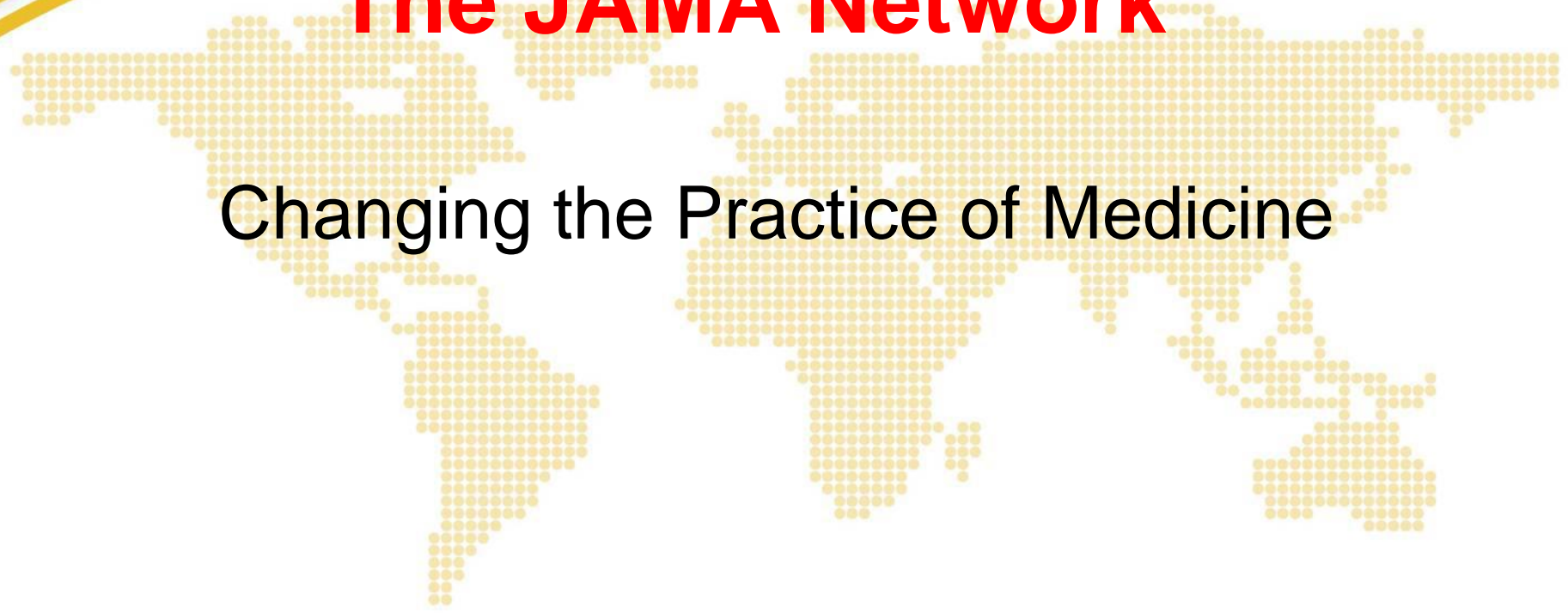




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– Howard Bauchner, MD, Editor-in-Chief, JAMA

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- JAMA **Internal Medicine** Rita F. Redberg, MD, MSc, IF: 14
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# The JAMA Network发展

- **2012年2月**：AMA在线数据库更名为：The JAMA Network
- **2012年5月**：新平台上线：[jamanetwork.com](http://jamanetwork.com)
- **2013年3月**：APP上线：The JAMA Network Reader
- **2013年7月**：期刊改版：JAMA Network journals
- **2013年12月**：CME部分增加离线访问功能
- **2015年2月**：*JAMA Oncology*创刊
- **2016年2月**：*JAMA Cardiology*创刊

# JAMA

- 主编：Howard Bauchner, MD
- 创刊年：1883
- 2017年 IF: 47.661
- 访问量：每年超过144万次访问次数
- 发行量：32万家纸本用户
- 出版内容：世界上发行范围最广的综合性医学杂志。主要刊载临床及实验研究论文，还包括编者述评、读者来信等文章，除主要关注临床医学外，还涉及卫生保健、政治、哲学、伦理、经济、历史等非临床信息。此外，期刊注重教育职能，设有CME栏目，向临床医师提供基础医学与临床医学方面的继续教育服务。





Theme issues highlighting critical topics in medicine



# The JAMA Network: Content focused

## 1. Research

- Original Investigations
- Case Reports

## 2. Opinion

- Viewpoint
- Editorial
- Commentary

## 3. Clinical Review & Education

- Review Articles
- Continuing Medical Education
- Clinical Challenge
- Patient Information





# 1 Research

- Clinical trials
- Meta-analyses
- Epidemiological studies

## Research

### Original Investigation

#### Emergency Department Resource Use by Supervised Residents vs Attending Physicians Alone

Stephen R. Pitts, MD, MPH, Sofie R. Morgan, MD, MBA, Justin D. Schragger, MD, MPH, Todd J. Berger, MD

**IMPORTANCE** Few studies have evaluated the common assumption that graduate medical education is associated with increased resource use.

**OBJECTIVE** To compare resources used in supervised vs attending-only visits in a nationally representative sample of patient visits to US emergency departments (EDs).

**DESIGN, SETTING, AND PARTICIPANTS** Cross-sectional study of the National Hospital Ambulatory Medical Care Survey (2010), a probability sample of US EDs and ED visits.

