

THE MULTIPLE BODIES OF THE MEDICAL RECORD: Toward a Sociology of an Artifact

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This article argues that the medical record is an important focus for sociological research. In medical work, the modern patient's body that Foucault has so aptly described is produced through embodied, materially heterogeneous work, and the medical record plays a crucial role in this production. It does not simply represent this body's history and geography; it is a central element in the material rewriting of these. Simultaneously, the record fulfills a core role in the production of a *body politic*. As the record is involved in the performance of the patient's body, it is also involved in the performance of the *clinic* in which that body comes to life. Finally, we argue that *different* records and different practices of reading and writing are intertwined with the production of different patient's bodies, bodies politic, and bodies of knowledge. As organizational infrastructure, the medical record affords the interplay and coordination of divergent worlds. Seen as a site where multiple stories about patients and organizations are at stake, including the interoperability between these stories, the medical record becomes highly relevant both analytically and politically.

In *The Birth of the Clinic* ([1963] 1973), Foucault argues that the classical, premodern "medicine of species" required a two-dimensional table as an intermediary between the individual body and medical knowledge. The table would translate individual symptoms, yielding the true nature of the disease by showing how symptoms fit into the eternal scheme of things. Symptoms were not the disease; they were pointers to this higher truth, which merely "precipitated" in individual bodies, and which the table could decode. In contrast to the medicine of species, Foucault argues, the modern clinical gaze requires no such intermediary. Truth is no longer found and organized elsewhere in some grand nosological scheme but rather in the pathological processes of individual bodies. The gaze deciphers this truth by following the symptoms inward, eliciting signs, and differentiating the pathological reality that now *is* the disease.

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Yet the development of this gaze depends crucially on the development of some new intermediaries. *Writing* is crucial in this new configuration. "Medicine no longer tried to see the essential truth beneath the sensible individuality; it was faced by the task of perceiving, and to infinity, the events of an open domain" (Foucault [1963] 1973, p. 98). In order to develop a body of true knowledge, medicine has to record individual cases; only in the accumulation of such experience, only in the totality of observers/observations can true knowledge be generated (Fagot-Largeault 1989; Dagognet 1970). A "cascade of inscriptions", to use Bruno Latour's term, typifies and produces the possibility of this means of knowing (Latour 1987; 1993, pp. 171-225).

Although Foucault does not discuss this in *The Birth of the Clinic*, knowing in the practice of medicine is similarly dependent on writing. The power of the gaze, in other words, cannot go very far if it is isolated (cf. Atkinson 1995, pp. 60-65). No longer typified by the metaphorical two-dimensional table Foucault describes, modern medicine cannot be imagined without that other object of consultation: the medical record. In this article, we argue that the medical record is fundamental to the everyday production of that contemporary body whose archaeology Foucault describes (a body that hides the essence of the disease in the pathological processes taking place in its tissues, where the symptoms and signs attest to a reality that is never completely accessible in life) and to the everyday production of the organizations that enact and treat it.

How is the patient's body produced in hospital wards? How is its specific geometry and historicity created? How is the patient's body transformed from the lived body of Mr. Thompson into a juxtaposition of organs, parameters, rows of numbers, graphs, and so forth? Is this through a specific way of *looking*? Or is this a discursive transformation, achieved through *talk* (as is a frequent focus of social constructivist medical sociology)?¹ We maintain that the body is produced through embodied, materially heterogeneous work (Hirschauer 1991; Cusins forthcoming). Much comes into play here: urine containers, infusion pumps, nursing routines, doctor's consultations, and so forth. All these artifacts, individuals, and organizational routines are intermediaries that together perform the medical body. Following recent developments in science and technology studies (Bijker and Law 1992; Clarke and Fujimura 1992; Latour 1996; Star 1995), we argue that they constitute the network, or the *dispositif*, within which the body acquires its specific ontology. We focus on the medical record because this artifact occupies a central niche in this network: it is where many of the nurses' and physicians' tasks begin, end, and are coordinated, where inscriptions accumulate, and where the specific spaces and times we will describe unfold. The record does not merely mirror the bodies it maps, we argue—but neither does it determine them. To emphasize the active role of artifacts without falling into technological determinism, we use the term "mediation" (Latour 1994): the record *mediates* the relations that it organizes, the bodies that are configured through it.

Following Foucault, we stress that these practices of reading and writing are not only central to the production of a patient's body: they also fulfill a core role in the production of a *body politic*. As the record is involved in the performance of the patient's body Foucault so aptly describes, it is also involved in the performance of the *clinic* in which that body comes to life. A specific configuration of the body cannot be cut loose from the specific social position different health professionals have within hospitals or from the type of stories about the work done that can emerge from the records. To strengthen both these points, we make a third argument that departs from the Foucauldian scheme.² We argue that different records,

different practices of reading and writing, are intertwined with the production of different patient's bodies, different bodies politic, and different bodies of knowledge.

In the first section, we look in some detail at a medical record taken from an oncology ward from a Dutch university hospital. Here we concentrate on the production of patients' bodies. In the second section, we focus on the way in which the medical record shapes various bodies politic. We explore some more general developments in the area of medical record keeping, such as the increasing attention to coding and classification and the attempts to produce an electronic medical record. In each section, we look first at the general process of production of the body/body politic and then examine the practice of multiplicity (managing the articulation of multiple bodies/bodies politic).

Throughout, we will be using a broad definition of the "medical record" as all written, typed, or electronically stored traces of any aspect of patient treatment that has official status within the hospital system and is in principle stored for a period of time (at least equal to the patient's stay in the hospital [e.g., Huffman 1990]). More often than not, this implies that the medical record is not one single object; rather, it is the record the physicians keep in one folder at the outpatient clinic together with the (also often physically separate) nursing and physicians' "in house" record, with the separate forms created and used in the hospital administration offices, and so forth.

This article is not primarily concerned with practices of reading and writing that bring the record to life (Berg 1996); it is concerned, rather, with mapping the configurations it helps bring into being. We will thus not be looking at the real-time articulation work that links the record to the ongoing work or at the informal organizations that interpenetrate the more formal bodies politic. These are crucial issues (e.g., Suchman 1987; Star 1995), but here we want to explore how the structuring of the record speaks to the structuring of the bodies we investigate. It is a synchronic exercise to explore just how a mundane, boring artifact like a medical record is involved in the politically charged production of human bodies, organizational hierarchies, and selective memories.

The article is based on two lines of research. Marc Berg has spent several months in different wards in various hospitals in the Netherlands, focusing on the role of artifacts such as records and protocols in the ongoing processes of medical work (e.g., Berg 1997). Geoffrey Bowker has studied the history of medical records and through a series of interviews and observations has traced the development of a nursing classification scheme designed for incorporation within hospital information systems.

PRODUCING BODIES

Mr. Wood is a patient on a Dutch university hospital oncology ward. Imagine a newly arrived oncologist, who begins her shift on this ward. She meets Mr. Wood without having his medical record to hand. She sees a middle-aged, somber-looking man, probably suffering from cancer, since this is the oncology ward. Questioning him and the personnel on the ward, she may elicit a story of Hodgkin's disease, which has been treated once before but has recurred. Investigating him might yield more clues as to the spread of the disease, the side effects of his treatment, and his general condition. Without the record, she might sense the damage the cancer has done and conclude that the prognosis is poor. Yet she would excuse herself and not take any action before reading the medical record. Without the record, she is without memory, without a device to structure her thought; despite all her years of experience, she is barely more able to proceed than the recently graduated resident who stands besides her.³

With the record, things are different. This record comprises some 120 pages, producing a fascinating, detailed yet jagged and dispersed memory of the patient. It starts with the temperature list (Figure 1), an unfolding sheet that is structured like a flowchart, wherein blood pressure, pulse, temperature, medications and so forth are logged. Next is the order form, on which physicians write down any diagnostic steps and changes in treatment for nursing staff to effectuate. Then come the physicians' progress notes, starting with a few prestructured forms that summarize the patient's medical history at the date of admission and followed by over twenty unstructured pages of daily notes. These are followed by computer printouts from the laboratory information system (listing rows of numbers indicating outcomes of laboratory tests performed on the patient's blood and urine), results from bacteriological tests and X-rays (over twenty pages), letters written about the patient, and so forth.

