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Control charts: Type of data plotted determines type of chart selected

Selection is critical to having correct control limits for the data

(Editor's note: This is the second in a series of articles on control charts. In the first article, presented in our January 2004 issue, we defined control charts and described the types of situations that lend themselves to the use of control charts. This month, we examine the process of selecting the most appropriate control chart.)

Correct control chart selection is a critical part of creating a control chart, according to PQ Systems, an industry leader in the manufacturing of statistical process control (SPC) and quality control software based in Miamisburg, OH. "If the wrong control chart is selected, the control limits will not be correct for the data," states the company's web site (www.pqsystems.com). "The type of control chart required is determined by the type of data to be plotted and the format in which it is collected."

"SPC is a methodology for charting the process and quickly determining when a process is out of control [e.g., a special cause variation is present because something unusual is occurring in the process]," according to **Sid Sytsma**, MSE, MBA, professor in the College of Business at Ferris State University in Big Rapids, MI, and an expert on SPC.

"The process is then investigated to determine the root cause of the out-of-control condition. When the root cause of the problem is determined, a strategy is identified to correct it. The investigation

Key Points

- Determining whether data are attribute or variable is a key first step.
- The size of samples and the timing of measurements also are important considerations.
- Be sure you know what you are measuring — and why.

and subsequent correction strategy is frequently a team process, and one or more of the TQM [total quality management] process improvement tools are used to identify the root cause," he says.

Reduced variation, Sytsma explains, makes the process more predictable, with process output closer to the desired value.

According to **Steve David**, MBA, president and CEO of SkyMark, a Pittsburgh-based manufacturer of SPC software, all control charts have three basic components:

- a centerline, usually the mathematical average of all the samples plotted;
- upper and lower statistical control limits that define the constraints of common-cause variations;
- performance data plotted over time.

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It is from those common points that the different types of control charts flow, dictated by the type of data and format.

The first determination that must be made in deciding what type of chart to use is whether you are dealing with attribute or variable data.

"In general, attribute data are *count* data," notes **Marilyn Hart**, PhD, of the University of Wisconsin-Oshkosh, who lectures and writes about health care and SPC. "You can *count* the number of patients attending the clinic each week, the number of patient falls, the number of C-sections, the number of births." Hart and her husband Robert Hart are co-authors of *Statistical Process Control for Health Care* (Pacific Grove, CA: Duxbury; 2002).

"This is the first decision you need to make before plotting data," adds **Patrice L. Spath**, RHIT, a consultant with Brown-Spath & Associates, in Forest Grove, OR. "Attribute data usually are the number of — i.e., surgical complications, C-sections, delinquent patient records."

PQ Systems adds this definition: "A standard is set and then an assessment is made to establish if the standard has been met. The number of times the standard is either met or not is the count. Attribute data never contain decimal places when they are collected; they always are whole numbers."

