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| **Project 6.1.1: Student Response Sheet**  |

**Introduction**

Anna Garcia was only 38 when she died; meaning that at least one of her body systems was no longer able to support life. The failure of one or more of her body systems may be the result of injury due to an accident or could be the result of an illness or a combination of illnesses. Before we can determine which system or systems failed or what caused the failure which led to her death, we have to learn more about the human body.

The human body is an amazing machine composed of many interrelated systems which are in turn composed of cells, tissues, and organs that act independently and interdependently within the body. No individual component of a human body works alone. Components of each system in the body affect or interact with every other system. The body is dependent upon the many interactions between all systems and structures to maintain homeostasis and health. In this activity you will investigate the different body systems that make up the human body and explore all of the ways Anna’s various illnesses affected each body system, potentially resulting in her premature death.

**Procedure:**

1. Look back in your course file and list all of the ways each body system was impacted by the illness or disease Anna Garcia experienced in her life.
2. Reference Autopsy Reports, Medical Histories and past lab activities to help you organize this information.
3. Record any evidence that shows how the illness or disease may have been involved with her untimely death.
4. Be specific about relationships between body systems and illness. You will use this chart to help construct your final timeline that explains how Anna died.
5. You will need to eventually upload this document to your e-portfolio under Anna’s Cause of Death.

**Part II: Anna’s Illnesses**

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|  | **Illnesses’ Effect on System (if applicable)** |  |  |  |
|  | **Diabetes** | **Sickle Cell Anemia** | **Heart Disease** | **Urinary Tract Infection** |
| **Cardiovascular** | Glucagon is carried in the blood and signals the liver to release glucose into the blood and the of insulin in the blood tells the cells to take in glucose from the blood. If blood glucose levels become too high for too long it can cause damage to the blood vessels. | Anemia in sickle cell disease results in chamber dilation and a compensatory increase in left ventricular mass. This is often accompanied by left ventricular diastolic dysfunction that has also a strong reason for mortality in sickle cell anemia patients**.**  | Heart disease can cause heart failure and heart attacks. Patients with heart disease are more likely to have cardiovascular problems. | Bacteria spreading can cause the infection to spread to the lungs and and heart and cause poor circulation throughout the body. The lack of oxygen to parts of the body can cause limbs to die and turn blue. |
| **Digestive** | Diabetes can affect the stomach if the nerves controlling the stomach are damaged by [high blood glucose levels](http://www.diabetes.co.uk/high-low-blood-sugar-symptoms.html). | Bilirubin gallstones - sickle cells die in 20 days; liver breaks down the bilirubin; extra bilirubin can become a gallstone in the gallbladder(bilirubin forms bile) | If oxygen is not getting to the heart, it is not getting to other parts of the circulatory system. If the supply of oxygen-rich blood flow to the small intestine or colon is blocked or altered, the digestive tract cannot function properly. The result is intestinal ischemia.  | Septic shock brought on by a UTI can cause organs in the digestive system to become infected or shut down |
| **Immune** | Diabetes patients, [especially those with type one](http://www.diabetes.co.uk/type1-diabetes.html), have an immune system with a lower ability to respond to and deal with any infections. | The immune system is directly affected by sickle cell anemia because immune cells reach their target areas through the blood flow. Sickle cells block or reduce blood flow, decreasing the delivery of germ-fighting immune cells to parts of the body. The spleen is also an important immune system organ, and damage to the spleen or removal of the spleen increases the risk of infection in the body, particularly in children. | The overactive use of the immune system will cause inflammation, pain, and destruction of healthy tissue. This can damage the heart muscle and increase risk of heart attacks. With the immune system out of business, infections can spread, foreign invaders can come in, and the body can’t do anything to fight off invaders. | Increased production of lymphocytes (B & T cells) and antibodies against the bacteria; Inflammatory response (may increase additional UTI and/or damage to urinary tract structures. |
| **Nervous** | People with diabetes can develop different types of neuropathy. This can result in many different ways including metabolic factors, autoimmune factors that can cause nerves to inflame and inherited traits. Symptoms can include numbness in the limbs, dizziness, and total body weakness. | Two-thirds of all strokes in people with sickle cell disease occur in children, at an average age of 8 years. About 10% of people with sickle cell disease have strokes or other brain bleeding when younger than 8-10 years. | Autonomic nervous system is what causes our bodies to perform involuntary actions such as our heart beating. With the autonomic nervous system being affected, it can cause irregular contractions in the heart. | Severe infections may lead to chronic inflammation in the central nervous system (CNS). |
| **Respiratory** | Rapid or laboured breathing, known as Kussmaul breathing, can be a symptom of diabetic ketoacidosis. DKA is a result of no insulin in the body so the body switches to burning fatty acids, producing acidic keytone bodies. | Acute chest syndrome can result from Sickle Cell Anemia which occurs when the lung tissue is deprived of oxygen(From the sickle cells clogging the arteries). It can cause fevers, wheezing, and rapid breathing. | Lungs can become congested. Fluid backup in the lungs can cause a shortness of breath with exercise or even difficulty breathing while resting. Lung congestion can also cause a dry hacking cough or wheezing. | If the bacteria spreads, it will result in sepsis which can cause tissue on the lungs to deteriorate. This can result in an increased difficulty of breathing. |
| **Urinary** | High levels of blood sugar make the kidneys filter too much blood. All of this extra work is hard on the filters. After many years, they start to leak and useful protein is lost in the urine. Having small amounts of protein in the urine is called microalbuminuria which is an early form of kidney disease. | Enuresis is very common in people with sickle cell anemia. This side effect causes increased urination and maybe even bedwetting from the uncontrollable bladder. This is caused by the sickle cells clogging the blood vessels in the kidneys which prevent the kidneys from working properly.  | With heart failure, the body fills up with fluid which the bladder needs to get rid of. This causes increased amount and frequency of urination. | A urinary tract infection (UTI) is an infection in any part of your urinary system — your kidneys, ureters, bladder and urethra. Most infections involve the lower urinary tract — the bladder and the urethra. |

**Sources Used:**

[**http://www.diabetes.co.uk/body/**](http://www.diabetes.co.uk/body/respiratory-system.html)

[**http://diabetes.niddk.nih.gov/dm/pubs/neuropathies/**](http://diabetes.niddk.nih.gov/dm/pubs/neuropathies/)

[**http://www.livestrong.com/article/128264-systems-body-affected-sickle-cell/**](http://www.livestrong.com/article/128264-systems-body-affected-sickle-cell/)

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[**http://umm.edu/health/medical/reports/articles/sickle-cell-disease**](http://umm.edu/health/medical/reports/articles/sickle-cell-disease)

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