History

The record produces a patient with a medical history; the accumulation of sets of traces configures a medical past for a specific patient.⁴ The temperature list maps the different parameters against time—the x-axis of this flowchart. Lines divide the sheet into weeks and days, and thinner lines divide the upper, graphical part of the sheet even further into eight-hour periods. Temperature, pulse, and respiration rate can be entered along the y-axis. Below this, the y-axis changes its role. It becomes a list of different parameters: tension, weight, specific gravity of the urine, bleeding time (neither filled in on this form), and the medication given. Presenting them in this way clarifies how changes in one are temporally related to changes in another, yet their vertical order is arbitrary. Below, the y-axis changes again: here it incorporates a mathematical operation. The different infusions listed add up to "total fluid intake" (*totale vochtopname*), followed by the different varieties of fluid loss that result in "total fluid loss". These totals are then subtracted, resulting in the last row on this sheet: the fluid balance.

The forms listing the laboratory results are structured in a similar fashion: columns of figures, with each column indicating a time at which the blood was tested. Reading such forms from left to right, one enters the past in a most orderly fashion: step by step, day by day, or even hour by hour, the same variable is followed back through time. This produces a linear, stable history; this activity performs the temporality that Foucault sees as a crucial innovation of the modern, clinical gaze. It generates a body with a set of variables whose mutual interrelations and deviations can be traced. The body acquires a double continuity, it acquires a past through recurring variables distributed throughout an evenly flowing time, and this past itself remains constant over time. Whether a doctor looks at these traces one day or one month later, this past does not change. (As we will see later, this constancy is not characteristic of all the histories produced in the record, nor does it imply a unified history.)

History is also produced by adding new forms (such as X-ray reports) in front of the previous form in that section. This does not produce the graphical oversight that a flowchart format provides, but by for example flipping through the bacteriology reports, the doctor again finds herself traveling back and forth through linear time, accelerating and decelerating where necessary. By compressing several weeks of reports into a few seconds, the doctor leaves the time zones of everyday medical work and enters the temporal order of pathological processes of Foucault's body: the record produces textbook time. The growth of a tumor as witnessed on successive X-rays, the battle between microorganisms and antibiotic regimes, and the rise and fall of blood cells as the chemotherapy does its work—these are not events that occur within

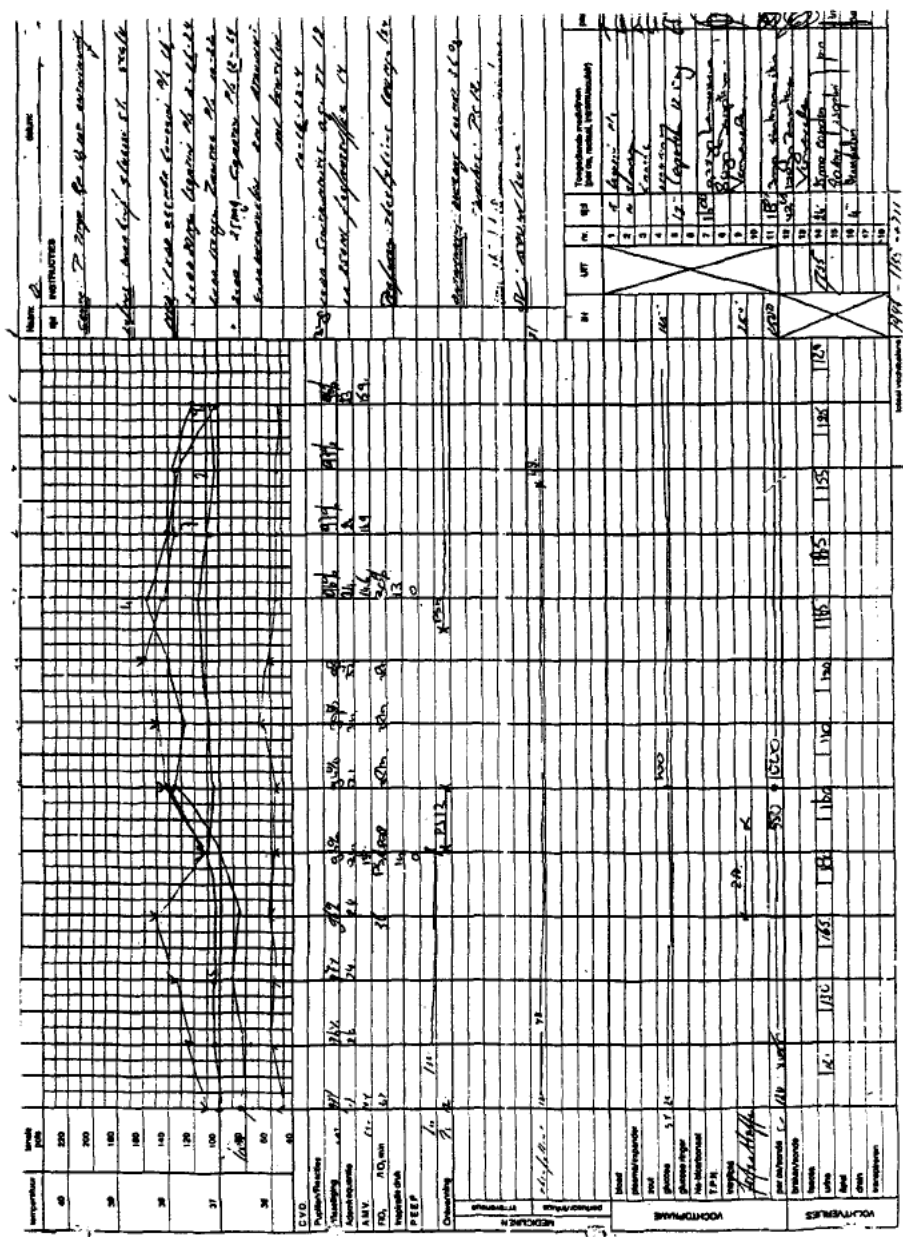


Figure 1. The temperature list.

the time zones of a working day. Fluctuations in blood cell levels become meaningful only over a several-day period, and the "growth of a tumor" unfolds over several weeks. Since the rows of blood-cell levels on one page cover about ten days, and the X-ray reports over a two-month period usually cover only a few pages, the record elegantly affords this crossing between time zones.⁵

The physicians' progress notes and letters, finally, generate a history in a somewhat different way. As the pages of the progress notes increase, the sequence of entries can certainly be read much as the sequence of bacteriology reports or laboratory tests: rewinding time backward to generate an image of events taking place in a different temporal order. Yet most entries themselves start out with a short "summary" of the case, as follows:

Now 8 days post-reinfusion		[of his bone marrow cells] ⁶
Last night started	amica 2 x 700	[these are antibiotics]
	ripera 4 x 4 gr.	
Origin?		[. . . of the fever]

In these summaries, the "current situation" is deduced from other entries in the record, the new laboratory results, information from nurses and the patient, and so forth. The starting point of that day's deliberations is formulated in a single phrase uninterpretable out of the context of the other entries. These summaries are read, reread and rewritten in the light of new events, then summarized again, and continually constitute a brief patient's history as relevant at that particular juncture (Berg 1996). Glancing through a few recent pages of progress notes, then, is often the preferred way for a physician new to the case to "eyeball" a patient's current situation: to build a multilayered history of pathological processes, diagnostic and therapeutic procedures, intertwined with organizational routines (e.g., who was the responsible physician at time X, where was the patient sent to).

