

Chapter 7

The Myth of Medical Clearance

Lev Libet, Yener Balan, and Seth Thomas

Contents

7.1	Introduction.....	105
7.2	Critical Assessment of Articles in Favor of Laboratory Screening.....	106
7.3	Articles in Favor of Selective Testing.....	107
7.4	History and Physical Examination.....	109
7.5	Pediatric Population.....	109
7.6	Unimportant Positives.....	110
7.7	Urine Toxicology Screen.....	110
7.8	Cost and Utility.....	111
7.9	Standardized Screening Protocols.....	111
7.10	Conclusion.....	112
7.11	Recommendations for Practice.....	112
	References.....	114
	Resources.....	116

7.1 Introduction

Behavioral emergencies constituted approximately 5.4% of all emergency department (ED) visits in 2001, which was a 40% increase over a 9-year period (Larkin et al. 2005). In 2011, there were 136 million ED visits, and by extrapolation that would mean 8,160,000 visits for behavioral emergencies in the United States in 2011 (CDC 2011). The trend of increasing ED visits for behavior health emergencies, shown more than a decade ago, has continued.

In most settings, the current practice is that the emergency physician performs a focused history and physical exam to ensure that there are no urgent medical needs. In many settings, a set of screening lab tests is required in order to “medically clear” the patient: complete blood count (CBC), Chem7, thyroid stimulating hormone (TSH), urine analysis, urine toxicology, alcohol level, acetaminophen level, beta HCG (the pregnancy hormone), and salicylate level. Further laboratory evaluation or imaging is left to the discretion of the emergency physician.

Once the patient is deemed to have no acute medical need and the presentation is thought to be purely psychiatric, care is transferred to the psychiatry service either within the hospital or to a stand-alone facility. Broderick et al. (2002) found that 35% of emergency practitioners practiced in a setting where testing was mandatory in a psychiatric medical screening exam. This was mandated by the receiving psychiatrist or receiving institution 84% of the time (Broderick et al. 2002). Some receiving institutions require a repeat alcohol level to ensure that the patient has metabolized. As the demand for the limited psychiatric beds is at an all-time high, the emergency departments cater to these demands to avoid having their patient overlooked.

The term “medical clearance” is a misnomer, as noted by previous publications (Lukens et al. 2006; Weissberg 1979; Zun 2005). It was first called into question by Weissberg in 1979, who rightfully noted that it is not only inaccurate but also potentially hazardous. The danger is in the assumption that “all” medical issues have been tended to. The American College of Emergency Physicians (ACEP) clinical policy in 2006 rewords the phrase as “focused medical assessment,” which is a more accurate description. It is well known that psychiatric patients often have coexisting medical illnesses. More importantly, the behavioral emergency may be due to underlying medical pathology, medications, and substance misuse. There are numerous medical etiologies for neuropsychiatric presentations, such as electrolyte disturbances, infections, encephalopathy, thyroid dysfunction, intracranial mass, intoxication, acute withdrawal, and anti-NMDA receptor encephalitis to name a few. To make the situation more complex, the history may be limited, physical examination refused, there may be strenuous social circumstances, and a lack of social support or finances. Physicians may also subconsciously limit their interaction with this patient population due to their own biases (Zun 2012). The complexity of this population is not to be ignored. The role of the emergency physician is to perform an initial “focused medical assessment” taking into account all of the data, ensure medical stability, and decide if there are medical diagnoses that may be contributing to the psychiatric presentation.

The degree of testing required in order to perform an adequate assessment prior to transfer to a psychiatric facility has been a source of controversy since the inception of the concept. This is not the first article on the topic, and its predecessors have been comprehensive (Anfinson and Kathol 1992; Chun 2014; Gregory et al. 2004; Williams and Shepard 2000; Zun 2005).

The purpose of this chapter is to review the literature with regard to screening tests in behavioral emergencies and to highlight the growing evidence that this is an antiquated practice.

7.2 Critical Assessment of Articles in Favor of Laboratory Screening

To be sure, there are coexisting medical conditions in behavioral emergencies. The prevalence of an organic etiology for the psychiatric presentation is highly variable 0–46% (Ferguson and Dudleston 1986; Hall et al. 1981; Kolman 1984; Koranyi 1979; Reeves et al. 2010; Willett and King 1977) depending on the inclusion criteria. In these studies, the setting and referral base is highly variable and often differs from the current system.

The first two studies discussed are frequently quoted as examples of the high-rate organic etiologies of the behavioral presentation, and seem to have pushed the medical community toward aggressive screening. Koryani (1979) retrospectively reviewed his clinic patients and reported that 43% of his sample suffered “from major medical illnesses.” In 51%, the physical illness aggravated the psychiatric condition, and in 18%, it was thought to be causative. Koryani wisely notes that the two specialties of psychiatry and medicine are “woven” together and neither should be

assessed in a vacuum. While the study provides insight into his patient population, it cannot be extrapolated to those presenting to the emergency department, nor does it make claims about how to initially screen patients.

