Repairing Reforms and Transforming Professional Practices: A Mixed-Methods Analysis of Surgical Training Reform

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INTRODUCTION

The changing nature of the professional project has been the subject of debate among scholars working in the field of the sociology of professions in the past decade. Various authors have examined the reworking of relationships and boundaries between key institutional actors like the state, the market, the organization and the professions themselves due to changing 'external' demands for professional work and 'internal' shifting expectations of what it means to be a professional (Blomgren and

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Waks 2015; Bolton et al. 2011; McGivern et al. 2015; Wallenburg et al. 2010). The growing body of literature on 'organized professionalism' highlights the mediation and hybridization between organizations and professions in daily work practices (Muzio and Kirkpatrick 2011; Noordegraaf 2011; Postma et al. 2015), depicting new patterns of professionalism as professions transform from self-governing entities to skilled and intelligible service providers in professional organizations, acting within and shaped through the organizational logic (Faulconbridge and Muzio 2008; Kipping and Kirkpatrick 2013; Muzio and Kirkpatrick 2011). On the one hand, it is argued that such change has resulted in the loss of autonomy for individual practitioners as their work becomes more circumscribed by clinical audits, protocols and guidelines (Evetts 2011; Levay and Waks 2009). Others, conversely, argue that professionals adapt to or capture reforms to further their own interests (Levay and Waks 2009; Waring and Currie 2009) or stress professions' ability to restore disrupted institutional arrangements and re-establish the status quo (Micelotta and Washington 2013).

In this paper we aim to come to a more precise understanding of how the professional-organizational relationship evolves and is actively given shape to in the course of everyday professional work. We do so through studying a critical and until date rather under-researched case: the reform of postgraduate medical education[1]. Medical education is a critical case to studying professionalism as it is generally seen as way of institutional reproduction, transferring knowledge and skills, as well as reinforcing legitimacy and reproducing advantageous institutional arrangements

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[1] In this research we focus on postgraduate medical education, which is the training to become a medical specialist or 'attending physician' (the term used in the US) or 'consultant' (UK). In the paper synonyms are used to indicate postgraduate medical education; medical training, medical residency training, residency training. These terms are used interchangeably throughout the text.

(Micelotta and Washington 2013). Medical education facilitates entrance to the profession and socializes young doctors in the ethical values, cultural norms and status of the profession. Traditionally, medical education is characterized by its reliance on expert knowledge gained through lengthy periods of dedicated 'hands on' training and socialization (Bosk 1979; Hafferty 2000). Contemporary reform, which stretches out across national boundaries and institutional contexts (Ringsted 2006), takes in a shift from apprenticeship-based training based on "learning-by-doing" and role modeling to time-restricted, streamlined, competency-based training programs based on modern educational insights and standardized performance assessment (Bolton et al. 2011; Ludmerer and Johns 2005; Wallenburg et al. 2015). The competency model encapsulates both medical technical and generic competences (e.g. communication, collaboration, health advocacy) in order to better equip young doctors for a changing healthcare context. Hence, the reform of medical education is part of a wider trend towards greater involvement of medical doctors in organizational matters, urging them to take on management roles in order to improve organizational performance and health outcomes (Clark et al. 2008; Veronesi et al. 2013; Witman et al. 2011).

This article deploys a mixed-methods study design to explore how medical professionals respond to changes in medical education, how the new training requirements are incorporated in the surgical training program, and how this impacts on medical training practice. In a more limited and tentative way, we examine the consequences for the evolvement of medical professionalism more in general. We examine how the reform is actually done and made sense of in everyday training practice. In doing so, we respond to recent calls to explain the reconfiguring of

medical professional work without reducing analysis to the enforcement of organizational control or the strategic resistance of medical doctors restoring professional dominance (Waring and Bishop 2013).

The article draws on a collaborative research project (2010-2012) of social scientists involved in a national evaluation project on postgraduate medical training reform, and a group of surgeons involved in a regionally organized training program in general surgery. The collaboration between social scientists and practicing surgeons offers the unique opportunity to study the transformation of surgical training 'from the inside out' (Dixon-Woods et al. 2011). We integrate a more reflective view on (changing) professional work with the daily experience of practitioners dealing with new and traditional expectations and beliefs of 'good' professional training. The central question guiding the research is *"How do surgeons and surgical residents experience, give meaning to, and deal with the new training requirements laid upon them?"*

In the next section we first turn to the sociological literature on medical education and the literature on changing professionalism to inform the analysis of our empirical findings.

UNDERSTANDING MEDICAL PROFESSIONAL TRAINING REFORM
In this research we are interested in how the medical profession gives shape to a modern residency training program and how this transforms medical training practice. Professional training serves two main mechanisms underlying professionalism and professionalization: the transfer and instilling of ethical values and understandings of professional responsibilities, and the reproduction of the knowledge base of the

profession (Muzio and Ackroyd 2005). In order to understand how contemporary reform transforms medical professional training, we rely on the sociology of medical education and theories on changing professionalism. The sociology of medical education enables us to understand the specificities of professional medical training, highlighting its community-based orientation. Insights of changing professionalism, in turn, envision how professional work practices – in our case, residency training – are enacted and transformed as they increasingly intertwine with organizational structures and purposes (Blomgren and Waks 2015; Waring 2014).