Geography

The record also produces an anatomical "geography". Its different sections detach the blood from its vessels, split its constituents, juxtapose the organs. The case history form separates several "organ systems," as do the nursing history forms; the X-ray reports delineate the "thorax," the "abdomen," and all the structures that can be seen within these bodily cavities. Orthogonal to the creation of a linear history, here anatomical orders are produced that perform the textbook medical body. The record thus also performs a dislocation in space (Latour 1987); it performs an *in vivo* dissection, fleshing out a map to the terrain that is hidden under the patient's skin. This map affords a linkage of anatomical realities analogous to the time travel described above. Juxtaposing the radiographic reports from Mr. Wood with the physical examination and the laboratory results allows the physician to trace the spread of the cancer and to weigh the damage done by the chemotherapy.

But what does it mean, exactly, to say that the record "produces" a patient's history or geography? Of course, Mr. Wood's record is productive of narrative in the banal sense that people tend to read a narrative structure into any set of facts and figures. Richard Boland (1993) has shown how, read by accountants, two different sets of balance sheets can give rise to quite varied conjectures about the personal lives and professional competence of their peers. Yet we want to go further. We are not arguing that the record produces a history or geography by creating a specific representation of the body, while leaving the "real" patient's

body untouched. It is not a matter of merely producing a particular discourse, a specific rhetoric about a body. The medical record is not simply a post hoc depiction of times passed and spaces explored: it feeds into the very constitution of these times and spaces. The medical record is a distributing and collecting device (Berg 1996); work tasks begin and end there. It produces the patient's history by sequentially demanding that the same measurements be made again and again (according to the density of the x-axis). In order to produce the evenly distributed graphs and tables, these measurements have to be meticulously timed: every day, standard blood tests are performed, bacteriological cultures are taken, and every eight hours, nurses measure the temperature and pulse. Every day, physicians produce a new summary of the situation that forms the basis for that day's diagnostic and therapeutic interventions. The end result is not a "medical" history that is clearly distinguishable from the history of Mr. Wood. The production of this representation can only occur with the concurrent transformation of that which is represented. The meticulous organizational routines into which the patient is "hooked" totally transform and control the patient's previous time zones—determining when the patient sleeps, structuring the days, and transforming the very experience of the flow of time (Frankenberg 1992; Roth 1963; Star and Bowker 1994). The body is thus rewritten in bureaucratic format: the weekly, daily, and eight-hour cycles that now structure the patient's time closely match the doctors' and nurses' shifts, the opening and closing hours of the laboratory, and the measurement units of the financial administration (Zerubavel 1979). Again, this is not merely a different, professional "reading" of the body. The body is materially reconfigured—its flesh is part and parcel of the discursive transformations we witness here. In Susan Leigh Star and Geoffrey Bowker's (1994) terms, we witness a "convergence" between body and representation; in its production, the representation inscribes itself in the body it represents.

It is this rewritten body, subsequently, that is the site of the diagnostic and therapeutic interventions. At this point, it becomes meaningless to debate whether these interventions address the body "itself" or its representation, since it is in and through this representation that the body "itself" is known, surveyed, and intervened upon. Peaks in the temperature curve will prompt the administration of a certain antibiotic, whose effect subsequently is also monitored in that graph and in the temporal changes in the laboratory values registering the organ functions that might be affected by this drug. Not only do the record's preformatted time zones inscribe itself into the patient's body, but all medical activities are started, followed up, and evaluated within the time zones produced by the record. Most of the relevant historical events in the hospitalized patient's life become events triggered by orders written in the record—procedures set in motion by specific forms; therapeutic dosages readjusted because of an increase in a certain laboratory variable as gleaned from the record.

While the patient's time is morphed into the record's time, the patient's geography is rewritten as well. As Stefan Hirschauer (1991, p.312) has so beautifully argued, the surgeon who operates on a body meticulously prepares and carves out the tissues so that they map the anatomical atlas. The atlas does not simply figure as the "ground" of objective knowledge, immediately visible in individual patient's bodies. Rather, this visibility is the outcome of the surgeon's "sculptured practice": "The proper anatomy of the ideal body is engraved . . . into the patient-body."

In an analogous fashion, the record inscribes a geography. The forms physicians and nurses use in their investigations of the patient body invariably delineate the organ systems. A form used in an intensive care unit, for example, lists the categories under "physical examination"

as follows: general impression, central nervous system, cardial, pulmonal, abdomen, urogenital, and extremities. Similarly, many laboratory tests are categorized anatomically: "liver function," "renal function," and "pulmonary function." In this way, through categorizing observations and substances from the body, the record carves out an anatomy. And it is this "geographicalized" body that is subsequently intervened upon: drug dosages are adjusted to correct a decreasing liver function, antibiotics are geared toward a possible infection seen on an X-ray, and tubes and monitor cables are put in place to monitor the cardiovascular circulation. As above, in an ever tightening cycle, the patient's body becomes its representation. Information required by or written in the record leads to interventions on the patient's body as it is represented in the record. Again, the medical record does not simply describe a patient's body; it structures the way the patient's body is rewritten. The categorization of observations and substances is only a first step in a continuing sequence of events in which the individual anatomical systems become the center for specific interventions by different specialists. Fluids and medication are given to correct urogenital problems, a chest is punctured to restore a deflated lung to its proper form, and postures have to be taken to shoot the X-ray correctly; in mapping the patient, the patient's body is reconfigured so that *it matches its map*.

The record is of course not the only element active in these rewriting processes. Only as a part of an interlocked series of elements does the record come to life; only when linked to nursing and laboratory routines, tubes, infusion bags and cables, the hospital information system and so forth does a network emerge that as a whole performs these transformations. And the record's structure does not "determine" the nursing routines in any simple way; these routines and the record's current structure have emerged together, mirroring one another and interlocking in historically specific ways (Berg forthcoming). Yet the record is one turning point in the cycle of inscriptions that circulate through these interlinked entities. It is where the inscriptions end up, are matched and rearranged, and where new inscription-yielding activities begin.

Multiplicity

The rewriting processes described above do not produce a single coherent and transparent patient's body, mapped into Euclidean space. Medical practice is not a unitary apparatus "disciplining" the patient's body into some free-floating, similarly unitary biomedical entity (Haraway 1991; Hirschauer and Mol 1995). Focusing again on the medical record, we could say that it constitutes multiple histories. It encompasses multiple layers: time flows faster in some sections than in others. The temperature curve exists in time measured in hours, while X-rays exist in time measured in days. Some pages capture a time span of two months, while other pages cannot hold even a single day.

These histories do not simply fold into one another. The flowchart links several histories by mapping them on a similar x-axis; yet even here the histories remain relatively self-contained. The fluid balance, for example, is produced as a closed system with a rhythm and an internal logic that is transparent. Daily, a single number results that "represents" the fluid balance of this particular patient. And the temperature curve is similarly clear-cut: it is a graph mapping the evolution of the patient's body temperature over eight-hour periods. Yet the interrelation between these two histories is not self-evident. The only direct linkage (Mol forthcoming) produced by the record is a temporal co-occurrence. But how are the peaks related to the numbers? Or are they? What is their joint history?

