Siemens Healthcare Diagnostics, a global leader in clinical diagnostics, provides healthcare professionals in hospital, reference, and physician office laboratories and point-of-care settings with the vital information required to accurately diagnose, treat, and monitor patients. Our innovative portfolio of performance-driven solutions and personalized customer care combine to streamline workflow, enhance operational efficiency, and support improved patient outcomes.

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# **SIEMENS**



# Women's health depends on a lifetime of answers—one test at a time. Together, we can support a lifetime of good health. For all women.

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Answers for life.



On a global basis, women and men differ in terms of biological make-up, power, status, and roles within society.<sup>1</sup> All of these factors can combine to impact the lifetime health of women. While women around the globe are enjoying greater equality and empowerment than ever before, the simple fact remains that, when it comes to health, women and men are not created equal.

Siemens Healthcare Diagnostics recognizes this disparity, and that is why we continue to invest in an expansive portfolio of laboratory-testing solutions to enhance the diagnosis and management of the disease states and conditions that impact women. We know that when it comes to health, laboratory test results can change everything. As a trusted diagnostics partner, Siemens is committed to providing the tools needed to empower you to advance the health and vitality of women throughout the continuum of life.



**Did you know:** Life expectancy is higher for women than men in most countries, but a number of health and social factors combine to create a lower quality of life for women.<sup>2</sup>



Throughout a woman's lifetime, there are a number of conditions and diseases that affect her differently, or to a greater extent, than men. Many of these conditions and diseases are interconnected, where the onset of one leads to a greater risk of developing another. With an enhanced understanding and focus on the unique healthcare needs of women, healthcare providers across the continuum of care can be better equipped to prevent, detect, and treat the most threatening diseases affecting their female patients throughout all stages of their lives.





### Nutrition

Malnutrition, referring to both undernutrition and overnutrition, is defined as faulty nutrition due to inadequate or unbalanced intake, or impaired utilization of nutrients.<sup>4</sup> From a clinical perspective, malnutrition is characterized by insufficient or excess intake of protein, energy, and/or vitamins, and the frequent infections and disorders that result.<sup>5</sup> Malnutrition is considered to be one of the largest threats to public health on a global basis and the single-largest contributor to disease in the world.<sup>5,6</sup>

- Undernutrition accounts for 12% of deaths worldwide.9
- Malnourishment and obesity are more prevalent in women than men.<sup>6, 9</sup>
- The disease burden associated with malnutrition impacts women and young children the most.<sup>8</sup>

#### Anemia

Anemia, a condition in which the blood is deficient in red blood cells, hemoglobin content, or total volume,<sup>10</sup> is a major global health concern impacting both developing and developed nations. While there are numerous classifications and etiologies of anemia, the most significant contributor to the development of anemia is iron deficiency.<sup>11</sup> Iron deficiency is the most prevalent nutritional disorder in the world and is the only nutrient deficiency that is also significantly widespread in industrialized countries.<sup>12</sup>

Women and children are impacted most by anemia, with approximately 818 million pregnant women, non-pregnant women, and young children suffering from the disease.<sup>13</sup> Poor nutritional status, increased blood loss during menstruation, and increased blood-supply demands during pregnancy contribute to the increased prevalence of anemia in women.<sup>14</sup>

- Anemia impacts more than 30% of the world population.<sup>12</sup>
- The prevalence of anemia is higher in women than men.<sup>11</sup>
- Anemia contributes to 20% of all maternal deaths.12

### **Reproductive Lifecycle**

The reproductive lifecycle ushers in a variety of changes for women. The biological progression from childhood to puberty to menopause is dependent on an intricate balance of many physiological processes, resulting in modulations of the reproductive hormones.

Women experience a number of conditions throughout their reproductive lifecycle that may impact their quality of life. In addition, while the reproductive hormones are essential in the natural biological progression of both women and men, in women, the sex hormones have also been linked to the development of many diseases and conditions such as allergies, autoimmune disorders, thyroid disease, breast cancer, osteoporosis, and cardiovascular disease.

- Precocious puberty (early puberty) has been seen to occur 10 times more often in girls than boys.<sup>15</sup>
- Abnormal uterine bleeding can occur in up to 20% of women worldwide, which may eventually be life-threatening if left untreated.<sup>16</sup>
- Approximately 40% of infertility-clinic patients are diagnosed with anovulation.<sup>17</sup>
- Eight hundred women die each day from preventable causes related to pregnancy and childbirth.<sup>18</sup>
- Each year, approximately 3000–5000 children are born with Down Syndrome.<sup>19</sup>
- After menopause, women are more likely to suffer from poor bladder and brain function, poor skin elasticity, poor muscle power and tone, deterioration in vision, and some weight gain.<sup>20</sup>



**Did you know:** Unequal access to information, care, and basic health practices can increase health risks for women.<sup>2</sup>

## TORCH

A number of infectious diseases can be transmitted to a pregnant woman and passed on to her baby, increasing the risk of miscarriage, birth defects, and developmental problems. These infections are known as "TORCH" and include Toxoplasmosis, Other (e.g., syphilis, HIV, varicella-zoster, parvovirus B19), Rubella, Cytomegalovirus, and Herpes simplex virus.

