Calculating immunisation’s return on investment

• In Gavi-supported countries, 2011–2020

3x
Public infrastructure

7x
Pre-school education

9x
Community health workers

18x (cost of illness)

Immunisation

48x (full income approach)
Whole Life Approach to Immunization

- Importance of vaccination
  - Prevention to avert health spending
  - Prevention is a “best buy”
  - Vaccines seen as a solution for national & economic security
- Dual function of vaccines
Vaccination essential element for promoting

• Health equity

• Economic equity (reducing medical & non-medical costs)

• Social equity – access to the health care system

• Vertical equity intervention - vaccines for diseases of poverty
When immunization rates are high, the wider community is protected including:

Infants who are too young to receive their vaccines.

Older adults at risk of serious diseases.

People who take medication that lowers their immune systems.
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

### TABLE 1: Vaccination guidelines for HIV-infected adolescents and adults.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Indication</th>
<th>Safety CD4 count</th>
<th>Doses for unvaccinated adults</th>
<th>Booster</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMR vaccine</td>
<td>Measles, mumps, rubella seronegative</td>
<td>≥ 200 cells/mL</td>
<td>2 doses [28 days apart]</td>
<td>Protection likely lifelong</td>
<td>Mainly indicated in measles-seronegative HIV-infected women of childbearing age. Pregnancy should be avoided for 6 months after vaccination.</td>
</tr>
<tr>
<td>Influenza</td>
<td>R</td>
<td>Any</td>
<td>1 dose</td>
<td>Yearly</td>
<td>-</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>R</td>
<td>Any</td>
<td>1 dose</td>
<td>-</td>
<td>Given with POIV23 but given 8 weeks after POIV13.</td>
</tr>
<tr>
<td>Poliovaccine (IPV)</td>
<td>RS</td>
<td>≥ 200 cells/mL</td>
<td>1 dose</td>
<td>3–10 years</td>
<td>Given in pregnancy combined with tetanus-diptheria (Tita/tetra).</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>R</td>
<td>Any</td>
<td>4 doses [40 µg] or 3 doses [20 µg]</td>
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</tr>
<tr>
<td>Hepatitis A</td>
<td>RS</td>
<td>travel, MSM, liver disease</td>
<td>≥ 200 cells/mL</td>
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<td>10 years</td>
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<tr>
<td>Meningococcal</td>
<td>RS</td>
<td>Any</td>
<td>2 doses</td>
<td>5 years</td>
<td></td>
</tr>
<tr>
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<td>R</td>
<td>Any</td>
<td>-</td>
<td>10 years</td>
<td></td>
</tr>
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<td>Any</td>
<td>1 dose</td>
<td>10 years</td>
<td></td>
</tr>
<tr>
<td>Polioypestis-inactivated</td>
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<td>3 doses</td>
<td>none</td>
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<td>none</td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>NR</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Be may considered if CD4 count &gt; 400 cells/mL.</td>
</tr>
<tr>
<td>Zoster</td>
<td>RS</td>
<td>≥ 200 cells/mL</td>
<td>1 dose</td>
<td>none</td>
<td>Only use if CD4 count ≥ 200 cells/mL.</td>
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MMR, measles, mumps, and rubella; R, recommended; RS, recommended in selected individuals; NR, not recommended; VL, viral load; HBsAb, hepatitis B surface antibody; MSM, men who have sex with men.
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

• Recommendations made on the basis:
  • Vaccines with strong local evidence for use
    • Influenza
    • Pneumococcal vaccination
    • Hepatitis B, Tetanus-diphtheria
  • Vaccines recommended but either local data lacking or warranted in selected cases
    • Pertussis
    • Meningococcal, hepatitis A
  • Vaccines with no recommendation (NR) OR recommended in selected individuals (RS)
    • Varicella
    • Herpes Zoster
    • Measles, mumps & rubella
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<tr>
<th>Vaccine</th>
<th>Indication</th>
<th>Safety CD4+ count</th>
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<td>R</td>
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<td>5–10 years</td>
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<td>R – travel, MSM, liver disease</td>
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<td>R</td>
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<td>none</td>
<td>Only use if CD4+ count ≥ 200 cells/µL</td>
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MMR, measles, mumps, and rubella; R, recommended; RS, recommended in selected individuals; NR, not recommended; VL, viral load; HBsAb, hepatitis B surface antibody; MSM, men who have sex with men.
Ms XB

• 24 Year old Nursing student
  – HIV positive CD4⁺ Count of 450 cells/μL
  – On ART for the past 3 years
    • Regimen of FDC (TDF/FTC/EFV)
    • Last viral load – LDL 6 months ago
  – 14 weeks pregnant
  – No other medical conditions & clinically well
  – What vaccines does she require?
R. Rappuoli, C. Mandl, S. Black, E. De Gregorio

