RADIOLOGY MANAGEMENT

January/February 2017
volume 39 number 1

The Journal of AHRA: The Association for Medical Imaging Management

Accounting Basics Part 3: Time Value and Internal Rate of Return

By Jason C. Porter, PhD
and Carole A. South-Winter, EdD, CNMT, RT, FAEIRS

MRI Upgrade: A Case Study in Germany

By Benjamin Kaltenbach, MD, Andrei Roman, MD, Julian L. Wichmann, MD, Sebastian Fischer, MD, Katrin Eichler, MD, Thomas J. Vogl, MD, and Stephan Zangos, MD

Maximize Marketing with a Deeper Dive into Data and Metrics

By Tina Rudisill and Gail Schwartz

CT Utilization: A Case Study in Iran based on ACR Appropriateness Criteria

By Zahra Meidani, Yaser Hamidian, Mehrdad Farzandipour, Akbar Aliasgharzade, Ghoalm abbas Mosavi, and Zahra Nazemi

ahra


HITACHI
Inspire the Next
LOWER DOSE CT
INSPIRED BY YOUR PATIENTS
Hitachi's Supria and Scenaria 16, 64, and 128-slice CT models provide both exceptional capabilities and value in lower dose*, rapid workflow and enhanced patient access.
Innovating Healthcare, Embracing the Future
Get more information about Hitachi CT products.
www.hitachimed.com
*In clinical use, dose saving features may reduce CT patient dose depending on the clinical task, patient size, anatomical location and clinical practices employed. Consultation with a radiologist and physicist are recommended to determine the appropriate dose needed to obtain diagnostic image quality for a particular clinical task.

AHRA 45TH ANNUAL MEETING AND EXPOSITION

ANAHEIM California

Early Bird!
Register by
April 14th and save

ANAHEIM CONVENTION CENTER | ANAHEIM, CA JULY 9-12, 2017

Home to famous theme parks and beach destinations, set aside July 9-12 to join AHRA in Anaheim, CA! Industry experts will be providing strategies on reimbursement, patient experience and leadership to help you tackle the challenges of healthcare's rapidly changing landscape.

Register by April 14 and save $50 off the Annual Meeting registration fee!

Anaheim, California

ahra 2017

WWW.AHRAONLINE.ORG/ANNUALMEETING

Designed to meet *your* goals.

MIC is your trusted CE source for MR & CT cross-training, *guaranteed* certification, and MQSA compliance in digital mammography for technologists & radiologists.

- **Keep your technologists up to date on current trends in radiology!**
- **CT and MR registry preparation.**
- **CT and MR cross-training.**
- **MQSA compliance in Digital Mammography and Digital Breast Tomosynthesis.**
- **Best Money Back Guarantee in the industry!**
- **Choose from more than 150 titles—and 400 credits!**

"...radiology managers have begun to embrace the responsibility to direct their technologists to CE that offers the practical knowledge and skills necessary to help ensure operational solvency and a high standard of patient care."

Radiology Management, AHRA, Jul/Aug '16, p.59

Technologists and their managers agree:
"MIC's courses <u>really</u> <u>work</u>!"

The CT Registry Review Program™

- Covers **every** topic on the ARRT & NMTCB post-primary exams in CT.
- **It's guaranteed:** Pass the ARRT or NMTCB CT exam or your money back!
- **22 Credits & 8 StudyModules.**

Now 5th Ed!

The MRI Registry Review Program™

- Covers **every** topic on the ARRT post-primary exam in MRI.
- **It's guaranteed:** Pass the ARRT exam in MRI or your money back!
- **30 Credits & 12 StudyModules.**

Now 5th Ed!

The CT CrossTrainer™

- Covers all the **essentials** of CT.
- Requires no prior training in CT.
- Explains CT so you'll **understand** it!
- **17 Credits & 6 StudyModules.**

The MR CrossTrainer™

- Covers all the **essentials** of MR.
- Requires no prior training in MR.
- Explains MR so you'll **understand** it!
- **18 Credits & 6 StudyModules.**

Digital Mammography Essentials™

- Meets MQSA requirements for digital mammography training.
- Covers all the **essentials** of digital mammography & requires no prior training.
- **11 Credits & 4 StudyModules.**

Digital Breast Tomosynthesis Essentials™

- Meets MQSA requirements for digital breast tomosynthesis training.
- Covers all the **essentials** of digital breast tomosynthesis.
- **8 Credits & 3 StudyModules.**

NEW!

Sectional Anatomy & Imaging Strategies™

- Learn all the **essential concepts** of sectional imaging...in a convenient self-study format!
- Explains sectional anatomy and tomographic imaging so you'll **really** understand it!
- **18 Credits & 6 StudyModules.**

Radiology Trends for Technologists™

- Choose from over 100 hot topic review articles.
- StudyBuddy helps you focus on relevant info.
- CT, MR, Mammo, PET, SPECT, etc.
- **1.5 to 4 credits for each "Trends" title!**

Every MIC course is accredited for Category A CE credits which are fully recognized by the ARRT & NMTCB.

A Proud Member of...
ahra
...since 1996

Call <u>today</u> for your
Free Info Kit
800-589-5685
or visit www.**MIC***info*.com

MIC
Medical Imaging Consultants, Inc.
1037 US Highway 46, Suite G2 • Clifton, NJ 07013 • 800-589-5685
...for *your* perfect image™.

RMgt01/02-17

CONTENTS

JANUARY/FEBRUARY 2017 • VOLUME 39:1

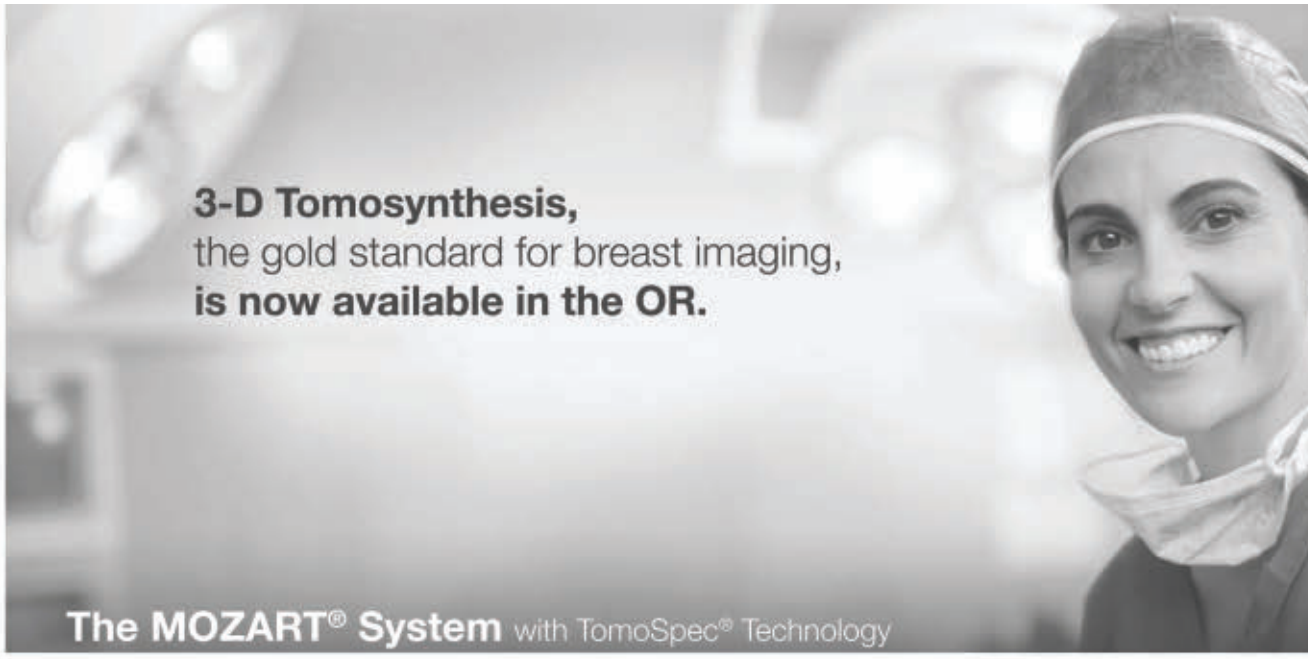
• features

Cover: (Top) 2016–2017 AHRA Board of Directors and (bottom) AHRA Education Foundation Board of Directors.

• departments

CONTENTS

• columns



KUBTEC MEDICAL IMAGING

KUBTEC.COM

This, Too, Shall Pass

By Debra L. Murphy

I recently overheard two strangers having a conversation about getting an MRI done. Because of her insurance plan, one of them said she had called a few different places to find out how much the exam would cost. "You wouldn't believe how much of a difference there was!" she told the other woman. I was a bit slack jawed, myself. I constantly hear our members and industry experts say that the patient is becoming the customer in the sense that they will shop around, but hearing two random people discuss it was, admittedly, surprising. Even my own father has been talking about quality ratings lately. This, from a man who prefers clip on ties.

Julie Kaufield, in her article "From the Outside Looking In" (p. 40), has had similar observations. In 2008, she left the field of imaging to raise her family. She recently reentered it, this time as a writer, and is seeing a world that is changing at a faster pace than ever before. Julie noted: "At the very heart of what's new remains the imaging culture I know and love, with values based on the quality of care and images. We now refer to this concept as the 'patient experience,' and it encompasses many areas beyond just satisfaction, including visibility, quality, accessibility, and patient advocacy."

This is a really important connection. As healthcare professionals, you understand this, but there are some significant barriers to care, which is unfortunately what many Americans understand. As long as people like you stay focused on the patient, as you always have, the ever-swirling and looming changes (see "The Certainty of Change" p. 44) will be kept in perspective. This issue of *Radiology Management* alone encompasses the diversity of these challenges – from capital purchases and equipment upgrades to modifiers and reimbursement to appropriateness criteria. (Lions and tigers and bears, oh my.)

But as Paul Dubiel notes (p. 7), "As 2017 gets going, remember why we all got into healthcare in the first place and know this, too, shall pass."

Deb Murphy is the Deputy Executive Director at AHRA. She is also managing editor of Radiology Management *and may be contacted at dmurphy@ahraonline.org.*

RADIOLOGY MANAGEMENT

The Journal of AHRA: The Association for Medical Imaging Management

January/February 2017 • Volume 39 Number 1

Radiology Management *is published 6 times each year (January, March, May, July, September, and November) by AHRA. For information on subscriptions, contact: AHRA, 490-B Boston Post Road, Suite 200, Sudbury, MA 01776; phone (978) 443-7591. For advertising and reprints, contact M.J. Mrvica Associates, phone (856) 768-9360 or 2 West Taunton Avenue, Berlin, NJ 08009.*

Subscriptions: Radiology Management *is an official publication of AHRA. The annual subscription is an integral part of the dues for members of the association. The fee for membership in AHRA is $175.00 a year with a $25 initial application charge. For information on membership, contact AHRA at the address above. A nonmember subscription rate is available at an annual cost of $100.00 within the US, $115.00 within Canada, and $135.00 for other foreign countries. A year's subscription covers the 6 regularly scheduled issues plus any special issues. All nonmember subscriptions must include payment (payable to AHRA) with the request and should be forwarded to AHRA at the address above.*

Change of Address: Notification should be sent to AHRA at the address above.

ISSN 0198-7097

Contact *Radiology Management*

Editor

Debra L. Murphy
AHRA
490-B Boston Post Road, Suite 200
Sudbury, MA 01776
Phone: (800) 334-2472, (978) 443-7591
Fax: (978) 443-8046
dmurphy@ahraonline.org

Advertising Sales

Kelly Miller
M.J. Mrvica Associates, Inc.
2 West Taunton Avenue
Berlin, NJ 08009
Phone: (856) 768-9360
Fax: (856) 753-0064
kmiller@mrvica.com

2017: Let the Games Begin

By Paul Dubiel, MS, RT(R), CRA, FAHRA

It always takes me a long time to come up with the title for my column. The title usually comes at the final edit stage of my writing process. I really want the title to set the stage for what I wrote and be interesting enough to grab the attention of the reader. I want it to be eye catching, but not overly dramatic or misleading. I want the title to draw the reader in and engage them because, after all, I know you go to Gordon's article first (I know, because I do it too) then decide which article to read next.

When I started thinking of a title for this column, I kept finding myself coming up with more and more depressing, dark, and cynical titles. As we move into the New Year I cannot ever remember a time of such uncertainty, confusion, and instability. And I lived through DRGs and numerous other governmental changes all aimed at reducing reimbursement and sending the healthcare field into disarray. A day doesn't go by where a news flash has some story about staff reductions, hospital closures, or NOIs falling far below expectations.

As we enter 2017 never has healthcare faced such difficult and uncertain times. New government leaders are vowing to change the fundamental structure and delivery system of healthcare, decrease reimbursement, increase oversight and requirements (some yet to be defined), as well as an increase in competition, all leading to a gloomy outlook for the future. With all this swirling through my head my working title for this column was "2017: Buckle up, People, It's Going to Be a Rough One" but I wanted to try and look at it from a more positive perspective. And, yes, through it all there is hope for optimism. We just have to find it and that's where we all need to shine.

For it is in these uncertain times, we as leaders need to step up and lead by example. We need to be the ones showing the way, being a positive influence for our staff. We need to step up not only in our departments, but in our hospitals, our homes, and in our communities. It isn't going to be easy. Our fiscal year is almost half over and it's been rough. We, like most of the country, have seen decreases in volume and reimbursement as patients struggle with high deductibles and healthcare costs in general. Payer mix has not held up to expectations. New mandates from the federal government and from our corporate offices on how we provide services as well as upgrades and updates to our electronic medical record and other IS systems to meet new ACO rules have thrown our system for a major loop. We are still trying to manage and adapt. With these changes have come staffing changes among many of our more experienced and tenured employees leaving the hospital for more stable work in clinics or out of the healthcare field all together. We have also seen reductions in needed capital to improve our efficiency to help meet new productivity targets. And I'm afraid we haven't seen the end yet.

But the end will come as it did during other times of turmoil in healthcare and we as an industry will be born again stronger than before. To get there, though, we need leaders who step up and help others understand the big picture. To do that, you must first understand the big picture of where your hospital wants to be, what the issues are, and how you as an individual and the leader of a critical department within your organization fit into the picture. Unless you are prepared and knowledgeable, you can't relay that message to staff in an accurate and thoughtful way. We need to be able to speak to what is happening around us by understanding it ourselves. We need to listen and learn from all sides of the picture so we can accurately and honestly help our staff understand and get through this adventure.

We need to be positive, yet honest. We can't tell staff there is nothing different happening and all is well as we send people home early because volume is low. We need to be out and about and available. We need to answer questions the best we can without causing any more anxiety. We need to control our own fears to help others manage theirs. We need to know when and what not to tell staff since there will be many decisions made that impact them and the hospital that should not be discussed until the time is right. Sometimes discretion is

the better part of valor, especially if that information is not fully developed and could cause panic if broadcast to staff before it should be.

I know this is easier said than done. I have the mangled pillows and bruises from my wife elbowing me to stop my constant tossing and turning during the night. But every day I show up to work for my staff, put on a smile, and do what I can to get them through the day. You being anxious and cranky only makes your staff anxious and cranky, which ultimately negatively affects the people who need us the most: our patients and their families.

So as 2017 gets going, remember why we all got into healthcare in the first place and know this, too, shall pass. While healthcare may never be the same again, the reason we provide healthcare will always be the same – to care for the sick and their families when they need us the most. If you remember that, it will make the other issues facing us that much less daunting.

Remembering what we do and why we do it will always bring peace and meaning to our lives and careers.

Paul A. Dubiel, MS, RT(R), CRA, FAHRA has been the senior director, imaging at Seton Family of Hospitals in Austin, TX since 2002. An AHRA member since 1993, he is currently editor-in-chief of Radiology Management *and has volunteered for numerous other task forces and committees. Paul can be contacted at pdubiel@seton.org.*

Accounting Basics Part 3: Time Value and Internal Rate of Return

By Jason C. Porter, PhD and Carole A. South-Winter, EdD, CNMT, RT, FAEIRS

The credit earned from the Quick Credit™ test accompanying this article may be applied to the CRA fiscal management (FM) domain.