Hall et al. (1981) found the highest prevalence of comorbid medical problems in psychiatric patients at a rate of 80%. As a result, the authors recommended extensive testing, which included 34 panel chemistry, urine drug screen, urine analysis, CBC, electrocardiogram (ECG), and electroencephalogram (EEG). The more astounding figure is that in 46% of the patients the organic pathology was thought to be directly related to psychiatric presentation. The setting of this article differs from today's practice, however, in that it was an inpatient clinical research ward and most patients were referred from a psychiatric reception center. This article also fails to examine the clinical significance of the laboratory abnormalities or ascertain whether these abnormalities would have been predicted by history and examination alone.

Shortly thereafter, there was a barrage of publications on this topic of missed physical diagnoses potentially causing or exacerbating the behavioral presentation. Summers et al. (1981) noted that 19% of their patient population had a "medical contribution" to their psychiatric presentation. Importantly, all 19% were noted on physical examination.

In 1981, Bunce et al. published their experience on an acute medical care ward to which there was a wide range of referrals. Only 23% were capable of communication, greater than 50% had altered mental status, and 29% presented with "general weakness." It is difficult to draw conclusions about the current population referred to the psychiatric wards based on this study.

Nine years later, Riba and Hale (1990) argue that it is also important to discover the minor medical abnormalities in the screening process as this may "cue psychiatrists to the presence of biological variables." This is a vague statement, and consequently it is open to varied interpretations. The role of the emergency physician is to ensure medical stability. Biologic variables not directly related to the presentation can be further assessed by the psychiatrist or medical consultant.

A protocol was instituted at Harbor UCLA in 1994 for new-onset psychiatric presentations of adults. The protocol consisted of laboratory testing, computed tomography (CT) of head (if the symptoms were not explained), and lumbar puncture if febrile (Henneman et al. 1994). A staggering 63% were found to have an organic etiology. Of the 100 patients, however, "60 were disoriented." Altered mental status is known to be more indicative of an organic etiology rather than psychiatric. Nonetheless, it is accepted practice that new-onset behavioral emergencies require a higher level of scrutiny for organic etiologies.

Reeves et al. in 2010, retrospectively reviewed admissions to their psychiatric hospital over a 7-year period. Among admitted patients, 2.8% were found to have a medical disorder that caused or exacerbated the altered mental status. All had altered mental status on presentation, which, as previously noted, is a high-risk criteria indicating the likelihood of an underlying medical etiology. Organic etiologies at a rate of 2.8% are surprisingly low for this group.

These studies are influenced by the population selected. First, when altered mental status is part of the inclusion criteria, then organic etiologies will naturally be more prevalent. Second, a new-onset psychiatric presentation demands adequate scrutiny. Third, if you work at an inpatient research ward in 1980, receiving undifferentiated patients as your referral base, then many will have organic etiologies.

7.3 Articles in Favor of Selective Testing

While it is important to know the prevalence of organic causes of behavioral emergencies, the more relevant questions are, which patients require laboratory screening and what is the utility

of the tests? The following studies assess the utility of laboratory screening directly, and a clearer answer is obtained. The more recent studies in this group also represent the current population in the emergency department setting.

In 1977, Willett and King published their experience at the Colorado psychiatric hospital at the University of Colorado Medical Center. In their introduction, they mention that facilities are instituting laboratory screening and that this is a matter of “considerable debate,” foreshadowing the next nearly four decades. The laboratory values obtained were CBC, venereal disease research laboratory (VDRL), blood urea nitrogen (BUN), creatinine, glucose, cholesterol, serum glutamic-oxaloacetic transaminase (SGOT), lactate dehydrogenase (LDH), alkaline phosphatase, calcium, phosphorous, protein, bilirubin, uric acid, and urine dipstick. After discharge, the lab test results were evaluated. The data of interest is the “unexpected abnormal,” which totaled 248 values. Of these values, 61% led to no action, and 21.6% were repeated and subsequently normal. Fourteen patients were found to have new diagnoses, none of which were the cause of the behavioral disturbance. There were three urinary tract infections (UTI), which were treated with antibiotics, and one dehydrated patient due to diuretics that was given hydration. There were no other urgent treatments. Four fairly minor diagnoses of 636 patients amounts to a laboratory contribution of 0.63%.

