

Immunizations for HIV+ People in the US

Sharon Lee, M.D.

Overview of Immunizations for HIV-infected Individuals in the US

- HIV may reduce the immunogenicity of vaccines
 - Effectiveness
- Vaccinations may impact HIV disease-
 - Safety
- Specific vaccinations review.

US Vaccine Preventable Diseases

- Diphtheria
- Haemophilus influenzae b
- Hepatitis A
- Hepatitis B
- Human Papilloma Virus
- Influenza
- Measles
- Meningococcus
- Mumps
- Pertussis
- Pneumococcus
- Polio
- Rotavirus
- Rubella
- Tetanus
- Varicella

Immunogenicity of Vaccinations in Persons with HIV

HIV effects CD4 numbers and function which reduces immunogenic responses-

- Poor antigenic priming or response to vaccination. (Impaired antibody production and impaired cell-mediated responses.)
- Reduced recall of previously encountered antigens.

Improve Immunogenicity of Vaccinations

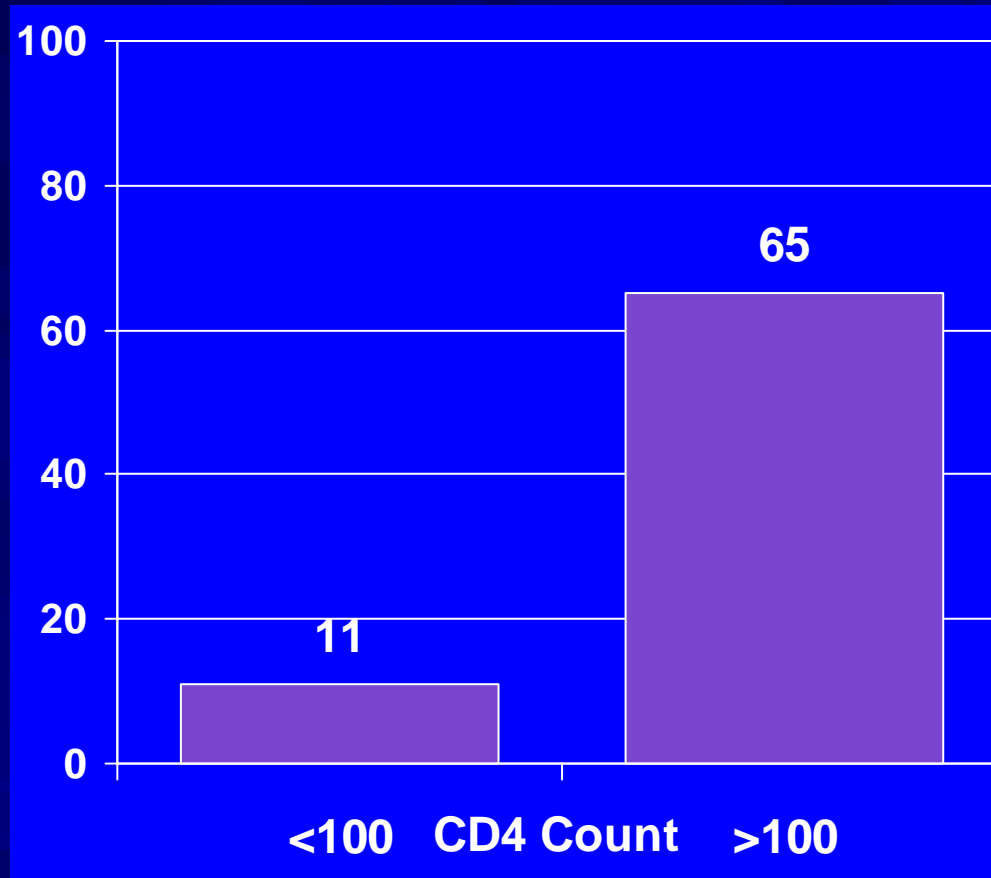
1. Treat with ART and wait for improvement in CD4 levels.
2. Increase antigenic stimulation through higher doses of vaccine.
3. Increase response through repeated vaccinations.
4. Increase response through choices of vaccinations.

