# All About Antiretrovirals

## A Nurse Training Programme

# Work Book

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AFRICAID

# Contents

## Training Modules

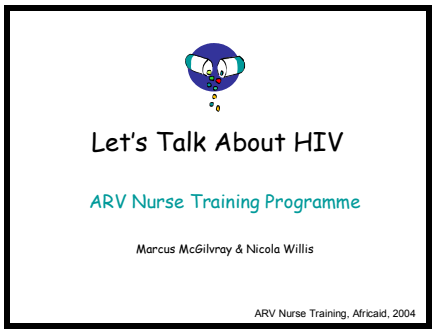
# Module 1: Let's talk about HIV

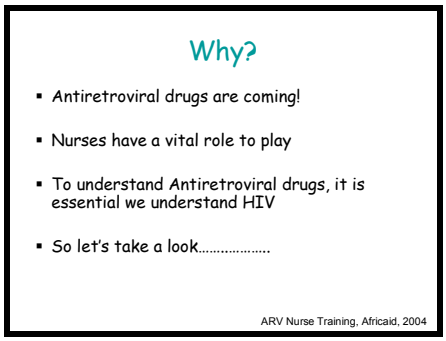
## Module Objectives

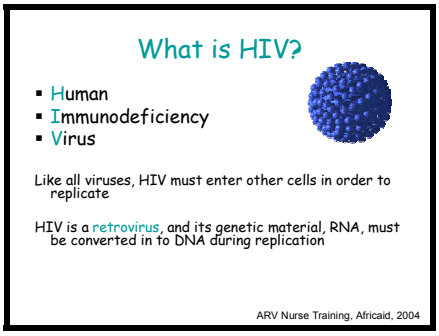
- To ensure nurses have a basic understanding of HIV infection and its effect on the immune system
- To provide nurses with an understanding of the usual clinical course of HIV infection
- To describe the general management of patients throughout the stages of HIV infection
- To equip nurses with the skills required to explain the basics of HIV infection to their patients
- To differentiate between HIV and AIDS

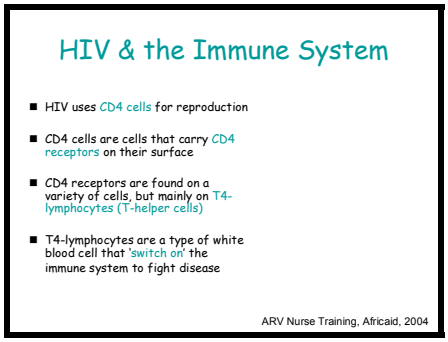
## Slide Presentation: Let's Talk About HIV

(All slides read from left to right)



## HIV & the Immune System

- The CD4 cells are like soldiers
- Strong CD4 cells are able to fight off infection
- BUT, when HIV enters CD4 cells for reproduction, it damages the CD4 cell, eventually killing it.
- So, HIV damages the very system that usually protects the body from infection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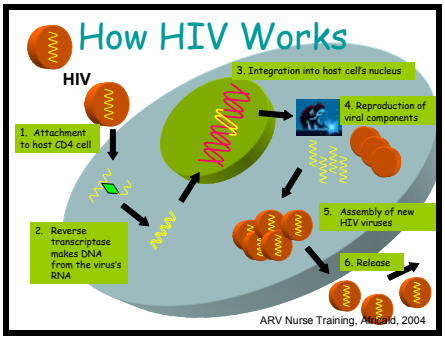
## How HIV Works

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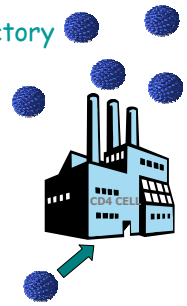
## HIV Factory

- When HIV binds to a CD4 cell, it turns that cell in to an HIV 'factory'
- Billions of HIV viruses are produced, and the CD4 cell is eventually killed
- The new HIV viruses go on to infect other CD4 cells, and reproduce

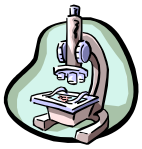



## A Losing Battle…

- The normal range for CD4 count is 600-- 1500 cells/mm$^3$
- With HIV infection, every day more CD4 cells are made; and every day HIV uses CD4 cells to replicate itself
- In the long term, it's a losing battle for the CD4 cells…


## Assessing the Damage

- The state of an HIV+ person's immune system is measured by counting the CD4 cells that remain ie CD4 count
- Over the years, HIV progressively weakens the body's immune system by decreasing the number of CD4 cells



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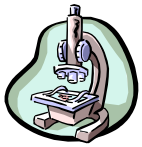
## Assessing the Damage

- Viral Load is another useful blood test
- It tells us how much HIV virus is in the blood
- Over time, viral load increases as more and more virus is produced



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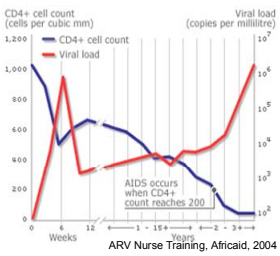
## Disease Progression

Over time,

Viral Load **increases**

CD4 **decreases**

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## Opportunistic Infections

- HIV slowly destroys CD4 cells over years of infection
- As the CD4 count drops, infections take 'opportunity' of this weakend immune system, resulting in **opportunistic infections**

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## Stages of HIV: Stage 1

- Usually asymptomatic (+/- persistent generalised lymphadenopathy)
- CD4 count 600-1500mm$^3$
- Able to fight infection well
- CD4 drops slowly over time
- Possible to continue with normal daily life

