Practical and Effective Methods for Improving Clinical Efficiency

Scott Weingarten, MD
Senior Vice President
Chief Clinical Transformation Officer
Disclosure
Chairman of Board of Stanson Health
Exhibit 1. Health Care Spending as a Percentage of GDP, 1980–2013

Notes: GDP refers to gross domestic product. Dutch and Swiss data are for current spending only, and exclude spending on capital formation of health care providers.
Source: OECD Health Data 2015.
## Exhibit 5. Diagnostic Imaging Supply and Use, 2013

<table>
<thead>
<tr>
<th></th>
<th>Magnetic resonance imaging</th>
<th></th>
<th>Computed tomography</th>
<th></th>
<th>Positron emission tomography</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MRI machines per million pop.</td>
<td>MRI exams per 1,000 pop.</td>
<td>CT scanners per million pop.</td>
<td>CT exams per 1,000 pop.</td>
<td>PET scanners per million pop.</td>
<td>PET exams per 1,000 pop.</td>
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<td>Australia</td>
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<td>France</td>
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<td>14.5</td>
<td>193</td>
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<tr>
<td>Japan</td>
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<td>–</td>
<td>101.3&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>United States</td>
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<td>OECD median</td>
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Exhibit 6. Average Number of Prescription Drugs Taken Regularly, Age 18 or Older, 2013

Source: 2013 Commonwealth Fund International Health Policy Survey.
## Exhibit 9. Select Population Health Outcomes and Risk Factors

<table>
<thead>
<tr>
<th>Country</th>
<th>Life exp. at birth, 2013&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Infant mortality, per 1,000 live births, 2013&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Percent of pop. age 65+ with two or more chronic conditions, 2014&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Obesity rate (BMI&gt;30), 2013&lt;sup&gt;a,c&lt;/sup&gt;</th>
<th>Percent of pop. (age 15+) who are daily smokers, 2013&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Percent of pop. age 65+</th>
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<tr>
<td>Australia</td>
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<tr>
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<td>Switzerland</td>
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<td></td>
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<td>18.9</td>
<td>17.0</td>
</tr>
</tbody>
</table>

<sup>a</sup> Source: OECD Health Data 2015.
<sup>b</sup> Includes: hypertension or high blood pressure, heart disease, diabetes, lung problems, mental health problems, cancer, and joint pain/arthritis. Source: Commonwealth Fund International Health Policy Survey of Older Adults, 2014.
<sup>c</sup> DEN, FR, NETH, NOR, SWE, and SWIZ based on self-reported data; all other countries based on measured data.
<sup>d</sup> 2012, 2011.
Costs

• 1/3rd of health care is “waste”
  ○ $910 billion per year

• Overtreatment
  ○ “subjecting patients to care that, according to sound science and the patients’ own preferences, cannot possibly help them”
  ○ $158 to $226 billion per year
  ○ 10% of health care expense

• Berwick DM, et al. JAMA 2012;307:1513-6
Reducing LOS

• Progression of Care Rounds
• Physician Advocates
• Patient examples
  • Prevented additional potassium being given to a patient with high potassium
  • Patient given antibiotics not consistent with local or national guidelines. Switched antibiotics
  • Diagnosed pulmonary embolism
Before PA Percentile (January 2013 - January 2014): 57th
After PA Percentile (February 2014 – June 2017): 23rd
FY17 PA Percentile: 25th

Prepared by Resource & Outcomes Management, 9/26/2017
Cedars-Sinai Compares Favorably With Other Academic Health Systems

- Medicine/surgery LOSI
  - Greatest improvement (#1/118) in rankings among academic health systems
    - Jan 2013 to Jan 2014 - Rank 67/11
    - July 2015 to June 2016 – Rank 22/118
  - 64th percentile to 23rd percentile for med/surg LOSI over 3 years
# Cedars-Sinai LOS Compares Favorably With Community Hospitals

