

**AN OVERVIEW ON EARLY DETECTION OF CANCER:  
IMPORTANCE, EFFECTIVENESS, DETERMINENTS****EUN-WHAN LEE***Department of Social and Preventative Medicine, School of Medicine,  
Sungkyunkawn University, South Korea.***ABSTRACT**

Today, non-communicable diseases (NCDs), mainly cancer represents a leading threat to human health and development. In the past few decades cancer was major killers in developed countries but now it is becoming a global issue with marked rise in mortality and morbidity in developing countries. Unlike developed countries the emergence of cancer epidemic in the developing countries has attracted less comment and little public health response although the developing countries contribute a great share to the global burden of cancer. In management or controlling cancer, early detection is very important. This review paper shows the current status of cancer in the world including low and middle income countries and then introduces importance of early detection of cancer, its evidences, effectiveness and several measures to manage cancer and early screening.

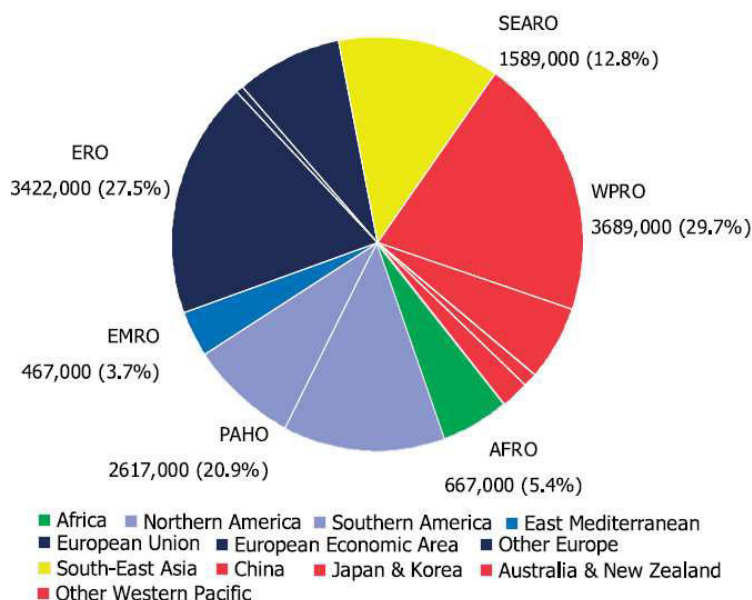
**KEYWORDS:** Cancer, Screening, Early detection, Health policy**EUN-WHAN LEE***Department of Social and Preventative Medicine,  
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## INTRODUCTION

Today, non-communicable diseases (NCDs), mainly cancer represents a leading threat to human health and development. In the past few decades cancer was major killers in developed countries but now it is becoming a global issue with marked rise in mortality and morbidity in developing countries. Unlike developed countries the emergence of cancer epidemic in the developing countries has attracted less comment and little public health response although the developing countries contribute a great share to the global burden of cancer<sup>26-31</sup>. World Health Organization(WHO) reported that estimated incidence of cancer was 12.4 million throughout the world in 2008<sup>1</sup>. Gender specific incidences were 6.7 million in men and 5.8

million in women. Data shows that 7.6 million people died from cancer; out of which, 4.3 million were men and 3.3 million were women. By region, there were 667 thousand cases (5.4%) in WHO African Region (AFRO), 2,617 thousand cases (20.9%) in WHO Pan-American Region (PAHO), 467 thousand cases (3.7%) in WHO Eastern Mediterranean Region (EMRO), 3,422 thousand cases (27.5%) in WHO European Region (ERO), 1,589 thousand cases (12.8%) in WHO South East Asia Region (SEARO), 3,689 thousand cases (29.7%) in WHO Western Pacific Region (WPRO). Large proportion of countries with resources (low and middle income) were over half of the incident cases; AFRO, EMRO, SEARO and WPRO (Figure 1)<sup>1</sup>.



**Figure 1**  
**Distribution of Global Cancer burden by World Health Organization Region (2008)<sup>1</sup>.**

WHO estimated that the number of new cases of cancer in the world is more than 27 million by 2030, with deaths increasing to 17 million. And WHO has warned that there is much burden of cancer in low-resources countries.

