

## COMMENTS AND RESPONSES

**Is Primary Care Practice Sustainable?**

**TO THE EDITOR:** In her essay on the sustainability of primary care practice, Montecalvo (1) described the very real challenges and difficulties facing primary care physicians today.

Her rendering of the nonmedical chores (I prefer to call them “drudgery chores”) of primary care truthfully describes why most primary care physicians are dissatisfied and demoralized and are either burned out or close to it. Her solution is simple—pay primary care physicians for the distracting and time-consuming tasks demanded of them so that they can reduce their patient load and thus make it more manageable. The results will be that the numerous distractions and interruptions to workflow will lessen and primary care physicians can have more time for their patients and lead more satisfactory professional and personal lives.

But her story needs to be taken to the public arena. It is good to share ideas with colleagues in respected journals like *Annals*, but for change to occur, we physicians need to get public opinion on our side.

So far we have failed to do this. Our leadership organizations, including the American Medical Association, and our specialty societies have abjectly failed to protect our professional security. Only if our leadership can muster the courage to push back against the many forces that have aligned themselves against primary care physicians will primary care survive. But I doubt that our leadership will rise to the occasion. History clearly shows that they have not in the past.

And to answer Montecalvo's question, “Is primary care practice sustainable?”—I say no. Primary care physicians will no longer be the principal providers for their patients. Even though being a primary care physician is admirable, the financial and personal rewards will continue to decline and the hopelessness and desperation experienced by most primary care physicians will continue to worsen.

It is likely that most primary care will be provided by advanced practice nurses in the future. They are already independently licensed to practice in many states.

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**Disclosures:** Author has disclosed no conflicts of interest. Form can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0591](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0591).

doi:10.7326/L15-0591

**Reference**

1. Montecalvo MA. Is primary care practice sustainable? From the secretary's desk. *Ann Intern Med.* 2015;163:394-5. [PMID: 26322699] doi:10.7326/M15-0339

**IN RESPONSE:** I thank Dr. Volpintesta for his comments and agree that we must move beyond voicing our concerns in the pages of our journals; we need physician leadership to champion primary care. Dr. Volpintesta contends that the pri-

mary care model, solo practitioner/office manager, is not sustainable.

I received letters from many physicians voicing similar concerns, ranging from a physician-in-training who chose a subspecialty to lessen exposure to the “drudgery chores,” to a 95-year-old physician who expressed deep concern over the loss of continuity in medical care. A per-member, per-month payment model to cover the costs of paperwork might be helpful. MDVIP (Value in Prevention) has such a model; practices are capped at 600 patients, but to allow this, patients must be able to afford a \$1650 annual premium, in addition to insurance premiums and co-pays (1). Dr. Volpintesta concludes that primary care will mostly be provided by advanced practice nurses in the future. Advanced practice nurses bring many assets to primary care because they are excellent at education and prevention, in addition to the provision of service. However, we still need physicians to provide guidance and leadership to patients navigating through the world of multiple subspecialists. As physicians, we should work collaboratively with our advanced practice nurse colleagues to address the issues that are central to both of us.

Beginning in 2019, Medicare's new physician payment system will favor physicians who receive payments from an accountable care organization, a medical home, or an alternative payment model (2). This is a big step toward payment for adherence to “value” indicators and may provide some financial assistance for the primary care physician. However, such a substantive change heralds the need to study its effects and learn from providers with firsthand experience practicing medicine in the world of value-based purchasing.

How do physicians working in the field provide input to policymakers? We do not have a good system for this. How will our medical school graduates, who will begin work with an individual median educational debt of \$183 000 (3), find the time to work on policy issues? Our professional societies must demand that the systems overseeing medical care require feedback from primary care providers, and they must create incentives that will allow providers the time to thoughtfully contribute their experience.