**Management**

✓ Healthy Lifestyle (20 minutes walk daily, eating regularly)
✓ Regular check-ups, STI screening, PAP smears, influenza vaccines, Safer sex

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## Stages of HIV: Stage 2

- CD4 count drops below 350mm$^3$
- Mild infections more often than usual, rashes, ski infections, fever, oral thrush, shingles, recurrent chest infections
- Weight loss common
- Possible to continue with normal daily life

**Management**

✓ Same as Stage 1 (Healthy Lifestyle, Check-ups, screening, safer sex, vaccines
✓ Early treatment of infections
✓ Prophylaxis (co-trimoxazole - Bactrim)

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## Stages of HIV: Stage 3

- CD4 count drops below 200mm$^3$
- More serious OIs common (,g pneumonia, meningitis)
- Chronic diarrhoea, prolonged fever, candida, TB, severe pneumonia
- Weight loss+
- Difficulty with daily activities

**Management**

✓ Same as Stage 1 (Healthy Lifestyle, Check-ups, screening, safer sex, vaccines)
✓ Early treatment of infections
✓ **Antiretrovirals**
✓ Prophylaxis (co-trimoxazole - Bactrim)

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## Stages of HIV: Stage 4

- CD4 count drops further, as low as 0mm$^3$
- Often Very sick, bedridden
- More severe OIs eg PCP pneumonia, severe diarrhoea, lymphoma, extrapulmonary TB, toxoplasmosis, CMV, cryptococcal meningitis, Kaposi's sarcoma, HIV encephalopathy, oesophageal candidiasis
- Weight loss+++

**Management**

✓ Treatment of OIs
✓ **Antiretrovirals**
✓ Hospital or home-based care
✓ Prophylaxis (co-trimoxazole - Bactrim)

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## Acquired Immune Deficiency Syndrome

These opportunistic infections are the signs and symptoms associated with HIV infection

When an individual's immune system is damaged to the extent that these OIs occur, the individual is said to have AIDS

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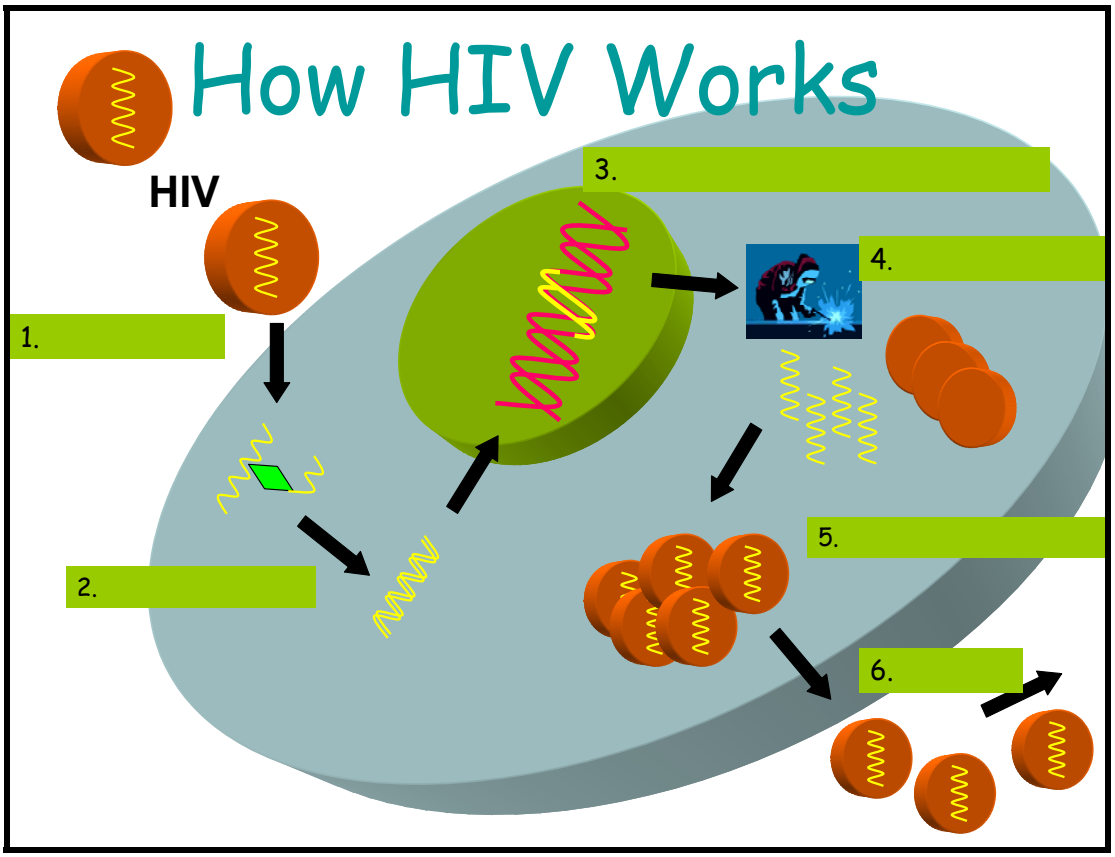
**Hand Out 2: The Life Cycle of HIV** (with kind permission from Dr J. Giddy)




**What is happening at each Stage in the Life Cycle? Fill in the Gaps or write below!**

**Learning Exercises: 'Let's talk about HIV' (Answers on Page 47)**

## A. Questions

1. Which cells does HIV primarily target for replication?

……..

……..

2. Why does HIV 'need' CD4 cells?

……..