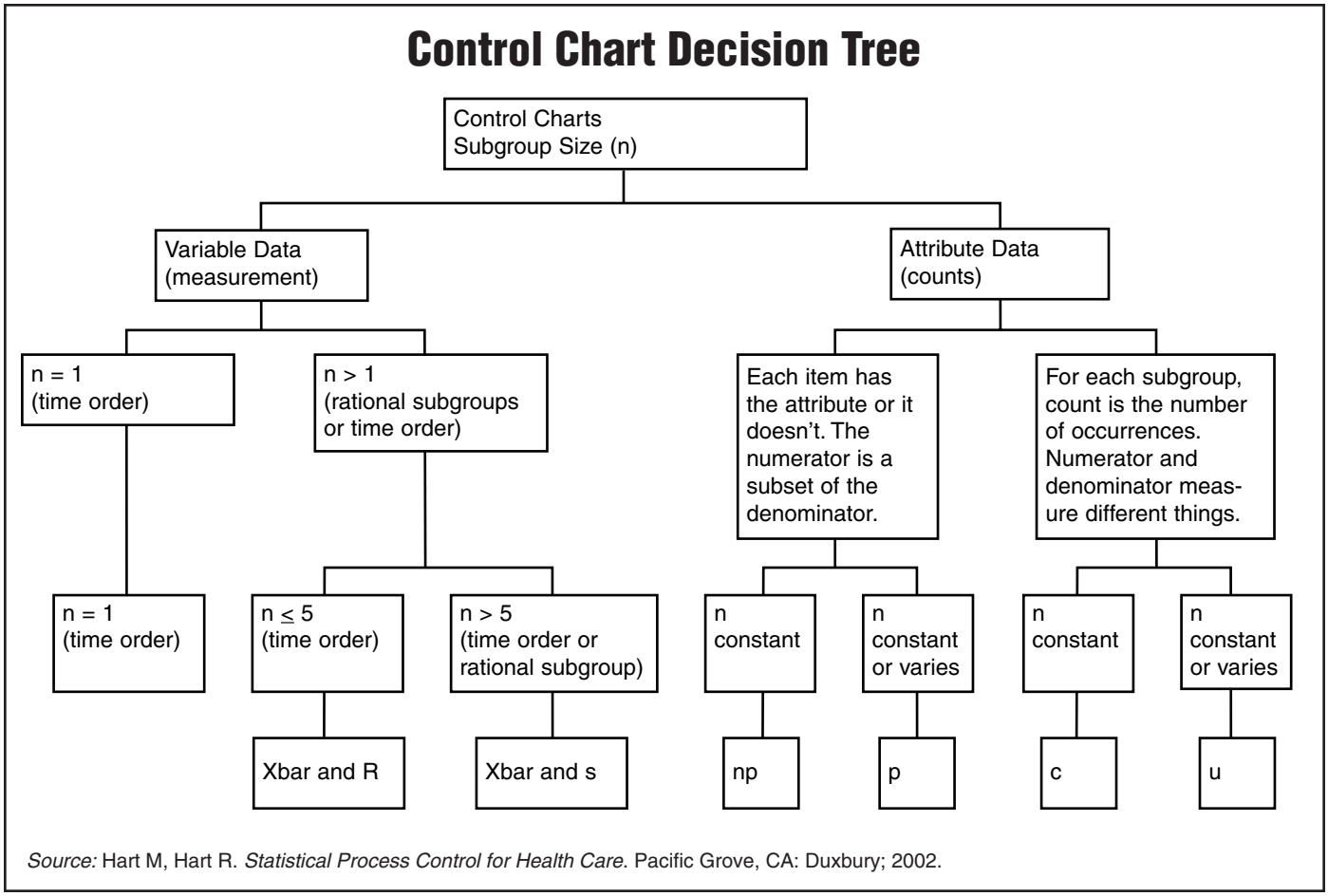
Variable data, Hart explains, are measurement data — sometimes called *continuous data*. "You measure, for example, the amount of time a laparoscopic cholecystectomy takes; you measure the amount of blood you've used; you measure the weight of the newborn infant," she says.

"It could include wait times in the emergency department," Spath adds; "actual surgical time less scheduled surgical time; dollar amount of accounts receivable; blood pressures of a patient over a 24-hour period — things that are measured, not counted."

"Generally, a measuring device such as a weighing scale or clock produces these data," according to PQ Systems. "Another characteristic of variables data is that they can contain decimal places."

As an illustration of the difference between the two types of data, **Judy Homa-Lowry**, RN, MS, president of Homa-Lowry Healthcare Consulting in Metamora, MI, refers to an example she used in the first article: monitoring refrigerators in a patient unit. **(See *Healthcare Benchmarks and Quality Improvement*, January 2004, p. 3.)**

"If you are asking whether or not the temperature had been checked, that would be attribute



Source: Hart M, Hart R. *Statistical Process Control for Health Care*. Pacific Grove, CA: Duxbury; 2002.

data," she notes. "But it might be more important to know the range of temperatures, or to measure that range, and that would be variable data."

Determining whether you are working with variable or attribute data is fairly simple. As the decision tree shows, all other decisions flow from determining the type of data with which you are working. **(See decision tree, above and decision matrix, p. 16.)** After that, the process becomes a bit more complex.

Hart offers the following guidelines for control chart selection when you have variables data:

If the data occur one at a time (newborn weights, time for a lap chole procedure, etc.) the chart for individuals (sometimes called an X chart or an I chart) is best. (The moving range [MR] chart to monitor the change from one reading to the next may or may not be used.)

If the measurement data are grouped by month, for example, an Xbar and s chart is best. The Xbar and s chart also is appropriate when grouping the data by rational subgroups.

Some people also may suggest an Xbar and R chart when the data are grouped in small groups, for instance groups of five or less. However, that type of application happens so rarely and can be handled by an Xbar and s chart, that it does not seem worthwhile to learn the extra chart.

Where it gets complicated

Determining whether you are working with a rational subgroup is fundamental, Homa-Lowry says. "If you were monitoring a lab and looked at the number of errors, that would be a rational subgroup. You would start plotting them maybe by week, or by month; you could also look at the total number of procedures or discharges.

