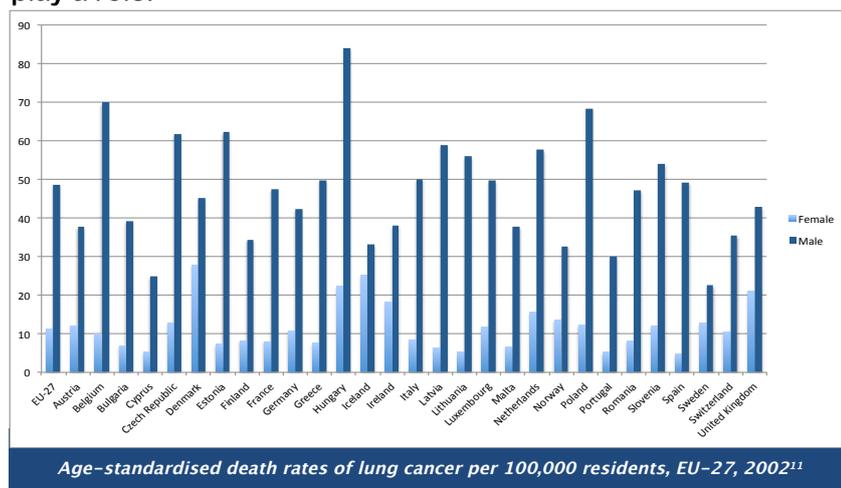
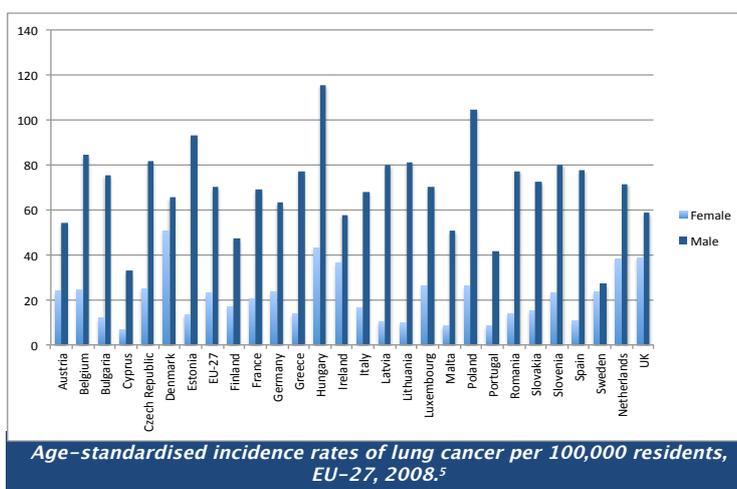


Lung Cancer: Why Gender Matters

Historically, lung cancer has mostly affected men and was considered rare in women. Overall, the smoking prevalence is lower among women than men. However, this gap has been narrowing due to a decrease in male smokers and increase in female smokers in some countries. Although more men are diagnosed with lung cancer, incidence is levelling off or decreasing in men, but is increasing among women over time.¹

Lung cancer is deadly, yet it is highly preventable. About 1/3 of EU citizens smoke; in some EU countries up to 50% of women smoke.² Annually, 650,000 Europeans die prematurely.³ A high percentage of lung cancer in women is smoking-related. Despite lung cancer's strong association with tobacco use, one in five women who develops the disease has never smoked. Non-smoking women appear to be at two to three times greater risk for developing lung cancer, suggesting that other factors such as passive or environmental smoke play a role.^{4, 5, 6}



In Europe, lung cancer causes 20% of all cancer-related deaths, the highest of any cancer.⁷ Cancer of the lung/bronchus is the third most common cancer among women. Lung cancer death has overtaken that of breast in Poland, the UK and Ireland. A recent study funded by Macmillan Cancer Support estimates that in the UK lung cancer death is expected to quadruple in women in the next 30 years.⁸ However, while women fear breast cancer, they seem to be unaware of their lung cancer risk. The poor prognosis for lung cancer leads

to similar incidence and mortality patterns throughout the world. Relatively low survival rates mean that despite high incidence rates there are fewer patients surviving. It is estimated that smoking costs the EU countries between €98-130 billion in health expenses per year.⁹

