

**Variation in lower limb amputation rates
a national scandal**

Houllind, Kim; Kjellberg, Jakob

Published in:
British Journal of Surgery

DOI:
10.1093/bjs/znac417

Publication date:
2023

Document version:
Accepted manuscript

Citation for published version (APA):
Houllind, K., & Kjellberg, J. (2023). Variation in lower limb amputation rates: a national scandal. *British Journal of Surgery*, 110(3), 291-293. <https://doi.org/10.1093/bjs/znac417>

Go to publication entry in University of Southern Denmark's Research Portal

Terms of use

This work is brought to you by the University of Southern Denmark.
Unless otherwise specified it has been shared according to the terms for self-archiving.
If no other license is stated, these terms apply:

- You may download this work for personal use only.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying this open access version

If you believe that this document breaches copyright please contact us providing details and we will investigate your claim.
Please direct all enquiries to puresupport@bib.sdu.dk

Variation in lower limb amputation rates: national scandal

By

Kim Christian Houliind

Professor, Head of Dept. of Vascular Surgery. Kolding Hospital, University Hospitals of Southern Denmark, Sygehusvej 24, 6000 Kolding

Dept. of Regional Health Research, University of Southern Denmark

Jakob Kjellberg

Professor in Health Economics

VIVE – The Danish Center for Social Science

Herluf Trolles Gade 11, 1052 Copenhagen K

This year, chronic limb threatening ischemia (CLTI) and amputations have been hot news in Danish media. Starting with being a top story on national television May 11th, almost every week since has had its headlines about patients who either underwent amputations of legs that might have been saved, or patients who barely avoided having an amputation by seeking second opinion in another part of the country. From existing in relative obscurity from the minds of most Danes, the vascular surgical speciality has been thrust into the center of public attention.

What sparked the interest was an analysis, written by one of the authors of this leader (KH), on the status of vascular surgery in the Central Region of Denmark (1), one of the five political-administrative units governing the tax-funded health care system in Denmark. The report was commissioned by the administrative leadership of the Region. In the report, a comparison was performed between the Central Region with a population of 1.321.053 inhabitants (in 2019) and the rest of the peninsula of Jutland with a population of 1.349.771 inhabitants. The number of infrainguinal procedures, bypass or endovascular, almost exclusively performed for amputation prevention in patients with CLTI, that were performed in the Central Region during the period 2007-2020 was 3,151 compared to 7,069 procedures in the rest of Jutland. This number was stable over the entire 14 years period. The number of major amputations performed in the Central Region over the period 2016 – 2020 was reported to be 2,013 while in the rest of Jutland it was reported to be 1,554, an annual difference of 92 amputations per year. Later, the Central Region corrected the number they had provided for the analysis, changing the number to an average difference of 47 amputations per year.

This difference in amputation rate was publicly deemed unacceptable by the political level of the Central Region, by the Danish Minister of Health, and by politicians from almost all political parties who demanded action. Among the consequences was the firing of the highest ranking civil servant in the Central Region. A broader analysis including all of Denmark has been performed (2) and hundreds of patients, who have had a limb amputated, have received letters that they may be eligible for financial compensation in case their limb could have been saved with early vascular intervention.

In the national report (2) it was found that three regions between 2016 and 2021 had increased their vascular surgical activity and seen a significant drop in amputation rate. But one of these regions saw a much larger reduction in amputation number than the two other.. In this Region (The Northern Region) The increase in the number of procedures had been combined with a strengthening the orthopedic service. This included a single entrance for fast track referral of wound care patients in the entire Region centered around a newly formed unit of orthopedic surgeons who had access to booking their own operating theaters and regular multidisciplinary team meetings with endocrinologists, vascular surgery specialists and interventional radiologists. This underlines the need for a multidisciplinary effort. The importance of dedicated slots for revascularization throughout the week was recently illustrated in a study from the UK documented difference in waiting time for revascularization depending on the weekday of admittance to hospital (3).

No direct (negative) correlation can be demonstrated between the number of vascular procedures within a geographic region and the number of amputations. A high number of vascular procedures may co-exist with a high number of amputations in a population with a high prevalence of atherosclerosis. Likewise, a low number of vascular procedures may co-exist with a low number of amputations in a fit and healthy population. In the case of the Central Region of Denmark, however, there was a high number of amputations and a small number of vascular procedures for amputation prevention, seemingly constituting an imbalance. Once enough capacity for revascularization is established, diabetes control, community service for wound care and smoking cessation programs, as well as a fast track for GPs and community nurses to referral to vascular service may be even more important (4). When comparing amputation rates in different regions, the question of case mix is complicated. In the National report (2), the Charlton Comorbidity Index (CCI) of patients who suffered amputations were compared and they concluded that there was no significant regional difference. However, the CCI does not paint the full picture. It is more interesting to note that some regions changed their amputation rates so much within a time span that could not be expected to see any large change in baseline characteristics of their population.

