

## Massachusetts General Hospital's Pre-Admission Testing Area (PATA)

*Kelsey McCarty, Jérémie Gallien, Retsef Levi*

Five anxious faces looked up at Dr. Jeanine Wiener-Kronish, chief of anesthesia at Massachusetts General Hospital (MGH), as she entered the conference room. It was June 2009, and the group before her was the task force for the Pre-Admission Testing Area (PATA). PATA had been struggling with inefficiencies and long patient wait times for over two years. Despite the group's best efforts to fix these problems, a letter forwarded from the president's office that morning highlighted that conditions in PATA were not getting better. Dr. Wiener-Kronish took a seat and read the letter aloud:

*Last week I brought my mother into the Pre-Admission Testing Area. We live almost 3 hours away and had to make a special trip for this appointment, which her oncologist, Dr. Paul Schneider, said was necessary to ensure a safe and successful surgery.*

*When we arrived at the clinic, the waiting room was so full, it was five minutes before my mother and I could get two seats together. We sat there for a full half-hour before they sent us back to get her blood pressure reading. We then waited back in the waiting room for another 45 minutes before being moved to an exam room. It was 20 minutes before a nurse finally came in and she mostly just asked questions I had already answered on a form provided by the front desk. After the nurse left, it was almost another half-hour before the doctor finally came in and he also asked many of the same questions. The providers were very nice and apologetic, but of the almost 4 hours we spent in the clinic, only 1½ hours of that was actually face time with anyone! Even more aggravating, while my mother was in surgery this morning, two families in the waiting room said their relatives never even had to have a PATA appointment. One even had the same condition as my mother so I'm not sure why our PATA visit was even necessary.*

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This case was prepared by Kelsey McCarty, MBA Class of 2010, Jérémie Gallien, Associate Professor of Management Science and Operations, London Business School, and Retsef Levi, Associate Professor of Management, MIT Sloan School of Management.

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*I brought my mom from out-of-state because we were told that Mass General provides the best care in all of New England, maybe even the country, but that's not at all what we experienced. I sincerely hope that we can expect more from our next visit to MGH.*

Dr. Slavin, president of MGH, had a dedicated department to process letters from patients, families, and friends. The majority of these letters were filled with overflowing gratitude for the quality of care delivered by the hospital and its employees. Therefore, when letters like this came across his desk, they were not taken lightly. Dr. Wiener-Kronish knew she needed to correct the problems in PATA quickly.

### **Anesthesia at MGH**

Dr. Jeanine Wiener-Kronish began her career in anesthesia as a resident at the University of California at San Francisco (UCSF) and went on to become a skilled attending physician,<sup>1</sup> researcher, and director of the Pre-Operative Program. In 1999, she achieved great renown for discovering a vaccine for an infection associated with prolonged ventilator usage. This infection was the leading cause of death in the intensive care unit (ICU). In 2008, ready for her next challenge, Dr. Wiener-Kronish accepted the position of anesthetist-in-chief at MGH, becoming only the fourth person to hold the prestigious position in the 70-year history of the Department of Anesthesia, Critical Care and Pain Medicine (DACCPM).

Located in Boston, Massachusetts, MGH was founded in 1811, making it the third oldest hospital in the United States. With 907 patient beds across a 4.6 million square-foot campus and almost 23,000 employees, it was one of the largest hospitals in the country and Boston's largest private employer. *U.S. News & World Report* consistently ranked MGH as one of the top five hospitals in the nation, and patients traveled from all over the country to receive treatment there. It was also home to the Ether Dome, an amphitheater that served as MGH's first operating room (OR) and became the birthplace of anesthesia when ether was first publicly administered there as a surgical anesthetic in 1846.<sup>2</sup> The DACCPM received its official charter in 1938 and since then has maintained its position as a leader in innovative anesthesiology research.

The DACCPM was one of the largest clinical departments in the hospital with 278 physicians and 198 nurses, researchers and administrative personnel. This large work force was needed to support all stages of the perioperative<sup>3</sup> patient flow: pre-operative assessment, intra-operative monitoring and care, and post-operative recovery. Due to the nature of the specialty, the DACCPM was also charged with administrative oversight in the ORs, the Post-Anesthesia Care Unit (PACU), the Pain Medicine Center, and the Surgical Intensive Care Unit (SICU). The department's achievements across many areas of MGH, however, were being overshadowed by the persistent challenges in PATA.

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<sup>1</sup> Attending physicians have hospital admitting privileges (the authority to provide patient care) and are primarily responsible for patient care. In contrast, interns, residents, and fellows are physicians in training and must receive attending approval for major patient care decisions.

<sup>2</sup> Prior to the discovery of ether, surgeons had their patients drink whiskey or coat the surgical area with snow to numb the pain, even for amputations, which were common in the 1800s.

<sup>3</sup> Pertaining to any aspects of a patient care provided before, during, or after, and in connection to, surgery.

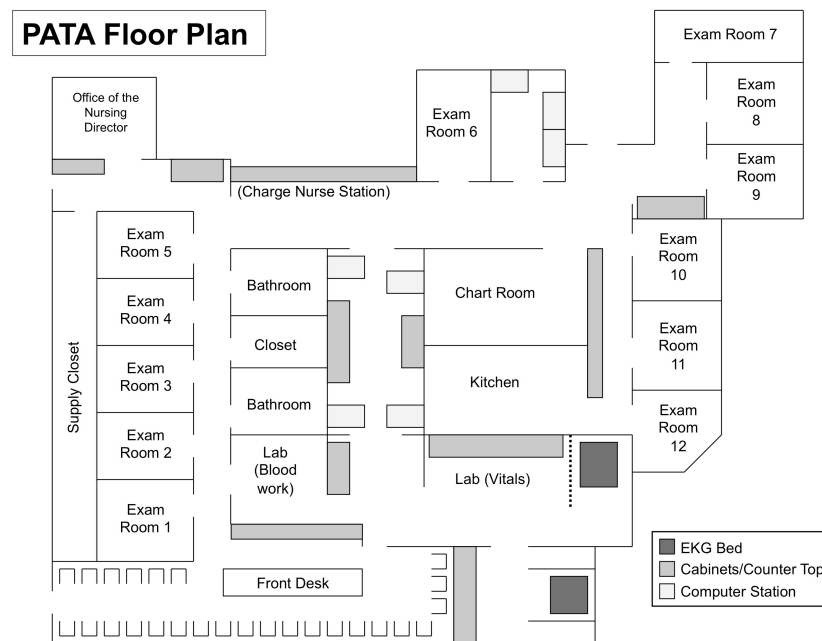
## The PATA Mission

The risk of administering anesthesia had decreased significantly since the early 1990s due to major strides in research and technology. Risks were still present, however, and complications could result in permanent disability or death. Doctors, therefore, needed to know before surgery that a patient's system was strong enough to endure anesthesia. All surgery patients were therefore required to have a "pre-admission work-up". The PATA clinic was responsible for completing work-ups for all out-patients,<sup>4</sup> which accounted for 43% of all surgical patients.

## Challenges in PATA

PATA was an outpatient clinic with 12 exam rooms, a lab, and a waiting room. (See **Figure 1**.) Patients typically spent about 80-90 minutes of face time with providers in PATA, but even in the best-case scenario, appointments lasted at least two hours. The average appointment was two-and-a-half hours and many patients spent over four hours in PATA. Long waiting times were particularly troubling due to the goal of high quality patient- and family-focused care that MGH espoused. Many surgical patients at MGH came from outside referrals. PATA, therefore, played a big role in a patient's first impression of the hospital. If referring physicians received enough complaints, they might start referring patients elsewhere.

**Figure 1**



<sup>4</sup> Out-patients (aka ambulatory patients) arrive from home to receive their care in contrast with in-patients, which are hospitalized. In-patients requiring surgery had their pre-admission work-ups completed on the hospital floor.

PATA providers were equally upset. Not only were they concerned by the long wait times endured by their patients, but they also experienced direct impact. Both registered nurses (RNs) and medical doctors (MDs) were salaried with the expectation that they worked from 7:00am to 5:00pm every day; appointments, however, were rarely ever completed by that time. Staying until 6:00pm had become routine and sometimes providers were there as late as 7:00pm or even 8:00pm. Tensions were growing as waiting room patient pile-ups and long days persisted.

Surgeons were the final stakeholders affected by the problems in PATA. They diagnosed the patient's medical condition and determined exactly what type of surgery was needed. They were also responsible for booking their patients' PATA appointments, which were required within 30 days of the scheduled surgery. Because of the limited capacity, there was a common understanding that the most complex cases had priority. The cases that fell into this category, however, were not well defined. This lack of clear guidelines plus variability in surgeon assessments often resulted in sick patients not being sent to PATA while young and healthy patients were scheduled.

While there was both an RN and an MD who jointly oversaw clinic activities, ownership for the clinic was shared between several departments. In addition, the clinic did not bring in any revenue,<sup>5</sup> which also made it even harder to justify additional resources.

The problems associated with pre-operative assessment were not unique to MGH. There were many publications in medical journals dedicated to the topic, but these mostly focused on best practices or cautions for various parts of the process. None offered systemic solutions to fix the problems as a whole.

Despite the operational challenges in PATA, the quality of care and concern for patient safety was very high. While it would have been easy to take short cuts under the pressures of decentralization, long wait times, OR delays, and grumpy patients and providers, the MGH staff remained committed to thorough pre-admission work-ups to ensure a safe and uneventful surgery.

