

Clinical protocol 10: Lung cancer epidemiology and mortality among Danish lung cancer patients in a Scandinavian context

Niels Lyhne Christensen MD, PhD, Erik Jakobsen MD, MPH, Susanne Dalton MD, PhD, Anders Green MD, DMSc and Bjørn Henning Grønberg MD, PhD.

Background

Lung cancer is the main cause of cancer related death in Denmark. Danish lung cancer patients are mainly diagnosed and staged in the fast track integrated cancer pathway for lung cancer, and thus generally receive treatment with minimal delay¹. Furthermore, patients receive both surgical and non-surgical treatment through high volume centers. Finally, Danish lung cancer patients are subjected to a short interval CT- based follow-up regimen, which is the most comprehensive among the Nordic countries². These initiatives and organizational factors have arguably contributed to the recent improvements in survival among Danish lung cancer patients. However, in spite of this, the mortality rate of Danish lung cancer patients is among highest in the Nordic countries³. Common mile stones when assessing cancer outcomes are one- and five -year overall survival. Currently, one-year survival for lung cancer patients is 50.8 % in both Norway and Denmark. However, the five-year survival is 20.9% in Norway⁴ (2017) vs. 14.9% in Denmark⁵ (2017) and the survival is even higher among Swedish lung cancer patients is even higher³. This suggests that other important negative prognostic factors e.g. tobacco smoking and alcohol consumption are more prevalent in the Danish population of lung cancer patients as compared to the other Nordic countries. The national lung cancer registries of the Nordic countries have high but still varying degrees of completeness (i.e. 86 and 95% in Denmark and Norway, respectively)^{4,6,7}. Consequently, valuable knowledge concerning factors associated with the apparent excess mortality that occur among Danish lung cancer patients, may be obtained by comparative register-based analyses between the cancer registries of Denmark, Sweden and Norway. While also assessing and comparing the quality and completeness of the data foundation on which the survival estimates are based upon in the respective countries.

Objectives

1: To assess clinical, patient-related and organizational factors relating to five-year mortality among Danish non-small cell lung cancer patients.

2: To compare the data contents and case mix of the national cancer registries between Norway, Denmark and Sweden.

3: Between a Danish and Norwegian cohort, we aim to compare baseline characteristics (age, gender, smoking, alcohol consumption, burden of comorbidity, tumor biology and sociodemographic factors) and clinical interventions concerning the treatment aspects (incl. palliative treatment) and the follow-up phase.

4: To assess potential differences in the cause of death between Danish and Norwegian lung cancer patients during the study period.

A Swedish cohort may be included in the studies relating to objective 3 & 4.

Clinical relevance

The high data quality and completeness of the Danish registries allow for multifactorial analyses of various associations in a larger population-based epidemiological setting. And thus constitute an important supplement to the studies already planned within the framework of the present application. Furthermore, the results of the register-based studies can inspire future clinical studies.

Methods

Study design

Retrospective population-based cohort studies, comparative studies, validation studies and nested case/control studies.

Inclusion criteria

Patients that according to the DLCR (DK), Kreftregistret (NO) and Cancerregistret (SWE) were diagnosed with non-small cell lung cancer between 2012 and 2018 will be eligible for inclusion.

Data sources

The national and clinical cancer registries will be the primary data sources. We will add data from other registries such as the National Patient Registry and Cause of Death registry.

Furthermore, in order to obtain knowledge concerning parameters that are not available through the registries and for validation purposes, a sample of the respective study populations will be subjected to a review of medical records.

Time schedule

Study planning and acquisition of relevant approvals	Nov 2019 –Aug 2020
Register-based analyses, paper writing and data collection	Sep 2020 – Mar 2021
Validation, final analyses and paper writing	Apr 2021 – Oct 2022

Budget and Funding

1.000.0000, for data collection, salary and traveling expenses. This will cover the isolated Danish studies. Depending on the extent of collaboration with the other Nordic countries, additional funding may be needed and potential co-financing will be addressed during the planning of the studies.

Perspectives

Since we aim to improve survival of Danish lung cancer patients, we need to know what they die from and if possible to identify clusters of patients who are at increased risk of dying. The planned register-based studies address these questions.

So far, the DLCR has been used primarily to improve the quality of- and harmonize treatment of lung cancer in Denmark. Furthermore, it has also served as the primary data source for several studies that have been published in international journals. The current study with comparative studies and validation elements in addition to the common register-based national studies will constitute a novel utilization of the DLCR and can potentially improve the quality of the DLCR. Moreover the planned comparative studies will provide insight into potential differences in data and patient composition between the national cancer registries in the Nordic countries. These potential differences have been suggested as part of the reason for the observed differences in outcome between the Nordic countries.

References:

1. Probst HB, Hussain ZB, Andersen O. Cancer patient pathways in Denmark as a joint effort between bureaucrats, health professionals and politicians-A national Danish project. *Health Policy (New York)*. 2012;105(1):65-70. doi:10.1016/j.healthpol.2011.11.001.

2. Christensen NL, Jekunen A, Heinonen S, Dalton SO, Rasmussen TR. Lung cancer guidelines in Sweden, Denmark, Norway and Finland: a comparison. *Acta Oncol (Madr)*. 2017;56(7):943-948. doi:10.1080/0284186X.2017.1315172.
3. Engholm G, Ferlay J, Christensen N et al. NORDCAN: Cancer Incidence, Mortality, Prevalence and Survival in the Nordic Countries, Version 7.3 (08.07.2016). Association of the Nordic Cancer Registries. Danish Cancer Society. Available from <http://www.ancr.nu>, accessed on 21/12/2016.
4. *Årsrapport 2017 Lungekreft.*; 2017.
5. *Dansk Lunge Cancer Register National Årsrapport 2017.*; 2017.
6. Jakobsen E, Green A, Oesterlind K, Rasmussen TR, Iachina M, Palshof T. Nationwide Quality Improvement in Lung Cancer Care: The Role of the Danish Lung Cancer Group and Registry. *J Thorac Oncol*. 2013;8(10):1238-1247. doi:10.1097/JTO.0b013e3182a4070f.
7. Swedish Cancer Registry. https://www.socialstyrelsen.se/register/halsodataregister/cancerregistret/bortfalloch_kvalitet.