Sociology of Medical Education

Professional education is at the heart of forming professionalism and building professional powers (Currie et al. 2009a). The sociology of medical education, staring with the early work of Merton et al. (1957) and Becker et al. (1961), particularly focuses on and conceptualizes the transition young doctors go through when entering medical practice. During their training, medical students are socialized in the medical professional community by incorporating the medical identity, taking on the special role and status claimed by the profession (Haas and Shaffir 1982; Hafferty 2000). Through this process they come to "think, act, and feel like a physician" (Merton et al. 1957). Hafferty points out that the transformation young physicians undergo is far from straightforward and neat; instead, it is an ongoing and tension-ridden series of encounters during which lay values and attitudes become labeled as "suspect", "dysfunctional", and ultimately "inferior", while newly encountered, medical "ways of seeing and feeling" become internalized as "desirable", "functional" and "superior" (Hafferty 2000: 241-42). Identity creation is depicted as a way of both safeguarding professional jurisdictions and autonomy, and organizing work and controlling

practitioners (Freidson 1994). Others have shifted attention to work practices and the process of embodying expertise. Prentice (2007) and Johnson (2008), for instance, draw on the concept of "legitimate peripheral participation" (Lave and Wenger 1991) to point out how juniors come to embody clinical skills, perceptions and judgments by working together with senior physicians in 'real-life' practice and, in doing so, gradually integrate in the local professional community and obtain a more autonomous clinical role (Wallenburg et al. 2013).

More recent accounts have drawn attention to the consequences of contemporary reform for medical identity construction and professional autonomy (Bolton et al. 2011; Brooks and Bosk 2012; Kellogg 2011;Wallenburg et al. 2012), revealing the transformation of traditional professional training practice. Brooks and Bosk (2012), for example, argue that duty hour regulations (DHR) impinge on the traditional "rites of passage"; the rituals, tests, ordeals and challenges that juniors must pass to become accepted as full members of the professional community. These studies reveal medicine's resistance to change. Szymczak et al. (2010) point out how medical residents navigate their socialization by on the one hand obeying the working hours restrictions and on the other ignoring them when they feel that these conflict with patient needs or would make them seen as inefficient. Kellogg et al. (2011) demonstrate how 'old' and 'new' training requirements increasingly interweave, challenging medical doctors to fabricate new training practices that fit both aims of professional identity creation and stream-lined, transparent and efficient residency training.

In order to better understand how this transformation process unfolds, we attend to the literature on changing professionalism.

Changing Professionalism

The literature on changing professionalism encapsulates various theoretical strands. Although demarcations are not straightforward or even diffuse, we may distinguish three literature strands. The first literature strand, which succeeded the classic professionalization literature, points out the deprofessionalization of professionals due to increasing outside control. Freidson, for instance, stressed that the professional logic as an ideal type of social organizational is increasingly oppressed by the market logic and the managerial logic, arguing that the profession 'is seriously weakened in the name of competition and efficiency' (Freidson 2001: 3). Others, drawing on the New Public Management approach, showed how neoliberal control (e.g. performance measurement) and consumer control weaken 'classic' professions such as medical doctors, turning them into occupational professions that primarily face organizational control (Exworthy and Halford 1999). At the same time, it was argued that "semi-professionals" like managers and social workers were increasingly perceived of and treated as professions, prompting new (power) relationships with 'classic' professionals (Noordegraaf 2007).

In the mid 2000s, however, the de-professionalization thesis was increasingly questioned by a growing group of scholars arguing that the de-professionalization process actually meant a re-professionalization of professions (Duyvendak et al. 2006) as professions possess the ability to actively give shape to managerial control and often use this to their own benefit (Evetts 2011; Noordegraaf 2011). Levay and

Waks (2009) and Waring (2007), for instance, demonstrated how the medical profession is able to capture and 'adapt' external regulatory systems to improve quality of care and, in doing so, strengthen its own position. Other scholars have applied an institutionalist lens to study the role of professionals in the process of institutional change (e.g. Muzio et al. 2013; Scott 2008). They perceive professionals as both the key mechanisms for, and primary targets of institutional change. A growing group of scholars has uncovered the institutional work professionals carry out to craft, maintain or disrupt institutions (Currie et al. 2012; Muzio et al. 2013). The concept of institutional work draws attention to the relationship between actors and institutions, and how actors are continually engaged in the partial re-enactment of routines and practices that may ultimately lead to field level dynamism, but may also result in the strengthening of existing institutional arrangements (Lawrence et al. 2011). Institutionalist sociologists of professions have particularly highlighted professions' abilities to maintain professional jurisdictions. They show that professions are able to actively shape institutional arrangements that privilege their own jurisdictional claims and enhance elite status (Currie et al. 2012). Drawing on the pioneering work of Lawrence and Suddaby (2006), Currie et al. (2012) uncover six types of institutional work professionals conduct: theorizing, defining, educating, policing, constructing normative networks, and embedding and routinizing. In another influential article in this field, Micelotta and Washington (2013) point out the 'repair work' – as another type of institutional work– professionals carry out through purposeful and effortful actions to oppose disrupted institutions and res-establish the status quo. This repair work, they argue, ensures institutional continuity and stability.