### **The Impact of PATA on the OR**

Due to limited capacity, the PATA clinic was only able to see about 65% of all out-patients. PATA, therefore, prioritized visits for patients with co-morbidities, long medical histories, or other potential complications (e.g., elderly, diabetic, or cancer patients). The remaining, typically healthier patients (i.e., a 30-year old who needed an ACL<sup>6</sup> repair) received their work-ups in the OR on the day of surgery. The work-ups had the same requirements and were performed with the same degree of quality of care regardless of whether performed in PATA or the OR. The latter was not ideal, however, because performing work-ups in the OR often led to delayed surgery start times. There was, therefore, a clear desire to see all patients before the day of surgery.

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<sup>5</sup> Reimbursement for work-ups were bundled with surgery and anesthesia payments so PATA did not bill separately for its services.

<sup>6</sup> A torn anterior cruciate ligament (ACL) is a common injury among athletes.

Each day at the MGH, it took hundreds of employees to undertake the formidable task of simultaneously coordinating 135 surgeries (34,000 surgeries per year) across MGH's 52 operating rooms. Having to perform pre-admission work-ups in the OR put additional strain on the already overloaded surgical staff and resources. Incomplete and missing work-ups often led to delayed surgery starts. As everyone who worked in the OR was well aware, if the first cases were delayed, there would be an avalanche of problems and delays throughout the day.

The OR director frequently had to make a tough call: go into overtime or cancel surgeries. Running the ORs into overtime was very costly but the impact on the staff was an even bigger problem. OR teams were asked much too frequently to cancel evening plans and stay late. On the other hand, cancelling surgeries upset patients and families who often came from long distances and had prepared many arrangements (transportation, time off from work, home nursing care, etc). There was also the physical component of having to fast for at least eight hours prior to surgery and the emotional component of mentally preparing for it. Asking a patient to go home (or stay an extra night in the hospital) and come back to the OR the next day was therefore not a favorable option. Fewer surgeries also meant less revenue. The OR director estimated that OR delays contributed to 57,000 minutes of lost productivity every year. The hospital could simply not sustain these losses.

### **The PATA Task Force**

Many valiant efforts were made by the OR director and the DACCPM executive director to improve the pre-operative assessment process. DACCPM Executive Director Susan Moss was the most senior administrator in the DACCPM and she worked closely with Dr. Wiener-Kronish to manage the department (these types of relationships were sometimes referred to as "suits and scrubs").

In 2005, Moss, the OR director and other hospital leaders put together a proposal to build an additional PATA clinic. Space was available at the Mass General West (MG West) satellite hospital in Waltham, Massachusetts and market research showed this would be a preferred location for a significant proportion of PATA patients. Building a second clinic here would enable the hospital to see 100% of surgical outpatients and provide the freedom to try a new practice design without disrupting MGH culture. Despite the robustness of the proposal, PATA was still a cost center and ultimately the MG West site was allocated to another (revenue generating) department at MGH that also asked for the site.

The group then moved to trying to include PATA fixes in larger projects aimed at improving the overall perioperative process. These broader-scope projects had insurmountable fiscal, political, and cultural hurdles of their own, however, and as a result never came to fruition. In 2008, because of her deep concern about the challenges in PATA and her experience as the director of the Pre-Operative Program at UCSF, one of Dr. Wiener-Kronish's first actions as the new chief was to form an official PATA Task Force. Moss was asked to lead the team, which included Dr. Wiener-Kronish, the

associate chief nurse of Patient Care Services, the PATA nursing director, the PATA medical director, and the OR medical director.

Building on their lessons learned from past attempts, the task force focused only on solutions that would require changes internal to PATA. They considered improving triaging,<sup>7</sup> providing online rather than in-clinic patient education about what to expect on the day of surgery, and switching from paper to electronic medical records. However, additional funding, personnel, and space would have been required to execute these ideas. In addition, while it was recognized that all of these efforts would certainly help, the task force knew they would not target the major source of the problems in PATA. Despite these obstacles, the task force continued to think creatively about ways to improve PATA.

In May 2009, Moss added a seventh member to the task force, an MBA intern from the MIT Sloan School of Management who had been hired to conduct a current state assessment of PATA's processes and performance. The clinic was run almost entirely on manual systems so data collection required several weeks of interviewing staff, shadowing patients and providers, conducting time studies, and mapping workflows. The data confirmed that most patients spent more time waiting than they did with an actual provider. (See **Figure 2.**) More broadly, the data revealed a complex system with significant variability, but also some hope for the future of PATA.

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<sup>7</sup> The process of prioritizing patients based on their medical needs.

MASSACHUSETTS GENERAL HOSPITAL'S PRE-ADMISSION TESTING AREA (PATA)  
 Kelsey McCarty, Jérémie Gallien, Retsef Levi

**Figure 2a PATA Patient Visit Detail, July 13, 2009**

Patient #	Time In	Appointment Time	Time Out	Length of Visit	Service	Exam Room #	1st Provider	2nd Provider
1	6:59	7:00	8:40	1:41	ORTH	7	RN1	MD4
2	6:59	7:00	9:10	2:11	ORTH	9	RN2	MD5
3	6:59	7:00	8:40	1:41	NEUR	5	RN1	MD2
4	7:15	7:30	9:37	2:22	ORTH	6	RN4	MD6
5	7:15	7:30	9:18	2:03	ORTH	4	RN5	MD1
6	7:15	7:30	8:30	1:15	ORTH	3	RN2	MD6
7	7:23	7:00	10:23	3:00	ORTH	12	RN3	MD2
8	7:45	8:00	9:37	1:52	ORTH	11	RN5	MD4
9	7:45	8:00	9:33	1:48	CARD	1	RN1	MD7
10	7:45	8:00	10:24	2:39	UROL	8	RN5	MD8
11	7:55	8:00	10:29	2:34	GYN	7	RN4	MD4
12	8:15	8:30	10:45	2:30	SONC	5	RN2	MD3
13	8:15	8:30	10:40	2:25	ORTH	10	RN1	MD7
14	8:15	8:30	10:32	2:17	UROL	4	RN2	MD6
15	8:15	8:30	10:02	1:47	SONC	3	RN3	MD3
16	8:47	9:00	10:23	1:36	GYN	9	RN5	MD5
17	9:10	9:00	13:01	3:51	NEUR	11	RN4	MD8
18	9:15	9:30	10:47	1:32	ORTH	2	RN3	MD7
19	9:15	9:30	11:20	2:05	UROL	3	RN5	MD2
20	9:17	9:00	11:29	2:12	CARD	1	RN1	MD1
21	9:27	9:30	11:29	2:02	GYN	6	RN5	MD6
22	9:45	10:00	11:53	2:08	OMF	9	RN4	MD5
23	10:04	10:00	14:18	4:14	GENS	7	RN1	MD4
24	10:07	10:00	12:14	2:07	UROL	8	RN2	MD7
25	10:15	10:30	12:59	2:44	GENS	3	RN5	MD3
26	10:15	10:30	13:56	3:41	TRNS	5	RN1	MD7
27	10:16	10:30	12:35	2:19	UROL	10	RN2	MD1
28	10:45	11:00	12:26	1:41	THOR	2	RN5	MD6
29	10:45	11:00	14:05	3:20	NEUR	12	RN4	MD4
30	10:45	11:00	13:15	2:30	SONC	6	RN3	MD5
31	11:04	10:30	13:45	2:41	OMF	4	RN1	MD3
32	11:04	11:00	14:16	3:12	GENS	9	RN2	MD8
33	11:15	11:30	14:34	3:19	UROL	5	RN3	MD2
34	11:15	11:30	13:37	2:22	OMF	1	RN2	MD2
35	11:30	11:30	13:42	2:12	UROL	10	RN3	MD7
36	11:48	add-on	15:27	3:39	SONC	11	RN5	MD6
37	11:49	11:30	14:10	2:21	GYN	2	RN5	MD6
38	11:51	12:00	14:14	2:23	NEUR	8	RN4	MD4
39	11:55	12:00	16:30	4:35	SONC	10	RN1	MD8
40	12:15	12:30	14:29	2:14	GYN	3	RN2	MD7
41	12:47	13:00	16:04	3:17	NEUR	4	RN4	MD5
42	12:57	13:00	15:49	2:52	GENS	1	RN5	MD8
43	13:12	add-on	15:42	2:30	ANES	12	RN3	MD6
44	13:15	13:30	14:55	1:40	PLAS	2	RN5	MD3
45	13:28	13:30	16:10	2:42	ORTH	6	RN4	MD7
46	13:45	14:00	16:11	2:26	GENS	9	RN4	MD4
47	13:47	14:00	16:15	2:28	SONC	11	RN5	MD5
48	13:50	14:00	15:42	1:52	GYN	3	RN5	MD1
49	14:00	14:30	16:16	2:16	THOR	5	RN2	MD2
50	14:00	14:30	15:31	1:31	ORTH	7	RN4	MD6
51	14:16	14:30	16:54	2:38	ORTH	2	RN1	MD2
52	14:38	14:30	16:51	2:13	THOR	1	RN2	MD3
53	14:43	15:00	17:20	2:37	NEUR	8	RN4	MD4
54	14:52	15:00	17:13	2:21	ORTH	4	RN2	MD1
55	15:00	15:00	16:57	1:57	NEUR	7	RN3	MD5

**Figure 2b** *Definition of Surgical Services*

MGH Surgical Services	
Abbreviation	Name
ANES	Anesthesia
CARD	Cardiac
EMER	Emergency
GENS	General Surgery
GYN	Gynecology
NEUR	Neurology
OMF	Oral and Maxillofacial
ORTH	Orthopedics
PEDI	Pediatrics
PLAS	Plastics
RAD	Radiology
SONC	Surgical Oncology
THOR	Thoracic
TRNS	Transplant
UROL	Urology
VASC	Vascular

