Example 4

Read the article and write a response in the spaces provided. Your response should be ***approximately 750 words in total****. Write under the criteria headings A, B, C and D. Use clear and precise language. Use appropriate ITGS terminology. Develop answers that demonstrate understanding beyond what is explicitly stated in the article.*

Topic: Health

Criterion A—The issue and stakeholder(s) *[4 marks]*

Describe **one** social/ethical concern related to the IT system.

Privacy could present an issue with the online diabetes monitoring system. Since the results are sent to an online database, hacking could occur after the data is entered into the online database or on the PC itself where the information is stored. The sensitive medical information potentially poses a major threat to the users, compromising their right to privacy.

Describe the relationship of **one** primary stakeholder to the IT system.

The primary stakeholder (the teen with diabetes) greatly benefits from the IT system (the internet site LivingWithDiabetes). The IT system provides an accurate and reliable database system to record the blood glucose levels which were previously kept on paper by the stakeholders themselves. The data is less prone to be lost and is better organized through this computerized database system. This ultimately contributes to maintaining healthy glucose levels and leading a normal life.

Criterion B—The IT concepts and processes *[6 marks]*

Describe, step by step, how the IT system works.

The special internet site “LivingWithDiabetes,” the IT system, works through step-by-step processes involving the diabetes patient, a blood glucose reading meter, and a PC. The diabetes patient measures their glucose levels with a blood glucose reading meter and then transfers the blood glucose levels to a computer. The computer stores this information but also sends the information to the online site, Better Diabetes. The glucose levels are stored on the online database and ordered chronologically. The results are organized by weeks and the data is displayed in charts to allow easy viewing for both medical personnel and the patients. Then, the medical personnel can easily monitor and check the patient’s glucose readings from the information in the online database.

Explain the relationship between the IT system and the social/ethical concern described in **Criterion A**.

In addition, the chronological ordering and chart presentation allow the readings to be compared with past data for medical personnel to observe. Patients may also view their own information at anytime. The IT system stores sensitive medical information in an online database which can be accessed by two major groups of people—the patients and medical personnel. This wide variety of users threatens the security of the database. Hackers can access this information through a patient's account or through a medical personnel's account. The online storage presents potential privacy issues. Also, the many steps required to enter the data offer more opportunities for this information to leak.

Criterion C—The impact of the social/ethical issue(s) on stakeholders *[8 marks]*

Evaluate the impact of the social/ethical issues on the relevant stakeholders.

Patients can compare current readings with past readings through charts. Also, they can quickly see calculations of their blood glucose readings such as "week average," "week low," and "week high." This would take time to calculate these numbers manually. If their glucose levels rise or fall to unhealthy levels, the patients will be able to quickly see this and therefore adjust their diet and life habits to bring it back to the healthy range. This system ultimately could save or prolong diabetes patients' lives.

The patients, however, risk privacy invasion with this system. Blood glucose readings are very personal and sensitive medical information. Potential hacking of the online database or of the patient's personal computer could present a major issue. The data would be used without the patient's consent. Though any form of hacking is serious, the severity level increases in this case since the data is sensitive medical information. Abuse of this information could lead to possible employment issues. If the data was released to employers, the patient might be denied employment based on their diabetic status. Employers might justify their denial since their health condition requires more expensive insurance coverage. The data could also be released to advertisers. In this case, the diabetes patient might be bombarded with spam and advertisements relating to diabetes. This advertisement overload is definitely a hassle for patients.

In addition, errors in entering the data could seriously compromise the patient's health. Errors would distort the data therefore giving patients incorrect feedback about the readings. Possible errors could once again lead to possible health problems, and in severe cases coma or death. Patients would not realize if their blood glucose levels were in a dangerous range and therefore could not adjust their diet and lifestyle if the data was incorrectly entered.

Medical personnel benefit from the system. Doctors can easily monitor and analyse the levels through the database and charts can be used for quick reference between "target range" blood sugar levels and the patient's actual level. Medical personnel can compare the past information to the current as well as store the information for extended periods of time. If levels change, medical staff can then aid the patient in maintaining healthy blood sugar levels by suggesting lifestyle habits.

Also, the database decreased the number of medical staff required to monitor the patients. For example, one hospital has a 1:300 ratio of nurses to patients monitoring glucose readings. This offers financial benefits to the hospital.

Overall, benefits to the patient outweigh concerns of both the patient and medical personnel. Security concerns involving the data, such as hacking, can be prevented through encryption. Although human error is always a possibility with technology, the program could incorporate a data validation function. The data validation function would check the patient-entered glucose levels. If the glucose levels were out of the "target range" or did not match with the other levels entered before and after, the program would prompt the patient to double-check the number. This could lead to a significantly decreased number of human errors when entering data.