<table>
<thead>
<tr>
<th>Medicine MS-DRGs</th>
<th>CSMC FY16 Crimson ALOS*</th>
<th>Crimson U.S. Community Hospitals Cohort (n=742)</th>
</tr>
</thead>
<tbody>
<tr>
<td>392 - ESOPHAGITIS, GASTROENT &amp; MISC DIGEST DISORDERS W/O MCC</td>
<td>3.59</td>
<td>3.21</td>
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<tr>
<td>872 - SEPTICEMIA OR SEVERE SEPSIS W/O MV 96+ HOURS W/O MCC</td>
<td>4.30</td>
<td>5.02</td>
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<tr>
<td>603 - CELLULITIS W/O MCC</td>
<td>3.71</td>
<td>4.03</td>
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<tr>
<td>690 - KIDNEY &amp; URINARY TRACT INFECTIONS W/O MCC</td>
<td>3.51</td>
<td>3.79</td>
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<tr>
<td>247 - PERC CARDIOVASC PROC W DRUG-ELUTING STENT W/O MCC</td>
<td>2.88</td>
<td>3.02</td>
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<tr>
<td>641 - MISC DISORDERS OF NUTRITION,METABOLISM,FLUIDS/ELECTROLYTES W/O MCC</td>
<td>3.19</td>
<td>3.58</td>
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<tr>
<td>379 - G.I. HEMORRHAGE W/O CC/MCC</td>
<td>2.30</td>
<td>2.84</td>
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<tr>
<td>293 - HEART FAILURE &amp; SHOCK W/O CC/MCC</td>
<td>3.00</td>
<td>3.44</td>
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<tr>
<td>066 - INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION W/O CC/MCC</td>
<td>2.93</td>
<td>3.68</td>
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<tr>
<td>195 - SIMPLE PNEUMONIA &amp; PLEURISY W/O CC/MCC</td>
<td>2.84</td>
<td>3.10</td>
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</table>

<table>
<thead>
<tr>
<th>Surgery MS-DRGs</th>
<th>CSMC Crimson ALOS*</th>
<th>Crimson U.S. Community Hospitals Cohort (n=742)</th>
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<tr>
<td>470 - MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY W/O MCC</td>
<td>2.58</td>
<td>2.96</td>
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<td>460 - SPINAL FUSION EXCEPT CERVICAL W/O MCC</td>
<td>3.98</td>
<td>3.50</td>
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<tr>
<td>743 - UTERINE &amp; ADNEXA PROC FOR NON-MALIGNANCY W/O CC/MCC</td>
<td>1.78</td>
<td>2.12</td>
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<tr>
<td>520 - BACK &amp; NECK PROC EXC SPINAL FUSION W/O CC/MCC</td>
<td>2.07</td>
<td>2.46</td>
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<tr>
<td>473 - CERVICAL SPINAL FUSION W/O CC/MCC</td>
<td>1.99</td>
<td>2.09</td>
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<td>027 - CRANIOTOMY &amp; ENDOVASCULAR INTRACRANIAL PROCEDURES W/O CC/MCC</td>
<td>2.57</td>
<td>3.96</td>
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<td>331 - MAJOR SMALL &amp; LARGE BOWEL PROCEDURES W/O CC/MCC</td>
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<td>455 - COMBINED ANTERIOR/POSTERIOR SPINAL FUSION W/O CC/MCC</td>
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<td>3.27</td>
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<td>165 - MAJOR CHEST PROCEDURES W/O CC/MCC</td>
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<td>390 - G.I. OBSTRUCTION W/O CC/MCC</td>
<td>3.06</td>
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</table>
• Ruth
• 83 year-old
• History of pituitary abscess, hypopituitarism, parkinsonism
• Minor insults (e.g., UTIs, viral illness) cause hypotension, altered mental status related to adrenal insufficiency and other factors
• “I do not like being in the hospital”
• Given benzodiazepines in the hospital which causes her to be unresponsive for 24 to 48 hours
Ruth
83 year-old
History of pituitary abscess, hypopituitarism, parkinsonism
Minor insults (e.g., UTIs, viral illness) cause hypotension, altered mental status related to adrenal insufficiency and other factors
“I do not like being in the hospital”
Given benzodiazepines in the hospital which causes her to be unresponsive for 24 to 48 hours
Importing Innovations

• Ruth
• Hospital at Home
  ○ 93% acceptance rate
• Satisfaction – Press Ganey CAHPS
  ○ 90.7 Hospital at Home v 83.9 hospital
• Meta-analysis of published trials (RCTs)
  ○ 21% reduction in mortality
    ▪ NNT = 50
  ○ 24% reduction in readmissions

Daily Admission Debrief (DAD): Finding Ways to Increase Value

- Each admission reviewed retrospectively by 2 to 3 physicians
- Database created to monitor trends over time and identify opportunities for improvement
- Was there a possible missed opportunity in the physician’s office or patient’s home that might have prevented an admission?
- Case-finding and Interventions are at 3 levels
  - Referral to Quality Improvement Committee (e.g., post-operative complications)
  - Real-time patient care enhancements (e.g., refer to Care Coordination)
  - Build systems of care to prevent future admissions (e.g., Fall Prevention Programs)