**Figure 2c** *PATA Patient Scheduling over a 3-week Period*

Date	Day	# of patients scheduled	# of no shows	# of add-ons	# of patients seen
June 19, 2009	Friday	53	2	3	54
June 22, 2009	Monday	58	3	2	57
June 23, 2009	Tuesday	59	5	3	57
June 24, 2009	Wednesday	59	9	3	53
June 25, 2009	Thursday*	50	4	5	51
June 26, 2009	Friday	54	3	4	55
June 29, 2009	Monday	60	5	3	58
June 30, 2009	Tuesday	59	4	3	58
July 1, 2009	Wednesday	60	6	1	55
July 2, 2009	Thursday*	51	5	4	50
July 3, 2009	HOLIDAY	--	--	--	--
July 6, 2009	Monday	59	4	3	58
July 7, 2009	Tuesday	58	6	4	56
July 8, 2009	Wednesday	58	5	3	56
July 9, 2009	Thursday*	53	4	2	51
July 10, 2009	Friday	53	5	4	52
July 13, 2009	Monday	58	5	2	55
Average		56.4	4.7	3.1	54.8

\* The clinic does not open until 9am on Thursdays to accommodate Grand Rounds and other hospital educational activities



## Overview of the PATA Clinic

In PATA, a laboratory technician, a nurse, and an anesthesiologist saw each patient. The lab tech was responsible for obtaining vital signs, an EKG,<sup>8</sup> and blood samples. The nurse completed a standardized nursing assessment form. The anesthesiologist assessed the patient's overall health and obtained the patient's consent for anesthesia. While all aspects of the appointment were conducted to ensure patient safety and quality of care, the nursing assessment form and anesthesia consent form were also required by law and had to be completed by an RN and an MD, respectively. The required pre-admission work-up was complete when each of these three providers had completed all the necessary exams, tests, and documentation. Each day the PATA nursing director scheduled five lab technicians, five nurses, and eight anesthesiologists.

**Patient Scheduling** Clinic hours were Monday through Friday from 7:00am to 5:00pm. Four patients were scheduled every half hour beginning at 7:00am and ending at 3:00pm, except during the lunch hours when there were only two patients scheduled at 12:00pm, 12:30pm, 1:00pm, and 1:30pm. The appointments were managed with an MGH software program that allowed surgeons' offices to log in and schedule patients for a PATA appointment. They could select any available date and time, as long as it was within 30 days of the scheduled surgery. Each day, including add-ons and no-shows there was a fairly consistent average of 55 patients per day.

**Check-In** There were two front desk attendants in the PATA waiting room, one of which was assigned to greet patients, locate their medical chart, document their time of arrival, and give them a form to complete. This entire process took about two minutes. The attendant would then walk the patient chart back to the lab and leave it in a holding bin, signaling to the lab technicians that a patient had arrived. Sometimes, when several patients arrived at once, multiple charts would pile up on the front desk before the attendant had a free moment to walk them back to the lab. Nevertheless, charts were typically transferred within 15 minutes of a patient's arrival. The other attendant was assigned to answer phones, enter data, and process paperwork.

**Vitals and EKG** The laboratory was split into two services: 1) two stations to take patient vitals and EKG at the beginning of the appointment, and 2) three stations to take patient blood samples at the end of the appointment. Providers needed the vital signs and EKG to evaluate a patient's health, which was why this step was done first. For about 10% of patients, the anesthesiologists needed to make amendments to the standard blood work order forms based on the patient exam. Therefore, to avoid sticking patients with a needle twice blood draws were done at the end of the appointment. A total of five lab technicians, trained to work at either station, were scheduled each day.

When a lab tech saw a patient chart in the holding bin, they would call the patient back from the waiting room. They would take the patient's vital signs first, which consisted of heart rate, blood

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<sup>8</sup> An electrocardiogram (ECG or EKG) is a diagnostic tool that monitors heart rhythms and conduction.

pressure, height, weight, temperature, and room air oxygen saturation. Next, the patient would be asked to lay flat while leads were placed on the patient's chest for the EKG. The EKG recorded cardiac rhythms, which were later reviewed by the anesthesiologists for any abnormalities. The entire process took an average of ten minutes<sup>9</sup> per patient. When the technician was done, they would record the patient's vital signs on an index card (**Figure 3**) and attach the card and the EKG printout to the patient's chart. The patient was then escorted back to the waiting room and the technician would notify the charge nurse that the patient was ready for the next provider.

**Figure 3** PATA Appointment Tracking Card

PAT Date: <u>7/13/09</u>			BP: <u>116/73</u>	<b>Index Card Key:</b>  <b>BP:</b> Blood pressure <b>T:</b> Temperature <b>P:</b> Pulse <b>R:</b> Respiratory Rate <b>O2 SAT:</b> % oxygen saturation of blood <b>HT:</b> Height <b>WT:</b> Weight
Appt. Time: <u>10:00</u>			T: <u>97.9</u>	
Time in Clinic: <u>10:05</u>			P: <u>71</u>	
	IN	OUT	INIT	
Check in:			<u>SR</u>	
VS/ECG			<u>NJ</u>	
MD/NP			<u>RE</u>	
RN			<u>WAZ</u>	
LAB			<u>RT</u>	
Time out Clinic: <u>2:16</u>			R: _____	
			O <sub>2</sub> SAT: <u>99</u>	
			HT: <u>5'6 1/2</u>	
			WT: <u>129.5</u>	
			84000 (3/10)	

This card was used to track a patient's PATA visit. The front desk stamped the reverse side with the patient's name and medical record number (MRN) and then entered the date, appointment time, and arrival time on this side. Lab techs recorded the vital signs, which were later transcribed into the patient's medical chart by the anesthesiologist. All providers initialed next to their provider type. At the end of the appointment, before the front desk let the patient leave, they verified that all steps of the appointment had been completed and wrote in the departure time. At one point, each provider recorded the time their session with the patient started (IN) and stopped (OUT), but those fields had not been used in a while. The cards were stored for two weeks after the appointment and then discarded.

**The Charge Nurse** The charge nurse was the director of patient flow, an essential role in PATA. This person kept track of add-ons and no-shows, assigned patients to rooms, and providers to patients. Their role was to keep the patient flow through PATA moving smoothly at all times. Each morning, a printout of the appointment schedule was taped to the back wall where the charge nurse had the best vantage point to monitor clinic activity. Next to each patient's name were empty columns for Room #, RN, and MD. (See **Figure 4.**)

<sup>9</sup> Standard deviation for vitals and EKG time was 3 1/2 minutes.

**Figure 4 PATA Appointment Schedule and Charge Nurse Flow Sheet\***

TIME	PATIENT NAME	BIRTH DATE	MRN	PROC DATE	SVC	DIAGNOSIS	PRIMARY PROCEDURE
7:00	BARBER, JAMIE	06/02/1928	9565214	07/17/2009	ORTH	FAILED RIGHT HIP	TOTAL HIP ARTHROPLASTY REVISION
7:00	RODRIGUEZ, JOSE	08/28/1938	9586478	07/20/2009	ORTH	OSTEOARTHRITIS	RIGHT TOTAL HIP ARTHROPLASTY
7:00	BITHNER, KATHRYN	05/06/1958	9986842	07/22/2009	NEUR	L3-S1 STENOSIS	LUMBAR POSTERIOR DECOMPRESSION
7:00	GRUBER, HAROLD	11/27/1952	9124655	07/27/2009	ORTH	OSTEOARTHRITIS	LEFT TOTAL HIP ARTHROPLASTY
7:30	FOSTER, MICHAEL	06/12/1953	9462365	07/20/2009	ORTH	OSTEOARTHRITIS	RIGHT TOTAL KNEE ARTHROPLASTY
7:30	SARKIS, DON	03/26/1947	9653696	07/31/2009	ORTH	OSTEOARTHRITIS	RIGHT TOTAL KNEE ARTHROPLASTY
7:30	CZERWONSKI, LINDA	07/05/1964	9454877	07/23/2009	ORTH	CERVICAL HNP	TOTAL DISC ARTHROPLASTY
7:30	LEWIS, ADELLE	12/23/1943	9563256	08/03/2009	ORTH	PROXIMAL HU	LEFT SHOULDER ANATOMIC INVERSE ARTHROPLA
8:00	ROBINSON, BARBARA	09/21/1948	9144255	08/04/2009	CARD	CAD	CABG, VASOVIEW
8:00	ASHE, DANIEL	05/30/1930	9568848	07/28/2009	UROL	BLADDER TUMOR	TURBT / CYSTOSCOPY
8:00	SUH, ELLEEN	02/10/1959	9764582	07/21/2009	GYN	UTERINE PROLAPSE	VAGINAL HYSTERECTOMY
8:00	O'DONNELL, MARK	10/18/1964	9986143	07/21/2009	SONC	THYROID GLAND CYST	THYROIDECTOMY
8:30	PAUL, ANGIE	01/23/1943	9132532	07/23/2009	ORTH	OSTEOARTHRITIS	LEFT TOTAL KNEE ARTHROPLASTY
8:30	DIANTONIO, JAMES	03/03/1936	9467854	08/06/2009	UROL	PROSTATE CANCER	RADICAL RETROPUBIC PROSTATECTOMY
8:30	KAPLAN, JANET	04/22/1956	9565632	07/23/2009	SONC	SECONDARY NEOPLASM	LIVER RESECTION
8:30	FLORES, MARIA	08/17/1989	9632621	07/17/2009	GYN	PERIURETHRAL CYST	EXCISION OF LESION / MASS / CYST
9:00	NING, LOUISE	06/12/1960	9864125	07/30/2009	NEUR	ACROMEGALY	TRANSPHENOIDAL
9:00	MCCARTNEY, CAROL	09/01/1944	9463256	08/05/2009	ORTH	KYPHOSCOLIOSIS	REMOVAL THORACIC SPINE HARDWARE
9:00	SMITH, ELIZABETH	11/09/1936	9747512	07/24/2009	UROL	RIGHT HYDROCELE	RIGHT HYDROCELE REPAIR
9:30	ORTEGA, DORA	06/15/1936	9356362	07/27/2009	CARD	CHF, MS, CAD	MVR, CABG
9:30	TARR, AUDREY	08/31/1979	9476873	07/24/2009	GYN	UTERINE FIBROID	ABDOMINAL MYOMECTOMY
9:30	COSTA, CARL	08/01/1995	9265322	07/22/2009	OME	MAXILLARY HYPOPLASIA/OSTEOTOMY, MAXILLA LEFORTE 1	
9:30	TULMAN, PETER	04/30/1963	9152463	07/17/2009	GENS	RECTAL CANCER	ANTERIOR POSTERIOR RESECTION
10:00	GOLDMAN, RYNA	07/24/1942	9184657	07/28/2009	UROL	RCC	LEFT LAPROSCOPIC PARTIAL NEPHRECTOMY
10:00	MARKOWITZ, LAURA	06/28/1951	9356245	08/04/2009	GENS	HYPERPARATHYROIDISM	PARATHYROIDECTOMY