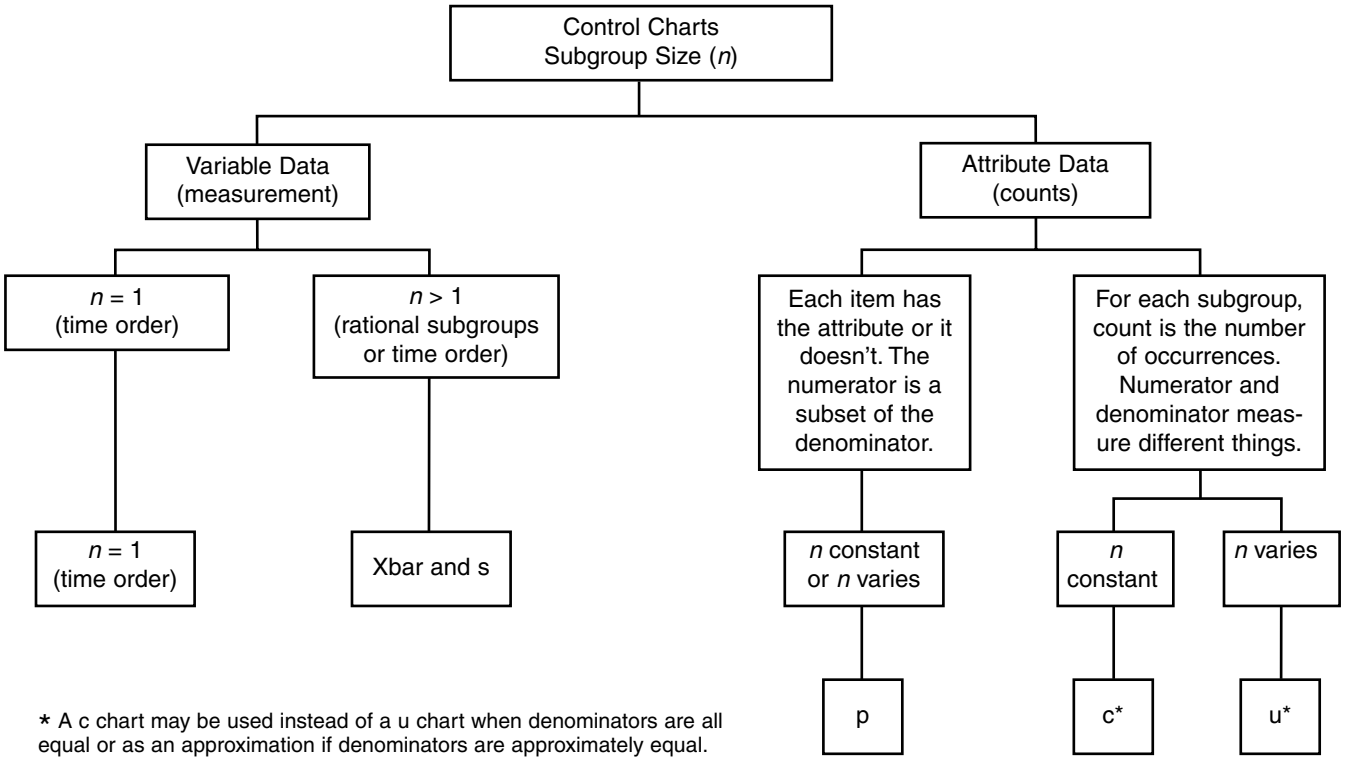
"If you have more than one observation per subgroup, you would use the Xbar chart. For example, looking at the turnaround for a daily sample of five lab orders: This might be good for a small hospital, since these things don't happen very often. If you have more than 10 per month, you would have the s chart. The Xbar and R chart would be how many lab orders do we process each week," she continues.

"The control chart method is quite robust," Hart cautions. "That is, it will tolerate some departures from the normality assumption and still work rather well. So the data need only be near-normal for the control charts to work. If the

Decision Matrix for Attribute Data

	Equal size subgroups	Unequal size subgroups
Count may be larger than the subgroup size	c chart (or could use a u chart)	u chart
Count is limited by the subgroup size	np chart (or could use a p chart)	p chart

The np chart is seldom used.



* A c chart may be used instead of a u chart when denominators are all equal or as an approximation if denominators are approximately equal.

Source: Hart M, Hart R. *Statistical Process Control for Health Care*. Pacific Grove, CA: Duxbury; 2002.

data are badly skewed, which is often the case with data such as time intervals, misleading results will occur. Points may occur outside the control limits due to the skew of the data, not due to any special-cause variation.

"A pattern also will occur on the Xbar and s chart. In particular, if the data are skewed to the right, the values plotted on the Xbar chart will be in phase with the values plotted on the s chart. That is, they will go up and down together. If the data are skewed to the left, the values plotted on the Xbar chart will be 180° out of phase with the values plotted on the s chart — that is, when one goes up, the other goes down. A histogram and a probability plot must be made before a control chart is made to see if the data are badly skewed. If so, a transformation may be made to make the data near-normal before the control chart is made," she explains.