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**Disclosures:** Author has disclosed no conflicts of interest. Form can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L15-0590](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L15-0590).

doi:10.7326/L15-0590

**References**

- Musich S, Klemes A, Kubica MA, Wang S, Hawkins K. Personalized preventive care reduces healthcare expenditures among Medicare Advantage beneficiaries. *Am J Manag Care.* 2014;20:613-20. [PMID: 25295675]
- Oberlander J, Laugesen MJ. Leap of Faith—Medicare's New Physician Payment System. *N Engl J Med.* 2015;373:1185-7. [PMID: 26398067] doi:10.1056/NEJMp1509154
- Association of American Medical Colleges. Medical Student Education: Debt, Costs, and Loan Repayment Fact Card. October 2015. Accessed at [www.aamc.org/download/447254/data/debtfactcard.pdf](http://www.aamc.org/download/447254/data/debtfactcard.pdf) on 29 February 2016.

## Cost Analysis of the American Board of Internal Medicine's Maintenance-of-Certification Program

**TO THE EDITOR:** Sandhu and colleagues' cost analysis on the American Board of Internal Medicine's (ABIM) Maintenance-of-Certification (MOC) program (1) is the first step in what must become a serial evaluation of MOC value. We must determine whether the estimated time and expenses, which are substantial for an individual but gargantuan for the entire cadre of board-certified physicians, are really justified by the additional benefit or value provided to patients. According to my accountant, my personal direct and indirect costs to recertify for only the subspecialty of rheumatology in 2012 were much higher than the lowest estimate reported in the article. It is one thing to estimate the costs of MOC, but it is a much more important analysis to determine the value of MOC in terms of costs versus outcomes: patient protection, cost-savings from application of best care practices, and better efficiencies in health care delivery. That determination of value must also include an evaluation of the clinical relevance of such items as the arcane questions in the MOC evaluations and the demonstrated relevance of the entire MOC process to the stated goal of advancing quality medicine.

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doi:10.7326/L16-0006

### Reference

1. Sandhu AT, Dudley RA, Kazi DS. A cost analysis of the American Board of Internal Medicine's Maintenance-of-Certification program. *Ann Intern Med.* 2015;163:401-8. [PMID: 26216046] doi:10.7326/M15-1011

**TO THE EDITOR:** I read Sandhu and colleagues' cost analysis on ABIM's MOC program with interest (1). I first took the internal medicine boards 50 years ago (actually 48) when the ABIM gave a written examination followed months later by an oral examination for those who had passed the written. I "failed to pass" the oral examination and had to wait a year before I could make another attempt. Rumbling was increasing about the lack of validity of the oral examination. A few years later, ABIM announced that it would give a select few candidates the written and oral examinations the same week. A few months later, without comment, ABIM announced that the oral examination could be replaced by a more carefully constructed written examination and it was never given again. Now, we have an equally unstudied "Maintenance of Certification" examination, with the only known fact being that it is expensive and time-consuming. The ABIM is as much of a pompous fraud now as it was in 1967.

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**Disclosures:** Author has disclosed no conflicts of interest. Form can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0005](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0005).

doi:10.7326/L16-0005

### Reference

1. Sandhu AT, Dudley RA, Kazi DS. A cost analysis of the American Board of Internal Medicine's Maintenance-of-Certification program. *Ann Intern Med.* 2015;163:401-8. [PMID: 26216046] doi:10.7326/M15-1011

**IN RESPONSE:** We share Dr. Adams' and Dr. Hanauer's concerns about the high cost of the ABIM's MOC program. We estimated that the program will cost individual physicians an average of \$23 607 over 10 years, but Dr. Adams is correct to note that costs to some physicians may be significantly higher. For instance, a physician who participates in a board certification course or needs to travel outside her hometown to take the recertification examination would face substantially higher costs. Our findings inform the ongoing debate about the societal value of the expanded MOC program: Within 24 hours of its online publication, ours was the most shared study among U.S. doctors on social media (1).

In its response to our work, the ABIM asserted that the staggering MOC-related costs we identified in our analysis simply represent the "cost of keeping up" (2). We disagree. Like Dr. Adams and Dr. Hanauer, we believe that this enormous investment—totaling \$5.7 billion over 10 years—should be guided by high-quality evidence of effectiveness rather than rhetoric about "controlling our destiny as a profession" (2). Is there any evidence to suggest that a physician's time is better spent completing an online module that includes questions about a negative phase 2 clinical trial (for which she would receive MOC credit) rather than attending grand rounds by a local expert on the health challenges faced by the city's homeless population (for which MOC credit would typically not be available)? Although we support the ABIM's ongoing efforts to maximize the educational value of the "high-stakes" MOC recertification examination, we argue that MOC must do more than educate. It must objectively demonstrate an improvement in clinical or economic outcomes to justify its existence. We estimate that the ABIM will receive more than a half-billion dollars in MOC-related fees over 10 years, and we recommend that these resources be earmarked for a systematic evaluation of the MOC program, preferably by a disinterested third party. The ABIM would also do well to learn from its peers: the American Board of Anesthesiology recently announced that it was dropping the decennial recertification examination in favor of a more continuous evaluation process (3), and the newly formed National Board of Physicians and Surgeons will not require its diplomates to take a recertification examination provided that they meet continuing medical education requirements (4).