**EXPOSURES** Supervised visits, defined as visits involving both resident and attending physicians. Three ED teaching types were defined by the proportion of sampled visits that were supervised visits: nonteaching ED, minor teaching ED (half or fewer supervised visits), and major teaching ED (more than half supervised visits).

**MAIN RESULTS AND MEASURES** Association of supervised visits with hospital admission, advanced imaging (computed tomography, ultrasound, or magnetic resonance imaging), any blood test, and ED length of stay, adjusted for visit acuity, demographic characteristics, payer type, and geographic region.

**RESULTS** Of 29 182 ED visits to the 336 nonpediatric EDs in the sample, 3374 visits were supervised visits. Compared with the 25 808 attending-only visits, supervised visits were significantly associated with more frequent hospital admission (21% vs 14%; adjusted odds ratio [aOR], 1.42; 95% CI, 1.09-1.85), advanced imaging (28% vs 21%; aOR, 1.27; 95% CI, 1.06-1.51), and a longer median ED stay (226 vs 183 minutes; adjusted geometric mean ratio, 1.32; 95% CI, 1.18-1.45), but not with blood testing (53% vs 49%; aOR, 1.18; 95% CI, 0.96-1.46). Of visits to the sample of 121 minor teaching EDs, a weighted estimate of 9% were supervised visits, compared with 82% of visits to the 34 major teaching EDs. Supervised visits in major teaching EDs compared with attending-only visits were not associated with hospital admission (aOR, 1.15; 95% CI, 0.83-1.58), advanced imaging (aOR, 1.21; 95% CI, 0.96-1.53), or any blood test (aOR, 1.02; 95% CI, 0.79-1.33), but had longer ED stays (adjusted geometric mean ratio, 1.32; 95% CI, 1.14-1.53).

**CONCLUSIONS AND RELEVANCE** In a sample of US EDs, supervised visits were associated with a greater likelihood of hospital admission and use of advanced imaging and with longer ED stays. Whether these associations are different in EDs in which more than half of visits are seen by residents requires further investigation.

Supplemental material, [jama.com](#)

## Case Report/Case Series

### Novel Gene Mutations in a Sporadic Port-Wine Stain

Christine Guo Lian, MD, Lynette M. Sholl, MD, Labib R. Zakka, MA, MD, Temsa M. O. MD, Cynthia Liu, Shoyun Xu, MD, PhD, Iwaina Starek, Elizabeth Garcia, PhD, Yonghui Ju, PhD, Laura E. MacCossell, PhD, George F. Murphy, MD, Milton Warner, MD, Martin C. Mihm Jr, MD

**IMPORTANCE** Port-wine stains (PWSs) are common congenital cutaneous capillary malformations. A somatic GNAQ mutation was recently identified in patients with sporadic PWSs and Sturge-Weber syndrome. However, subsequent studies to confirm or extend this observation are lacking.

**OBSERVATIONS** We report a long-standing, unilateral facial PWS of a man in his early 70s confirmed by histopathological analysis. Staged surgical excision of the vascular malformation was performed, and genomic DNA was extracted from the vascular malformation specimen and normal skin. Targeted next-generation sequencing of the coding sequence of 275 known cancer genes including GNAQ was performed in both specimens. A single-nucleotide variant (c.548G>A, p.Arg183Gln) in GNAQ was identified in the PWS-affected tissue but not in the normal skin sample. In addition, this sequencing approach uncovered several additional novel somatic mutations in the genes SMARCA4, EPHA3, MYB, PDGFR $\beta$ , and PIK3CA.

**CONCLUSIONS AND RELEVANCE** Our findings confirm the presence of somatic mutations in GNAQ in the affected skin of a patient with congenital PWS, as well as alterations in several other novel genes of possible importance in the pathogenesis of PWS that may also offer substantial therapeutic targets.

JAMA Dermatol. 2014;150(12):1336-1340. doi:10.1001/jamadermatol.2014.1244  
Published online September 3, 2014.

Port-wine stains (PWSs), or capillary malformation, are a common type of cutaneous vascular malformation with a prevalence of 0.3% to 0.5%.<sup>1-3</sup> Clinically, PWS often involves the head and neck as an isolated pink flat lesion that becomes darker and may thicken over time.<sup>4</sup> Port-wine stains may be part of a syndrome, including Sturge-Weber syndrome among others.<sup>5,6</sup> A long-standing hypothesis that PWSs are associated with an underlying somatic mutation was supported in a recent study. Twelve of 13 patients with nonsyndromic PWSs showed a mutation in a single-nucleotide variant (c.548G>A, p.Arg183Gln) in the GNAQ gene (OMIM 600998).<sup>7</sup>

In this report on a patient with a long-standing PWS lesion, we document the presence of a GNAQ c.548G>A mutation. Importantly, several novel mutations in the SMARCA4, EPHA3, MYB, PDGFR $\beta$ , and PIK3CA genes were also identified. Vincent infarctoid condition, extending the scope of mutational anomalies in this Little Rock, Arkansas, condition.