……..

3. What is the effect of HIV's attack on CD4 cells?

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4. What does 'latency' mean?

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5. Using Handout 2: '*Life Cycle of HIV'* below, write in the different stages of HIV replication from 1 – 6

6. What are the clinical signs and symptoms associated with early infection (Stage I & II)?

……..

……..

……..

7. What are the clinical signs and symptoms associated with the later stages of HIV infection (Stage III & IV)?

……..

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……

## B. Group Work

Patients will look to you for explanations about their condition. If patients are to have confidence in their nurse and receive clear, accurate information, it is vital that nurses are able to answer their questions appropriately. These role plays have been designed to help equip you with the skills to answer some common questions patients may have about their condition.

Practice some responses to the following questions.

**Typical Patient Questions:**

1. What is the difference between HIV and AIDS?

……..

……..

……..

……..

2. How does HIV make me sick?

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3. What are these blood tests I have to have?

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4. What will happen to me now that I have HIV?

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……..

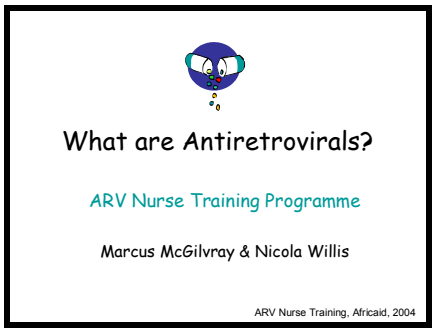
# Module 2: Let's Talk About ARVs

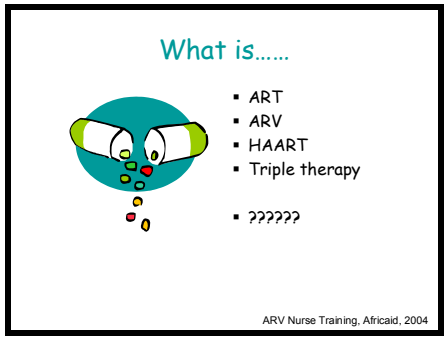
## Module Objectives

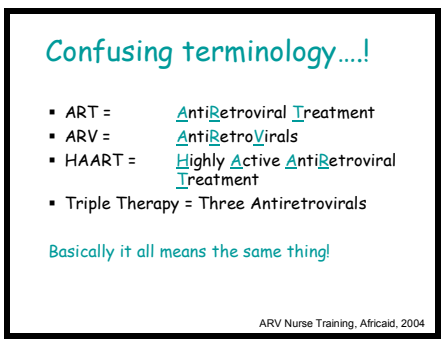
- To equip nurses with an understanding of how ARV drugs work
- To demonstrate the impact of ARV drugs and triple therapy on HIV disease
- To provide nurses with a basic understanding of the criteria for commencing ARV therapy
- To introduce nurses to the ARV drug combinations most commonly used
- To equip nurses with the skills required to explain about ARV drugs to their patients
- To introduce the immense challenges associated with ARV administration

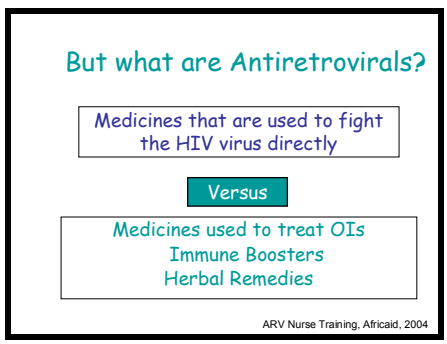
## Slide Presentation: Let's Talk About ARVs

(All slides read from left to right)



## What do ARVs do….?

ARVs change HIV from a terminal (fatal) disease to a "chronic disease".

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## What is a Chronic Disease??

An illness which cannot be "cured" but can be controlled

Examples of chronic diseases:
- Diabetes
- High Blood pressure
- Asthma
- Schizophrenia

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## How do they control HIV?

- ARVs reduce the ability of the HIV virus to replicate
- In turn, this increases the ability of the body to fight disease

HIV Replication ↓

Immune Response ↑

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## Primary Goal of ARVs

**to decrease or reverse immune system damage associated with HIV infection,**

**thus improving quality of life and reducing HIV-related morbidity and mortality**

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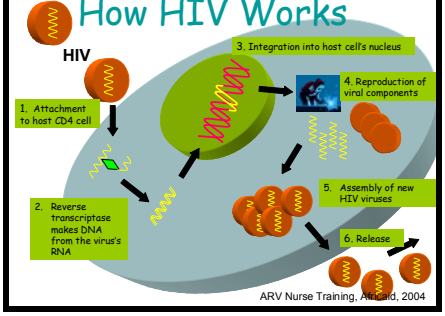
## How HIV Works

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## ARVs at Work….

- Remember – HIV uses the CD4 cell as an HIV factory…….
- ARVs get inside the factory, and at different places, reduce the ability of the virus to replicate
- So, less virus can be made


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## 3 Main Classes of ARVs

NRTIs – "nukes" eg AZT, 3TC, DDI, D4T

NNRTIs – "non nukes" eg EFV, NVP (Nevirapine)

PIs – protease inhibitors eg lopinavir, ritonavir

Each class acts at a different stage and in a different way, to prevent HIV replicating within the CD4 cell

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## ARVs at Work…..

Remember the enzymes involved in HIV replication….?