1. CD4 Levels

- Response to vaccines may be significantly reduced if levels of CD4 < 200 (< 15%) in adults, < 25% in children.
- Optimal responses are noted with nadir CD4 > 500.
- It is not known if the response with reconstituted* CD4 > 500 is as effective.

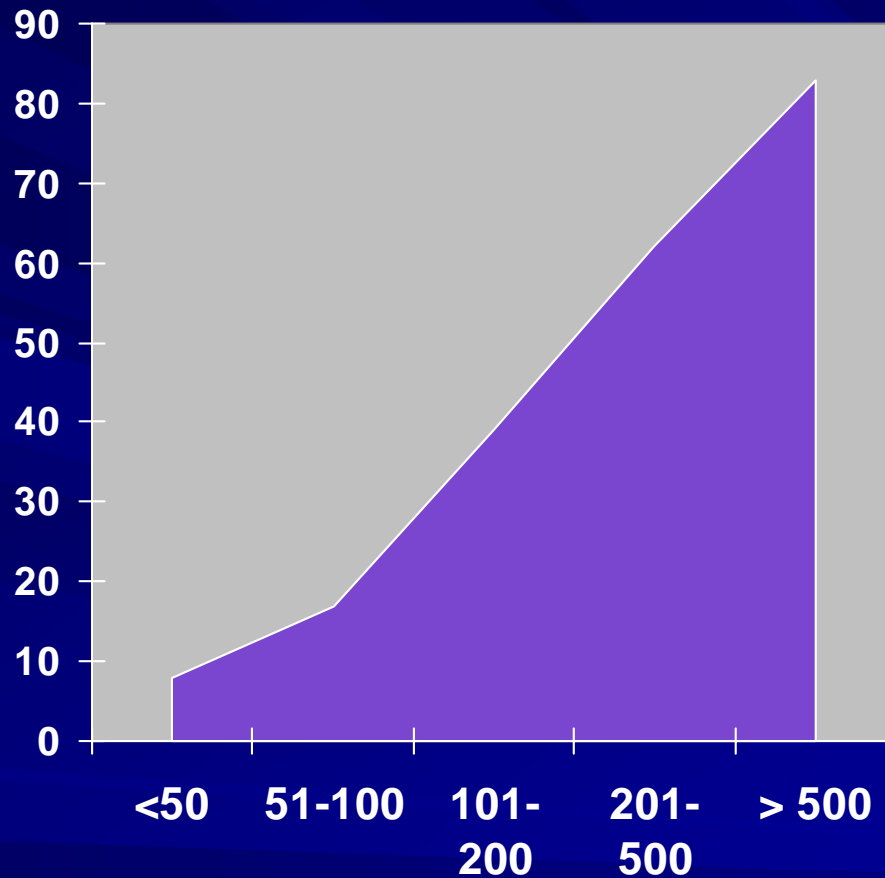
* Reconstituted CD4's levels after ART may have persistent patchy immune defects.

Influenza Vax Effectiveness in HIV+



Fine, *Clin Infect Dis* 2001;32:1784-91.

