

Effects of the Restriction of Working Time for Residents: A Dutch Perspective

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A main objective of restricting working time for residents, whether it is the Accreditation Council for Graduate Medical Education (ACGME) regulation or the European Working Time Directive (EWTD), is to protect patients from exhausted doctors. However, in the Netherlands, legislation enacted in 1993 to reduce working hours for junior doctors, as residents are termed, and midwives was prompted by trainees in a teaching hospital who complained to members of parliament about long working hours and miserable personal lives. At the time, public working hours were mandated to no more than 38 h/wk. An arbitrary 10 hours was added for education and training; thus, trainees were allowed to work 48 hours a week.

In the first years, the Dutch Department of Labor took a more or less lenient position but, in 1997, started to enforce the law. Site visits to hospitals are made routinely, resident schedules are inspected, and hospitals are fined if they do not comply with the rules. Initially the surgical community fiercely opposed the new regulation and argued that a work week of 48 hours would not suffice to adequately train young surgeons. However, their plea for a 60-hour work week was politically unacceptable to the Dutch government, which had already accepted the limits of the European Working Time Directive. In 1995, the yearly survey of the Dutch Association of Surgical Trainees reported a work week of 57 hours. This number decreased to 55 hours in 2005 and has remained unchanged since.¹

Effects of Reduced Work Hours on Quality of Patient Care

“A tired doctor is a dangerous doctor.” This statement is the subject of active research.² In the Netherlands, data demonstrating a relationship between safety of surgical practice and the number of working hours are still lacking, but data from the aviation industry—often compared with surgical specialties—may be indicative. The effect of fatigue on flight crew performances was studied in simulated contexts. Findings resulted in regulation of a maximum

working week of 55 hours for UK pilots and a 30-hour work week for US pilots.³ It would seem that reducing work hours might, therefore, improve patient outcome as well. Moonesinghe and colleagues⁴ recently reviewed studies of the effects of reducing working hours (less than 80 hours per week in the US; less than 56 or 48 hours per week in the UK and mainland Europe) on the quality of patient care: 4 systematic review articles reported a beneficial effect on patient safety and clinical outcome, 2 articles found an increase in complications, and 28 articles showed no difference in outcomes in patients. Most studies were done in the US, with a paucity of high-quality studies from the UK and European Union countries. The authors concluded that the evidence at that time was inconclusive about whether reduced working hours improved patient outcomes.

There may be unintended, negative consequences to reducing work hours. More handovers are inevitable because rotations must fit within the maximum 13 hours at a stretch allowed by Dutch and European law. In spite of some methodologic flaws, a study among 6 German intensive care units (ICUs) is of interest here. Bollschweiler and coauthors⁵ compared 2 hospitals with a 12-hour ICU shift system (2 shifts) with 4 hospitals using an 8-hour ICU shift system (3 shifts). Patient characteristics, including health status on admission, were comparable, but patients in the ICUs using 2 shifts of 12 hours made significantly quicker recoveries than did patients in the ICUs using 3 shifts of 8 hours each.

Effects of Reduced Work Hours on Quality of Life

Has the quality of life of junior doctors in the Netherlands improved as was the original aim of the Dutch law? Currently, there are no good data to answer that question. On-call shifts became shorter, but many trainees initially complained that calls became more frequent as well. A survey among Dutch trainees in surgery demonstrated a 76% approval of the new working times.⁶

In a collective review on the effect of the ACGME regulation, Curet⁷ found that 7 out of 10 studies reported a favorable outcome on the quality of life for US residents when working hours were reduced. Two studies are particularly interesting. Jones and colleagues⁸ found a 40% increase in the number of births per year among orthopedic residents after the introduction of reduced work hours. Barger et al⁹ examined the risk of motor vehicle accidents

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among interns in multiple specialties working extended work shifts longer than 24 hours. Every extended shift increased the monthly rate of any motor vehicle crash by 9.1%. Three studies did not show a difference in outcomes.^{10–12}

Other studies hint that the reduction of working hours is not necessarily a positive factor in trainees' personal lives. A study conducted in the East Sussex Hospitals Trust in the UK demonstrated a notable increase in sick leave episodes among junior doctors after the implementation of the EWTD.¹³ The authors suggest that both shift work and reduced working hours might contribute to a loss of "group cohesiveness." Another suggestion was that "work compression," that is, the availability of fewer doctors, leading to an increase in task density, might have been responsible for a higher sickness rate. Trainees may also experience the discontinuity of patient care, and lack of personal, longitudinal follow-up with their patients as worrisome.