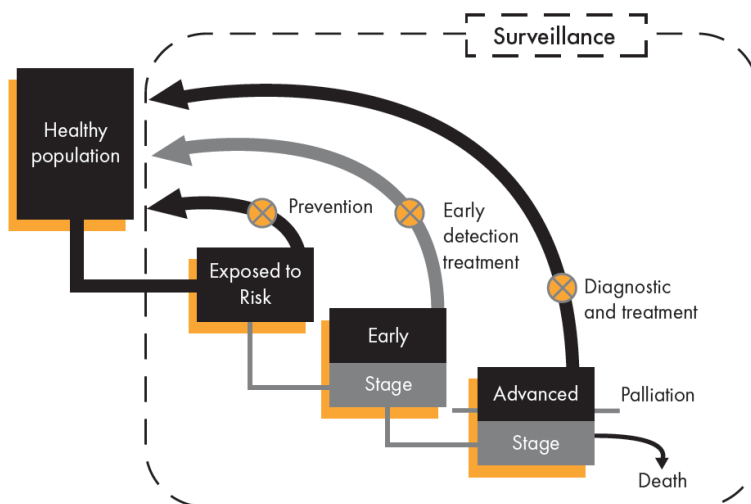
### **Importance of screening for early detection of cancer**

Cancer is potentially the most preventable of the chronic illnesses<sup>1</sup>. In accordance with natural history of disease, cancer screening is conducted to detect cases earlier so that the

intervention is more effective<sup>2</sup>. WHO reported that early detection through screening is complete and swift way to control cancer, furthermore, one third of cancer patients can be prevented<sup>3</sup>. Figure 2 illustrates WHO's comprehensive approach to cancer control according to stage. WHO recommends that primary prevention is important to reduce risk of cancer through healthy life style, but after on set, secondary prevention through early detection is most important due to the fact that it can decrease the mortality rate with less

effort and short period of time relatively. WHO emphasize the importance of screening for

early detection of cancer to decrease the burden of cancer in low-resource countries<sup>1</sup>.



**Figure 2**  
**WHO's comprehensive approach to cancer control?<sup>1</sup>**

### **Effect of early screening**

Many countries including low and middle income countries have been implementing early screening for stomach cancer, breast cancer, cervical cancer and colorectal cancer as one of the country level health policy. And many studies have provided evidence of the effect of early screening. They demonstrated that those who received early screening showed lower rate of death and higher rate of early stage detection, compared to those who did not receive<sup>4-7</sup>. An analysis of the effect of early stomach cancer screening with 39,250 samples showed that the early stomach cancer screening was effective in discovering and treating the cancer at its early stage<sup>4</sup>. And a case-control study demonstrated that the risk of dying from stomach cancer was significantly low in the group who received early stomach cancer screening<sup>5</sup>. As well, another study reported that when one received stomach cancer screening every five years, one may decrease his/her death rate by 60%, and that those who received the screening annually showed significantly lower rate of dying from stomach cancer in comparison with the group who did not<sup>6</sup>.

In the case of breast cancer, the rate of dying from breast cancer decreased by 29% in the group who received early mammography<sup>7</sup>. Puliti et al., conducted a case-control study on breast cancer between

50 and 74 years old women from five regions in Italia, and reported that the risk of dying from breast cancer was decreased 0.55 times compared to the group who did not<sup>8</sup>. Magnus et al., followed up 45,960 females between 26 and 59 years of age from 1959 to 1982, and reported that the group who received early cervical cancer screening showed lower rate of cancer incidence by 0.62 times<sup>9</sup>, and Macgregor et al., conducted a case-control study during 1982~1991 and found that the death rate of the group who received early cervical cancer screening was lower 0.25 times than the group who did not<sup>10</sup>. As stated above, many studies demonstrate the evidence that those who received early screening shows lower death rate from cancer and the higher rate of detection of early stage, in other words, early screening is effective for management of cancer.