Hence, these literature strands tend to stress the duality between professions and 'external regulators', highlighting medical dominance vis-à-vis non-medical actors. The literature on organized professionalism, a third literature strand, seeks to overcome this divide. These scholars both theoretically and empirically show how the organization of expert work is increasingly shaped by a multitude of connections between the occupational ('professional') and organizational ('managerial') domains (e.g. Blomgren and Waks 2015; Noordegraaf 2011; Postma et al. 2015). Literature on organized professionalism points at a shift from traditional notions of partnership, collegiality and informality towards 'managerial professional business' characterized by increasing levels of bureaucracy and formalization (Muzio and Kirkpatrick 2011; Waring and Bishop 2013). It portrays organizations as a key locus and vector of professionalization (Faulconbridge and Muzio 2008; Muzio et al. 2013). The concept of 'hybrids' is coined to underscore the blurring professional and organizational boundaries, drawing attention to the connections and co-dependencies between professionals and the organizations in which they work (Noordegraaf et al. 2014; Waring 2014). Recently, scholars have urged to shift focus from managerial control versus the strategic resistance of professionals, to the actual and emergent practices of how professionals interact, mediate and co-create new organizational environments (Waring and Bishop 2013).

In this paper we will link the sociology of medical education to the literature on changing professionalism, and more in particular to the institutionalist perspective. We investigate how surgeons and surgical residents enact new training requirements and purposes, how they make sense of them, how this plays out in everyday residency training, and with what consequences for the institutionalized medical professional

training practice. Furthermore, we explore how new training arrangements are being co-produced in everyday training activities and what this teaches us about medical professional evolvement. Before turning to our empirical case we first elaborate on the research setting and our mixed-methods study design.

METHODS

Setting

In the Netherlands, surgical residency training is organized in eight "training and educational regions," all consisting of one university hospital and several affiliated district teaching hospitals. This study was conducted in one of these regions located in the southwest of the Netherlands. Depending on the training schedule, residents switch between the university hospital and one or two district hospitals or vice versa. Residents rotate through various surgical services and departments, gradually taking on increasing levels of autonomy and responsibility. The format and content of the training program is structured in accordance with national requirements set by the Association of Surgeons of the Netherlands and the Registry Committee Medical Specialists (RCMS).

In the early 2000s, following pressure from the government, the RCMS announced that all postgraduate medical training programs had to be reformed in order to become more patient-centered and transparent, corresponding with changing healthcare needs. Training programs had to be competency-based, with structured and time-capped internships and predefined, measurable training objectives (Scheele et al. 2008). These reforms co-existed, and also were partly developed in response to the European Working Time Directive that had limited duty hours for medical residents to 48 hours

on average and set restrictions for on-call work. In practice, the DHR meant a sharp

reduction of the time residents spend in clinical practice[2]. In addition, and further

reducing training time, the European Union of Medical Specialists advocated a

revision of the duration of residency training to standardize the widely varying

European training programs. In the Netherlands, where training in general surgery

used to last up to eight years including subspecialization fellowships, program

trajectories were shortened to a six-year program.

In 2009, a modernized surgical training program based on the Canadian Medical

Education Directives for Specialists (CanMEDS) competency framework was

introduced. This framework lists seven competencies or "roles" that residents must

learn to fulfill, including Medical Expert, Communicator, Collaborator, Manager,

Professional, Scholar and Health Advocate (Frank and Danoff 2007). In addition, the

format of surgical training was altered. A far more structured training program

comprising clearly defined end goals replaced the traditional model of "learning-by-

doing" and "role modeling". Various clinical assessment tools were introduced,

aiming to standardize resident assessment and to render performance of competencies

both measurable and comparable (Ludmerer and Johns 2005; Lurie et al. 2009).

Moreover, and in sharp contrast to the recent past in which residents were trained as

general surgeons, subspecialty training was incorporated in the last two years of

surgical residency. Consequently, residents are no longer trained as broad-based

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[2] Also in the US DHR policies have been implemented. Here, residents' working weeks are limited to 80 hours per week on average. Despite the huge difference in the amount of hours residents are allowed to work, in both continents medical doctors have expressed similar concerns about the decreased clinical exposure of medical residents (e.g. (Escobar and Mccullough 2006)).

general surgeons, but as surgical specialists in certain focus areas such as gastrointestinal surgery, surgical oncology, trauma surgery, or vascular surgery.

Mixed-Methods Approach

We used a mixed-methods design, which implies that quantitative and qualitative research methods are used in parallel to inform and strengthen each other, instead of being single components of a research design (Creswell and Plano Clark 2007; Goodman et al. 2012). Using both methods iteratively allows the obtained data to be "mutually informative to construct a negotiated account of what they mean together" (Bryman 2007). In this study, the qualitative data consists of semi-structured in-depth interviews with attending surgeons and surgical residents, and participant observations of monthly meetings of the regional training committee. This committee, comprising the program directors (all practicing surgeons) of the seven regional teaching hospitals, complemented by one resident-representative, organized and monitored surgical residency training on the regional level. In our study, the committee also acted as an expert group with whom we discussed our findings (see below). A questionnaire distributed among all residents and attending surgeons in the training region where the study was conducted provided the quantitative data. Ethical approval for this research was deemed exempt. Below, we describe the qualitative and quantitative components of our study design and their entanglement in more detail.