Effects of Reduced Work Hours on the Quality of Training

Has the reduction in working hours affected the training quality of young surgeons-to-be in the Netherlands? By one measure, perhaps not. We and others have looked at the most obvious parameter, the number of surgical procedures reported to the national specialist registry at the time of certification as a surgeon.¹⁴ We found that the mean number of cases per trainee per year did not change substantially between 1990 and 2005 (mean, 195; range, 35–450). This is in accordance with the number reported by trainees in their yearly survey through the Dutch Association of Surgical Trainees⁶ (average, around 190). Maintaining a fairly stable number of procedures performed while reducing trainee working hours may signify changes in staff attitude, with staff consciously safeguarding opportunities for trainees to acquire operative skills.

There is, however, more to the story than simply the numbers of procedures done by surgeons-in-training. Reduction of the number of working hours from 80 to 100 per week to 55 h/wk, as is the current practice in the Netherlands and spending the same amount of time in the operating theatre means less longitudinal observation of patients, less hours in the outpatient department, and less attendance at patient conferences and case discussions. In other words, "the doing" is safe, whereas "the thinking" suffers. Over these years, observation suggests that trainees exhibit a lessened ability to recognize and analyze patient problems since the reduction in work hours went into effect. Hence, unnecessary diagnostics and even delay in adequate treatment may occur.

Gaining insufficient expertise in this aspect of surgical practice was confirmed in a Dutch-Canadian study.¹⁵

Schijven et al¹⁵ measured a variety of surgical competencies in Dutch and Canadian practice-ready candidate surgeons using validated methods. No differences were found in technical skills and cognitive knowledge, but Canadian participants outperformed their Dutch counterparts in skills for complex patient management. For comparison, the surgical training program at the University of Toronto embraces 5 years of 84 h/wk versus the Dutch program with 6 years of 55 h/wk. The authors suggest that the difference in competencies seen between Dutch and Canadian participants may be a result of less working hours in the Netherlands. We conclude that a reduction in working hours may have negatively influenced important qualities of surgical practice. This should be a major concern to the surgical community.

Increased hours spent in a training program do not necessarily equate with increased educational opportunities, however. Implicit in the working hours approach is the argument that experience is primarily influenced by practice. Although it is a truism that gaining experience is a prerequisite to attaining a certain level of proficiency, the specific role of experience in "becoming better at something" is not well understood. Several reviews have shown that empirical evidence regarding the development of expertise through extended experience *alone* is surprisingly limited.^{16,17} Exploring the role of practice in a variety of domains (music, sports, chess), Ericsson¹⁶ demonstrated that particular conditions should be met to translate practice into increased levels of experienced performance: (1) instruction should be given to improve some aspects of performance; (2) detailed, immediate feedback on performance is necessary; and (3) there should be ample opportunities to perform the same task or similar tasks repeatedly, with training sessions limited to about 1 hour. Ericsson¹⁶ calls it *deliberate practice*. If these conditions constitute part of a surgical training program, perhaps the adverse effects of diminishing working hours on complex skills acquisition may be counteracted.

