HIV, Non-communicable diseases and Tuberculosis - The path forward for treatment and prevention

By Dr Nomthandazo G. Lukhele

National program officer TB/HIV/NCD

WHO - ESWATINI
Presentation outline

- The Global Burden of disease
- HIV and NCD
- TB and Diabetes
- Way forward: Integrated Health services
Global NCD Threat

- NCDs responsible for 41 million death each year
  - 71% of all deaths globally

- Each year, 15 million people between 30-69 years of age die from an NCD
  - over 85% of these "premature" deaths occur in LMIC

- Four conditions account for over 80% of all premature NCD deaths

<table>
<thead>
<tr>
<th>Disease</th>
<th>Annual Number of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD</td>
<td>17.9 million</td>
</tr>
<tr>
<td>Cancers</td>
<td>9 million</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>3.9 million</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.6 million</td>
</tr>
</tbody>
</table>

WHO 2018
FIGURE 2: Projected Burden of Disease (percentage of Total DALYs) by Groups of Disorders and Conditions, SSA, 2008 and 2030

- Injuries
  - Intentional injuries
  - Other unintentional injuries
  - RTIs

- NCDs
  - Other NCDs
  - Neuropsychiatric disorders
  - NCDs (CVD, cancer, respiratory diseases, diabetes)

- Communicable, maternal, perinatal, nutritional
  - Nutritional deficiencies
  - Perinatal conditions
  - Maternal conditions
  - Respiratory infections
  - Other infectious and parasitic diseases
  - Malaria
  - HIV/AIDS
  - Tuberculosis

Legend: 2030 in red, 2008 in yellow
Healthy life expectancy at birth, both sexes, 2017

Healthy life expectancy is the number of years that a person at a given age can expect to live in full health, taking into account mortality and disability.
HIV and NCDs: Co-Located Epidemics
Burden of NCDs in Swaziland

Proportional mortality (% of total deaths, all ages, both sexes)*

Cardiovascular diseases 11%
Cancers 3%
Chronic respiratory diseases 3%
Diabetes 3%
Other NCDs 8%
Communicable, maternal, perinatal and nutritional conditions 63%
Injuries 9%

Total deaths: 14,000
NCDs are estimated to account for 28% of total deaths.
WHO Country Profile 2014
DALYs amongst Swaziland Adults (50-69 years)
What Are The Drivers/Risk Factors?
1. Factors contributing to the development of cardiovascular disease and complications

Social determinants and drivers
- Globalization
- Urbanization
- Ageing
- Income
- Education
- Housing

Behavioural risk factors
- Unhealthy diet
- Tobacco use
- Physical inactivity
- Harmful use of alcohol

Metabolic risk factors
- High blood pressure
- Obesity
- High blood sugar (diabetes)
- High blood cholesterol

Cardiovascular disease
- Heart attacks
- Strokes
- Heart failure
- Kidney disease
What Contributes to the Risk of NCDs in HIV?

Understanding the relative contributions of each of these factors to the pathogenesis of specific complications in HIV will help to inform the development of strategies for prevention and treatment.
**Strong linkages between HIV/AIDS and NCDs**

- PLHIV have higher risk of developing NCDs and MHD as compared to general population
- Common background factors, life style factors, antiretroviral treatment, common complications, and other disease conditions (HCV, TB).
- Integrating HIV and noncommunicable disease services can improve HIV treatment outcomes
- Harmonisation of WHO normative guidance for HIV (ARV Consolidated Guidelines), NCDs (PEN) and MHD (mHGAP)
TB and NCDs
### Population attributable fraction – risk factors for progression to disease

$$PAF = \frac{P \times (RR - 1)}{P \times (RR - 1) + 1}$$

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Relative risk for active TB disease</th>
<th>Weighted prevalence (adults 22 HBCs)</th>
<th>Population Attributable Fraction (adults)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV Infection</td>
<td>20.6/26.7</td>
<td>0.8%</td>
<td><strong>16%</strong></td>
</tr>
<tr>
<td>Malnutrition</td>
<td>3.2</td>
<td>16.7%</td>
<td><strong>27%</strong></td>
</tr>
<tr>
<td>Diabetes</td>
<td>3.1</td>
<td>5.4%</td>
<td><strong>10%</strong></td>
</tr>
<tr>
<td>Alcohol use (&gt;40g / d)</td>
<td>2.9</td>
<td>8.1%</td>
<td><strong>13%</strong></td>
</tr>
<tr>
<td>Active smoking</td>
<td>2.0</td>
<td>26%</td>
<td><strong>21%</strong></td>
</tr>
<tr>
<td>Indoor Air Pollution</td>
<td>1.4</td>
<td>71.2%</td>
<td><strong>22%</strong></td>
</tr>
</tbody>
</table>