Hart notes that attribute data must be further subdivided into two categories.

"Each item has the attribute or it doesn't," she observes. "One example could be C-sections. Each delivery either was a C-section or it wasn't, and the number of C-sections cannot exceed the number of deliveries. Another would be mortality rates; there either was a mortality or there wasn't."

In setting up your equation, the numerator is a subset of the denominator, so the count is limited by the number of units inspected, Hart continues. "This is governed by the binomial [two names] distribution, and the data are kept on a p chart."

Referring to Hart's decision tree, "P," which

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- **Sid Sytsma**, MSE, MBA, Professor, College of Business, Ferris State University, Big Rapids, MI 49307. Phone: (231) 591-3594.

Also, check out these resources:

- **Shewhart W. *Economic Control of Quality of Manufactured Product,*** Van Nostrand; 1931. (Available at www.amazon.com.) Waler Shewhart, a statistician at the Hawthorne plant at Western Electric, authored what is considered to be the foundation of modern statistical process control (SPC), and provides the basis for the philosophy of total quality management or continuous process improvement for improving processes.
- **SkyMark**, Pittsburgh. Web: www.skymark.com. SkyMark offers two software packages: PathMaker for Windows and ipathmaker for the web. Both applications make it very easy for nonexpert users to make correct control charts and many other commonly used charts. They offer the main chart types, all the standard control tests, and auto-calculate all the relevant statistics. Both packages also include a full set of charting tools, plus brainstorm, affinity, flowchart, cause-and-effect diagram, voting, meetings, and more.
- **PQ Systems Inc.**, 10468 Miamisburg-Springboro Road, Miamisburg, OH 45342. Phone: (800) 777-3020. PQ offers software services to help its customers meet ISO and other standards to help them compete for the Baldrige Award and pursue Six Sigma efforts to improve quality. The company also provides training for SPC, measurement systems analysis, and quality improvement.

stands for proportion, equals the number of items that have the attribute. "N" equals the total number in the P chart.

If the number of units inspected always is the same, it may be kept on an np chart, she adds. "This happens so rarely, however; and since the p chart will always work with this type of data, it may not be worth learning the np chart," she advises.

In the U chart, counts per unit are measured, and "C" stands for count. "Say we were looking at all the lab orders each week and wondering how many errors are observed; this would be plotted on a U chart," Homa-Lowry says, "because you can have a different number [of lab orders] each week. If there were 100 lab orders every week and you wanted to know how many errors were observed, you would use a C chart."

The second category of attribute data plots the number of occurrences, but the numerator (count of occurrences) and the denominator (area of opportunity) measure different things. The count is not limited by the area of opportunity. "This is governed by the Poisson distribution [named for the man who discovered it]," Hart notes. "It could depict the number of injuries, the number of chips in chocolate chip cookies, and so on, and is kept on a C chart if the area of opportunity is constant, and on a U chart if it is not."

An example, she says, would be the number of patient falls per patient day. "The count is the number of falls, and if there are 100 patients there one day, there theoretically could be more than 100 falls on that day. If the number of patients is constant (or at least relatively constant), a C chart could be kept just on the count of falls each day. If the number of patients varies from day to day, the data kept on a U chart are the number of falls divided by the number of patient days, or the number of patients times the number of days studied.

"You can't have some falls that were *not* falls," Hart explains. "You can't count how many times somebody *didn't* fall."

Whatever it is you decide to depict, and whatever chart is most appropriate to use, Homa-Lowry offers these words of warning before you even begin:

"Make sure you have an operational definition for what you are doing — what it is you are going to collect, how you are going to collect it, the reasons for collecting it, and how you're planning to use the data," she says. "If you don't do that, you may go through this whole process and have something you can't use." ■

Study: Shorter stays don't reduce quality

Quality indicators show significant improvement

According to a study published in the Oct. 23, 2003, *New England Journal of Medicine*, the Department of Veterans Affairs (VA) health care system has slashed the time veterans spend in the hospital by half without sacrificing quality of patient care.

Starting in 1994, the VA began an effort to significantly reduce unnecessary hospital stays and encourage veterans to get routine care for chronic conditions. This initiative was part of the reorganization of the VA medical care system undertaken in the mid-1990s.

"When we embarked on those changes, we asked one of our research centers to track the most vulnerable cohorts of patients while we were embarking on a massive change of system, to see what the effect would be," explains **Kenneth W. Kizer**, MD, MPH, one of the study's lead authors and formerly the head of the VA health care system. Currently, he is president and CEO of the Washington, DC-based National Quality Forum.

In fact, the researchers noted that these patients were picked *because* they were the sickest and most vulnerable veterans and would best indicate the VA reforms' impact on quality.

