Ways to Prevent Cancers

Subject: Biology

Grade: 9th, 10th

Purpose: In this lesson, students will learn about different kinds of common cancers. Although some of the cancers are caused by genetic alterations, many others are caused by risky health behaviors, such as smoking. Students will understand more about the risk factors and how these factors may cause cancers.

Materials:
Student Handout

Lesson Duration: 45 minutes

TEKS Objectives:

§112.43. Biology. (c) (2a-d) (6a)

Background Information:
The number of deaths due to cancer has increased dramatically in recent decades. After much research, there is a possibility that a number of cancers are preventable by voluntary actions. To efficiently prevent the incidence of such cancers, we must define the cancer's causes and risk factors. Figure 1, is a brief table that shows common cancers and risk factors associated with them.

The following figures show graphs related to deaths caused by cancer. These facts are valuable resources for student to assess the current situation of deaths related to cancer.

Cancer	Dietary and diet-related risk factors	Dietary protective factors	Other major risk factors
Oral cavity, pharynx, and oesophagus	Alcohol Very hot drinks Obesity (adenocarcinoma of the oesophagus) Chinese-style salted fish (nasopharyngeal cancer)	Probably fruit and vegetables	Smoking
Stomach	Probably high intake of salt-preserved foods and salt	Probably fruit and vegetables	Infection by *Helicobacter pylori*
Colorectum	Obesity Possibly red and processed meat	Probably fruit, vegetables, and other plant foods rich in fibre	Sedentary lifestyle
Liver	High alcohol intake Foods contaminated with aflatoxins	None established	Hepatitis viruses
Pancreas	None established	None established	Smoking
Larynx	Alcohol	None established	Smoking
Lung	None established	Possibly fruit and vegetables	Smoking
Breast	Obesity after menopause Alcohol	None established	Reproductive and hormonal factors
Endometrium	Obesity	None established	Low parity
Cervix	None established	None established	Human papillomavirus
Prostate	None established	None established	None established
Kidney	Obesity	None established	None established

Figure 1. Dietary risk factors, dietary protective factors, and other major risk factors for the common cancers
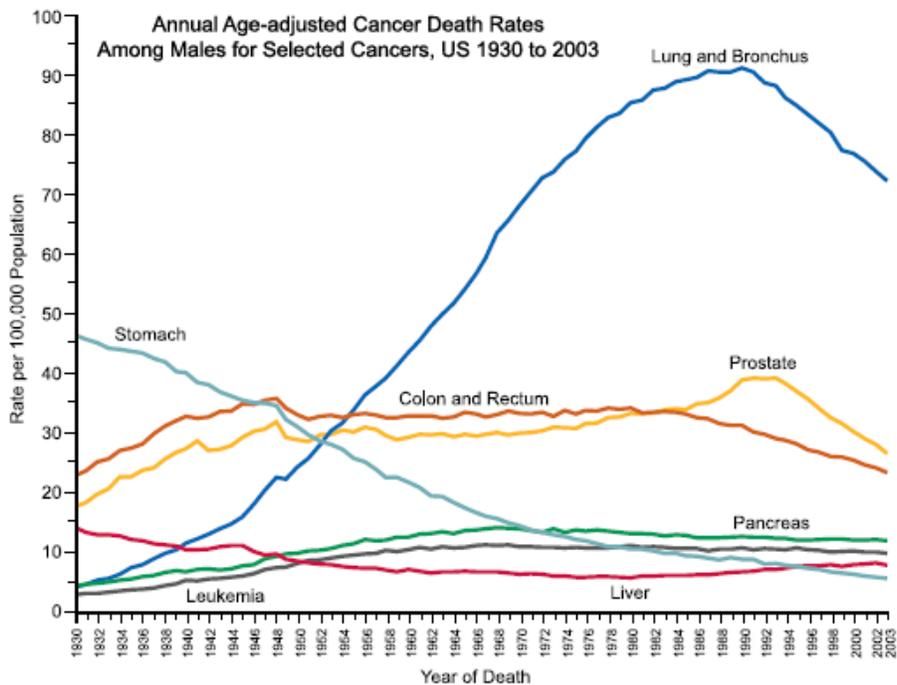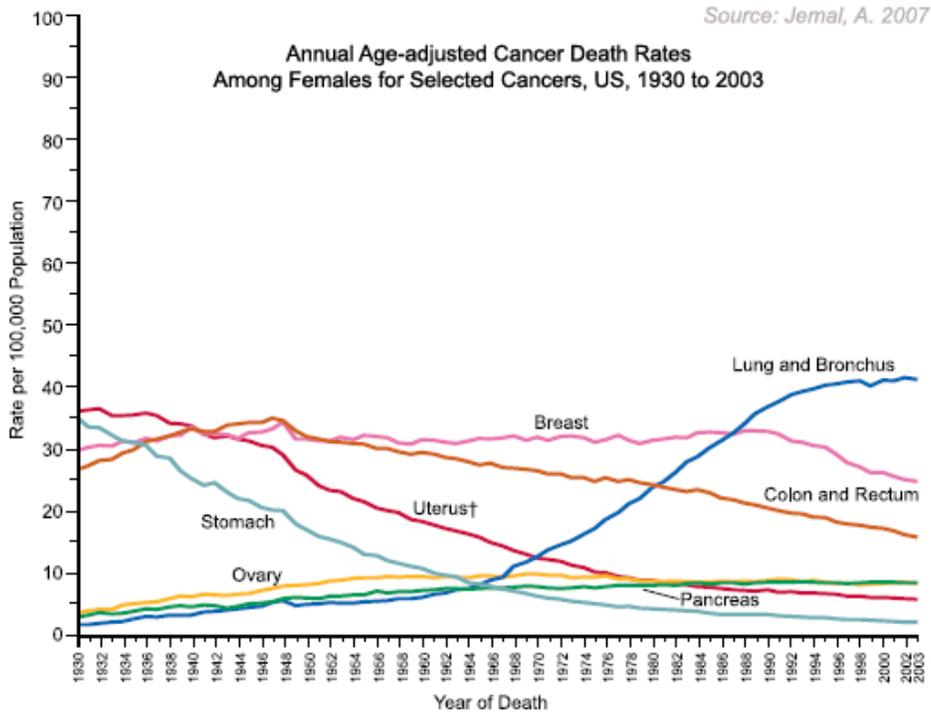