C J Thomas (1979) assessed how frequently psychiatrists used screening tests, how much information the tests provided, and whether or not it was acted upon. In addition to the tests performed in the previously mentioned study, B12, folate, erythrocyte sedimentation rate (ESR), thyroid hormones (T3 and T4), and “Routine radiology of the chest and skull were also considered” (Jacobs et al. 1997). None of the positives for syphilis were considered significant, 3 abnormal thyroid studies of 145 were treated, 8 out of 99 with abnormal B12 or folate received replacement, and 10 out of 251 skull x-rays were considered abnormal, although none were related to the psychiatric presentation. Of the laboratory tests, 8.1% were considered abnormal. Of these, more than half were not followed up on. It is not clear if they were missed or deemed insignificant by the clinician.

In 1986, Ferguson and Dudleston published the first study that attempted to identify high-risk groups to improve “the efficiency of the screening process.” By this time, routine screening had “been introduced in most hospitals to assist in detection of physical illness” (Ferguson and Dudleston 1986). Of 650 patients, 22 did not receive a physical exam, which may reflect the psychiatrists’ discomfort with exams. All abnormal thyroid studies were insignificant and no patient received treatment for this. Skull x-rays, still in play, were found to be of “limited value.” The clinical criteria used predicted 86.4% of the laboratory abnormalities. The criteria would have missed 5 UTIs and 5 electrolyte abnormalities or only 1.5% (10 out of 650) of medical illness. High-risk groups included an age greater than 65, altered mental status, drug and alcohol abuse, and weight loss of more than 10%.

Kolman et al. (1984) specifically looked at an older age group, ages 56–94. Despite the natural tendency of the elderly to have a higher prevalence of comorbid medical illnesses, screening tests lacked utility. In their study, only 1.4% of tests led to a change in detection and treatment of an illness.

In a chart review of 785 patients, Dolan and Mushlin (1985) searched for abnormal values that yielded new clinically important information also termed “laboratory diagnoses.” The rate of true positives was 1.8%, and the rate of false positives was 8 times higher. Laboratory diagnoses were made in 0.08% of the cases studied.

More than a decade later, Olshaker et al. (1997) studied 345 patients, of which 19% were found to have acute medical conditions. Of those with acute medical conditions, 94% were discovered on history alone. Of the four patients not picked up by history, one was febrile, one had anemia, and two had mild hypokalemia. Similar findings are noted in another retrospective study by Janiak and Attebettery in 2012. They found that of 148 inpatients, 1 patient had significant

laboratory abnormalities. This single outlier was also febrile and tachycardic. These results differ greatly from those published by Hall et al. (1981) in the early 1980s, and speak to the difference in patient population, the objective of the study, the definition of abnormal, and the quality of the initial history and physical exam.

In a single-center prospective study in oriented patients performed by Amin and Wang (2009), there was no change in disposition based on laboratory values. Of 375 patients, only 4 patients had non-substance abuse related laboratory abnormalities that required intervention. All that were positive were found on the urine analyses.

Parmar et al. in 2012 conducted a two-center prospective study consisting of 191 patients. These patients were deemed “medically clear” and had screening labs drawn. The financial burden was also assessed at a Medicare reimbursement rate of \$197 per patient. Only one patient had a change in disposition due to a positive acetaminophen level.

The logical conclusion from these studies has already been well stated by Gregory et al. (2004): “Overall, results indicate that the yield for routine laboratory investigations is fairly low.” “Instead of routine laboratory screening testing in the ED, the data support more selective testing for patients at high risk of serious medical pathology.” The 2006 ACEP clinical policy states: “Routine laboratory testing of all patients is of very low yield and need not be performed as part of the ED assessment.”

7.4 History and Physical Examination

The medical assessment of the behavioral emergency is predicated on a good history and physical exam. Whether or not lab tests are performed, the assessment is incomplete if the basic elements are absent. Poor examination, documentation, or both of psychiatric patients have been shown on multiple occasions to the extent of a full neurologic exam being documented in only 8% of the charts (Szpakowicz and Herd 2008; Tintinalli et al. 1994).

This trend continues today, as shown by Reeves et al. (2010), an adequate medical history and an adequate physical examination were each documented 60% of the time, and an adequate assessment of cognitive function was documented only 31% of the time. There is no study stating that laboratory screening is a replacement for the physical exam. Therefore, the clinician should not feel reassured if screening tests are obtained, as it does not preclude a thorough assessment.

Screening tools have been attempted since 1977 (Jacobs et al. 1977; Shah et al. 2012; Zun and Howes 1988). The tool, akin to the mini-mental status examination, proposed by Jacobs et al. (1977), interestingly called for laboratory testing only after a certain threshold was met. Vital elements of the physical examination, as advocated by Dr. Zun, are a neurologic examination and a cognitive assessment. This should be done in the presence or absence of laboratory testing.

