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American College of Emergency Physicians

Ten Things Physicians and Patients Should Question

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1 **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.**

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 identify patients with minor head injury in whom it is safe to not 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.

2 **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.**

Indwelling urinary catheters are placed in patients in the emergency department to assist when patients cannot urinate, to monitor urine output or 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, relief of urinary obstruction, at the time of surgery and end-of-life care. When possible, alternatives to indwelling urinary catheters should be used.

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

Palliative care is medical care that provides comfort and relief of symptoms for patients who have chronic and/or incurable diseases. Hospice care is palliative care for those patients in the final few months of life. Emergency physicians should engage patients who present to the emergency



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department with chronic or terminal illnesses, and their families, in conversations about palliative care and hospice services. Early referral from the emergency department to hospice and palliative care services can benefit select patients resulting in both improved quality and quantity of life.

4 **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.**

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 well-functioning immune system. Additionally, culture of the drainage is not needed as the result will not routinely change treatment.

5 **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.**

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 these fluids by mouth. Giving a medication for nausea may allow patients with nausea and vomiting to accept fluid replenishment orally. This strategy can eliminate the need for an IV. It is best to give these medications early during the ED visit, rather than later, in order to allow time for them to work optimally.

6 **Avoid CT of the head in asymptomatic adult patients in the emergency department with syncope, insignificant trauma and a normal neurological evaluation.**

Syncope (passing out or fainting) or near syncope (lightheadedness or almost passing out) is a common reason for visiting an emergency department and most episodes are not serious. Many tests may be ordered to identify the cause of such episodes. However, diagnostic tests for syncope should not be routinely ordered, and the decision to order any tests should be guided by information obtained from the patient's history or physical examination. CT scans of the brain are frequently ordered for this problem to look for bleeding or strokes, but published research has confirmed that abnormalities are rarely found. CT scans are expensive, and may unnecessarily expose patients to radiation. If a head injury is associated with a syncopal episode (fainting spell), then a CT scan of the brain may be indicated. In addition, if there were symptoms of a stroke (i.e., headache, garbled speech, weakness in one arm or leg, trouble walking or confusion) before or after a syncopal episode, a CT scan may be indicated. However, in the absence of head injury or signs of a stroke, a CT scan of the brain should not be routinely ordered.

7 **Avoid CT pulmonary angiography in emergency department patients with a low-pretest probability of pulmonary embolism and either a negative Pulmonary Embolism Rule-Out Criteria (PERC) or a negative D-dimer.**

Advances in medical technology have increased the ability to diagnose even small blood clots in the lung. Now, the most commonly used test is known as a CT pulmonary angiogram (CTPA). It is readily available in most hospitals and emergency rooms. However, disadvantages of the CTPA include patient exposure to radiation, the use of dye in the veins that can

damage kidneys and high cost.

Studies have demonstrated that certain findings in a patient's medical history put them at very low risk for having a blood clot in the lung. In some cases, a blood test called a D-dimer may be additionally used to screen for the possibility of a clot. If patient historical factors and physical examination findings are negative, along with a negative D-dimer (if the physician chooses to order it), evidence shows that the risk of an undiagnosed blood clot is the same as if the patient had a negative CTPA. Such a strategy saves the risk of radiation, kidney injury and the high cost of a CTPA.

8

Avoid lumbar spine imaging in the emergency department for adults with non-traumatic back pain unless the patient has severe or progressive neurologic deficits or is suspected of having a serious underlying condition (such as vertebral infection, cauda equine syndrome, or cancer with bony metastasis).

Low back pain without trauma is a common presenting complaint in the emergency department (ED). Most of the time, such pain is caused by conditions such as a muscle strain or a bulging disc that cannot be identified on an X-ray or CT scan. When a patient has symptoms or physical findings of a serious or progressive neurological condition, or is suspected of having a serious underlying condition such as cancer or a spinal infection, imaging may be appropriate and may include plain X-rays or advanced imaging (e.g., MRI or CT scan). Diagnostic imaging does not accurately identify the cause of most low back pain and does not improve the time to recovery. The vast majority of cases of back pain in the ED are related to muscle strain or inflammation. As a result, routine imaging of the low back should be avoided in order to reduce ionizing radiation exposure and unnecessary cost.

9

Avoid prescribing antibiotics in the emergency department for uncomplicated sinusitis.