Such links are sometimes made in other parts of the record, especially in progress notes. A high temperature reading may be linked to a negative fluid balance record by the story that the former causes dehydration. Yet the progress notes refer only to a fraction of all the data listed in the record. More often than not, the X-ray reports, temperature curve, fluid balance, laboratory values, and so forth remain unconnected, in their own time zones. And even if they are connected through the progress notes, another complication of the image of a fully integrated, unitary, Euclidean body arises. Where the flowchart and the series of X-ray reports produce a series of—often separate—linear histories, the progress notes contain *nonlinear* histories. The summaries extract and condense time to match the current situation. Moreover, they continually reconstruct these histories whenever the current situation is changed. The progress notes do not build up linear histories like a flowchart does. Rather, a history of the patient evolves in the progress notes, changing whenever the current situation changes. Links are forged to the linear histories evolving elsewhere in the record, but these links are constantly reconstructed, removed, and retrofitted whenever the current situation alters. What a crucial temperature peak is at time *t* may become a singular, nonrelevant reading later and then be forgotten in the next summary. What is described as a sequenced chain of events at some stage in the progress notes gets summarized into a singular “event” later on. At the eighth day after the reinfusion of Wood’s bone marrow cells, the summary in the progress notes starts out with “now 8 days post-reinfusion” and then states “last night started amica & ripera.” A whole evening of doctor’s deliberations on the right antibiotics to prescribe is summarized in this last sentence. And the eight days between reinfusion and the previous night flash by uneventfully, only to slow down “last night” and to stop in the present, where the search for the “origin” of the fever is the order of the day. Time loops and swirls in these reconstructions; post hoc rationalizations after a sequence of dispersed occurrences become prior reasons for a “decision,” and episodes are condensed, stretched, and rearranged. Although the progress notes sometimes tie together the histories evolving in different sections of the record, they produce a history that is nonlinear, constantly rewritten, and constantly emergent.

There is, then, no simple mapping between these histories. Wood’s record portrays an array of histories, that do not fold into one another to produce one overall history of a medical body. Rather, the different histories coexist, self-contained, sometimes touching and interlinked, but often going their own way. The record performs multiple histories: a series of parallel trajectories through parallel but also often disconnected time zones, and a series of statements in which an integrative, historical narrative constantly rewrites itself.

The multiplicity of the patient performed by the medical record is prominent when we look at the patient’s geography. Juxtaposing the different parts of the record does not provide an evenly distributed, three-dimensional map of the body. The travel through bodily space is discontinuous and filled with indeterminacy. The different sections all stand for a series of probes (the blood tests, the radiographic procedures, the physical examination) that are let down into the body that, in Foucault’s ([1963] 1973, p.165) felicitous phrase, hides its inner pathological truth as long as it remains in the “night of life.” Different sections perform different geographies; some organ systems are lumped together in one and separated in other parts. The blood test forms meticulously separate different cell types, that are lumped together in the fluid loss forms (all under the category “blood”). The bacteriological forms distinguish different sites from which cultures are taken: the urine, blood, throat, prepuce, feces. The X-ray reports speak about the thorax (including the lungs and heart) and the abdomen (including liver, spleen, pancreas, and so forth). And sometimes, different geographies are performed on

one form: the "organ systems" listed on the intensive care's physical examination form, for instance, map out regions (the abdomen, the extremities), functional systems (cardial, pulmonal, central nervous system), and an overall "others" category (general impressions).

Here as well, the different geographies do not unequivocally fold into one biomedical body. There are spaces that remain empty, and there are spaces that are filled with competing tales. A differentiation in "regions" cross-sects a differentiation in "fluids" (blood, urine), which crosscuts a differentiation in "functional systems"; some "functional systems" might be grouped in one "region," while others (e.g., the cardiovascular or nervous systems) might not. How are these related? How is what is seen on the chest X-ray related to the "cardial system" as felt and heard during the physical examination? Does fluid loss through blood loss result in a loss of equivalent amounts of the different blood cell types, or does bleeding result in a depletion of some types or cells more than others? These links are not self-evident. They may be created, in the record, through an explicit juxtaposition and interpretation of these observations in the progress notes or through additional examinations (e.g., a more frequently repeated series of blood tests). The point is that these links are often absent, thus leaving the geographies in their unconnected realms (Mol forthcoming). And when such attempts are made, the geographies may well contradict each other. The blood might seem infected according to the changing ratio in blood-cell types but not according to the bacterial examination of the blood; while the physical examination may carve out lungs that are "clean," an X-ray may simultaneously show lungs that are "massively infiltrated." Again, the record does not contain mechanisms for preventing such gaps and conflicts. It performs multiple geographies, sometimes linked, sometimes oblivious to one another, sometimes conflicting.

MULTIPLE BODIES POLITIC

The record is not only crucial for the planning of interventions and the coordination and interaction between care providers. Other parties are also highly interested in the record. Insurance companies want more information about the indications for interventions; researchers want data on the prevalence of combinations of symptoms and the efficacy of therapies; and governments and hospital boards want to know how many days patients of a specific diagnostic category are hospitalized—and for what reasons. All these parties claim that the patient record can deliver the information they require (e.g., Ball and Collen 1992). In these discussions, the record is often portrayed as a "repository of information" (Dick and Steen 1991), as a vast treasure of facts that only needs to be tapped. In such a view, the building blocks, the "facts," can only be more or less "adequate" and "complete."

One image of an electronic medical record from the 1970s was that such a record would provide an unmediated picture of doctors' thoughts and produce an untainted, complete, error-free document:

To put a secretary or a computer technician between the physician and the computer is defeating the purpose of a direct natural language physician-computer conversation. If a girl has to interpret what you have said and then put this in some form that she thinks the computer will understand, I think we increase the error rate. More important, you prevent the physician from talking to the computer. When the technology becomes sophisticated enough and the expense becomes low enough that the physician-computer interface should be direct and in a natural language, there should be no girl, no mark sense card, no keyboard or any other type of artificial instrument between him and his computer. This is why a light pen was devised. It looks like a pencil, it has the physical form of a pencil. The

physician has been using the same instrument since he was three years old. (Anderson and Forsythe 1970, p. 257)

Current “paper” medical records are harshly criticized precisely for not properly reflecting what has happened and what physicians think:

The medical record is an abomination. It is a disgrace to the profession that created it. More often than not, the chart is thick, tattered, disorganized, and illegible; progress notes, consultant’s notes, radiology reports, and nurses’ notes are all co-mingled in accession sequence. The charts confuse rather than enlighten; they provide a forbidding challenge to anyone who tries to understand what is happening to a patient. (Bleich 1993)

The dream of the unmediated record dates from the earliest medical computing applications such as MUMPS (Barnett 1975) and has of course never been realized. There are many steps between “what happened” and the final record of these events: the summarizing processes described above, but also the often invisible but crucial pool of typists who transform the physicians’ taped reports into legible, grammatically correct and understandable reports. And most medical records work in hospitals is actually done by the equally invisible yet crucial medical records professionals—there are some fifty schools in the United States that train people for bachelor’s degrees in medical records administration (Huffman 1990, p. 53). Such professionals significantly change aspects of the record. For example, Ann Fagot-Largeault (1989, pp. 139-140) traces the mediation process for French death certificates. She cites cases where, like doctors, coders (who take the medical history and apply it to the death certificate) have their own favorite codes—leading to an “epidemic” of “diffuse intravascular coagulation” in the 1970s (p. 145). These mediations add up: she cites a study from 1970 in Stockholm, where it was shown that the final cause of death was wrong (as demonstrated by autopsy; itself of course a specific mediation) in 45 percent of cases for “probable” causes of death and in 25 percent of “certain” causes. . . (p. 145). It is estimated in France that about one in four certificates filled in by doctors needs to be “reinterpreted”; and doctors agree with the coder’s choice only about 80-95 percent of the time (p. 218).⁷

The image of the record as a more or less adequate representation of facts and events is also problematic since, as we have seen, the record feeds into the very constitution of these facts and events. We have seen how the record contains many emergent stories about the patient’s body, both about its temporality and geography. Any one implementation of the record actualizes one type of story; and a set of implementations employing a standardized story format (it is easier to tell some stories than others in the record) inscribes its specific time and space in the patient’s body. In this section, we shall see that the same analysis can be made of the organizational work done by the medical record.