Qualitative Methods and Analysis

Between July and August 2011, we conducted semi-structured interviews with attending surgeons (n=14) and surgical residents (n=12). Respondents were selected based on seniority, as we tried to obtain a mix of experienced and less routinized

surgeons and surgical residents. Topics for the interviews were based on literature research, a previous study on postgraduate medical educational reform by the first author (IW), and the authors' practical experience in surgical residency training [CH, TH]. Topics included: the modernized training program, use and application of clinical assessment tools, impact of DHR on residency training and health care delivery, and the altered structure and organization of residency training. The interviews were conducted by IW (social scientist), CH (PhD candidate, and formal surgical house officer) and TH (attending surgeon and program director at a district hospital). The tape-recorded interviews lasted between 30-90 minutes and were transcribed verbatim. In addition, IW conducted observations during monthly meetings of the expert group (n=7) who discussed the national, regional and local training issues, leading to an overall observation time of 16 hours. Observational data were supplemented by informal interviews that explored participants' experiences and beliefs on surgical training reform. Notes were taken during the observations and worked out in "thick descriptions" (Geertz 1973) shortly after.

Analysis of the qualitative data was conducted in two phases. First, IW and CH independently coded the transcribed documents to identify emerging themes and conceptual categories. Deviating codes were discussed between both researchers until consensus was reached. Following this initial stage, CH presented the preliminary results to the expert group to define a framework for the questionnaire and quantitative analysis. IW observed the subsequent discussion among members of the expert group, and the issues raised were further discussed in the research team (comprising all authors). At times the expert group meetings as well as our own meetings could best be described as focus group meetings, where discussions of the

results led to new examples, debates, and stories on residency training and the changes happening within it, generating in-depth insight into how those involved perceive and act upon traditional and "new ways" of surgical training.

Quantitative Methods and Analysis

In November 2011, as part of a wider research project exploring surgeons' attitude to CanMEDS roles and adopted assessment tools, we sent a questionnaire to all surgical residents (n=51) and attending surgeons (n=108) in the training region of this study, yielding a response rate of 88% (n=140). A previous article discusses the questionnaire in detail (Hopmans et al. 2013). The questionnaire consisted of the following themes: opinion of competency-based training, support and application of clinical assessment tools, feasibility of training objectives and subspecialty training during residency, impact of duty hour regulations on surgical residency training and health care delivery, and the altered structure and organization of the training program. We set several questions and/or statements for each theme, to be scored on a 5-point Likert scale: 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree.

Statistical analyses were performed with SPSS version 17.0 (SPSS Inc., Chicago, IL, US) calculating descriptive statistics for all items, including means, standard deviations (SD) and frequencies. We defined agreement with questionnaire items as a response of four or five on the 5-point Likert scale. To explore whether the scores between surgical residents and attending surgeons were different, we applied the Mann-Whitney U test and used the Bonferroni correction to adjust p-values for multiple testing, considering $p<0.001$ statistically significant.

Integrating the Quantitative and Qualitative Methods

In both the methodological approach and the analysis stage, the quantitative and qualitative findings were used iteratively to inform each other. The semi-structured interviews and thick descriptions were used to inform the questionnaire. The statistical analyses of the questionnaire laid the basis for the second round of analyzing the interview and observation data. Subsequently, we presented the analytical results of both quantitative and qualitative data at a meeting of the expert group. Observations of the following discussions (e.g. their critical reaction on our observation that DHR were not always obeyed or that clinical assessment tools were sometimes ignored or used differently than intended, see below) were used to interpret the outcomes of the questionnaire and connect these to the interview data. In so doing, we deepened our understanding of how surgeons and surgical residents give shape to contemporary changes in surgical training and how this impacts on surgical practice.

In the next section we discuss the results of our analysis by attending to both the quantitative and qualitative data.

RESULTS

The results are presented in two sections. In the first section we describe how the traditional way of residency training has changed due to contemporary transitions in surgical training programs as well as the hospital organization, and how surgeons and surgical residents make sense of them. We will show how the reform has induced a disembedded training practice. In the second section we examine how surgeons and

surgical residents respond do this by conducting repair work to re-embed surgical training, yet at the same time embrace the new training methods to come to a modern surgical training program.