Sinusitis is a common reason for patients to visit the emergency department. Most patients with acute sinusitis do not require antibiotic treatment, because approximately 98% of acute sinusitis cases are caused by a viral infection and resolve in 10-14 days without treatment. For some patients with sinusitis, antibiotics might be appropriate, such as those patients taking drugs that reduce the effectiveness of the immune system, those with prolonged, severe symptoms, or those with worsening symptoms. Antibiotics can cause many side effects and have potentially severe complications, and these risks usually outweigh the benefits of their use for sinusitis. In addition, inappropriate antibiotic use for sinusitis can contribute to the development of antibiotic-resistant infections and contributes to avoidable health care costs.

10

Avoid ordering CT of the abdomen and pelvis in young otherwise healthy emergency department (ED) patients (age <50) with known histories of kidney stones, or ureterolithiasis, presenting with symptoms consistent with uncomplicated renal colic.

Kidney stones can cause severe pain (called renal colic) and nausea, which can usually be relieved with medication. Most stones pass spontaneously in the urine in a few days, though kidney stones often do recur. CT scans may be needed to diagnose kidney stones, and rule out other problems that may mimic the pain of kidney stones. Many patients in the ED who are less than 50 years old and who have symptoms of recurrent kidney stones do not need a CT scan unless these symptoms persist or worsen, or if there is a fever or a history of severe obstruction with previous stones. CT scans of patients in the ED with symptoms of recurrent kidney stones usually do not change treatment decisions, and the cost and radiation exposure can often be avoided in these cases. Close follow-up by a primary care physician or specialist is necessary.

These items are provided solely for informational purposes and are not intended as a substitute for consultation with a medical professional. Patients with any specific questions about the items on this list or their individual situation should consult their physician.

Founded in 1968, the American College of Emergency Physicians (ACEP) has promoted the highest quality of emergency care and is the leading advocate for emergency physicians, their patients and the public. Headquartered in Dallas, Texas, ACEP has more than 32,000 members and 53 chapters representing each state, as well as Puerto Rico and the District of Columbia. A Government Services Chapter represents emergency physicians employed by military branches and other government agencies. Emergency physicians are recognized and valued for their commitment to high quality patient care, teaching, leadership, research and innovation. Emergency medicine is a valued and essential public service.

To learn more about ACEP, visit www.acep.org.

How this list was created (1–5): The American College of Emergency Physicians (ACEP) developed five Choosing Wisely® recommendations through a multi-step process that included input from ACEP members, an expert panel of emergency physicians and the ACEP Board of Directors. In 2012, ACEP appointed a task force to address cost effective emergency care. The Cost Effective Care Task Force conducted a survey that was open to all ACEP members asking for strategies to reduce cost and improve value in emergency medicine. The task force received over 200 individual suggestions, which were grouped into a set of strategies. A technical expert panel, including representatives from all aspects of emergency medicine practice, reviewed and prioritized the recommendations using a modified Delphi technique. The panel prioritized the strategies using multiple rounds of voting based on contribution to cost reduction, benefit to patients and actionability by emergency physicians. A literature review including data on cost was assembled for the highest-rated strategies. Strategies were further refined and a final list of strategies that received majority support of the panelists was created. Five of these were ultimately selected by the Board of Directors to be included in Choosing Wisely®.

How this list was Created (6–10): The entire ACEP membership (30,000+) was surveyed and given an opportunity to provide input on what in their view would be cost effective and improve the quality of patient care. A Delphi panel of emergency physicians was convened and the list was winnowed using the Delphi process to the top twelve. To be included in the top twelve, there must be research to demonstrate the cost effectiveness and improvement of patient care, consensus among clinicians and the College's Medical Legal Committee that the proposed list of recommendations did not pose a significant risk of litigation if implemented with reason, caution and explanation to the patient. Also of importance was the consideration that the recommendations would be or are also in concert with some of the other specialties participating in the Choosing Wisely® campaign.

ACEP's disclosure and conflict of interest policy can be found at www.acep.org.

Sources

- Jagoda AS, Bazarian JJ, Bruns JJ, Jr, Cantrill SV, Gean AD, Howard PK, Ghajar J, Riggio S, Wright DW, Wears RL, Bakshy A, Burgess P, Wald MM, Whitson RR; American College of Emergency Physicians; Centers for Disease Control and Prevention. Clinical policy: neuroimaging and decision-making in adult mild traumatic brain injury in the acute setting. *Ann Emerg Med.* 2008 Dec;52(6):714–48.

Stiell IG, Clement CM, Rowe BH, Schull MJ, Brison R, Cass D, Eisenhauer MA, McKnight RD, Bandiera G, Holroyd B, Lee JS, Dreyer J, Worthington JR, Reardon M, Greenberg G, Lesiuk H, MacPhail I, Wells GA. Comparison of the Canadian CT head rule and the New Orleans criteria in patients with minor head injury. *JAMA.* 2005 Sep 28;294(12):1511–8.