The internal medicine community has embraced the principle of evidence-based medicine in clinical practice—such expensive policy interventions as MOC should be held to the same evidentiary standards. We hope that our work catalyzes future studies that address the impact of MOC on the quality

of care delivered by board-certified physicians in the United States and examine whether there is an empirical basis for investing physician time and money in ABIM MOC over alternative strategies for quality improvement.

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**Disclosures:** Authors have disclosed no conflicts of interest. Forms can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M15-1011](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M15-1011).

doi:10.7326/L16-0007

#### References

1. MDigitalLife Doctors' daily read [tumblr blog]. Accessed at <http://doctorsdaily.tumblr.com/post/125289629136/the-article-shared-the-most-by-us-physicians-today> on 1 August 2015.
2. Baron RJ. The cost of keeping up. ABIM Blog. Posted 28 July 2015. Accessed at <http://transforming.abim.org/the-cost-of-keeping-up/> on 4 November 2015.
3. American Board of Anesthesiology. Maintenance of Certification in Anesthesiology MOCA 2.0. Accessed at [www.theaba.org/MOCA/About-MOCA-2-0](http://www.theaba.org/MOCA/About-MOCA-2-0) on 1 December 2015.
4. National Board of Physicians and Surgeons. Criteria for Board Certification. Accessed at <https://nbpas.org/criteria/> on 1 December 2015.

## Diet and Physical Activity Promotion Programs to Prevent Type 2 Diabetes

**TO THE EDITOR:** I am responding to Balk and colleagues' recent review on combined diet and physical activity promotion programs to prevent type 2 diabetes mellitus (1). My experience has been that despite strong evidence, we do not have structured programs in the United States at community levels for lifestyle changes. Patients are busy and have financial constraints to see a dietitian and obtain formal, individualized meal plans. Dietitians are also hard to come by, and consultations are not included in patients' health care benefits. Although some insurance companies do have some discounts to gymnasiums, the lack of structure is a major cause of failure of implementation in the community. If this is not addressed, we will continue to fail our patients. We have strong emphasis on medications to prevent diabetes, but are we not obligated to give our patients a good shot at lifestyle changes?

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**Disclosures:** Author has disclosed no conflicts of interest. Form can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L15-0571](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L15-0571).

doi:10.7326/L15-0571

#### Reference

1. Balk EM, Earley A, Raman G, Avendano EA, Pittas AG, Remington PL. Combined diet and physical activity promotion programs to prevent type 2 diabetes among persons at increased risk: a systematic review for the Community Preventive Services Task Force. *Ann Intern Med.* 2015;163:437-51. [PMID: 26167912] doi:10.7326/M15-0452

**IN RESPONSE:** We thank Dr. Kedlaya for emphasizing the importance of implementing the evidence for prevention of diabetes. There are many structured programs at the community level in the United States. Currently, over 700 organizations deliver in-person and virtual diabetes prevention programs and more than 40 commercial health plans provide some form of coverage as part of the National Diabetes Prevention Program ([www.cdc.gov/diabetes/prevention/](http://www.cdc.gov/diabetes/prevention/)). Work is under way with both Medicare and Medicaid to provide coverage of these programs. The National Diabetes Prevention Program is a valuable resource for diet and physical activity promotion programs to prevent diabetes, including links to specific programs across the United States.

Despite these efforts, we agree that the range and availability of programs need to expand by promoting participation in the National Diabetes Prevention Program and advocating for coverage by insurers. This kind of infrastructure cannot happen without stakeholders joining forces and focusing on a common agenda, which has been done by the Community Preventive Services Task Force and continues to be done by the National Diabetes Prevention Program.