**REPORT OF A CASE**

A healthy man in his early 70s presented with a predominantly unilateral congenital facial vascular lesion. Physical examination revealed painless, dark red to violaceous macules,

patches, coalescent plaques, and no his face (Figure 1). There was marked lateral lower lip, right cheek, right (Figure 1). The lesion also extended to terior neck. A clinical diagnosis of PW Weber syndrome was ruled out by ap previously received laser and surgic cently a staged surgical excision of th periphery over a 6-month period, exci ptosis of the previously untreated au diameter sample of normal skin are

**Histopathological Analysis** Compared with the normal skin as study of the auricular nodule show dilatation of papillary dermal capill ules, and small veins in the sup (Figure 2A). The abnormal vasculer ferent sizes and shapes throughout (Figure 2A). The superficial abnorm walls (Figure 2A), in contrast to the t aspects of large vessels (Figure 2B). Those larger ectatic structures had thickened walls with multiple duplications of the basement membrane zones and entrapment of pericyte-like cells in the thickened areas (Figure 2B). The endothelial cells

## Letters

### RESEARCH LETTER

#### Non-English-Language Proficiency of Applicants to US Residency Programs

More than 25 million US residents have limited English proficiency, an 80% increase from 1990 to 2010.<sup>1</sup> Limited English proficiency (LEP) may impede participation in the English-language-dominant health care system.<sup>2</sup> Little is known about the non-English-language skills of physicians

in training. This study characterizes the language diversity of all US residency applicants through the Electronic Residency Application Service and contrasts applicant language skills with the predominant languages of the US population with LEP.

**Methods** | Applicants were asked to self-report proficiency in all languages spoken using the Interagency Language Roundtable scale adapted for physicians for the first time in 2013.<sup>3</sup>

Table 3. 2013 Residency Applicants by Ethnic Self-identity and Citizenship/Immigration Status

Ethnic Self-identity*	Total (N = 52 892)	Applicants, %	Languages Spoken, % <sup>†</sup>		At Least Advanced Proficiency of NEL, %	
			English Only	>2		
Latino	2800	5.3	1.4	73.6	25.0	91.4
Peruvian	166	0.3	0	63.3	36.8	98.2
Dominican	178	0.3	0	72.5	27.5	98.3
Colombian	279	0.5	0.4	74.6	25.1	96.0
Puerto Rican	594	1.1	1.2	85.4	13.5	96.4
Other Hispanic, Latin	743	1.4	1.2	59.6	39.2	94.4
Cuban	232	0.4	1.3	86.6	12.1	90.4
Mexican, Mexican American	608	1.1	3.1	77.1	19.7	76.7
Asian						
South Asian	10 430	19.7	2.1	14.0	84.0	82.6
Bangladeshi	308	0.6	0.3	22.4	77.3	89.3
Pakistani	1842	3.5	0.8	14.9	84.3	90.4
Indian	8280	15.6	2.4	13.5	84.1	80.5
Other	5548	10.5	4.3	48.1	47.6	68.9
Vietnamese	596	1.1	2.7	51.7	45.6	64.7
Taiwanese	404	0.8	2.7	41.6	55.7	59.8
Chinese	1812	3.4	2.9	56.7	40.4	69.0
Other Asian	1088	2.1	2.6	35.2	61.2	82.1
Korean	816	1.5	6.3	42.6	50.1	60.3
Filipino	668	1.3	7.5	49.9	42.7	64.4
Japanese	164	0.3	11.0	58.5	30.5	78.8
Black/African American	3376	6.4	27.7	47.9	24.4	56.1
Other black or African	143	0.3	16.1	39.2	44.8	65.0
African	1372	2.6	19.7	54.5	25.8	78.6
Afro-Caribbean	518	1.0	24.1	33.2	42.7	54.7
African American	1343	2.5	38.5	47.7	13.9	25.9
White	21 077	39.8	27.9	50.9	21.3	31.3
Other	1722	3.3	8.3	44.8	47.0	74.9
No identity response <sup>‡</sup>	8029	15.2	10.2	41.6	48.3	61.0
Citizenship/Immigration Status						
Non-US citizens	15 219	28.7	3.6	32.9	63.5	93.0
Legal alien <sup>§</sup>	7227	13.6	3.0	28.3	68.7	93.4
US permanent resident	5126	9.7	3.3	38.7	58.0	94.8
Non-US-based applicant	2866	5.4	5.6	34.0	60.4	88.7
US citizen	37 763	71.3	20.4	46.7	32.9	42.2

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Opinion

EDITORIAL

## Substance Misuse Among Adolescents To Screen or Not to Screen?

Geetha A. Subramanian, MD, DFAPA; Nora D. Volkow, MD

**Alcohol, tobacco, and marijuana** are the top 3 substances of misuse among teenagers. According to the Monitoring the Future study,<sup>1</sup> marijuana use continues to increase in contrast to tobacco or alcohol use, which has leveled off; currently, more than one-third of 12th graders report having used marijuana in the past year, and 6.5% report using it regularly. Emerging evidence suggests that the adolescent brain is highly vulnerable to exposure to alcohol or cannabis consumption, resulting in proximal and distal impairments in neurocognitive functioning (including memory and intelligence), sensitivity to reward, and emotional regulation. Moreover, deaths in adolescents are largely preventable because most are a result of substance-related motor vehicle accidents and overdose or unintentional poisoning. Substance use disorders (SUDs), especially those that begin during adolescence, have a high likelihood of persisting into adulthood, with associated negative medical, personal, and professional consequences. Pediatric care physicians are well positioned to prevent initiation or curb the progression of substance misuse among adolescents.

