

Reemergence of *Plasmodium vivax* Malaria in the Republic of Korea

To the Editor: In "Reemergence of *Plasmodium vivax* malaria in the Republic of Korea" (1), the term eradication was, in my judgment, inappropriately used. In 1981, Yekutieli proposed that eradication is "The purposeful reduction of specific disease prevalence to the point of continued absence of transmission within a specified area by means of a time limited campaign" (2). In 1984, Hinman proposed an important addition that eradication must have followed a "deliberate effort" (3). At the Dahlem Workshop in 1997 (4), a more comprehensive definition was proposed. This definition states that eradication is "Permanent reduction to zero of the worldwide incidence of infection caused by a specific agent as a result of deliberate efforts; intervention measures are no longer needed" (4). At the same conference, two other terms were also defined. Elimination of disease: "Reduction to zero of the incidence of a specified disease in a defined geographic area as a result of deliberate efforts; continued intervention measures are required." Elimination of infection: "Reduction to zero of the incidence of infection caused by a specific agent in a defined geographic area as a result of deliberate efforts; continued measures to prevent reestablishment of transmission are required."

These definitions promote unanimity in using the term eradication and avoid misconceptions over accomplishments.

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Paratyphoid Fever

To the Editor: The letter on paratyphoid fever by Kapil et al. (1) stated that an outbreak of enteric fever due to *Salmonella paratyphi* A has never been reported. A large (227 cases) outbreak of enteric fever secondary to *S. paratyphi* A occurred in the Arabian Gulf nation of Bahrain in 1987. The clinical and epidemiologic details of the outbreak were reported in a local medical society journal (2). Like the outbreak described by Kapil et al., the Bahraini outbreak was associated with sewage leaking into the water supply.

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Hospitalizations After the Persian Gulf War

To the Editor: Knoke et al., Naval Health Research Center, San Diego, California, published two articles on military hospitalizations in Persian Gulf War veterans, the most recent in *Emerging Infectious Diseases* (1,2).

Although the titles of both articles indicated general hospitalizations, Knoke et al. studied just military hospitalizations among selected, mostly healthy, active-duty Persian Gulf War veterans enlisted as of 1994. They compared military hospitalizations of active-duty Gulf War veterans (cases) with military hospitalizations of active-duty era veterans not in the Persian Gulf between 1990 and 1991 (controls). "Healthy warrior" effects would have predicted low military hospitalization rates for both cases and control populations (3), but both were high.

The studies were "restricted to active-duty personnel" hospitalized in military facilities because active-duty personnel were "rarely hospitalized outside of DoD facilities" (1). However, of 150 surgical procedures, mostly

intestinal and skin biopsies, performed on 85 sick active-duty and reservist Persian Gulf veterans from Pennsylvania between 1991 and 1995, more than one third, 58 (39%), were performed in private facilities (4). Most of the federal procedures were done in Veterans Administration (VA), not military, hospitals. Many active-duty, sick Persian Gulf veterans in Pennsylvania, Texas, and California deliberately avoided military, and some VA, hospitals between 1991 and 1997 because of concerns about competence, convenience, confidentiality, and career opportunities during this era of downsizing and closing of military bases (3,5).

In addition, Knoke et al. excluded at least five groups of sick veterans from their limited case studies: 1) those treated in VA and private hospitals, 2) those from the Reserves and National Guard, 3) those who retired early largely because of illness, 4) those who consented to long military hospitalizations within the DoD Comprehensive Clinical Evaluation Program (CCEP) for Gulf War Veterans, and 5) those who had obstetric complications after returning home from the Gulf War. Thus, many sick veterans were excluded from the case studies.

If we hypothesize that one or more new infectious agents like *Leishmania tropica*, *Brucella* species, *Bacillus anthracis*, *Mycoplasma fermentans (incognitus)*, *Coxiella burnetti*, or obscure fungi or molds might be involved, comprehensive research studies in the future would do better to include all workers from the Arabian desert, reservists as well as active-duty personnel.

Few Gulf veterans with Gulf-related illnesses were welcomed by military hospitals and about half of 452 Persian Gulf veterans surveyed by the U.S. General Accounting Office sought health care outside the VA for health problems they believed were related to service in the Persian Gulf (5). An alternative interpretation of Knoke's hospitalization study might be that admitting officers in military facilities prevented sick Persian Gulf War veterans from obtaining medical care within their facilities.

Not only were the case populations studied unusual; recent workers and travelers to the Middle East were not excluded from the control population. "Nondeployed" controls included recently deployed Persian Gulf military personnel as long as nondeployed personnel worked in

the Gulf after 1991. Some of those late-deployed Persian Gulf workers also fell ill with the same illnesses as veterans deployed between August 1990 and 1991. Illnesses from late Persian Gulf deployments might explain excess hospitalizations seen in nondeployed controls. All late-deployed personnel from the Middle East should also have been excluded from the nondeployed control population.

Finally, medical ICD-9 diagnoses, while interesting, were incomplete and nonspecific. Medical diagnoses common to Gulf veterans should have been listed in addition to unexplained illnesses. Knoke's condensed diagnostic list, like patient charts we have seen from DoD hospitalizations, may have failed to capture common clinical and laboratory abnormalities seen in many sick Gulf veterans, including (but are not limited to) ulcerative colitis, Crohn colitis, inflammatory bowel disease, intestinal bleeding due to inflammatory colonic polyps, skin acne, nodules, plaques, psoriasiform skin rashes, nose ulcers, nose bleeds, leukocytosis, neutropenia, elevated alanine transaminase (SGPT/ALT) liver enzymes, hepatosplenomegaly, thrombocytopenia, nephrolithiasis (kidney stones), and fevers of unknown origin (4,6). In addition, more than one unexplained illness category should have been tabulated per patient, because "Gulf War Syndrome" is a multisystem illness (4,6-9).

More research is needed on hospitalizations in addition to deaths and new diseases found in Persian Gulf War veterans (3). Civilian scientists and physicians must collaborate closely with other diverse federal and nonprofit organizations to study Gulf War illnesses objectively (5,9). The health problems seen in Gulf War veterans may be part of a new complex of emerging desert-associated illnesses (9-14).

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Hospitalizations after the Gulf War—Reply to K.M. Leisure et al.

To the Editor: We studied all active-duty Persian Gulf War—era veterans who remained on active duty at the conclusion of deployment (July 31, 1991), not as Leisure et al. stated in their letter "selected, mostly healthy, active-duty Persian Gulf War veterans enlisted as of 1994."

Our study was restricted to hospitalizations of active-duty service members because these were the only service members whose records were available on computerized files. No one was excluded from the defined target population. However, there are "sick Gulf War veterans" and healthy Gulf War veterans not in the target population. The difficulty is in studying either a random sample or the entire population of Gulf War veterans. The only published study we know of the entire population is the mortality report of Kang and Bullman (1).

The suggestion that we should have excluded from the control group service members who had ever been in the Gulf War area would have been appropriate for a report of exposure to the Persian Gulf region; ours was a report of exposure to the Persian Gulf War. That we should have studied a different collection of ICD-9 diagnoses also suggests a different report.

While our study may have limitations, we have not seen objective data that support the anecdotal observations of Leisure et al.

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