EXECUTIVE SUMMARY

- Understanding the principles behind the time value of money can help individuals succeed in both business and personal long-term planning.
- The Internal Rate of Return (IRR) method provides a straightforward way to analyze long-term financial decisions. The result, the project's IRR, is a simple percentage that is easy to explain and compare with the results from other projects.
- When considering multiple investments, it is relatively simple to rank them by their IRRs, make minor adjustments to the list for qualitative issues, and invest down the list until the funds for the year have been spent.

Budgeting, payroll, spreadsheets, tables, finances. These words, and the calculations that go with them, can be intimidating to many healthcare professionals. Parts 1 and 2 of this series defined some of this terminology and walked through the basics of how accounting numbers can be used to support a decision or make a recommendation to the management team. This article will be a guide through two more advanced accounting tools, including some techniques and concepts that are useful for personal decision making as well as business decision making. Combined with the tools and definitions already discussed, these skills will provide even more powerful tools for understanding accounting information and for making proposals to senior management.

This discussion will use the example from the previous article. In this example, it is assumed that the emergency department (ED) of a large hospital has determined that moving trauma patients all the way to radiology for x-rays, several floors away, for images is slowing things down, causing added pain and discomfort for patients and frustrating providers. At the same time, an increased volume of business has been experienced in the ED, making it even more desirable to provide the x-rays in the ED. It has been proposed to executive administration that a dedicated portable x-ray machine and digital reader be purchased for use in the ED. The last article outlined a series of six steps that described the basics of making this proposal. Now, some more advanced tools will be added to make the argument even more convincing.

The Importance of Time Value

While the payback period that was calculated in Part 2 of the series is a great starting point for a financial analysis (especially since it is so easy to calculate), it has a few drawbacks. The most significant problem is that it ignores the principle of "time value." Time value refers to the change in buying power over time. For example, $1 today can't buy what it did a year ago. Everyone's heard the stories of how you used to buy gas for $0.25 a gallon or go to the movies and buy popcorn for just $0.50.

Now that same gallon of gas is about $2.50 and the movie would cost about $10. That's the basic idea of time value. More accurate time value adjustments start with inflation (the drop in buying power of a $1 each year) and then adds basic interest (the increase in value an investor wants for the inconvenience of not having access to the money) and risk (the amount charged to make an investor willing to risk losing their investment).

For example, inflation in the US is typically 2% a year, so an investment needs to provide at least 2% interest each year to give the investor the same buying power at the end of the investment as she had at the beginning of the investment. Basic interest depends on many factors, but is usually also about 2% for a five year investment, so an investor will want an additional 2% interest each year to compensate for the inconvenience of investing instead of spending the money now. Shorter investments will have lower basic interest rates and longer investments will have higher basic interest rates, like a 15 year mortgage versus a 30 year mortgage.

If the investor were to invest in a five year bond from a large corporation she would want them to pay around 4% interest each year: 2% for inflation + 2% for basic interest. Since large companies aren't very risky, investors don't insist on a risk premium. If, on the other hand, the investor was considering an investment in a smaller company she might want them to pay 7% interest: 2% for inflation + 2% for basic interest + 3% for the risk of investing in a smaller business. If one of the companies is offering 7% or more, then she will invest in them. If the company is offering less, then she will invest somewhere else.

Each of us have similar opportunities. Every time we think about investing in a savings account, CD, money market account, bond or stock, we need to decide if the interest rate is enough to cover the inflation that will occur each year they hold our money, the inconvenience of saving instead of spending, and the risk that they might not be able to return our funds. If an investor feels that the interest offered isn't enough to offset those three elements, then they won't invest or save in that way. Instead, they'll find another investment opportunity or spend the money on something they want now.

Like individuals, businesses and other organizations want to make sure that any investment they make today will give them enough buying power (inflation adjustment) and profit (basic interest and risk adjustment) over the life of the project to make it worth the investment today. This is especially true for healthcare organizations that need to be able to continue investing in future technologies and processes that will benefit their patients. Remember, any large investment is essentially asking the hospital to pay money now for potential returns in the future (when the buying power will be less), so the decision maker needs methods that consider the time value of money.

The Internal Rate of Return Method

There are two methods commonly used to incorporate the effects of time value into financial decision making. The first method is called the Internal Rate of Return (more commonly referred to by accounting and finance professionals as "IRR"). The IRR is a measure of the percentage of profit the investment will return over its life. The easiest example of an IRR is the rate of return on a savings account or CD. When you go to the bank to save money, the bank will tell you the interest rate that their savings account is currently making and how much their CDs are making. As an individual, you will have to decide if the higher interest rate on the CD is worth not having access to your money for six months or more. Most investment companies will report each year what each investment made for its owner to make it easy for the owner to decide if they want to continue their investment or move on to another opportunity.

That's the basic idea of an IRR, and it makes the decision on a project very easy. When considering a project, business leaders compare the project's IRR to a predetermined threshold, a percentage that the organization or management team has chosen as a minimum for any new projects. Often organizations will take their average interest rate on the debt they are paying, add between one and three additional percentage points, and use the result as the minimum IRR threshold. The organization's average interest rate on debt will already include inflation, basic interest, and the organization's risk. By adding additional points, the management team offsets the risk of not having the money to pay back their own debt because the money is tied up in another investment. For the example used in Part 2 of the x-ray machine, the company's IRR threshold is 10%.

If a project meets or exceeds the IRR, then the management team moves forward with the project. If it doesn't, then the team won't make the investment. When considering multiple investments, it is relatively simple to rank them by their IRRs, make minor adjustments to the list for qualitative issues (like potential lawsuits or special needs of the community served), and invest down the list until the funds for the year have been spent. It doesn't get much easier than that!

In addition to the simplicity of the decision making process, technology like Excel© and Google Sheets™ makes the calculation of the IRR extremely easy for those who know the method. To make the calculation, open up a spreadsheet and type in the net cash flows for each

Any large investment is essentially asking the hospital to pay money now for potential returns in the future.

TABLE 1. IRR Example

Year	Estimated Cash Flows
Initial	($120,000)
2017	$38,576
2018	$38,576
2019	$38,576
2020	$38,576
2021	$38,476

year of the investment. The x-ray example in this article would look like Table 1.

Notice that the $120,000 for the purchase of the equipment and the training fees are listed first, followed by the net cash flows for each of the next five years. All outflows have to be listed as negative in order for this process to work. As discussed in Part 2 of the series, the annual cash inflows on the project are the $164,162 that would be collected each year from the new procedures done by the new x-ray machine (only the new procedures, since the hospital wouldn't make extra money from x-rays that would have been made anyway using the old x-ray machine) plus the cost savings from using the new machine instead of the old machine ($3/x-ray). The cash outflows ($128,850) would include the salary of the new tech hired to run the machine, insurance on the new machine, and the sterilization costs. These cash flows led to a net annual cash inflow of $38,576: $164,162–$128,850. The 2021 amount is a little smaller than the other annual inflows because in that final year the company will pay an additional $100 to decommission the equipment and ship it to a smaller clinic that will be able to use it once the hospital no longer can.

Now that the cash flows are set up, a basic equation is used to calculate the IRR. The equation in a spreadsheet is "=IRR(". Once this is typed in, click and drag to select all of the dollar amounts in the list of cash flows just made. Finally, type in ")" and press enter or return, and the spreadsheet will do the rest. In this example, the final equation looks like this: =IRR(B30:B35). When "enter" is pressed, 18% is the result. Not a bad return on this small investment, especially since most bank accounts are currently earning less than 1%. Since the project exceeds the desired 10% IRR threshold, the hospital should move ahead with the project.

Let's take a look at one more example. Assume that a nearby hospital has the opportunity to rent out a small office building next door to their main building for the next six years. They are considering using the new building as a records office to free up more space for three new beds in the main facility. The hospital has an IRR threshold of 9%.

To determine the cash flows of the project, the administrator will need to determine all of the new costs of adding the new beds, setting up the new office space, and then of running the new spaces. Any costs that will not change or will shift from one building to the other won't be included, since the hospital was already paying them. For example, the record clerk's salary will not be included, since the hospital will pay him the same amount if he works in the hospital building or the new office building. Similarly, the benefits of the new space will only include cost savings from the current way of doing things and any additional revenues brought in from the new beds. It won't include any revenues from patients moved to the new beds for patient privacy, because the hospital isn't making any additional money if those patients would have been in the hospital anyway.

The facilities manager believes that it will cost $250,000 to remodel the office building and the hospital rooms and to purchase and install new equipment in both places. He also believes that they will need to spend $5,000 in four years to repaint and do other minor repairs. At the end of the six years, the hospital hopes to either buy the property or extend the lease. However, since they aren't sure they can do that, the staff has to assume that they will close the facility after six years. The facilities manager estimates that it will cost $50,000 to restore the office building as required in the lease. They will be able to offset some of that cost with the sale of the office equipment for about $4,000.

The annual costs for this new project will include the lease payments on the new facility, the increase in utility and insurance costs, the additional cleaning costs in both locations, and any additional administrative and other miscellaneous costs. Since they are adding only three more beds and moving the office staff to a new location, there will be no new staff hired. The total cost will be $112,000. In addition, the hospital believes that they will have 677 additional bed stays each year because of the additional space. The average inflow from a stay is $250 per day, giving the facility total annual inflows from the new beds of $169,250.

Based on this information, this project has a total initial cost of $250,000, annual net cash flows of $57,250 ($169,250–$112,000), and a final ending cost of $46,000, which leads to an IRR table that looks like the one presented in Table 2. Notice that 2020 has a lower net inflow because of the $5,000 in special maintenance required that year, and 2022 has a much smaller net inflow because of the net value of $46,000 ($50,000 in costs less $4,000 in proceeds from selling off unneeded office equipment) that the hospital will need to pay to close down the facility at the end of the lease.

TABLE 2. Second IRR Example

Year	Estimated Cash Flows
Initial	($250,000)
2017	$57,250
2018	$57,250
2019	$57,250
2020	$52,250
2021	$57,250
2021	$11,250

While the net cash flows each year are positive, the IRR for the project comes out to only 5%. Since the hospital has set an IRR threshold of 9%, the management team would most likely not accept the proposal. In fact, the administrator might choose not to even make the proposal once she sees the numbers. However, knowing how to use these tools not only increases your ability to make an argument to the executive team, but it also provides the opportunity to adjust a proposal before making the argument.

The supervisor making this proposal could increase her chances of convincing the team if she discusses the needs of the community as part of her discussion or mentions the possibility of finding a donor to help offset the initial costs of the extension to her argument. Similarly, she might look into buying the property instead of leasing it. While the hospital would then have a much higher initial cost, it would have many more years to use the facility to offset those costs. If the hospital could make $57,250 every year for 30 years instead of only six years, the project might end up with a high enough IRR to pass the threshold. Increasing the number of overnight stays, raising the prices, reducing the initial renovation costs, negotiating for a lower lease payment, and many other possible changes to the original estimates can also be tested to see if a viable option can be worked out. The only rule is to be sure that numbers used are actually feasible. Playing around with the numbers without justification (ie, facts to back up the alternatives) to get support for a pet project will greatly reduce your credibility and reputation.

Conclusion

Time value concepts have led to many important financial decision making tools. One of the most commonly used is the IRR method, which uses basic equations and assumptions to provide straightforward results that are easy to compare between projects and explain to decision makers. These benefits have made the IRR method a popular tool for almost all business decision makers, especially as a tool for sorting or ranking the investments for projects under consideration.

However, despite its benefits, the IRR method isn't the best method available for justifying capital expenditures. Unfortunately, the method assumes that all of the net cash flows of a project are spread equally over the life of the investment. So, if an investment will return $10,000 in the first year, $20,000 in the second year, and $30,000 in the third year of the investment, the IRR method assumes that the return will be $20,000 each year. Because of the time value of money, this assumption will return an incorrect result if the cash flows are not actually equal each year.

While that limitation doesn't make the method useless, it does mean that other tools are needed to adjust for uneven cash flows and confirm the results of the faster IRR method. Part 4 of this series will introduce the Net Present Value (NPV) method, which allows decision makers the ability to adjust when cash flows will occur so that they can effectively evaluate all the cash flows of a project and the timing of those cash flows.

Jason Porter, PhD is an associate professor of accounting at the University of South Dakota. During the past eleven years, he has taught a variety of accounting courses and has received numerous teaching awards, including the Outstanding Accounting Faculty Award and the College of Business and Economics Teacher of the Year Award from the University of Idaho. His scholarship includes articles helping students and professionals better understand the accounting cycle and the budgeting process, ways to effectively assess student learning, methods to effectively perform budgeting and variance analysis, and examples for understanding and applying new accounting rules. Jason can be contacted at Jason.Porter@usd.edu.

Carole South-Winter EdD, CNMT, RT, FAEIRS is an assistant professor of Health Services Administration in the Beacom School of Business at the University of South Dakota. She served for 13 years as program director of one of the largest nuclear medicine technology programs in the United States, as the interim Director of Education for the AHRA, Executive Director for Reclaiming Youth International, and Director of a free standing radiation therapy center and continues to serve as annual meeting planner for AEIRS. Dr. South-Winter has been active with many societies and organizations dealing with administration, education, global health care and imaging sciences and continues to lecture and write at local, state, national, and international levels. She can be contacted at Carole.South-Winter@usd.edu.

Continuing Education

Accounting Basics Part 3: Time Value and Internal Rate of Return

Home-Study Test

1.0 Category A credit • Expiration date 2-29-20

Carefully read the following multiple choice questions and take the post-test at AHRA's Online Institute (www.ahraonline.org/onlineinstitute)

The credit earned from the Quick Credit™ test accompanying this article may be applied to the AHRA certified radiology administrator (CRA) fiscal management (FM) domain.

QUESTIONS

Instructions: Choose the answer that is most correct. Note: Per a recent ARRT policy change, the number of post-test questions has been reduced from 20 to 8.

1. **Payback period has a drawback of ignoring**
   a. Financial analysis
   b. Cost accounting
   c. Time value
   d. Market analysis

2. **Time value refers to the change in**
   a. Buying power over time
   b. Exchange rate over time
   c. Market share over time
   d. Cost over time

3. **Time value is a combination of**
   a. Cost, value, risk
   b. Inflation, basic interest, and risk
   c. Valuation, inflation, price
   d. Interest, profit potential, price, value

4. **Healthcare administrators compare a project's IRR to a predetermined_____, a percentage that the organization or management team has chosen as a minimum for any new projects.**
   a. Internal return
   b. Time value
   c. Payback period
   d. Decision threshold

5. **Individuals use time value very differently than businesses do.**
   a. True
   b. False

6. **What does the IRR method measure?**
   a. The percentage of profit the investment will return over its life
   b. The percentage of interest that will be charged to finance a project
   c. The percentage of return required by a company for investing in a new project
   d. The percentage of return an investment will return in the first year of its life

7. **How should an IRR be used to compare multiple projects that all meet the threshold?**
   a. Project IRRs should be ranked and the smallest investments chosen first
   b. Project IRRs should be ranked and the highest IRRs should be chosen first
   c. Project IRRs should be listed, but qualitative factors should determine which investments should be used
   d. Project IRRs should be calculated to determine if the project should be discussed, but should not be used in the final decision making process

8. **Which of the following is the weakness of the IRR method?**
   a. It assumes that the cash flows are the same each year
   b. It requires a complex calculation
   c. It is hard to explain to the management team
   d. It is too simple to be taken seriously

Feedback delivered!

(automagically)

Check out our new online member community: AHRA Connect

Build your network, share documents, and get your pressing questions answered in the updated (and very popular) Forum. With an archive of over 100,000 messages, this resource will save you time and stress. CONNECT with your colleagues today!

www.ahraonline.org/Connect

ahra

the association for medical imaging management

The Washington Shuffle

By Bill Finerfrock and Nathan Baugh

Any moving company will tell you that moving is a seasonal business. When the weather is warm, people move, and when it's cold people stay put. However, in Washington, DC, peak moving season corresponds with transfers of power more-so than the weather. Indeed, Washington is a busy place at the moment as the Obama administration moves out and the Trump administration begins to fill in the approximately 4,000 federal political appointee job vacancies.