Hep A Vax Effectiveness in HIV+



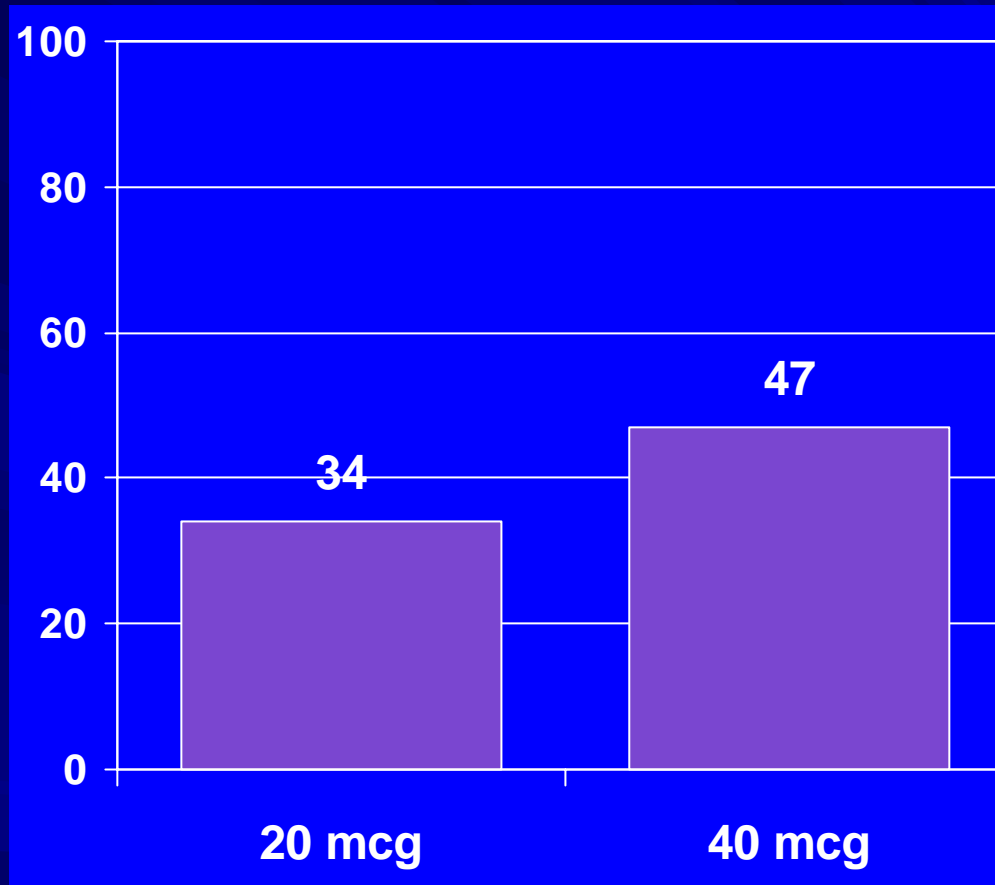
CD4 Count

2. > Antigenic Stimulation

- Increased doses of vaccines may illicit a stronger response in the elderly and perhaps others with reduced immune function.
 - Comparison of flu vaccine doses in elderly:
 - normal dose (15 micrograms)
 - 2X dose (30 micrograms)
 - 4X dose (60 micrograms)
 - Responses were 40-79% higher in 60 vs 15 mcg groups.*

* Keitel, *Archives of Internal Medicine* (2006)

Hepatitis B Dosing in HIV+



3. Repetitive Vaccination

- Re-vaccinations for pneumococcus every 5 years is recommended particularly for those individuals most likely to have rapid declines in antibody levels.
- Re-vaccination with MMR may be warranted in children vaccinated with low CD4's - after reconstitution.

4. Vaccine Choice

Not all vaccines are created equal.

- Studies have shown that nonconjugated bacterial vaccines produce a predominant B cell response.
- In contrast, vaccines which include bacterial antigens conjugated with a carrier protein transform to a primary T cell dependent response.
- Therefore some (Hecht, Lotten, Feikin, etc.) suggest that the choice of nonconjugated versus conjugated vaccines may be based on immune status.*

*Patients with lower CD4 levels may respond better to a nonconjugated pneumococcal or hemophilus vaccine.

Safety of Vaccinations

- Viral Level- Multiple studies have shown that antigenic stimulation results in transient elevations of HIV levels in people who are not on fully-suppressive ART.
- CD4 Level- People with severe immune suppression should generally not be challenged with live attenuated vaccines. There are reports of disease related to vaccine strains. (Measles, Varicella, Vaccinia, Oral Polio)

Safety of Inactivated Vaccines

- Generally, inactivated vaccines are not considered a risk to immunodeficient children or adults.
- There is a potential for any immunization or antigenic stimulation to accelerate the course of HIV infection.
- Postponing immunization until viral suppression is achieved may be prudent.