- Reverse Transcriptase (essential for copying RNA into DNA in the early stages of replication)
- Protease ( required for assembly and maturation of fully-infectious new virus in final stages of replication)

ARVs INHIBIT these enzymes, thus slowing down the replication cycle

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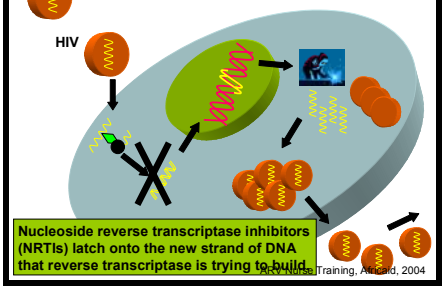
## How NRTIs Work

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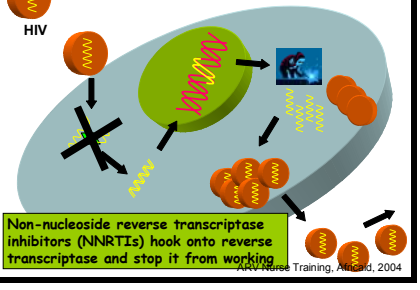
## How NNRTIs Work

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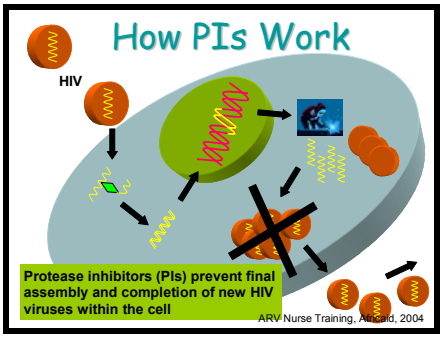
## How PIs Work

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Does everyone with HIV need ARVs ?

NO

It depends on the 'Stage' of HIV Infection

Which depends on……

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## Who needs ARVs…..?

The 'Stage' of HIV depends upon:

- Immunological markers (CD4 count)
- Clinical symptoms (Opportunistic infections)

It also depends greatly on whether the patient is ready to start

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## WHO Guidelines (2002)

HIV infected adults and adolescents should start ARV therapy when they have:

- **WHO stage IV of HIV disease, regardless of CD4 count**
- **WHO stages I, II, III of HIV disease, with a CD4 count below 200/mm$^3$**

**(where CD4 testing available!)**

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## Starting ARVs in Children (WHO 2002)

NB: Children differ in their immunology and virological response to HIV

And are managed differently!

<18 months:
Paediatric Stage III, irrespective of CD4 cell %
Paediatric Stage I or II with CD4 <20%

18+ months:
Paediatric Stage III, irespective of CD4 cell %
Paediatric Stage I or II with CD4 <15%

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## What to Start…..?

- The most effective regimens utilise drugs from different classes
- This promotes maximum viral suppression by inhibiting replication in different ways, at different places in the life cycle

NRTIs:
AZT, D4T, 3TC, ddI

NNRTIs:
NVP, EFV

PIs:
NFV, IDV, LPV, SQV

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## So….

Examples of drug regimens commonly used in ARV combinations

| | | |
|---|---|---|
| d4T + 3TC | + | NVP |
| d4T + 3TC | + | EFV |
| AZT + ddI | + | Lopinavir/Ritonavir |

NB AZT + D4T should NEVER be used together!

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## What to expect!

Treatment success =

- Decline in VL of at least 1.0 log from pre-treatment levels by 6-8 weeks after initiating ARVs
- A decline in VL to <400 RNA copies/mL by 24 weeks after commencing ARVs

**Undetectable viral load = ultimate goal!**

(A sustained viral load of <50 RNA copies/mL is associated with the most durable virological benefit)

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## Achievable…..?

YES

ARVs are able to significantly reduce viral load, allowing immune reconstitution followed by an increase in quality of life and reduction in morbidity and mortality

**BUT**

they are not perfect…….

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## Not perfect!

Unfortunately, 'treatment failure' may occur for some people, where:

- A sustained increase in VL >5000 copies/mL
- A decline in VL of less than 1 log within 6-8 weeks after commencing ARVs
- A sustained increase in VL of >0.6 log from its lowest point or a return to 50% of pre-treatment value

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"It is not like just giving 2 aspirins…"

(National AIDS conference, RSA, August 2003)

This is true

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## And……


What may work for one,
may not work for another

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## Why is HIV so hard to treat?

It's a cheeky little devil!

10 billion copies of the virus are made every day

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## And…

- The problem of resistance (a biological issue)
- The challenge of adherence (a human issue)
- Side effects……

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## What can we do……?

Understanding the way in which ARVs work and the challenges our patients face, helps us to help them!

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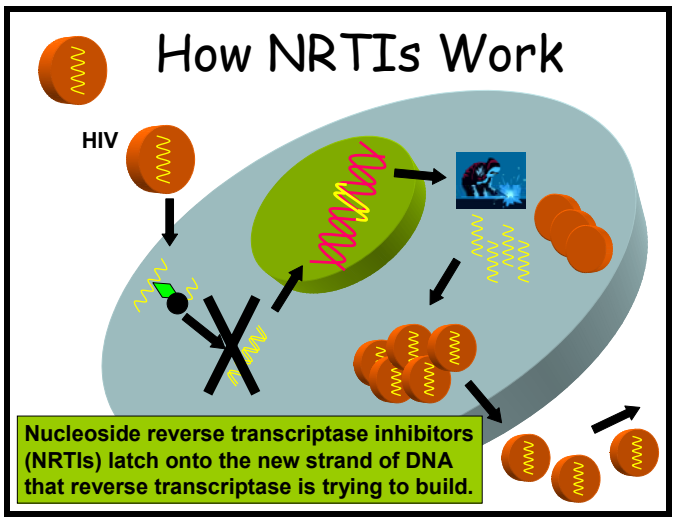
## Handout 3: Antiretroviral Drugs & Doses