Some are advocating that the Trump administration could and should reduce the number of political appointees in the federal government as a way to improve its effectiveness. However, despite some of Trump's rhetoric on the campaign trail about "draining the swamp," giving someone a job is a powerful way to curry political favors. As of this writing, it remains to be seen if the President-elect will fill all 4,000 positions.

There are various categories of political appointees:

- Presidential Appointments with Senate Confirmation
- Presidential Appointments without Senate Confirmation
- Non-career Senior Executive Service (positions that could be filled with either a career employee or political appointee)
- Schedule C Appointments (roles can range here, but are typically jobs that support the other political appointments in both administrative and policy capacities). Finding qualified people to fill these roles takes time and thus many of these positions will be temporarily handled by qualified "interim" career civil servants.

The AHRA Regulatory Affairs Committee is actively monitoring this Washington (or in the case of the Centers for Medicare and Medicaid Services, Baltimore) shuffle on behalf of AHRA members. There are several important regulatory questions, especially surrounding the implementation of Clinical Decision Support Mechanisms and Appropriate Use Criteria, that CMS still has to answer. While career employees will be responsible for working out the details, certain key decisions (such as when CDSM/AUC should be implemented) may be made by the new political appointees.

It should be noted that President-elect Trump has indicated that he will put a temporary moratorium on all federal rulemaking, which is something President Obama did when his administration took over from President Bush. Trump has also stated that he intends to create a requirement that for every new federal regulation, two existing regulations must be eliminated. It is unclear how such a requirement would be operationalized.

While the moratorium on rulemaking can cause pending regulations to die, we are anticipating that the regulatory activities most relevant to AHRA members will continue to move forward given their roots in bipartisan pieces of legislation. The following is a quick update on a few key regulatory issues.

Appropriate Use Criteria

CMS has not specified how CDSM/AUC will be operationalized. They indicated that this is something they will do in next year's rulemaking process. AHRA is actively engaging with CMS to ensure that the rollout of this mandate is reasonable and achievable.

Site Neutral Payment Policies

CMS finalized their definition of excepted "off-campus" Provider-based Departments (PBDs) in such a way that does not allow these grandfathered-in Hospital Outpatient Departments (HOPDs) to change addresses. Any off-campus PBD that is not grandfathered-in will bill for services on UB-04 claims with the modifier "PN" to indicate that the service is to be paid under a Physician Fee Schedule

(PFS) rate. We expect CMS to revise and amend this policy in 2018 rule-making; it is unclear if the new administration would have a different take on the application of this policy. There remains a strong lobbying effort and appetite in Congress to implement this policy in a more flexible manner.

Payment Modifier for Film X-rays

In CY 2017 X-rays taken using film must include modifier "FX" to indicate that they were taken via film and should therefore be subject to a 20% cut. CMS will create another modifier for X-rays taken using computed radiography technology in next year's rulemaking.

MACRA (Quality Payment Programs) Implementation

President Obama's HHS decided it had the authority to create a "transitional year" for implementation of the quality payment programs. During this transitional year, HHS made it relatively easy for providers to avoid penalties. We expect President-elect Trump's HHS to continue to develop Medicare quality payment programs. The speed at which Trump's HHS will ease penalties back into the quality payment programs remains unclear.

At the time of this writing, it is still early in the vetting/nomination process. However, two key healthcare appointments have already been made. President-elect Trump has nominated Congressman Tom Price for Secretary of Health and Human Services, and Ms. Seema Verma for Administrator of the Centers for Medicare and Medicaid Services.

Prior to his election to Congress twelve years ago, Congressman Price was a practicing Orthopedic Surgeon. As chair of the House Budget Committee, he has been an outspoken proponent of repealing and replacing the Affordable Care Act (ACA). Last year, he was instrumental in passing a bill that repealed many of the core features of the ACA, only to have the bill vetoed by President Obama.

Congressman Price has also advocated for reducing the administrative burdens placed on physicians by the Medicare program. Given a career of expressing concerns about the red tape placed on providers by the government, it will be interesting to see how Congressman Price oversees the implementation of the complex initiatives in MACRA.

If confirmed, Congressman Price will be the second physician to serve as Secretary of HHS, after Dr. Louis Sullivan.

Ms. Seema Verma is the President, CEO and founder of SVC, Inc, which is a national health policy consulting company that specializes in helping states reform their Medicaid programs. She has been particularly active in the Indiana Medicaid program, and advised both Governor Mitch Daniels, and Vice President-elect Mike Pence on their efforts to move Indiana Medicaid to a "consumer directed" program.

Ms. Verma has been an advocate for a Health Savings Account approach for Medicaid eligible individuals, as opposed to the more traditional models. She has helped several states attain Medicaid waivers from the federal government, which states need in order to implement innovative and alternative Medicaid models.

Based on her curriculum vitae, it is less clear where Ms. Verma stands on Medicare payment reforms and the shift driven by MACRA from volume to value reimbursement.

As Ms. Verma, Congressman Price, and the rest of the federal workforce settle in to their new roles, Washington will be a bit more chaotic than usual. While the transition of power generates a lot of unknowns, it also presents unique opportunities to address the regulatory priorities of AHRA.

Bill Finerfrock is the president and owner of Capitol Associates, a government relations/consulting firm based in Washington, DC, who has partnered with AHRA on their regulatory affairs issues. Nathan Baugh is an associate with CAI. They can be contacted at bf@capitolassociates.com and baughn@capitolassociates.com.

MRI Upgrade: A Case Study in Germany

By Benjamin Kaltenbach, MD, Andrei Roman, MD, Julian L. Wichmann, MD, Sebastian Fischer, MD, Katrin Eichler, MD, Thomas J. Vogl, MD, and Stephan Zangos, MD

The credit earned from the Quick Credit™ test accompanying this article may be applied to the CRA asset management (AM) domain.

EXECUTIVE SUMMARY

- The purpose of this work was a cost analysis for the acquisition of two new MRI devices in a university hospital. The costs of a classical exchange (new purchase) were compared to those of a system upgrade.
- Taking the local circumstances into account, up to $121,000 could be saved with the system upgrade for one MRI system compared to a classic exchange. Upgrades of the 1.5 and 3 Tesla systems were performed within 15 working days without any problems or restrictions. The number of examinations per day could be increased from 13.4 to 16.2 using the 1.5T system and from 14.1 to 15.9 using the 3T.
- The upgrade possibility of an old MRI device represents an economically attractive approach, which allows access to the latest state-of-the-art MRI technology while respecting the limited economic resources of the department.

In recent years, cost reduction and high quality assurance are more and more in focus within radiology departments.[1] Innovative MRI technology represents an important element of a modern radiology department but is associated with high equipment costs. The financing of new MRI devices reveals an increasing conflict between generally higher costs and lower income.[2,3]

However, the advancement of medical device technology is so rapid that modern high tech MRI devices are already outdated after a few years and a replacement of the system is essential. The modern radiology department stands between the funding allocations and the interests of the hospital on one hand and the requirements of the market on the other.[4] High image quality and innovative technology are needed to take a position towards competitors. The installation of a new MRI device in an ongoing clinical routine represents a logistical challenge. In some cases this may hinder the workflow of other devices and can lead to financial losses, which might be a reason to delay a necessary exchange of an old system. The purpose of this work was to perform a cost-benefit analysis of the worldwide first upgrade of two MRI systems taking place during ongoing clinical routine and to report the technical realization and initial experience. The study took place at the Institute for Diagnostic and Interventional Radiology at University Hospital Frankfurt, Johann Wolfgang Goethe-University in Frankfurt, Germany.

Material and Methods

Currently, two options are available for the acquisition of a new MRI system: a classical exchange of the MRI device where the old unit is completely removed and a pre-assembled system is delivered and the new option of a system upgrade. As the costs strongly depend on the local circumstances, we compared the estimated costs of a classical exchange to the costs of an upgrade adjusted to our department. An approval of the institutional review board was not necessary for the present analysis.

Classical Exchange

Our department is located at the basement floor. Because of the local construction circumstances, the removal of the old and installation of a new device is only possible via the atrium (Figure 1). For the exchange of both systems a period of four weeks was estimated.

Figure 1 • Department layout and exchange paths of Magnetom Avanto (A) and Trio (B). The removing of the old device and installation of the new device is only possible via the atrium through the working area. The dashed and grey boxes represent dust barriers. The grey one is installed after the magnet has been brought in the scanner room.

The exchange of the Magnetom Avanto (1.5 T system) led to a closing period of the other two MRI systems (Magnetom Trio and Espree) for approximately ten working days. During this time no MRI examination was possible in the department. In addition, an opening of the radiofrequency (RF) shielded cabin was necessary for the device exchange.

The new magnet required for the exchange of the Magnetom Trio (3T), also passed through the atrium. For this, the adjacent Magnetom Espree had to be closed for at least ten working days. Protected by dust protection walls, the Magnetom Avanto could be used during the rebuilding phase and the adjacent Magnetom Espree could operate after ten working days following the installation of dust protection walls.

System Upgrade

An upgrade of the Magnetom Avanto to a Magnetom Avanto-Fit and an upgrade of the Magnetom Trio to a Magnetom Prisma-Fit were investigated as an alternative to the classical exchange. The upgrade contained the newest MRI technology including a new gradient system, Tim 4G-architecture and DOT (day optimizing throughput) workflow engines. During the upgrade process, all covers, the body coil, as well as the gradients were dismounted in the scanner room and replaced by new system components. Only the old magnet would remain in the examination room. All analogue cables would be replaced with a new digital-in/digital-out RF system. A new cooling system, a new controlling unit, and a new gradient power amplifier would be installed in the technical room. Workstation monitors and keyboards are also replaced. After a software update and a final quality test, the upgrade is performed within 15 working days.

Results

For the cost calculation, the manufacturer's cost estimation was used. Hereby, all costs which could result from the exchange, including the costs for equipment breakdown, were taken into account. We analyzed only the cost of the exchange without taking into account the cost of the devices themselves.

Estimated Costs for Classic Exchange

A crane is necessary at the cost of approximately $11,000. The access to the scanner room as well as the closure of the RF cabin by a cabin builder would cost approximately $11,000. The additional construction related costs, especially the transport route to the atrium and changes to the working area including dry construction are estimated at approximately $44,000.

Currently, with around 50 MRI examinations a day using all three MRI scanners, about 500 examinations would have been cancelled during the down-time of ten working days for all systems. Considering an earned profit of $110 per MRI examination (according to the German health insurance coverage) the department would have had a loss of approximately $55,000 during the Avanto exchange. During the remaining installation time, the examination capacity of the Avanto would have been temporarily compensated by the other two devices.

The exchange of the Magnetom Trio would result in an additional closure of one MRI device (Espree) for ten working days due to the structural conditions of

TABLE 1. Comparison of possible additional costs for the installation of a new MRI system in our clinic.

Costs	FIT-Upgrade	Ex-Factory (Avanto FIT)	Ex-Factory (Prisma Fit)
Local costs			
Construction costs	not necessary	$44,000	$44,000
RF-Cabin	not necessary	$11,000	$11,000
Crane	not necessary	$11,000	$11,000
System downtime	15 working days	20 working days	20 working days
Estimated costs		$55,000	$18,370
Applications Training			
Standard 1–2 (weeks)	equal	equal	equal
Service	equal	equal	equal
Total additional costs	**$0**	**$121,000**	**$84,370**

the department. This could be partially compensated by the one remaining MRI scanner (Avanto). Nevertheless, an estimated loss of approximately $18,370 would originate here. During the remaining time, the closure of the Magnetom Trio could also be compensated by the other two scanners. Table 1 gives an overview of the estimated costs.

System Upgrade

Based on the estimated costs for a classical exchange, a system upgrade (Fit-Upgrade) appeared to be the only economically feasible option to access the newest MRI technology in our department. Consequently, we decided to start the worldwide-first Avanto-Fit upgrade in spring 2013. During the upgrade period no restrictions to the workflow of the surrounding MRI devices occurred. Therefore, the upgrade was performed without restrictions to patient care or additional costs (Figure 2 a-c).

After the successful Avanto-Fit upgrade, we decided to follow this path with the Prisma-Fit upgrade half a year later as well. The upgrade was done analogously to the Avanto upgrade, without interruption of the clinical workflow. Both upgrades proceeded without any problems within 15 working days each. During the upgrade period the closure of one scanner was compensated by the other two scanners.

Initial Experience

Compared to the same observation period, the number of examinations per day could be increased from 13.4 to 16.2 for the 1.5T system ($p < 0.0001$) and from 14.1 to 15.9 for the 3T system ($p < 0.0001$), which represents an increase of 20.6% and 13.2% respectively.

Since the focus of the department is on abdominal and hepatobiliary imaging, the use of abdomen DOT has led to an improvement of the workflow and examination quality (Figure 3). The DOT software offers simplified examination planning and execution through automatic positioning of the examination region as well as automatic respiration commands.

Both systems are currently operating without any problems. There have been no unscheduled downtimes or device failures since the upgrades.

Discussion

Radiological imaging systems are subject to rapid innovation cycles. These make a replacement after 10 years nearly mandatory. The purchase and installation of a new MRI scanner, along with the construction or renovation of a building, will result in high costs and may take many days or weeks to complete.[5] Besides the costs of the new device, a complete exchange would have brought additional costs related to the crane, cabin construction, transport, and room recovery. Moreover, the disruption in the clinical routine caused by the installation of the new MRI would be a logistic challenge as the workflow of the neighbouring devices would also be interrupted. When planning and constructing a new radiology department, direct device replacement paths must be considered in order to keep future costs low. Inadequate planning may lead to future problems requiring expensive or time-consuming solutions.[5] Because of the architecture of our institution, the classical exchange of the devices would have led to an additional closing of the adjacent MRI scanners resulting in a substantial reduction of examination capacity.

The acquisition of a new MRI in a university hospital is only possible with great financial effort, which may lead to a postponement of the purchase. The new acquisition was possible in our institution

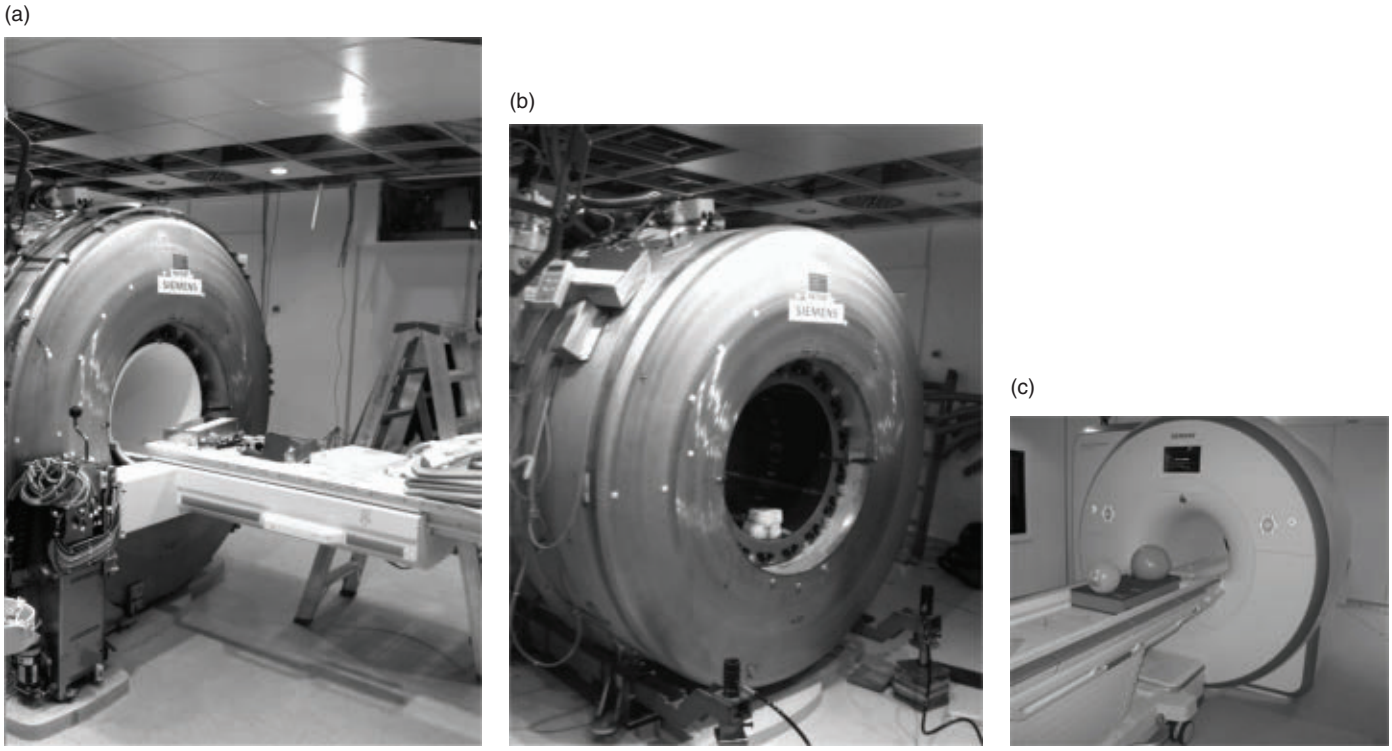


Figure 2 • Building steps during the Fit upgrade of the Magnetom Avanto to a Magnetom Avanto-Fit. All old system components were removed (Figure 2a, 2b). Final adjustment after installation of the new Fit components with new gradients, Tim covers and new patient table (Figure 2c).