\*All patient information shown is fictitious data to protect patient privacy and comply with privacy regulations but is similar to actual information posted in PATA.

When evaluation of vital signs and the EKG were complete, the lab technician would place the patient's chart in the charge nurse's holding bin to signal that the patient was ready to be seen by an RN. The charge nurse would call the patient back from the waiting room and escort them to an empty exam room. She would then write the exam room number on the schedule under the "Room #" column to communicate the location of the patient. If all rooms were taken, the patient would remain in the waiting room until one became available.

Regardless of appointment time, patients were seen in the order they arrived by whichever lab technician, RN, or MD was first available. After a patient was escorted to an exam room, the charge nurse would find an available RN to assign to the patient and then enter that provider's initials under the "RN" column. When the RN had completed the exam, their initials would be immediately crossed out. This signaled that the RN step was complete and the patient was ready to see an anesthesiologist. The charge nurse would then find an available anesthesiologist and write their initials on the schedule under the "MD" column. Similar to the RN, when the anesthesiologist was done, their initials would be crossed out to signal that the exam was complete. The charge nurse would then highlight the patient's information to communicate that the patient had left and the room was available.

The charge nurse was also responsible for managing the lunch hour. In theory, the charge nurse would give providers half-hour lunch breaks that corresponded with ebbs in patient arrivals, but this alignment proved very difficult. Often, the charge nurse would send providers to lunch when the clinic seemed quiet, only to have multiple new patients walk through the door just as they left. The system basically came down to staggering the lunch breaks and "crossing fingers" that patients wouldn't build up in the waiting room while providers were out. As a result, during the 12:00pm to 2:00pm lunch period, there was typically only one front desk attendant, one vital/EKG tech, two RNs, four MDs, and two blood draw techs on duty. Even outside of lunch breaks, PATA ran very unevenly. Sometimes multiple providers were ready and waiting, other times a patient might have to wait for an hour before they were seen.

While the charge nurse's schedule was helpful for tracking patients, rooms, and providers, there were several challenges with this system. If the nurse or a provider forgot to write in their initials, two providers might think they were responsible for seeing the same patient. Conversely, sometimes initials would be written in but the provider didn't realize they'd been assigned. The first scenario led to redundancy and waste of previous provider time; the second left patients waiting for up to an extra 30 minutes.

Another problem was that the system relied on providers informing the charge nurse when they were available. If no patients were waiting to be seen, providers would often leave to get other work done or take a break. When a patient did become available, the charge nurse then had to leave their station to find an available provider. This increased the time patients spent waiting and sometimes led to the charge nurse missing important patient flow events while away from the station (i.e., an RN completing an exam but not crossing out their initials).

**Registered Nurses** Five RNs<sup>10</sup> were on duty in the clinic each day. Their primary responsibility was to complete nursing assessment forms for all patients. The form consisted of a series of questions about the patient's medical history, mental health, and social welfare. It was a regulatory requirement and could not be completed by the patient, a physician, or other third party.

RNs would review the recent medical information in the chart left by the lab tech in the holding bin. Some RNs would also log into the electronic medical record system and review the patient's complete history.<sup>11</sup> These longer reviews could take up to 20 minutes for RNs who felt that this level of thoroughness was necessary to ensure quality of care. Other RNs felt that reading through the entire record was an invasion of privacy,<sup>12</sup> not needed to complete the form accurately and a consumption of precious time that could be better spent seeing more patients. Across all RNs, the average chart review time was five minutes.

Once in the exam room, completing the nursing assessment form took an average of 27 minutes per patient. After the appointment, nurses also needed some time to complete additional documentation and file the paperwork. On average, this took 11 minutes per patient.

**Anesthesiologists** The process for anesthesiologists was similar to the RNs, but their assessments were more complex. More time was therefore required at each step – an average of 10 minutes for patient chart review and 17 minutes for post-exam documentation. Once the RNs left the exam room, the first available anesthesiologist was assigned. Since the MDs did not need the documentation or notes from the RN exam, they could enter the patient room as soon as the RN left.

For the patient exam, the anesthesiologist began by entering the vital signs from the index card into the patient's electronic medical record and reviewing the EKG from the lab. They then followed a medical history and physical exam interview protocol that included asking the patient about their medical history, surgical history, prior experience with anesthesiology, family history with anesthesiology, smoking, alcohol, and drug use, medications taken, allergies to medications or latex, and level of physical activity. They listened to the patient's heart and lungs and examined the mouth, eyes, abdomen, and neck. They also explained the risks of anesthesia and what to expect on the day of surgery. Finally, they reviewed the blood work order form and added or removed tests as needed. If the anesthesiologist cleared the patient for surgery, the visit concluded with both the patient and the anesthesiologist signing the anesthesiology consent form.

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<sup>10</sup> An RN is the standard nursing degree. There are also many advanced training specialized nursing degrees that allow for an expanded scope of practice, which partially, or sometimes almost completely, overlaps with physician privileges. These include nurse practitioners (NP), certified nurse anesthetist (CRNA), certified nurse midwife (CNM), etc.

<sup>11</sup> At the time of the case, MGH was in the process of switching to electronic medical records (EMRs). Since not all departments were using them yet, the most recent physician notes and test results were maintained in a paper chart. Older information could only be found in the EMR.

<sup>12</sup> The Health Insurance Portability and Accountability Act (HIPAA) of 1996 includes many patient privacy laws, including that providers may only access patient information if it is necessary to provide quality care.

The length of the visit could vary wildly. Long medical histories, many medications, the need for a translator, missing diagnostics, or a patient who was a “talker” were just a few things that could add time to an exam. Exams ranged from 15 to 70 minutes, but on average they lasted 37 minutes per patient.

There were many factors that contributed to variability for both nurses and anesthesiologists at other stages of the appointment as well. Phone calls, disorganized charts, or the need to consult with a colleague could all add time to an appointment. The time study, therefore, attempted to capture this variability, which was reflected in the standard deviation (21 minutes for RNs and 29 minutes for MDs<sup>13</sup>) for the collective three-step – the pre-exam chart review, patient exam, and the post-exam chart documentation – provider process.

After the exam, the doctor would walk the patient back to the waiting room and give the blood work order form to the front desk. Next, they crossed their initials off the charge nurse's schedule and entered their physician's note with detailed observations of the patient, reasons why they did or did not clear the patient for surgery, and any special conditions that the OR anesthesiologist should know.<sup>14</sup> The note, the completed nursing assessment form and a copy of the blood work order form were added to the chart, which was then deposited into a final holding bin and filed until the day of the surgery.

**Blood Work** When the front desk received the blood work order form from the anesthesiologist, they immediately transferred it to the laboratory holding bin. As with the vital signs, patients were called back by a tech in the same order their blood order forms were received. Different tests required different tubes – some were coated with special chemicals, others needed to be stored on ice. The lab tech would draw the patient's blood and prepare the required samples. This took an average of six minutes per patient.<sup>15</sup> The patient was then sent back up front and the tubes were stored for pick up by another lab that did the actual testing.

**Check-Out** After having their blood drawn, patients returned to the front desk with their index card. In addition to the patient's vital signs, the card had the initials of all the providers the patient had seen. The attendants used these initials as a check that the patient had been through all the requisite steps of the appointment. If the card looked okay, the patient was finally free to leave. This last step took less than a minute, but most patients were so fed up with their PATA experience at that point, even that was too long.

Occasionally, patients became so tired of waiting they simply left in the middle of the appointment. This was one of the reasons patients sometimes arrived for surgery with incomplete PATA work-ups. More often, work-ups were incomplete because surgeon offices didn't forward patient records that

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<sup>13</sup> The average coefficient of variation for patient interarrival times was 1.0 for RNs and 0.2 for MDs, however these values could be much higher or lower when evaluating providers individually.

<sup>14</sup> The anesthesiologist in PATA who cleared the patient for surgery was not the same anesthesiologist who cared for the patient in the OR during surgery.

<sup>15</sup> Standard deviation is 2.0 minutes and coefficient of variation for patient inter-arrival times is 0.4.

PATA physicians needed to complete their assessments. Several phone calls were often required to get the information, if it was sent at all, leaving physicians extremely frustrated by their general lack of control over the process.

### **The June Task Force Meeting**

When Dr. Wiener-Kronish finished reading the patient letter, the team took a minute to take in the information, and then the ideas started flying.