What do medical records record? The record traces what Anselm Strauss and his coworkers (1985, p. 8) have called the “illness trajectory”: the course of the illness, the total organization of work done over that period, and the impact of that work on those involved. In this section, we will take one cut through this totality, arguing that medical records always describe past action in the context of a set of organizational arrangements. It would be meaningless to cite a temperature reading from a record out of the context of what that reading entailed organizationally—a high reading in this kind of chart at this point entrains this kind of response and so forth. The medical record of its nature exists only within a certain organizational context, as

do all records of past action. But at the same time it feeds into the reproduction of these organizational contexts: the act of recording both enacts the organization that deals with the phenomenon and creates the past within which the phenomenon has occurred. Medical records produce a series of well-defined narrative structures, each of which reflects and produces a particular kind of social organization. We want to look at some of these structures to elaborate how the record is involved in the reflection and production of different bodies politic, that is, how the records are involved in the very production of the descriptions under which they function.⁸ Here as well as above, the crucial observation is that the stories the record produces are not mere *representations* of the work—they are a core, constituent *part* of it. We will concentrate on three dimensions of the organizational life of medicine in turn: institutional (legal and insurance arrangements), work practice, (the organization of the clinic), and processes of professionalization (nursing). At each point we shall be concerned with the deployment of medical records in building a “body politic.”⁹ Finally, we will (making the same move as in the previous section) discuss the question of multiplicity: How can one infrastructural form (the medical record) produce a range of configurations of these bodies politic?

The Body of the Law

The medical record is one of the records that produces the legal entity of the “citizen-in-the-state” (Ewald 1986). In order for the record to work, the object of the story has to be a registered entity (the need for registration often being the need for medical attention). Here as elsewhere the primary issue is not whether the record tells a “true” story, though in this case the act of registering in a sense makes it so—it is constitutive of citizenship. Ed Hutchins (1995) reminds us of this in the case of navigation: the primary motive for the rich set of records kept by every ship is that the captain needs to be able to show, in case of accident, that everything possible was done.¹⁰ In a textbook on medical records, the first thing said about medical data entry is that it “formulates a legal document that demonstrates the following:

- the patient has a need for service
- the correct service is provided
- the service is provided in the proper manner by the proper person.” (Waters and Murphy 1979, p. 54)

In current medical work, this legal story is simultaneously the story produced for the insurance companies’ interest; it legitimates the actions performed as well as their costs. These are particular kinds of stories. The legal record should not contain inconsistencies or lacunae (Bowker 1994). It should not refer to things that “just happened.” Everything has to be explicable and justifiable. If the patient died, it was despite the full operation of due process; if a test was performed, it was because there was a clear-cut medical indication. The *outcome* of the legal record (the moral of the story) is the meta-affirmation that the medical system is fully penetrated and underwritten by the legal system, that the doctors did everything that they could be expected to, and that all these affirmations were just.

Typically, these “preferred” accounts centralize the physician’s agency as core decision maker and reduce the nurse’s role to the provision of primary data and execution of the doctor’s plans. Although nurses spend far more time with patients, their presence in the medical record is limited to filling in the temperature list, while the final story emphasizes the logical

work (rational reconstruction) of physicians, who are geographically much more removed from the patient. The story told over and over again is that patients are cured by doctors' actions and that doctors' actions reflect a rational thought process. In producing these stories about doctors as heroes and patients as objects, the record configures chains of delegation that render the doctor the representative of the entire heterogeneous assembly comprising the hospital. S/he is performed as the head of the organizational work comprising the crafting of the patient's body, which is done according to the logic of textbook science. This "repository of information," in other words, embodies a differential evaluation of whose time counts, whose information matters, and whose work deserves to be mentioned and made visible (Egger and Wagner 1993; Frankenberg 1992; Star 1991).¹¹

How do these preferred accounts evolve? It would be wrong to assume that medical personnel "lie," or that there are "cover ups" going on somewhere. Preferred accounts emerge from the record only gradually, through small steps and reconstructions that by themselves are just ordinary moments in the ongoing work. The ordering and polishing of accounts is a natural process, it is a *prerequisite* for the smooth progression of complex, interactive work processes (Garfinkel 1967).

One of the active elements in the production of such accounts is the medical record (Berg 1996). The record leads to a rational reconstruction of the past - the same kind of rational reconstruction that has been so successfully deconstructed within science studies (e.g., Latour and Woolgar 1986). The record is instrumental in producing such stories that tell "rational," "textbook" narratives about a patient entering a hospital with complaint X, being diagnosed with Y, treated with Z, and who was discharged with or died from Q. Its very forms are structured toward such a sequence; the complaint should be filled in first, then the diagnosis, and then the therapy. The forms suggest the reasoning process that *should* have taken place; the conclusions are logically derived from the gathered data (Barrett 1988).

In addition, the record is the very place where a public account of "what has happened" is created. It is when writing into this potential source for retrospective inspection that physicians and nurses construe narratives that align what actually happened with what should have happened, no matter how insignificant these occurrences may seem (Garfinkel 1967, pp. 197-207; Hunter 1991). If a patient has been hospitalized for several days, for example, nurses may omit measuring the blood pressure and just fill in yesterday's measurement in today's column (Figure 1). Likewise, residents often ask nurses what to prescribe while they complete the order form in the regular fashion, as if it is they who have told the nurses what to do (cf. Hughes 1988). The same phenomenon occurs in and through the summaries that are continually being produced. In this process, details are omitted, and the story is simplified and retold in ways that fit the situation at hand. This results in an increasing stylization of past events into a standard canon, a sign leading to a diagnosis leading to a therapy leading to an outcome. A sentence like "admitted with Hodgkin, now 8 days post-reinfusion" effectively sets the focus of the current attention. Yet in doing so, it also smoothes over any diagnostic uncertainties that might have played a role, erasing the deliberations that went into the selection of this therapy and Mr. Wood's fears and anxieties.

Finally, all this adds to the peculiar feature of written text that, once written, tends to have a privileged position vis-à-vis other recollections of these events (see Clanchy 1993 for the historical genesis of this privilege). Wherever it travels (from the audit committee to the insurance inspector's desk to the courtroom), it becomes *the* trace to the "original event." As Dorothy Smith (1974, p.260) aptly summarizes these issues, accounts enter "document time" once

they are written: "that crucial point at which much if not every trace of what has gone into the making of that account is obliterated and what remains is only the text which aims at being read as 'what actually happened.'"¹²

Legal concerns are not the only relevant crosscutting interferences here; the fact that these documents are also (formally and informally) used for quality control purposes and for the evaluation of colleagues and trainees yields similar consequences. And these are not new interferences: the first official, early twentieth-century attempts to standardize and improve medical record keeping in the United States did not derive primarily from the urge to improve the primary care process. Rather, they were driven by the absence of means to decide upon certification and accreditation of hospitals and individual doctors (Stevens 1989; Waters and Murphy 1979, pp. 4-5). From early on, then, the record was a crucial element in the generation and reproduction of this complex body politic.

The Body Politic of the Clinic

Analogous to its involvement in the production of a patient's body, the medical record is involved in the production and reproduction of the body politic of the clinic. First, it plays a core role in the ongoing reproduction of the hospital's temporal structure. Triggering sequenced measurements produces *both* a graph in a record and circumscribed, cyclical work tasks for nurses. The unstructured progress notes forms require physicians to summarize regularly the current state of affairs and thus create an organizing structure for their work days. Without the record's core role as a distributing and collecting device, the complex temporal organization of this body politic could not exist. The record lists which actions have been and still need to be undertaken, when which requests or interventions will yield outcomes, and who is responsible for the completion of such a task. The flowchart's medication and infusion lists, for example, function for both nurses and physicians as a list of what has been administered and as a means to see at a glance how some crucial measurements have been affected by these interventions. In addition, they also organize the work: the ward secretary can see what type of medication might need to be ordered, and nurses can see when to give what and can subsequently add the infusion dosages for the calculation of the fluid balance. The record, in other words, affords a highly complex, temporally distributed division of labor.

