Should We Do Elective Cardiac Catheterizations on the Weekends?

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The issue of working weekends to deliver more care is complex and requires a thoughtful game plan to commit the resources for the value of the expanded services. In the times of COVID, the need for hospital throughput has never been more critical. Performing needed catheterizations for inpatients to facilitate discharges over the weekends to open more beds makes sense, but there are many logistical and personal concerns.

I received a question about elective catheterizations on weekends from Dr. Richard (Rick) A. Chazal, Medical Director, Heart and Vascular Institute Lee Health, Fort Myers, Florida, who asks, "We (and others) are under increasing pressure from the administration to do elective cath cases six or seven days a week to fully utilize facilities (and improve the patient experience). In discussing, all of us are have difficulty with this due to staffing (made worse in the current COVID environment) and pushback from busy/fatigued docs. Are you aware of anyone successfully running true electives on weekends? (We've been pushing to use computed tomography [CT] for diagnostic, reserving cath labs for acute coronary syndromes [ACS]/myocardial infarction [MI] on weekends...)."

Mort Kern, Long Beach, California: Rick, I'm at the VA in Long Beach and we do not do ST-elevation MI (STEMI) call during off hours (8-4 pm) or on weekends. Therefore, no electives (or any cath, including ACS patients, on weekends). This VA is not typical for most cath labs in general. I am aware of several successful high-volume programs in New York, but mostly these are the exceptions. (See Figure 1, pros and cons at a glance).

Let's see what our colleagues say.

David Rizik, Scottsdale, Arizona: As someone who has been the director of cath lab services and interventional cardiology for over two decades, I believe that each program must individualize the approach on this very subject. It comes down to weighing the "competing benefits."

There is the issue of work-life balance on the part of cath lab staff, nursing, and physicians. Still in the throes of the most recent surge of COVID cases in Arizona, nursing staff is truly in short supply. And, they are simply burnt out. On the other hand, there is the potential competing interest of patient experience, shorter length of stay, and any potential cost savings there may be to "moving patients through the system" (which no one has convincingly demonstrated for me). And remember, overworking and then losing cath lab staff and having to replace them is a costly undertaking in and of itself.

With the complexity of cases we now perform, structural cases, cases of longer duration, and more complex coronary interventions, the cath lab staff is putting in an incredible number of hours over the past decade. Historically, I have discouraged the practice of elective cases on weekends and continue to do so.

Issues about weekend cath lab operations	Pro	Con
Patient load	High volumes, more throughput	More efficient turnover during work week,
Staffing	More cases, more staff, more work	Burnout
Ancillary Support	Electives low risk may not need full ancillary service	High risk or any critical complication = trouble
Weekend pay	More work, more $	Exceed resources
Patient/physician acceptance	Patient convenience	Physician and staff inconveniece

Figure 1. **The pros and cons of weekend catheterization at a glance.**

Srihari S. Naidu, Valhalla, New York: The math is going to make sense at some hospitals (busy elective load, lots of private docs who bring stable cases, weekday cases efficient yet still chewing up staff overtime pay) and will be disastrous at others. We tried this under my previous directorship, but after an initial interest, the interventional cardiologists no longer wanted to come in on weekends on a rotational basis. At my hospital now, where nurses are unionized and on-call pay is high, the math simply doesn't make sense even if you factor in length of stay (LOS). It is better to focus on the true urgent/emergent cases and keep staff at home other times. We should also remember that this is a time of high burnout, and nursing and technologist staff need their weekends to refresh as well, whether or not they are on call. There may be short-term gains at some hospitals with long-term losses if you can no longer recruit.

Duane Pinto, Boston, Massachusetts: I'm with David. We have experimented with this over the last 20 years, and I have seen this both as a fellow and attending. With only selected cases (say non-STEMI, mild tamponade, etc.), the staff are in and out (of the lab) and the work doesn't justify a second on-call team. So, unless the team is hungry for call pay, the staff, and the fellows and attendings, find their weekends more burdensome (as attendings also cover other things like the cardiac care unit [CCU]). Even if the lab were to get busier by scheduling true elective outpatients, it still begs the question of why do electives on weekends. If there is capacity during the week, then one should figure out how to be more efficient those days, rather than work on the weekends to maintain the turnover inefficiency during the week. Regardless, if the weekends become clogged with "elective" cases, e.g., right heart cath for volume check, help the CCU place a

central line, etc., then one must decide whether to have one or two teams to have to ability to respond and spend the hours needed with a STEMI, mechanical circulatory support (MCS), extracorporeal membrane oxygenation (ECMO) patient who comes in as the primary (no pun intended) reason why we have a team on call able to respond within 20 minutes. Increasing the infrastructure to do this erodes any financial benefit and has all the adverse consequences that David mentions. Just take the sick people to the cath lab when they need it. Schedule well people for the cath lab when they should be, which is during the week, when the rest of your system is fully staffed (cardiac surgery consults, anesthesia, nurses for teaching and care in the holding area, etc.).