TB and Diabetes

A Deadly linkage
- Weak immune system- high risk for progression from Latent TB to Active disease
- Diabetes Triples the risk – about 15% of TB globally can be linked to diabetes
- TB can cause impaired glucose tolerance hence pose a risk to development of diabetes
- The likely hood of TB death or relapse is high in patients with diabetes
- A large proportion are not diagnosed or diagnosed late

WHO Response
- Developed a collaborative framework for care and control of TB Diabetes
Moving Forward

What Vs How
WHO - CVD management guidance and PEN
I. Protocols for primary care

for management of hypertension, diabetes, raised cardiovascular risk, asthma, chronic obstructive pulmonary disease and referral of suspected breast and cervical cancer through an integrated approach

WHO PEN Protocol 1
Prevention of Heart Attacks, Strokes and Kidney Disease through Integrated Management of Diabetes and Hypertension

WHO PEN Protocol 2
Health Education and Counseling on Healthy Behaviours (to be applied to ALL)

WHO PEN Protocol 3
3.1 Management of Asthma
3.2 Management of Chronic Obstructive Pulmonary Disease (COPD)

WHO PEN Protocol 4
4.1 Assessment and referral of women with suspected breast cancer at primary health care

WHO PEN Protocol 4
4.2 Assessment and referral of women with suspected cervical cancer at primary health care
The HEARTS technical package covers six elements

- Healthy lifestyle
- Evidence-based treatment protocols
- Access to essential medicines and technology
- Risk-based management
- Team care and task-sharing
- Systems for monitoring
**Cost of care**

**District hospital**

- Specialist treatment
  - Initial review of high-risk patients and all secondary prevention cases
  - Review of complex cases referred from outpatient health clinic
  - Provide doctor to supervise medical clinics in primary health care

**Primary health care**

- Risk screening, assessment and management
  - Cardiovascular risk assessment
  - Blood pressure, body mass index, urinalysis, blood glucose, total cholesterol
  - Counselling on risk factors
  - Referral of acute events to next level, medication

**Community health worker**

- Health education
  - Screening of population for risk factors
  - Providing lifestyle interventions (tobacco cessation, physical activity, diet)
  - Referral of individuals with risk factors to primary health care
Challenge

- No studies using WHO PEN interventions or tools in patients with HIV
- Few studies comparing performance of CVD risk screening tools in predicting actual CVD events in patients with HIV
- Many studies comparing performance of CVD risk screening tools in patients with HIV, but without real-world outcomes
- No tool really hits the spot every time – all are quite variable in their performance
# Common Challenges Faced Across Health Threats

<table>
<thead>
<tr>
<th>Challenge</th>
<th>HIV/AIDS</th>
<th>Diabetes</th>
<th>CVD</th>
<th>Chronic Lung Disease</th>
<th>Cancers</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand-side barriers</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Inequitable availability</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Health worker shortages</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Lack of adherence support</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Inadequate infrastructure and equipment</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Inconstant supplies of drugs and diagnostics</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Missing linkage and referral systems</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Need for client and community engagement</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stigma and discrimination</td>
<td>++</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

Adapted from Rabkin and El-Sadr, *Global Public Health*, 2011
Health System Challenges: Models of Care for HIV and NCDs

Scenario 1: Parallel Services

Scenario 2: Coordinated Services

Scenario 3: Integrated Services

Adapted from: Rabkin, Kruk and El-Sadr, AIDS 2012
Building on the HIV platform: tackling the challenge of noncommunicable diseases among persons living with HIV

Wafaa El-Sadr
Professor of Epidemiology and Professor of Medicine, College of Physicians and Surgeons, Mailman School of Public Health, Columbia University, US

Eric Goosby, Professor, University of California, San Francisco, US
Scale-up of HIV Treatment

UNAIDS, 2017
Support for Health Systems

- Renovation
- Medical Records
- Peer Programs
- Laboratories
- Data Management
- Tools and job aides
- Pharmacy
- Training & Mentoring
- Community mobilization
Diverse Models of Care
Integrating cardiovascular disease risk factor screening into HIV services in Swaziland: lessons from an implementation science study