7.5 Pediatric Population

The rate of pediatric behavioral emergencies is 1.6–3.3% of ED visits (Mahajan et al. 2009; Sills and Bland 2002). Donofrio et al. in 2014, assessed 1082 patients who were either a danger to self, danger to others, or deemed to be gravely disabled. Of these, 80.5% had screening lab tests, with 7 having a change in disposition (0.8%); and 6 out of 7 had findings on history and physical exam. The only disposition change that was not anticipated was a positive pregnancy test, which

may have been “an unnecessary admission.” The authors stated that the positive pregnancy test seemed to provide a reason for refusal of admission by the receiving psychiatric facility. There was otherwise no change in management. The most common laboratory finding was a positive urine analysis at 1.8%. This is rightfully qualified in the study by the presence of asymptomatic bacteriuria in the general population at a rate of 0.9–2.0%.

Studies have also shown an increased length of stay due to laboratory screening (Fortu et al. 2009; Santillanes et al. 2014). Santillanes et al. make a case for field triage of pediatric psychiatric complaints and bypassing the ED entirely in those that meet criteria, which was 91% of their studied patients. In their cost assessment, they found that the patients occupied an emergency department bed on average for 6.8 hours, and that the average cost was \$970 per patient.

7.6 Unimportant Positives

Most studies do not focus on the parameter of false positivity. Dolan and Mushlin (1985) noted a rate of eight times the number of false positives to true positives. Willett and King (1977) had nine times the rate of false positives compared with true positives. Donofrio had a TSH false positive rate of 22.9%. Several studies (Amin and Wang 2009; Donofrio et al. 2014; Ferguson and Dudleston 1986) show urine analysis to be positive for UTI, however, samples are frequently contaminated and may not be true urinary tract infections (culture is not available at the time of treatment). Sheline and Kehr (1990) found that 44.9% urine analyses were contaminated. In addition, as mentioned, those who are asymptomatic and not pregnant do not require intervention for asymptomatic bacteriuria. False positive test results are not without consequence. The prudent physician will repeat the test or ensure follow-up at greater cost and extending the length of stay.

7.7 Urine Toxicology Screen

Mental health and illicit substance use are inseparable as they are often coexisting and each influences the other. In 2007, a healthcare cost utilization project found that one in 8 emergency department visits (12 million or 12.5% of all ED visits) was for chief complaints of mental health or substance use. Of mental health and substance use visits, 11.9% were co-occurring conditions (Owens et al. 2010). The urine toxicology is felt to yield invaluable information to the psychiatrist, and is at best unhelpful for the emergency physician. In addition, the test may extend the length of stay, is costly, and may be misleading.

In general, the information regarding illicit substance use and alcohol use can be gathered during the history and physical exam. Olshaker found the self-reporting to be at 91% for illicit substances use, and 96% for alcohol use in the last 24 hours. Similar sensitivities have been found in other studies (Kroll et al. 2013; Shihabuddin et al. 2013). In the pediatric population, the self-reporting of substance abuse was lower, at 83% (Fortu et al. 2009).

More importantly, the urine toxicology does not change the disposition of a patient. Schiller et al. (2000) assessed this in a retrospective review and found no difference in disposition between those with positive urine toxicology screen ordered versus not. Shihabuddin et al. (2013) found that of 539 patients, 62 had positive urine toxicology screens with no changes in management by either emergency physicians or psychiatrists. Eisen et al. (2004) had similar results in which change in management was reviewed and none were deemed justified.

The use of a urine drug screen is of limited use in the pediatric population as well. Fortu et al. (2009) assessed 385 patients with toxicology screens performed in routine fashion in uncomplicated psychiatric complaints. Of these, 31% were positive, with none admitted for medical concerns. Again, the urine toxicology had no effect on disposition.

The results of the individual substances tested lacks nuance and requires intelligent interpretation. Multiple doses of methamphetamine, for example, can lead the urine toxicology screen to be positive for 5 to 6 days depending on the cut off used (Vandevienne et al. 2000). There are also numerous agents that provide a false positive screen such as bupropion, trazodone, ranitidine, promethazine, and chlorpromazine. Therefore, if there are no clinical features of stimulant abuse, it is difficult to attribute suicidality or psychotic features to methamphetamine. A recent study showed that methamphetamine positivity has not been shown to be associated with placing the patient on an involuntary psychiatric hold (Pomerleau et al. 2012).

Similarly, benzodiazepine positivity may be deceiving. The test detects the metabolites oxazepam and nordiazepam, but it does not distinguish between benzodiazepine types, nor does it indicate abuse. Diazepam may take up to 36 hours post-ingestion, which can lead to a potentially negative result despite intoxication. In addition, benzodiazepines with a long half-life will cause the test to be positive for up to 30 days, making the positive result irrelevant in the absence of a fitting clinical presentation (Moeller et al. 2008). It is also worth mentioning that there are illicit substances that do not appear on the toxicology screen, such as synthetic cannabinoids and synthetic cathinones.