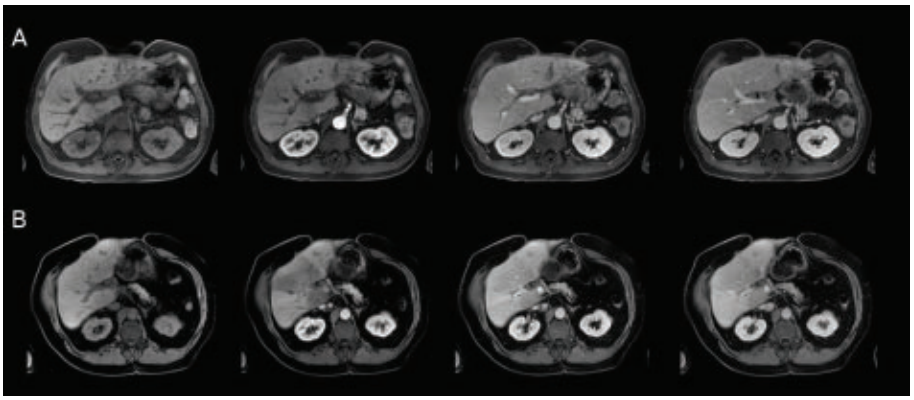


Figure 3 • Comparison of Avanto (A; TE: 1.7ms; TR: 3.7ms; flip angle: 10°; slice thickness: 3.5mm; slices: 64; acquisition time: 16sec) and Avanto-Fit (B; TE: 2.4ms; TR: 6.6ms; flip angle: 10°; slice thickness: 3mm; number of slices: 64; acquisition time: 13.6sec) body examination with equivalent T1-weighted volumetric interpolated breathhold examination (VIBE).

only by upgrading the present systems which allowed a preservation of the workflow.

The application of new technology can lead to an improvement in patient comfort, image quality, and also an increase in the number of examinations. New technical developments can also be associated with a significant cost reduction enabling faster investment amortization.[6] As mentioned before, the number of examinations per day could be increased after the system upgrade. However, changes in the number of examinations can be multifactorial and may not be accurately broken down to individual causes. We were able to achieve this increase without a conscious change to our examination strategies or by shortening examination time. We found out that the better performance of the new systems and the use of the DOT-engines were the primary cause for the increase in examinations/day. An improvement of image quality was also visible for our clinical partners, which has led to good acceptance of our MRI examinations in the hospital.

Innovation in medical technology continues to bring solutions and services to the market, which provides new tools for healthcare professionals expanding the breadth and capabilities of healthcare systems. Of course, this must be weighed against the purchase costs of the new systems and against the possible benefit

for the department and/or the clinic. As large pieces of equipment are expensive in their acquisition and maintenance, at least these costs should be covered by these devices.

A new MRI system with innovative technology can still show a unique selling proposition and offers the possibility to open new markets.[6] Besides, new high-tech devices reflect the innovative adjustment of a hospital, therefore the radiology department can outwardly represent a pioneer role.[7]

Providing an improvement in examination quality, modern high-tech devices offer an increase of attractiveness and research possibilities for physicians in their own area of expertise. However, these devices do not automatically lead to high-quality diagnostics.[7] For this purpose the experience of the technical assistants and radiologist are essential. It may happen that relatively inexperienced employees service the systems, especially in teaching hospitals. Here, the new DOT-engines offer the possibility to achieve a constant image quality.[8] Using the integrated guidance, the DOT-engines can lead inexperienced employees through the examinations and thereby significantly reduce training times. We achieved a more consistent image quality through the upgrade and the use of the DOT-engines especially in the case of abdominal and cardiac imaging. This also allows an improvement to the work satisfaction of the medical technical assistants through the use of these new software tools.

Several limitations of the present analysis have to be noted. First, all listed costs are based on the local circumstances and cannot be generalized. Due to structural characteristics of the building, the resultant costs can also be significantly higher. Second, only the estimated costs of one manufacturer were taken into consideration. In certain circumstances, a different manufacturer might provide similar services at lower costs. Third, a system upgrade is not possible for all devices. Currently there is only an upgrade option available for three different scanner types, including the two mentioned in the present study. Therefore, the purchase of a new device represents the sole option for older MRI systems. Finally, the process flow and project management between different departments was not part of the present analysis. The focus was on the upgrade and the consequences for the radiology department.

In conclusion, the possibility of a FIT-upgrade of an old MRI device represents an economically attractive approach, which allows the purchase of a new device without major structural modification. This facilitates access to the newest MRI technology without overstretching the institution's resources.

References

[1]Busch HP. The hospital in the midst of changing—the department of radiology in the course of transition to a radiology service center. RöFo : Fortschritte auf dem Gebiete der Röntgenstrahlen und der Nuklearmedizin 2004;176:1546–8. doi:10.1055/s-2004-813690.

[2]Levin DC, Templeton A, Casarella W. How to buy high-tech imaging equipment: is there a prophet in the house? Health technology 1989;3:14–9.

[3]McVey L. Medical imaging as a contributor to today's healthcare crisis. Radiology management 2008;30:45–51.

[4]Busch HP, Schilz C, Frewer W. Efficient IT solutions in radiology: prerequisite for successful management. Der Radiologe 2013;53:346–52. doi:10.1007/s00117-013-2475-8.

[5]Pooley RA, Felmlee JP. MRI site planning adventures. Journal of the American College of Radiology : JACR 2004;1:871–3. doi:10.1016/j.jacr.2004.06.013.

[6]Gerhardt P. Diagnostic radiology in the cost development spectrum in medicine. Der Radiologe 1996;36:270–8.

[7]Busch H. Management-Handbuch für Radiologen: 43 Tabellen. Stuttgart, New York, NY: Thieme, 2008.

[8]Moenninghoff C, Umutlu L, Kloeters C, Ringelstein A, Ladd ME, Sombetzki A, et al. Workflow efficiency of two 1.5 T MR scanners with and without an automated user interface for head examinations. Academic radiology 2013;20:721–30. doi:10.1016/j.acra.2013.01.004.

Benjamin Kaltenbach, MD is a fourth year resident at University Hospital Frankfurt, Institute for Diagnostic and Interventional Radiology. His special interests include new MRI techniques, microwave ablation techniques, and interventional radiology. He can be contacted at benjamin.kaltenbach@kgu.de.

Andrei Roman, MD is a third year resident in the doctorate program Erasmus plus at the University Hospital Frankfurt, Institute for Diagnostic and Interventional Radiology. His special interests include microwave ablation of lung and liver tumors and CT-guided interventions.

Julian L. Wichmann, MD is a fifth year resident at the University Hospital Frankfurt, Institute for Diagnostic and Interventional Radiology and a 2014 visiting instructor at the Department of Radiology & Radiological Sciences, Medical University of South Carolina, Charleston, SC. His special interests are cardiovascular imaging and dual-energy CT.

Sebastian Fischer, MD is a fifth year resident at the University Hospital Frankfurt, Institute for Diagnostic and Interventional Radiology. His special interests are CT-guided interventions and new MRI techniques.

Katrin Eichler, MD is assistant medical director at the University Hospital Frankfurt, Institute for Diagnostic and Interventional Radiology. Her special interests are CT-guided interventions and new MRI techniques.

Thomas J. Vogl, MD is chairman at the University Hospital Frankfurt, Institute for Diagnostic and Interventional Radiology. He has an international reputation in locoregional tumor therapy: TACE, microwave ablation and his special interests include head and neck imaging and liver imaging.

Stephan Zangos, MD is chairman at the Institute for Diagnostic and Interventional Radiology, Hospital Göppingen, Germany. He is the former assistant medical director, University Hospital Frankfurt, Radiology. His special interests are interventional radiology and MRI interventions.

Continuing Education

MRI Upgrade: A Case Study in Germany

Home-Study Test

1.0 Category A credit • Expiration date 2-29-20

Carefully read the following multiple choice questions and take the post-test at AHRA's Online Institute (www.ahraonline.org/onlineinstitute)

The credit earned from the Quick Credit™ test accompanying this article may be applied to the AHRA certified radiology administrator (CRA) asset management (AM) domain.

QUESTIONS

Instructions: Choose the answer that is most correct. Note: Per a recent ARRT policy change, the number of post-test questions has been reduced from 20 to 8.

1. **An MRI upgrade is a potential option for every MRI system.**
   a. True
   b. False

2. **Which statement is true?**
   a. With a newer MRI system, the number of examinations per day cannot be increased
   b. After upgrading a 1.5T system, the magnetic field strength will increase to 3T
   c. An opening of the radiofrequency shielded cabin is necessary for a device exchange
   d. The system upgrade includes the exchange of the magnet

3. **Which item is generally not part of the cost analysis comparing a classical device exchange and a system upgrade?**
   a. Construction costs
   b. Cost for RF-cabin
   c. Costs for crane
   d. Costs for new contrast agent

4. **The worldwide first upgrade of an MRI system took place in which German university hospital?**
   a. Frankfurt
   b. Berlin
   c. Munich
   d. Heidelberg

5. **Which statement is incorrect?**
   a. Innovative MRI technology is associated with high equipment costs
   b. The installation of a new MRI device in an ongoing clinical routine represents a challenge
   c. MRI devices may be outdated after a few years as the advancement in medical technology is so rapid
   d. Radiology departments in Germany are generally independent of hospital budgeting

6. **Which statement is incorrect?**
   a. Modern high tech devices offer an increase of research possibilities
   b. The use of DOT-engines can lead to a more consistent image quality
   c. The system upgrade has no influence on the image quality
   d. The experience of the technical assistants is essential for the image quality

7. **Comparing the costs for a FIT-upgrade and a purchase of an ex-factory Avanto system, what are the cost savings?**
   a. $1210
   b. $12,100
   c. $121,000
   d. $1,210,000

8. **Which statement is correct?**
   a. Innovative technology does not offer the possibility to open new markets
   b. Inadequate planning of a new radiology department may lead to future problems
   c. Closing of adjacent MRI scanners during the exchange period does not lead to substantial reduction of examination capacity
   d. The time period for a classical exchange and a FIT-upgrade can be seen as comparable

Smile

By Mark Lerner

My wife and I have been extremely fortunate in that we have been able to travel to Europe on several occasions. On these trips we often find ourselves in countries in which the spoken language is something other than English. My wife learned French when she was young so when we were in Paris she often conversed with the local residents using the words she could remember from her childhood. I, however, have never been able to take to gaining knowledge in any dialect other than the one I use at home. It has never been an issue during our vacations. All I do is smile.

Many years ago we shared a truly remarkable trip to Madrid, Spain with our two children. One evening we were eating dinner outside at this incredibly busy café. There was one waiter for numerous tables all filled with guests. The meal of paella and sangria was amazing, and when we received our bill it was for 230 Euros instead of the correct amount of 23. I tried to explain the mistake to the server but because he was so busy, and because he didn't understand what I was saying to him (because he spoke only Spanish), he motioned for me to go inside the restaurant to straighten the problem out.

When I arrived two staff members were eager to help. I attempted to relate my dilemma, but the communication barrier was just too great. Finally, after many minutes of me desperately detailing the error with the check while smiling at these two men and them struggling to grasp what I was talking about, we all looked at each other and burst into laughter. Eventually, I was charged the correct amount of money.

Smiling can play a central role as well in helping you obtain your goals at work. When I started in my current position nine years ago I placed a tremendous emphasis on smiling at my co-workers and peers. Then one day I was talking to a female friend who happens to know the neighbor of one of my employees. When my friend mentioned to her that she is acquainted with someone who started working at the same hospital as her neighbor, the neighbor stated that she had already heard that all of the staff there loved the new radiology administrator. The reason, she continued, is that he smiles all the time.

Smiling can play a crucial role in bringing up the morale of others in your department. It also sends a message that you are open and available to listen to the needs of those reporting to you. Most importantly, I have found that starting the day with a smile results in positive outcomes at the office. Alternatively, wearing a frown originating from waking up with a negative attitude almost always means that bad experiences are right around the corner.

As with anything, smiling can be used in excess. For example, if someone is relating information to you that is upsetting to them smiling is an inappropriate response. I have been criticized in the past for not taking people seriously because I have a smile on my face when I'm being given bad news.

On a recent occasion, a referring physician called me to say that our front desk receptionists treated his wife poorly when she reported for an examination. She had apparently come at the time that she had been told to arrive, but we had her down for an earlier appointment. The staff member talking to her apparently demanded to know why she was late and indicated in a demeaning manner that she was going to have to wait around until another opening became available for her MRI.

When I heard this story I immediately tried to implement the service recovery skills that I had been taught. I listened carefully without interrupting. Then I apologized several times for what had taken place. Next, I thanked the doctor for relaying this information as I assured him that it would help us prevent the same situation from happening to another patient. Finally, I spent several minutes telling him of all of the positive steps we were taking in our department to improve the patient experience, including the fact that we have a value-based customer service program. He thanked me for my time.

I sincerely hope that during the last part of our conversation he could see me smiling through the telephone.

Mark Lerner is the director of diagnostic imaging at the George Washington University Hospital. He can be reached at Mark.Lerner@gwu-hospital.com.


HITACHI
Inspire the Next
IMAGING SOLUTIONS
INSPIRED BY YOUR PATIENTS
Innovations in MRI, CT, Ultrasound and X-Ray that deliver value, choice, and a better patient experience.
Innovating Healthcare, Embracing the Future
Get more information about Hitachi products.
www.hitachimed.com

Maximize Marketing with a Deeper Dive into Data and Metrics

By Tina Rudisill and Gail Schwartz

EXECUTIVE SUMMARY

- In the current business environment for contract radiology services, a more strategic approach to marketing can strengthen the ability of an organization to retain existing contracts and win new ones.
- Although over 70% of surveyed AHRA members believe that marketing is valued within their organizations, only a quarter rated their current marketing programs as highly effective.
- Survey responses indicate recognition of an unmet need for marketing programs that are data driven and designed to be evaluated based on measurable outcomes.
- Starting with an understanding of a few key essentials of marketing data and basic categories of marketing metrics can form the foundation of a demonstrably effective marketing program for a contract-based radiology organization.

