What was the unintended consequences of raising plane tickets to improve air traffic safety in the readings?

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Vehicle deaths per 1 million residents, in 20 rich countries



Deciding Public Policy

The problem with testing the entire US population for HIV is that

- a) a positive result becomes relatively meaningless on its own because of all the false positives
- b) other



Image Credit: Linda Cai http://cdn1.theodysseyonline.com/files/2015/07/20/

6357302788007031102045264443_price-of-life-by-linda-cai.png

Deciding Public Policy

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6357302788007031102045264443_price-of-life-by-linda-cai.png
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What it does at least somewhat reveal is to change the probability that a person is HIV-positive from roughly 3 in 1000 (general population) to roughly 1 in 4 true positives in the test (but 3 in 4 would be false positives). Testing other populations would require a different analysis.



Image Credit: Linda Cai

 What are the pros and cons of HIV testing all of the US? all of Eswatini? of other populations?

—If a test is 98.4% accurate for people who have a disease then it correctly tests positive 98.4% of the time, but incorrectly tests negative for them 100%-98.4%= 1.6% of the time (false negative). *Sensitivity* is .984

-If a test is 99.6% accurate for people who don't have a disease then it correctly tests negative 99.6% of the time, but incorrectly tests positive for them .4% of the time (false positive). *Specificity* is .996.

	Test+	Test-
Person is HIV +	HIV+ people \times probability they test +	
Person is HIV -	# of false positives	
Total		

A retail version of OraQuick costs \$30 and gives results in about 20 to 40 minutes. About half of US states test every inmate for HIV on admission or during incarceration. Voluntary testing programs are often ineffective because prisoners do not want to admit to high-risk behaviors. Given this and your statistical analyses from the case studies worksheet, consider whether we should support mandatory HIV testing of newly admitted prison inmates, as you **respond to all of these**:

- a) Summarize what you believe is the strongest argument from the "yes" side
- b) Summarize what you believe is the strongest argument from the "no" side

c) What do you think—yes or no?

Connections to Geometry Segment



Russell Knightley. http://www.rkm.com.au/VIRUS/HIV 🗇 👌 🛓 🛓 🛓 🖉 🔍

Does Armspan Predict Height?

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What else could predict height?

Head Circumference

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-

y is height in both cases





What else could predict height?

y is height in both cases

Shoe Length



y = 2.4042x + 109.23 $R^2 = .4131$

y = 2.1505x + 49.472 $R^2 = .2129$

Head Circumference

Say a break-in occurred. The perpetrator left a shoe print that was approximately 26 cm in length, and a head stocking was found near the scene that was stretched to a diameter of 18 cm (circumference = $\pi \times$ diameter). Use both pieces of information to come up with a prediction of the person's height.

General Electric Illumination Study

General Electric (GE) funded the National Research Council (NRC) of the National Academy of Sciences to study how worker productivity is tied to lighting during a 1924 illumination study. What do you think the NRC concluded?

a) Turn up the lighting slightly (but noticeably) and productivity goes up

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- b) Dim the lighting slightly (but noticeably) and productivity goes up
- c) Productivity stays the same in both cases
- d) Productivity goes up in both cases
- e) Productivity goes down in both cases

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No fair, you changed the outcome by measuring it! [from *Futurama* about the Heisenberg uncertainty principle]

Stereotype Threat

- White men performed worse on a test of mathematical abilities when reminded of Asian-Americans' superior performance in mathematics [Aronson, 1999].
- Asian women performed better on a mathematics test when 'cued' as Asians, but they performed worse when their gender identity was 'cued' [Shih, 1999].



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Picture credit: DOI:10.1093/femspd/ftac011

Mental Rotations Test (MRT)–Is Time on your Side?

Which two of the pictures on the right are the same as the one on the right when rotated in 3-space? Write down two from a), b), c), and d)...

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Mental Rotations Test (MRT)-Is Time on your Side?

Which two of the pictures on the right are the same as the one on the right when rotated in 3-space? Write down two from a), b), c), and d)...



Mental rotations, A Group Test of Three-Dimensional Spatial Visualization, Vandenberg and Kuse, 1978

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Math Gene



(Time Magazine, 2005)

 I was in Japan... Nobody could fathom the idea that if learning higher math didn't come easily, you weren't supposed to continue. You were supposed to work harder... it had nothing to do with some concept of a math gene. [Lazarus, 2001]

Confounding Issues in Testing–What to Do?

Confounding Issues in Testing–What to Do?

• When and if to mark gender, race, ethnicity? No fair, you changed the outcome by measuring it! [from Futurama about the Heisenberg uncertainty principle]

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As a researcher, was it ethical to remove the armspan/height points that I eliminated from the class data and keep the remaining points?

- a) egg-sactly ethical
- b) egg-stremely likely
- c) other



https://www.howtosmile.org/resource/are-you-square-or-rectangle