The PATA nursing director spoke first: “With four appointments scheduled every half-hour, the clinic is behind from the minute the day begins. We should extend the clinic hours until 6:00pm so we can increase the time between appointments to 45 minutes.”

The PATA medical director had a different suggestion: “Longer appointments will mean longer days and the staff are already upset about being over-worked. What I consistently hear from my team is that the expectation to see 55 patients is just simply not reasonable. We need to either add more rooms, physicians and nurses or reduce the patient volume.”

The OR medical director sympathized with the difficulty of managing a frustrated staff, but he did not completely agree with using another resource-intensive approach: “We can’t reduce our patient volume when we’re already only seeing 65% of out-patients and we’ve already tried several solutions that require asking for more people and more space and all of them have been rejected. If we really want to see positive changes in PATA, we’re going to have to figure out how to run the clinic better with the resources we already have.”

Moss listened carefully and then commented: “Each suggestion seems reasonable in theory, but no one has presented methods for evaluating the actual expected impact on the clinic. Also, while improving the clinic without any additional resources sounds great, what would that actually look like?”


The intern finally spoke up: “I could evaluate the impact of these scenarios using the data collected in the time study. (**Figure 2**) The review also highlighted some opportunities for increased efficiency that may be able to address your idea of improving PATA without more resources.”

Whichever direction the task force would choose to go next, Moss knew that detailed analysis would be needed to guide and support the group’s decision and obtain buy-in from key members of hospital leadership: “Alright, let’s see what your analysis tells us. Let’s meet at the same time, same place next week. Everyone, be prepared to discuss what changes make the most sense in light of the new process analysis data. Take a really hard look at what has to be done, who can do it best, whether we are leveraging technology as much as we should, and let’s generally challenge all existing assumptions. Everything about this process should be on the table.”

MASSACHUSETTS GENERAL HOSPITAL'S PRE-ADMISSION TESTING AREA (PATA)

Kelsey McCarty, Jérémie Gallien, Retsef Levi

Appendix 1 PATA Patient Intake Form

 <b>MASSACHUSETTS GENERAL HOSPITAL</b> <b>PATA INTAKE FORM</b>	
Name: _____	
Do you speak English? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, what language do you speak? _____	
<b>ALLERGIES</b> to medicine/drugs: (please list allergy and reaction): _____ _____	
<b>ALLERGY</b> to latex? <input type="checkbox"/> Yes <input type="checkbox"/> No Reaction: _____	
<b>ALLERGIES</b> to food (please list allergy and reaction): _____ _____	
<b>ALLERGIES</b> to the environment (please list allergy and reaction): _____ _____	
<b>MEDICATIONS</b> (including prescription drugs, inhalers, and eyedrops) Name                      Dose                      How often do you take it? _____ _____ _____ _____	
<b>LIST</b> any over-the-counter medications, vitamins, and herbal medicines: Name                      Dose                      How often do you take it? _____ _____ _____	
<b>Personal Habits</b> 1. Do you or did you ever smoke? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes: No of packs: _____ No of years you smoked: _____ 2. If you quit smoking, when did you quit? <input type="checkbox"/> less than 6 months ago <input type="checkbox"/> between 6 months to a year ago <input type="checkbox"/> more than a year ago 3. Do you drink alcohol (beer, wine, etc.)? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, how much? 4. Have you had a problem with alcohol? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when? 5. Have you had a problem with addiction? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when and what? 6. Have you used any recreational drugs in the last month (marijuana, cocaine, etc.)? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when and what?	
7. Do you exercise regularly? <input type="checkbox"/> Yes <input type="checkbox"/> No Type of exercise: _____ How often (# days per week)? _____	
<b>Medical History</b> 1. Do you or have you ever had HIGH BLOOD PRESSURE? <input type="checkbox"/> Yes <input type="checkbox"/> No 2. Do you or have you ever had a HEART condition? <input type="checkbox"/> Yes <input type="checkbox"/> No <b>Have you ever had any of the following:</b> A heart attack? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when was your heart attack? Chest pain or pressure or angina? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when was the last time? Do you feel tightness/chest pressure/chest pain with activity? <input type="checkbox"/> Yes <input type="checkbox"/> No Shortness of breath with minimal activity? <input type="checkbox"/> Yes <input type="checkbox"/> No Heart failure or fluid in your lungs? <input type="checkbox"/> Yes <input type="checkbox"/> No Irregular heart beats or problem with your heart rhythm? <input type="checkbox"/> Yes <input type="checkbox"/> No Heart murmur or heart valve problem? <input type="checkbox"/> Yes <input type="checkbox"/> No Congenital heart disease (born with heart problem) <input type="checkbox"/> Yes <input type="checkbox"/> No Specify heart problem: 3. Have you had heart surgery or angioplasty or heart stents placed? <input type="checkbox"/> Yes <input type="checkbox"/> No 4. Have you ever had heart tests such as: (if yes, list date of test and location of results) Stress test (treadmill)? <input type="checkbox"/> Yes <input type="checkbox"/> No Heart catheterization? <input type="checkbox"/> Yes <input type="checkbox"/> No An "echo" or heart ultrasound? <input type="checkbox"/> Yes <input type="checkbox"/> No A "Holter" heart rhythm monitor? <input type="checkbox"/> Yes <input type="checkbox"/> No 5. Do you have a pacemaker? <input type="checkbox"/> Yes <input type="checkbox"/> No 6. Do you have an internal defibrillator? <input type="checkbox"/> Yes <input type="checkbox"/> No 7. Any other heart conditions? (please list) 8. Do you have any BREATHING problems or LUNG condition? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have Emphysema? <input type="checkbox"/> Yes <input type="checkbox"/> No Have you used steroids (Prednisone)? <input type="checkbox"/> Yes <input type="checkbox"/> No When? Have you been hospitalized? <input type="checkbox"/> Yes <input type="checkbox"/> No When?	

Have you ever had a breathing tube placed? <input type="checkbox"/> Yes <input type="checkbox"/> No When? _____ Do you have asthma? <input type="checkbox"/> Yes <input type="checkbox"/> No Have you used steroids (Prednisone)? <input type="checkbox"/> Yes <input type="checkbox"/> No When? _____ Do you have wheezing? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have Sleep apnea? <input type="checkbox"/> Yes <input type="checkbox"/> No CPAP/BiPAP? <input type="checkbox"/> Yes <input type="checkbox"/> No Blood Clot to lungs (pulmonary embolism)? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you use oxygen at home? <input type="checkbox"/> Yes <input type="checkbox"/> No Amount? _____		If yes, please explain: Rectal bleeding or blood in stool? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Abdominal pain? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Stomach ulcers (peptic ulcer disease)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Do you have frequent gastroesophageal reflux (GERD) or heartburn? <input type="checkbox"/> Yes <input type="checkbox"/> No	
9. Any other lung problems? (please list) 10. Do you have or ever had a LIVER condition? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have hepatitis? <input type="checkbox"/> Yes <input type="checkbox"/> No Type of hepatitis: Do you cirrhosis of the liver? Other LIVER problems (please list): 11. Do you or have you ever had a KIDNEY problem? <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, please explain: Are you on dialysis? <input type="checkbox"/> Yes <input type="checkbox"/> No 12. Do you have DIABETES? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you take Insulin? <input type="checkbox"/> Yes <input type="checkbox"/> No 13. Do you have a THYROID condition? <input type="checkbox"/> Yes <input type="checkbox"/> No 14. Do you have any NEUROLOGIC conditions? Have you had a stroke or TIA ("mini-stroke")? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have a seizure disorder or epilepsy? <input type="checkbox"/> Yes <input type="checkbox"/> No 15. Any other NEUROLOGIC condition? (please list)		19. Do you now have or have you had any of the following: Frequent urination? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Burning or painful urination? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Blood in the urine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Incontinence? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Difficulty urinating? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Kidney stones? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Sexual difficulty? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: 21. Have you had CANCER? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, list type _____ Chemotherapy (please list dates/type, if known): Radiation Therapy (please list dates):	
16. Do you have RHEUMATOID ARTHRITIS? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, do have symptoms affecting your neck? <input type="checkbox"/> Yes <input type="checkbox"/> No 17. Do you have a BLOOD disorder? Do you have anemia (low blood count)? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have sickle cell disease? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have abnormal bleeding/bruising? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you have a tendency to form blood clots? <input type="checkbox"/> Yes <input type="checkbox"/> No Have you had a blood transfusion in the past? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when? Other BLOOD disorder (please list):		22. Any DIFFICULTIES with anesthesia or surgery? Have you had problems with nausea/vomiting after anesthesia? <input type="checkbox"/> Yes <input type="checkbox"/> No Have you had problems with difficult intubation (breathing tube insertion)? <input type="checkbox"/> Yes <input type="checkbox"/> No Have you had problems with awareness under anesthesia (remember being in surgery)? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you or any family member have a history of Malignant Hyperthermia? <input type="checkbox"/> Yes <input type="checkbox"/> No Has any other family member had major anesthesia problems? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please list date, type of surgery, and hospital surgery took place: Do you have any particular concerns you'd like to discuss with an anesthesiologist before your surgery? <input type="checkbox"/> Yes <input type="checkbox"/> No	
18. Do you now have or have you had any of the following GASTROINTESTINAL problems?: Loss of appetite? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Change in bowel movements? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Nausea or vomiting? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Frequent diarrhea? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know If yes, please explain: Constipation or painful bowel movements? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know		23. WOMEN: Is there any chance that you may be PREGNANT? <input type="checkbox"/> Yes <input type="checkbox"/> No Date of last menstrual period:	



**Appendix 2a Nursing Assessment Form (pages 1 and 2 of 6)**

MASSACHUSETTS  
GENERAL HOSPITAL

**NURSING DATASET FORM**

NAME AND UNIT NUMBER ARE TO BE WRITTEN DISTINCTLY WHEN PLATE NOT AVAILABLE.