Nature Reviews Immunology | November 2011; doi:10.1038/nri3085
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  – No other medical conditions & clinically well
  – **What vaccines does she require?**

Viral Load | 15 000 copies/ml
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

• Pertussis
  – Emerging epidemiological data on burden of pertussis in HIV endemic countries
  – Only pregnant women regardless of CD4+ count or viral load
  – Recommend acellular vaccine
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

- **Influenza**
  - 1 dose yearly
  - Irrespective of CD4+ cell count, HIV viral load or pregnancy status
NK

• 38-yr-old
• Diagnosed HIV +ve 2004
  – CD4+ 11 (nadir)
  – ART initiation 03/2004
    • D4T/3TC/EFV
  – 06/2008
    • Diabetes Mellitus
  – Virologic failure 09/2010
    • Put on second line regimen
    • TDF/FTC/LPV/r
    • VL- <50 cps/mL

• Previous OI’s
  – Cryptococcal Meningitis 2004
  – PTB 2011 (treated for 8/12)

• Social history
  – Employed as a senior clerk
  – Alcohol on week-ends

Do you need to vaccinate and what vaccines?
### Table 1  Factors associated with an increased risk of pneumococcal diseases

<table>
<thead>
<tr>
<th>Age</th>
<th>Host factors</th>
<th>External factors</th>
<th>Behavioural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immunocompetent</td>
<td>Immunocompromised</td>
<td></td>
</tr>
<tr>
<td>&lt;2 years</td>
<td>Underlying medical conditions</td>
<td>HIV</td>
<td>Socioeconomic</td>
</tr>
<tr>
<td>≥50 years</td>
<td>• CCVD</td>
<td>CRF, nephrotic syndrome</td>
<td>Environmental</td>
</tr>
<tr>
<td></td>
<td>• CPD</td>
<td>Cancer (solid, haematological)</td>
<td>• Preceding viral respiratory infection</td>
</tr>
<tr>
<td></td>
<td>• Diabetes</td>
<td>Organ and bone marrow transplant</td>
<td>• Residence in an institution</td>
</tr>
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<td></td>
<td>• Alcoholism</td>
<td>Auto-immune diseases</td>
<td>(e.g. nursing home)</td>
</tr>
<tr>
<td></td>
<td>• CLD</td>
<td>Immunosuppressive therapy, corticosteroids</td>
<td>• Frequent contact with children</td>
</tr>
<tr>
<td></td>
<td>• Cerebrospinal fluid leaks</td>
<td>Primary immunodeficiencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Functional and anatomical asplenia</td>
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CCVD: cardiovascular and cerebrovascular disease; CPD: chronic pulmonary disease, CLD: chronic liver disease; CRF: chronic renal failure; HIV: human immunodeficiency virus
Antiretroviral Therapy as Prevention of ... Pneumococcal Infections?
Estimated incidence of invasive pneumococcal disease amongst HIV-infected and -uninfected persons by age category, South Africa, 2017

GERMS-SA, unpublished data

Slide courtesy – Susan Meiring
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

• **Pneumococcal**
  - All HIV-infected regardless of CD4+ with suppressed viral load
  - Prime-boost approach
  - PCV13 followed by PPV23 eight weeks later
  - PCV13 alone is sufficient
DPH

• 21-yr-old female
  – HIV positive current CD4+ 218 on FDC (TFE)
  – Previously treated Disseminated Kaposi Sarcoma
    • Pulmonary involvement
• previously vaccinated with polysaccharide vaccine
• What vaccines are necessary?
Immunogenicity and Safety of 13-Valent Pneumococcal Conjugate Vaccine in HIV-Infected Adults Previously Vaccinated with Pneumococcal Polysaccharide Vaccine


The Journal of Infectious Diseases® 2015;212:18-27

• Immunogenicity studies with single-dose or combination regimens of PCV7 and PPSV23 in HIV – yielded variable results

• Open-label, single-arm study
  • Safety & immunogenicity of 3 doses of PCV13
  • Given at 6 monthly intervals

• Conclusion:
  • Vaccination with PCV13 induces anticapsular immunoglobulin G and opsonophagocytic anti-body responses in HIV-infected adults with prior PPSV23 vaccination and CD4 cell count ≥200 cells/mm³. The observations support the use of PCV13 in this population.
**TABLE 1: Vaccination guidelines for HIV-infected adolescents and adults.**

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<td>≥ 200 cells/mL</td>
<td>1 dose</td>
<td>none</td>
<td>Only use if CD4+ count ≥ 200 cells/μL</td>
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MMR, measles, mumps, and rubella; R, recommended; RS, recommended in selected individuals; NR, not recommended; VL, viral load; HBsAb, hepatitis B surface antibody; MSM, men who have sex with men.
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