It is important to educate women about these diseases and their risks, optimally prior to pregnancy. Vaccination is available for some of the diseases, and taking precautions to avoid exposure, such as frequent hand washing, can also aid in disease prevention. The best way for a woman to protect her unborn child from congenital diseases is to protect herself.<sup>21</sup>

- Worldwide, congenital HIV infection is a major cause of infant and childhood morbidity and mortality, responsible for an estimated 4 million deaths since the start of the HIV pandemic.<sup>22</sup>
- Cytomegalovirus (CMV) is the most common virus known to be transmitted in during pregnancy, affecting approximately 0.5–1.5% of births.<sup>23</sup> Approximately 40% of maternal CMV infections during pregnancy result in congenital infection.<sup>24</sup>
- In pregnant women with untreated early syphilis, 25% of pregnancies result in stillbirth and 14% in neonatal death, an overall perinatal mortality of approximately 40%.<sup>25</sup>

## Allergy

An allergy is an abnormal reaction by the immune system to a normally harmless substance found in the environment.<sup>26</sup> It is estimated that 30–40% of the global population is affected by allergies.<sup>27</sup> The World Allergy Organization has indicated that complex allergies involving polysensitization, multiple organ involvement, and high morbidity are increasing, placing a higher burden on healthcare delivery services around the globe.<sup>28</sup>

Studies indicate a role of sex hormones in allergy and autoimmunity, leading to more females suffering from allergies after puberty than males. Women allergy sufferers often report more-severe symptoms and more admissions to emergency departments and hospitals than men.<sup>29</sup>

- Worldwide, 220–520 million people may suffer from a food allergy, and 10–30% of the population is afflicted with allergic rhinitis.<sup>28</sup>
- Food allergies affect more adult women than adult men.<sup>30</sup>
- The prevalence of asthma and incidence of asthma exacerbations are consistently higher in women then men.<sup>31</sup>

#### **Autoimmune Disease**

Autoimmune diseases are conditions in which the immune system mistakenly attacks and destroys healthy body tissue. More than 80 different types of autoimmune diseases are known to exist, impacting almost every major organ system in the body.<sup>32</sup> Heredity, genetics, and environmental triggers are thought to lead to autoimmune diseases. While accurate statistics on the global prevalence of autoimmune diseases are difficult to ascertain, they are considered a significant cause of chronic illness and death.<sup>33</sup>

Autoimmune diseases affect women disproportionately. In the U.S. alone, 8% of the population suffers from autoimmune diseases, 78% of which are women.<sup>34</sup> Rheumatoid arthritis is an example of an autoimmune disease that affects women more than men.

- Several reports have indicated that autoimmune diseases collectively affect 5–10% of the developed world's population.<sup>33</sup>
- Female sex hormones are listed as environ-mental triggers for autoimmune diseases.<sup>33</sup>
- Autoimmune diseases are listed as one of the top-10 causes of death in women ≤65 years old.<sup>33</sup>

### **Thyroid Disease**

Thyroid disease is any benign or malignant condition that affects the structure or functioning of the thyroid gland,<sup>35</sup> impacting its ability to produce the hormones required for proper metabolism. Common manifestations of thyroid disease include hypothyroidism, hyperthyroidism, and thyroid cancer. The most common cause of thyroid disorders worldwide is iodine deficiency. In areas where iodine deficiency is not a problem, such as in the U.S., thyroid disease is generally the result of autoimmune disease.<sup>36</sup>

Thyroid disease can affect anyone at any age, but is most prevalent among females.<sup>37</sup>

- Globally, 1 billion people are at risk for iodine deficiency that can lead to thyroid disease.<sup>38</sup>
- Grave's disease (a form of hyperthyroidism) is more prevalent in women than men (ratio 7:1).<sup>39</sup>
- Females make up the vast majority of patients with Hashimoto disease.<sup>39</sup>





#### Bone

Osteoporosis is a metabolic bone disease that is characterized by low bone mass and deterioration of bone tissue.<sup>40</sup> Bone metabolism is the constant process where the body removes old bone and replaces it with new bone. Osteoporosis occurs when the body either loses too much bone density, does not make enough, or when there is a combination of both factors. This results in increased fragility of the bone, leading to the risk of fractures. The World Health Organization estimates that the lifetime risk for wrist, hip, or vertebral fractures occurring in people living in developed countries is very close to their risk for developing coronary heart disease.<sup>41</sup>

Women outnumber men when it comes to prevalence of osteoporosis and the incidence of fractures associated with the disease. By 2050, the worldwide incidence of hip fracture in men is projected to increase to more than 1 million, but the incidence of hip fracture in women will be more than double that of men.<sup>42</sup>

- More than 200 million people suffer from osteoporosis worldwide.<sup>43</sup>
- Eighty percent of people suffering from osteoporosis are women.<sup>44</sup>
- Women have a 40–50% risk of having a fracture during their lifetime, while men have a 13–22% risk.<sup>45</sup>