Barry Uretsky, Little Rock, Arkansas: I am unaware of such of a program, although one may exist in the United States. In general, it makes intuitive sense to utilize a facility every day, as the most efficient and productive approach. Such an approach requires adequate staffing and an appropriate compensation model. Since two days a week are acknowledged as non-workdays in most work areas in our society, any compensation approach must configure that issue into a compensation plan. Simply increasing the number of sessions of work by the same medical personnel and current compensation plan is not workable. If there were adequate medical personnel available (which there is not) and if an appropriate compensation approach was developed (which I am not aware of), then it may make sense to perform cardiac procedures every day, but in the current environment, in my opinion, it does not.

Kirk Garrett, Newark, Delaware: At ChristianaCare, we started a Saturday morning schedule 7 or 8 years ago. The interventional cardiologist on call does the cases. Start 7 am, with a maximum of 4 cases, so staff can be done by 3 pm. This was an initiative by the employed group, but independent cardiologists used some slots. This not only moves patients through quicker, but avoids a completely unmanageable Monday morning case load. It worked well, although utilization varied a lot. We shut it down around the start of the pandemic, and with staffing issues now it will stay shut down for a while. I'll restart the practice as soon as we can. With payment models and patient expectations what they are, we can't afford to add 1-2 days LOS doing nothing but waiting for a cath. We have ways to manage the staff schedule (when we're fully staffed), so it's not onerous work. Also, a potluck lunch was traditional — that makes a huge difference.

Gregg Stone, New York City, New York: Samin Sharma (Mount Sinai Hospital in New York City) for many years has run a full cath lab day on Sunday at Sinai, with approximately 30 elective cases, but avoiding complex or high-risk PCI. I personally think it is an excellent idea for a very busy program, as long as staffing can be run seamlessly. Of course, different attendings can work on different days (some working weekends but taking weekdays off). For me I have always believed that hospitals and even outpatient facilities should be 7-day per week operations if the volume is present to support them — a good problem to have — as long as quality control can be assured. It does make sense, whoever, to avoid high-risk cases on weekends, as all hospital-wide services may not be available.

Jim Blankenship, Albuquerque, New Mexico: From a pure business point of view, it makes sense to use expensive facilities 24/7 on the theory that it is cheaper to build and use one facility (i.e., lab) 24/7 than to build and use two facilities (i.e., labs) on weekdays only. If one saves the capital cost of building a second lab by using one lab 24/7, the savings in capital amortized over lifetime of the lab might be $150k/year (assuming cath lab lifetime of 10 years). But as others have pointed out, the human costs would outweigh the financial benefits. In common practice, the business case often leads to CT and MRI scanners running 24 hours/day, but the human costs lead to cath labs running only 5 days per week for elective cases.

I think scheduling truly elective cases on a weekend makes no sense for small and medium-sized cath labs, due to the concerns mentioned about staff burnout/dissatisfaction and how to handle STEMIs that come in when the cath lab is occupied. It would also make no sense unless the weekday schedule was backlogged to the extent that patients were having adverse events while waiting for cath. It might make sense for large volume, very busy labs that could support multiple call teams or where individual staff would only work an occasional weekend.

The original question concerns truly elective outpatient procedures, but it raises the question of how to manage low-risk patients admitted over the weekend. Should stable low-risk patients undergo cath over the weekend or wait for Monday? And what about 3-day holiday weekends? At both my prior institution and current hospital, we wrestled with this question. The comments so far point out benefits (shorter LOS, better patient satisfaction, less weekend overload on Mondays, better patient outcomes) and drawbacks (fatigue and dissatisfaction of staff and docs, more overtime pay, need for two call teams, and how to manage STEMIs when cath team is doing an elective case). Here again it is more difficult for smaller labs and easier for larger labs. How the question is decided varies depending on cath lab size, culture, leadership, and the influence of hospital administration.

Chet Rihal, Rochester, Minnesota: At Mayo Clinic, we have done Saturday inpatient caths for many years. It helps the flow of patients through the hospital. It is usually a full day, staffed by the on-call interventional cardiologist. It can be an issue if a STEMI shows up simultaneously with another case, but this is rare and can be managed. I agree with Gregg that hospitals should be a 7-day a week operation, but most hospitals are not staffed, and staffing is becoming increasingly challenging.