A recent survey of 106 AHRA members found that most—over 70%—believe that marketing is valued within their organizations. In an environment in which record numbers of practices are losing contracts, that's critical, because the right marketing strategies and tactics can strengthen contract retention efforts.[1] However, only a quarter of respondents rated their marketing programs as "highly effective," defined as "we have a plan and we're reaching measurable goals." Nevertheless, there is good news hidden in the bad news. These respondents are recognizing an unmet need for a marketing program that is data-driven from the ground up, with metrics built in to assess its effectiveness and facilitate ongoing improvement. Such a program can support a group's efforts to:

- Retain current hospital contracts and reduce vulnerability to RFPs (requests for proposals for renewal of a radiology contract, often with competitors invited to bid)
- Win new hospital contracts
- Build greater loyalty among existing patients and referral sources
- Attract new patients and referral sources
- Optimize payer mix

A Roadmap to Marketing Success

Strictly speaking, the "business of medicine" has from its very origins involved certain elements of marketing. But the existence of marketing as a specifically defined department, job title, or organizational function is relatively new in healthcare organizations, at least compared to many other industries. As expressed by Marasco and Linton in 1989, "Usually such marketing has been unstructured and perhaps even inadvertent on the part of the physician. Marketing 'strategies' have been intuitive, and have been accepted as 'the art of medicine.' . . . Competition has made the idea of marketing central to medical practice today."[2]

Other research points out further that "prior to the 1970s hospitals did not have a marketing department, nor did they employ a person titled 'director of marketing,' 'director of public relations,' 'vice president of public relations,' or 'chief marketing officer.' Marketing did not have a place at the table in strategic planning, decision making, and budget allocation when the American Marketing Association published the first issue of the *Journal of Health Care Marketing (JHCM)* in 1980."[3]

Granted, radiologists, compared to other medical specialists, were among the "early adopters" of marketing, as evidenced by Marasco and Linton drawing much of the discussion of their 1989 article from a conference session on radiologic marketing held in 1987.[2] Nevertheless, systematic approaches to marketing are not as long-established among hospital-based groups as they are among independent outpatient imaging centers. According to an Advisory Board study, "Imaging is the most valuable hospital outpatient service, but it is woefully under-marketed. By failing to prioritize radiology and imaging marketing, hospitals underexpose and therefore underutilize one of their best and most lucrative resources."[4]

It is therefore understandable that, as the survey of AHRA members shows, many groups are struggling to find the right approach. But in an industry environment as competitive as today's, attempting to market without a strategic, data-driven plan is like setting off on a long road trip to an unfamiliar destination without a map or GPS to guide the way.

The findings of the survey, which was conducted as background research for a session at the AHRA 2016 Annual Meeting ("Marketing with Your Eyes Wide Open by Counting What Counts," July 31, 2016), suggest that most of your peers have goals directly related to these challenges:

- Two-thirds of respondents said they would like to achieve growth by attracting more patients or more of the right kind of patients
- Nearly 40% expressed a need to counter the effects of competition

Additional key findings of the survey are summarized in Figures 1 and 2, as well as below:

- 30% said they work in an organization where making marketing decisions is difficult.

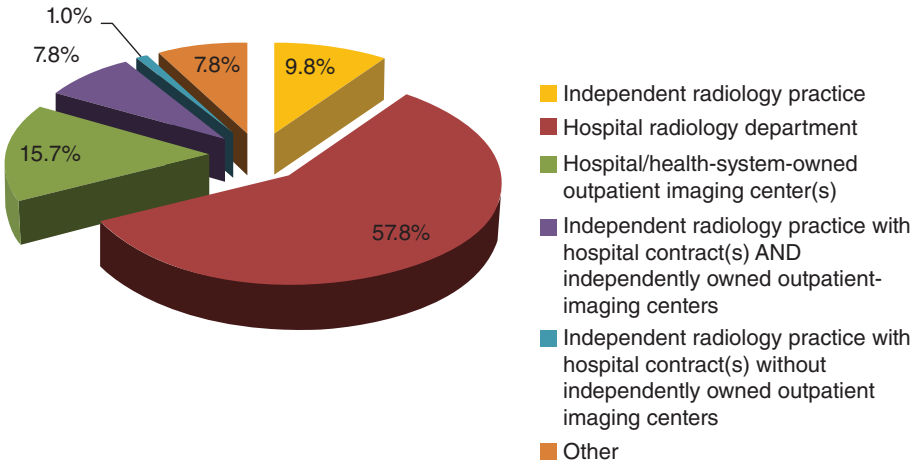


Figure 1 • Who Were the Survey Respondents?

- Nearly 30% do not believe that marketing is valued in their organizations.
- Nearly 60% did not create a marketing plan for 2016.
- More than 40% of respondents skipped the question about the types of data they use to guide marketing decisions, suggesting that under-utilization of business data for marketing purposes is widespread.
- Of those respondents in an organization with a physician relations program, nearly 63% said that there is no customer relationship management (CRM) solution in use.

Although it is promising that the industry appears to be recognizing the need for a more systematic approach to marketing, there is a clear disconnect between this understanding and the respondents' uncertainty about their current approaches. The responses also give clues about why this uncertainty exists. For example, when asked who was responsible for developing a marketing plan for their practices, 40% responded, "I work with the hospital's marketing department." For hospital-based radiology groups, marketing efforts in collaboration with a hospital partner can result in significant mutual benefit. But if this is where the marketing efforts end, it may not be sufficient to support all of a radiology group's business needs and goals.

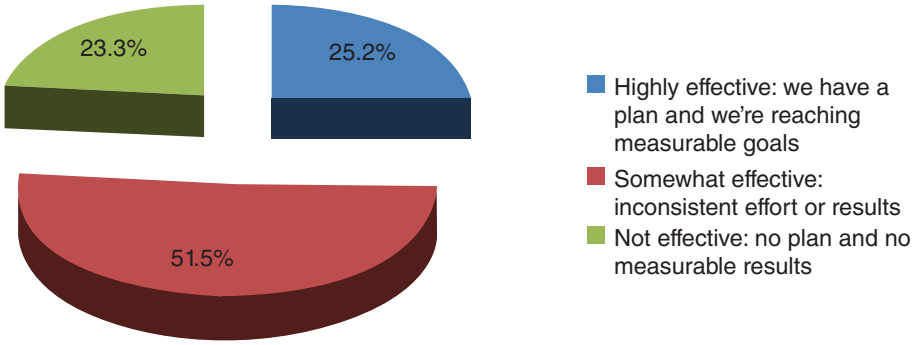


Figure 2 • How Do They Rate Their Current Marketing Efforts?

The business of imaging doesn't lend itself to marketing approaches that try to force-fit each group into a predetermined mold.

Here's one very important reason why: a hospital's marketing efforts are likely to be predominately consumer directed. It is indeed beneficial for a radiology contractor to influence the imaging-related content of the hospital's consumer-facing outreach. But an engagement that consists *only* of consumer-facing efforts could miss vital opportunities with other audiences, such as:

- **Hospital imaging partners.** For a contract radiology provider, consistently communicating to the right people about the value the group adds to the hospital setting can strengthen the case for retention and reduce vulnerability to RFPs.
- **Referring physicians.** Increasingly, radiologists are expected to maintain visibility outside of the reading room and to be directly accessible for consultations. Referring physicians, especially in certain specialties such as oncology, value having radiologists participate actively in aspects of the care process such as treatment planning. The more valuable radiologists are to referring physicians, the more valuable they will be to the institutions that contract for their services.

Elements of a more traditional understanding of marketing, such as advertisements, billboards, events, and sponsorships, are important. But a complete understanding of marketing doesn't end there. To make it easier to see what might be missing, here is a concise definition of marketing:[5]

Mar-ket-ing (n): Marketing is everything a company does, from how they answer the phone, how quickly and effectively they respond to email, to how they handle accounts payable, to how they treat their employees and customers.

How do hospital clients feel about the relationships between contract radiologists and their team members, and about the leadership and operational expertise they provide to their imaging programs? How do patients feel about the promptness of reporting or the way interventional radiology providers treat them? For radiology groups responsible for training and managing technologists at client sites, does the behavior of these operational imaging team members consistently support an exceptional customer experience?

From this perspective, it's easy to see how cooperative marketing efforts with clients may not fully meet the needs of contract radiology groups. What might not be so obvious, however, is the scope of data and measurement that will be involved in ensuring that marketing efforts are strategy-driven, justified by demonstrable business needs, and suited to concrete evaluation of their effectiveness.

Four Essentials of Marketing Data

No two radiology departments are in exactly the same business situation. Each faces unique internal and external opportunities and challenges. So the business of imaging doesn't lend itself to marketing approaches that try to force-fit each group into a predetermined mold.

To market effectively, there is a core of essential data that nearly any organization should analyze. Most already collect much of this data. So the next step is to integrate and report on it in ways that can direct and refine marketing efforts.

1. Patient Origin. Understanding where patients are coming from geographically can guide marketing decisions in many ways. Generate a report showing patient counts by zip code over a given time period—three years works well—and plot the results on a map. What communities send many patients? Which send only a few or even none? What are their demographic profiles? Insights from patient origin data can support marketing efforts that are more strategic and targeted.

2. Volumes and Revenue by Facility. For groups operating multiple sites, ongoing analysis of volume and revenue trends can improve awareness of where business is going well versus where problems may need attention. For example, if one facility shows a much stronger upward trend, examine what they are doing right and try to replicate that at other facilities.

3. Referral Volumes by Physician and Modality. Consider the state of relationships with referring physicians. Who are the top referrers in each specialty? Which are sending more referrals? Which are dropping? Volume trends by physician and modality can uncover opportunities that you can work to maximize—or issues that need to be resolved.

4. Payer Mix. It's more important than ever for medical providers to optimize their mix of public and private payers. Factors like an aging population and expanded Medicaid access may shift more of the base toward public payers. Cost pressures could steer more employers and individuals toward lower-reimbursing plans. Insights gained from analyzing payer mix can inform "mix management" strategies. Suppose, for example, lower-reimbursing payers are over-represented compared to the general share of population covered by those payers in the service area. It may be possible to address such an imbalance by evaluating whether marketing efforts are reaching and resonating with patients covered by higher-reimbursing plans. This can strengthen an organization's financial position and, by extension, support efforts to assist uninsured and underinsured patients.

Digging Deeper

As marketing efforts evolve, digging deeper into data can sharpen competitive edge. This might include such efforts as collecting and analyzing external market intelligence and assessing brand awareness and perception.

External Market Data

Especially if an organization's goals need support from consumer-facing marketing efforts, it's important to solidly understand local markets. Is market share ahead of competitors, or lagging? Is there upside that could be won from them? Do growing communities at the outskirts of the service area point to expansion opportunities? Have community health profiles been analyzed to identify underserved needs that could be met through service-line enhancements or awareness campaigns? Analyzing demographic and health data to find answers to questions like these will help ensure that marketing efforts are aligned with current opportunities and challenges.

Brand Perception and Awareness

In today's perpetually connected, digitally immersed society, the number of influence points on brand awareness and perception is imposing—and growing. While traditional marketing channels like print, broadcast, and outdoor advertising remain vitally important to brand awareness, it is a mistake to overlook newer ones like social media and online review sites. Trying to monitor brand awareness and perception inexpensively can be challenging, but various tools available for measuring engagement in digital channels are changing that. Systematic reputation management practices can also help an organization keep its finger on the pulse of what people are thinking and saying about it in both online and traditional channels.

Begin and End with Measurement

Just as any marketing effort should begin with data analysis, it should end with marketing metrics. There are two key reasons why a marketing program without metrics is like a medical treatment course with no follow-up monitoring.

The first has to do with the basic integrity of the marketing effort itself. Individual marketing strategies and tactics may serve a variety of specific purposes. But in the final analysis, marketing is—or should be—about one thing: making a business more successful, in terms not only of its financial well-being but also its success in its basic medical mission. If it isn't being measured, how true are you being to the marketing program's essential purpose?

The second—yet still closely related—key purpose of marketing metrics is to concretely demonstrate the value of marketing and alleviate internal doubts. As the survey here showed, not all radiology entities have a leadership team that values marketing. You need the confidence of leadership, but you also need the buy-in and support of everyone else on the team. A disciplined marketing metrics program can help a facility:

- Gain the respect of leadership.
- Stay focused in support of goals.
- Secure relationships with existing customers.
- Maintain confidence that marketing decisions are made for the right reasons.
- Highlight the scientific aspects of marketing to stakeholders who are oriented toward data and numbers—like physicians and accountants.

The most basic marketing metrics seek answers to the most basic questions. Did we meet our goal? Did we exceed it? Or, if we missed it, by how much? What adjustments can we make to achieve our goal? At a more specific level, the mix of marketing metrics will be determined by the interplay of:

- The goals the marketing efforts are intended to support.
- The marketing strategies, tactics, and channels used to advance toward those goals.

Most marketing metrics fall into one of a few broad categories:

- **Financial metrics** include assessing whether revenue targets for a specific initiative were met, or comparing the marketing cost of acquiring new patients to their expected lifetime value. Although the general concept of return on investment (ROI) is also a financial metric, it should be used with caution because some marketing initiatives, such as brand awareness campaigns, have impact that is longer term and more difficult to immediately quantify.
- **Behavioral metrics,** a broad measurement category, focus on what you want your audience to *do* in response to marketing initiatives. Desired customer behaviors may include patients making appointments or physicians referring more patients to the facility. Measures may include trends in volumes or scheduling calls, market share trends, or attendance at events, to name just a few.
- **Attitudinal metrics** answer questions about beliefs and perceptions. What percentage of consumers and referring physicians are actively aware of the facility? Do they recognize the brand more readily than competing brands? If presented with a survey listing imaging providers in their area, would they choose yours first? Do most customers view the organization favorably? Surveys measuring patient satisfaction, employee satisfaction, and referring physician satisfaction are also attitudinal metrics, as are efforts to monitor reviews on consumer websites as well as rankings in surveys conducted by media outlets, such as "Top Docs" lists.
- **Digital marketing metrics** assess the effectiveness of digital marketing tactics, such as online display ads, search-engine marketing, social media marketing, and Internet radio advertising. Although efforts in these channels also aim to influence behavior and attitudes, digital media warrant a

metrics category of their own due to their direct, immediate measurement capabilities. Some common digital marketing metrics are:

- Impressions: the number of times a digital ad was displayed.
- Click throughs: for example, the percentage of users who clicked on a display ad.
- Website analytics: monitoring trends in the volume, demographic makeup, and user behavior patterns of an online audience.

As the background literature and survey results summarized here indicate, marketing is a relatively new business activity in the hospital-based radiology services industry—one that many are still struggling with. It is promising that most appear to recognize the need for marketing and see that there are shortcomings in current approaches. Taking the next step—using data and marketing metrics more systematically—will have a two-fold benefit: it will (1) help build support for giving marketing decisions a more solid basis, and (2) drive continuous improvement.

If a marketing program is truly strategic, it will end where it began—with a set of data that now includes measurement results. This enables organizations to begin again with marketing strategies and tactics that have been further refined by what was learned. By leveraging the power of marketing metrics, organizations will be able to understand and do more of what is demonstrably effective—and to make course corrections when they discover what isn't.

References

[1]Muroff LR. Why Radiologists Lose Their Hospital Contracts: Is Your Contract Secure? *J Am Coll Radiol.* 2010;7(3):180–186.

[2]Marasco JA, Linton OW. Marketing Radiology and Radiologic Services. *AJR Am J Roentgenol.* 1989;152:191–194.

[3]Cellucci LW, Wiggins C, Farnsworth TJ. *Healthcare Marketing: A Case Study Approach.* Chicago: Health Administration Press; 2014.

[4]The Advisory Board Company. Imaging Marketing Strategy: Lessons from Progressive Centers on Securing Share. 2008. Available at: https://www.advisory.com/Research/Imaging-Performance-Partnership/Studies/2008/Imaging-Marketing-Strategy. Accessed December 15, 2016.

[5]Cohen H. 72 Marketing Definitions. Heidi Cohen: Actionable Marketing Guide. Published March 29, 2011. Available at: http://heidicohen.com/marketing-definition/. Accessed November 1, 2016.

Tina Rudisill brings more than 30 years of experience to trg Marketing Works, the agency she leads in York, Pennsylvania. Rudisill has delivered presentations on healthcare marketing strategies and spearheaded strategic marketing programs for clients in radiology and other medical specialties, garnering awards for external marketing, advertising, and general brand awareness initiatives. Tina can be reached at 717-852-7171 or trudisill@marketingworks.net.

Gail Schwartz, Vice President—Healthcare for trg Marketing Works in York, Pennsylvania, has an extensive background in planning and executing strategic marketing and branding initiatives for entire healthcare organizations and specialty service lines. Her work has been recognized with Quest Awards, Aster Awards, and the Annual Healthcare Advertising Awards. Gail can be reached at 717-852-7171 or gschwartz@marketingworks.net.

