarely reported in 1930s.

The attitude of colonial authorities toward malaria in Korea was contrasted with that in Taiwan. After Japan had set out to colonize Taiwan as a result of Sino-Japanese war, malaria in Taiwan was a big obstacle to the colonization process. Therefore, a lot of medical scientists were asked to engage the malaria research in order to handle health problems in colonized countries caused by malaria (飯島 涉, 2005).

Unlike the situation in Taiwan, malaria in Korea did not cause a serious health problem as in Taiwan. However, its risk was not negligible. In 1933 there were almost 130,000 malaria patients in Korea and 1,800 patients among them died of malaria. Chronic patients who were suffering from it more than three years were not rare, and many of the victims were children (Dong-A Daily, 1934. 1. 25). The major obstacle was the people’s idea of malaria. Most of the people living in rural area had superstitious ideas on the cause and treatment of malaria, which prevented them from taking effective measures against malaria.

Available information reported on malaria in Korea prior to 1945 indicates that vivax malaria was endemic and prevalent throughout the Korean peninsula, demonstrating an uneven geographical distribution with a higher incidence rate in mountainous areas rather than large rice growing regions (Ree, 2000). There was a tendency of slight decrease in malaria incidence from 1930s. The tendency seems to have continued during 1940s.
Despite lack of overall data, the situation became worse during and after the Korean War which lasted from 1950 to 1953. Several statistics show the worsened situation. Among 6,311 army soldiers examined, 1,044 (16.5%) had febrile episodes due to malaria during 6 months in the year 1950 (Chun and Kim, 1959). According to the Korean Army medical records, 8,855 malaria cases in 1953 and 5,741 cases in 1954 (Paik and Tsai, 1963) were reported. Foreign armies which participated in the Korean War also became victims of malaria. Although US soldiers received weekly chloroquine chemoprophylaxis during the transmission season, 1,513 soldiers were reported to have been caught with malaria from July 1951 to November 1952 (Hanky et al., 1953). Besides, 152 (11%) out of 1,350 Canadian veterans who had fought in the Korean War during the year 1952 developed malaria after returning home (Hale and Halpenny, 1953).

The incidence of malaria seems to have decreased a little after the war. However, there were still a lot of endemic foci throughout the country. The mountainous northeastern part of the country turned out highly prevalent along with the northern part of Kyung-ki province near the Demilitarized Zone (DMZ). In order to cope with malaria which was still one of major health problems, the National Malaria Eradication Service (NMES) was launched in April 1959 as a joint project of the government of Korea and the UN/WHO Western Pacific Regional Office. A national wide-scale study on malaria was carried out in 1960. Various methods such as spleen survey, mass blood survey, passive case detection, and active case detection were used to diagnose malaria. A total of 18,697 blood smears was collected randomly from 278 nation wide areas, and 212 cases (1.1 %) were diagnosed positive for \textit{P. vivax} (Ministry of Health and Social Affairs, Korea, 1966; Paik et al., 1988). Malaria rate per 10,000 population was
significantly higher in the north and northeastern areas (13.0) than in the south and
south-eastern areas of South Korea. Chloroquine administration and vector control by
DDT were carried out. Thanks to the activities of malaria control operated by the NMES
and to the elevation of socio-economic status of the Koreans, the prevalence of malaria
began to decrease by the end of 1960s. The decline of the number of malaria cases was
more dramatic during 1970s. In 1970 15,926 malaria cases were reported, and it fell
virtually to zero in the year 1980. The number of malaria cases from 1980 to 1993 was
negligible for less than five cases were reported each year. If you exclude the imported
malaria cases, there was no indigenous case after 1984.

However, the situation began to change from 1993. In July 1993, a young soldier
who was camping near Demilitarized Zone (DMZ) developed fever which showed a
periodic pattern. He was admitted to the Capital Armed Forces General Hospital and
was diagnosed as vivax malaria. After the first report of the indigenous malaria,
subsequent reports followed. Next year 23 cases were reported and the number of
reports increased exponentially year by year: 108 cases in 1995, 368 cases in 1996,
1771 cases in 1997, 3978 cases in 1998, 3621 cases in 1999, and 4142 cases in 2000. In
particular, an epidemic outbreak during 1995-1998 was remarkable.

The majority of the cases were soldiers. At the beginning of the outbreak more than
90 percent of the cases were soldiers and veterans who served near the northern part of
Kyungki province, and the rate of soldiers decreased year after year. The proportion of
civilian cases increased up to 20-25 percent in 1997-1998.

At first, the areas of malaria outbreak were confined to Paju and Yonchon,
Kyungki province, both of which are located within 10-15 km from the southern border
of the DMZ. And the areas of re-emerging malaria began to expand southward. Some
cases, however, were also reported far from these outbreak areas. The number of such cases increased remarkably in 1998. The majority of the cases were either recently discharged veterans who had served in DMZ or at vicinity of DMZ, or civilians who traveled the areas. They could be a possible source of secondary transmission. Therefore, despite the nationwide distribution of the re-emerging cases, the primary source of infection cannot be the region where malaria patients were reported.

Now it is time to ask why malaria had re-emerged in DMZ area? Several hypotheses were proposed to explain re-emerging of malaria in this area. One possibility was a natural transmission from relapsed or long-term latent infection of indigenous cases in Paju area, where malaria was highly prevalent in the past. The possibility was discarded as malaria was virtually eradicated in South Korea in 1979 that it seemed impossible for endemicity to be re-established in 1993 and 1994. The second possibility was malaria transmission by imported cases. This possibility is also hardly plausible since most of the reported patients had no experience of traveling foreign countries where malaria is prevalent. The third possibility, which is the most plausible, is introduction of sporozoite-infected mosquitoes dispersed from North Korea to South across DMZ (Chai, 1997). Malaria had been prevalent throughout the Korean peninsula before Korea was divided in 1945. Although we do not have detailed and reliable information on public health and disease statistics of North Korea, it is presumed that malaria had persisted in North Korea even with low endemicity. The situation seemed to have changed from 1993 when the first indigenous malaria case occurred in South Korea. A question is naturally raised why malaria cases began to appear near DMZ in 1993 and subsequent years.
We can presume environmental change in North Korea near DMZ as the possible cause of re-emerging of malaria. Despite the lack of meteorological data of North Korea, we know that North Korea had suffered from unusual flood from 1993 onward especially during summer season. Monthly precipitation records of meteorological office near North Korea reports that there was very heavy rainfall in the area, which exceeded the average monthly precipitation by 100mm to 450mm. The flood that had devastated the North Korea can not only be attributed to heavy rain alone but to reckless deforestation which had been carried out past years. These floods seemed to have provided extensive breeding places for vector mosquitoes, *Anopheles sinensis*. Malaria epidemics might have started then. Variations of climatic and environmental conditions such as heavy rainfalls have great influence on the transmission and seasonal incidence of malaria. The species of vector mosquitoes, *Anopheles sinensis*, is highly zoophilic: 97.3% of female feed on cows and pigs. However, the floods had left few cattle whereas numerous mosquitoes had been reproduced due to the favorable natural conditions. As a result, most female vectors had no other choice than to feed on humans (REE, 1998).

Vivax malaria in Korea had been endemic for centuries and prevailed throughout the country. Even though malaria had virtually disappeared in Korea around 1980, it re-emerged from 1993 on. The Korean case shows that malaria epidemics return when environmental factors such as climatic, socio-ecological, and political factors change in favor of vectors or parasites.

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