The available screening tools to detect substance misuse in pediatric settings have several limitations. In response, the Institute on Drug Abuse provided a funding opportunity<sup>2</sup> to validate a quick and combined (ie, alcohol, marijuana, and other commonly abused substances) screening and brief assessment tool for universal adoption to adolescents (age range, 12-17 years) in pediatric settings. Among other criteria, the National Institute on Drug Abuse required that the quick tool triage responses lead the clinician to a clinically actionable problem category; be self-administered by the teen and administration by staff; be delivered on an electronic platform, such as a tablet; factor in workflow considerations at medical settings; and be available in the public domain. In this issue, Levy and colleagues<sup>3</sup> present the results of 1 validation projects that were funded. The quick tool developed by the authors was composed of the past-year free-screen questions from the National Institute on Drug Abuse screen for tobacco, alcohol, marijuana, and several drug use categories, followed by an Alcohol Use Identification Test for adolescents with positive alcohol use results, or the RAFFT questions (ie, CRAFFT without question) for adolescents with positive marijuana and substance screen results. The psychometric properties of the screen and brief assessment were excellent for self-

administration and interviewer administration, and it took less than 1 minute to complete. The authors serendipitously found that asking the frequency of use screen questions alone was sufficient to identify the 3 types of *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) (DSM-5) SUD diagnostic categories, further simplifying the process. Of course, these findings need to be replicated in larger samples to allow validation of these and other common substance use screen questions. In addition, the authors' findings suggest that the screen, if used by a pediatrician, could be shared with the pediatrician's prescriber, or the prescriber, if used by a pediatrician, could be shared with the pediatrician. This would be a valuable tool for the pediatrician.

Strategies to disseminate the use of this validating tool would need to overcome barriers to screening in pediatric primary care settings. Barriers<sup>4</sup> are the lack of knowledge on how to manage adolescents of abuse, the lack of training in or familiarity of adolescents with substance use, the burden on pediatric physicians to take these tests, and the time constraints of busy practices.

Perhaps an even bigger barrier to widespread adoption is the lack of an evidence base to clinically guide the physician when substance misuse is uncovered. How and when does he/she intervene? To date, few trials have reported the efficacy of brief interventions for alcohol, cannabis, or other substance misuse in pediatric settings. As a result, the American Academy of Pediatrics has issued an "I" (indicating insufficient evidence) recommendation for screening and intervention for adolescent alcohol, cannabis, or other substance misuse. According to their definition, the existing evidence is either poor quality, thereby precluding them from making a recommendation for or against screening and/or intervention, or the evidence is of low quality, thereby precluding them from making a recommendation for or against screening and/or intervention. In the case of substance misuse in pediatric settings, the evidence is of low quality, thereby precluding them from making a recommendation for or against screening and/or intervention. In the case of substance misuse in pediatric settings, the evidence is of low quality, thereby precluding them from making a recommendation for or against screening and/or intervention. In the case of substance misuse in pediatric settings, the evidence is of low quality, thereby precluding them from making a recommendation for or against screening and/or intervention.

September 2014 Volume 168, Number 9

## Viewpoints

## Dueling Viewpoints

## Editorial

## Commentary

## Invited commentary

### VIEWPOINT

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## Public Health in the Age of Ebola in West Africa

The world is witnessing the unprecedented unfolding of the West African Ebola epidemic. The epidemic could have major ramifications for global public health in ways that no other modern infectious disease has, perhaps including AIDS, and can be viewed as a "Black Swan" event. Nassim Nicholas Taleb, the Lebanese-American author and scholar, introduced the metaphor of the black swan, a bird that was once thought not to exist, to explain financial events. Subsequently, Taleb extended the Black Swan concept, in his 2007 book of the same name, beyond finance to explain high profile, difficult to predict, and rare events in history and the present.<sup>1</sup>

What we call here a Black Swan (and capitalize it as an event with the following three attributes. First, it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme "impact." Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable.

The West African Ebola epidemic has all the makings of a Black Swan event with one exception—the global public health community will be working to contain it for months, or years, to come. As of October 2014, there is no evidence that this devastating epidemic is anywhere near under control. If the number of new cases of Ebola virus disease projected by the World Health Organization (WHO) (20 000 cases by early November 2014)<sup>2</sup> and the Centers for Disease Control and Prevention (1.4 million cases in Liberia and Sierra Leone by the middle of January 2015 if there are no or unsuccessful interventions)<sup>3</sup> materialize, the West African Ebola epidemic will be the most difficult to contain in the world. It is difficult to imagine that the virus will not make its way into other African countries, particularly densely populated cities such as Dakar, Senegal; Abidjan, Ivory Coast; Lagos, Nigeria; Kinshasa, Democratic Republic of the Congo; or Nairobi, Kenya. Nearly infected, but not ill or only mildly ill, persons could leave the affected countries by foot, air, or sea, and even persons that move across the continent. With rail, road, and air networks, and the high prevalence of poverty in the large slums of major urban centers, circumstances are ripe for an even larger Ebola epidemic throughout continental Africa.

What can be learned from the first phases of the unfolding Ebola epidemic in West Africa? Already, we have learned that Ebola in an urban Africa creates a much different situation than Ebola in rural Africa. The early rapid and widespread nature of the West African Ebola from sprawling out of control, and that quarantine efforts are more likely to backfire than to curtail the spread of disease. Two lessons, however, have changed our thinking about infectious disease threats

and their potential effects on international and regional security, economic stability, and overarching public health governance.

**Research and Response**

There is now clear evidence that an infectious disease such as Ebola virus disease can threaten the stability of a country's or region's government, economy, and social fabric. Although other infectious diseases, including AIDS, malaria, tuberculosis, childhood diseases that are preventable by vaccine, and diarrheal illness, have killed more people in Liberia, Sierra Leone, and Guinea during the past year than Ebola virus disease has killed to date, those diseases have not destabilized the region. This is another painful lesson that what kills us may be very different from what frightens us or substantially affects our social systems.