It thereby also maps a complex geography of the hospital. The record discussed here is a so-called "source-oriented" record, by far the most common means of record keeping. It entails ordering the different sections in the record according to the different institutional sources the data are derived from: nursing notes, doctors' notes, laboratory results, bacteriology reports, consultations of different specialties, and so forth.¹³ Again, this does not yield a map that merely "represents"; it feeds into the reproduction of these geographies. Having their own forms and sections within the record, nurses are separated from physicians, both physically and intellectually. Notwithstanding other alliances or differences, the record also clearly differentiates the bacteriologists vis-à-vis the radiologists, and sets them both apart, as two isolated groups, from the specialists in charge.

The record, moreover, feeds into the reproduction of the hierarchies between these geographical sections. The treating physicians are on top; they write the central pages of the record, define the outlines of the illness trajectory, and incorporate and summarize information coming from all other sources. They have unlimited access to all the sections but only write there where the overall course is set. Likewise, specialists called in for consultation will usually fill in their own yellow consultation forms, but they are allowed to write their findings

in the progress notes. No other discipline is allowed to do this. In addition, the hierarchy is evident in the way just how much of a form is prestructured. An unstructured form lets a named author create order through the production of a narrative, and it does not exert demands on the content of these narratives by listing preformatted labels, which may remain visibly empty. The physicians' progress notes are totally unstructured, and the consultancy forms have a few, large sections with labels such as "findings, conclusions and advice," all designed for free text. The radiographic reports are more brief, but the radiologist is free to describe the image as s/he pleases, as long as it is followed by a conclusion that answers the treating physician's request. The bacteriologist, however, is limited to saying "no growth," "a little growth," or "much growth," and the laboratory workers and nurses can only produce the numbers that end up in the preformatted graphs and columns. As Hunter (1991, p.88) phrases it, "the hierarchy of disciplines is very alive in the chart."¹⁴

The record not only plays a generative role in the organization of the clinic, it also legitimates this organization's design. As we have pointed out above, the record tells the story of the *work* this body politic performs. One way of evaluating the record has been to see every record as a description of the structure of a working organization operating at peak efficiency. Thus, record keepers are advised that the purpose of the record is to tell a story that begins with admission, describes an every more precise diagnostic process, goes on to treatment, and ends with discharge, or (even more "complete" from the medical record keepers' perspective) death (Waters and Murphy 1979, p. 97). In this case the outcome of the record is again the meta-affirmation that allopathic medicine works—and, ipso facto, that the sites where medicine is performed work. Every record, as individual as it may be, is through its very form a testament to this assertion of success.

The Professional Nursing Body

The fact that the chart maps, and thus feeds into the hierarchy of disciplines in medical work has not gone unnoticed by these disciplines. Turning to our third example, we encounter a professional group striving to enhance its status through attempting to change these record keeping practices. Here, the constitution of a body politic in and through the medical record has become a site of active contestation. The record keeping practices at stake concern the nursing classification scheme designed for incorporation within hospital information systems. The scheme, NIC (nursing interventions classification) divides nursing work into a series of well-defined actions that are then coded (allowing nursing administrators to track the work of their staff). The group at Iowa University School of Nursing published a first edition of their system in 1992, and a revised and expanded version came out in 1996 (Cohen, Kruckeberg, McCloskey et al. 1991; McCloskey and Bulechek 1996).

NIC is a fascinating system. Some categories, like "Bleeding Reduction—Nasal—4024," are on the surface relatively obvious and codable into discrete units of work practice to be carried out on specific occasions. But what about the equally important categories of hope installation and humor? "Hope Installation—5310" includes the subcategory of "avoid masking the truth." This is not so much something that nurses do on a regular basis, as something that they should not do constantly. It also includes "help the patient expand spiritual self." Here the contribution that the nurse is making is to an implicit lifelong program of spiritual development. With respect to "Humor—5320," the very definition of the category suggests the operation of a paradigm shift: "Facilitating the patient to perceive, appreciate, and express what is funny, amusing, or ludicrous in order to establish relationships." It is unclear how this

could ever be attached to a time line: it is something the nurse should always do while doing other things. Further, contained within the nursing classification is an anatomy of what it is to be humorous and a theory of what humor does. The recommended procedures break humor into subelements. A nurse should determine the types of humor appreciated by the patient, determine the patient's typical response to humor (e.g., laughter or smiles), select humorous materials that create moderate arousal for the individual (e.g., picture a forbidding authority figure dressed only in underwear), encourage silliness and playfulness, and so on, to make a total of fifteen subactivities, any one of which might be scientifically relevant. A feature traditionally attached to the personality of the nurse (being cheerful and supportive) is now attached through the classification to the job description as an intervention that can be accounted for. These process categories fit into the same numbering scheme as more punctual categories such as "Bottle Feeding—1052" or "Suturing—3620": once in the record, there is no distinction between process and single interventions.

The Iowa group (the kernel of whom are nursing administration teachers) made essentially three arguments for the creation of a nursing classification, initially to nursing informaticians and thence to the hospital information systems community. First, they argued that, without a standard language to describe nursing interventions, there would be no way of producing a scientific body of knowledge about nursing. NIC in theory would be articulated with two other classification systems: NOC (the nursing sensitive patient outcomes classification scheme) and NANDA (the nursing diagnosis scheme). The three could work together: researchers could perform studies over a set of hospitals employing the three schemes in order to check if a given category of patient responded well to a given category of nursing intervention. Rather than this comparative work being done anecdotally as in the past through the accumulation of experience, it could be done scientifically through experiments. The second argument for classifying nursing interventions was that it was a key strategy for defending the professional autonomy of nursing. The Iowa nurses are very aware of the literature on professionalization (notably Schön 1983) and are aware of the force of having an accepted body of scientific knowledge as their domain. The third argument was that nursing, along with medical professions, was moving into the new world of computers. As the representational medium changed, it was important to be able to talk about nursing in a language that computers could understand. If not, nursing work would not be represented at all in the future and would risk being even further marginalized than it was already.

The intervention in turn could then be linked by nursing academics to nursing outcomes in a series of clinical studies. The outcome of the records would be the integration of nursing work into the medical establishment. The expressed fear of professional leaders is that without representation in the information system, the profession of nursing would become ever more marginalized. So the record is producing a patient (as we stressed in the first part of this article) but it is also producing an organizational result. For the nurses then, the record constitutes building blocks for a *body of knowledge*, that in turn loops back into the hierarchy. In current storage practices, nurses' notes are frequently separated from doctors' notes and are often destroyed immediately after the patient leaves the hospital (Huffman 1990). A professionalized form of reporting would create a continuing record of their activities that could feed into the discipline of nursing science and be used to unseat the current hierarchy.¹⁵

Nurses who met to develop a "nursing minimum data set" (modeled on the successful medical minimum data set) to be produced by all hospitals in their medical records argued that "the most frequently focused upon language is that developed by medicine and the numerous

natural or physical sciences that contribute to medicine's scientific knowledge base. This language is focused upon most frequently by nurses, because of medicine's long history of dominance in nursing, its relative specificity about physiological phenomena, its apparent measurability, and its familiarity. It is also valued for its social status as a scientific language, used by a politically powerful professional group, physicians" (Kritek 1988, p. 25). It is not enough for nurses to record accurately what they do—they must record it in a language acceptable to physicians and hospital administrators and productive of a new, higher status. For this reason, "leech treatment" was not initially recognized as a NIC category - even though it was indeed a treatment and was carried out by a number of nurses. The nursing record had to be considered "professional" in order for it to do its work. That work is, in part, the modeling of nursing on the example of medicine - itself modeled (with the help of the medical record, as we saw above) in the image of pure science.