Gender and Biological Differences in Lung Cancer

Researchers are just beginning to understand the differences in lung cancer between women and men. These differences affect lung cancer prevention, treatment and survival. Lung cancer results from the interactions between genetic, hormonal, behavioural and environmental factors. Studies suggest that lung cancer in women is biologically different from that in men:¹⁰

- Their genes may make women more vulnerable to the harmful effects of smoking.
- Women's bodies may metabolise the chemicals in tobacco differently.
- Changes to genes that control cell growth may aid in cancer development.
- A lowered ability to repair DNA damage may aid in cancer development.
- Women's hormones, such as estrogen, may directly or indirectly influence cancer progression.¹⁰

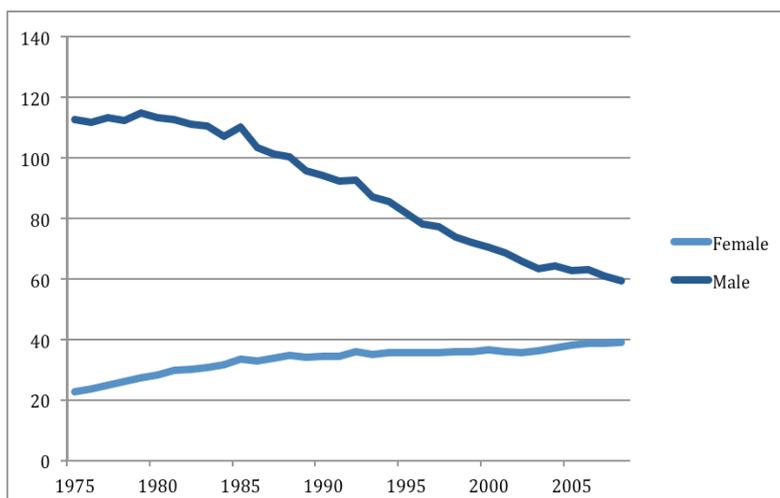
Women tend to develop lung cancer at a younger age, however they survive longer than men in both early- and late-stages regardless of the treatment. Specifically, the five-year relative survival rate in women is 16% compared to 12% in men. The reason for this difference is unknown. Some studies also indicate that some treatments work better in women than in men.^{11,12} More research into the gender and biological differences needs to be encouraged.

WOMEN AND LUNG CANCER IN THE EU

Gender and Lung Cancer Screening & Treatment: The Interaction

Few studies have explored the differences between women and men in the procedures and outcomes of lung cancer screening. Since women and men develop different histological subtypes of lung cancer, various experts believe that radiological screening vary in effectiveness by gender.¹³

Treatment varies between men and women for lung cancer. Studies have found that women were less likely to undergo surgery to treat lung cancer than men. Radiation therapy is more frequently administered to



Age-standardised incidence rates of lung cancer per 100,000 residents, UK¹⁵

Women have better survival rates than men following surgery even when adjusting for confounders for both non-small cell and small cell lung cancers as well as various types of treatments (surgery, chemotherapy, radiation therapy, no treatment)—although the reasons for the difference are unknown.¹⁶

Targeted therapies, adjusting for tumor characteristics, are improving lung cancer treatment. One of the most promising molecular targets to-date in lung cancer treatment focuses on the epidermal growth factor receptor gene (EGFR). Mutations in this gene are more common in women who have never smoked and in those with adenocarcinoma of the lung than in other populations.¹⁷

Smoking and Women: Prevalence, Anti-Smoking Initiatives, influence of Tobacco Industry

The gender gap in smoking rates is narrowing: in 14 out of 26 EU countries, girls out-smoke boys. Combining both daily and occasional smokers, the prevalence reached 46.5% in Austria and was above 20% in the majority of European countries for which data was available.¹⁸ Smoking has become more popular among younger women; this will have negative consequences for their future health.