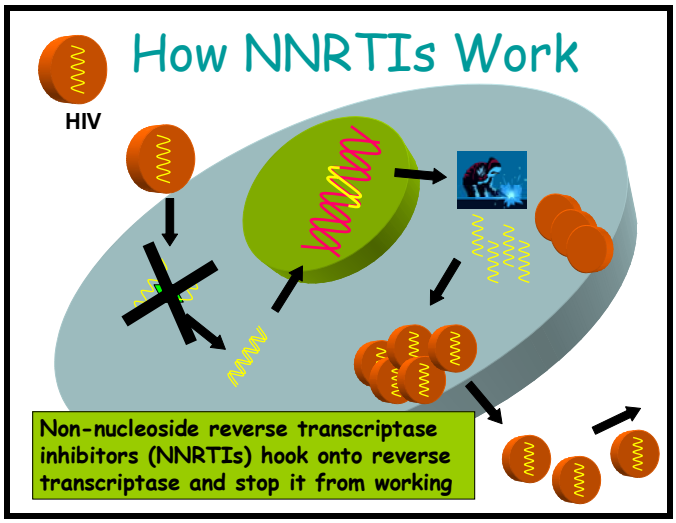
| Name | Brand & other name | Dosing | Total daily pills | Food restrictions |
|---|---|---|---|---|
| **NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITORS (NRTIs, 'NUKES')** | | | | |
| **D4T** | **Zerit, stavudine** | **1 capsule, twice daily** | **2** | **none** |
| **AZT** | **Retrovir, zidovudine** | **1 capsule, twice daily** | **2** | **none** |
| **ddI 100mg**<br>**ddI 200mg**<br>**ddI/EC** | **Videx, didanosine**<br>**'reduced mass' ddI**<br>**'enteric coated'** | **4 tabs, once daily**<br>**2 tabs, once daily**<br>**1 capsule, once daily** | **4**<br>**2**<br>**1** | **do not eat for 2 hours before & 1 hour after (2 hours after for EC)** |
| **3TC(150mg)**<br>**3TC (300mg)** | **Epivir, lamivudine**<br>**Epivir, lamivudine** | **1 tab, twice daily**<br>**1 tab, once daily** | **2**<br>**1** | **none**<br>**none** |
| Abacavir | Ziagen, 1592 | 1 tab, twice daily | 2 | None |
| Combivir | (AZT/3TC) | 1 tab, twice daily | 2 | None |
| Trizivir | (AZT/3TC/abacavir) | 1 tab, twice daily | 2 | None |
| Tenofovir | Viread | 1 tab, once daily | 1 | take with food |
| FTC* | Emtracitabine | 1 capsule, once daily | 1 | None |
| **NON-NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITORS (NNRTIs, 'NON-NUKES')** | | | | |
| **Efavirenz** | **Sustiva**<br>**Stocrin** | **1 tab(600mg) once daily** | **1** | **not with high-fat meal** |
| **Nevirapine** | **Viramune** | **1 tab, twice daily** | **2** | **None** |
| delavirdine* | Rescriptor | 6 tabs, twice daily | 12 | None |
| **DUAL & BOOSTED PROTEASE COMBINATIONS** | | | | |
| lopinavir/r | Kaletra, ABT-378/r | 3 capsules, twice daily | 6 | take with food |
| Indinavir/ritonavir | 400mg/400mg<br>800mg/200mg<br>800mg/100mg | 1xIDV/4xRTV twice daily<br>2xIDV/2xRTV twice daily<br>2xIDV/1xRTV twice daily | 10<br>8<br>6 | None<br>none<br>none |
| saquniavir/ritonavir<br>saquinavir,ritonavir | 400mg/400mg<br>1000mg/100mg | 2xSQV/4xRTV twice daily<br>5xSQV/1xRTV twice daily | 12<br>12 | Food side effects<br>food side effects |
| Fosamprenavir*/ritonavir | 700mg/100mg | 1xFosAPV/1xRTV twice daily (once daily possible) | | None |
| Atazanavir*/ritonavir | 300mg/100mg | 2xATV/1xRTV twice daily | 3 | None |
| **SINGLE PROTEASE INHIBITORS (PIs)** | | | | |
| Indinavir | Crixivan | 2 capsules, 3 times daily | 6 | 2 hours after or 1hour before food |
| Nelfinavir | Viracept-film coated | 5 tabs, twice daily | 10 | take with meal |
| Atazanavir | Reyataz | 2 capsules, once daily | 2 | take with food |
| **ENTRY INHIBITORS (Fusion inhibitors)** | | | | |
| Enfuvirtide | T-20, Fuzeon | Sub-cut inj, twice daily | | None |