Interpreting the drug screen is not only challenging but expensive. It is the most pricey single test ordered on the panel of tests. Reimbursement for the urine toxicology screen ranges from \$133.22 (Schiller et al. 2000) to \$154.00 (Fortu et al. 2009). Due to the limited and potentially misleading information provided by the urine toxicology screen, the practice of routine drug testing is not supported by the literature.

7.8 Cost and Utility

There are few attempts at examining the cost and utility of these tests. Sheline and Kehr (1990) note 20 changes in medical management. However, 9 were iron replacement and 3 were clinic referrals, leaving 8 important results with a total cost to their facility of \$19,610. If this is parceled to each significant test, the cost is \$2451.25 per test. Feldman and Chen (2011) evaluated inpatient child and adolescent patients. Of 142 subjects, there were 809 tests obtained, and only 4 abnormalities yielded a direct impact on care. One patient had symptoms of a UTI; a second had slight elevation in liver enzymes, which affected the choice of mood stabilizer; and a third patient was found to have new-onset diabetes. From an emergency medicine perspective, only the third patient is a clinically significant finding that would not have been found on history and examination. The total direct cost to the facility was \$12,630.47. If all four tests are included as significant, it places the cost per significant results at a staggering \$3,157.62 per test.

7.9 Standardized Screening Protocols

Standardized medical screening protocols for psychiatric patients have been developed and studied in the literature. Remarkably, the approach that these protocols have taken in assessing patients is similar, relying on the presence of any of the following elements to selectively drive the diagnostic evaluation (Shah et al. 2012; Zun and Downey 2007; Zun et al. 1996):

- New psychiatric conditions
- Abnormal physical examination (including focused mental status exam)
- Abnormal vital signs
- Presence of other potential acute medical problems

Zun and Downey in 2007 retrospectively assessed the application of such a protocol on their ED population, finding that although the protocol did not improve ED throughput for psychiatric patients, it did offer a significant reduction in average cost per patient with a similar rate of return to the ED for further evaluation. Shah et al. in 2012, published a retrospective analysis of 485 consecutive ED patients screened by a similar tool and subsequently transferred to a psychiatric crisis center. Their study demonstrated remarkable utility in determining which patients required further diagnostic evaluation beyond a thorough history and physical exam.

Given the evidence and potential of such protocols to reduce the cost of evaluation in an ED setting, improve quality and consistency, all while resolving conflict among emergency medicine and psychiatry colleagues, these authors are in favor of the development of these protocols. In some regions, comprehensive laboratory evaluation of psychiatric patients is an expectation placed upon local emergency departments by inpatient psychiatric facilities. The result of such an arrangement without application of contemporary evidence produces unnecessary delays, and drives up cost. The opportunity to apply sound evidence-based medicine to reduce cost while improving the quality of care is the impetus for the development of our SMART protocol (Wetzel et al. 2015). Please refer to Figure 7.1 for the SMART protocol.

Following the same tenets previously discussed, the SMART protocol will rely on the presence or absence of the following elements to guide the diagnostic evaluation:

- New psychiatric conditions
- Medical conditions that require screening
- Abnormal vital signs
- Risky presentations (age, ingestion, or mechanism of injury)
- Therapeutic drug levels that require screening

7.10 Conclusion

The mostly older studies that seem to justify the utility of routine laboratory screening in behavioral emergencies do not apply to the patient population appearing in the emergency departments today. Newer studies show that routine screening in these patients yields little information of use to the emergency physician in making medical decisions. The lab tests, particularly the urine toxicology screen, are costly and provide potentially misleading information. In the vast majority of cases, the relevant data needed to make decisions about how to medically stabilize these patients can be obtained from an adequate medical history and physical examination. A standardized screening protocol may be useful in limiting unnecessary testing.

7.11 Recommendations for Practice

- Thorough history and physical examination, including cognitive function and complete neurologic exam.
- New onset psychosis requires laboratory screening, with consideration for CT brain and lumbar puncture.