Kizer says that several papers have been written about the VA experience; this particular paper addressed one- and five-year survival rates.

Many of the reforms, noted the authors, "Were aimed at reducing the historically high levels of use of VA hospitals."[1] Clearly, such a reduction had to be offset by many other system changes, including improvements in ambulatory care, to keep urgent care visits from increasing or survival rates from falling.

The transformation of the VA system included reconfiguring its four regions into 22 service delivery networks; the institution of a primary care model; and a change in the eligibility laws to allow the VA to provide a full range of services. In addition, starting in 1997, VA networks were financed by a capitation system. "We also put in place an electronic health information system, which was a key element, in addition to shifting to an integrated service delivery network model, a new performance management system, and the new payment policy," Kizer explains.

Key Points

- Five of nine patient groups actually showed improvement from reduced utilization.
- Veterans were encouraged to seek routine care for chronic conditions.
- The sickest and most vulnerable patients were studied to see effect of reforms.

The implementation of universal primary care resulted in much better coordination and continuity of care, which may have been the most significant change of all, he points out. "We put in place more community-based clinics, which made care more accessible."

In addition, veterans were encouraged to get routine care for chronic conditions. "We removed the barriers for them to get the care. Most patients want to do it, but we make it difficult for them to get the care they need," Kizer explains.

The nine patient cohorts were: chronic obstructive pulmonary disease, pneumonia, congestive heart failure, angina, diabetes, chronic renal failure, bipolar disorder, major depressive disorder, and schizophrenia. The results of the study were very impressive.

"Not only did reduced hospital utilization not result in adverse outcome, but in five of the nine cohorts [pneumonia, congestive heart failure, angina, bipolar disorder, and major depressive disorder], it actually resulted in improvement; this is *not* trivial," Kizer asserts. "We closed 55% of the acute care hospital beds, reduced cost per patient by 25.1%, while dramatically improving quality of care indicators." The study also found that urgent care visits dropped by 37%.

"Something else we should not overlook is the fact that VA patients are much more difficult to treat than the average patient," Kizer observes. "So many of them are homeless, less well educated, or poor; the VA is a safety net system. To get that type of improved outcomes with that patient population makes you wonder what you would do with a middle-class population."

Does that suggest what was accomplished in the VA system could serve as a legitimate benchmark for other systems around the country?

"I think it can," Kizer asserts. "Of course, we're not truly looking at apples to apples — perhaps MacIntosh to Delicious — but an awful lot of the rest of the systems could learn from the VA."

Ironically, he says, most of what he did in the VA was based on experiences in the private sector. "In

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our case, however, we could actually put in place what people in the private sector were just talking about," he notes.

What's more, Kizer says, the reforms he instituted were not really that costly. "They were actually done within the context of taking budget reductions every year." For example, one year, he had a $400 million increase, which sounds like a lot, but the budget included a 3% pay increase. "So to make it work, I needed $800 million." The VA, Kizer says, instituted initiatives such as a national formulary to save money.

Reference

1. Ashton CM, Souchek J, Petersen NJ, et al. Hospital use and survival among Veterans Affairs beneficiaries. *N Engl J Med* 349; 17:1,637-1,646. ■

JCAHO strengthening its infection standards

Renewed interest in HAIs spurs agency to action

The Joint Commission on Accreditation of Healthcare Organizations has approved revised standards to help prevent the occurrence of deadly health care-associated infections (HAIs).

The standards retain many of the concepts embodied in existing standards but sharpen and raise expectations of organizational leadership and of the infection control program itself. The requirements for ambulatory care, behavioral health care, home care, hospital, laboratory, and long-term care organizations will take effect January 2005.

"There has been over the last number of years renewed interest in the amount of HAIs in the country," notes **Bob Wise**, MD, vice president of the division of standards at the Joint Commission. "The CDC [Centers for Disease Control and Prevention] continues to publish data that show somewhere between 2 million and 4 million health care-associated infections exist, with 90,000 deaths per year associated with those HAIs."

A CDC guideline published in October 2002 for hand hygiene in the health care setting — the culmination of 20 years of data — indicates that one of the main ways to stop cross-infection is, in fact, hand washing.

"Yet health care professionals are doing an abysmal job of washing their hands," Wise asserts. "And we have more and more people in hospitals who are susceptible, immunocompromised, and at greater mortality and morbidity risk."

For years, the health care profession had recognized HAIs were too high, but had argued about how many were preventable, he points out. "But now we have identified a method that can clearly reduce them — just by washing our hands. So if even the basic things are not being done, we realized we needed to look at overall strategies."

This laid the groundwork for a group of experts to have an extensive dialogue on the topic, Wise says. The group was formed in early 2003.