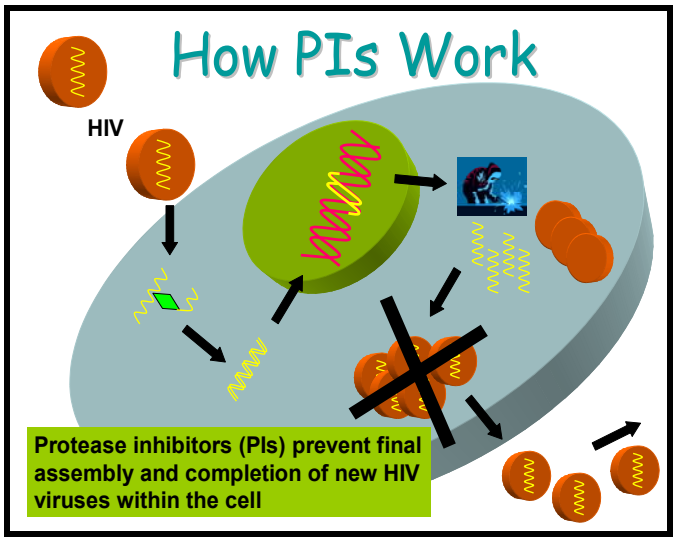
Table courtesy of HIV i-Base Publications (adapted for the Nurse Training Manual).

The above table is a reference for different names of drugs, doses, total pill count & brief details of food restrictions. The drugs and associated information highlighted in BLUE indicate the ARVs expected to be used in the roll-out of ARVs in South Africa. Other drugs which are used elsewhere in the world are included purely for the interest of the nurse. An asterix * is for a drug which may be available on an expanded access programme and/or which is expected to be licensed shortly (not necessarily in South Africa).

**Handout 4: How do ARVs Work?** (with kind permission from Dr J. Giddy)



## Learning Exercises: 'How do ARVs work?' (Answers on Page 49)

### A. Questions

1. How do ARV drugs affect HIV disease?

……..

……..

2. Name the three main classes of ARV drugs

……..

……..

3. Where do ARVs work in the HIV Life Cycle?

……..

……..

4. What are the two main enzymes which current ARV drugs inhibit?

……..

……..

5. What is the main goal of ARV therapy?

……..

……..

6. What are the main advantages of ARV drugs?

……..

……..

7. When should ARV drugs be started?

……..

……..

8. What are the three main challenges of ARV drugs?

……..

……..

9. What three main factors are taken in to consideration before starting patients on ARV drugs?

……..

……..

## B. Group Work

1. How do ARV drugs work?

In you groups, describe to each other where ARVs work, using Hand Out 1: The Life Cycle of HIV. You will then be asked back in to the main group to discuss your thoughts together.

……..

……..

……..

……..

2. Why should I take ARVs?

Patients need to know the benefits of taking ARV drugs. Nurses must be able to explain to patients the effect of ARV drugs on HIV disease. In your group, use role play to practice how you would explain this to patients, where one of you is the patient asking “Why should I take ARVs?” and the other is the nurse, providing the response.

……..

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3. **Case Scenario**

Read the following case scenario

**Nkosnati is a 25 year old, HIV positive man. 7 months ago, his CD4 count was 50 cells/mm3 and his viral load was 200,000 copies. He was bedridden and extremely sick with cryptococcal meningitis, severe weight loss and chronic diarrheoa. As well as being treated for cryptococcal meningitis, Nkosnati commenced ARV therapy. He started taking AZT, 3TC and Efavirenz. After 3 months, Nkosnati's general health was much improved. The cryptococcal meningitis had been treated, his appetite had improved considerably and he was gaining weight. The diarrhoea continued but had improved dramatically. His blood tests revealed his viral load was now undetectable and his CD4 count had increased to 120 cells/mm3.**

Now in your groups, discuss the following question before feeding back your responses to the whole group.

**How have the ARVs helped Nkosnati?**

……..

……..

……..

……..

……..

……..

……..

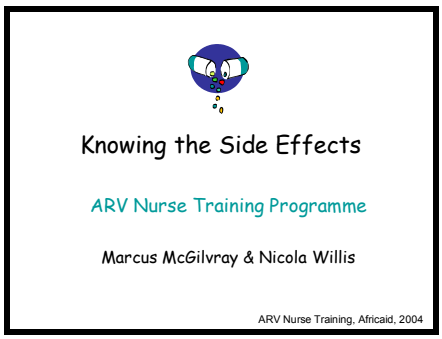
# Module 3: Side Effects

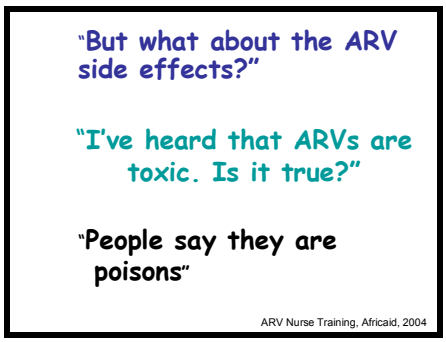
## Module Objectives

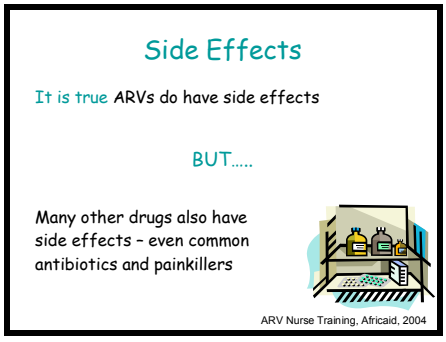
- To ensure nurses have the skills and knowledge required to recognise common side effects associated with ARVs
- To equip nurses with an understanding of the impact of these side effects on patients taking ARVs
- To differentiate between more common, manageable side effects and severe side effects requiring immediate referral by the nurse
- To provide nurses with the knowledge and skills required to manage common side effects
- To demonstrate the importance of support and encouragement for patients experiencing side effects

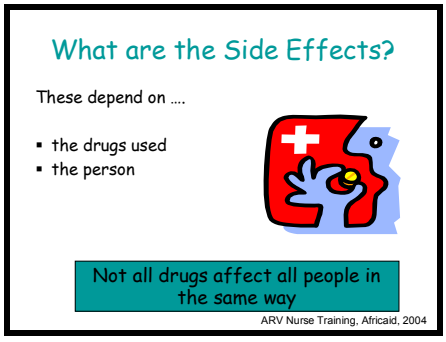
## Slide Presentation: Side Effects

(All slides read from left to right)



## Different types

**'Acceptable'**
(transient)

Versus

**'Unacceptable'**
(severe, unsafe)

.....but, **ALL** must be reported so that they can be managed appropriately!