Criterion D—A solution to a problem arising from the article *[8 marks]*

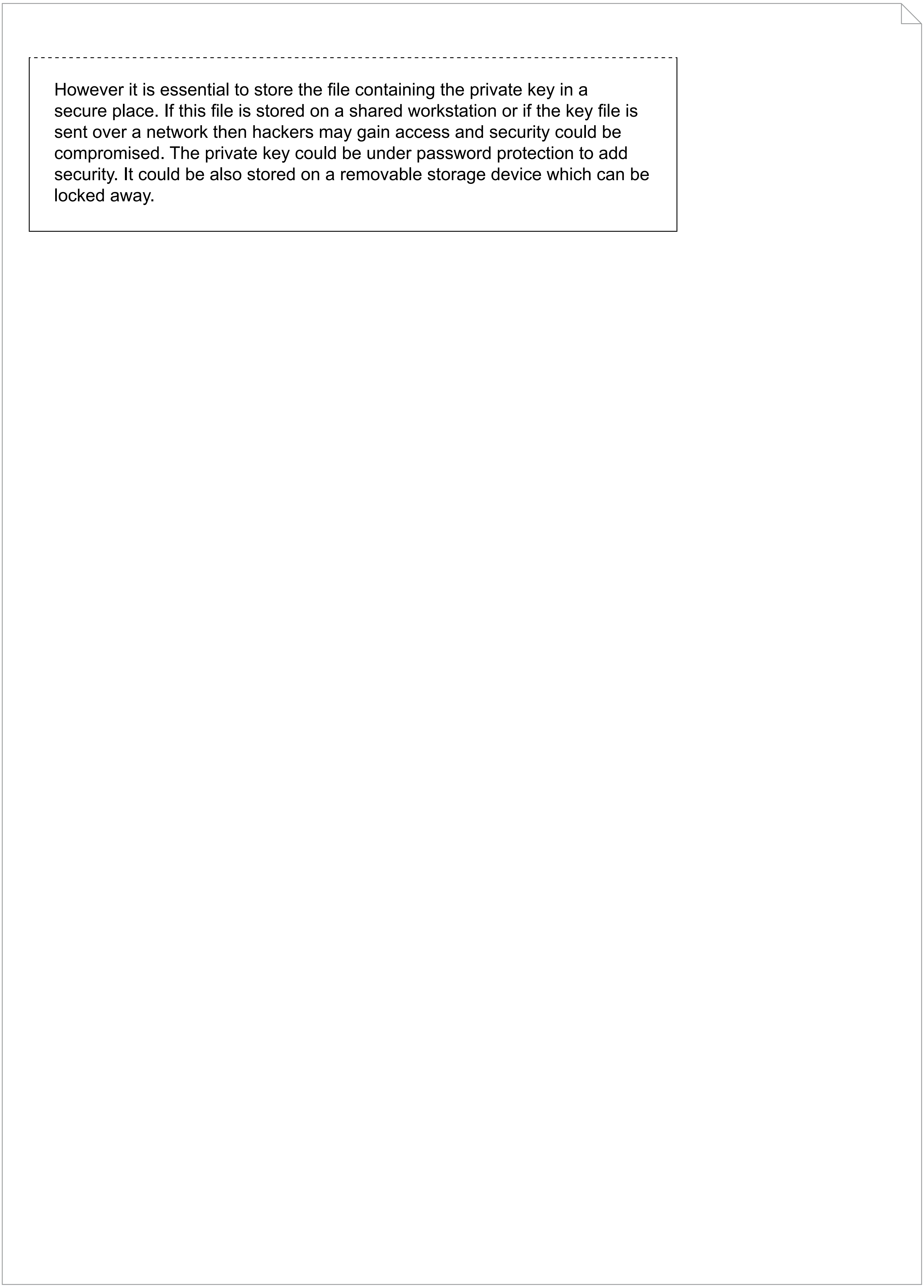
Evaluate one solution that addresses at least **one** problem identified in **Criterion C**.

Privacy poses a threat to the patient. The privacy problem, however, can be solved.

Encrypting the data could prevent data being accessed by unauthorized sources. Encryption would protect the transmitted data information by scrambling the transmission. Encryption could be used for data stored on the server and also during transfer of the data from patient to hospital.

When results are sent by the patient data would be encrypted using a public key. After the data transmission, only authorized medical staff could unscramble the transmission and access the data using the corresponding private key. The private key decrypts the numerical code of the patient-enabled public encryption key. The use of two separate coding keys, the encryption key and decryption key, provides two layers of security.

Encryption is essentially secure as hackers would not be able to make sense of the useless jumble of letters without the private key. For instance if a key length of 128 bits is used it would take too long and too much computing power to test every possible key sequence.



However it is essential to store the file containing the private key in a secure place. If this file is stored on a shared workstation or if the key file is sent over a network then hackers may gain access and security could be compromised. The private key could be under password protection to add security. It could be also stored on a removable storage device which can be locked away.