"There are two ways we vet standards," he explains. "With something as technical as this, we go out and find the people who are experts in the area [infection-control practitioners, hospital epidemiologists, physicians, nurses, risk managers, and other health care professionals] such as John Boyce, one of the main authors of the CDC guideline for hand hygiene, as well as health care organizations and major stakeholders. Then, it will be put out [to all accredited organizations] for field review across the country."

The field review will include two new issues — emerging antimicrobial resistance and the management of epidemics and emerging pathogens — that have been identified since the group began its work.

For the Joint Commission, prevention represents one of the major safety initiatives that a health care organization can undertake. The revised standards focus on the development and implementation of plans to prevent and control

Key Points

- CDC guideline shows hand washing is one of the main ways to stop cross-infection.
- Statistics show 90,000 health care-associated infection-related deaths per year.
- Pressure has been increased on top-level management in health care organizations.

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infections, with organizations expected to:

- Incorporate an infection control program as a major component of safety and performance improvement programs.
- Perform an ongoing assessment to identify its risks for the acquisition and transmission of infectious agents.
- Effectively use an epidemiological approach, which includes conducting surveillance, collecting data, and interpreting the data.
- Effectively implement infection prevention and control processes.
- Educate and collaborate with leaders across the organization to effectively participate in the design and implementation of the infection control program.

Another key aspect of the revised standards is an increase in the pressure placed upon top-level management in health care organizations.

"This is a pretty important point," Wise points out. "One of the issues that kept coming up concerning the problems with infection control programs is that they are too low down in the organization. The practitioners who run them don't reach the people who are high enough to help; they have trouble getting resources and training. So what you get is a nice program on paper, but [one that is difficult] to implement. You *need* a leadership voice; this is not a program that sits in a single unit or department — it only works if it is organizationwide."

The Joint Commission is expecting a lot from health care organizations, but it also is being realistic when it comes to those expectations. "There is no organization today that has the amount of money needed to handle every infection problem, and we appreciate that," he says. "There is, however, an expectation that each organization understands where its greatest vulnerabilities are. We expect a thoughtful plan to be put together that indicates it knows exactly where its greatest threats exist. It could be surveillance data, not being able to get the proper staff, or training problems; whatever they are, they need to be addressed."

Essentially, Wise adds, the process improvement must include an understanding of what the goals are, why the facility chose those goals, a description of the problems within the organization, an attempt to fix those problems, and if they are not fixed, an explanation as to why they were not fixed. The revised infection controls standards will not be a part of the scored survey until January 2005.

"But because they are so important, we will release them in July 2004," he notes. "If an organization is surveyed in the last half of the year, there will be consultations on these standards, indicating how they might have been scored and what problems would have been cited."

The Joint Commission also has made the CDC's recently updated hand-washing guidelines a 2004 National Patient Safety Goal for all accredited organizations. Furthermore, the Joint Commission has advised accredited organizations that HAIs resulting in death or serious injury also should be voluntarily reported to the Sentinel Event database. ■

Women's high CRP levels can predict hypertension

Hypertension may be an inflammatory disease

In an eight-year study of more than 20,000 women, researchers at Brigham and Women's Hospital (BWH) in Boston have found for the first time that high levels of C-reactive protein (CRP), a marker of inflammation proven to predict risk of heart attack and stroke, also may predict the future development of hypertension. BWH is a 725-bed nonprofit teaching affiliate of Harvard Medical School and a founding member of Partners HealthCare System, an integrated health care delivery network.

Key Points

- Elevated levels of C-reactive protein (CRP) led to a 52% increase in the risk of developing hypertension.
- Results were significant even in women with low blood pressure.
- The study raises the possibility that lowering blood pressure might lower CRP levels.

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These findings provide key evidence that hypertension may be, in part, an inflammatory disease. The study appears in the Dec. 10, 2003, issue of *Journal of the American Medical Association*.

In the study, researchers monitored 20,525 women, ages 45 or older, for the development of high blood pressure over approximately an eight-year period, during which those with elevated levels of CRP when they entered the study had a 52% increase in the risk of developing hypertension.

"We were surprised by the vigorousness of our findings that associated [CRP] with the ultimate development of hypertension; even in women with low blood pressure, it remained significant," notes the study's lead author, **Howard D. Sesso**, ScD, MPH, an associate epidemiologist at BWH. "This significant increase in risk also was seen among healthier women without many traditional coronary risk factors."

The study's senior author, **Paul M. Ridker**, MD, MPH, BWH's director of the Center of Cardiovascular Disease Prevention and Harvard Medical School professor, adds, "Beyond the immediate significance in terms of risk prediction, the new data raise the intriguing possibility that lowering blood pressure might also lower CRP, an issue we now need to investigate directly."