Get Modified!

By Melody W. Mulaik, MSHS, CRA, FAHRA, RCC, CPC, CPC-H

The new year brings new codes, new challenges, and new things to focus on to ensure that your organization does not lose appropriate reimbursement. On top of that, you must ensure compliance not only with coding changes but also a plethora of regulatory requirements. While many requirements do not necessitate any individual action, increasingly the burden of compliance now falls on the provider to communicate to their Medicare Administrative Contractor (MAC) their "status" of compliance at the claim level by the addition of a modifier. This article will provide a high level summary of overall modifier requirements as well as information on the regulatory modifiers required to appropriately report radiology services in 2017.

In order to ensure accurate payment for the radiology services performed, many times a two digit modifier must be appended to communicate important information to the payor. Assigning modifiers incorrectly, or not appending them at all, can result in substantial revenue losses for an organization. Who assigns them for your organization and when do they do this critical step? Many times modifiers are "hard coded" into the Charge Description Master (CDM) which is appropriate for some modifiers but not all.

Procedure code modifiers were introduced to CPT® in the third edition 25 years ago to identify a service that was altered by some special circumstance, although the code description itself had not changed.

Briefly stated, modifiers for radiology typically indicate:

- Only part of a service was performed
- An adjunct service was performed
- A bilateral service was performed
- A service or procedure was provided more than once
- A procedure was altered in some way from the basic descriptor
- A service or procedure represents only a professional or a technical component

The medical record must contain sufficient documentation and adequate definition of the service or procedure performed to support the use of a modifier. If the service is not documented, or the special circumstance is not indicated, a modifier should not be assigned.

Placement of a modifier after a CPT® code does not ensure reimbursement. It is important to remain current on the latest CPT® guidelines regarding modifiers; and it is equally important to become familiar with federal and commercial payors' guidelines. Claims that include modifiers should be monitored until you have determined a pattern of how their use affects payment. The effect of modifiers on reimbursement can often be negotiated in contracts with payors.

Some modifiers can by definition only be utilized by physicians, while others are limited to hospital outpatient use only, and others can be used in any setting.

Modifiers Commonly Applied to Radiology Codes

The modifiers most applicable to radiology services are listed in Table 1. Note that this is a partial listing of all modifiers and should not be construed as comprehensive to address all potential situations that may require the use of modifiers at your organization.

Regulatory Modifiers Now Required for Radiology Services

The Centers for Medicare and Medicaid Services (CMS) has implemented new modifiers that providers must use to indicate their compliance, or lack of compliance, with new regulations. These modifiers must be appended to the procedure code(s) so that the MAC can appropriately adjudicate the claim and either make the required payment reduction or ensure that a reduction is not applied to the submitted service. These modifiers are required when submitting claims to Medicare. At the present time commercial payors do not require these modifiers; however, this is always subject to change. See Table 2 for commonly used regulatory modifiers.

TABLE 1. Commonly Used Radiology Modifiers

Modifier	Usage
26	Professional component: Append this modifier when billing for the physician's professional service only.
50	Bilateral procedure: Append this modifier to identify procedures performed on both sides of the body during the same session.
51	Multiple procedures: Append this modifier to secondary procedures when the physician performs multiple procedures during the same session.
52	Reduced services: Append this modifier when a service or procedure is partially reduced or eliminated at the physician's discretion.
53	Discontinued procedure: Append this modifier when the procedure is terminated due to extenuating circumstances or those that threaten the well being of the patient [Physician only]
59	Distinct procedural service: Append this modifier to indicate that the procedure is distinct or independent from other services performed on the same day. Use this modifier only when another modifier does not better describe the circumstances. Use modifier 59 with caution because it will bypass most payors' re-bundling software.
73	Hospital outpatient procedure canceled prior to the administration of anesthesia
74	Hospital outpatient procedure canceled after the administration of anesthesia
76	Repeat procedure by the same physician on the same date of service
77	Repeat procedure by a different physician on the same date of service
LT	Procedure performed on the left side of the body
RT	Procedure performed on the right side of the body

CT Modifier: Effective 1/1/16

The Protecting Access to Medicare Act of 2014 (Section 218) instituted a Medicare payment reduction for CT scans performed on scanners that do not meet the National Electrical Manufacturers Association Standard XR-29-2013, "Standard Attributes on CT Equipment Related to Dose Optimization and Management."

The reduction applies to technical component payments under the Medicare Physician Fee Schedule (MFPS) and to hospital payments under the Outpatient Prospective Payment System (OPPS). Payments were reduced by 5% in 2016 and will be reduced by 15% in 2017 and subsequent years. The reduction is applied *after* the OPPS cap for free-standing centers/IDTFs, and for global claims, only the TC portion will be reduced.

Both hospital-based and non-hospital-based imaging facilities must apply a modifier to the CT scan code when they are billing Medicare for the TC of any of the applicable codes and the scan was performed on a scanner that is not XR-29 compliant. Note that this modifier does not need to be applied to the claim for the professional component (interpretation of the CT scan).

For more information, see the Medicare Claims Processing Manual, Chapter 12, Section 20.4.7.[1] Also, the ACR has posted Frequently Asked Questions about XR-29 in the Radiology Safety section of its website.[2]

FX Modifier: Effective 1/1/17

The Consolidated Appropriations Act of 2016 requires a Medicare payment reduction of 20% for x-rays taken using film. This provision is intended to promote the adoption of digital radiography. The payment reduction begins with dates of service on or after January 1, 2017. It applies to hospital payments paid through OPPS and technical component (TC) payments covered by the MPFS, including the TC portion of global payments. The Act also requires a 7% payment reduction for computed radiography, which begins in 2018 and rises to 10% in 2023. At this time no guidance has been issued by CMS on how to report CR services on January 1, 2018.

CMS stated in the 2017 MPFS Final Rule that it does not intend to provide a listing of codes that are subject to the payment reduction. The Final Rule simply states that the modifier must be applied "whenever an imaging service is an X-ray taken using film."

For more information, see Transmittal 3583 (August 12, 2016) and the Medicare Claims Processing Manual, Chapter 12, Section 20.4.8.[1]

TABLE 2. Commonly Used Regulatory Modifiers

Modifier	Usage
CT	Computed tomography services furnished using equipment that does not meet each of the attributes of the National Electrical Manufacturers Association (NEMA) XR-29-2013 standard
FX	X-ray taken using film
PN	Non-excepted service provided at an off-campus, outpatient, provider-based department of a hospital
PO	Excepted service provided at an off-campus, outpatient, provider-based department of a hospital

PN & PO Modifiers: *PN is new for 2017; PO was introduced in 2015 and revised for 2017*

Hospitals are subject to special billing and payment rules for outpatient services performed in an off-campus provider-based department (PBD), such as an off-campus physician office that is owned by a hospital and maintained as an outpatient department.

If the off-campus PBD was providing covered Medicare outpatient services prior to November 2, 2015, its services are not subject to the site-neutral payment provisions of the Bipartisan Budget Act of 2015. These "excepted" services must be submitted with modifier PO and will be paid in the normal manner under OPPS.

If the off-campus PBD did not begin providing covered Medicare services until November 2, 2015, or later, then its services are subject to site-neutral payment. All services must be submitted with modifier PN. These "non-excepted" services will be paid at a discounted rate (usually 50% of the OPPS rate). See the Medicare Claims Processing Manual, Chapter 4, Section 20.6.11, for more information.[3]

It is important to determine how the modifier will be appended to the procedure code. Modifiers CT and FX are equipment defined so unless you have separate Radiology Information System (RIS) line items and CDM numbers for exams based on the equipment you may have to append these modifiers manually. Since the PN and PO modifiers are completely defined based on the place of service it is anticipated that these modifiers can be hard coded into the applicable systems since they apply to all services performed in a specific location.

Once again, I provide you with a question and a challenge. Who is assigning modifiers for the radiology services being billed? Are you 100% confident that it is being done correctly? There has never been a more critical time to ensure that you are compliant and getting reimbursed appropriately.

References

[1]Centers for Medicare & Medicaid Services. Medicare Claims Processing Manual Chapter 12—Physicians/Nonphysician Practitioners. Rev 3-11-16. Available at: https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/clm104c12.pdf. Accessed December 19, 2016.

[2]American College of Radiology. Radiology Safety. Available at: http://www.acr.org/Quality-Safety/Radiology-Safety. Accessed December 19, 2016.

[3]Centers for Medicare & Medicaid Services. Medicare Claims Processing Manual Chapter 4—Part B Hospital (Including Inpatient Hospital Part B and OPPS). Available at: https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/clm104c04.pdf. Accessed December 19, 2016.

Melody W. Mulaik is president and co-founder of Coding Strategies, Inc. She is a nationally recognized speaker and has delivered numerous presentations at AHRA annual meetings and conferences. Melody is a member of AHRA, has published extensively, and may be contacted at melody.mulaik@codingstrategies.com.

CT Utilization: A Case Study in Iran based on ACR Appropriateness Criteria

By Zahra Meidani, Yaser Hamidian, Mehrdad Farzandipour, Akbar Aliasgharzade, Ghoalm abbas Mosavi, and Zahra Nazemi

EXECUTIVE SUMMARY

- Due to the importance of controlling healthcare costs and appropriate utilization of imaging, this study evaluates CT scan utilization based on the ACR appropriateness criteria in patients at Kashan University of Medical Sciences Tertiary Care University Hospital (KAUMS-TCUH) in Kashan, Iran.
- Of CT scans performed, imaging procedures were rated as inappropriate (9.1%), may be appropriate (11.9%), and appropriate (78.9%). Findings revealed that the highest rates for appropriate and inappropriate requests pertained to trauma (101, 87.8%) and ataxia (8, 34.8%) patients.
- Findings demonstrated that CT scan utilization is not appropriate in Kashan. Of the total rates of CT scans, almost one tenth are in the inappropriate and may be appropriate groups. This suggests immediate actions to reduce the rates. For effective intervention based on the problematic area, a utilization committee for resources should be established to regularly direct the CT scan utilization.

Inappropriate utilization has been seen as a significant problem in healthcare, especially in areas such as imaging.[1-3] Evidence indicates that the number of CT examinations increased from 3 million in 1980 to 80 million in 2014 in the United States.[4] Literature, mainly from Western countries, suggests a steady increase in CT utilization in the emergency department (ED), specifically.[5] In 2007 in the United States, 14% of all patients in the ED underwent CT, a six fold increase compared with 1995. The majority (80%) of the annual increase in CT use in the ED can be attributed to rising frequency of CT scanning, while only 20% are related to an increased numbers of patients in the ED.[6]

The massive volume of imaging requests makes for an excessive workload and consequently increases the likelihood of errors.[7] Moreover, much of the research highlights harmful effects of radiation associated with CT examinations on generating diseases.[8] It has been estimated that CT imaging contributes to 1.5–2% of all cancers in the US. [9] In the literature, it is debated that CT imaging is substantially overused and imposes large costs to the healthcare system annually.[10,11] Some authors suggest that 20-50% of imaging procedures may be unnecessary.[12]

Proper utilization of and appropriate reasons for imaging are beneficial to both patients and providers. However, in the case of inappropriate utilization, imaging costs can increase.[13] Inappropriate utilization is mostly influenced by various factors such as an increase in demand, unnecessary patient demand, self-referral, concerns for medical-legal risk, progression of new technologies, physician experience and education for managing imaging procedures, unavailability of enough clinical data for radiologists, and lack of appropriateness guidelines.[14,15] Today, most healthcare providers look at various methods to prevent overutilization or underutilization of imaging procedures.[13] Utilization of resources is an alternative that offers a tool for effective and efficient selection of imaging studies on the basis of appropriateness criteria.[16]

Appropriateness criteria for radiology procedures has been published by different organizations and institutions including the Royal College of Radiologists (RCR) Referral guidelines,

imaging referral guidelines in Europe, diagnostic imaging in clinical practice guidelines (CPGs), and CAR Diagnostic Imaging Referral Guidelines.[17-21] The ACR Appropriateness Criteria is of special importance for its focus on educational guidelines for radiology procedures. Studies have proven that these guidelines can help physicians decide on appropriate utilization for radiology procedures.[22] ACR criteria can minimize inappropriate utilization by up to 30%.[23-25] Consequently, due to the importance of the matter and concerns about radiology usage, this study evaluates appropriate and inappropriate CT scans in the patients in Shahid Beheshti Hospital of Kashan University of Medical Sciences (KAUMS-TCUH) in Kashan, Iran based on ACR appropriateness criteria.

Method

This current descriptive cross-sectional study was performed in KAUMS-TCUH in one of the 510-bed hospitals of Kashan University of Medical Sciences. In 2014, about 2802 patients were admitted to the hospital with 82% of the beds occupied. For judging the appropriateness criteria of procedures, anatomic posture, and other concerns were considered based on the phases below.

Phase One: Determining Appropriateness Criteria of the Procedures

Different literature was searched and appropriate guidelines of various organizations were reviewed. As a result, due to the educational aspect of the ACR and the possibility to provide an educational package based on these criteria, studies performed, referral of AIM and CareCore National to the ACR criteria, and views of radiologists, it was decided to apply the ACR criteria as a measuring tool in this study.

Phase Two: Modality and Case

Based on the studies done and consulting with radiologists, internists, surgeons, and medical physics experts, it was agreed to study triage patients with CT head requests. According to the HIS of Beheshti Hospital, 60% of the CT head requests are received from the triage department of that hospital.

Phase Three: Data Collection and Checklist Completion

This study was conducted on 370 patients admitted to the triage department of Shahid Beheshti Hospital with CT head requests. By reviewing medical records, it was revealed that medical documentation for the patients was not eligible and satisfactory enough (descriptions in phase one). Consequently, due to the significance of the data recorded (authenticity, precision, comprehensiveness, and readability); a prospective method was applied to collect the data. In this method, to evaluate appropriateness or inappropriateness of the CT head requests of the triage department patients, a general practitioner unaware of the aim of the study was recruited. This physician was earlier evaluated and trained on the ACR criteria and guidelines by neurologists. After detection of the CT head requests in the triage department, the physician was present at the patient's bed to complete a clinical history and physical examination based on a checklist, which was designed according to the criteria in the ACR guidelines for CT head requests.

Based on the checklist and the ACR criteria, the imaging procedures were put into three categories: appropriate, inappropriate, and may be appropriate. Comparing the items in the checklist with the ACR criteria, the items were then scored. Items scored 1, 2, or 3 were considered as inappropriate, those scored 4, 5, or 6 were considered as may be appropriate and items scored 7, 8, or 9 were considered as appropriate. Also, cause of imaging procedure for each patient was inserted in the checklist to determine which factors are most effective in the inappropriateness procedure.

Statistical Analysis

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software and to describe the quantitative variables of central tendency and dispersion. SPSS is a commonly used software package with lots of capabilities for statistical analysis to address the entire analytical process, from planning to data collection to analysis, reporting, and deployment.

In this study, SPPS was employed to calculate frequency tables and graphs that described the qualitative variables used. Statistical methods such as chi-square were also used for data analysis.[25]

Findings

Findings demonstrated that among the total CT scan requests in the triage departments, the majority of requests pertained to men (58.7%). Also, the age group above 70 years old (122 individuals, 33.8%) and the age group below 29 years old (63 individuals, 17.5%) were the most and the least prevalent, respectively. Of the total CT scan requests in the triage departments, 115 (31.9%) and 264 (68.1%) were traumatic and non-traumatic, respectively. Cerebrovascular disease (CVA) was seen as the most prevalent abnormality among the traumatic patients (164 cases) and ataxia was the least prevalent among them (23 cases). Most of the patients (38.5%) were admitted at night (from 8 PM to 8 AM) with the majority (44.8%) having CT scan requests. Of the total CT scan requests, 9.1% were "inappropriate," 11.9% were "may be inappropriate," and 78.9% were "appropriate." The majority of the appropriate requests were related to the traumatic patients (101 cases, 87.8%) and most of the inappropriate requests as presented in Table 1 pertained to ataxia patients (8 cases, 34.8%).