Jeffrey Moses, Roslyn, New York: I tried this several times. At Lenox, we got poor response from the patients and worse from the staff. Our most recent trial [of weekend electives] at Columbia in the recent past was abysmal and demoralizing for the staff.

Gurpreet S. Sandhu, Rochester, Minnesota: We have run a single cath lab room on Saturdays for well over a decade. Our weekend STEMI team runs this from 7:30 am, like a regular cath lab day, and this can often become incredibly busy. We only do inpatient cases, primarily NSTEMI, some hemodynamic support, urgent right ventricular biopsy, etc., but no chronic total occlusions, structural, or complex hemodynamics cases. We had originally started with a separate Saturday cath team, but subsequently consolidated to a single Saturday/weekend STEMI team, as we were doubling the weekend burden for staff.

This [weekend work] helps reduce LOS, provides more timely care for a few patients, and frees up some lab capacity on Monday. This does not help with staff satisfaction and does add to burnout. It is mostly revenue-neutral as an inpatient offering, and if anyone is truly contemplating the full spectrum of weekend outpatients with complex coronary, transcatheter aortic valve replacement (TAVR), and structural cases, then you would need to open the entire (non-cath) weekday infrastructure and support systems for that.

Chet Rihal, Rochester Minnesota: This was our analysis of weekend cath services (Table 1, Figure 2).[1] As Guri points out, decreased LOS and process metrics, not a ton of savings on cost. The analysis may or may not be relevant to other centers based on the management structure.

"The issue is how to capitalize the physical resources for the hospital, balanced against the human resource issues."

— Steve Bailey, MD

Table 1. Observed Economic Outcomes by CSA Era.

Outcome	Pre CSA (n = 331)	Post CSA (n = 244)	Mean Difference 95% CI)[a]	*P*
Total costs, $[b,c]	25,400 (16,440) ± 23,851	23,829 (14,887) ± 23,233	-1571 (-5405 to 2428)	.43
Hospital costs, $[b,c]	21,990 (14,217) ± 21,132	20,673 (12,485) ± 20,913	-1317 (-4735 to 2275)	.46
Physician costs, $[b,c]	3587 (2490) ± 3129	3398 (2356) ± 2865	-189 (-653 to 321)	.46
LOS, days[b]	5.91 (4) ± 5.85	3.82 (2) ± 4.37	2.09 (1.27-2.95)	<.001

CSA indicates catheterization service availability; LOS, length of stay; SD, standard deviation
[a]Bootstrap 95% CI using the percentile method.
[b]Observed mean (median) ± SD.
[c]Costs represent 2010 constant dollars.