Figure 2. Male cancer death rates due to cancer between 1930 and 2003

Figure 3. Female cancer death rates due to cancer between 1930 and 2003

Death Rates From Cancer and Heart Disease for
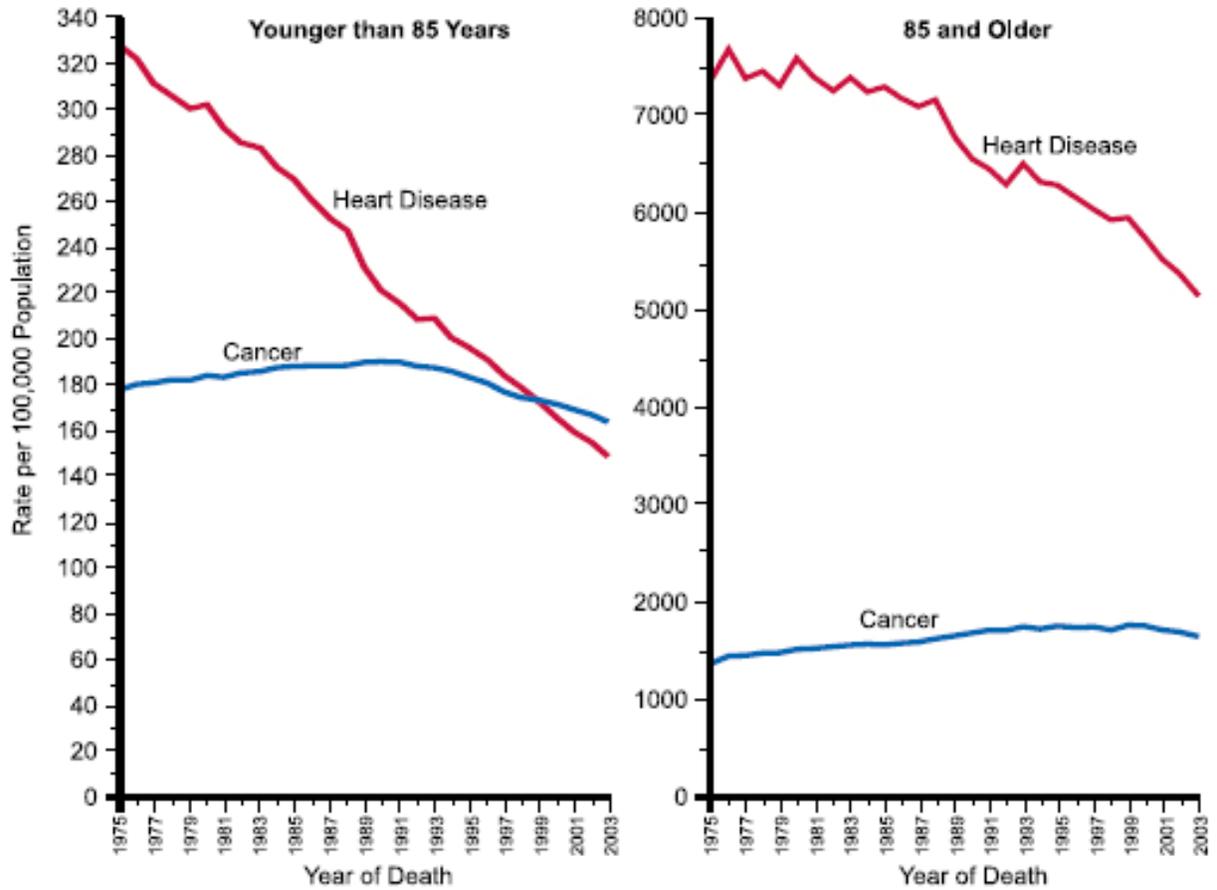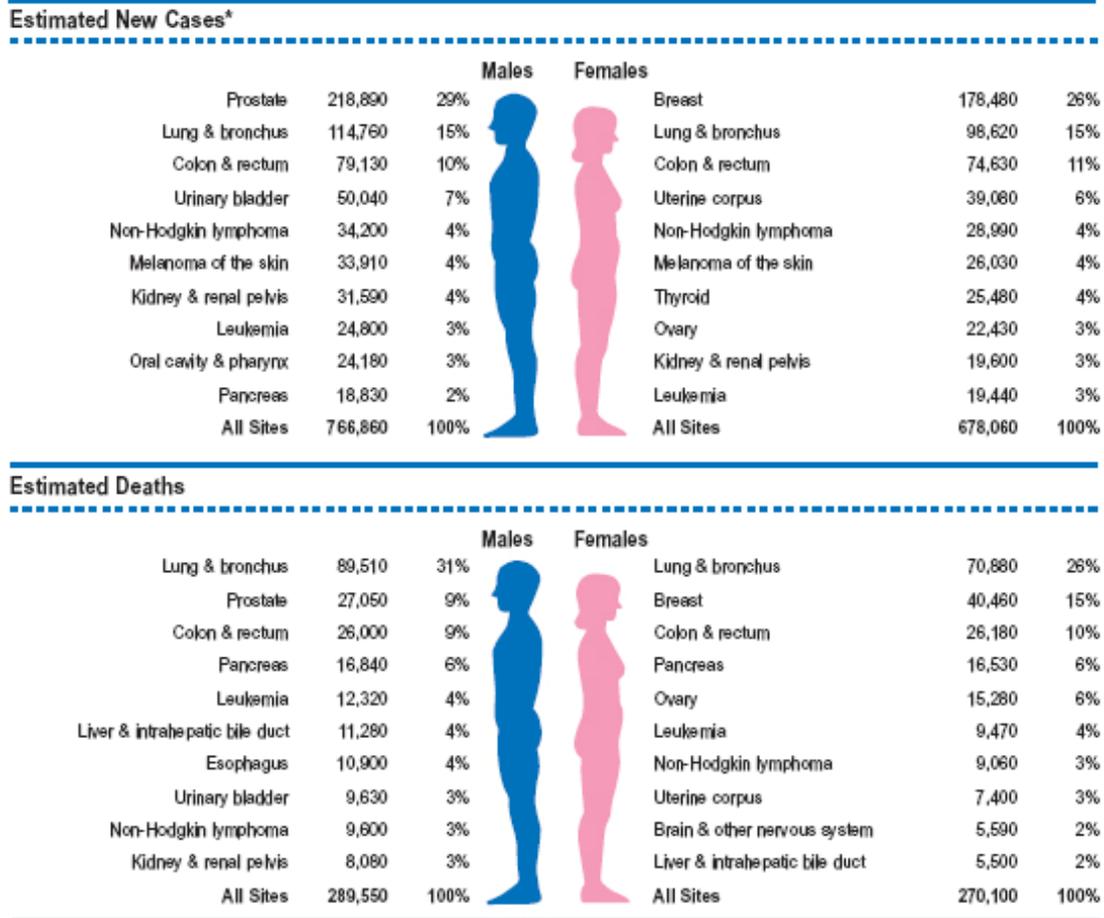Ages Younger than 85 and 85 and Older