Haydel MJ, Preston CA, Mills TJ, Luber S, Blaudeau E, DeBlieux PM. Indications for computed tomography in patients with minor head injury. *N Engl J Med.* 2000 Jul 13;343(2):100–5.

Smits M, Dippel DWJ, de Haan GG, Dekker HM, Vos PE, Kool DR, Nederkoorn PJ, Hofman PA, Twijnstra A, Tanghe HL, Hunink MG. External validation of the Canadian CT head rule and the New Orleans criteria for CT scanning in patients with minor head injury. *JAMA.* 2005 Sep 28;294(12):1519–25.
- Umscheid CA, Mitchell MD, Doshi JA, Agarwal R, Williams K, Brennan PJ. Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs. *Infect*

Control Hosp Epidemiol. 2011 Feb;32:101–14.

Lo E, Nicolle L, Classen D, Arias KM, Podgorny K, Anderson DJ, Burstin H, Calfee DP, Coffin SE, Dubberke ER, Fraser V, Gerding DN, Griffin FA, Gross P, Kaye KS, Klompas M, Marschall J, Mermel LA, Pegues DA, Perl TM, Saint S, Salgado CD, Weinstein RA, Wise R, Yokoe DS. Strategies to prevent catheter-associated urinary tract infections in acute care hospitals. *Infect Control Hosp Epidemiol*. 2008 Oct;29:541–50.

Munasinghe RL, Yazdani H, Siddique M, Hafeez W. Appropriateness of use of indwelling urinary catheters in patients admitted to the medical service. *Infect Control Hosp Epidemiol*. 2001 Oct;22:647–9.

Hazelett SE, Tsai M, Gareri M, Allen K. The association between indwelling urinary catheter use in the elderly and urinary tract infection in acute care. *BMC Geriatr*. 2006 Oct 12;6:15.

Gardam MA, Amihod B, Orenstein P, Consolacion N, Miller MA. Overutilization of indwelling urinary catheters and the development of nosocomial urinary tract infections. *Clin Perform Qual Health Care*. 1998 Jul-Sep;6:99–102.

Gokula RR, Hickner JA, Smith MA. Inappropriate use of urinary catheters in elderly patients at a midwestern community teaching hospital. *Am J Infect Control*. 2004;32:196–9.

Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA; Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for prevention of catheter-associated urinary tract infections 2009. Atlanta (GA): HICPAC; 2009. 67 p.

Scott RA, Oman KS, Makic MB, Fink RM, Hulett TM, Braaten JS, Severyn F, Wald HL. Reducing indwelling urinary catheter use in the emergency department. A successful quality-improvement initiative. *J Emerg Nurs*. 2013 Mar 7. pii: S0099-1767(12)00344–3. [Epub ahead of print]

3. DeVader TE, DeVader SR, Jeanmonod R. Reducing cost at the end of life by initiating transfer to inpatient hospice in the emergency department. *Ann Emerg Med*. 2012;60(4s):S73.

Kenen J. We can't save you: how to tell emergency room patients that they're dying. *Slate* [Internet]. 2010 Aug 4 [cited 2013 Sep 4]. <http://www.slate.com/id/2262769/>.

Quest TE, Marco CA, Derse AR. Hospice and palliative medicine: new subspecialty, new opportunities. *Ann Emerg Med*. 2009;54:94–102.

Smith AK, McCarthy E, Weber E, Censer IS, Boscardin J, Fisher J, Covinsky K. Half of older Americans seen in emergency department in last month of life; most admitted to hospital, and many die there. *Health Aff*. 2012 Jun 31;1277–85.

4. Baumann BM, Russo CJ, Pavlik D, Cassidy-Smith T, Brown N, Sacchetti A, Capano-Wehrle LM, Mistry RD. Management of pediatric skin abscesses in pediatric, general academic and community emergency departments. *West J Emerg Med*. 2011 May;12(2):159–67.

Duong M, Markwell S, Peter J, Barenkamp S. Randomized, controlled trial of antibiotics in the management of community-acquired skin abscesses in the pediatric patient. *Ann Emerg Med*. 2010 May;55(5):401–7.

Llera JL, Levy RC. Treatment of cutaneous abscess: a double-blind clinical study. *Ann Emerg Med*. 1985;14:15–9.

Niska R, Bhuiya F, Xu J. National Hospital Ambulatory Medical Care Survey: 2007 Emergency Department Summary. National health statistics reports. Hyattsville, [MD]: National Center for Health Statistics. 2010. 31 p. Report no.: 26.