If, in fact, elevated CRP levels do predict the risk of developing high blood pressure, these findings can help improve primary prevention efforts, Sesso says. How might that change the health care provider's approach to patients with high levels of CRP?

"That's really the central question we authors went back and forth on," he concedes. "It's hard to make sweeping generalizations at this point. As we begin other studies to support our findings, the real question is not just whether elevated CRP is associated with hypertension, or if it adds clinical utility above and beyond what we know. If you look at the existing risk factors, they include smoking, obesity, physical inactivity, and dietary factors. In our study, CRP seemed to be independent [of those factors]."

A potential response to the findings can be found in the current protocols for patients with certain cardiovascular risks. Many clinicians now routinely order CRP levels whenever they measure cholesterol, a policy endorsed for millions of patients by both the Centers for Disease Control and Prevention and the American Heart Association.

"There are not that many biochemical risk factors for high blood pressure; other types of studies need to be done over time," Sesso adds. "Do we need a whole panel, or just one or two biomarkers?"

The authors are clear on just how much remains to be learned. For example, Ridker postulates that lowering blood pressure could lower CRP, which seems a bit confusing if high blood pressure is the effect and CRP the cause. "There are two differing views on CRP with hypertension," Sesso remarks. "There is much stronger literature on lab studies that basically postulate that it seems plausible CRP may have a causal link, yet it may go in hand that by lowering blood pressure you get the converse."

For example, he points out, if you put an overweight patient on a strict weight management program, not only will his or her cholesterol go down, but his or her CRP will go down. "But we don't know which is really coming before and which is coming after. I would argue, [however], that while this is a useful exercise, our prime goal should be to identify those who haven't developed hypertension yet and keep them in primary prevention," Sesso continues.

"[Hypertension] is arguably the most common preventive chronic disease in the U.S.; perhaps 50 million people have been diagnosed," he adds. "Any new risk fact we can find to identify [at-risk individuals] long before they develop high blood pressure has the potential to make a very strong public health impact." ■

WHO issues benchmarks on musculoskeletal ills

U.S. study builds foundation for first-of-kind data

The Geneva-based World Health Organization (WHO) has released the *Global Burden of Disease* technical report, or Monitor Project as it is sometimes known, which for the first time involves the assessment and publication of benchmarks on

Key Points

- The number of hip fractures worldwide is expected to more than triple by 2050.
- A World Health Organization document serves as a data benchmark for more than 150 conditions.
- Major focus of U.S. efforts are on awareness and research funding.

musculoskeletal conditions worldwide. Among the key findings is that the number of hip fractures worldwide is expected to more than triple to 6 million by 2050, from 1.7 million in 1990.

The report was produced in collaboration with the Bone and Joint Decade Initiative of Musculoskeletal Conditions at the Start of the New Millennium, a worldwide enterprise.

The statistics from the American Academy of Orthopaedic Surgeons' (AAOS) *Musculoskeletal Conditions in the U.S., 1999,* one of the first activities of the United States Bone and Joint Decade (USBJD), were the foundation of the case statement for the decade in the United States and a primary source for data in the global burden of disease project, according to **Stuart L. Weinstein**, MD, past president of The American Orthopaedic Association and a spokesman for the USBJD.

President Bush signed a presidential proclamation declaring the U.S. National Bone and Joint Decade in March 2002.

The WHO document provides a global snapshot and serves as a data benchmark for more than 150 conditions, including joint diseases, rheumatoid arthritis and osteoarthritis, osteoporosis, spinal disorders, and back pain.

"What's most significant about this is the realization by WHO that it is very important to get a handle on how severe these conditions really are," notes **Regis O'Keefe**, MD, PhD, professor of orthopaedics at the University of Rochester (NY), who also is active with the USBJD. "The fact that they took on this task and produced such an outstanding document attests to the fact this is really a worldwide epidemic, and they describe it as such."

The U.S. decade

The overall goals of the USBJD are to:

- Increase public awareness of the growing burden of musculoskeletal conditions.
- Improve patient education.
- Increase resources for research.
- Improve diagnosis and treatment.
- Increase the resources available to physicians and others who provide care.

"Musculoskeletal conditions are underrecognized, underresourced in the research field, and underappreciated," Weinstein says.

"Look at President Bush," O'Keefe suggests. "He's getting his knees done because he can't jog. This issue is really profound; these conditions ultimately affect all of us and our lives in really significant ways."

One of the initiatives already under way is Project 100. "We recognize the sensitivity [of this issue] to providers; and in hospitals, these conditions will really impact on care and treatment," he adds. "This project is really designed to try to get 100% of the medical schools to offer and require musculoskeletal education; that is *not* the case now."

To date, he says, 50% of the medical schools approached have signed on. "This is really important," O'Keefe notes. "The health care centers that educate also do a lot of research and treat a lot of patients. By raising their awareness, they will have a large impact."