Figure 4. Comparison between the death rates due to cancer and heart disease in two age groups

Ten Leading Cancer Types for the Estimated New Cancer Cases and Deaths, by Sex, US, 2007

Estimated New Cases*

		Males	Females			
Prostate	218,890	29%	Breast	178,480	26%
Lung & bronchus	114,760	15%	Lung & bronchus	98,620	15%
Colon & rectum	79,130	10%	Colon & rectum	74,630	11%
Urinary bladder	50,040	7%	Uterine corpus	39,080	6%
Non-Hodgkin lymphoma	34,200	4%	Non-Hodgkin lymphoma	28,990	4%
Melanoma of the skin	33,910	4%	Melanoma of the skin	26,030	4%
Kidney & renal pelvis	31,590	4%	Thyroid	25,480	4%
Leukemia	24,800	3%	Ovary	22,430	3%
Oral cavity & pharynx	24,180	3%	Kidney & renal pelvis	19,600	3%
Pancreas	18,830	2%	Leukemia	19,440	3%
All Sites	766,860	100%	All Sites	678,060	100%

Estimated Deaths

		Males	Females			
Lung & bronchus	89,510	31%	Lung & bronchus	70,880	26%
Prostate	27,050	9%	Breast	40,460	15%
Colon & rectum	26,000	9%	Colon & rectum	26,180	10%
Pancreas	16,840	6%	Pancreas	16,530	6%
Leukemia	12,320	4%	Ovary	15,280	6%
Liver & intrahepatic bile duct	11,280	4%	Leukemia	9,470	4%
Esophagus	10,900	4%	Non-Hodgkin lymphoma	9,060	3%
Urinary bladder	9,630	3%	Uterine corpus	7,400	3%
Non-Hodgkin lymphoma	9,600	3%	Brain & other nervous system	5,590	2%
Kidney & renal pelvis	8,080	3%	Liver & intrahepatic bile duct	5,500	2%
All Sites	289,550	100%	All Sites	270,100	100%

Source: Jemal, A. 2007

Figure 5. Estimates of new cases and deaths of both sexes due to cancer in Year 2007

Activity

The students will be assessed for their knowledge about cancer at the beginning of lesson. The students will share their experiences about what they know about cancer. Students will receive the graphs above and will analyze and discuss each one. There is a spike in male deaths due to lung and bronchial cancers in recent decades. Initiate in-depth class discussion with the students.

Procedure

Follow the student handout.

References:

Colditz, G.A., et al. "Epidemiology – identifying the causes and preventability of cancer?" *Nature Reviews: Cancer*, Vol. 6, 75 (2006)

Jemal, A., et al. "Cancer Statistics, 2007." *CA: Cancer J Clin* Vol. 57, 43 (2007)

Name: _____   Class Section: _____
                                        Date: _____

Ways to Prevent Cancers

List as many common cancers as you can below.

_____   _____

_____   _____

_____   _____

_____   _____

Describe the causes of the cancers listed above.

CANCER   **CAUSE**

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

Which cancer, in your opinion, is the most common type of cancer? Why?

_____

_____

_____

Name: _____   Class Section: _____
                                          Date: _____

Ways to Prevent Cancers

Cancer	Dietary and diet-related risk factors	Dietary protective factors	Other major risk factors
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Kidney	Obesity	None established	None established

Compare your responses on the first page to the table above. Were you correct at identifying the cause of the cancers?

Knowing the causes of some major cancers, what can we do to prevent them? List <u>two</u> methods for each of the following cancers.