Daily Admission Debrief (DAD): Looking for “Potentially Avoidable” admissions

Increasing value of care by focusing on quality and preventing downstream costs
Avoidable admissions cut in < 1/2

Trend Comparison for % of Potentially Avoidable Commercial HMO Patients

- % of Commercial HMOs that were Potentially Avoidable
- % of Unscheduled Commercial HMOs that were Potentially Avoidable
Avoidable admissions cut in < 1/3

Senior HMO Admissions
Cedars-Sinai Alerts Its Docs to *Choosing Wisely*

*June 5, 2014*

With a focus on stimulating physician and patient conversations, there is perhaps no more appropriate environment in which the *Choosing Wisely*® campaign could take hold than the examining room. Cedars-Sinai Health System has taken an important step in ensuring these conversations happen by becoming the first system in the nation to incorporate dozens of specialty society campaign recommendations into its electronic medical records (EMR) system.
### Predictors of Success

<table>
<thead>
<tr>
<th>Predictors of Success</th>
<th>Adjusted OR</th>
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<tbody>
<tr>
<td>Automatic provision of decision support as part of workflow</td>
<td>112</td>
</tr>
<tr>
<td>Provision of decision support at the time and location of decision making</td>
<td>15</td>
</tr>
<tr>
<td>Provision of recommendation rather than just an assessment</td>
<td>7</td>
</tr>
<tr>
<td>Computer-based generation of decision support</td>
<td>6</td>
</tr>
</tbody>
</table>

**Medical Research Funding**

- NIH research: $31 billion in 2016
- US medical research: $95 billion/year
- Global medical research: >$140 billion/year

**Output**

- 20,000 biomedical journals
- 8,000 articles per day
- 1 article every 26 seconds
- 20,000 new lab tests in the next 5 years
- Medical information doubling time 3.5 years

**Point of Care**

- Brain
  - 200 MB
- CDS
Information Challenges

• Finish medical school and residency knowing everything
• Read and retain 2 articles every single night
• At the end of 1 year
• 1,225 years behind

W Stead. JAMIA 2005;12:113-20
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Examples

1. Don’t place, or leave in place, urinary catheters for incontinence or convenience or monitoring of output for non-critically ill patients (acceptable indications: critical illness, obstruction, hospice, perioperatively for <2 days for urologic procedures; use weights instead to monitor diuresis).

Increased morbidity, mortality, costs

2. Don’t prescribe medications for stress ulcer prophylaxis to medical inpatients unless at high risk for GI complications. According to published guidelines, medications for stress ulcer prophylaxis.

Increased nosocomial pneumonia, C difficile, costs

3. Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds and in the absence of symptoms of active coronary disease, heart failure or stroke.

Increased morbidity, mortality, costs
Choosing Wisely

American College of Emergency Physicians

Five Things Physicians and Patients Should Question

Avoid computed tomography (CT) scans of the head in emergency department patients with minor head injury who are at low risk based on validated decision rules.

1. Minor head injury is a common reason for visiting an emergency department. The majority of minor head injuries do not lead to injuries such as skull fractures or bleeding in the brain that need to be diagnosed by a CT scan. As CT scans expose patients to ionizing radiation, increasing patients' lifetime risk of cancer, they should only be performed on patients at risk for significant injuries. Physicians can safely classify patients with minor head injury in whom it is safe not to perform an immediate head CT by performing a thorough history and physical examination following evidence-based guidelines. This approach has been proven safe and effective at reducing the use of CT scans in large clinical trials. In children, clinical observation in the emergency department is recommended for some patients with minor head injury prior to deciding whether to perform a CT scan.

Avoid placing indwelling urinary catheters in the emergency department for either urine output monitoring in stable patients who can void, or for patient or staff convenience.

2. Indwelling urinary catheters are placed in patients in the emergency department to assist when patients cannot urinate, to monitor urine output for patient comfort. Catheter-associated urinary tract infection (CAUTI) is the most common hospital-acquired infection in the U.S., and can be prevented by reducing the use of indwelling urinary catheters. Emergency physicians and nurses should discuss the need for a urinary catheter with a patient and/or their caregivers, as sometimes such catheters can be avoided. Emergency physicians can reduce the use of indwelling urinary catheters by following the Centers for Disease Control and Prevention’s evidence-based guidelines for the use of urinary catheters. Indications for a catheter may include output monitoring for critically ill patients, renal or urinary obstruction, at the time of surgery and end-of-life care. When possible, alternatives to indwelling urinary catheters should be used.