IF ONE RN COMPLETES THE ENTIRE NURSING DATASET FORM WITHIN 24 HOURS OF ADMISSION, ONE SIGNATURE ON THE LAST PAGE IS REQUIRED. IF MULTIPLE RNs ASSESS PATTERN AREAS AND CONTRIBUTE INFORMATION TO THE DATASET FORM, INITIALS, DATE AND THE TIME ARE REQUIRED FOR EACH PATTERN AREA AND RN SIGNATURE IS REQUIRED ON BACK PAGE.

Reason for Hospitalization

Past Medical History

<p><b>1 Communication</b></p> <ul style="list-style-type: none"> <li>• What language do you speak? _____</li> <li>• Language Barrier? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Interpreter needed? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>Initials _____ Date _____ Time _____</p>	
<p><b>2 Cognitive/Perceptual</b></p> <ul style="list-style-type: none"> <li>• Have you had any difficulty remembering dates, times, appointments, directions to your home, telephone numbers? <input type="checkbox"/> Yes <input type="checkbox"/> No explain _____</li> <li>• Have you had difficulty completing tasks (paying bills, shopping) or losing your train of thought or forgetting things such as when to take your medications? <input type="checkbox"/> Yes <input type="checkbox"/> No explain _____</li> <li>• Can you tell me the Month _____, day of week _____, Year _____, Season _____</li> <li>• Have you had recent changes in your eyesight? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Have you had recent changes in your hearing? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Do you presently have difficulty with:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Fainting <input type="checkbox"/> dizziness <input type="checkbox"/> telling hot from cold</li> <li><input type="checkbox"/> Sensation <input type="checkbox"/> numbness <input type="checkbox"/> sensitivity to light <input type="checkbox"/> Speech</li> </ul> </li> <li>• Are your vision and/or hearing problems improved with:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Glasses <input type="checkbox"/> contacts <input type="checkbox"/> hearing aid <input type="checkbox"/> other</li> </ul> </li> <li>• Did you bring any of these assistive devices with you? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>Initials _____ Date _____ Time _____</p>	<p>With identified changes, consider consult to physical therapy and/or occupational therapy.</p> <p>If yes to dizziness, initiate Risk for Injury problem / outcome / intervention sheet. If problem with speech/communication, consider consult to SLP</p>
<p><b>3 Pain</b></p> <ul style="list-style-type: none"> <li>• Do you experience pain or discomfort? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• If yes, how much pain? (no pain) 1 2 3 4 5 6 7 8 9 10 (severe pain)</li> <li>• Where is the pain? _____</li> <li>• What helps? _____</li> </ul> <p>Initials _____ Date _____ Time _____</p>	<p>If yes, initiate pain on problem / outcome / intervention sheet.</p>

White - Medical Record Copy
84598 (7/08)


MASSACHUSETTS  
GENERAL HOSPITAL

**NURSING DATASET FORM**

NAME AND UNIT NUMBER ARE TO BE WRITTEN DISTINCTLY WHEN PLATE NOT AVAILABLE.

<p><b>4 Substance Use History</b></p> <ul style="list-style-type: none"> <li>• Alcohol use Frequency _____ Quantity _____ Last Drink <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Tobacco use in last month? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Tobacco use in last year? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• History of smoking? <input type="checkbox"/> Yes <input type="checkbox"/> No Quit date _____ Packs per day _____ Years smoked _____</li> <li>• Illicit Drug use? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>Initials _____ Date _____ Time _____</p>	<p>If yes, initiate Risk for Injury related to potential or actual alcohol withdrawal problem / outcome / intervention sheet. Consider alcohol withdrawal pathway as needed.</p> <p>If current/recent tobacco use, call smoking cessation consult (#6-7443). Consider opiate withdrawal pathway.</p>
<p><b>5 Allergies</b></p> <ul style="list-style-type: none"> <li>• Do you have any allergies to medications? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Do you have any allergies to foods? (Include bananas, kiwis, avocados, chestnuts) <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Do you have any history of reaction to latex gloves/latex products? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>Initials _____ Date _____ Time _____</p>	<p>If allergy to bananas, kiwis, avocados or chestnuts, initiate latex allergy precautions.</p> <p>If yes, initiate latex allergy precautions.</p>
<p><b>6 Skin Integrity</b></p> <ul style="list-style-type: none"> <li>• Do you have problems with your skin? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>If yes, explain _____</p> <p>Skin intact <input type="checkbox"/> Yes <input type="checkbox"/> No Pressure Ulcer <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Location _____</p> <p>Stage _____</p> <p>Other wound(s) location _____</p> <p>Initials _____ Date _____ Time _____</p>	<p>If wounds present, consult unit-based CNS. Initiate impaired skin integrity as an active problem on the patient problem list. Complete the Braden scale on the Flow sheet Section.</p>
<p><b>7(A) Nutrition/Metabolic</b></p> <ul style="list-style-type: none"> <li>• Ht: _____ Current Wt: _____ actual / patient stated</li> <li>• Usual Wt: _____</li> <li>• Unintentional weight loss greater than 10 lbs in the last 3 months? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• If yes consult dietitian <input type="checkbox"/></li> <li>• In the past 5 consecutive days has the patient had no, decreased or very poor food intake? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• If yes consult dietitian <input type="checkbox"/></li> <li>• What diet restrictions did you follow prior to admission? _____</li> <li>• Are you on coumadin/warfarin and does your regular diet consist of broccoli, spinach, and/or kale? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• If yes consult dietitian <input type="checkbox"/></li> </ul> <p><i>Reason for present admission:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Initiation of TPN-Consult NSU <input type="checkbox"/> Cystic Fibrosis</li> <li><input type="checkbox"/> Bone marrow or organ transplant <input type="checkbox"/> Anorexia/Bulimia</li> </ul>	<p>If a diagnosis listed below is checked, consult dietitian and initiate a Nutrition problem/outcome/intervention sheet in the patients chart.</p>

**Appendix 2b Nursing Assessment Form (pages 3 and 4 of 6)**



MASSACHUSETTS  
GENERAL HOSPITAL

**NURSING DATASET FORM**

NAME AND UNIT NUMBER ARE TO BE WRITTEN DISTINCTLY WHEN PLATE NOT AVAILABLE.

---

**7(A) Nutrition/Metabolic (continued)**

<input type="checkbox"/> Cachexia	<input type="checkbox"/> End stage liver disease
<input type="checkbox"/> Major GI surgery/oral surgery	<input type="checkbox"/> Inflammatory bowel disease
<input type="checkbox"/> Multiple trauma/Burns	<input type="checkbox"/> New diagnosis renal disease
<input type="checkbox"/> New diagnosis CAD/CHF	<input type="checkbox"/> New diagnosis diabetes
<input type="checkbox"/> Decubitus Ulcer Stage II-IV	

Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

**7(B) Speech Language Pathology**

- Do you have any difficulty swallowing or have a history of a swallowing disorder?  Yes  No  
 Explain: \_\_\_\_\_
- Do you frequently cough or choke when eating or drinking?  Yes  No  
 Explain: \_\_\_\_\_
- Have you changed your diet because of your coughing or choking? (e.g. pureed food, soft solids, etc.)  Yes  No  
 Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

If patient has difficulty swallowing, initiate Risk for Aspiration on problem/outcome/intervention sheets and request consult to Speech Language Pathology (physicians order required).

**8 Activity/Exercise**

- Have you fallen down recently?  Yes  No
- Do you have a fear of falling?  Yes  No
- Do you have any dizziness?  Yes  No
- For the following activities do you need assistance?

	No	Need Device (cane, etc.)	Need help of person device	Need help person and device	Device Used
Eating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hygiene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Dressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Mobility / Transfers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

If yes, initiate Risk for injury related to falls problem / outcome / intervention sheet.  
 If appropriate, consider consult to physical therapy or occupational therapy.  
 Complete Morse Fall scale on flow sheet


**9 Safety**  
Under all circumstances the patient must be alone when this question is asked.

Many people deal with fear and abuse in their relationship. We routinely ask all patients these questions.

- Are you in a relationship in which another person tries to control you?  Yes  No
- Has anyone physically harmed you in anyway in the last 12 months?  Yes  No
- Do you ever feel unsafe at home?  Yes  No

Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

If yes to any of these questions, consult Social Service.



MASSACHUSETTS  
GENERAL HOSPITAL

**NURSING DATASET FORM**

NAME AND UNIT NUMBER ARE TO BE WRITTEN DISTINCTLY WHEN PLATE NOT AVAILABLE.

---

**10 Elimination**

- Have you had recent changes in your bowel habits?  Yes  No  
 If yes, explain \_\_\_\_\_
- How often do you move your bowels? \_\_\_\_\_
- Do you take anything to help move your bowels? \_\_\_\_\_
- Have you had recent changes with urination?  Yes  No  
 If yes, explain \_\_\_\_\_
- Do you have urgency or do you lose control of your urine or stool?  Yes  No

Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

If yes to incontinence - initiate Risk for Injury Falls problem / outcome / intervention sheet.