Young girls are more likely to smoke than boys, particularly in Northern and Western European countries. In the 2002-2005 period, more girls than boys smoked in Italy, Sweden, Finland, the Czech Republic, France, Spain, Denmark, Ireland, the UK, Norway, Belgium, the Netherlands, Hungary, Germany, Austria, Greece, Portugal, and Slovenia.¹⁹

The Tobacco industry has long targeted young people in the promotion of their products. Their aggressive marketing strategies are increasingly aimed at young girls and women worldwide. The industry considers female consumers to be a lucrative, unexplored market. Creating women-only brands, their packaging plays on the appeal of glamorous images such as cigarettes as party accessories, sponsored events, like women's tennis games and dances. Female-targeted branding includes light or slim cigarettes, low prices, easy availability and free samples.²⁰ The revision of the Tobacco Products Directive will provide Europe with an opportunity to curb these promotional activities through plain packaging.²¹ The recent affirmative ruling of the Australian High Court to make this legal should encourage positive action worldwide.²¹ Various restriction have been placed on tobacco products; more regulation is needed and a committed approach similar to that of Australia.^{22, 23}

Despite the industry aggressively targeting women with their promotional activities, few anti-smoking initiatives have taken a gender-based approach reaching out to women. Smoking is more common in lower socio-economic groups. Women on average are poorer than men, have a lower employment status, and often are economically dependent. Increasingly, they are heading single parent and low-income households. Their lower-paid work, may expose them to a smoking environment through part-time house or hospitality work. Maternal smoking has a devastating effect on their offspring, causing miscarriages, birth defects, premature births etc. Smoking cessation programmes for vulnerable women must offer a way out of breaking the cycle of deprivation and tobacco dependency.^{24,25}



References

1. EUGLOREH. 2007. *The Report on the Status of Health in the European Union*. <http://www.eugloreh.it/default.do>
2. World Health Organization. 2003. "Global cancer rates could increase by 50% to 15 million by 2020." <http://www.who.int/mediacentre/news/releases/2003/pr27/en/>
3. European Commission (EC). 2004. *Tobacco or Health in the European Union: Past, Present, and Future*. http://ec.europa.eu/health/ph_determinants/life_style/Tobacco/Documents/tobacco_exs_en.pdf
4. Martin, T. 2005. "Cancer Statistics." <http://quitsmoking.about.com/od/tobaccostatistics/a/cancerstats.htm>
5. Wakelee HA, Chang ET, et al. 2007. "Lung cancer incidence in never smokers." *J Clin Oncol* 25(5), 472-8.
6. MacMillan. 2012. "Lung cancer in women set to rise 35 times faster than in men by 2040." http://www.macmillan.org.uk/Aboutus/News/Latest_News/Lungcancerinwomensettorise35timesfasterthanmenby2040.aspx
7. The International Agency for Research on Cancer. 2008. *GLOBOCAN*. http://globocan.iarc.fr/burden.asp?selection_pop=63968&Text-p=Europe&selection_cancer=14110&Text-c=Lung&pYear=2&type=1&window=1&submit=%A0Execute%A0
8. Wilmott, Glenis, MEP. 2012. "Lung cancer due to quadruple in women." <http://www.gleniswilmott.eu/lung-cancer-due-to-quadruple-in-women/>
9. Cancer Research UK. 2011. *Lung Cancer UK Incidence Statistics*. <http://info.cancerresearchuk.org/cancerstats/types/lung/incidence/#age>
10. EC. 2004. *Tobacco or Health*.
11. American Society of Cancer Oncologists. 2009. *Women and Lung Cancer*. <http://www.cancer.net/patient/All+About+Cancer/Cancer.Net+Feature+Articles/Cancer+Screening+and+Prevention/Women+and+Lung+Cancer?cpsexcurrchanne1>
12. World Health Organization. 2004. *Gender in Lung Cancer and Smoking Research*. <http://whqlibdoc.who.int/publications/2004/9241592524.pdf>
13. EUPHIX. 2009. *Lung Cancer Mortality*. http://www.euphix.org/object_document/04589n27172.html
- 14, 15. Brigham and Women's Hospital. 2010. *Out of the Shadows: Women and Lung Cancer*. http://www.brighamandwomens.org/Departments_and_Services/womenshealth/connorscenter/images/WomenandLungCancerFinal-April22_2010pdf.pdf
16. Cancer Research UK. 2011. *Lung Cancer UK Incidence Statistics*. <http://info.cancerresearchuk.org/cancerstats/types/lung/incidence/#age>
- 17, 18. Brigham and Women's Hospital. 2010.
19. European Communities. 2009. Data and information on Women's Health in the EU. http://ec.europa.eu/health/population_groups/docs/women_report_en.pdf
20. World Health Organization. 2009.
21. Europa. 2012. "Tobacco Products Directive: Making tobacco products and smoking less attractive." http://europa.eu/rapid/press-release_SPEECH-12-968_en.htm
22. RTE. 2013. "Australian court upholds logo ban on cigarette packs." <http://www.rte.ie/news/2012/08/15/australian-court-upholds-cigarette-pack-logo-ban-business.html>
23. UN. 2012. *Anti-tobacco ruling in Australia welcomed by UN health agency*. <http://www.unmultimedia.org/radio/english/2012/08/anti-tobacco-ruling-in-australia-welcomed-by-un-health-agency/>
24. Kaufman, N. and Mimi Nichter, 2001. *The Marketing of Tobacco to Women: Global Perspectives*. WHO.
25. Zatonsky. 2007. HEM. *European Journal of Public Health*.