Other initiatives include seminars for members of Congress. By educating legislators, it is hoped awareness will be raised for the need for public funding and research.

In addition, the USBJD is partnering with health care organizations such as the American Association of Occupational Health Nurses, which is targeting the impact of musculoskeletal diseases on workers.

There is much more work to be done, explains Weinstein. "At present, five major areas of musculoskeletal conditions are being targeted [back and other joint pain; arthritis; osteoporosis; neoplasms of bone and connective tissue; and congenital and developmental malformations

Need More Information?

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involving the musculoskeletal system], and they cover an estimated 80% of the problems," he observes.

"But there are lots of areas where there are not even good data, such as childhood musculoskeletal conditions. Without an awareness of the magnitude of the problem and the shortage of funding, as the population ages and without that funding and awareness, the possibility for badly needed treatment advances just won't happen." Weinstein adds.

(Editor's note: For more on the WHO publication, go to: www.who.int/ncd/cra/is.htm.) ■

AHRQ funding IT projects to boost safety, quality

Applications sought for more than 100 grants

As part of a larger initiative to support investments in information technology in the nation's health care delivery system, the Agency for Healthcare Research and Quality (AHRQ) in Rockville, MD, is seeking applications for about 100 grants to plan, implement, and demonstrate the value of health information technology to improve patient safety and quality of care.

These grants will be part of a $50 million portfolio of grants, contracts, and other activities to demonstrate the role of health information technology to improve patient safety and the quality of care.

"These grants will give health care providers the resources they need to implement real-world health care information technology solutions to improve the quality and safety of health care," says AHRQ director **Carolyn M. Clancy**, MD.

The $41 million grant program, Transforming Healthcare Through Information Technology, includes grants for planning and implementation of health information technology in communities as well as grants to examine its value.

The awards, supporting more than 100 new research and demonstration projects, will comprise the core of AHRQ's Health Information Technology portfolio.

Applications will be accepted from public and private nonprofit organizations, including universities, clinics, and hospitals; for-profit organizations (for implementation grants only); faith-based organizations; and state and local government agencies throughout the United States.

The agency expects to award up to $24 million to fund as many as 48 new implementation grants under the first request for applications (RFA), with up to $14 million going to small and rural hospitals and communities. The RFA emphasizes the importance of community partnerships. AHRQ will provide up to 50% of the total costs in matching funds, not to exceed $500,000 per year, for each project. Applications are due April 22, 2004. *(Go to the* NIH Guide *at grants.nih.gov/grants/guide/rfa-files/RFA-HS-04-011.html.)*

As much as $7 million is expected to be awarded under the second RFA to fund up to 35 new planning grants to provide communities and organizations with the resources needed to develop their health information technology infrastructure and compete for future implementation grants. At least $5 million is expected to be used to support applicants from rural and small communities. Projects can last up to one year, and applicants may request budgets of up to $200,000 in total costs. Letters of intent are due March 22, 2004, and applications are due April 22, 2004. *(Go to the* NIH Guide *at http://grants.nih.gov/grants/guide/rfa-files/RFA-HS-04-010.html.)*

Demonstrating the value derived from the adoption, diffusion, and use of health information technology will be the focus of the third RFA,

Need More Information?

For more information, contact:

- **The Agency for Healthcare Research and Quality**, 540 Gaither Road, Third Floor, Rockville, MD 20850. Phone: (301) 427-1200. Web: www.ahcpr.gov.

COMING IN FUTURE MONTHS

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awarding approximately $10 million to up to 20 new grantees. The objective of these projects will be to provide health care facilities and providers with the information they need to make informed clinical and purchasing decisions about using health information technology. Applicants may request budgets of up to $500,000 per year in total costs. Letters of intent are due March 22, 2004, and applications are due April 22, 2004. *(Go to the* NIH Guide *at http://grants.nih.gov/grants/guide/rfa-files/RFA-HS-04-012.html.)*

The remainder of the $50 million portfolio will be spent on other activities, including the creation of a Health Information Technology Resource Center to aid grantees by providing technical assistance, provide a focus for collaboration, serve as a repository for best practices, and disseminate needed tools to help providers explore the adoption and use of health information technology to improve patient safety and quality of care. ■

Clarification

In the cover story of our October 2003 issue, we referred to Planar Systems' Invitium workstation as an example of point-of-care radiology. Planar clarifies: "Invitium is a POC workstation designed for patient bedside diagnostic testing, charting, and order entry; medication administration; and accessing laboratory, PACS, and other information. The Invitium is a mobile cart solution utilizing a medically certified display and rechargeable battery system, with both thin and thick client built-in CPUs." ■