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doi:10.7326/L15-0570

## Collateral Damage: Pay-for-Performance Initiatives

**TO THE EDITOR:** The late Secretary of Defense under the Kennedy-Johnson administrations, Robert McNamara, applied the concept of systems analysis to the conduct of the Vietnam War. As one of the Harvard "whiz kids," he applied statistical analysis to the fighting to create a more efficient, limited, controlled engagement. Despite the horrid failure of this endeavor, it seems our government is entrapped by his legacy and has applied these basic principles to numerous areas, including education and medicine.

During the Vietnam War era, there was “promotion for performance”, wherein postengagement statistics had to be reported. How many American lives were lost in trying to examine the battlefield to collect these data? How much data were fictitious and distorted?

Woolhandler and colleagues (1) have just scratched the surface of the wrongheadedness of pay-for-performance. In addition to the socioeconomic limitations penalizing how we care for the poor and the underserved, there will be the usual statistical GIGO (garbage in, garbage out) that will taint the metadata. There will also be an unprecedented opportunity for fraud and abuse in a complicated, computer-run system that will dole out rewards and punishments based on the submitted data.

Decades ago we watched the fall of Saigon despite favorable battlefield statistics. The same is happening in education and will happen in medicine.

Perhaps we should first be required to report simple outcomes, such as the number of “kills” and “probables.”

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**Disclosures:** Author has disclosed no conflicts of interest. Form can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L15-0573](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L15-0573).

doi:10.7326/L15-0573

#### Reference

1. Woolhandler S, Himmelstein DU. Collateral damage: pay-for-performance initiatives and safety-net hospitals [Editorial]. *Ann Intern Med.* 2015;163:473-4. [PMID: 26343907] doi:10.7326/M15-1393

**IN RESPONSE:** Dr. Galishoff points to McNamara's body count-driven planning during the Vietnam War as an early, failed example of a pay-for-performance-like strategy. We agree.

Medical pay-for-performance rests on several dubious assumptions: 1) Quality metrics accurately reflect clinician performance, not the characteristics of their patients, or efforts to game the measures; 2) lack of motivation is an important cause of poor performance; 3) bonuses and penalties will add to motivation, not undermine it; 4) hospitals and physicians delivering poor-quality care should get fewer resources; and 5) the current payment system is too simple. None of these assumptions rests on evidence (1).

Although process-based quality metrics (such as mammography rates) are easy to tabulate, they are poor proxies for real quality. Death or disability rates are the most salient indicators but are profoundly influenced by factors that are beyond clinicians' control. At present, performance metrics do not reliably separate the “signal” of medical quality from the “noise” of other factors. Hospital mortality rates provide a best-case scenario for assessing performance: Time horizons are short, deaths are frequent, and vast troves of hospital data offer an ideal substrate for statistical analysis. Nonetheless, widely used risk-adjusted metrics on hospital mortality yield wildly different quality rankings and show little relationship to expert clinicians' assessments based on chart review (2).

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Moreover, financial incentives often lead hospitals and physicians to slant their documentation (for example, through upcoding), corrupting data and uncoupling reward from actual performance. Such efforts also squander physicians' time and divert our focus; at our hospital, sessions devoted to instruction on International Classification of Diseases, 10th Revision, coding are mandatory, whereas attendance at grand rounds is optional.

Pay-for-performance also flies in the face of growing evidence from behavioral economics that penalties and bonuses often undermine preexisting motivation and worsen performance on complex cognitive tasks.

Pay-for-performance penalties drain resources from already struggling safety-net institutions (3). Clinicians battle electronic health records that are optimized for billing and quality reporting but are ill-suited to patient care (4). Hospital administrative costs, which now consume one quarter of total hospital budgets, continue to rise (5).

Pay-for-performance augments external control of the physician-patient encounter, vesting power in managers who have scarcely touched blood, death, or despair. Like McNamara and Vietnam, payers and bureaucrats push ahead with pay-for-performance, undaunted by mounting evidence of failure.