STEPS FOR POLICY ACTION

- 1) **Improve existing EU data collection to track smoking prevalence and lung cancer.**
Annually collect data on the prevalence and incidence of lung cancer, disaggregating by gender and age in order to fully understand trends. At the EU-level, set up a robust comparable monitoring system to track smoking prevalence across the 27 Member States.
- 2) **Make women and the public health community aware that women are at risk of developing lung cancer.**
Target effective smoking cessation programmes at girls and young women as a priority in all EU countries. Promote an understanding in young women of the impact smoking has on their own health and that of their children. Develop anti-smoking campaigns to reach out with convincing messages to women during pre-natal care when they may be most receptive to advice.
- 3) **Make tobacco control policies and interventions more gender-sensitive according to the Framework Convention on Tobacco Control (FCTC) recommendations, taking account of socio-economic factors and vulnerable groups.**
- 4) **Ensure that the revision of the EU Tobacco Products Directive provides for plain packaging.**
The European Commission has revised the 2001 Tobacco Products Directive. This provides an opportunity for Europe to follow the Australian leadership to make plain packaging mandatory.
- 5) **Remove the stigma of lung cancer and increase research funding for both women and men to ensure optimal care for patients, improve their chances of survival and reduce the high financial and social burden of this disease.**
Increase funding for basic and clinical research into early detection, diagnosis, appropriate biomarkers to enable earlier diagnosis and hence more effective treatment. Develop effective screening tests and screening criteria to detect lung cancer early. Develop affordable biotherapies for all stages of lung cancer.
- 6) **Increase understanding of the disease differences between men and women, such as different patterns, causes and mechanisms to develop a comprehensive strategy for the prevention, diagnosis and treatment of lung cancer in both genders.**
Fund research into the differences of lung cancer prevention, diagnosis and treatment between women and men and develop effective gender-sensitive guidelines for health professionals.
- 7) **Expand and support lung cancer advocacy through interdisciplinary collaboration and coordination including epidemiologists, public health policy leaders, oncologists, behavioural scientists, researchers, politicians, women's and patient groups and lung cancer advocates.**
Interdisciplinary collaborations can best address the complex interaction between the social and biological determinants of health that lead to differences in the development, diagnosis, and treatment of lung cancer between men and women.

A special thank you to expert-reviewers:

*Norma Cronin, Board Member, International Network of Women Against Tobacco (INWAT)
Pilar Garrido MD PhD, Head of Thoracic Tumor Unit, Medical Oncology Department,
Hospital Universitario Ramón y Cajal, Madrid, Spain*



European Institute of Women's Health
<http://www.eurohealth.ie>