### **Factors associated with taking early screening**

When looking into previous studies that aimed at improving early cancer screening, we can find some studies that suggest how to increase the screening rate by comparing the differences between those who received early cancer screening and those who did not, or by finding out such a factor that affects the behavior of receiving cancer screening. Studies on the factors associated with taking

cancer screening, reported that social and economic characteristics, the characteristics in the use of medical services and the social and mental characteristics are associated with taking cancer screening. Firstly, the social and economic characteristics including gender, age, race, educational background, level of income, marital status and insurance type<sup>11-15</sup>, and the characteristics in the use of medical services, including regular visit to doctors, and the experiences of receiving cancer screening in the past affected the behavior of cancer screening<sup>11,12,14,16,17</sup>. In addition, the social supports such as the recommendation by doctors or those around the patient were the factors that are related to the behavior of cancer screening<sup>14,18,19</sup>, and the social and mental characteristics such as the belief that cancer can be cured, the sensitivity to the risks of cancer, the knowledge of the benefits from cancer screening, barriers to cancer screening and the patient's own sense of efficacy are reported to be the factors that influence the behavior of receiving cancer screening<sup>18-25</sup>.

## CONCLUSION

WHO has suggested the criteria for selecting specific cancers that are appropriate for the strategy of early screening as follows<sup>32</sup>. Firstly, that cancer type should be problematic in terms of the public health, should have a

definite natural history of disease and a stage available for early screening. Additionally, there should be a way that enables ethical, safe and efficient early screening, and when that cancer is detected in early stage, there should be a way to treat that cancer, which are requirements for selecting a specific cancer type that is proper for the strategy of early screening. Therefore, it is required to select such a cancer which has a high incidence rate in terms of the public health in each country, and to conduct the strategy of early screening. For example, cervical cancer is increasing in developing countries recently, may be illustrated as a good example. Cervical cancer has been most common in women and one of the leading causes of mortality in high income countries both in 1960s and 1970s. However, the significant decline in cervical cancer mortality in developed countries has been attributed to widespread screening<sup>33</sup>. When reflecting the results of the studies stated above on the factors affecting the undertaking of screening, the social and economic factors including the level of income and education influenced it. That is, in case of the vulnerable groups, their likelihood of receiving cancer screening was lower, which suggests that it is likely that there is social inequality in cancer screening. Therefore, it is required to take vulnerable groups into account when pursuing the strategy of early cancer screening.

## REFERENCES

1. Boyle P and Levin B. World Cancer Report 2008. Geneva: WHO Press: 12-61, (2008).
2. Stewart BW and Kleihues P. World Cancer Report 2003. Geneva: WHO Press: 58-86, (2003).
3. World Health Organization. National Cancer Control Programmes. Geneva: World Health Organization Press: 34-101, (2002).
4. Shiratori Y, Nakagawa S, Kikuchi A, Ishii M, Ueno M, Miyashita T, Sakurai T, Negami J, Suzuki T, Sato I. Significance of a gastric mass screening survey. American Journal of Gastroenterology, 80(11):831-834, (1985).
5. Oshima A, Hirata N, Ubukata T, Umeda K, Fujimoto I. Evaluation of a mass screening program for stomach cancer with a case-control study design. Int J Cancer, 38(6):829-33, (1986).
6. Fucao A, Tsubono Y, Tsuji I. The evaluation of screening for gastric cancer in Miyagi prefecture, Japan: a population-based case-control study. Int J Cancer, 60:45-48, (1995).
7. Shapiro S, Venet W, Strax P et al. Ten to fourteen year effect of screening on breast cancer mortality. J Natl Cancer Inst, 69:349-355, (1982).
8. Puliti D. Effectiveness of service screening: a case-control study to assess breast cancer mortality reduction. British Journal of Cancer, 99:423-427,