We believe that taking the Ericsson¹⁶ *deliberative practice* as a guidepost for training in surgery may allow for optimal attainment of surgical competencies in a 55- to 60-hour work week. This necessitates supervisors' commitment to increased interaction with trainees on the work floor outside the operating theatre. Supervisors need to employ interactions that challenge trainees to articulate their reasoning and to consider alternatives. These interactions should use dialogue and questioning as educational tools to steer trainees' lines of thinking. Supervisors of residents should be aware of the importance of being both model and coach.¹⁸ "Book wisdom" may, in principle, be acquired by self-study, but thinking *and* acting must be acquired in and through interaction with proficient

practitioners. The sheer number of working hours counts—there is a lower limit—but the quality of the interactions trainees have during their training is critical as well.

References

- Wijnhoven BPL, Watson DJ, van den Ende ED. Current status and future perspective of general surgical trainees in the Netherlands. *World J Surg.* 2008;32(1):119–124.
- Veasy S, Rosen R, Barzansky B, Rosen I. Sleep loss and fatigue in residency training: a reappraisal. *JAMA.* 2002;288(9):1116–1124.
- Leff D, Aziz O, Darzi A. Trucks, planes, and scalpels. *Arch Surg.* 2007;142(9):817–820.
- Moonesinghe SR, Lowery J, Shahi N, Millen A, Beard JD. Impact of reduction in working hours for doctors in training on postgraduate medical education and patients' outcomes: systematic review. *BMJ.* 2011;342:d1580. doi:10.1136/bmj.d1580.
- Bollschweiler E, Krings A, Fuchs K-H, Pistorius G, Bein T, Otto U, et al. Alternative shift models and the quality of patient care. An empirical study in surgical intensive care units. *Langenbecks Arch Surg.* 2001;386(2):104–109.
- Dutch Association of Surgical Trainees. *Survey of the Dutch Association of Surgical Trainees.* Utrecht, the Netherlands: Nederlandse Vereniging van Chirurgische Stagiairs; 2003.
- Curet MJ. Resident work hour restrictions: where are we now? *J Am Coll Surg.* 2008;207:767–776; comment, *J Am Coll Surg.* 2009;208(3):480.
- Jones AM, Jones KB. The 88-hour family: effects of the 80-hour work week on marriage and childbirth in a surgical residency. *Iowa Orthop J.* 2007;27:128–133.
- Barger LK, Cade BE, Ayas JT, Cronin JW, Rosner B, Speizer FE, et al. Extended work shifts and the risk of motor vehicle crashes among interns. *N Engl J Med.* 2005;352(2):125–134.
- Gelfand DV, Podnos YD, Carmichael JC, Saltzman DJ, Wilson SE, Williams RA. Effects of the 80-hour work week on resident burnout. *Arch Surg.* 2004;139(9):933–938.
- Stamp T, Termuhlen PM, Miller S, Nolan D, Hutzel P, Gilchrist J, et al. Before and after resident work hour limitations: an objective assessment of the well being of surgical residents. *Curr Surg.* 2005;62(1):117–121.
- Kiernan M, Civetta J, Bartus C, Walsh S. 24 hours on-call and acute fatigue no longer worsen resident mood under the 80-hours work week regulations. *Curr Surg.* 2006;63(3):237–241.
- McIntyre HF, Winfield S, Te HS, Crook D. Implementation of the European Working Time Directive in an NHS trust; impact on patient care and junior doctor welfare. *Clin Med.* 2010;10(2):134–137.
- Guicherit OR. Operatietableaus van chirurgen geregistreerd in de periode van 1990 tot 2000 [Operations by surgeons registered in the period 1990 to 2000] [in Dutch]. *Ned Tijdschr Heelkd.* 2002;11:13–17.
- Schijven MP, Reznick RK, ten Cate OTJ, Grantcharov TP, Regehr G, Satterthwaite L, et al. Transatlantic comparison of the competence of surgeons at the start of their professional career. *Br J Surg.* 2010;97(3):443–449.
- Ericsson KA. Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. *Acad Med.* 2004;79(10, suppl):S70–S81.
- Eraut M. Informal learning in the workplace. *Stud Cont Educ.* 2004;26(2):247–273.
- Schön DA. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions.* San Francisco, CA: Jossey-Bass Publishers; 1987.