Individuals and organizations that exert influence in global health should keep this point in mind as they allocate limited public health resources to prepare for infrequent, but nonetheless predictable, disease outbreaks, epidemics, or pandemics caused by a wide range of infectious disease agents, such as a novel influenza virus, an intentional release of a known or unknown bacterium agent, or a new emerging respiratory pathogen such as the coronavirus that causes Middle Eastern respiratory syndrome. Before September 2014, most researchers in global health would have considered it good public policy to allocate limited resources toward developing an effective vaccine against Ebola virus disease—at least with the same level of commitment as the development of vaccines for human immunodeficiency virus, tuberculosis, malaria, or diarrheal diseases. Developing vaccines for these other diseases remains critically important. But the Ebola epidemic in West Africa has deepened the realization that the historical mortality and mortality of an infectious disease does not necessarily predict what might happen in the future. An essential characteristic of a Black Swan event is the inappropriate rationalizations after the fact with the benefit of hindsight. Researchers and public health officials should have and could have imagined what a virus such as Ebola that is transmitted through direct contact could do once it infected people outside of sparsely populated rural Africa and found its way into the crowded and impoverished neighborhoods of large African cities. The lesson to be learned is that more creative imagination is needed in considering future infectious disease scenarios and in planning accordingly. Governments and other organizations that fund global public health efforts should be willing to support this type of forward thinking, which ultimately is aimed at securing our collective future.

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### VIEWPOINT

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## Global Tuberculosis Perspectives, Prospects, and Priorities

**Despite being nearly 100% curable**, tuberculosis remains a major public health problem, representing the second leading cause of death from infectious diseases globally, with drug-resistant tuberculosis increasingly common. In 2012, an estimated 8.6 million people developed tuberculosis worldwide—a global incidence rate of 122 persons per 100 000 population—and 1.3 million people died. Incidence rates vary from high in southern Africa (550/100 000 population in Mozambique and Zimbabwe and 1000/100 000 population in South Africa) to fewer than 10/100 000 population in the United States, Canada, and most of Western Europe.<sup>1</sup> Although the global prevalence of multidrug-resistant tuberculosis was estimated at 3.6% of newly diagnosed and 20.2% of previously treated patients, these rates were 20% to 35% for newly diagnosed cases and 50% to 60% for retreatment cases in the Russian Federation and some other former Soviet republics.

In sub-Saharan Africa, the tuberculosis epidemic is driven by HIV through both increased reactivation of latent tuberculosis infection and the increased risk of rapid development of disease soon after exposure to Mycobacterium tuberculosis because of HIV-induced immunodeficiency. There is lower tuberculosis incidence in Asia, but because Asia's population is so much larger than Africa's—more than 4 billion compared with about a billion—75% of the 5 million tuberculosis cases in the 22 highest-burden countries are in Asia. In these countries, crowding, poverty, and inadequate tuberculosis treatment completion rates contribute to the epidemic.<sup>2</sup>

Despite these statistics, marked progress has occurred since the World Health Organization (WHO) declared tuberculosis a global emergency 20 years ago. In 1995, fewer than 2 million patients were successfully treated using the WHO's Directly Observed Treatment, short course (DOTS) strategy, less than a quarter of the estimated total; by 2011, nearly 5 million patients were treated successfully with DOTS. Approximately 56 million patients have been treated successfully since 1995, preventing an estimated 22 million deaths. However, every year about 3 million people with tuberculosis are missed by health systems. Mortality rates are declining, albeit slowly, in all regions of the world. Since 1990, the death rate associated with tuberculosis has decreased 45%, from 25 persons to 14/100 000 population, although rates vary widely between countries.

The greatest risk to tuberculosis control is lack of implementation of effective and currently available strategies and tools. Tuberculosis control rests on 3 fundamental principles: prompt and accurate diagnosis and monitored until completion, and interruption of transmission.

**Diagnosis**

Microbiological examination of sputum smears for acid-fast bacilli, despite limitations, remains the mainstay of diagnosis. Newer diagnostics provide greater sensitivity, particularly among children and persons with HIV infection (whose sputum smears are often negative), and can also identify rifampin resistance. These newer tests can enhance, but not yet replace, smear microscopy because of expense and requirements for suitable infrastructure, including stable electricity supplies. Early and accurate identification of tuberculosis can result in earlier treatment and decrease transmission, but only if treatment is promptly initiated.<sup>3</sup>

**Rapid and Complete Treatment**

All patients diagnosed with tuberculosis should receive prompt, complete, and effective treatment. In practice, however, as many as 10% to 30% of patients with laboratory-detected smear-positive sputum do not start treatment,<sup>4</sup> the result of disconnects between laboratories, treating facilities, and patients. Turnaround time between identification of a positive specimen, whether by smear microscopy or molecular diagnostics, and treatment initiation should not be longer than 24 hours. Communication between diagnosing and treating facilities remains problematic, and responsibility for promptly finding patients once there is a positive result remains nebulous in many programs.<sup>5</sup>

Monitoring and evaluation of the diagnosis and treatment cascade within every facility should be routine and performed quarterly, but in practice it is rare for a treating facility to know what percentage of patients diagnosed actually began treatment at the facility to which they were referred, or have information about outcomes of these diagnosed patients, such as cured, died, lost to follow-up, or remaining smear- or culture-positive.

Effective, regular, and structured supervision of tuberculosis diagnosis and treatment facilities and their patients, combined with program management and evaluation, is essential to tuberculosis control. Supervision helps determine why patients do not seek care and how attendance might be improved and teaches staff to perform essential tasks and keep accurate records. Cohort analysis, performed quarterly and answering 2 simple questions: how many patients were diagnosed with tuberculosis and what happened to them is the hallmark of effective tuberculosis control and a model of accountability for treatment of any chronic illness.