- (2008).
9. Magnus K, Langmark F, Andersen A. Mass screening for cervical cancer in Ostfold county of Norway 1959-77. *Int J Cancer*, 39:311-316, (1987).
  10. Macgregor JE, Campbell MK, Mann EM, Swanson KY. Screening for cervical intraepithelial neoplasia in north east Scotland show fall in incidence and mortality from invasive cancer with concomitant rise in preinvasive disease. *BM*, 308:1407-1411, (1994).
  11. Ham OK. Factors affecting mammography behavior and intention among korean women. *Oncology Nursing Forum*, 33(1):113-119, (2006).
  12. Tessaro I. Knowledge, barriers, and predictors of colorectal cancer screening in an appalachian church population. *Preventing Chronic Disease*, 3(4):1-11, (2006).
  13. Janz NK, Wren PA, Schottenfeld D, Guire KE. Colorectal cancer screening attitudes and behavior: a population-based study. *Preventive Medicine*, 37:627-634, (2003).
  14. Trauth JM, Ling BS, Weissfeld JL, Schoen RE, Hayran M. Using the Transtheoretical Model to stage screening behavior for colorectal cancer. *Health Education & Behavior*, 30(3):322-336, (2003).
  15. Juon HS. Breast and cervical cancer screening among Korean American elderly women. *European Journal of Oncology Nursing*, 6(4):228-235, (2002).
  16. O'Neill SC. Intentions to maintain adherence to mammography. *J Womens Health*, 17(7):1133-1141, (2008).
  17. Clemow L. Underutilizers of mammography screening today: characteristics of women planning, undecided about, and not planning a mammography. *Annals of Behavioral Medicine*, 22(1):80-88, (2000).
  18. Hahm MI, Choi KS, Park EC, Kwak MS, Lee HY, Hwang SS. Personal background and cognitive factors as predictors of the intention to be screened for stomach cancer. *Cancer Epidemiol Biomarkers Prev.*, 17(9):2473-2479, (2008).
  19. Soskolne V. Beliefs recommendations and intentions are important explanatory factors of mammography screening behavior among muslimarab women in Israel. *Health Education Research*, 22(5):665-676, (2007).
  20. Ryu EJ. Predictors of mammography uptake in Korean women aged 40 years and over. *Journal of Advanced Nursing*, 64(2):168-175, (2008).
  21. Menon U, Belue R, Skinner SC, Rothwell BE, Champion V. Perceptions of colon cancer screening by stage of screening test adoption. *Cancer Nurs*, 30(3):178-185, (2007).
  22. Russell KM, Monahan P, Wagle A, Champion V. Differences in health and cultural beliefs by stage of mammography screening adoption in africanamerican women. *Cancer Supplement*, 109(2):386-395, (2007).
  23. Dundar PE. The knowledge and attitude of BSE and mammography in a group of women in a rural area in western Turkey. *BMC Cancer*, 6(43):1-9, (2006).
  24. Lawsin C. Colorectal cancer screening among low-income African americans in east Harlem: a theoretical approach to understanding barriers and promoters to screening. *Journal of Urban Health*, 84(1):32-44, (2006).
  25. Tolma EL. Examining the theory of planned behavior and the construct of self-efficacy to predict mammography intention. *Health Education & Behavior*, 33(2):233-251, (2006).
  26. Pradhan D, Joshi V, Tripathy G. Anticancer effect of sapindus trifoliatus on human breast cancer cell lines. *International Journal of Pharma & Bio Sciences*, 1(1):1-9, (2010).
  27. Balaji SUBBIAH, Balaji P. Nanotechnology and cancer—an overview. *International Journal of Pharma & Bio Sciences*, 1(4):186-201, (2010).
  28. Sarkar PIYALI, Mahmud MAK, Kaiyum-Mahmud MA. Gingerol might be a sword to defeat colon cancer. *International Journal of Pharma & Bio Sciences*, 2(1):816-827, (2011).
  29. Srinivasan R, Manoj L, Kalyani M, Jyothi K, Ganga Bhavani G, Govardhani V. Review of brain and brain cancer treatment. *International Journal of Pharma & Bio Sciences*, 2(1):468-477,

- (2011).
30. Jaganti V, Das S, Sampath TS. A review on cancer vaccines. International Journal of Pharma & Bio Sciences, 2(3):86-97, (2011).
31. Mulla SK, Swamy P. Anticancer activity of ethanol and polyphenol extracts of portulaca quadrifida linn on human colon cancer cell lines. International Journal of Pharma & Bio Sciences, 3(3):488-498, (2012).
32. Kmietowicz, Z. WHO insists screening can cut breast cancer rates. BMJ: British Medical Journal, 324(7339):695, (2002).
33. Gakidou E, Nordhagen S, Obermeyer Z. Coverage of cervical cancer screening in 57 countries: low average levels and large inequalities. PLoS Med, 5(6):e132, (2008).