Safety of Live Vaccines

- MMR- combination of 3 live attenuated viruses.
 - Measles (rubeola- 10 day measles)
 - Mumps
 - Rubella (“German”- 3 day measles)
- MMR vaccination is recommended for all asymptomatic HIV-infected persons who do not have evidence of severed immunosuppression* for whom measles vaccination would otherwise be indicated.
- MMR vaccination should be considered for all symptomatic HIV-infected persons who do not have evidence of severe immunosuppression* or of measles immunity.

* A fatal case of pneumonia attributable to vaccine type measles virus was documented in a young adult with AIDS. *MMWR* 1996

Safety of Live Vaccines

- Varicella- live attenuated virus is recommended for asymptomatic or mildly symptomatic hiv-infected children with N1 or A1 class disease with CD4 >25% and for adults with CD4 >15% (~200) who are on stable ART. In adults, this is not a preventative vaccine, but designed to reduce reactivation symptoms.
- Influenza- live attenuated virus (Flumist) is not recommended, injectable is preferred.
- Polio- live attenuated virus (Sabin) oral polio vaccine is not recommended, preferred is the Salk injectable killed virus vaccine.

General Guidelines

- Vaccine effectiveness may be attenuated in the presence of HIV infection, but there is evidence of at least limited protective effects from most vaccinations and significant protection with some.
- Individuals with compromised immune function (generally very low CD4 levels) and/or not on suppressive regimens, the harm/benefit ratio may tip in favor of postponing immunizations.
- Recommendations for Primary Immunizations (0-6yo) of HIV+ children are the same as for uninfected children except for children with significant immune compromise. (Avoid live vax.)

Planning for vaccinations of your HIV+ adult patients.

- Diphtheria, Pertussis, Tetanus- Tdap recommended every 10 years.
- Haemophilus influenzae b (Hib)- some patients may have a specific immune defects that may be closed with a response to HiB vax.
- Hepatitis A- recommended for at-risk individuals (M-t-M sex, IVDA, liver dz.)
- Hepatitis B- recommended for anti-HBc negative at-risk individuals.
- Influenza- recommended annually, especially for patients with CD4>200 (benefit may be limited in those with lower CD4.)
- Measles, Mumps, Rubella- MMR may be considered for those with low nadir CD4 after reconstitution of CD4 level. AVOID in patients with severe immune compromise.
- Pneumococcal may be given at diagnosis, consider re-vaccination when CD4 reconstitution or after 5 years.
- Varicella- In Oct 2006, the CDC Advisory Committee on Immunization Practices proposed recommending that the vaccine label be changed to indicate a precaution rather than a contraindication for HIV+ and that the vaccine be considered for HIV+ with a laboratory confirmed (+IgG VZV) history of varicella, particularly in HIV+ patients with “less advanced HIV” (CD4>15% or >200) of any age in order to add protection from Shingles and post-herpetic neuropathy.

Planning for vaccinations of your HIV+ adult patients.

58 yo woman with CD4>200, VL<50 on ART.

- Diphtheria, Pertussis, Tetanus- Tdap recommended (q10 y)
- Haemophilus influenzae b (Hib)- if recurrent infection indicates an immune gap.
- Hepatitis A & Hepatitis B- consider if anti-HBc negative as she has risk of IVDA.
- Influenza- recommended each fall with CD4>200.
- Measles, Mumps, Rubella- MMR may be considered.
- Pneumococcal- consider vaccination or re-vaccination if > 5 yrs.
- Varicella- consider to prevent shingles.

Resources

■ Resources:

- The Advisory Committee on Immunization Practices (ACIP) of the CDC,
- The American College of Physicians (ACP),
- The National Vaccine Advisory Committee,
- The National Coalition for Adult Immunization,
- The U.S. Preventive Services Task Force.