Don’t delay engaging available palliative and hospice care services in the emergency department for patients likely to benefit.

3. Palliative care is a medical care that provides comfort and relief of symptoms for patients with chronic and/or incurable diseases. Hospice care is palliative care for those patients in the final five months of life. Emergency physicians should ensure that all patients in the emergency department with chronic or terminal illnesses, and their families, are conversations about palliative care and hospice services. Early referral from the emergency department to hospice and palliative care services can benefit patients, resulting in better quality care and better quality of life.

Avoid antibiotics and wound cultures in emergency department patients with uncomplicated skin and soft tissue abscesses after successful incision and drainage and with adequate medical follow-up.

4. Skin and soft tissue infections are a frequent reason for visiting an emergency department. Some infections, called abscesses, become walled off and form pus under the skin. Opening and draining an abscess is the appropriate treatment; antibiotics offer no benefit. Even in abscesses caused by Methicillin-resistant Staphylococcus aureus (MRSA), appropriately-selected antibiotics offer no benefit. If the abscess has been adequately drained and the patient has a self-functioning immune system, it is similarly necessary to drain and excise in abscesses caused by infections prone to the spread of the disease. Additionally, routine cultures of the abscess are not needed or will not significantly change treatment.

Avoid instituting intravenous (IV) fluids before doing a trial of oral rehydration therapy in uncomplicated emergency department cases of mild to moderate dehydration in children.

5. Many children who come to the emergency department with dehydration require fluid replacement. To avoid the pain and potential complications of an IV catheter, it is preferable to give those fluids by mouth. Giving a medication for nausea may allow patients with nausea and vomiting to accept fluid replacement orally. This strategy can eliminate the need for an IV. It best to give these medications early during the ED visit, rather than later, in order to allow time for them to work adequately.

Avoid unnecessary treatments in the ER

A discussion with the doctor can help you make the best decision.

It can be hard to say "No" in the emergency department. But talking with your emergency room (ER) doctor may help you avoid costly testing.

That’s why the American College of Emergency Physicians lists three common procedures you should know about:

- CT scans of the head for minor injury
- Urinary catheterization
- Antibiotics and cultures for abscesses

CT scans of the head for minor injury.

A CT scan uses X-rays to create a picture of the brain. If your head injury is not serious, a CT scan does not give useful information to the doctor. A medical history and physical exam help the doctor determine if your injury is minor. This can help you avoid a CT scan.

CT scans have risks and cost a lot. CT scans use radiation, which can increase the risk of certain cancers. Children, especially infants, have a greater risk of these cancers because their brains are still developing.

Services in the ER cost a lot, because of fees for doctors, services, and facilities. A CT scan can add over $2,600 to your costs.

You may need a CT scan if you have dangerous symptoms, such as:

- An injury your doctor can see or feel
- Becoming unconscious
- Changes in mental state or alertness
- Ongoing vomiting or a bad headache

If you take a blood thinner, such as warfarin (Coumadin®), you are more likely to bleed. So you may need a CT scan, even for a minor injury.
Choosing Wisely®: “Don’t perform population based screening for 25-OH-Vitamin D deficiency.”

translation

clinical logic

exclusion criteria

osteomalacia, vitamin D deficiency, osteoporosis, pathologic fracture, chronic kidney disease, intestinal malabsorption, cirrhosis, chronic liver failure, cystic fibrosis, inflammatory bowel disease, radiation enteritis, unspecific non-infections colitis, bariatic surgery, hyperparathyroidism, chronic pancreatitis, COPD, obesity/BMI > 30, sarcoidosis, tuberculosis, histoplasmosis, coccidiomycosis, other fungal infections, berylliosis, malignant lymphomasosarcoma, other malignant lymphomas, diabetes, history of falls

Visit related to pregnancy

Active anti-seizure, antifungal, anti-retroviral medications, glucocorticoids, or bile acid sequestrants

NOT (gender = female AND age >= 70 years) OR (gender = male AND age >= 65 years)

NOT ICD-9 OR ICD-10 diagnosis codes

inclusion criterion

Vitamin D test ordered

IF Lab test order = LAB535

NOT (gender = female AND age >= 70 years) OR (gender = male AND age >= 65 years)

NOT ICD-9 OR ICD-10 diagnosis codes

other exclusion criteria

males age > 70 years OR females age >= 56 years
**Choosing Wisely:** Don’t use benzodiazepines or other sedative-hypnotics in older adults as first choice for insomnia, agitation or delirium.

