

## Environmental and Genetic Pressures on Brain Functions

**Gastrointestinal tract disruption** may deprive the brain of essential nutrients for key metabolic pathways, resulting in psychiatric symptoms. Gastrointestinal tract disruptions and psychiatric disorders show remarkably high comorbidity.<sup>29</sup> For example, most studies that have investigated the comorbidity of irritable bowel syndrome and psychiatric disorders show prevalence of psychiatric disorders in irritable bowel syndrome patients to be 90% or greater.<sup>30</sup>

**Genetic micronutrient requirements.** Research is uncovering major genetic risk factors in psychiatric illness.<sup>31</sup> Up to one-third of gene mutations result in decreased enzyme binding affinity for corresponding coenzymes, including vitamins and minerals.<sup>32</sup> As a result, individuals with certain genotypes may have significantly higher requirements for essential micronutrients in key mood-related brain pathways.<sup>32,33,44</sup>

**Low micronutrient intake** may contribute to psychiatric illness.<sup>34,35,36</sup> Intake of many micronutrients is inadequate in the United States, as shown in Figure 2. RDA levels are deemed to be “sufficient to meet the dietary requirements of nearly all (97 to 98 percent) of healthy individuals”, but do not ensure mental health for at-risk sub-populations:<sup>13</sup> “intake at the level of the RDA or AI would not necessarily be expected to replete individuals previously undernourished, nor would it be adequate for disease states marked by increased requirements.”<sup>37</sup>

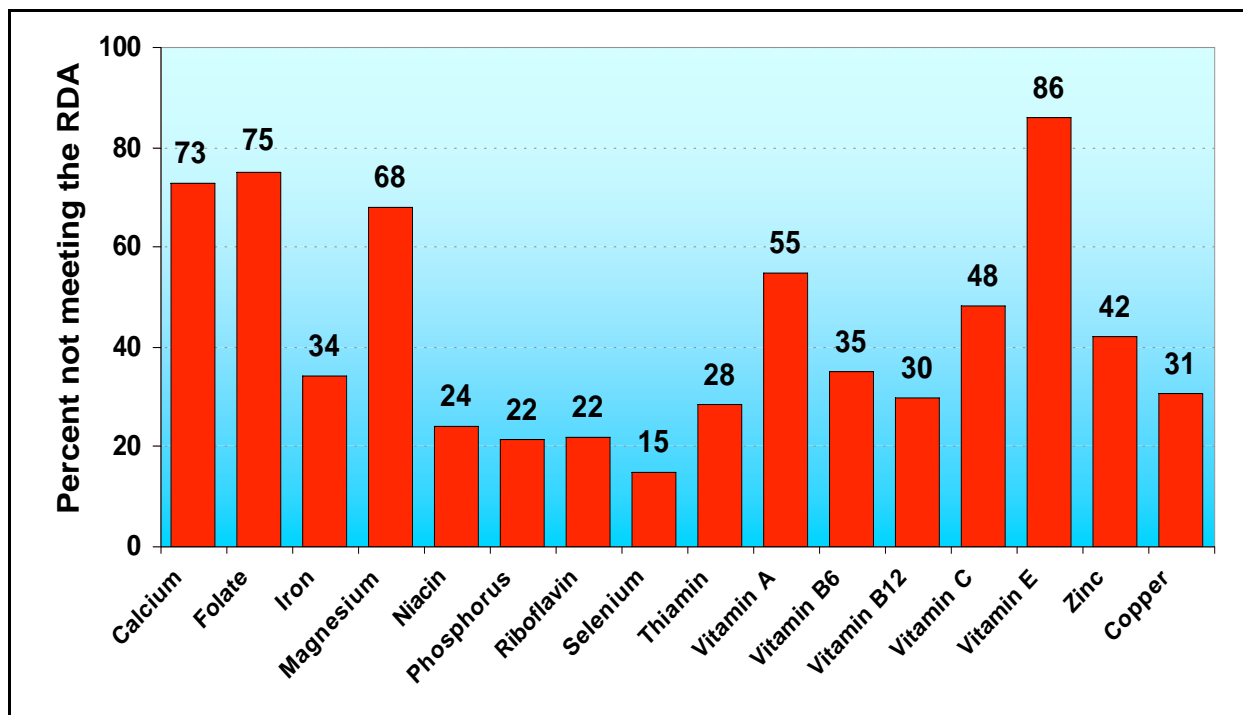


Figure 2. Percent of the U.S. population not meeting the Recommended Dietary Allowance (RDA) for specific micronutrients (USDA data).<sup>38</sup>