**Did you know:** Women's life-expectancy advantage over men becomes smaller when "healthy life expectancy"—years spent in "full health"—is examined rather than overall life expectancy.<sup>3</sup>

#### Cancer

Cancer is a term used for more than 100 different diseases in which abnormal cells divide uncontrollably and are able to invade other tissues.<sup>46</sup> Cancer is noted as a leading cause of death worldwide by the World Health Organization, accounting for more than 7 million deaths on an annual basis.<sup>47</sup>

Cancer does not discriminate between women and men; however, there are differences in the frequency of which the different forms of cancers affect the sexes. Breast cancer is one of the top six cancers attributed to the most deaths on a global basis, causing more than 450,000 deaths each year.<sup>47</sup> While the disease can occur in both women and men, the incidence of breast cancer in men is significantly small.<sup>48</sup> Unique to women, ovarian cancer causes more deaths than any other cancer of the reproductive system.<sup>49</sup> Each year, 240,000 women are diagnosed worldwide with ovarian cancer, and 125,000 of them will die from this disease.<sup>50</sup> Thyroid cancer is the most common form of endocrine malignancy worldwide, and it also is more common in females than males.<sup>51</sup>

- Cancer causes approximately 13% of all deaths annually and is estimated to be the cause of 13.1 million deaths in 2030.<sup>47</sup>
- Breast cancer is by far the most common cancer in women worldwide, both in developed and developing countries.<sup>52</sup>
- Less than 50% of women survive longer than 5 years after being diagnosed with ovarian cancer.<sup>53</sup>
- More females are diagnosed with thyroid cancer than males (3:1 ratio).<sup>51</sup>

#### Diabetes

Diabetes is a chronic disease that arises when the pancreas does not produce enough insulin, leading to hyperglycemia. This is associated with long-term damage to the body and failure of various organs and tissues.<sup>54</sup> Diabetes requires careful control and monitoring. Uncontrolled diabetes can damage tissues in a variety of organs, leading to cardiovascular disease, kidney failure, nerve damage, and vision loss.<sup>55</sup>

Diabetes in women is unique in that it can impact them as well as their offspring. Uncontrolled or undiagnosed diabetes during pregnancy can lead to life-threatening complications, including miscarriage and birth defects. Additionally, pregnancy can induce gestational diabetes, which puts a woman at risk for type 2 diabetes later in life.<sup>56</sup>

- There are 371 million people living with diabetes, and 50% are unaware of their condition.<sup>57</sup>
- The risk of heart disease, the most common complication of diabetes, is more serious among women than men.<sup>58</sup>
- Women with diabetes live 8.2 fewer years than those without diabetes, versus men with diabetes, who live 7.5 years less.<sup>59</sup>

#### **Renal Disease**

Renal (kidney) disease is a general term for damage that Cardiovascular diseases (CVD) are a group of disorders impacts the ability of the kidneys to clear waste and affecting the heart and blood vessels and are documented excess fluid from the body.60 Kidney disease can include as the leading cause of death worldwide by the World acute kidney injury, in which there is a sudden, temporary, Health Organization. By 2030, 23.3 million people and sometimes fatal loss of kidney function, and chronic are expected to die each year from CVD. The effects kidney disease (CKD), a progressive form of the disease of cardiovascular disease place a significant burden that causes reduced kidney function over a period of time. on healthcare systems and economies around the globe. CKD can lead to end-stage renal disease (ESRD), in which In low- and middle-income countries, CVD contributes there is total and permanent kidney failure.<sup>61</sup> Kidney to poverty due to high out-of-pocket expenses. Globally, disease is closely linked to cardiovascular disease many CVD patients die at younger ages—during their and diabetes and is considered to be a major global most productive years—which places additional burdens public-health concern.62 on global economies.66

It is challenging to assess the true impact of kidney disease on the global population, but studies have indicated that the disease tends to impact women more than men.<sup>63</sup>

- Chronic kidney disease may impact 1 in 10 adults globally.<sup>64</sup>
- Studies in the U.S., Europe, and Asia have shown a higher prevalence of CKD in women than men.<sup>63</sup>
- Women with CKD are at an increased risk of mortality.<sup>65</sup>



#### **Cardiovascular Disease**

While CVD was once thought of as a "man's disease," cardiovascular disease is a significant health risk for women. Women around the globe are at greater risk of death from cardiovascular disease than the next five leading causes of death.<sup>67</sup> Yet all too often, women and their healthcare providers do not recognize the significant risk posed by CVD.<sup>68</sup>

- Each year, cardiovascular diseases result in more deaths worldwide than any other cause.<sup>66</sup>
- Women tend to develop CVD later in life than men, and they experience significantly worse outcomes than men.<sup>68</sup>
- Fourteen percent more women than men over the age of 60 will die from CVD.<sup>69</sup>

**Did you know:** Current societal arrangements often create an environment in which women are less able to advocate for their own health.<sup>3</sup>

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