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## Transient Side Effects

- Many are transient in the first few weeks
  eg headache, nausea, diarrhoea, vomiting
- Other medication can by used to manage/alleviate these symptoms
- Patients need IMMENSE SUPPORT and ENCOURAGEMENT to continue with regimen

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## Severe Side Effects

- Some side effects may be severe
  eg rash, hepatitis, lactic acidosis, pancreatitis, hyperlipidaemia, peripheral neuropathy
- The Doctor may need to change the ARVs being taken by the patient
- Early identification and prompt, appropriate management is essential!

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## Side Effects of NRTIs

- AZT (Retrovir): headache, nausea, diarrhoea, anaemia, neutropenia, thrombocytopenia, liver toxicity
- 3TC (Epivir): nausea, diarrhoea, headache, fatigue, skin rash, abdominal pain, increase LFTs
- D4T (Zerit): headache, nausea, vomiting, diarrhoea, rash, increase LFTs, peripheral neuropathy, pancreatitis
- DDI (Videx): nausea, vomiting, diarrhoea, abdo pain, peripheral neuropathy, increase LFTs, pancreatitis

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## Side Effects of NNRTIs

- Efavirenz (Stocrin): rash, sedative effects, headache, nausea, diarrhoea, vivid dreams, insomnia, 'drunk feeling', increase LFTs, hepatitis, liver failure
- Nevirapine (Viramune): headache, nausea, rash, diarrhoea, increase LFTs, hepatitis, liver failure

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## Side Effects of PIs

- Nelfinavir (Viracept): nausea, vomiting, diarrhoea, headache, asthenia, abdo pain, rash, hyperglycaemia, lipodystrophy
- Ritonavir (Norvir): nausea, vomiting, diarrhoea, abdominal pain, anorexia, increase LFTs, pancreatitis, hyperlipidemia, hyperglycemia, circumoral paresthesia, lipodystrophy

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## Diarrhoea

Possible causes:

- OIs (e.g. cryptosporidium, CMV, giardia, salmonella, shigella)
- Antibiotics
- **ARVs** (e.g PIs, ddI, Abacavir)

i.e. not necessarily ARV-related but it is common

**Severity and duration variable**
Dependent on person and drug

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## Management of Diarrhoea

- Identify cause: stool sample to exclude OI
- Rehydration: encourage fluids >3L/day
- Replace potassium: bananas, potatoes, chicken, fish
- Soluble fibres: pulses, oats, bananas, apples, pears
- Anti-diarrhoea drugs: e.g. loperamide

**Support & Encouragement to promote Adherence!**

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## Nausea and Vomiting

Possible causes:

- OIs (e.g. acute diarrhoeal infections)
- ARVs (eg 3TC, ddI, D4T, EFV, NVP & PIs)

i.e. not necessarily ARV-related but it is common

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## Management of Nausea & Vomiting

- Exclude other cause: eg OI, diarrhoeal disease, pregnancy
- Investigation: eg U+Es
- Anti-emetic drugs: e.g. Maxalon
- Dietary Advice: adhere to dietary requirements of ARV drugs
- Other: eg small, frequent meals; space intake of fluids/solids; avoid fatty, fried food; salty, dry foods; cold foods, remain elevated; herbal teas
- Change Regimen: ?? Reduce dosage or frequency; stop drug

**Support & Encouragement to promote Adherence!**

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## Skin Problems

Possible causes:

- Interaction between immune system and HIV (eg seroconversion illness, pruritic rash)
- Infections (eg bacterial, viral, fungal)
- ARVs (eg NVP, 3TC, D4T, EFV, NFV)

**Severity and duration variable**
Most are mild and can be treated

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## Management of Skin Problems

- Mild skin rash: treatment can be continued; treat with prednisone, antihistamines; advice on not using soaps & deodorants
- Severe rash: discontinue and do not take again!
- Nevirapine: rash experienced in 20-30% of patients; 2% experience life-threatening Stevens Johnson Syndrome. NVP is commenced in low doses, increasing to full dose over 2 weeks

**Support & Encouragement to promote Adherence**

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## Anaemia

Possible causes:

- Common with AZT
- OIs eg MAI
- Maybe HIV related (Rare in CD4 >200mL)

Management:

- Routine monitoring of FBC
- Reduce dose / change drug eg ddI

**Support & Encouragement to promote Adherence**

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## Other toxicities.....

Regular monitoring of blood levels is essential to identify ARV toxicities

Appropriate intervention can then be made

**FBC**
**LFTs**
**U&Es**
**Cholesterol**
**Glucose**

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## Our Role.....

As nurses, we have a vital role to play in ensuring side effects are

**identified, managed and treated**

**appropriately and effectively**

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## How do we do this?.....