CANCER   **PREVENTIVE METHOD**

LUNG   _____
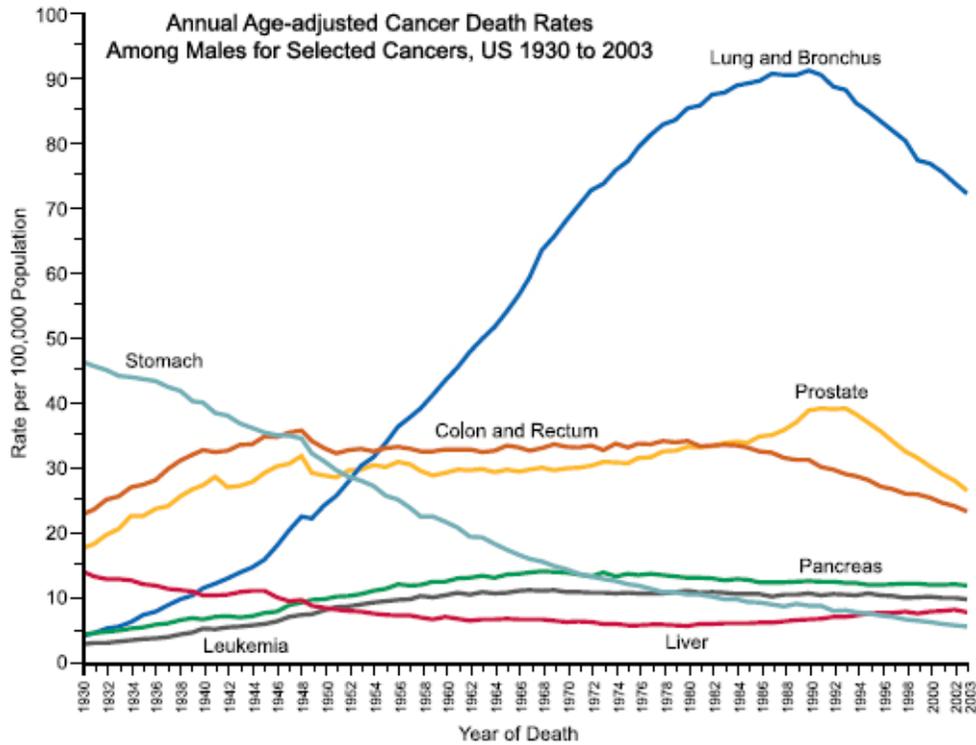
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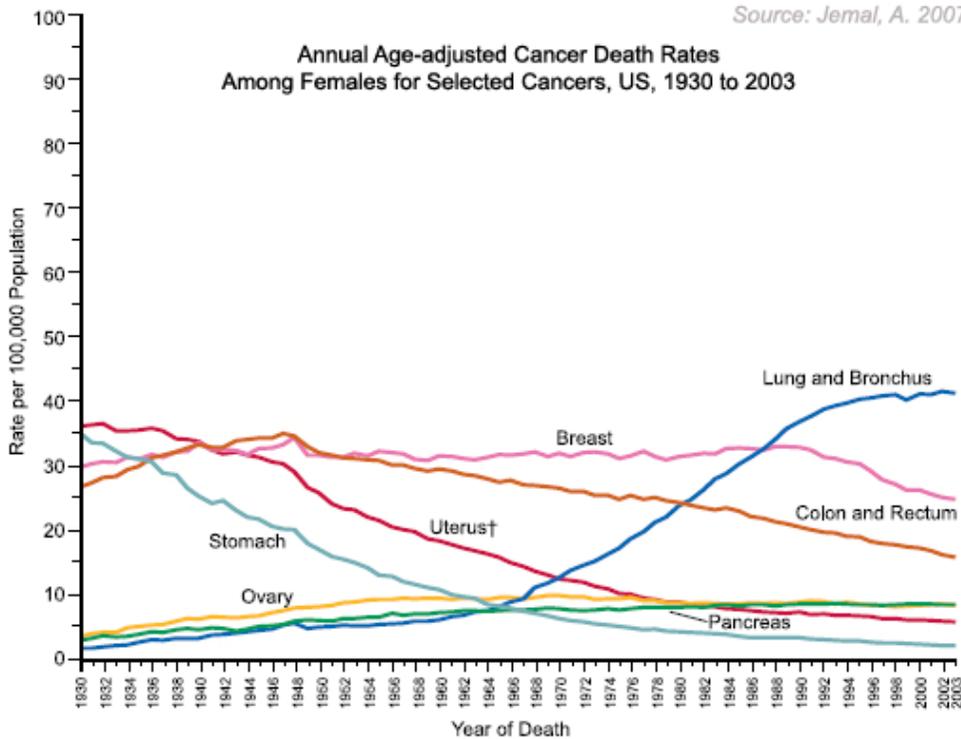
BREAST   _____