**VENOUS THROMBOEMBOLISM RISK ASSESSMENT - Circle risk scores**

Risk Factors	Score
Age > 70	1
Obesity	1
Immobility or bed rest (unrelated to surgery)	1
History of VTE/PE	3
Known Factor V Leiden or other hypercoagulable state	3
Oral contraceptives / hormone replacement	1
Cancer	3
Major surgery (any intra-abdominal surgery and all others > 45 min) or Trauma	2
New hip or knee replacement or hip / pelvic / leg fracture	4
Final Risk Score	

If patient has risk factor score of 3 or greater, collaborate with MD and consider the following:

- Mobility
- Hydration
- Antiembolism stockings
- Pneumatic compression boot

**11 Sleep/Rest**

- Do you have a problem with fatigue or lack of energy?  Yes  No
- Do you have problems with Sleeping?  Yes  No  
 Explain: \_\_\_\_\_
- Do you use sleeping aids? (including cpap, medication, multiple pillows) \_\_\_\_\_  
 Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

If on CPAP call Respiratory Therapy.

**12 Sexuality/Reproductive**

- Do you anticipate this illness to cause problems/concerns with your sexuality?  Yes  No
- Do you anticipate this illness to cause problems/concerns with your reproductive system?  Yes  No

Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_


If yes to any questions, collaborate with MD.

**13 Self Perception**

- Has or will your illness affect your feelings about yourself?  Yes  No

Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_


**Appendix 2c Nursing Assessment Form (pages 5 and 6 of 6)**

 MASSACHUSETTS GENERAL HOSPITAL

**NURSING DATASET FORM**

NAME AND UNIT NUMBER ARE TO BE WRITTEN DISTINCTLY WHEN PLATE NOT AVAILABLE.

<p><b>14 Coping/Stress</b></p> <ul style="list-style-type: none"> <li>Have you been feeling:  <input type="checkbox"/> Anxious/nervous <input type="checkbox"/> Depressed <input type="checkbox"/> Fearful <input type="checkbox"/> Irritable <input type="checkbox"/> None                      Other _____</li> <li>Have you or others noticed a change in your behavior: (circle answers):                      Argumentative Short Tempered Throwing objects                      Combative Isolating self</li> <li>Who or what helps you cope with stress? _____</li> <li>Do you think this hospitalization will be stressful for you?  <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>Illness can create concerns for patients and families. Would you or a member of your family like to speak with our team social worker about any worries you may have?  <input type="checkbox"/> Yes <input type="checkbox"/> No                      Initials _____ Date _____ Time _____</li> </ul>	<p>Consider Psychiatric CNS consult.</p> <p>Consider Social Service Consult.</p>
<p><b>15 Value/ Belief</b></p> <ul style="list-style-type: none"> <li>Do you identify with a spiritual or religious tradition? Specify _____</li> <li>Do you have any cultural, spiritual or religious needs that we can help you with?</li> <li>Our staff chaplains visit our units regularly. They are here to support you emotionally and spiritually, whatever your beliefs. Would you like to meet a chaplain?  <input type="checkbox"/> Yes <input type="checkbox"/> No                      Initials _____ Date _____ Time _____</li> </ul>	<p>If yes or patient requests visit, consult Chaplains office. # 6-2220.</p>
<p><b>16 Anticipated Learning Needs</b></p> <ul style="list-style-type: none"> <li>How best do you learn?  <input type="checkbox"/> Written material <input type="checkbox"/> Verbal explanation <input type="checkbox"/> Visual  <input type="checkbox"/> Demonstration <input type="checkbox"/> other _____                      Initials _____ Date _____ Time _____</li> </ul>	<p>Consider Video Channel, Care Notes or calling the Blum Family Learning Center.</p>
<p><b>17 Anticipated Discharge Needs</b></p> <ul style="list-style-type: none"> <li>Which of the following best describes your living arrangements?  <input type="checkbox"/> Live alone <input type="checkbox"/> Live with spouse or partner  <input type="checkbox"/> Live with parents <input type="checkbox"/> Live with children  <input type="checkbox"/> Homeless <input type="checkbox"/> Assisted living / Nursing home</li> <li>Does anyone depend on you for care at home? <input type="checkbox"/> Yes <input type="checkbox"/> No                      Who? _____</li> <li>Do you receive nursing care or other services at home? <input type="checkbox"/> Yes <input type="checkbox"/> No                      If yes, what services? _____</li> <li>If you need help taking care of yourself after you leave the hospital, would someone be able to help?  <input type="checkbox"/> Yes, as much as I need. <input type="checkbox"/> Yes, a little bit of help. <input type="checkbox"/> No</li> <li>Do you need more information re:  <input type="checkbox"/> Medications <input type="checkbox"/> Diet <input type="checkbox"/> Home resources  <input type="checkbox"/> Other _____                      Initials _____ Date _____ Time _____</li> </ul>	<p>If in a nursing home or in need of VNA consult RN Case Manager</p> <p>Consider using Care Notes.                      Consult Dietician.                      Consult Case Management.</p>

 MASSACHUSETTS GENERAL HOSPITAL

**NURSING DATASET FORM**

NAME AND UNIT NUMBER ARE TO BE WRITTEN DISTINCTLY WHEN PLATE NOT AVAILABLE.

Additional information.

Information obtained from:  
 Patient  Family  
 Medical record  Interpreter utilized


If one RN completes the entire dataset form (1-17) within 24 hours of admission  
 Signature \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

If unable to complete the data set with 24 hours of admission, please check why  
 patient unable to provide information  
 family unavailable or unable to provide information

Initials: \_\_\_\_\_ Signature: \_\_\_\_\_  
 Initials: \_\_\_\_\_ Signature: \_\_\_\_\_  
 Initials: \_\_\_\_\_ Signature: \_\_\_\_\_

Belongings/Assistive Devices brought to the Hospital  
 Glasses  Contact lenses  family  significant other  patient  
 Dentures:  upper  lower  family  significant other  patient  
 Hearing Aid  family  significant other  patient  
 Cane  Crutches  Walker  Wheelchair  family  significant other  patient  
 Prosthesis  Braces  family  significant other  patient  
 Valuables  family  significant other  patient  
 Location of valuables \_\_\_\_\_  
 Signature of person obtaining valuables \_\_\_\_\_ RN Date \_\_\_\_\_  
 Patient has a valuables envelope stored in Admitting \_\_\_\_\_. Patient elects to keep the following valuables in their possession. \_\_\_\_\_

**Appendix 3 Anesthesia Consent Form**



**MASSACHUSETTS  
GENERAL HOSPITAL**

**ANESTHESIA CONSENT FORM**

UNIT NO: \_\_\_\_\_

PATIENT: \_\_\_\_\_

Site Verification  
 Right  Left  Bilateral  Not applicable

**ANTICIPATED TYPE OF ANESTHETIC:**

**ASSOCIATED PROCEDURES:**     Arterial Catheter                       Central Venous Catheter  
     Pulmonary Artery Catheter             Other Procedures:

I have explained the available anesthetic options and associated procedures with their various benefits and risks. I have also explained that:

1. It is not uncommon for a patient to experience one or more of the following short-term side effects from anesthesia: nausea, vomiting, sore throat, headache, backache, muscle pains, shivering, drowsiness, confusion and difficulty with urination.
2. Because some anesthetics involve manipulations and the use of instruments around the mouth and nose, there is a potential for soreness and bruising in this area. In rare instances, teeth may be dislodged or damaged.
3. With any anesthetic or procedure there is always the possibility of unexpected side effects or complications such as an allergic reaction, nerve damage, heart attack, eye injury, blindness, awareness during a general anesthetic, brain damage or, rarely, death.
4. The patient may experience an untoward reaction in the event of a blood component transfusion.

Additional Comments (if any): \_\_\_\_\_

\_\_\_\_\_  
Print  
 Physician/Licensed Practitioner Signature: \_\_\_\_\_

\_\_\_\_\_  
 DATE: \_\_\_\_\_

I understand that Massachusetts General Hospital is an academic medical center and that residents, fellows, CRNAs and students in medical and allied disciplines may participate in this procedure. In addition, I understand that tissue, blood or other specimens removed for necessary diagnostic or therapeutic reasons may subsequently be used by the Hospital or members of its Professional Staff for research or educational purposes.

Patient's Signature: \_\_\_\_\_                      If patient's signature cannot be obtained, indicate the reason in the Additional Comments section above.

Consent/CRF  
83729 (3/06)

PATIENT IDENTIFICATION AREA

**Massachusetts General Hospital**

**Pre-Anesthetic Note**

Preop Diagnosis		Planned Procedure		Identification		
Age	M	F	Height	Weight	<b>DAY OF SURGERY</b> <input type="checkbox"/> PT REASSESSED	
Previous Anesthetic History	NO		Current Medications	NO		
Smoking, Alcohol, Drugs				NO	Family History/Surgical Problems	NO
				Allergies/Documentation	NO	

System	History	Current Status
Cardiovascular	NC	
Pulmonary	NC	
Renal	NC	
Hepatic	NC	
Neurological	NC	
Gastrointestinal	NC	
Hematological	NC	
Endocrine/Metabolic	NC	
Musculoskeletal	NC	
Psychiatric	NC	
Obstetrical	NC	
Vital Signs	NC	General <input type="checkbox"/> NC    Airway <input type="checkbox"/> NC    Teeth <input type="checkbox"/> NC    Lungs <input type="checkbox"/> NC
Heart	NC	Abdomen <input type="checkbox"/> NC    Extremities <input type="checkbox"/> NC    Spine <input type="checkbox"/> NC    Regional Anes. Site <input type="checkbox"/> NC
Chest X-Ray	NC	ECG <input type="checkbox"/> NC    Na <input type="checkbox"/> NC    Cl <input type="checkbox"/> NC    BUN <input type="checkbox"/> NC    WBC <input type="checkbox"/> NC    PT <input type="checkbox"/> NC    Other <input type="checkbox"/> NC
		K <input type="checkbox"/> NC    CO2 <input type="checkbox"/> NC    Creat <input type="checkbox"/> NC    Hb/HCT <input type="checkbox"/> NC    PTT <input type="checkbox"/> NC
		GLU <input type="checkbox"/> NC    LFTS <input type="checkbox"/> NC    PLTS <input type="checkbox"/> NC
Assess.	ASA	Full Stomach Precautions? <input type="checkbox"/> Y <input type="checkbox"/> N

Patient Signature: \_\_\_\_\_                      Date: \_\_\_\_\_

AM  
PM

Appendix 4 Surgical Consent Form



MASSACHUSETTS GENERAL HOSPITAL

PATIENT IDENTIFICATION AREA

PATIENT CONSENT TO PROCEDURE

PATIENT:

UNIT NO:

PROCEDURE:

Right  Left  Both Sides  Not applicable

I understand my illness/medical condition and the procedure/surgery I will be having. I understand the risks and benefits I can reasonably expect from this procedure/surgery, compared to those I could expect from other approaches.