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doi:10.7326/L15-0572

#### References

- Himmelstein DU, Ariely D, Woolhandler S. Pay-for-performance: toxic to quality? Insights from behavioral economics. *Int J Health Serv.* 2014;44:203-14. [PMID: 24919299]
- Hogan H, Zipfel R, Neuburger J, Hutchings A, Darzi A, Black N. Avoidability of hospital deaths and association with hospital-wide mortality ratios: retrospective case record review and regression analysis. *BMJ.* 2015;351:h3239. [PMID: 26174149] doi:10.1136/bmj.h3239
- Gilman M, Hockenberry JM, Adams EK, Milstein AS, Wilson IB, Becker ER. The financial effect of value-based purchasing and the hospital readmissions reduction program on safety-net hospitals in 2014: a cohort study. *Ann Intern Med.* 2015;163:427-36. [PMID: 26343790] doi:10.7326/M14-2813
- Rosenbaum L. Transitional chaos or enduring harm? The EHR and the disruption of medicine. *N Engl J Med.* 2015;373:1585-8. [PMID: 26488690] doi:10.1056/NEJMp1509961
- Himmelstein DU, Jun M, Busse R, Chevrel K, Geissler A, Jeurissen P, et al. A comparison of hospital administrative costs in eight nations: US costs exceed all others by far. *Health Aff (Millwood).* 2014;33:1586-94. [PMID: 25201663] doi:10.1377/hlthaff.2013.1327

### Cardiometabolic Effects of CASCADE Trial Explained by Mediterranean Diet

**TO THE EDITOR:** The CASCADE (Cardiovascular Diabetes and Ethanol) trial (1) is the first long-term randomized clinical trial

that evaluated the effect of moderate wine consumption on glycemia and lipid profile in an alcohol-abstaining diabetic population. Patients were randomly assigned to regularly drink water, red wine, or white wine at dinner and were also advised to follow a Mediterranean diet. They participated in group sessions guided by a clinical dietitian monthly for the first 3 months and quarterly thereafter for 2 years.

Some study details should be addressed. All 3 groups had improved lipid profiles after 6 months that were attenuated at the end of the study, suggesting an effect of diet intensification. A recent meta-analysis of controlled trials (2) showed that the Mediterranean diet is associated with improved glucose control (0.47% reduction in hemoglobin A<sub>1c</sub> [HbA<sub>1c</sub>]) and increased high-density lipoprotein cholesterol (mean difference, 1.54 mg/dL) in diabetic patients, improving cardiovascular risk. Also, the reported difference in glucose control (decreased fasting plasma glucose) is not clinically relevant. Fasting plasma glucose is a transient variable, and this reduction might be explained by the ethanol-mediated acute hypoglycemic effect. Glycated hemoglobin, a more reliable measure of glucose control, did not differ among groups at the end of the study. Fasting plasma glucose and HbA<sub>1c</sub> were evaluated in a 3-month trial (3) in which wine or nonalcoholic beverage consumption at dinner and diet counseling were introduced into a population with similar characteristics to those of the CASCADE trial. Whereas fasting plasma glucose decreased only in the wine group, HbA<sub>1c</sub> decreased in all groups, including the placebo group, which suggests an overall dietetic intervention benefit. Thus, the results reported in the CASCADE trial are probably mainly determined by the co-intervention, the Mediterranean diet. No solid data conclude that moderate alcohol intake would determine a real improvement on cardiometabolic risk in patients with diabetes.

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**Disclosures:** Authors have disclosed no conflicts of interest. Forms can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0015](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0015).

doi:10.7326/L16-0015

#### References

- Gepner Y, Golan R, Harman-Boehm I, Henkin Y, Schwarzfuchs D, Shelef I, et al. Effects of initiating moderate alcohol intake on cardiometabolic risk in adults with type 2 diabetes: a 2-year randomized, controlled trial. *Ann Intern Med*. 2015;163:569-79. [PMID: 26458258] doi:10.7326/M14-1650
- Esposito K, Maiorino MI, Bellastella G, Chiodini P, Panagiotakos D, Giugliano D. A journey into a Mediterranean diet and type 2 diabetes: a systematic review with meta-analyses. *BMJ Open*. 2015;5:e008222. [PMID: 26260349] doi:10.1136/bmjopen-2015-008222
- Shai I, Wainstein J, Harman-Boehm I, Raz I, Fraser D, Rudich A, et al. Glycemic effects of moderate alcohol intake among patients with type 2 diabetes: a multicenter, randomized, clinical intervention trial. *Diabetes Care*. 2007;30:3011-6. [PMID: 17848609]