5. Szajewska H, Gieruszczak-Bialek D, Dylag M. Meta-analysis: ondansetron for vomiting in acute gastroenteritis in children. *Aliment Pharmacol Ther*. 2007;25:393–400.

Roslund G, Hepps T, McQuillen K. The role of oral ondansetron in children with vomiting as a result of acute gastritis/gastroenteritis who have failed oral rehydration therapy: a randomized controlled trial. *Ann Emerg Med*. 2008;52(1): 22–9.

Hartling L, Bellemare S, Wiebe N, Russell K, Klassen TP, Craig W. Oral versus intravenous rehydration for treating dehydration due to gastroenteritis in children. *Cochrane Database System Rev*. 2006;19(3):CD004390.

6. Gallagher EJ. Hospitalization for fainting: high stakes, low yield. *Ann Emerg Med*. 1997 Apr;29(4):540–2.

Pires LA, Ganji JR, Jarandila R, Steele R. Diagnostic patterns and temporal trends in the evaluation of adult patients hospitalized with syncope. *Arch Intern Med*. 2001 Aug 13-27;161:1889–95.

Giglio P, Bednarczyk EM, Weiss K, Bakshi R. Syncope and head CT scans in the emergency department. *Emerg*

Radiol. 2005 Dec;12(1-2):44-6.

Shukla GJ. Cardiology patient page. Syncope. Circulation. 2006Apr 25;113(16):e715-7.

Grossman SA, Fischer C, Bar JL, Lipsitz LA, Mottley L, Sands K, Thompson S, Zimetbaum P, Shapiro NI. The yield of head CT in syncope: a pilot study. Intern Emerg Med. 2007 Mar;2(1):46-9.

Mendu ML, McAvay G, Lampert R, Stoehr J, Tinetti ME. Yield of diagnostic tests in evaluating syncopal episodes in older patients. Arch Intern Med. 2009 Jul 27;169(14):1299-305.

7. Quaseem A, Snow V, Barry P, Hornbake ER, Rodnick JE, Tobolic T, Ireland B, Segal J, Bass E, Weiss KB, Green L, Owens DK; Joint American Academy of Family Physicians/American College of Physicians Panel on Deep Venous Thrombosis/Pulmonary Embolism. Current diagnosis of venous thromboembolism in primary care: a clinical practice guideline from the American Academy of Family Physicians and the American College of Physicians. Ann Fam Med. 2007 Jan-Feb;5(1):57-62.

Corwin MT, Donohoo JH, Partridge R. Do emergency physicians use serum D-dimer effectively to determine the need for CT when evaluating patients for pulmonary embolism? A review of 5,344 consecutive patients. AJR Am J Roentgenol. 2009 May;192(5):1319-23.

Torbicki A, Perrier A, Konstantinides S, Agnelli G, Galiè N, Pruszczyk P, Bengel F, Brady AJ, Ferreira D, Janssens U, Klepetko W, Mayer E, Remy-Jardin M, Bassand JP; ESC Committee for Practice Guidelines (CPG). Guidelines on the diagnosis and management of acute pulmonary embolism. European Heart J. 2008 Sep;29(18):2276-315.

Kline JA, Webb WB, Jones AE, Hernandez-Nino J. Impact of a rapid rule-out protocol for pulmonary embolism on the rate of screening, missed cases, and pulmonary vascular imaging in an urban US emergency department. Ann Emerg Med. 2004 Nov;44(5):490-502.

Tiesman NA, Cheung PT, Frazee B. Is the ordering of imaging for suspected venous thromboembolism consistent with D-dimer result? Ann Emerg Med. 2009 Sep;54(3):442-6.

Kline JA, Courtney DM, Kabrhel C, Moore CL, Smithline HA, Plewa MC, Richman PB, O'Neil BJ, Nordenholz K. Prospective multicenter evaluation of the pulmonary embolism rule-out criteria. J Thromb Haemost. 2008 May;6(5):772-80.

Physician Fee Schedule Search. Washington (DC): Centers for Medicare & Medicaid Services; [updated 2-14 Oct 1; cited 2014 Oct 2]. Available from: <http://www.cms.gov/apps/physician-fee-schedule/search/search-results.aspx?Y=2&T=0&HT=0&CT=3&H1=71275&M=4>.

Fesmire FM, Brown M, Espinosa JA, Shih RD, Silvers SM, Wolf SJ, Decker WW; American College of Emergency Physicians. Critical issues in the evaluation and management of adult patients presenting to the emergency department with suspected pulmonary embolism. Ann Emerg Med. 2011 Jun;57(6):628-52.