Table 2 confirms that 74.8% of the head trauma patients for whom imaging was requested had a Glasgow Coma Score (GCS) less than 13. Also, 26.1% of the ataxia patients had met criteria 1 and 2 (Table 3). The findings reveal

TABLE 1. Distribution of CT scans conducted on patients as appropriate or inappropriate for the shahid Beheshti hospital triage 1393

Total	Inappropriate	May be appropriate	Appropriate		
115(100%)	14(12.2%)	0(0%)	101(87.8%)	**Trauma**	
23(100%)	8(34.8%)	5(21.7%)	10(43.5%)	Ataxia	**Nontrauma**
164(100%)	9(5.5%)	12(7.3%)	143(87.2%)	CVA	
26(100%)	0(0%)	3(11.5%)	23(88.5%)	Headache	
33(100%)	2(6.1%)	23(69.7%)	8(24.2%)	Seizures and Epilepsy	
361(100%)	33(9.1%)	43(11.9%)	285(78.9%)	**Total**	

TABLE 2. Distribution of brain CT scan for Head Trauma patients According to ACR criteria in shahid Beheshti Hospital triage 1393

Criteria I: Minor or mild acute closed head injury (GCS ≥13), without risk factors or neurologic deficit.

Criteria II: Minor or mild acute closed head injury, focal neurologic deficit, and/or risk factors.

Criteria III: Moderate or severe acute closed head injury.

Criteria IV: Mild or moderate acute closed head injury, child <2 years old.

Criteria V: Subacute or chronic closed head injury with cognitive and/or neurologic deficit(s).

Criteria VI: Closed head injury; rule out carotid or vertebral artery dissection.

Criteria VII: Penetrating injury, stable, neurologically intact.

Criteria VIII: Skull fracture

Percentage	No	Criteria
74.8	86	criteria I
11.3	13	criteria II
19.1	22	criteria III
0	0	criteria IV
0	0	criteria V
6.1	7	criteria VI
0	0	criteria VII
0	0	criteria VIII

TABLE 3. Distribution of brain CT scan for Ataxia patients According to ACR criteria in shahid Beheshti Hospital triage 1393

Criteria I: Slowly progressive ataxia, or ataxia of long duration (adult or child)

Criteria II: Acute ataxia (<3 hours) as a manifestation of suspected stroke (adult or child).

Criteria III: Acute or subacute ataxia as a manifestation of suspected infection (adult or child).

Criteria IV: Acute ataxia following head trauma, less than 24 hours (adult or child).

Percentage	No	Criteria
26.1	6	criteria I
26.1	6	criteria II
4.3	1	criteria III
17.4	4	criteria IV

that distribution of appropriate, may be appropriate, and inappropriate CT scans were different in the normal and abnormal test results (P.value<0.001). In other words, the majority of inappropriate CT scans (7.8%) had been reported normal and no abnormal findings were detected. Other findings suggest that distribution of normal and abnormal test results is quite different in the surgical and internal wards (P.value<0.001) so that only findings of 36 CT scans (31.3%) for the traumatic patients were abnormal.

Discussion

Our findings showed that the majority of appropriate use of diagnostic imaging was related to traumatic patients (101 cases, 87.8%). Also, the majority of inappropriate use of diagnostic imaging pertained to ataxia patients (8 cases, 34.8%). This can be attributed to the complexity of the diagnostic process. In fact, ataxia is an abnormality that may result from the engagement of different parts of the body such as cerebral cortex, thalamic nuclei, vestibular nuclei, brainstem, cerebellum, spinal cord, white matter tracts of the cerebral hemispheres (especially the frontal lobes), and peripheral sensory nerves.[26–27]

This multiplicity of etiological factors along with anatomic regions has challenged the appropriateness imaging in these cases. Accordingly, the ACR has insisted on the clinical history and physical findings of patients.[26] One researcher believes that ataxia is a general symptom that can be generated because of various hereditary and acquired conditions. Therefore, gathering comprehensive data at the onset and progression of symptoms is necessary for exact diagnosis.[27] One study indicated that 30% of performed head CT examinations were unnecessary.[28] Also, in another study, 7.4% of CT scan requests of trauma patients were reported as inappropriate.[29] According to another, 20% of the imaging requests for cervical spine in patients in the emergency department were not appropriate.[30] It is estimated that 30–40% of requested CT scans were unnecessary.[30]

Findings of this study confirm that, based on the ACR criteria (Glasgow Coma Scale [GCS] less than 13), most of the imaging requests of head trauma patients (86 cases, 74.8%) were appropriate, while 68.69% of their CT scans were normal. Thus, it is not only necessary for these criteria to be accurate, but also physicians should be informed of how to apply it. GCS is a common neurological scale used for assessing comatose patients.[31] Therefore, GCS is a highly recommended tool for assessment level of consciousness for traumatic brain injury (TBI). GCS is objective and comprises three tests of the eye with verbal and motor (EVM) responses graded on respective scales of 4, 5, and 6. The total GCS score is derived from the sum of the scores allocated to these three components; the lowest possible GCS (the sum) is 3 (deep coma or death) while the highest is 15 (fully awake person).[31–32]

A study on Nigerian university hospital specialists reported that physicians' knowledge on GCS was not appropriate.[31] Previous evidence suggested that physicians' knowledge on GCS is weak.[31] Moreover, sole theoretical knowledge of the GCS does not ensure proper administration of this clinical scale in the course of patient management and about 36.9% of trained physicians scored GCS wrongly.[32] It was concluded that learning the GCS is not simple and more time should be allocated for its establishment.

In a study on patients with traumatic brain injury to assess the inaccuracy and misjudged factors of GCS scores by 94 junior residents, one study concluded that they needed more instruction in this regard.[33] In addition to enough knowledge and experience in the application of the GCS scale, most texts insist on the use of this tool together with other injury scoring criteria to assess both severity of the injury and survival prediction of the patients.[35, 34-35] The mission of the GCS is to improve communication between physicians and nurses to describe the difficult state of impaired consciousness and to avoid ambiguous definitions. Therefore, more comprehensive scales such as the Full Outline Unresponsiveness Score (FOUR) should be used.[36]

In addition to the necessity of instructing physicians on how to use the GCS in conjunction with other methods for injury scoring, most researchers believe that attention to clinical factors are of the same importance as the GCS scale for appropriate utilization of brain CT scan in patients with minor head injury.[37] Proper justifiable symptoms, history, and physical examination have reduced the number of CT examinations by approximately 20%.[6]

In addition to the GCS and with respect to risk factors including severe headache, nausea, vomiting, and depressed skull fracture on physical examination, one study achieved a 61% reduction in the number of head CT scans in minor head trauma patients.[38] As a result, clinical decision (or prediction) rules are effective in reducing CT scans for minor head injury through collecting and interpreting clinical data standards.

A decision rule which is derived from original research entitled the Canadian CT Head Rule (CCHR) may help clinicians diagnose patients with minor head injury for CT scan by incorporating variables such as history, physical examination, or simple tests.[39] Studies reveal that CCHR with 100% sensitivity can help clinicians accurately identify patients requiring neurosurgical intervention and presence of the clinically important brain injury.[40] Therefore, utilization of the GCS (≥13) scale for minor or mild acute closed head injury patients is considered one of the flaws of the ACR criteria that challenges determination of the appropriateness of head CT scans in most studies.[2] On the whole, although these criteria can effectively reduce inappropriate CT scans, costs, and radiation for the trauma patients, history and physical exam along with development and implementation of clinical guidelines and protocols can also be effective in appropriate utilization.[2,28, 41]

Research Limitation and Strengths

One of the strengths of this study is that this is the sole study in the country of Iran to evaluate the CT scan utilization based on ACR appropriateness criteria. In addition, to evaluate the CT scans, we did not rely on medical records that were not documented properly; and the study was directed by a trained general physician. However, this study suffers limitations. First, the ACR criteria is not designed according to the needs and structure of services provided in Iran and, therefore, it ought to be confirmed by an expert panel. Focus on the appropriateness of head CT scans due to the reduced generalization of the findings is considered another limitation of this study. Another limitation was that instead of a neurologist familiar with signs and symptoms pertaining to brain injuries and GCS, the evaluation was made by a general physician.

Implications for Practice, Education, and Research

Due to limited resources, managing the costs is a vital consideration in providing services. Therefore, CT scan utilization review should be performed to determine and detect probable factors for its inappropriate utilization. Probable causes of inappropriate CT scans include absence of proper instruction for physicians; unavailability of clinical guidelines and protocols; lack of suitable evaluation and giving feedback to physicians on how to appropriately utilize CT scans; negligence in collecting comprehensive data regarding clinical symptoms through history and physical exam; and inability to apply GCS accurately. Of course, performance of such studies in different wards and clinical specialties particularly in the state, profitable, social insurance, educational, and non-educational hospitals may contribute to the recognition of factors behind the CT scan utilization all over the country.

Conclusion

The authors came to the conclusion that CT scan utilization based on ACR appropriateness criteria is not satisfactory in Kashan. Nearly one tenth of the total CT scans was categorized in the inappropriate and may be appropriate groups. To exactly identify the main factors and make effective interventions, it is suggested to design a suitable criterion for evaluating CT scan utilization according to the needs and context of the country. Then, a multidisciplinary team under the name of a resource utilization committee including physicians, information technology (IT) experts, health services managers, and nurses should be developed in hospitals in order to regularly evaluate the CT scan utilization based on abovementioned criteria. By continuous and regular evaluation of the imaging services in different diagnostic areas and various clinical wards, this committee will certainly be eligible to provide more succinct information about the main factors of CT scan inappropriate utilization and focused interventions.

References

[1]Meidani Z, Farzandipour M, Farrokhian A, Haghighat M. A review on laboratory tests' utilization: A trigger for cutting costs and quality improvement in health care settings. *Med J Islam Repub Iran*. 2016 May 8;30:365.

[2]Zargar BalayeJame S, Majdzadeh R, Akbari Sari A, Rashidian, Arab M, Rahmani H. Indications and Overuse of Computed Tomography in Minor Head Trauma. *Iran Red Crescent Med J*. 2014;16(5):e13067.

[3]Blackmore C, Mecklenburg R, Kaplan G. Effectiveness of Clinical Decision Support in Controlling Inappropriate Imaging. *J Am CollRadiol* 2011;8:19–25.

[4]Friedman DP, Smith NS. Impact of a Collaborative Radiology Utilization Management Program: Does the Specialty of the Referring Provider Matter? *AJR Am J Roentgenol*. 2016 Jul;207(1):121–5.

[5]Hu SY, Hsieh MS, Lin MY, Hsu CY, Lin TC, How CK, Wang CY, Tsai JC, Wu YH Chang YZ. Trends of CT utilisation in an emergency department in Taiwan: a 5-year retrospective study. *BMJ Open*. 2016 Jun 8;6(6):e010973.

[6]Wang X, You JJ. Head CT for nontrauma patients in the emergency department: clinical predictors of abnormal findings. *Radiology*. 2013 Mar;266(3):783–90.

[7]Fitzgerald R. Error in Radiology. *Clin Radiol*. 2001;56(12):938–46.

[8]Sarma A, Heilbrun ME, Conner KE, Stevens SM, Woller SC, Elliott CG. Radiation and chest CT scan examinations: what do we know? *Chest*. 2012 Sep;142(3):750–60.

[9]Lehnert BE, Bree RL. Analysis of appropriateness of outpatient CT and MRI referred from primary care clinics at an academic medical center: how critical is the need for improved decision support? *J Am Coll Radiol*. 2010 Mar;7(3):192–7.

[10]Wilson MG, Ellen ME, Lavis JN, Grimshaw JM, Moat KA, Shemer J, Sullivan T,Garner S, Goeree R, Grilli R, Peffer J, Samra K. Processes, contexts, and rationale for disinvestment: a protocol for a critical interpretive synthesis. *Syst Rev*. 2014 Dec 11;3:143.

[11]Sharp AL, Nagaraj G, Rippberger EJ, Shen E, Swap CJ, Silver MA, McCormick T, Vinson DR, Hoffman JR. Computed Tomography Use for Adults with Head Injury: Describing Likely Avoidable ED Imaging based on the Canadian CT Head Rule. *Acad Emerg Med*. 2016 Jul 30.

[12]Sheng AY, Castro A, Lewiss RE. Awareness, Utilization, and Education of the ACR Appropriateness Criteria: A Review and Future Directions. *J Am Coll Radiol*. 2016 Feb;13(2):131–6.

[13]Agiro A, Sylwestrzak G, Shah C, Power T, DeVries A. Examining the association between utilization management and downstream cardiovascular imaging. *Health Serv Res*. 2014 Oct;49(5):1616–37.

[14]Lu MT, Tellis WM, Fidelman N, Qayyum A, Avrin DE. Reducing the rate of repeat imaging: import of outside images to PACS. *AJR Am J Roentgenol*. 2012 Mar; 198(3):628–34.

[15]Hendee WR, Becker GJ, Borgstede JP, Bosma J, Casarella WJ, Erickson BA, Maynard CD, Thrall JH, Wallner PE. Addressing overutilization in medical imaging. *Radiology*. 2010 Oct;257(1):240–5.

[16]Gertz ZM, O'Donnell W, Raina A, Balderston JR, Litwack AJ, Goldberg LR. Implementation of a Computerized Order Entry Tool to Reduce the Inappropriate and Unnecessary Use of Cardiac Stress Tests With Imaging in Hospitalized Patients. *Am J Cardiol*. 2016 Oct 15;118(8): 1123–1127.

[17]Henry AM, Rodda SL, Mason M, Musurunu H, Al-Qaisieh B, Bownes P, Smith J, Franks K, Carey B, Bottomley D. The Effect of Dose and Quality Assurance in Early Prostate Cancer Treated with Low Dose Rate Brachytherapy as Monotherapy. *Clin Oncol (R Coll Radiol)*. 2015 Jul;27(7):382–6.

[18]Remedios D, Hierath M, Ashford N, Bezzi M, Cavanagh P, Chateil JF, Grenier P, Simeonov G, Vilgrain V. Imaging referral guidelines in Europe: now and in the future-EC Referral Guidelines Workshop Proceedings. *Insights Imaging*. 2014 Feb;5(1):9–13.

[19]European Society of Radiology (ESR).; American College of Radiology (ACR). European Society of Radiology (ESR) and American College of Radiology (ACR) report of the 2015 global summit on radiological quality and safety. *Insights Imaging*. 2016 Aug; 7(4):481–4.

[20]Reed MH. Assessing the recommendations for the use of diagnostic imaging in clinical practice guidelines. *J Evid Based Med*. 2012 May; 5(2):48–9.

[21]Fine B, Dhanoa D. Imaging appropriateness criteria: why Canadian family physicians should care. Can Fam Physician. 2014 Mar;60(3):217–8. Erratum in: *Can Fam Physician*. 2014 May;60(5):432.

[22]Powell DK, Silberzweig JE. The use of ACR Appropriateness Criteria: a survey of radiology residents and program directors. *Clin Imaging*. 2015 Mar-Apr;39(2):334–8.

[23]Blachar A, Tal S, Mandel A, Novikov I, Polliak G, Sosna J, et al. Preauthorization of CT and MRI Examinations: Assessment of a Managed Care Preauthorization Program Based on the ACR Appropriateness Criteria® and the Royal College of Radiology Guidelines. *J Am CollRadiol* 2006;3:851–859.

[24]Levy G, Blachar A, Paz I, OlshaSh, Atar E, et al. Nonradiologist Utilization of American College of Radiology Appropriateness Criteria in a Preauthorization Center for MRI Requests: Applicability and Effects. *AJR* 2006;187:855–858.

[25]IBM SPSS Software. Available at: http://www.ibm.com/analytics/us/en/technology/spss/. Accessed December 19, 2016.

[26]National Guideline Clearinghouse (NGC). Guideline summary: ACR Appropriateness Criteria® ataxia. In: National Guideline Clearinghouse (NGC) [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2012 Jan 01. [cited 2016 Oct 28]. Available at: https://www.guideline.gov. Accessed December 19, 2016.