Supportive supervision—helping health workers improve their performance—requires staff training in specific skills, with central or provincial staff supervising districts of officers who in turn supervise frontline health staff. Regular, structured field visits to treatment clinics en-

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Opinion

JAMA October 8, 2014 Volume 312, Number 14

# 3 Clinical Review & Education

- Review articles
- New article types aimed at busy clinicians
- Guide Methods
- Clinical Challenge
- Patient Page

Clinical Review & Education

**Review**

## Traveler's Diarrhea

### A Clinical Review

Robert Steffen, MD; David R. Hill, MD, DTM&H; Herbert L. DuPont, MD

**IMPORTANCE** Acute diarrhea is the most common illness that affects travelers seeking medical care in many regions of the world. Although improved hygiene has reduced the risk at many destinations, the risk remains high in others.

**OBJECTIVE** To review the current state of knowledge on the etiology, and management of traveler's diarrhea.

**EVIDENCE REVIEW** A search of the PubMed, Google Scholar, and Cochran for the period 2012–April 2014 was performed for articles on traveler's search yielded 2976 articles, of which 37 were included in this review. 85 articles previously identified by the authors.

**FINDINGS** Improved hygiene has reduced the risk of traveler's diarrhea (for a 2-week stay) to between 8% and 20% in some parts of the world. Traveler's diarrhea causes 12% to 46% of travelers to change their travel plans. In 3% to 17% of patients who have had traveler's diarrhea. Prevention by dietary avoidance measures is often not successful. Chemotherapy is the standard treatment in self-therapy of traveler's diarrhea when patients are in South or Southeast Asia, where azithromycin is preferred.

**CONCLUSIONS AND RELEVANCE** Diarrhea remains a common problem for travelers. Persons intending to travel to at-risk countries should be counseled on prevention measures and may be given a travel pack that includes medication should they become ill.

1015.31310.71-80. doi:10.1001/jama.2014.17006

JAMA PATIENT PAGE | Infectious Diseases

## Traveler's Diarrhea

Traveler's diarrhea is the most common illness among persons visiting lower-income countries.

**What Is Traveler's Diarrhea?**  
Traveler's diarrhea is an illness mostly caused by bacteria in food or water. If you have traveler's diarrhea, your main symptom will be loose stools. Stomach cramps and nausea are also common. You also might have vomiting or fever.  
If you are a healthy adult, traveler's diarrhea will probably not be serious. But you might have to change your travel plans until you recover. Without treatment, most people recover within 4 days.

**How Can I Avoid Traveler's Diarrhea?**  
To avoid getting traveler's diarrhea, you should  
• Wash your hands often. This is especially important after you use the bathroom or before you eat. Use lots of soap and water.  
• Be careful what you eat or drink.  
• Try to choose restaurants that are busy and clean. Try to avoid buffets. Food should be recently cooked and served very hot.  
• Avoid raw fruits and vegetables. (But these might be safe if they are peeled or washed in clean water.)  
• Avoid undercooked meats, fish, and seafood.  
• Avoid tap water and ice. (Ice might have been made with unclean water.)  
• Choose beverages in factory-sealed containers. Bottled water is a good example. Beverages made using boiling water are also safe. Tea is a good example.

**How Can I Treat My Traveler's Diarrhea?**  
If you develop traveler's diarrhea, you should drink lots of fluids. This is especially important for young children. It is also especially important if you are older or have a chronic illness.  
Make sure the fluids are safe (see above). Tea with some sugar is a good choice. Soup is another good choice. If you are dizzy, eat salted crackers. In serious cases, you can drink a solution made from a powder you can buy in drugstores worldwide. These solutions can help prevent dehydration. They are also helpful in children or in adults with medical conditions.  
You might also consider packing an antibiotic. The choice of antibiotic will depend on where you are going. You should ask your doctor or travel clinic for help choosing.

**Ways to avoid traveler's diarrhea**

Wash hands often with soap and water, especially after using the bathroom and before meals.

Eat only food that has been recently prepared and is served very hot.

Wash raw produce with clean water or peel when possible.

Drink beverages made with boiling water or from factory-sealed containers.

Drugs are available that can stop diarrhea for a short time (for example, loperamide). Because these drugs stop diarrhea, you can board a bus or plane until an antibiotic starts working.

**What If I Still Have Traveler's Diarrhea After I Get Home?**  
You should see your doctor or travel clinic if you still have traveler's diarrhea for more than 72 hours after you get home. This is especially important if you are seriously ill or if you have a fever or blood in your stool.

**FOR MORE INFORMATION**

- Centers for Disease Control and Prevention [www.cdc.gov/travel/page/travelers-diarrhea](http://www.cdc.gov/travel/page/travelers-diarrhea)

## JAMA Clinical Challenge

### A 38-Year-Old Man With Extensor Surface Papules

Eric Melnychuk, DO, EMT-3; Alexis Weymann Perinuzzi, MD, MEd; Eric Hoelder, MD



Figure 1. Left, Erythematous pink and yellow papules on the wrists. Right, Close up of the papules.

**A 38-year-old morbidly obese man** presents with a 1-month history of rash on the extensor surfaces of his hands, forearms, elbows, shoulders, flanks, and upper thighs. The rash is nonpruritic but is associated with burning pain. The patient has had no fevers, shortness of breath, recent viral syndromes, or recent travel. He has a history of pancreatitis several years prior, recent repair of a tibial fracture, ankle osteoarthritis, cholelithiasis, seizure disorder, and bipolar disorder. He has a family history of type 2 diabetes in his father and brother. His current medications include phenobarbital, levetiracetam, quetiapine, lorazepam, fluoxetine, tramadol, aspirin, celecoxib, and gabapentin, none of which were started in the past few months. Skin examination reveals hundreds of bright pink papules with central yellow hue distributed symmetrically over his dorsal hands, elbows, shoulders, and thighs (Figure 1). The remainder of the examination is unremarkable.