• **Pneumococcal**
  - All HIV-infected regardless of CD4+ with suppressed viral load
  - Prime-boost approach
  - PCV13 followed by PPV23 eight weeks later
  - PCV13 alone is sufficient
South African Guidelines for Pneumococcal Vaccination

www.sahivsoc.org

New guidelines released May 2018

www.pulmonology.co.za

A updated guideline released in 2017

Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa presented to the National Advisory Group on Immunisation (NAGI) of South Africa in May 2018
Table 1 Summary of advisory group recommendations for inactivated vaccines with broad indications for HIV-infected adults

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumococcal</td>
<td>Not recommended in resource-limited settings</td>
<td>Recommended for all patients. Use PCV-13 (one dose) regardless of HIV control.</td>
<td>Recommended for all patients. Use PCV-13 (one dose)</td>
<td>No repeat dosing advised</td>
<td>Recommended for all patients. Use PCV-13 and PPV-23</td>
</tr>
<tr>
<td></td>
<td>PPV recommended only for those with additional risk factors which include:</td>
<td></td>
<td></td>
<td></td>
<td>Previously unvaccinated: 1 dose of PCV-13 followed by 1 dose of PPV-23 at ≥8 weeks later (preferably when CD4 count ≥200 cells/mm³). Repeat PPV-23 dose 5 years later</td>
</tr>
<tr>
<td></td>
<td>- Age &gt;65 years old</td>
<td></td>
<td></td>
<td></td>
<td>Previously vaccinated with PPV-23: 1 dose of PCV-13 at ≥3 years followed 2 months later with 1 dose of PPV-23</td>
</tr>
<tr>
<td></td>
<td>- Younger adults with concurrent comorbidity (e.g., asplenia) based on national program recommendations</td>
<td></td>
<td></td>
<td></td>
<td>Previously vaccinated with PPV-23, give PCV-13 at ≥1 year later followed by PPV-23 at 5 years later</td>
</tr>
<tr>
<td></td>
<td>Dosed as 1 dose of PPV-23 with PPV-23 given ≥3 months after PCV-13</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
• 14-year-old female HIV +ve patient on ART- TLD
  • CD4+ count 450 cells/L
  • VL <50 cps/mL
  • No other medical conditions

• Which vaccines are indicated in this patient?

• How many vaccines can be given at the same time?
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

- Tetanus-diphtheria (Td)
  - Vaccinated irrespective of CD4+ count
  - Booster vaccine every 10 years (until more data available)
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

• Human papilloma virus
  • In SA HPV- preteen girls 9-13 yrs- regardless of HIV status
  • Recommended for all HIV-infected adult men (MSM) & women,
  • Can be given regardless of CD4+ count, ART use or viral load
Guidelines for the vaccination of HIV-infected adolescents and adults in South Africa

• **Meningococcal**
  • Should be considered
  • 2 dose schedule (12 weeks apart)
  • Booster every 5 years
• Benefits of zoster vaccine
  – Reduce incidence of shingles
  – Reduce severity of disease
  – Reduce occurrence of post-herpetic neuralgia
• Concerns that remain
  – Lack of data on ideal dosing schedule
  – Safety & efficacy
Results from this study suggest no evidence of a diminished VZV immune response following concomitant administration of ZVL with PPSV23.

Concomitant vaccination is recommended to minimize barriers to patients & providers & improve vaccination coverage.
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</tbody>
</table>

MMR, measles, mumps, and rubella; R, recommended; RS, recommended in selected individuals; NR, not recommended; VL, viral load; HBsAb, hepatitis B surface antibody; MSM, men who have sex with men.
Vaccine advocacy

• Advocacy is all about change:
  • Changed attitudes
  • Behaviour
  • Policies
  • Practices
  • Bridging the gap from problem to solution

• What we need to ask in South Africa is:
  • What **CHANGE** is needed?
  • Who can make the **CHANGE** happen?
  • How do we persuade for **CHANGE**?
Intervention strategies to increase adult vaccination rates

- **Pillar 1**: Convenient vaccination services

- **Pillar 2**: Communication with patients about importance of vaccination and the availability of vaccines

- **Pillar 3**: Enhanced office systems to facilitate adult vaccination

- **Pillar 4**: Motivation through an office immunization champion
Conclusion

• Are opportunities to expand immunization for HIV-infected Adolescents & Adults

• Vaccinate during stable disease

• Communicate with patients about the importance of vaccination and the availability of vaccines

• Vaccination is the most cost effective intervention of 21st century
THANK YOU!