Venkatesh AK, Kline JA, Courtney M, Camargo CA, Plewa MC, Nordenholz KE, Moore CL, Richman PB, Smithline HA, Beam DM, Kabrhel C. Evaluation of pulmonary embolism in the emergency department and consistency with a national quality measure. Arch Intern Med. 2012 Jul 9;172(13):1028-32.

8. Chou R, Quaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians; American College of Physicians; American Pain Society Low Back Pain Guidelines Panel. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med. 2007 Oct 2;147(7):478-91.

Adult low back pain, 12th edition. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2006 Sep. 37 p.

van Tulder M, Becker A, Bekkering T, Breen A, del Real MT, Hutchinson A, Koes B, Laerum E, Malmivaara A; COST B13 Working Group on Guidelines for the Management of Acute Low Back Pain in Primary Care. Chapter 3. European guidelines for the management of acute nonspecific low back pain in primary care. 2004. Eur Spine J. 2006 Mar;15 Suppl 2:S169-91.

Australian Acute Musculoskeletal Pain Group. Evidence-based Management of Acute Musculoskeletal Pain. Acute Low Back Pain. Chapters 4 & 9, pg 25-62 and 183-188. 2003.

Bussieres AE, Taylor JA, Peterson C. Diagnostic imaging practice guidelines for musculoskeletal complaints in adults -an evidence-based approach part 3: spinal disorders. J Manipulative Physiol Ther. 2008 Jan;31(1):33-88.

Tracey NG, Martin JB, McKinstry CS, Matthew BM. Guidelines for lumbar spine radiography in acute low back pain: effect of implementation in an accident and emergency department. Ulster Med J. 1994 Apr;63(1):12-17.

9. Sinusitis and antibiotics. Lancet Infect Dis. 2012 May;12(5):355.

Chow AW, Benninger MS, Brook I, Brozek JL, Goldstein EJ, Hicks LA, Pankey GA, Seleznick M, Volturo G, Wald ER, File TM Jr, Infectious Diseases Society of America. IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults. *Clin Infect Dis*. 2012Apr;54(8):e72-e112.

Ahovuo-Saloranta A, Rautakorpi UM, Borisenko OV, Liira H, Williams JW Jr, Mäkelä M. Antibiotics for acute maxillary sinusitis in adults. *Cochrane Database Syst Rev*. 2014 Feb 11;2:CD000243.

Donnelly JP, Baddley JW, Wang HE. Antibiotic utilization for acute respiratory tract infections in U.S. emergency departments. *Antimicrob Agents Chemother*. 2014;58(3):1451-7.

Tashima L, Piccirillo JF. Are antibiotics indicated for acute sinusitis? *Laryngoscope*. 2014 Sep;124(9):1979-80.

Wald ER, Applegate KE, Bordley C, Darrow DH, Glode MP, Marcy SM, Nelson CE, Rosenfeld RM, Shaikh N, Smith MJ, Williams PV, Weinberg ST; American Academy of Pediatrics. American Academy of Pediatrics. Clinical practice guideline for the diagnosis and management of acute bacterial sinusitis in children aged 1 to 18 years. *Pediatrics*. 2013 Jul;132(1):e262-80.

MacKenzie A. Balancing the benefits and risks of empirical antibiotics for sinusitis: A teachable moment. *JAMA Intern Med*. 2014 Aug 1;174(8):1221-2.

10. Ha M, MacDonald RD. Impact of CT scan in patients with first episode of suspected nephrolithiasis. *J Emerg Med*. 2004 Oct;27(3):225-31.

Ripollés T, Agramunt M, Errando J, Martínez MJ, Coronel B, Morales M. Suspected ureteral colic: plain film and sonography versus unenhanced helical CT. A prospective study in 66 patients. *Eur Radiol*. 2004 Jan;14(1):129-36.

Pfister SA, Deckart A, Laschke S, Dellas S, Otto U, Buitrago C, Roth J, Wiesner W, Bongartz G, Gasser TC. Unenhanced helical computed tomography vs intravenous urography in patients with acute flank pain: accuracy and economic impact in a randomized prospective trial. *Eur Radiol*. 2003 Nov;13(11):2513-20.

Katz SI, Saluja S, Brink JA, Forman HP. Radiation dose associated with unenhanced CT for suspected renal colic: impact of repetitive studies. *AJR Am J Roentgenol*. 2006 Apr;186(4):1120-4.



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