## OBSERVATION

### Zika Virus Infection in a Massachusetts Resident After Travel to Costa Rica: A Case Report

**Background:** Zika, a mosquito-borne flavivirus, has rapidly spread through South and Central America and the Caribbean since being recognized in Brazil in 2015 (1, 2) (Table and Figure 1). Here, we describe a case in a U.S. resident after travel to Costa Rica.

**Case Report:** On 2 to 3 January 2016, a previously healthy 55-year-old male Massachusetts resident presented to the walk-in clinic at Mount Auburn Hospital in Cambridge, Massachusetts, with rash, conjunctivitis, and arthralgia. He had traveled to Costa Rica with 2 family members from 19 to 26 December 2015 and stayed in Nosara, on the northwestern coast. He reported having had many mosquito bites. The patient noted mild myalgia and subjective fever starting 30 December, followed by a red rash of the trunk and arms, redness of the face and eyes, headache, and arthralgia.

Examination revealed conjunctival injection; maculopapular rash involving the face, trunk, and arms; and redness of the hard palate. Laboratory tests found leukopenia (leukocyte count of  $3.65 \times 10^9$  cells/L [reference range, 4.00 to  $10.80 \times 10^9$  cells/L]), lymphopenia (lymphocytes accounted for 13.0% of all leukocytes [reference range, 20.0% to 40.0%]), and bandemia (band cells accounted for 19% of all leukocytes [reference range, 1% to 10%]) but normal erythrocyte and platelet counts, normal basic metabolic profile, and negative results on rapid streptococcal testing and malaria smears. The C-reactive protein level was mildly elevated at 178.10 nmol/L (reference range, 0.76 to 28.50 nmol/L). Serologic tests found immunity to rubella but not rubeola. Tests for IgM and IgG antibodies to dengue and chikungunya viruses were sent, and negative results were reported 2 weeks later.

The patient was referred for evaluation to Mount Auburn Hospital Travel Medicine Center, a GeoSentinel site, and was seen on 7 January (day 9 of illness). He was afebrile but had backache, nonpurulent conjunctivitis, and a faint residual erythematous maculopapular rash on the face and trunk (Figure 2). Complete blood count and differential were unremarkable, and leukopenia, lymphopenia, and bandemia had re-

**Table.** Spread of Zika Virus

<b>Americas</b>	Mexico
Barbados	Nicaragua
Bolivia	Panama
Brazil	Paraguay
Colombia	Puerto Rico
Costa Rica	St. Martin
Curaçao	Suriname
Dominican Republic	U.S. Virgin Islands
Ecuador	Venezuela
El Salvador	
French Guiana	<b>Oceania/Pacific Islands</b>
Guadeloupe	American Samoa
Guatemala	Samoa
Guyana	Tonga
Haiti	
Honduras	<b>Africa</b>
Jamaica	Cape Verde
Martinique	

**Figure 1.** Countries and territories with active Zika virus transmission as of 5 February 2016.



Available at [www.cdc.gov/zika/geo/index.html](http://www.cdc.gov/zika/geo/index.html).

solved. Assays for IgM and IgG antibodies to rubeola remained negative. Serologic testing for antibodies to dengue and chikungunya viruses was repeated and later showed positive enzyme-linked immunosorbent assay results of IgM antibodies to dengue virus of 2.23 (reference range, <0.90) and negative results for IgG antibodies to dengue virus and IgM and IgG chikungunya virus.

Enzyme-linked immunosorbent assay for IgM antibodies and plaque reduction neutralization antibody tests for Zika and dengue viruses were done at the Centers for Disease Control and Prevention in Fort Collins, Colorado. On 26 January, IgM antibodies to Zika and dengue viruses were reported as positive. Plaque reduction neutralization antibody test titers were greater than 5120 for Zika virus and less than 10 for dengue virus. Given the consideration of Zika virus infection, the patient was advised on his initial visit to the travel medicine center on day 9 of illness about the possibility of sexual transmission and to practice safe sex.