Multiplicity: Interoperability and Infrastructure

It is turning into a complex thing, our medical record. It produces multiple bodies and underwrites a number of ever-shifting organizational configurations. For the nurses, the medical record is a crucial tool in their organizational struggle for status at the same time that it is a record of what happened to the patient, a legal document, and a tool that organizes their daily work. It must be able to do all these jobs at once for all those who work with it. In the multiplicity of context the record is drawn into (and helps to constitute), materially different objects are at play: most physicians never see the coding forms used by the coders; most record administration coders know little of the elaborate nursing coding schemes; most nurses draw on the nursing record primarily during their work, and so forth.

As we have seen, medical records are involved in the production of multiple bodies politic. Consider the legal reading of the record that we have discussed. In this reading, the legal narrative is the chief concern, and some features of the record are activated as relevant for the story to be properly told. It may not matter for the nursing record whether or not a given temperature reading was taken, but this may make a large difference legally (as indicative of contributory negligence). So medical records do not have to do a single job; they have to be configured in such a way that a set of different organizations are serviced by them. To borrow the vocabulary of information science, they have to serve as an "infrastructure" (Star and Ruhleder 1996) to a set of organizations and do so in such a way that these organizations can use the medical records in conjunction with other records that they generate. Thus, for example, you want the medical record to store information about ethnicity in a way that makes sense to epidemiologists and to public health officials, so that in turn these groups can deploy the records in conjunction with other records that they produce to track diseases. Again, to borrow the vocabulary of information science, we can say that the medical record needs to guarantee *interoperability*. In this section, we shall see that the fashioning of medical records into infrastructural tools guaranteeing interoperability involves a series of organizational alignments of great political and ethical importance. Just as for the patients in the above section, there is a real *multiplicity* of organizations produced by the records, which conflicts with a rhetoric of singularity (the convergence of traces on a single ideal patient temporality and geography and on a single ideal organizational context).

A recent history of medical informatics notes that, "by the 1980s, the provision of health care in the United States had three dimensions of integration for patient care information: *local integration* of information in hospitals or in physicians' offices; *vertical integration* of

information between affiliated hospitals and medical offices; and *horizontal integration* among associated hospitals, clinics, and community health and welfare support groups" (Collen 1995, p. 82). Each of these forms of integration (which cannot be as neatly separated off from each other as Collen implies) entails a different form of interoperability. The record has to be aligned with the needs of the organizations associated with them. This involves, for one thing, matching of different timetables and geographies the records produce. Julius Roth (1963) discusses the difficulty of a tuberculosis patient traveling to a new sanatorium without there being an agreed-upon language for describing the patient's condition. The NIC nurses despair of ever producing nursing knowledge without comparability (Timmermans, Bowker, and Star forthcoming). But this integration also extends to relationships with health-care providers, public health officials, the World Health Organization (which maintains the International Classification of Diseases), the legal profession, and so forth; as we have pointed out, the record is increasingly seen as a vital source for these "third parties" as well. With the development of computer-based records, a further dimension is introduced by the needs of the programmers. Thus, at a meeting discussing the development of the NIC classification, nursing informaticians protested the existence of "nested classifications" within NIC, that is to say, an intervention containing another within it. They argued that this made for difficulties in programming the appropriate screens on the electronic nursing record.

With the extension of the record's reach through different times, spaces, and into novel domains, much work is done *on* the record to ensure that these multiple configurations continue to be possible. Much of this work seems "purely technical"; it appears far removed from organizational or political issues. Consider the sets of committees that have been involved with standardizing medical informatics:

The American Standard for Testing Materials (ASTM) E31.12 subcommittee framed nomenclatures and medical records. In 1988, ASTM sub-co E31.12 published standards for patient discharge and transfer data. Health Level Seven (HL7), an organization made up of vendors, hospitals and consultants, was organized in 1987 to develop interface standards for transmitting data between applications that used different computers within HISs. The message content of HL7 was to conform to the International Standards Organization (ISO) standards for the applications level 7 of the Open Systems Interconnection (OSI) model; the HL7 standard used the same message syntax, the same data types and some of the same segment definitions as ASTM. The Medical Data Interchange (MEDIX) P1157 committee of the IEEE, formed at the SCAMC 1987, was also developing a set of standards, based on the ISO application-level standards, for the transferring of clinical data over large networks from mixed sources, such as from a clinical lab and a pharmacy, for both intra- and interhospital communications. (Collen 1995, p. 109)

Each of these interconnections was the product of a continuing effort to maintain and stabilize an infrastructure. Janet Abbate (forthcoming) has demonstrated how the OSI standards are themselves the fragile outcome of a series of negotiations between a computing industry wanting to retain the proprietary edge of a closed system, government regulators, public pressure groups, and so forth. As you spiral down into the infrastructure, you get beyond a particular database in a hospital to the technical standards (OSI) underwriting that database; and as you follow OSI in development, you witness a titanic struggle between company interest and the public good being written in code. This is typical for infrastructure: the "harder" you go, the *closer* you get to organizational and political concerns (see also Hanseth, Monteiro, and

Hatling 1996, and see Carlson 1991, who makes this point brilliantly for innovation in the electrical industry).

All these standardization efforts do not eliminate the continuing impetus to balance the needs exerted within the different networks that interconnect through the infrastructure (Bowker and Star 1994; Timmermans and Berg 1997). The ever unattainable ideal of pure, quantifiable knowledge remains a driving organizing force, even when it is patently absurd. Consider the case of fluid balance: this is precisely measured to the milliliter in intensive care units and then a fudge factor out of all proportion to the data is added in for sweating (which cannot be so simply measured). Why is this ideal so successful in organizing infrastructures and guaranteeing interoperability? One answer is that it generates alignments. If we are all striving in the same direction, then, whether or not the direction itself is a good one, our sets of fudge factors and uncertainties will tend to align with each other. An analogy here would be to the story of the emperor's new clothes. If everyone seeks to describe the world in ways acceptable to the others around them, then the emperor will be seen to be well dressed—whether or not he is—but if one person is out of alignment, the whole may crumble. This, we would argue, is one reason why formal records entail such deep organizational discipline.

The nurses producing NIC believe deeply that the current system of accounting inscribed in the hospital information systems is wrong-headed. Thus, in a June 1995 meeting, the coleader of the NIC team, JoAnne McCloskey, mentioned the rise of activity-based accounting, meaning that individual activities had to be costed. She went on effectively to deconstruct this in much the same vein as Boland (1993) has done for the field of management and information science. Nurse practitioners, McCloskey noted, see patients for longer than doctors (since they are teaching, preventing reoccurrence, etc). Until one compares productivity with performance one cannot see this. This was also a problem, she noted, for women physicians. They tend to see patients longer and need to see them less often as a result, but on a productivity measure it looks like they are working more slowly. However, the productivity measures used were based on the factory measure of how many widgets an hour you produced. Crucially, McCloskey added: "Nursing needs to speak the language used elsewhere. This is why we need to use a restricted definition of productivity." In our terms, she is pointing to the need for interoperability of the nursing records with other medical records. Indeed in the NIC e-mail list she floated an attempt to pin times to interventions (difficult in the case of emotional support and active listening, but not obvious even for bowel incontinence care). In order to speak the language of accountancy well enough to justify a new nursing slot, the organization had to be recorded as having worked in a particularly well-defined set of temporal slots. Here is a sample argument that uses the assignation of time slots to NIC interventions to justify the creation of a new nursing position in a given hospital. This argument was presented to nursing administrators and nursing information specialists at the same meeting:

Position justification	
Teaching/discussion/process	time (minutes)
individual teaching	8
prescribed medication	15
prescribed procedure	10
treatment	30
63 minutes by 620 new patients per year = 39,060 minutes or 651 hours.	
651 hours divided by 2,000 = .3 FTE (FTE is "full-time equivalent")	

What is happening here is that a key player in the production and maintenance of the medical record—the nurse—does not believe in the validity of the traces that they are producing of their own work in the record. Yet they have to write records as if such traces were true, and write them well enough so that nursing will be seen as a key player in the efficient scientific treatment of patients (rather than a prime candidate for cost-cutting). What a strange irony! It is, we would argue, an extreme example of a very common phenomenon. Consider the case, discussed at length by Allan Young (1995) and Stuart A. Kirk and Herb Kutchins (1992) of psychoanalysts who in order to receive reimbursement for this treatment need to couch it in a biomedical language that is anathema to them but is the *lingua franca* of medical insurance companies. The nurses have potential allies—there are radical accountants, radical doctors, and critical medical informaticians—but the need to align is immediate; the risks of disappearing forever from the medical record are too great to make the risk of challenging the common language worthwhile. Local use of the record underwrites organizational multiplicity (nurses will continue to be concerned with process; psychoanalysts with the *id*) at the same time as the constrained form of the record evokes a single large medical organization with guaranteed interoperability of its “departments” (nursing, epidemiology, public health, medical insurance and so forth), just as the patient’s body is at once conjured into a single time and space while remaining locally multiple.

Infrastructures underwrite alignment of the organizations that they are infrastructural to, and in the case of the medical record, a key feature of this alignment is the evanescent ideal of the scientific operation of medicine. As Latour (1988) has argued in an analysis of Louis Pasteur, much of the power of science comes from such alignment. This alignment is neither completed nor entirely successful, but large techno-economic networks cannot exist without it. The medical record produces organizations that can configure their own records such that a privileged set of stories (due process, medical science, nursing efficiency) can be told again and again.

CONCLUSION

The medical record, it has become clear, is both a complex object and a fascinating and crucial focus for sociological research. It feeds into that which it seems merely to represent; it is a crucial element in the constitution of the patient’s body (inscribed in a set of spaces and times) and of the hospital as a formal organization (equally inscribed in a set of spaces and times). It is a site where both the constitution of the patient and the constitution of the hospital worker is at work: the bodies and bodies politic they inhabit are reinscribed into novel places, broken apart in new ways, and configured into spaces and times out of their control. Seen in this light, as a site where multiple stories about patients and organizations are at stake (including the interoperability between these stories), the medical record becomes highly relevant both analytically and politically. There is a strong current “push,” for example, toward the implementation of the electronic medical record, and when the record is seen as an innocuous storage device, the appropriate implementation is often seen as a “technical problem,” or as a matter of finding the “appropriate interface.” When it is acknowledged that the medical record is interwoven with the structure of medical work in fundamental ways, and that different medical record systems embody different notions of how work is organized, different modes of configuring patient bodies, and so forth, we are in a position better to understand and intervene upon the issues at stake. We are reminded of Latour’s (1987) observation that science is bureaucracy or Michel Serres’s (1987) equation of law and science: the site of the

creation of organization and body is the bureaucratic work of creating inscriptions. To end where we began: this site thereby becomes a key locus for the arrogation and exercise of power.

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NOTES

1. Many studies of the doctor-patient contact, for example, focus on the way the patient's symptoms and medical problem are constituted in the doctor-patient interaction (e.g., Davis 1986; Ten Have 1994). In his recent work, Atkinson (1995) has broadened this approach to include, for example, discussions between specialists. Here also, however, the emphasis is on the constitution of a patient's medical situation through *talk*.

2. Many have taken similar departures before us (e.g., Deleuze and Guattari 1988; Haraway 1991; Mol 1993).

3. Hodgkin's disease is a form of cancer of the lymphoid tissues. We begin with a thought experiment since we want to convey the sheer impossibility of clinical work without the record. Our field notes have several instances where the record was (temporarily) unavailable, when the unwillingness to undertake any potential consequential action is always prominent. For stylistic reasons, however, we preferred to introduce Mr. Wood immediately, so as not to introduce confusion by presenting other patients.

4. Although they do not focus specifically on the medical record, the following classical studies provide valuable insights on the role of time in medical work: Roth (1963); Richman and Goldthorp (1977); Zerubavel (1979); Atkinson (1981); Horobin and McIntosh (1983); Frankenberg (1992).

5. For the notion of different, coexisting zones or orders of time, see Kavanagh and Araujo (1995); Frankenberg (1992); Zerubavel (1979).

6. This refers to the bone marrow treatment: the bone marrow cells are reinfused after high doses of chemotherapeutics have done their toxic or yet, we hope, curative work.

7. In a study performed in Sweden, researchers found that in 1975, coders disagreed with doctors' attributions of rheumatoid arthritis 38 percent of the time (Fagot-Largeault 1989, p. 228).

8. In *Rewriting the Soul*, Hacking (1995, pp. 234-257) discusses the problem of using current categories, such as child abuse, to describe past actions, such as Lewis Carroll's collection of pictures of children. When the category did not exist in social discourse, he argues, there is a real sense in which it does not apply. Action, he argues, is always "action under a description." By this he means that whenever we describe a past action, we only have access to it through a set of constructed categories (a description). Thus when I seek to describe the behavior of someone I consider a "bully," the latter category only fits the action within the context of my middle-class, late twentieth-century definition of bullying, whereas a nineteenth-century English patriarch might have seen someone with a "bit of backbone" (a description not available today). Hacking's concern is to demonstrate that where there was in the past no category of child abuse there was no abuse (even though, he is quick to point out, there might have been bad action) (pp. 55-68). However, his argument becomes much stronger when it is applied directly to social organization mediated by record keeping. Where there is no logging of the action of child abuse in a record within an organizational discourse, there is no child abuse. Recording something as having been so makes it so, particularly when the record is itself the only trace of the past action.

9. These three dimensions are not to be taken as exhaustive or even as necessarily central; they are dimensions in which the record's role is spelled out particularly clearly.

10. We wish to thank Bruno Latour (personal communication) for pointing out the the analytical significance of the centrality of this legal aspect of record keeping.
11. One could say that a specific nursing record does exist but that record is hardly ever used for research, administrative, and/or financial purposes.
12. See also Goody (1977) and Latour (1987) on the power of writing and written traces.
13. As opposed to, for example, an ordering by means of a list of the patient's problems, as in Weed's "problem oriented record" (1971).
14. With regard to the electronic medical record, it is tantalizing to assert a connection between the databases drawn upon and the work organization. There have been three major epochs in the development of databases: the hierarchical, the relational, and the object-oriented (Khoshafian, 1993). All three are still in use in medical and other databases. The hierarchical database echoes the hierarchical organizational structure most favored in the 1960s; the relational database echoes more the team model of the 1970s; and object orientation is the nec plus ultra of radical outsourcing. Organizational theorists have certainly drawn these connections, arguing a one-to-one relationship between database structure and organization, with mismatches leading to problems. Thus, it has been argued that relational databases are sometimes problematic since "they have a flat, two dimensional view of the world" (Stead, Wiederhold, Gardner, Hammond and Margolies 1992). Although the complex mediations we describe here are unlikely to end up in any rigid repetition, the way a particular type of story gets told, enforced, and mediated through different nodes in the network is an important issue for further research.
15. See Abbott (1988) on domain knowledge as a professionalizing tool; see Bowker (forthcoming) on nursing records.

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