Changing Organization of Surgical Training

First, our analysis reveals how the organization of residency training has changed. Due to the reforms, the traditional master-apprenticeship training model has been replaced by a more a structured training program with formal arrangements:

We used to choose our own role model, someone you wanted to be like. You watched everything he or she – well, usually he – did. You joined him, watched his activities. You wanted to see as much as you could. That meant you came in at seven in the morning and stayed until eight or nine in the evening (…). Nowadays residents are only in for a short time. That's why the reform is necessary. You need formal training requirements and assessment of competencies to know how someone is doing. (surgeon, AS11)

During the interviews and observations, both residents and attending surgeons underscored the changing nature of surgical training. Surgical training used to be characterized by lengthy periods of formal and informal on-the-job training, of making long hours and frequent and intensive contact between attending surgeons and residents (Bolton et al. 2011). The surgeon above points at the crucial importance of role modeling, of closely interacting and "shadowing" an admired surgeon. Yet, this surgeon argues, the sharp reduction of the number of hours residents spend in the hospital encroaches on the traditional training model. Like other respondents (see

Table 1), he recognizes the need of a more structured and formalized training model. At the same time, however, the old training model was still highly valued, as reflected by the quantitative data showing that both attending surgeons and residents highly appreciated the traditional master-apprenticeship model. A majority stated that the traditional training model forms an essential part of surgical residency training (residents 86%, mean=4.26 versus attendings 78%, mean=3.89). The statement that the new training program is an improvement compared to the traditional master-apprenticeship model was in general rejected (residents 14%, mean=2.93 versus attendings 21%, mean=2.93).

<Table 1>
<Table 2>

A second major transition was the shortening of the surgical training trajectory, due to both the reduction of working hours and the shift to early subspecialization. After four years of training in general surgery, residents must choose a subspecialization for the last two years of their training. Consequently, residents are no longer trained as general surgeons, being able to take care off all emerging surgical needs, but are specialized in the areas of gastrointestinal surgery, surgical oncology, trauma surgery or vascular surgery. Although a majority of the respondents recognized the need for subspecialty training during general surgery education, most residents (75%, mean=3.77) and attendings (73%, mean=3.97) believed that subspecialization leads to higher quality of care. It was argued that due to innovations in medical technology and the rapid development of medical knowledge in general, it is no longer possible

for a surgeon to be competent in, and possess full knowledge of all surgical procedures:

You don't want a vascular surgeon to operate on your grandmother's hip. He's less competent than a trauma surgeon who does ten hip operations a week. That's just the way it is. (resident, SR1)

However, both quantitative and qualitative data also reflect respondents' worries about the shift to subspecialty training. Few respondents believed that just-qualified surgeons could act as fully qualified subspecialized surgeons after six years of training. Only 14% of residents (mean=2.26) and 11% of attending surgeons (mean=2.16) agreed with the statement "fellowships will be superfluous in the future", indicating the belief that when residents qualify they are not ready to act as fully competent surgeons in their field of expertise (Table 2). During the interviews another concern was revealed, which had to do with the shift to tailor made subspecialty training programs. As not all surgical procedures are carried out in one particular hospital – especially not the more complicated procedures such as liver and lung surgery or particular kinds of cancer operations – residents now must compose an individual, tailored made program in which they attend different hospital sites to meet all aspects and targets belonging to their chosen subspecialty. Both attending surgeons and residents worried about the consequences of residents 'moving around'. Of particular concern was the breach of the building of personal relationships between attending surgeons and residents. Through their stay at a particular hospitals site, residents become part of the clinical staff and are able to participate in the clinical process. Moving in and out of the hospital, due to working in shifts as a consequence

of the DHR or following the logic of a tailored made training schedule, induces social distance between attending surgeons and residents:

In the past [a resident] *saw everything. Now the day is divided into shifts. Residents lack continuity. Attending surgeons work more hours than residents. Especially when you're low in the hierarchy, this means you lack information. When you have a more prominent position, you'll be informed. But if you're low, you have to sort things out for yourself. For educational purposes, residents would benefit if they were the ones solving clinical problems instead of the surgeons.* (surgeon, AS3)

Residents are part of a local surgical community for only a short period of time. During an interview a surgeon typically pointed them out as "passers by". Hence, residents lack the informal connections which attending surgeons *do* have. Attending surgeons, for instance, are brought up to date on patients admitted to their wards after a day off or a holiday. Residents are not automatically informed. Hence, it is more difficult for them to be closely involved in daily patient matters – and thus to be able to fully participate in surgical care delivery as the surgeon quoted above explained.

Moreover, moving between hospital sites is in contrast with the tradition of gradual integration and embedded learning. As a resident nicely pointed out:

I don't think it's possible to learn a specific trick [surgical procedure] *within a year or so. Look, you enter someone else's shop, and it takes months before a boss* [attending surgeon] *really trusts you. Before they let you operate on your own, the year has passed.* (resident, SR5)

Imagine, you come here wanting to learn a specific form of lung surgery, and after a couple of months you leave and visit another couple of hospitals for short periods. That's not going to work. (…) All the residents will say: here she comes, pinching our operations. (surgeon, AS2)

According to the resident and surgeon quoted above, and reinforcing earlier accounts on residency training (e.g. (Prentice 2007; Wallenburg et al. 2013)), residents need to 'earn' their place at the operation theater by demonstrating their competences, dedication and seniority to the professional community. In addition, they must put effort in becoming part of the team of residents and 'share' the "interesting learning cases" – meaning those patient cases residents can learn from and that expand their surgical knowledge – among them. The tailored made subspecialty program impedes on this process of embedded learning and gradual transition as residents are "in" for only a short period of time. Moreover, the shift to resident-oriented training with a focus on an individual resident's needs instead of 'group learning' encroaches on the traditional focus on embedded learning and student socialization.