                              _____

LIVER   _____

                              _____

STOMACH   _____

                              _____

SKIN   _____ (List one)

Take a look with the following graphs and discuss with them your group. What does each graph represent?

Annual Age-adjusted Cancer Death Rates Among Males for Selected Cancers, US 1930 to 2003

Source: Jemal, A. 2007

Annual Age-adjusted Cancer Death Rates Among Females for Selected Cancers, US, 1930 to 2003

Name: _____   Class Section: _____
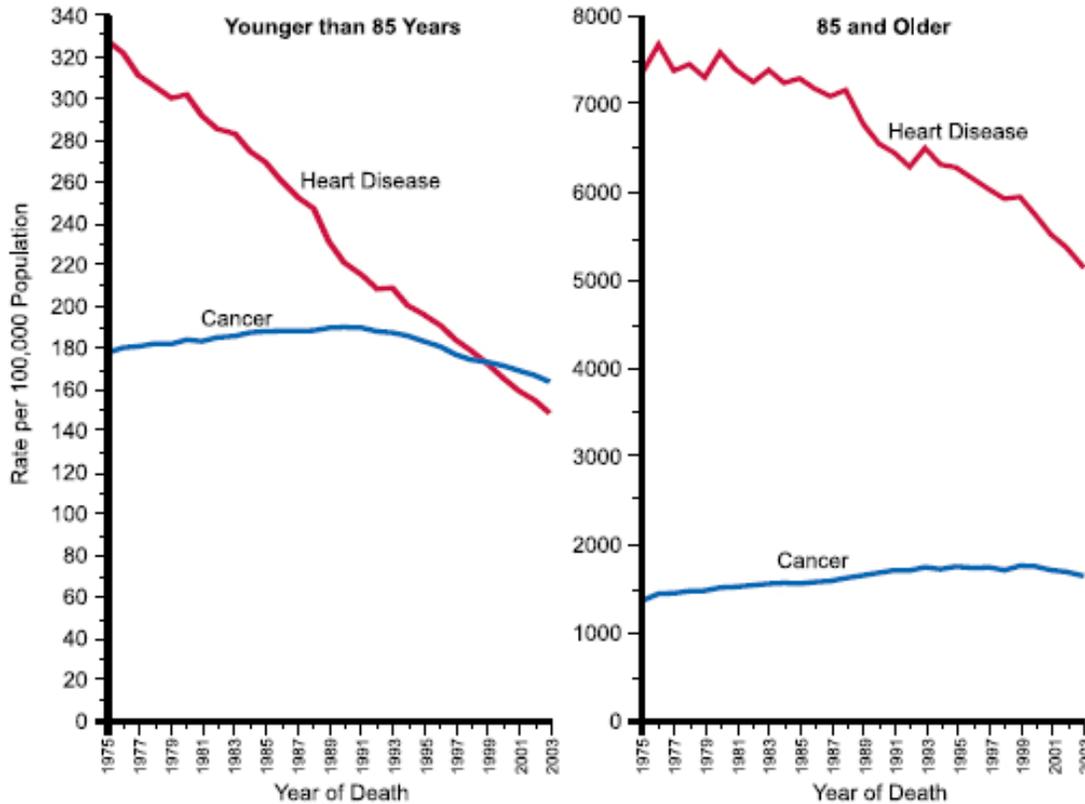   Date: _____

Read the following graph carefully.

Source: Jemal, A. 2007

Death Rates From Cancer and Heart Disease for Ages Younger than 85 and 85 and Older

In one or two paragraphs, explain 1) Why the death rate attribute to heart disease is on the decline; and 2) Explain the steady death rate due to cancer. If you cannot think of a substantial reason, propose a hypothesis with an explanation.

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