I understand the risks and the possibility of major complications of this procedure/surgery. I understand that among the risks of this procedure are: drug reactions, bleeding, infection, and complications from receiving blood or blood components. I also understand that, as with every procedure/surgery, there is the possibility of unexpected complications.

The following additional specific risks or issues were discussed with me: [Physician/Licensed Practitioner, please list]

- I received teaching materials to help me understand the information explained to me.
- Procedural sedation will be used during this procedure/surgery to control my pain. I understand that this method of pain control has risks, including the possibility of suppressed breathing, low blood pressure and, sometimes, incomplete pain relief.

Doctor \_\_\_\_\_ will perform my procedure/surgery.

I understand that Massachusetts General Hospital (MGH) is a teaching hospital. This means that resident doctors, doctors in medical fellowships (fellows) and students in medical, nursing, and related health care professions receive training here. These doctors and students may take part in my procedure/surgery. My doctor will determine when it is necessary or appropriate for others to participate in my procedure/surgery and care.

I understand that this procedure/surgery may have significant educational or scientific value. The hospital may photograph, videotape, or record my procedure/surgery for teaching purposes. Any information used for these purposes will not identify me.

I understand that blood or other samples removed to treat or diagnose my condition may later be thrown away by MGH. These materials also may be used by MGH, by medical organizations connected to MGH, or by educational or business organizations approved by MGH, for research, education and other activities that support MGH's mission.

I have had an opportunity to ask about the risks and benefits of this procedure/surgery and of the alternatives. All my questions have been answered to my satisfaction, and I consent to this procedure/surgery:

Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM \_\_\_\_\_

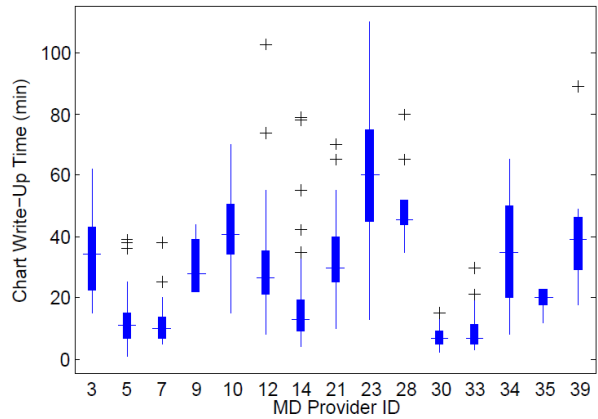
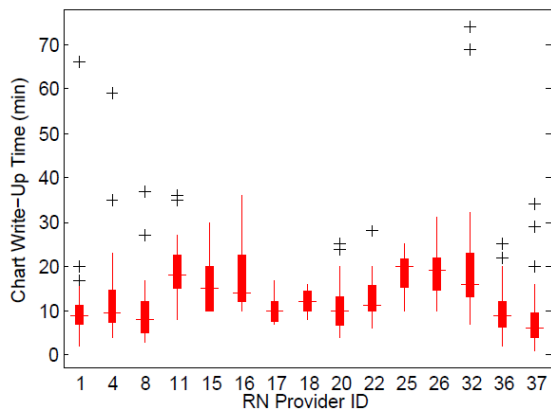
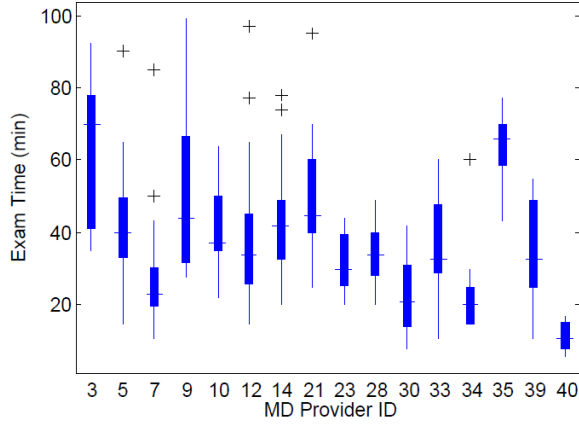
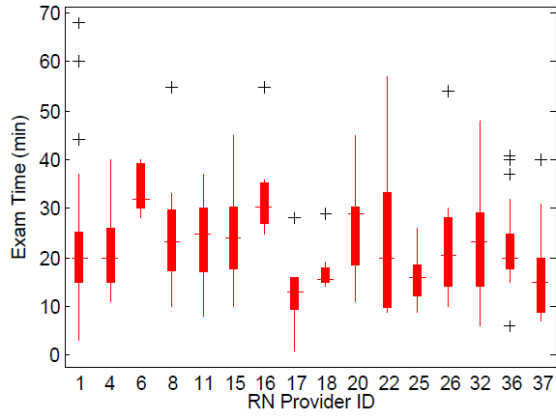
Signature (patient/health care agent/guardian/family member) (If patient's consent cannot be obtained, indicate reason above.)

I attest that I discussed all relevant aspects of this procedure/surgery, including the indications, risks, and benefits, as compared with alternative approaches, with the patient, and answered his/her questions.

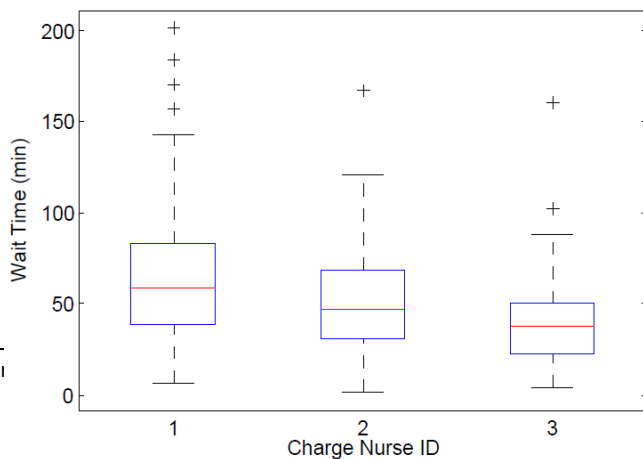
Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM \_\_\_\_\_

Signature (Physician/Licensed Practitioner)

**Appendix 5** *Provider Variability (data collected over 10 days)*



Total Wait Time for RN and MD Exams

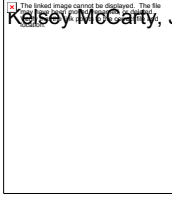


p-values for two-sample t tests

RN1 vs. RN2	0.0024
RN1 vs. RN3	0.0046
RN2 vs. RN3	2.05E-09

MASSACHUSETTS GENERAL HOSPITAL'S PRE-ADMISSION TESTING AREA (PATA)

This image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been deleted. Restart your computer and try again. If the red x still appears, you may have to delete the image and then insert it again.  
Kelsey McCarty, Jérémie Gallien, Retsef Levi





**Appendix 6 Photos of PATA**

*Upper left: A patient checking in at the front desk*

*Upper right: A lab tech checking a patient's blood*



*Bottom left: A lab tech preparing an EKG bed*

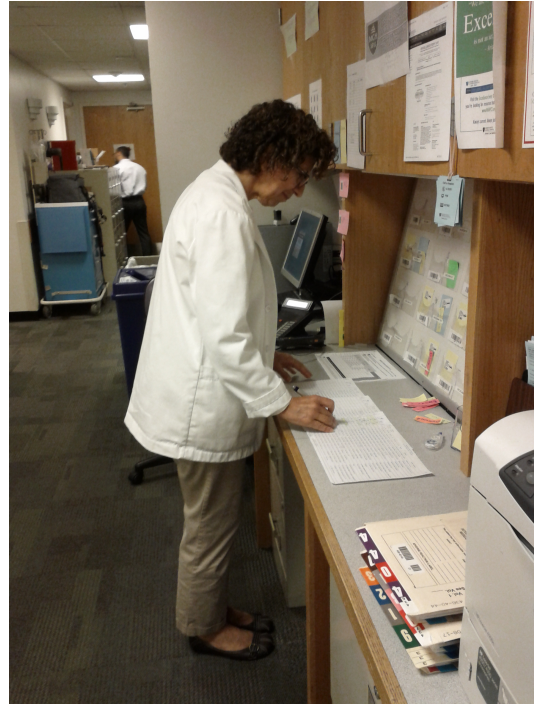
*Bottom right: Hall to exam rooms 1 to 5*





MASSACHUSETTS GENERAL HOSPITAL'S PRE-ADMISSION TESTING AREA (PATA)

Kelsey McCarty, Jérémie Gallien, Retsef Levi



*Upper left:* Patient exam room

*Upper right:* The charge nurse station at the back of the clinic



*Middle left:* Providers reviewing patient histories and writing up exam notes

*Bottom left:* A lab tech labeling blood samples

*Bottom right:* The blood work lab