Miriam Rabkin

Director for Health Systems Strategies at ICAP Columbia and an Associate Professor of Medicine & Epidemiology at Columbia University's Mailman School of Public Health, NY, US

Palma, Anton; McNairy, Margaret L.; Gachuhi, Averie B.; Simelane, Samkelo; Nuwagaba-Biribonwoha, Harriet; Bongomin, Pido; Okello, Velephi J.; Bitchong, Raymond A.; El-Sadr, Wafaa M.
## CVDRF Screening Results (N=1,826)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total</th>
<th>Age (years)</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total (n (%))</td>
<td>40-49 (%)</td>
<td>50-59 (%)</td>
</tr>
<tr>
<td>At least 1 CVD risk factor</td>
<td>1,826 (100%)</td>
<td>1,121 (61%)</td>
<td>462 (25%)</td>
</tr>
<tr>
<td>Hypertension (BP &gt; 140/90 mmHg)</td>
<td>25%</td>
<td>19%</td>
<td>31%</td>
</tr>
<tr>
<td>Hypercholesterolemia (non-fasting TC &gt; 6.2 mmol/L, POC)</td>
<td>8%</td>
<td>6%</td>
<td>11%</td>
</tr>
<tr>
<td>Diabetes (HbA1c &gt; 6.5%, POC)</td>
<td>5%</td>
<td>3%</td>
<td>8%</td>
</tr>
<tr>
<td>Smoking in past year (self-report)</td>
<td>9%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Hypertensive emergency (SBP &gt;180 or DBP &gt;110)</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>≥ 10% 10-year CVD risk</td>
<td>3%</td>
<td>1%</td>
<td>4%</td>
</tr>
</tbody>
</table>
Practical Implementation Barriers

Mean: 43 screened per week

KEY: Timeline of screening activities and clinic events
Blue: space, supplies and systems; Green: staffing issues

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  1st screening room opened</td>
</tr>
<tr>
<td>B  Additional nurses posted to clinic</td>
</tr>
<tr>
<td>C  2nd screening room opened</td>
</tr>
<tr>
<td>D  Kaposi’s Sarcoma clinic opened, staff diverted</td>
</tr>
<tr>
<td>E  Baby clinic opened, off-site trainings occurred</td>
</tr>
<tr>
<td>F  Clinic short 4 nurses for the holidays</td>
</tr>
<tr>
<td>G  Study staff begin to help with screening</td>
</tr>
<tr>
<td>H  Clinic nurses reduce screening due to presence of study staff</td>
</tr>
<tr>
<td>I  BP machine broke</td>
</tr>
<tr>
<td>J  Study staff begin early morning screening and enrollment</td>
</tr>
<tr>
<td>K  Point-of-care test kits stock-out</td>
</tr>
<tr>
<td>L  No clinic nurses assigned to screening</td>
</tr>
</tbody>
</table>
Conclusions re: Screening for CVDRF

- High yield; 39% of patients had at least one risk factor
- Appreciated by patients and staff
- Multiple practical barriers even with point-of-care diagnostics funded by study and provided free of cost
  - Space / Staff / Supplies / Systems
- Careful planning is required in order to implement integrated HIV/NCD services at scale

This research was supported by the United States President’s Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Centers for Disease Control and Prevention (CDC) under the terms of Cooperative Agreement Number R01AI100059 and by the National Institute of Allergy and Infectious Diseases under grant #T32AI114398. The contents are solely the responsibility of ICAP and do not necessarily reflect the views of the United States Government.
Motivation and Methods

Implementation science (IS) is a **systematic, scientific approach** to ask and answer questions about how to **deliver what works** in populations who need it with greater speed, appropriate fidelity, efficiency, and relevant coverage.

Inclusion:
- Evaluating integrated NCD/HIV services in SSA
- Reporting at least one implementation outcome\(^1\)

Exclusion:
- Did not explain variation in implementation outcomes

---

Adapted from Proctor et al, 2011.
Conclusion

- More evidence is needed

- Global partnership

- Reorient the Health System – country context
  - Model of service delivery
    - Integrate to existing programs
    - Integration of NCD management across the different levels of the health care system
    - Integration of interventions that address multiple common risk factors together

- Universal health coverage – patient centered primary health care response
  - Equitable Access to quality services by all who need services at no financial hardship for the clients
Thank you

- WHO
- MOH
- Nercha
- IAS
- Partners – unilateral and bilateral