*(American Geriatrics Society)*¹, ², ³

Hyperlink: [Choosing Wisely – American Geriatrics Society](https://www.americangeriatrics.org/)

Information for Patients: [Use of Sedatives in Elderly Patients](https://www.americangeriatrics.org/)

Reasons for override:

- sleep disorder
- end of life care
- withdrawal / DT
- non-drug options failed
- peri-procedural anesthesia

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*note: CDS alert displays using Epic’s native best practice alerts; Epic does not allow use of actual screenshots*
Choosing Wisely

≈ alerts 250 per day
About 2.5% of total alerts
Choosing Wisely: Don’t transfuse more units of blood than absolutely necessary. (Society for Hospital Medicine)\textsuperscript{1, 2, 3}

Hyperlink: Choosing Wisely – Society of Hospital Medicine

Information for Patients: Blood Transfusion for Anemia in the Hospital

Reasons for override:
- Active blood loss
- Hemoglobinopathy
- Subarachnoid hemorrhage
- Chemotherapy

note: CDS alert displays using Epic’s native best practice alerts; Epic does not allow use of actual screenshots
17% reduction in blood utilization while CMI increased by 14%
Most Recent Year - Direct Cancelled Orders Only

<table>
<thead>
<tr>
<th>Visible Alerts</th>
<th>Annualized savings</th>
<th>Avg. followed rate $^{2}$</th>
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<tbody>
<tr>
<td>Amb</td>
<td>83</td>
<td>$1.63$M</td>
</tr>
<tr>
<td>Inp</td>
<td>53</td>
<td>$304k$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$1.33$M</td>
</tr>
</tbody>
</table>

Removes re-orders and substitutions
Additional savings for
- Educational/learning effect
- Labor costs
- Costs of harm avoided
- Order set, preference list optimization
Case Study

- PVCs prevalent – 40% to 70% of population
- Transient atrial fibrillation, SVT
- Old studies - Non-selective antiarrhythmic treatment can increase mortality
  - SPAF – Atrial fibrillation
  - CAST - PVCs

**Don’t order continuous telemetry monitoring outside of the ICU without using a protocol that governs continuation.**

Telemetric monitoring is of limited utility or measurable benefit in low risk cardiac chest pain patients with normal electrocardiogram. Published guidelines provide clear indications for the use of telemetric monitoring in patients which are contingent upon frequency, severity, duration and conditions under which the symptoms occur. Inappropriate use of telemetric monitoring is likely to increase cost of care and produce false positives potentially resulting in errors in patient management.
American Society of Anesthesiologists – Pain Medicine

View all recommendations from this society

Released January 21, 2014

Don’t prescribe opioid analgesics as first-line therapy to treat chronic non-cancer pain.

HYDROCODONE-ACETAMINOPHEN 5-325 MG PO TABS
medication [3493]

4,562 orders
15% no source (702)
46% order set (2,079)
39% preference list (1,781)
Case Study

inappropriate vitamin-d screenings - before
January 2014

inappropriate vitamin-d screenings - after
May 2014
• Physician did not agree with a guideline
• Contacted subspecialty society
• Guideline changed

Society for Vascular Surgery
View all recommendations from this society

Released January 29, 2015; updated July 1, 2016

Avoid use of ultrasound for routine surveillance of carotid arteries in the asymptomatic healthy population.

The presence of a bruit alone does not warrant serial duplex ultrasounds in low-risk, asymptomatic patients, unless significant stenosis is found on the initial duplex ultrasound.

The presence of asymptomatic severe carotid artery disease in the general population yields a risk of neurologic events which is <2%. Even in patients who have a bruit, if no other risk factors exist, the incidence is only 2%. Age (over 65), coronary artery disease, need for coronary bypass, symptomatic lower extremity arterial occlusive disease, history of tobacco use and high cholesterol would be appropriate risk factors to prompt ultrasound in patients with a bruit. Otherwise, these ultrasounds may prompt unnecessary and more expensive and invasive tests, or even unnecessary surgery. In general population-based studies, the prevalence of severe carotid stenosis is not high enough to make bruit alone an indication for carotid screening. With these facts in mind, screening should be pursued only if a bruit is associated with other risk factors for stenosis and stroke, or if the primary care physician determines you are at increased risk for carotid artery occlusive disease.
Why???
"Of course it's hard. It's supposed to be hard. If it were easy, everybody would do it. Hard is what makes it great."