- WHAT WOULD YOU DO NEXT?**
- Obtain a lipid panel.
  - Order a chest radiograph.
  - Treat empirically with oral prednisone.
  - Unroof one of the papules and send for viral culture.

Despite the description of the syndrome of traveler's diarrhea more than 50 years ago by B. H. Kean,<sup>1</sup> the discovery of enterotoxigenic *Escherichia coli* (ETEC) as a pathogen a decade later,<sup>2</sup> and effective treatment soon thereafter,<sup>3</sup> the incidence of traveler's diarrhea during a 2-week stay is 10% to 40%, depending on destination and traveler characteristics. In addition, the GeoSentinel database, a global of clinicians sharing data about travel-related morbidity, indicated that acute and chronic diarrhea accounted for 335 of 3000 medical visits by returned travelers.<sup>4</sup> Reduction in the incidence of traveler's diarrhea is more closely related to sanitation at the destination rather than specific interventions implemented by the traveler.<sup>5</sup> Therefore, travelers are often prepared to manage illness that may occur during their travels.

**Authors:** Robert Steffen, MD; David R. Hill, MD, DTM&H, FRCP, FRCPC; Herbert L. DuPont, MD.

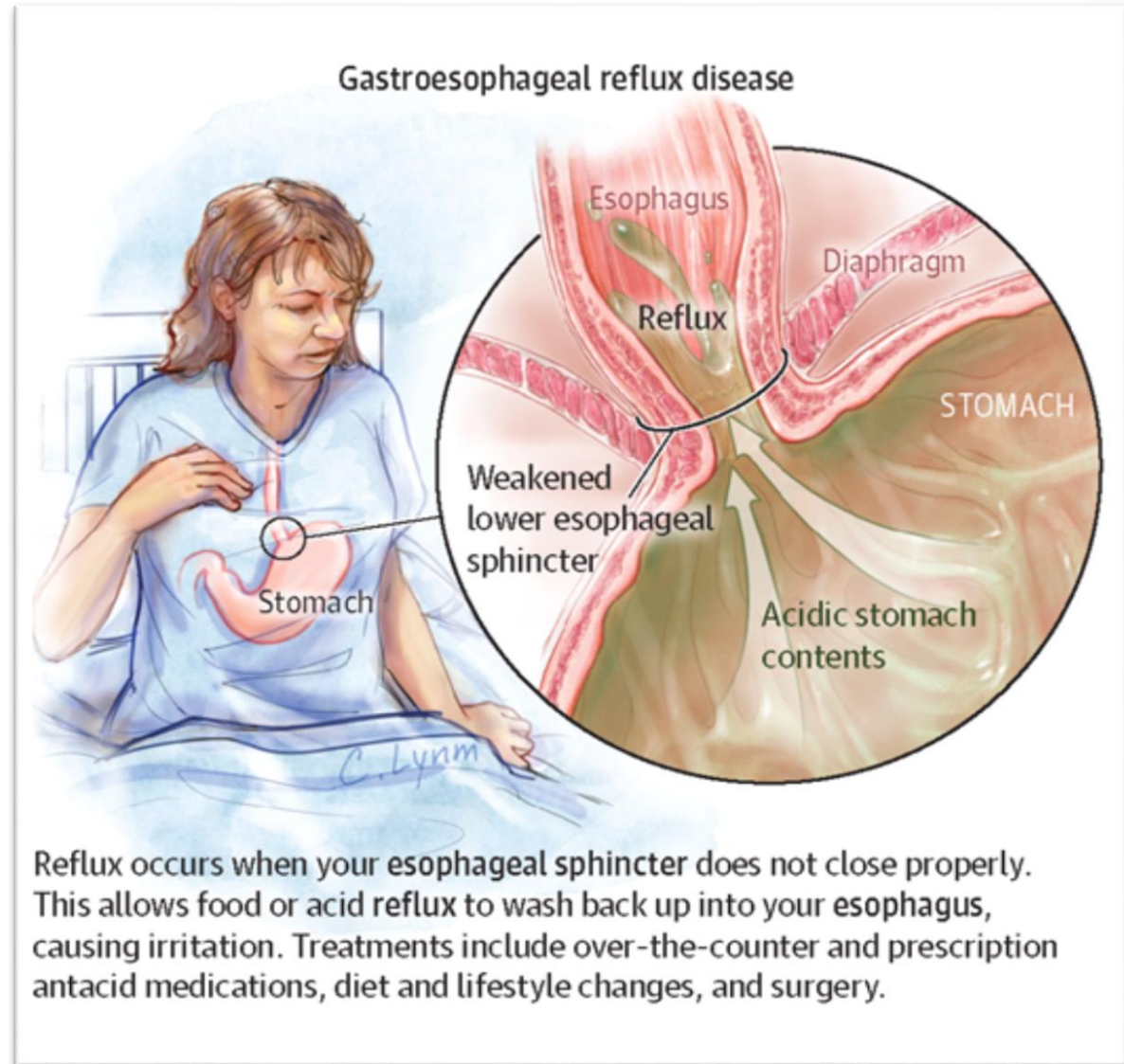
**Conflict of Interest Disclosures:** All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Steffen reports receipt of consulting fees/honoraria and support for travel from Dr Talk Pharmaceuticals and payment for lectures/speakers bureaus and support for travel from various vaccine producers unrelated to traveler's diarrhea. Dr DuPont reports consultancy for Salix Pharmaceuticals and Cubist and payment for lectures/speakers bureaus from Merck, Cubist, and Salix Pharmaceuticals (paid to him) as well as consultancy for Merck and GlaxoSmithKline and grants from Satorius, Sanofi Pasteur, GlaxoSmithKline, and Viropharma (paid to his institution). Dr Hill reported no disclosures.