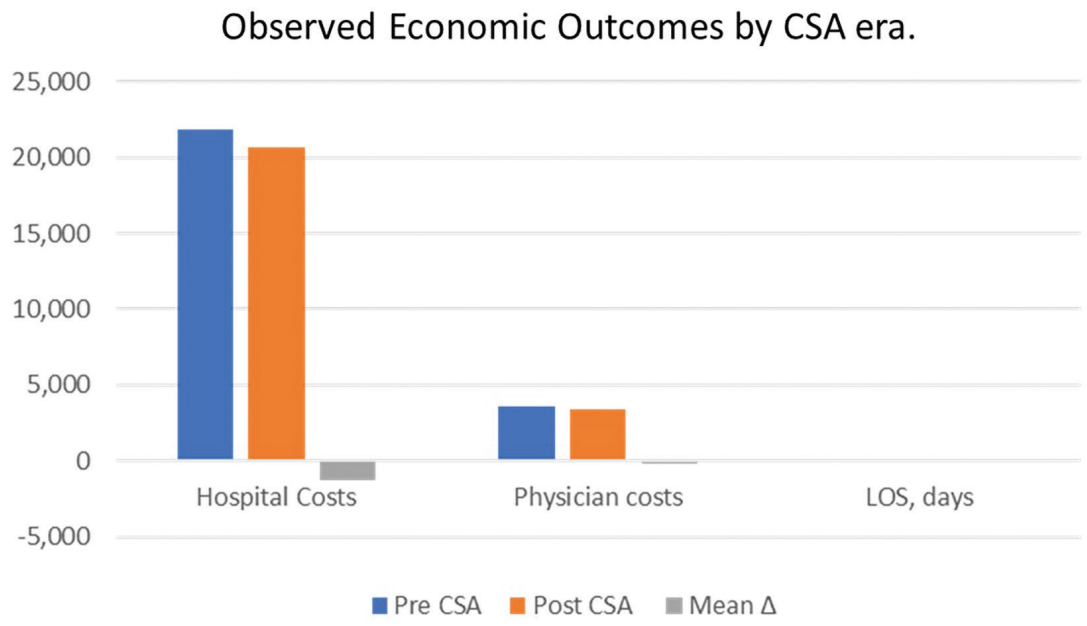


Table 1 and Figure 2. Observed Economic Outcomes by Catheterization Service Availability (CSA) era. The Mayo Study of patients undergoing cath before and after Saturday cath service availability examined patient cohorts of Friday and Saturday admissions with cath compared to similar admission patients before cath service availability (2007-2008 vs 2009 to 2010). Statistical modeling was used to predict length of stay (LOS) and costs, and estimate the likelihood of adverse events during follow-up. There were 331 pre-CSA cases (327 patients) and 244 post-CSA cases (243 patients) with similar age and other clinical characteristics. There was no difference in clinical outcomes. There was a reduction in the average LOS reduction (5.7 vs 4.0 days; *P*<.001), yet inpatient costs were similar ($24,817 vs $24,753). The study conclusion was that weekend CSA for routine inpatients was clinically safe and effective, and reduced hospital LOS with no change in inpatient costs.

Table 1 is reprinted with permission from Long KH, Moriarty JP, Ransom JE, Lennon RJ, Mathew V, Gulati R, Sandhu GS, Rihal CS. Economic and clinical impact of routine weekend catheterization services. Am J Manag Care. 2016 Jul 1; 22(7): e233-e240.

Jeffrey Moses, Roslyn, New York: I think the crux of it is that is if you need a full second team, as your STEMI team needs to be available. If you use the on-call team, then what [do you do for a STEMI that comes in]?

Duane Pinto, Boston, Massachusetts: Chet, is it fair to say that in your analysis[1], one interpretation is that it is a safe strategy with similar individual patient costs? A reduced LOS allows another patient to come out of the emergency department or for the system to accept another transfer, etc., thereby increasing total revenue. Either way, I am focused on my patients, staff, and physicians, and for our specific situation, where the harm outweighs the benefit, because, in our system the ones reaping the benefit are not the ones suffering the additional burden.

Chet Rihal, Rochester Minnesota: I fully agree, Duane, right now we must look out for our colleagues and staff. It's not the right time to expand services given all the stress in the system.

Fred Welt, Salt Lake City, Utah: At the University of Utah, we don't do elective outpatients on the weekend, but we will do any inpatient case in whom the procedure will facilitate earlier discharge. We are constantly at >90% census and beds are at a premium.

Duane Pinto, Boston, Massachusetts: It is built into our DNA to try to help and solve problems as interventionalists. That often means we will take on additional work, because we or others perceive it is the "right thing to do". We'll make sure that we get that elective case gets done in time for the STEMI and work those extra weekends to help. I've done it and you've done it, and it's satisfying if you believe in the mission. When the mission is more abstract, others benefit while you are burdened with a lesser motivation of compensation, then burnout sets in. See Daniel Pink's TED talk or book, *Drive*, on motivation. Separately, I'm on a salary, like some others. For an additional burden, nurses, technologists, and physicians should be compensated. I usually say, when this comes up, that we should pay physicians what a plumber gets (and one-third for their apprentice) per hour to work nights and weekends. That usually makes the financials less favorable. Planning meetings should be scheduled for Saturdays or Sundays, but often, the administrators are not available. [*MK*: No weekend admin meetings should be a rule. There's time during the week for this.]

Sam Butman, Scottsdale, Arizona: This is a most contemporary question and one I have lived in for the last 15 years in a rural hospital offering acute services 24/7. The question of weekend elective work really has not come up due to our low volumes. However, as others have mentioned, having patients with ACS who have cooled down, who wait until Monday (earlier on longer holiday weekends, though) is a small price to pay to reduce stress and turnover in the cardiac cath lab staff. There really was no pushback from the patients. The question of an eager or pressed administrator trying to reduce LOS or fully maximize the cardiac cath lab is another question. We were fortunate that this did not arise or if it did, it passed.

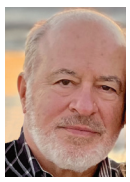
Rajiv Gulati, Rochester, Minnesota: Rick's question was about electives. For many here, the pressure to address this will grow as we fill our days with more cases and more complex procedures. At our place, radiology has successfully delivered a weekday extended hours service for over a year. Outpatient MRI/CT runs to midnight. One thing is clear: the patients love it. They can have a regular day, eat lunch, and find parking. We have begun to look at models for the cath lab, and there is more appetite and operational feasibility for evening hours during the week, rather than daytime hours at weekends. All that said, I agree with Chet that now is not the time for us to implement.