SMART Medical Clearance Form	No*	Yes	Time Resolved
S uspect <u>New Onset</u> Psychiatric Condition?	1		
M edical Conditions that Require Screening?	2		
Diabetes (FSBS less than 60 or greater than 250)			
Possibility of pregnancy (age 12-50)			
A bnormal:	3		
Vital Signs?			
Temp: greater than 38.0°C (100.4°F)			
HR: less than 50 or greater than 110			
BP: less than 100 systolic or greater than 180/110 (2 consecutive readings 15 min apart)			
RR: less than 8 or greater than 22			
O ₂ Sat: less than 95% on room air			
Mental Status?			
Cannot answer name, month/year and location (minimum A/O x 3)			
If clinically intoxicated, HII score 4 or more? (next page)			
Physical Exam (unclothed)?			
R isky Presentation?	4		
Age less than 12 or greater than 55			
Possibility of ingestion (screen all suicidal patients)			
Eating disorders			
Potential for alcohol withdrawal (daily use equal to or greater than 2 weeks)			
Ill-appearing, significant injury, prolonged struggle or "found down"			
T herapeutic Levels Needed?.....	5		
Phenytoin			
Valproic acid			
Lithium			
Digoxin			
Warfarin (INR)			

* If ALL five SMART categories are checked "NO" then the patient is considered medically cleared and no testing is indicated. If ANY category is checked "YES" then appropriate testing and/or documentation of rationale must be reflected in the medical record and time resolved must be documented above.

Date: _____ Time: _____ Completed by: _____, MD/DO

Figure 7.1 SMART medical clearance form.

- Urine pregnancy in age appropriate females.
- Four-hour acetaminophen level in patients with risk of intentional or accidental ingestion.
- Consider development of a regional standardized screening protocol.

References

- Amin M, Wang J. 2009. Routine laboratory testing to evaluate for medical illness in psychiatric patients in the emergency department is largely unrevealing. *Western Journal of Emergency Medicine* 10 (2): 97–100.
- Anfinson T J, Kathol R G. 1992. Screening laboratory evaluation in psychiatric patients: A review. *General Hospital Psychiatry* 14 (4): 248–257.
- Broderick K B, Lerner E B, McCourt J D, Fraser E, Salerno K. 2002. Emergency physician practices and requirements regarding the medical screening examination of psychiatric patients. *Academic Emergency Medicine* 9 (1): 88–92.
- Bunce D F, Jones L R, Badger L W, Jones S E. 1982. Medical illness in psychiatric patients: Barriers to diagnosis and treatment. *Southern Medical Journal* 75 (8): 941–944.
- CDC (Centers for Disease Control and Prevention). 2011. National Hospital Ambulatory Medical Care Survey: 2011. Emergency Department Summary Tables. https://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2011_ed_web_tables.pdf.
- Chun TH. 2014. Medical clearance: time for this dinosaur to go extinct. *Annals of Emergency Medicine* 63 (6): 676–677. doi:10.1016/j.annemergmed.2013.11.012.
- Dolan J G, Mushlin A I. 1985. Routine laboratory testing for medical disorders in psychiatric inpatients. *Archives of Internal Medicine* 145 (11): 2085–2088.
- Donofrio J J, Santillanes G, McCammack B D, Lam C N, Menchine M D, Kaji A H, Claudius I A. 2014. Clinical utility of screening laboratory tests in pediatric psychiatric patients presenting to the emergency department for medical clearance. *Annals of Emergency Medicine* 63 (6): 666–675. doi:10.1016/j.annemergmed.2013.10.011.
- Eisen J S, Sivilotti M L, Boyd K U, Barton D G, Fortier C J, Collier C P. 2004. Screening urine for drugs of abuse in the emergency department: Do test results affect physicians' patient care decisions? *Canadian Journal of Emergency Medicine* 6 (2): 104–111.
- Feldman L, Chen Y. 2011. The utility and financial implications of obtaining routine laboratory screening upon admission for child and adolescent psychiatric inpatients. *Journal of Psychiatric Practice* 17 (5): 375–381. doi:10.1097/01.pra.0000405369.20538.84.
- Ferguson B, Dudleston K. 1986. Detection of physical disorder in newly admitted psychiatric patients. *Acta Psychiatrica Scandinavica* 74 (5): 485–489.
- Fortu J M, Kim I K, Cooper A, Condra C, Lorenz D J, Pierce M C. 2009. Psychiatric patients in the pediatric emergency department undergoing routine urine toxicology screens for medical clearance. results and use. *Pediatric Emergency Care* 25 (6): 387–392. doi: 10.1097/PEC.0b013e3181a79305.
- Gregory R J, Nihalani, N D, Rodriguez E. 2004. Medical screening in the emergency department for psychiatric admissions: A procedural analysis. *General Hospital Psychiatry* 26 (5): 405–410.
- Hall R C, Beresford T P, Gardner E R, Popkin M K. 1982. The medical care of psychiatric patients. *Hospital and Community Psychiatry* 33 (1): 25–34.
- Hall R C, Gardner E R, Popkin M K, Lecann A F, Stickney S K. 1981. Unrecognized physical illness prompting psychiatric admission: A prospective study. *American Journal of Psychiatry* 138 (5): 629–635.
- Henneman P L, Mendoza R, Lewis R J. 1994. Prospective evaluation of emergency department medical clearance. *Annals of Emergency Medicine* 24 (4): 672–677.
- Jacobs J W, Bernhard M R, Delgado A, Strain J J. 1977. Screening for organic mental syndromes in the medically ill. *Annals of Internal Medicine* 86 (1): 40–46.
- Janiak B D, Atteberry S. 2012. Medical clearance of the psychiatric patient in the emergency department. *The Journal of Emergency Medicine* 43 (5): 866–870. doi:10.1016/j.jemermed.2009.10.026.