The patient had recovered completely when he was seen again on 25 January (day 27 of illness). He reported that the 2 family members who had traveled to Costa Rica remained well as of 8 February 2016.

**Discussion:** Results of plaque reduction neutralization antibody tests confirmed the diagnosis of Zika virus infection in a traveler who returned to the United States from Costa Rica and had mild illness consistent with that reported in persons infected with Zika virus (1, 2). There was cross-reactivity of serologic results of dengue virus with those of Zika virus. Both are mosquito-borne flaviviruses. Zika virus infection had not been documented in Costa Rica as of 26 January, the date when infection in this patient was confirmed.

This case shows that Zika virus is probably circulating more widely than has been officially reported in the Americas and illustrates the role of travelers as sentinels for outbreaks and for the potential expansion of pathogens to new geographic areas (3). GeoSentinel sites worldwide are reporting

cases of Zika virus infection in returning travelers (Hamer D, Schlagenhauf P. Personal communication).

The current outbreak of Zika virus infection resembles the rapid spread of chikungunya fever in the Americas since 2013 (4). Costa Rica is a popular travel destination and has the *Aedes* mosquitoes that are also responsible for transmitting dengue and chikungunya viruses. Travelers to all areas where these mosquitoes are present, including Costa Rica, should be advised to avoid day-biting mosquitoes to prevent dengue, Zika, and chikungunya virus infections. The Centers for Disease Control and Prevention ([www.cdc.gov/zika](http://www.cdc.gov/zika)), the Pan American Health Organization ([www.paho.org](http://www.paho.org)), and other health authorities have posted recommendations for mosquito bite protection and information about the possible association of Zika virus with microcephaly in infected pregnant women (1, 2, 5).

**Figure 2.** Faint residual erythematous maculopapular rash on the trunk.



## LETTERS

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This article was published at [www.annals.org](http://www.annals.org) on 10 February 2016.

**Acknowledgment:** The author thanks Drs. Davidson Hamer and Patricia Schlagenhauf for critical review of the paper and Drs. Beth A. Zeeman and Irmgard Behlau for patient evaluation in the walk-in center.

**Disclosures:** Disclosures can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0075](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=L16-0075).

doi:10.7326/L16-0075

## References

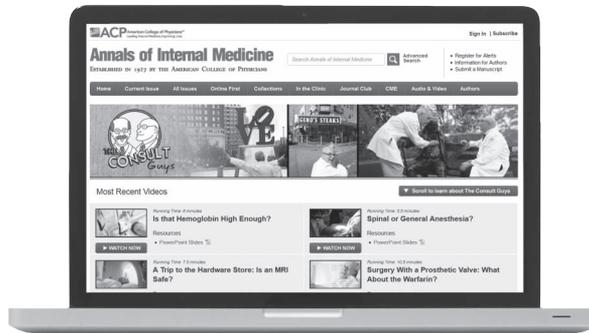
1. Chen LH, Hamer DH. Zika virus: rapid spread in the Western hemisphere. *Ann Intern Med.* 2016. [Epub ahead of print]. doi:10.7326/M16-0150
2. Hennessey M, Fischer M, Staples JE. Zika virus spreads to new areas—region of the Americas, May 2015–January 2016. *MMWR Morb Mortal Wkly Rep.* 2016;65:55-8. [PMID: 26820163] doi:10.15585/mmwr.mm6503e1
3. Chen LH, Wilson ME. The role of the traveler in emerging infections and magnitude of travel. *Med Clin North Am.* 2008;92:1409-32. [PMID: 19061759] doi:10.1016/j.mcna.2008.07.005
4. Hamer DH, Chen LH. Chikungunya: establishing a new home in the Western hemisphere. *Ann Intern Med.* 2014;161:827-8. [PMID: 25244354] doi:10.7326/M14-1958
5. Oduyebo T, Petersen EE, Rasmussen SA, Mead PS, Meaney-Delman D, Renquist CM, et al. Update: interim guidelines for health care providers caring for pregnant women and women of reproductive age with possible Zika virus exposure—United States, 2016. *MMWR Morb Mortal Wkly Rep.* 2016;65:1-6. doi:10.15585/mmwr.mm6505e2er

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