<Table 3>

<Table 4>

Our analysis thus reveals a mixed image of both support for the new training program and hanging on to the traditional training model. This was also visible in discussions about the implementation of the DHR (Table 3) and the perception of the clinical assessment tools (Table 4, for more detailed discussion on this topic see the second empirical section below). On the one hand, surgeons and residents expressed their

support, stressing the need for change and welcoming the added value of the new training methods to traditional training practice like an increasing quality of care and enhanced patient safety due to subspecialty training (Table 2) and a better work-life balance for residents (Table 3). On the other, however, they were also highly critical and underscored the importance of long-lasting personal relationships, the building of trust among surgeons and residents, and clinical exposure.

Changes in clinical exposure were not only due to the reform of surgical training, but also a result of an increasing emphasis on efficiency in hospital organizations, particularly in the use of the operation theater. The operating theater is a costly part of the hospital organization due to the use of high-tech medical equipment, safety requirements and the presence of a large amount of highly educated staff. To save time and money, operations are tightly scheduled and time is managed strictly. Time management policies have ensued a discussion on the enrollment of residents in operations as residents need guidance and instruction and hence work in a far less efficient way than routinized surgeons. As one of the surgeons explained:

If you don't get the time in the operating room you're entitled to, it is normal that you don't manage to keep up with the production. That isn't my fault. Interviewer [YY]: *Does it come at the cost of residents' operating time?* Attending (AS12): *Occasionally, yes. When we have to go on at 15hr they* [operating room managers] *say: "You can do this one, but only when you do it yourself"*. (surgeon AS12)

Although not all attending surgeons shared this experience ("*The operation room manager doesn't decide on that. Of course they sometimes say things like that, but in*

the end it is still a teaching hospital", surgeon, AS2), it occurred that space for medical training cannot be taken for granted and increasingly must be negotiated. New connections between hospital's strategic policies and surgical work make surgeons more dependent on organizational properties that serve both professional and organizational aims: providing good care *and* working in an efficient manner, training a new generation of surgeons *and* holding on to operation schedules. Hence, external regulations and organizational preferences increasingly must be taken into account.

In short, surgical training programs are going through a number of transitions that pursue a more disembedded way of training; surgical training no longer is something that goes naturally as residents work fewer hours, move between hospital sites and training is increasingly subjected to hospital policies. In the next section we examine how surgeons and surgical residents have responded to these changes by conducting repair work. This repair work, we will show, encapsulates both adopting the new training procedures and instruments, and fashioning 'work arounds' to undo unwanted effects and restore and 're-embed' traditional professional training values.

Repairing Reforms

From the data analysis three repertoires of repair work emerged: (1) organizing for the reform, (2) bending rules, and (3) negotiating procedures.

Organizing for the reform

As indicated above, the reform entailed a shift of the old, rather implicit and lengthy training model of learning-by-doing and role modeling to a time-capped and

structured training trajectory. The excerpt below, which stems from our field notes of a monthly meeting of the surgical program directors, nicely illustrates how the surgeons 'organized for the reform', revealing the effort they put into making it work:

The surgical program directors discuss the residents' training schemes that are displayed in colored charts on pieces of paper in front of them. Some senior residents are still looking for a training post in the subspecialty of their choice, and there are some missing spots; some hospitals do not have enough residents to fulfill their capacity needs. One of the program directors complains that he is losing senior residents to the neighboring hospital, while his group has made a large investment in training them. The chair program director answers that they all face this problem, but that the training schedule of the residents is leading now. He points at Tom [fictional name], *a resident who has signed up for a position in vascular surgery. He glances at one of the other program directors: can you have him? The surgeon sighs; he does not know Tom personally. "I want to talk to him first". The chair asks the resident-representative to go and find Tom. When the residents returns, he says that Tom is in the operation theater, but that he will get there before the end of the meeting.* (field notes, meeting program directors).

This excerpt uncovers how the program directors seek to compose tailored made training schedules and to serve training goals as much as possible. This is not without pain; some surgeons 'lose' their experienced and hence valuable residents to neighboring hospitals. The program directors in our study made an effort to at least keep the residents for their training region. They spent a lot of time fabricating training schemes and negotiating the allocation of senior residents among them.

However, personal relationships still played an important role. The excerpt above reveals that the surgeon was willing to include Tom in his team of residents, but not without meeting him first. Program directors wanted to know whom they engaged with. This illustrates that besides the aim of providing sufficient training opportunities, residency training still is a matter of personal relationships and trust.

Also surgical residents organized for the reform, particularly with regard to their operation skills. The quantitative data reveals (Table 3) that residents felt the DHR went at the cost of their clinical experience as it limited the number of surgical procedures residents can perform, as well as clinical patient encounters (83% of the residents agreed upon this statement (mean=3.95) versus 49% of the attendings (mean=3.30), which is a significant difference (p< 0.001). Yet, in practice residents made sure they could practice by negotiating their position in the group of residents and allocating learning opportunities among them. As one of the residents explained:

You can always discuss this with the appointed senior resident [in this case the interviewed resident herself]. *It is considered how you can schedule someone so they can learn something; it isn't just about production. You discuss with someone who's done enough inguinal hernia repairs so these can be passed on to another resident. And I make sure the* [other] *resident can do more hips.* (interview resident, SR7)

Residents thus conduct repair work as well; they schedule their own operations to be able to practice specific operating skills. The new training model – and, as we pointed out above, hospital efficiency policies as well – allow for fewer 'spontaneous' surgical procedures to participate in now residents are less around. By fabricating

operating schemes residents organize their own learning opportunities and safeguard individual learning targets.