[27]Lin DJ, Hermann KL, Schmahmann JD. The Diagnosis and Natural History of Multiple System Atrophy, Cerebellar Type. *Cerebellum*. 2015 Oct 14.

[28]Linscott LL, Kessler MM, Kitchin DR, Quayle KS, Hildebolt CF, McKinstry RC, Don S. CT for pediatric, acute, minor head trauma: clinician conformity to published guidelines. *AJNR Am J Neuroradiol*. 2013 Jun-Jul; 34(6):1252–6.

[29]Moak JH, Gong DX, Young JS, Sochor MR. Guidelines for cervical spine imaging in patients with blunt trauma: Utilization and outcomes. *Annals Emerg Med*. 2011; 58(4. 1): 272–273.

[30]Owlia M, Yu L, Deible C, Hughes MA, Jovin F, Bump GM. Head CT scan overuse in frequently admitted medical patients. *Am J Med*. 2014 May;127(5):406–10.

[31]Adeleye AO, Owolabi MO, Rabiu TB, Orimadegun AE. Physicians' Knowledge of the Glasgow Coma Scale in a Nigerian University Hospital: Is the Simple GCS Still Too Complex? *Front Neurol*. 2012 Mar 9;3:28.

[32]Yusuf AS, Salaudeen AG, Adewale AA, Babalola OM. Knowledge of Glasgow coma scale by physicians in a tertiary health institution in Nigeria. *Niger Postgrad Med J*. 2013 Mar;20(1):34–8.

[33]Namiki J, Yamazaki M, Funabiki T, Hori S. Inaccuracy and misjudged factors of Glasgow Coma Scale scores when assessed by inexperienced physicians. *Clin Neurol Neurosurg*. 2011;113(5):393–398.

[34]Kimura A, Chadbunchachai W, Nakahara S. Modification of the Trauma and Injury Severity Score (TRISS) Method Provides Better Survival Prediction in Asian Blunt Trauma Victims. 2012;36(4): 813–818.

[35]Eid H, Abu-Zidan F. New Injury Severity Score Is a Better Predictor of Mortality for Blunt Trauma Patients Than the Injury Severity Score. 2015;39(1):165–171.

[36]Faruq M. Looking for an ideal coma scale: It is time to replace GCS. Bangladesh *Crit Care J*. March 2014;2(1):1–3.

[37]Mitsunaga MM, Yoon HC. Journal Club: Head CT scans in the emergency department for syncope and dizziness. *AJR Am J Roentgenol*. 2015 Jan;204(1):24–8.

[38]Miller EC, Holmes JE, Derlet RW. Utilizing clinical factors to reduce head CT scan ordering for minor head Traumapatients. *J Emerg Med*. 1997;15:453–457.

[39]Stiell IG, Wells GA, Vandemheen K, Clement C, Lesiuk H, Laupacis A, et al. The Canadian CT Head Rule for patients with minor head injury. *Lancet*. 2001;357(9266):1391–1396.

[40]Zakhari R, Sterrett SE. Attitudes toward evidence-based clinical decision support tools to reduce exposure to ionizing radiation: The Canadian CT Head Rule. *J Am Assoc Nurse Pract*. 2016 Sep 22

[41]Chin JY, Goldstraw E, Lunniss P, Patel K. Evaluation of the utility of abdominal CT scans in the diagnosis, management, outcome and information given at discharge of patients with non-traumatic acute abdominal pain. *Br J Radiol*. 2012 Sep; 85(1017):e596-602.

Zahra Meidani is assistant professor, Health Information Management Research Center (HIMRC), Department of Health Information Management & Technology, School of Allied Health Professions at Kashan University of Medical Sciences in Kashan, Iran. She can be contacted at meydani-z@ kaums.ac.ir.

Yaser Hamidian is assistant professor in the Department of Radiology, School of Medicine at Kashan University of Medical Sciences in Iran, Kashan, Iran. And can be contacted at hamidian_y@kaums.ac.ir.

Mehrdad Farzandipour is associate professor at the Health Information Management Research Center (HIMRC), Department of Health Information Management & Technology, School of Allied Health Professions at Kashan University of Medical Sciences in Kashan, Iran. And can be contacted at farzandipour-m@ kaums.ac.ir.

Akbar Aliasgharzade is associate professor in the Department of Medical Physics, School of Allied Health Professions at Kashan University of Medical Sciences in Kashan, Iran. And can be contacted at aliasgharzade-a@ kaums.ac.ir.

Ghoalm abbas Mosavi is a lecturer at the Health Information Management Research Center (HIMRC), Department of Statistics at Kashan University of Medical Sciences in Kashan, Iran. And can be contacted at himmeidani@gmail.com.

Zahra Nazemi is at the Health Information Management Research Center (HIMRC), Department of Health Information Management & Technology, School of Allied Health Professions at Kashan University of Medical Sciences in Kashan, Iran. And can be contacted at zahra_nazemibidgoli@yahoo.com.

Acknowledgement

This work was supported by Kashan University Medical Sciences, Research Committee [Grant No.93153].

Great Leaders, Great Teams, Great Results!

Improve your team's performance by incorporating this online, on-demand training into your onboarding or performance appraisal program.

The Basic Track online course is an excellent way to ramp up staff performance. It will help your team realize their potential through management skills training in areas such as: budgeting, communication, patient satisfaction, quality, and more!

ahra
BASIC MANAGEMENT SKILLS

www.ahraonline.org/BasicTrack

From the Outside Looking In

By Julie Kaufield, MA, RT(R)

I began my imaging career the way many of my AHRA colleagues have; first as an x-ray technologist and then a front line leader, shifting to larger management roles as the years progressed. My personal passion was always to focus on providing strong patient care, coupled with perfecting the quality of the images I produced; a goal that has remained a top priority for most organizations for many years.

I grew within imaging during a time that saw monumental changes, from film x-ray to digital archiving, from paper records to EMRs, and from good old Dictaphones to voice recognition. The pace continually quickened as all of healthcare rode the wave of the technology boom. In 2008, I left the field to raise a family.

Fast forward to 2015: I re-entered the world of imaging as a writer, seeking out my own relevance in a world that is changing at a faster pace than ever before. The Affordable Care Act, HCAHPS, MIPS reimbursements, value based purchasing, major conglomerations… the list of changes goes on and on. Covering imaging topics through national conferences such as RSNA or through my contributions with e-zines including "Diagnostic Imaging," and being able to see the industry through a longer, objective lens, has afforded me many "aha" moments.

At the very heart of what's new remains the imaging culture I know and love, with values based on the quality of care and images. We now refer to this concept as the "patient experience," and it encompasses many areas beyond just satisfaction, including visibility, quality, accessibility, and patient advocacy.

Visibility

I left the industry at a time when radiologists were just discovering the freedom of offsite reading, as well as the ability to decentralize due to PACS. Today's world is one that makes full use of every social media and online tool available. Seeing radiologists now speak at RSNA about the direct impact they need to make as a team member, including direct patient face time and involvement in performance improvement, is refreshing. Visibility to the patient has increased in the form of:

- Offering direct phone numbers into the reading room on reports
- Direct thank you notes to patients from radiologists and departments
- Interactive Facebook and Twitter accounts
- PR and marketing campaigns that connect faces to the name on a patient's bill
- Most importantly, an expectation that radiologists will be a visible, active member of the care team

Creating visibility is what radiology has always done best in terms of the human body, and now visibility of the imaging team drives value not only from the patients' perspective, it also drives certain payment models.

Quality = Value not Volume

Today's value system still demands high volume, but also strives to understand quality of the experience through the patient's perspective. These metrics are harder to define and may be different from patient to patient and across different sub-specialties. Patient-identifiable value metrics include the ACR gold seal of approval, having all technologists on a team certified within their specialties, or having the entire administration team CRA certified. Both AHRA and the ACR are focused on providing advanced courses to develop leaders within radiology, and as a result, professional titles are far more robust and recognizable to patients than ever before. Leaders may still rise through the ranks, but are distinctly more prepared with multiple qualifications to back up their expertise.

Accessibility and Leveraging Technology

Robust technology platforms have led to data superhighways for patient information, from digital images to electronic medical records. Today's struggles include internal data protection as well as using these systems to mine information

into meaningful, efficient usage. Current enterprise imaging strategies that involve connecting images from any device to a common shared platform will ultimately result in a more highly comprehensive patient record than ever before.

Accessibility is not just about practices receiving and sending information; it is also about ease of scheduling, convenient locations, physically comfortable departments, and patient access to reports, films, and the radiology staff. Patients want transparency, easily understood information, and a contact to answer questions.

Patients as Advocates

There is a movement within the industry to allow patients to be in charge of their experiences as well as to share their own expertise. The role of patient advocate, used within many imaging organizations, allows real life perspective from patients on how and when to provide care. Sitting on patient and family experience committees as well as internal design teams, patients not only help drive their own experiences, but are designing and implementing improvements within departments alongside the healthcare team. They are consulting on everything from ambient room upgrades to real time experience surveys and lung cancer screening advocacy. Imaging facilities that integrate patients within the care model are at the forefront of what regulation and policy changes will demand.

Seeing imaging from a more distant, objective viewpoint, I have the pleasure now of interviewing forward thinking physicians, administrators, and patients daily. I can honestly say that my biggest delight is that the velocity of this current healthcare momentum is keeping the best and brightest on their toes, creating a fertile ground for constant mindfulness of one's own actions, and positively impacting a greater number of patients.

Julie Kaufield, MA, RT(R) is a freelance medical writer. She can be reached at juliecaddick@hotmail.com.

Index to

ADVERTISERS

Advertiser	*Web Site*	*Page Number*
AHRA	www.ahraonline.org	cover, 14, 30
Advanced Data Systems Corp	www.adsc.com	8
The Burwin Institute	www.burwin.com	43
Hitachi	www.hitachimed.com	cover, 24
Kubtec	www.kubtec.com	5
Mednovus-SAFESCAN®	www.mednovus.com	41
MIC	www.micinfo.com	2
Radcomm	www.radcomm.net	43

THE MARKETPLACE

Radiology Management Article Database

www.ahraonline.org/rmsearch

One of the most popular pages on AHRA's website, this archive contains journal articles since 1995. Access is open to members and subscribers only.

Opportunities for banner ad placements.

Convention Daily

AHRA's Annual Meeting & Exposition is the premier event for imaging administrators. Reach meeting attendees each morning with the AHRA *Convention Daily*, the only publication that provides the most recent news, information, and schedules. *Convention Daily* advertisements are a great way to direct traffic to your booth.

Advertising Rates

Size	2x*	4x**
Full page	$1915	$1075
1/2 page	$975	$590
1/4 page	$520	$365

*2x advertisers must advertise in the second and fourth issues.
**4x advertisers must advertise in each of the four issues.

COLOR
- 4-Color Process: add $550

Marketplace Advertising

No Additional Charge for 1/8 Page Horizontal Ad Layout! Just send us a company logo, contact information and a description of your services. Or send us an image of your product with a 70 word (maximum) description; we'll put it into a standard 3 1/2" x 2 1/8" format and place your ad in this highly visible section.

Ad Rates and Discounts	1X	3X	6X
Black & White Only	$275	$249	$225

Radiology Management Digital Edition

Offered to subscribers as an alternative format, all print ads are included in the digital edition of *Radiology Management* at no additional cost. A major advantage of digital edition advertising is the ability to promote and track usage of click-throughs (all ads containing an e-mail address and/or a URL are clickable). **Nearly 80% of readers prefer receiving information about a product or service by visiting a company's website.*** Advertisers follow normal print advertising production specifications and deadlines.

*Source: *Radiology Management* Reader Survey, March 2010.

For more information on how these advertising opportunities and more can work for you contact:

Kelly Miller
M.J. Mrvica Associates, Inc.
(856) 768-9360
E-mail: kmiller@mrvica.com

The Certainty of Change

By Gordon Ah Tye, FAHRA

I recently spent many hours helping to care for my wife during a brief hospital stay. I saw numerous doctors and staff come in and out of her room. I heard announcements, walked the halls, and reflected on the decades of change in healthcare.

Hand Washing. We are all programmed to squirt hand sanitizer every time we touch something, someone, or go in or out of a room. Last month, a state surveyor wanted to see our policy on how we clean equipment between every patient we do in rooms and with portables. Cleaning a portable machine is a little more involved than squirting gel on our hands.

HIPAA Regulations. God forbid I lose my job over looking at my own healthcare records. Patient information privacy acts are more delicate and sensitized with the advent of the electronic medical record. I guess all records are subject to being hacked as much as any records floating out there in the cloud.

Emergency Evacuation Routes. There are maps all around the hospital that nobody probably looks at. How much work and expense was made so that in the event of a fire, we would know what to do? If we're crawling on the ground to avoid fumes, how do we see the maps? Someone will probably think of placing a second map 6" off the ground next.

Cidex Use. We just spent tens of thousands of dollars last year to replace our Cidex cleaning processes for automated sterilization units. Have your employees had issues with the side effects of Cidex fumes? If you didn't have the thousands it costs to buy the sterilizers, you'll have to spend ten times as much making sure the air is circulating.

Radiation Monitoring. It used to be sufficient to test aprons and monitor fluoro use with annual physics testing. Now we have rules that are costing us some heavy bucks, or else we get fined. XR-29 was expensive enough. The Consolidated Appropriations Act of 2016 is another crazy push that is designed to penalize us if we don't have DR technology. Talk about expensive! Clinically, does it add to the quality of CR vs DR? Not in my humble opinion.

Patient ID. It is critical that patient identification is accurate and correct when an order is made for any exam requiring radiation use. As busy as our departments are, it is important. When we do make an error and irradiate the wrong person, it must be reviewed to see if it exceeds a dose that may require it be reported to the State. We always had repeat rates, but this gives it a whole new meaning.

Informed Consent. Where is the line drawn? Invasive procedures? Yes. How about all CTs, MRIs, ultrasounds, fluoroscopic exams? With ever increasing regulations, the more procedures that will require informed consent. Expect radiology practitioners, like nurse practitioners, to be in our future as a means of coping.

Active Shooter. What a crazy world we live in that requires training on dealing with an active shooter. Sorry, but if that occurred, no plan is going to help the panic. If someone really wanted to do any kind of violent act, it is near impossible to avoid.

IV Contrast Medication. For decades we gave patients IV contrast for many purposes, but most predominantly for CT scans. Given its frequency, determining an acceptable way to see that the order is made with proper processing is an operational quandary. That requires our radiologist or pharmacist being required to sign off for each injection prior to administration, with Pyxis distribution. How much has that interrupted your throughput?

MRI Safety. I long for the days when MRI was done in outpatient facilities only. I still question the necessity of emergent MRIs done in house. It adds a whole different level of safety issues with the higher acuity of inpatients and emergency patients. It requires training of anyone who may enter the suite with an unwanted crash cart, wheel chair, or metal O2 tank. I just don't like doing MRIs of the knee in the middle of the night because the ED doc doesn't think they will follow up as an outpatient.

So, here we are, with some of the things I reflected on during my wife's short stay in the hospital. It just seems to get more complicated all the time. But as difficult as it is, and as we know there will be more regulations that will continue to challenge us, remember this: the only thing we can be sure of is change.

Gordon Ah Tye, FAHRA is director of imaging and radiation oncology services for Kaweah Delta Health Care District in Visalia, CA. He holds a bachelor's degree in biological sciences from California State University in Fresno. Gordon is a past president of AHRA, received the AHRA Gold Award in 2001, and received the 2006 Minnie for Most Effective Radiology Administrator of the year. He may be contacted at gahtyes@aol.com.

Experience authentic southern charm while catching up on the latest news and trends in medical imaging.

Rated as one of the "World's 30 Friendliest Cities" by Condé Nast Traveler, this coastal town has a reputation for hospitality. With AHRA's quality educational sessions and opportunities for connecting with colleagues and vendors, there are plenty of reasons to attend the 2017 Spring Conference. To learn more visit our website at: www.ahraonline.org/SpringConference

ahra
the association for medical imaging management

Keep it simple and register on line at:

www.ahraonline.org

ahra

the association for medical imaging management

JULY 9-12, 2017

Anaheim, California

ahra 2017

www.ahraonline.org/AnnualMeeting