- Kolman P B. 1984. The value of laboratory investigations of elderly psychiatric patients. *Journal of Clinical Psychiatry* 45 (3): 112–116.
- Koranyi E K. 1979. Morbidity and rate of undiagnosed physical illnesses in a psychiatric clinic population. *Archives of General Psychiatry* 36 (4): 414–419.
- Kroll D S, Smallwood J, Chang G. 2013. Drug screens for psychiatric patients in the emergency department: Evaluation and recommendations. *Psychosomatics* 54 (1): 60–66. doi:10.1016/j.psych.2012.08.007.
- Larkin G L, Claassen C A, Emond J A, Pelletier A J, Camargo C A. 2005. Trends in US emergency department visits for mental health conditions, 1992 to 2001. *Psychiatric Services* 56 (6): 671–677. doi:10.1176/appi.ps.56.6.671.
- Lukens T W, Wolf S J, Edlow J A, Shahabuddin S, Allen M H, Currier G W, Jagoda A S. 2006. Clinical policy: Critical issues in the diagnosis and management of the adult psychiatric patient in the emergency department. *Annals of Emergency Medicine* 47 (1): 79–99. doi:10.1016/j.annemergmed.2005.10.002.
- Mahajan P, Alpern E R, Grupp-Phelan J, Chamberlain J, Dong J, Holubkov R, Jacobs E, Stanley R, Tunik M, Sonnet M, Miller S, Foltin G L. 2009. Epidemiology of psychiatric-related visits to emergency departments in a multicenter collaborative research pediatric network. *Pediatric Emergency Care* 25 (11): 715–720. doi:10.1097/PEC.0b013e3181bec82f.
- Moeller K E, Lee K C, Kissack J C. 2008. Urine drug screening: Practical guide for clinicians. *Mayo Clinic Proceedings* 83 (1): 66–76. doi:10.4065/83.1.66.
- Olshaker J S, Browne B, Jerrard DA, Prendergast H, Stair T O. 1997. Medical clearance and screening of psychiatric patients in the emergency department. *Academic Emergency Medicine* 4 (2): 124–128.
- Owens P L, Mutter R, Stocks C. 2010. Mental health and substance abuse-related emergency department visits among adults, 2007. *Statistical Brief #92. Healthcare Cost and Utilization Project (H-CUP). Agency for Health Care Policy and Research; 2006–2010.*
- Parmar P, Goolsby C A, Udombanyan K, Matesick L D, Burgamy K P, Mower WR. 2012. Value of mandatory screening studies in emergency department patients cleared for psychiatric admission. *Western Journal of Emergency Medicine* 13 (5): 388–393. doi:10.5811/westjem.2012.1.6754.
- Pomerleau A C, Sutter M E, Owen K P, Loomis E, Albertson T E, Diercks D B. 2012. Amphetamine abuse in emergency department patients undergoing psychiatric evaluation. *The Journal of Emergency Medicine* 43 (5): 798–802. doi:10.1016/j.jemermed.2012.01.040.
- Reeves R R, Parker J D, Loveless P, Burke R S, Hart R H. 2010. Unrecognized physical illness prompting psychiatric admission. *Annals of Clinical Psychiatry* 22 (3): 180–185.
- Riba M, Hale M. 1990. Medical clearance: Fact or fiction in the hospital emergency room. *Psychosomatics* 31 (4): 400–404. doi:10.1016/S0033-3182(90)72134-2.
- Santillanes G, Donofrio J J, Lam C N, Claudius I. 2014. Is medical clearance necessary for pediatric psychiatric patients? *The Journal of Emergency Medicine* 46 (6): 800–807. doi:10.1016/j.jemermed.2013.12.003.
- Schiller M J, Shumway M, Batki S L. 2000. Utility of routine drug screening in a psychiatric emergency setting. *Psychiatric Services* 51 (4): 474–478. doi:10.1176/appi.ps.51.4.474.
- Shah S J, Fiorito M, McNamara R M. 2012. A screening tool to medically clear psychiatric patients in the emergency department. *The Journal of Emergency Medicine*. 43 (5): 871–875. doi:10.1016/j.jemermed.2010.02.017.
- Sheline Y, Kehr C. 1990. Cost and utility of routine admission laboratory testing for psychiatric inpatients. *General Hospital Psychiatry* 12 (5): 329–34.
- Shihabuddin B S, Hack C M, Sivitz A B. 2013. Role of urine drug screening in the medical clearance of pediatric psychiatric patients. Is there one? *Pediatric Emergency Care* 29 (8): 903–906. doi:10.1097/PEC.0b013e31829e8050.
- Sills M R, Bland S D. 2002. Summary statistics for pediatric psychiatric visits to US emergency departments, 1993–1999. *Pediatrics* 110 (4): e40.
- Summers W K, Munoz R A, Read M R, Marsh G M. 1981. The psychiatric physical examination – part ii: Findings in 75 unselected psychiatric patients. *Journal of Clinical Psychiatry* 1981; 42 (3): 99–102.
- Szapkowicz M, Herd A. 2008. “Medically cleared”: How well are patients with psychiatric presentations examined by emergency physicians? *The Journal of Emergency Medicine* 35 (4): 369–372. doi:10.1016/j.jemermed.2007.11.082.