Bending rules

A second repertoire of repair work is 'bending rules'. From the qualitative data it emerged that both surgeons and residents sometimes ignored procedures or regulations in order to create training opportunities or preserve 'old school' training methods, like "sticking to the ward" instead of going home when a shift has ended to 'grasp' more training cases. As one of the residents pointed out:

 (…) *[B]eing around, sticking to the ward if you want to do an operation…you need to be the first.* (…) *You can't test or measure it, but residents who are always in the front and willing to do more get rewarded. They get phoned more often than the ones who don't hang around.* (resident, SR4)

Showing off eagerness to learn and, in doing so, bonding with attending surgeons is a way of creating training opportunities. Residents who prove their willingness to learn are rewarded with doing more operations. Another resident explained how he sometimes did not register for an operation to be able to attend or participate in a surgical procedure without making this visible to external regulators. Hospitals risk high fines of the Dutch Labor Inspectorate in case of exceeding the threshold. Not registering, as way of working around the system, may be a convenient solution to enhance training:

I want to become a good surgeon. This means that I must be able to remove a spleen.

These patients do not show up from 9 to 5. They enter in the middle of the night.

(Resident, SR5)

The DHR not only limit the maximum amount of hours residents are allowed to work, but also sets restrictions on overnight shifts and days off. Although residents admitted that they did not always obey the rules, attending surgeons were careful not to let residents stay in the hospital too long. During the interviews and observations, the reduction of resident duty hours was an often, and sometimes heated topic of debate. When we presented our findings to the expert group, demonstrating that a majority of the surgeons were highly critical about the DHR (Table 3) and revealing that residents had indicated it was difficult not to violate the rules, a heated debate ensued in which some surgeons argued that we should not make these breaches with the law visible in our research. Some stated that they themselves did not accept over work, and that they sent residents home after a working day or an overnight shift and that residents were not expected to be around on a day off. Here our findings parallel Szymczak and colleagues' argument that residents (and attending surgeons) do not just ignore the DHR, but rather navigate the rules by seeking suitable solutions to local or individual needs (Szymczak et al. 2010). This 'repair work' aims to soften or even solve the negative and unwanted effects of the new training requirements – missing interesting learning cases, not being able to demonstrate devotion and eagerness to become a professional – while still attempting to live up to them.

Negotiating instruments

A third repertoire of repair work is the negotiation of instruments. With the reform, clinical evaluation instruments have been introduced to measure resident performance. Briefly described, clinical assessment instruments are standardized checklists aimed at making residents' performance objective, measurable and comparable (Epstein 2007). For example, the Objective Structured Assessment of Technical Skills (OSATS) is used in the operation theatre to assess surgical skills. The instrument spans different performance dimensions that are important when performing a surgical procedure, including tissue handling, time and motion, knowledge and handling of instruments, use of assistants, flow of operation and knowledge of the specific procedure. Again, our quantitative and qualitative data together reveal a mixed picture of support and criticism. The clinical assessment tools were appreciated as they offer means to structure and coordinate feedback (Table 4). Residents stated that the assessment tools enabled them to gain grip on their learning processes as the tools help them to obtain feedback and personal attention from their supervisors. As one of the residents explained: "*They force supervising attendings to interact with you and provide feedback on how you're doing*" (resident, SR9).

Attending surgeons, in turn, stated that the instruments helped them to instruct juniors and signal under-performance.:

The benefit of competency-based evaluations is that the assessment tools act as a safety net and provide tangible evidence when a resident is functioning substandardly compared to peers. (surgeon, AS1)

Interestingly, during the interviews the clinical assessment instruments were particularly related to junior residents and the residents who did not meet professional norms. Conversely, adequately performing senior residents seemed to have passed beyond the instruments. Although the instruments were used, as residents are obliged to include a certain number of forms in their portfolios, we noticed that the forms became less significant. Residents still needed good scores, but lessons were transferred more implicitly during personal interactions:

During a discussion about using clinical assessment tools, one of the surgeons states: "You have to make clear what a resident can improve, and that's not something you trust to paper but tell in person. Such feedback is far more important than circling a level of competence. I don't care about this level (…). In the end, you judge a resident by comparing him to yourself. Setting norms is pointless, it's all about trust." (field notes meeting program directors)

Likewise, it was argued that formal assessment by using clinical assessment tools was only a (small) part of evaluating performance and cannot replace professional judgment – a statement which a majority of the respondents agreed with in the questionnaire: 72% of the residents (mean=3.98) and 71% of the attending surgeons (mean=3.83). Also, assessment instruments were seen as an administrative burden: 81% of the residents agreed on this statement (mean=4.02) versus 86% of the attending surgeons (mean=4.2), see Table 4.