**Source:** Centers for Disease Control and Prevention

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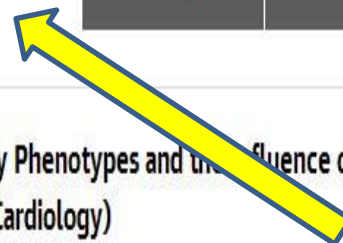
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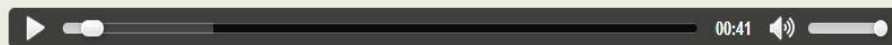
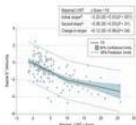
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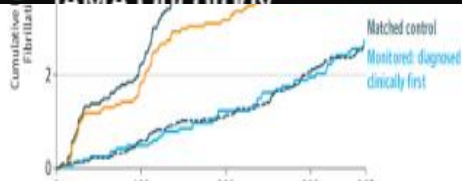
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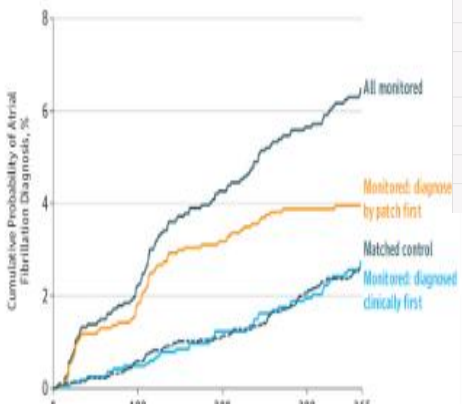
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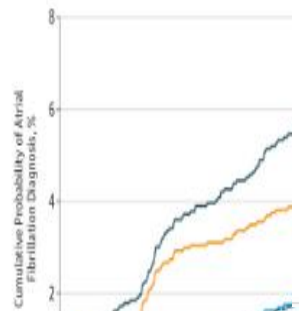
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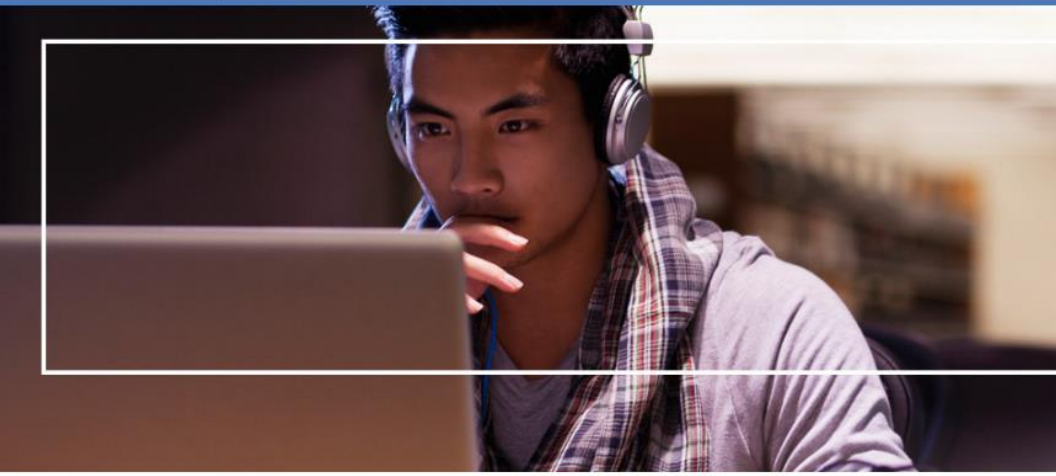
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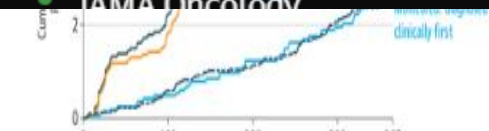
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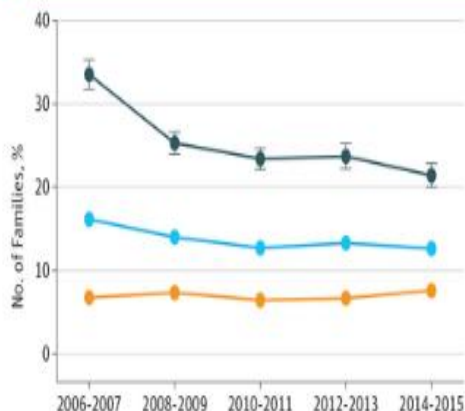
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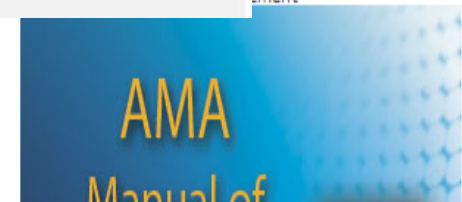
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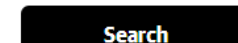
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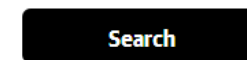


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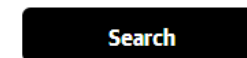


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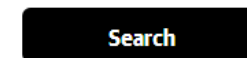
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