Lecture 11: 4/15/08

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*Challenges and New Approaches in the Quest for a Prophylactic HIV vaccine*

International Aids Vaccine Initiative

33.2 million people currently infected with HIV; every minute there are 5 new infections.

Deliver for today:
- prevent further spread of virus
- treatment and care for those infected
- mitigate social impact

Develop better tools for future
- invest in tools necessary to end the epidemic (drugs, diagnostics, microbicides, vaccines)

Necessary investment is in the billions of dollars, and is much more than has yet been spent. A vaccine is critical for the affordability of this effort; also, vaccines *work* at ending epidemics (e.g. smallpox).
- A vaccine would also be the best women-controlled intervention; women around the world don’t always have control over their own health or safe-sex practices.

Is an AIDS vaccine possible? Yes.
- Humans can control the virus, up to a point.
  - Rare human antibodies protect against HIV strains.
  - Majority of HIV infected people initially suppress viral load.
  - Some never contract HIV despite repeated exposure to virus; some become infected but don’t develop AIDS.
- Experiments in animals provide valuable insights.

Goals for vaccine:
Primary: prevent establishment of HIV infections (block entry)
Secondary: control HIV infection and progression to AIDS (reduce viral load)
Tertiary (public health): reduce HIV transmission (reduce infectiousness)

A vaccine could have a significant impact: could avert 5.5 to 28 million new infections, according to projections.

Many challenges:
- Scientific:
  - HIV suppresses/destroys key immune system cells
  - Retrovirus; infection is forever
  - Natural immunity doesn’t clear virus
  - Unmatched in virus variability
- Traditional approaches are not feasible
- Relevant animal models are lacking
- Correlates of protection unknown (not unusual; chicken/egg problem)
- Clinical trials are long and costly

- Policy:
  - Ethical concerns (high-risk cohorts; observations might be accused of “watching and waiting”)
  - Health systems challenges
  - Market incentives for the industry are lacking

- Political:
  - Long-term challenge requires long-term global commitment

Why don’t we have a vaccine today? Effort was sub-optimal and the science is tough. The global pipeline is and has been inadequate.

International AIDS vaccine initiative: the first PPPDP.

The neutralizing antibody challenge: formed the IAVI Neutralizing Antibody Consortium.

[The IAVI part of the presentation might be good for inspiring thought questions about how to improve the process. I should try to get my hands on the presentation, or just push to publish it.]

Questions for IAVI, and the world of global health in general:
- How can we get the most creative minds engaged?
- Are there other approaches we should be exploring?
- Are there other mechanisms we should be exploring?