However, residents did not simply reject the clinical assessment tools but rather use them in a situated manner. The clinical assessment tools were commissioned to teach specific lessons, as was nicely pointed out by one of the surgeons:

When assessing residents [with assessment tools] *I always make sure to point out what they can improve. Scoring everything at the top level makes no sense.* (surgeon, AS12)

This surgeon reveals how he sometimes used an assessment instrument to encourage a resident to excel[3], a practice that was recognized by other surgeons. Hence, the actual use of the clinical assessment tools and the ways in which they are giving meaning to in everyday surgical practice uncover the tension between the objective evaluation criteria suggested by the clinical assessment tools on the one hand, and the reliance on personal interactions and professional judgment on the other. Objective assessment criteria imply neutrality and 'disembeddedness', while personal interactions reflect closeness and embeddedness. The 'neutral' clinical assessment instruments are repaired by re-imbedding them in the professional interactions that make up professional work and render them part of the wider socialization process of becoming a surgeon.

DISCUSSION

In this article we have focused on the critical case of postgraduate medical educational reform to examine how professionals give shape to new training requirements and methods, and how these impact on institutionalized training

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[3] We have worked out this argument on the creative use of clinical assessment tools in an other article: (Wallenburg et al. 2015)

practices. Our mixed-methods study reveals that both surgeons and surgical residents are rather ambivalent towards the reform. On the one hand, they perceive the increasing structuring and formalization of surgical training as a necessary answer to the new regulations (i.e. limitation of duty hours, shortening of the training trajectory) due to which residents spend far less time on the work floor and have less intense contact with their attendings. The new training methods, like formal assessment procedures, are considered a feasible and even necessary answer to this. Yet, on the other hand the reforms are criticized as they impede on the highly valued tradition of embedded training, socialization and gradual integration in the medical community.

We have shown how the attending surgeons and surgical residents give meaning to the reform by simultaneously implementing and 'repairing' the new training requirements and educational methods. This repair work aims to soften the unwanted effects and re-embed surgical residency training in the social-material context of professional practice. Repair work, in our case, involved organizing for the reform, bending rules and negotiating instruments. Program leaders, for instance, put a lot of effort in fabricating individual training schedules and sought to maintain their personal relationships with their residents. Residents, in turn, collaborated in organizing their participation in the operating theater. In doing so, both the attending surgeons and residents connected new training methods with established practices of embedded training and socialization.

Repair work, we argue, goes beyond restoring disrupted institutional arrangements in order to restore the status quo in the sense of 're-establishing the old' (Micelotta and Washington 2013) –mirroring the scholarly debate of professions as controlled by

managerial processes *or* strategically operating actors resisting change– and rather involves *acting with* the reform; seeking convenient solutions that preserve old values and related practices while adopting new arrangements. Hence, 'repair work' encapsulates a more diverse variety of activities of which outcomes are yet unsure and emergent. Our study contributes to the developing institutionalist perspective on professionalism, and more in particular on the institutional work literature (e.g. Currie et al. 2012; Lawrence et al. 2013; Micelotta and Washington 2013). Repair work, as a specific type of institutional work, we have demonstrated, is heterogeneous in nature. It is an ongoing and recursive process of goal-setting, learning and revision based on this learning that impacts on vested practices, prompting institutional reconfiguration. Rather than pursuing clear-cut profession-oriented goals to restore medical dominance, medical professionals tinker with traditional and 'modern' values of good residency and bring these together in daily practice. Out of this, new training routines are developed that reflect shifting institutional relationships; residency training no longer is an isolated practice merely using hospital facilities like the operation theater, but surgeons continuously must negotiate the use of these very hospital facilities. This underscores how expert work is increasingly situated in the bureaucratic hospital practice.

In addition, and interesting in the light of recent literature on the role of standardization and materiality in institutional work (Monteiro and Nicolini 2015; Slager et al. 2012) that foreground how procedures and objects perform institutional work as they are put in place, our study shows how material entities (e.g. clinical assessment tools, training schemes) mediate and pursue institutional change that are unforeseen and impact on vested professional practices. The tailored-made training

schemes, for instance, render individual resident's learning goals central to the training process, encroaching on the traditional hierarchical master-apprentice relationship. Hence, material entities play an active role in constituting and perpetuating the fabric of residency training. Future research should further explore the role of materiality in the evolvement of medical training. Moreover, such perspective may generate new insights in the actual day-to-day actions and processes that underlie medical professional evolvement more in general.

CONCLUSIONS

Medical education has been said to be stubborn to change. In a special issue on medical education in the Journal of Health and Social Behavior in 1988, Bloom stated: "education is essentially unchanging, even though brave ideological statements guide curriculum reforms that do little but mask the underlying reality" (Bloom 1988)(Bloom 1988: 295). Our empirical study, however, has highlighted medical profession's ability to renew and adapt work routines to changing societal and organizational circumstances, sketching a more dynamic and reflexive picture of medical professional evolvement. We have demonstrated how change processes unfold as medical doctors give meaning to the new requirements and methods by simultaneously implementing and repairing them in daily practice, and how this reconfigures medical professionalism. Our study, we argue, points at an increasing 'normalization' of medical education and medical work. This evokes new questions on the restratification among medical residents and (future) medical doctors, and the consequences hereof for the evolvement of medical professionalism as well as the contents and organization of medical work.

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