- Thomas C J. 1979. The use of screening investigations in psychiatry. *British Journal of Psychiatry* 135: 67–72.
- Tintinalli J E, Peacock F W, Wright M A. 1994. Emergency medical evaluation of psychiatric patients. *Annals of Emergency Medicine* 23 (4): 859–862.
- Vandevenne M, Vandenbussche H, Verstraete A. 2000. Detection time of drugs of abuse in urine. *Acta Clinica Belgica* 55 (6): 323–333.
- Weissberg M P. 1979. Emergency room medical clearance: An educational problem. *American Journal of Psychiatry* 136 (6): 787790. doi:10.1176/ajp.136.6.787.
- Wetzel A E, Thomas S, Balan Y, Hosein R, Noobakhsh A. 2015. Crisis in the emergency department: Removing barriers to timely and appropriate mental health treatment. Sierra Sacramento Valley Medical Society. Sacramento. White Paper.
- Willett A B, King T. 1977. Implementation of laboratory screening procedures on a short-term psychiatry inpatient unit. *Diseases of the Nervous System* 38 (11): 867–870.
- Williams E R, Shepherd S M. 2000. Medical clearance of psychiatric patients. *Emergency Medicine Clinics of North America* 18 (2): 185–198.
- Zun L S. 2005. Evidence-based evaluation of psychiatric patients. *The Journal of Emergency Medicine* 28 (1): 35–9. doi:10.1016/j.jemermed.2004.10.002.
- Zun L S. 2012. Pitfalls in the care of the psychiatric patient in the emergency department. *The Journal of Emergency Medicine* 43: 829–835. doi:10.1016/j.jemermed.2012.01.064.
- Zun L S, Downey L. 2007. Application of a medical clearance protocol. *Primary Psychiatry* 14: 47–51.
- Zun L, Howes D S. 1988. The mental status evaluation application in the emergency department. *American Journal of Emergency Medicine* 6 (2): 165–172.
- Zun L S, Leikin J B, Stotland N L, Blade L, Marks R C. 1996. A tool for the emergency medicine evaluation of psychiatric patients. *American Journal of Emergency Medicine* 14 (3): 329–333. doi:10.1016/S0735-6757(96)90191-6.

Resources

- Drescher M J, Russell F M, Pappas M, Pepper D A. 2014. Can emergency medicine practitioners predict disposition of psychiatric patients based on a brief medical evaluation? *European Journal of Emergency Medicine* 22 (3): 188–191. doi:10.1097/MEJ.0000000000000131.
- Dupouy J, Memier V, Catala H, Lavit M, Oustric S, Lapeyre-Mestre M. 2014. Does urine drug abuse screening help for managing patients? A systematic review. *Drug and Alcohol Dependence* 136: 11–20. doi:10.1016/j.drugalcdep.2013.12.009.
- Hoffman R S. 1982. Diagnostic errors in the evaluation of behavioral disorders. *JAMA* 248 (8): 964–967.
- Koran L M, Sox H C, Marton K I, Moltzen S, Sox C H, Kraemer H C, Imai K, Kelsey T G, Rose T G, Levin L C et al. 1989. Medical evaluation of psychiatry patients results in a state mental health system. *Archives of General Psychiatry* 46 (8): 733–740.
- Smith-Kielland A, Skuterud B, Morland J. 1997. Urinary excretion of amphetamine after termination of drug abuse. *Journal of Analytical Toxicology* 21 (5): 325–329.
- Wilcox C E, Bogenschutz M P, Nakazawa M, Woody G. 2013. Concordance between self-report and urine drug screen data in adolescent opioid dependent clinical trial participants. *Addictive Behavior* 38 (10): 2568–2574. doi:10.1016/j.addbeh.2013.05.015.