Lloyd Klein, Napa, California: Hospital administration is not going to hire more staff or pay doctors much more for weekend work. They will say that that is all factored into the salary. The reimbursement is the same. They might, at the start, pay staff overtime. The idea is to make more money from decreased LOS only. You think you are going to see that benefit when it doesn't appear on the balance sheet? In hybrid labs with independent and owned practices, the idea is to drive the independent out by taking the weekend cases. We are being manipulated and are simply rolling over — out of fear of loss of job or favor by those above us, out of a sense of thinking we are helping, out of a belief in our own ego.

And your administrators know that. They are taking advantage of our desire to do what we believe is the right thing for our patients. They know we are afraid — for our incomes, for our promotions, for our futures. They are taking advantage of our fears and ego, and paying as little as they can get away with.

Whether elective cases going to the cath lab on a Sunday not Monday is in the patient's interest is highly debatable, and I would say in many cases is to their detriment. Years of dealing with hospital administrators has shown me that they have very little insight into what they are asking in this regard.

Let me tell you that your children are going to grow up. Your friends are going to get older. If your parents are alive, for how long? If you don't spend time with them now, they will remember that. You are not going to get second chances with family. And, you also will reach a point of burnout sooner or later. We call it something else: early retirement, or moving into administrative ranks ourselves, but it's really the same thing with a smiley face.



Carl Tommaso, Evanston, Illinois: One issue is that hospitals are not fully staffed on weekends. Although complications are very rare, they do occur. Major complications that may occur during usual hours may need several hours to get an OR or call in a vascular surgeon. Even issues like blood bank, nursing, and lab are on weekend shift with people who may be overwhelmed or less experienced. This [limited weekend staffing] may compromise care. Unless the hospital is running at full staffing, weekend electives can be a problem.

Bonnie Weiner, Worchester, Massachusetts: Carl, this is an important point. One could also make the case that like facilities without on-site surgery, that the consent process/form should include explanation that some of these services might not be available, or available in a timely manner, for elective cases on weekends. There is a general acceptance that this might be the case for urgent or emergent cases, but truly elective cases are different, and patients should be informed.

Steve Bailey, Shreveport, Louisiana: Over the last 15 years, I have supervised labs that had (1) no elective weekend cath procedures, only emergent patients, (2) inpatient-only cath procedures, and (3) elective (low risk) cath and electrophysiology procedures. The issue is how to capitalize the physical resources for the hospital, balanced against the human resource issues. Nursing/technologist staffing, recovery staffing, and physician staffing of cardiac and cardiothoracic surgery all have played a role at each location.

Elective outpatient procedures were done in the setting of full utilization of two shifts on regular weekdays. This was the least successful, as it decreased the weekday/night coverage pool of staff. It also resulted in altered work schedules, often removing staff and faculty from weekday rotations.

The weekend inpatient scheduled procedures was the most successful at decreasing LOS, as low to intermediate risk patients could have a definitive diagnosis. Many percutaneous coronary intervention (PCI)/coronary artery bypass graft (CABG) still were kept in-house for higher levels of support for procedures. As we were forced to "double" up, we did face the issue of how to deal with urgent/STEMI cases and how to recover them with limited beds. We saw an 0.15 day decrease in LOS, but no substantial decrease in cost.

"One issue is that hospitals are not fully staffed on weekends. Although complications are very rare, they do occur."
— Carl Tommaso, MD

Today, we struggle to fully staff two full shifts plus call. Adding elective weekend procedures has been discussed, but is not tenable, based upon lack of staff and physician numbers, interest or motivation, and facilities to recover or place patients.

The Bottom Line

Taking the last words from Duane Pinto: "Just take the sick people to the cath lab when they need it. Schedule well people for the cath lab when they should be scheduled, which is during the week when the rest of your system is fully staffed (cardiac surgery consults, anesthesia, nurses for teaching and care in the holding area, etc.)."

There is no one answer fits all to the question of weekend electives. If your hospital has the need (patient volume), and the resources (physicians, staff, support personnel, and weekend functions for emergencies), then weekend cath operations makes sense.■

Reference

1. Long KH, Moriarty JP, Ransom JE, Lennon RJ, Mathew V, Gulati R, Sandhu GS, Rihal CS. Economic and clinical impact of routine weekend catheterization services. *Am J Manag Care.* 2016 Jul 1; 22(7): e233-e240.

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