A thorough process with meetings and study visits has now been instigated in Denmark in order for health professionals and policy makers from areas with high amputation rates to learn from practices in areas with low amputation rates. Also, substantial increases in the budgets for vascular surgical services have been passed in two regions. Rather than placing blame on hospital administrations, vascular surgeons, GPs, municipality wound services, or others, focus is now be on learning from the best and extending practices from the best performing regions to other places. Each region has its own bottleneck issues and focus is on identifying obstacles to timely revascularization in each region.

It is well known that even health care systems with universal access deliver wide variations in many aspects of healthcare. Variations in amputation rate have earlier been documented in Denmark (5) as well as within other countries (6-7) and between European countries (8). A recent study showed large variations in the utilization of vascular diagnostics and treatment before amputation in different regions of Germany (9). The occurrence of variation is often referred to as the "postcode lottery". Postcode lotteries in health refer to variations in health

care between different geographical areas that appear arbitrary and un-linked to health need. This has previously been established for example uncomplicated varicose vein surgery and cancer surgery in the UK (10-11). In some parts of the country, more people have better access to a certain intervention than people in another part of the country. In some cases, there are good reasons for variation, but in other cases the reasons for variation can be more difficult to justify. A strong commitment to providing high quality health services to the whole country is necessary in order to address the unwarranted variation. However, it is equally important to understand the causes and effects of unwarranted variation. The identified difference in amputation in Denmark shows, that a simplistic response after a heated political debate not always provides a long lasting solution to a very complex problem.

References

1. Houliind KC. Analyse af karkirurgien i Region Midtjylland Foretaget for Region Midtjylland [https://www.rm.dk/api/NewESDHBlock/DownloadFile?agendaPath=%5C%5CRMAPPSS0221.onerm.dk%5CCMS01-EXT%5CESDH%20Data%5CRM Internet%5Cdagsordener%5Chospitalsudvalget%202022%5C09-05-2022%5CAaben tillaegsdagsorden&appendixId=342120](https://www.rm.dk/api/NewESDHBlock/DownloadFile?agendaPath=%5C%5CRMAPPSS0221.onerm.dk%5CCMS01-EXT%5CESDH%20Data%5CRM%20Internet%5Cdagsordener%5Chospitalsudvalget%202022%5C09-05-2022%5CAaben%20tillaegsdagsorden&appendixId=342120)
2. <https://www.rkkp.dk/siteassets/om-rkkp/nyheder/ny-vice-direktor/rkkp-amputationer-rapport-2022-003.pdf>
3. Birmipili P, Johal A, Li Q, Waton S, Chetter I, Boyle JR, Cromwell D. Factors associated with delays in revascularization in patients with chronic limb-threatening ischaemia: population-based cohort study. *Br J Surg*. 2021 Aug 19;108(8):951-959
4. Hinchliffe RJ, Forsythe R, Apelquist J, et al. Guidelines on the diagnosis, prognosis, and management of peripheral artery disease in patients with foot ulcers and diabetes (IWGDF 2019 update). *Diabetes Metab Res Rev* 2020;36(S1)e3276
5. Londero, LS, Hoegh A, Houliind K, Lindholt JS. Major amputation rates in Patients with Peripheral Arterial Disease Aged 50 and Over in Denmark during the period 1997-2014 and their Relationship with Demographics, Risk Factors, and Vascular Services. *Eur J Vasc Endovasc Surg* 2019;58:729-737
6. Holman N, Young RJ, Jeffcoate WJ. Variation in the recorded incidence of amputation of the lowe limb in England. *Diabetologia* 2012;55:1919-1925
7. Goodney PP, Travis LL, Brooke BS, DeMartino RR, Goodman DC, Fisher ES, Birkmeyer JD. Relationship Between Regional Spending and Amputation Rate. *JAMA Surg* 2014;149(1):34-42
8. Behrendt C-A, Sigvant B, Szebering, et al. International variations in Amputation Practice: A VASCUNET Report. *Eur J Vasc Endovasc Surg* 2018;56:391-399
9. Hagenström K, Garbe C, Debus ES, Augustin M. Vascular Diagnostic and Surgical Treatments Before Lower Limb Amputations in Patients with Arterial Vascular Diseases: A Population Bsaed Study from 2013 to 2015 in Germany. *Eur J Vasc Endovasc Surg* 2021;62:469-75
10. James N, Pascoe J, Zachariah A, Ray D, Oldroyd A, Parry H, Benghiat H, Karina M, Collins S, Porfiri E: Effect of the UK Postcode Lottery on Survival of Patients with Metastatic Renal Cancer: an Audit of Outcomes in Patients with Metastatic Renal Cancer Suitable for

Treatment with Tyrosine Kinase Inhibitors. *Clin Oncol.* 2009, 21 (8): 610-616.
10.1016/j.clon.2009.06.007.

11. Nasr MK, Budd JS, Horrocks M: Uncomplicated Varicose Vein Surgery In the UK - A postcode Lottery?. *Ann R Coll Surg of Engl.* 2008, 90 (6): 474-476.
10.1308/003588408X301109.