10th Anniversary Celebration of Bioscience in the 21st Century

Challenges and Controversies in Bioethics, Science, & Engineering: Panel discussion with Drs. Neal Simon and Vassie Ware
DRUG PRICING
Ethical Issues

- Who pays?
- Is the price justified?
- Relative cost?
the price is right
$900
$53,000
$80,000
$94,500
Hepatitis C & HARVONI

- An infection caused by a virus that attacks the liver and leads to inflammation. Most people infected with the hepatitis C virus (HCV) have no symptoms.

- In 20% of cases, liver cancer develops and is fatal.

- 130-150,000,000 chronic cases with up to 5% mortality.

- October, 2014: FDA approves Harvoni, once-daily oral nucleotide analog polymerase inhibitor.
Gilead Sciences: Harvoni

- Cost of Treatment: $94,500/patient

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“My primary responsibility is to Valeant shareholders. We can do anything we want to do.”

"We are going to continue to run a business, and we are going to continue to meet the supply and demand that's out there."

“Hard to accept that these imbeciles represent the people in our government.”
In the News

- Martin Shkreli
  - CEO of Retrophin and Turing
  - Daraprim: toxoplasmosis
    - $13.50 to US$750 per pill overnight

- Michael Pearson
  - CEO of Valeant Pharmaceuticals
  - Nitropress: hypertension: 3-fold
  - Isuprel: bradycardia—6-fold

- Heather Bresch
  - CEO of Mylan
  - EpiPen: 6-fold increase; 25% since Feb.2015
<table>
<thead>
<tr>
<th>Drug Description</th>
<th>Cost (Patient/year)</th>
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<tbody>
<tr>
<td>Cinryze (Hereditary Angioedema)*</td>
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*orphan indication
Thank you for your time and attention
Bioethics of Experimental Ebola Treatments
In 2014, the administration of an experimental serum (Zmapp) to two American healthcare workers treated for Ebola on US soil raised questions of safety, efficacy, access, and ethics.

Bioethicist: Experimental Ebola Treatment Endorsed, But Who Gets It?
By Arthur Caplan
Genetically Modified Organisms (GMOs) involved in Ebola drug treatment (a process that involves growing humanized mouse antibodies in tobacco leaves)

http://mashable.com/2014/08/17/ebola-serum-zmapp/
Tobacco plants used to create the experimental treatment given to the two U.S. patients infected with Ebola at the KBP facilities in Kentucky. Courtesy of Kentucky BioProcessing
July 2015 -- Results from an interim analysis of the Guinea Phase III efficacy vaccine trial show that VSV-EBOV (Merck, Sharp & Dohme) is highly effective against Ebola. Clinical trials continue using "ring vaccination" which was used in the 1970s to eradicate smallpox. Ring vaccination controls an outbreak by vaccinating all suspected individuals in an area around the outbreak.

June 2016 -- WHO declares the end of Ebola virus transmission in the Republic of Guinea and in Liberia. Forty-two days have passed since the last person confirmed to have Ebola virus disease tested negative for the second time. Guinea and Liberia now enter a 90-day period of heightened surveillance to ensure that any new cases are identified quickly before they can spread to other people.
Neuroengineering

Currently: Advances in neural systems and intersecting technologies primarily concerned with perceptual aids such as cochlear implants or vision therapies.

New technologies: brain-machine interfaces to control computers, exoskeletons, robots, other devices with thought alone.

Questions: Can you imagine devices that will enhance and speed up thought or mind-reading devices that project the conscious contents of one’s brain onto a screen as if it were a movie?

Should we make our brains accessible to all? Should we make our brains “faster and better?” Could we/should we change creativity and perception?
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