- Educating patients
- Prompt recognition and referral
- Understanding lab tests and results
- Explaining lab tests to patients
- Therapeutic intervention
- Providing support and counselling for patient and family
- Ensuring follow up of patients
- Educating the general public

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## In turn…….

- We are able to ensure **safety** of our patients
- Enhance **quality of life** for people taking ARVs through therapeutic intervention
- Promote **adherence**, through understanding of side effects
- Dispel **myths** and **misconceptions** about ARVs

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Patients taking ARVs face a very difficult challenge

BUT

together,

we CAN make a big difference

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## Hand Out 5: ARVs and Side Effects

| Generic Name | Trade Name | How Supplied | Notes | Side Effects |
|---|---|---|---|---|
| **Nucleoside Reverse Transcriptase Inhibitors (NRTIs)** | | | | |
| **Didanosine (ddI)** | Videx | Chew Tab (white; round) 25mg, 50mg, 100mg, 150mg; Powder for oral solution in packets & bulk bottles | ddI liquid: mixed with antacids, Shake well; refrigerate; stable for 30 days. Take on empty stomach | **Common**: nausea/vomiting/diarrhoea (N/V/D), abdominal pain.<br><br>**Severe**: peripheral neuropathy; electrolyte abnormalities; hyperuricemia.<br><br>**Uncommon**: pancreatitis; increase liver function tests (LFTS); retinal depigmentation. |
| **Lamivudine (3TC)** | Epivir | 150mg white tab; Oral solution:10mg/ml (strawberry,banana) | With or without food<br><br>Active against Hep B<br><br>Store oral solution at room temp | **Common**: nausea/diarrhoea (N/D); headache (HA); fatigue; skin rash; abdominal pain.<br><br>**Severe:** pancreatitis. |
| **Stavudine (d4T)** | Zerit | Cap: 15mg, 20mg,30mg,40mg. Oral powder for solution: 1mg/ml | With or without food<br><br>Oral solution: shake, refrigerate, stable for 30 days | **Common:** HA; N/V/D; skin rash; increased LFTs.<br><br>**Severe**: peripheral neuropathy; pancreatitis. |
| **Zidovudine (AZT) & (ZDV)** | Retrovir | Cap: 100mg (white with blue stripe); tab: 300mg (white, round, biconvex); Syrup 10mg/ml; IV 10mg/ml | Take with food<br><br>Hematologic toxicity: interrupt therapy or decrease dose, or use erythropoietin | **Common**: Hematologic toxicity; HA<br><br>**Other**: myopathy; myositis: liver toxicity. |
| **Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs)** | | | | |
| **Efavirenz (Stocrin)** | Sustiva | Cap: 50mg,100mg,200mg | With or without food avoid high fat | **Common**: Rash; sedative effects; HA; N/D<br><br>**Other**: Increase LFTs; rare-hepatitis. |
| **Nevirapine (NVP)** | Viramune | Tabs: 200mg (oblong, white scored); Oral liquid: 10mg/ml sweet tasting off-white liquid) | With or without food<br><br>Don't crush tabs because of salt form | **Common**: Rash; sedative effects; HA; N/D<br><br>**Other**: Increase LFTs; rare-hepatitis. |

Table courtesy of Baylor College of Medicine (2001). Adapted for Nurse Training Manual.

## Learning Exercises: 'Side Effects' (Answers on Page 50)

### A. Questions

**1. Name some of the more common side effects associated with ARVs**
*Nausea, diarrhoea, vomiting, headache, abdominal pain, skin rash*

*2.* **Why is regular monitoring of Full Blood Count, U&Es and LFTs so important for patients taking ARVs?**
*ARVs can be toxic to the liver, kidneys and blood cells. Any damage may be detected by taking regular blood tests to identify changes in blood levels from the normal range as early as possible. There is then plenty of time for the medical team to decide what to do for the patient.*

*3.* **What must a patient be told when starting Nevirapine?**
*If they experience a rash when starting Nevirapine, they must come to the clinic immediately.*

4. **How can a nurse best help patients when they first start ARVs?**
*Patients need to know that they may experience side effects, how to recognise them and what to do if they occur. This requires that the nurse takes the time to ensure patients have correct, clear information about their drugs and are confident what to if they experience any side effects.*

*5.* **If a patient arrives at clinic with yellow eyes, what may be the cause and what should you do as a nurse?**
*ARVs may be toxic to the liver. The patient may have jaundice and must be referred immediately to a doctor for appropriate management.*

6. **Whilst taking vital signs from a patient taking ARVs, you ask the patient how she is managing with them. The patient becomes very distressed and informs you she is finding it very difficult indeed, due to the diarrhoea she experiences on a daily basis. What should you do for your patient?**
*First and foremost, she must be praised highly for doing so well by continuing with her ARVs. She must be reassured that she is not alone and has lots of people in the clinic to support her. Explain to her that although the diarrhoea may be due to the ARVs, it is necessary to take some stool specimens in case she has an infection. Then, ensure she is seen by the Doctor for further investigation. The Doctor may prescribe anti-diarrhoeal medication to help alleviate the symptoms. Encourage her that diarrhoea is a very common side effect of ARVs and often passes. Remind her again of the importance of adherence, offering support at all times.*

### B. Group Work

**1. Nurses' experiences of ARV Side Effects**
In your groups, share any experiences you may have of ARV side effects experienced by patients in your care.

……..

……..

**2**. **Recognising and Managing Side Effects**

You will be given an ARV drug. Find out the more common side effects associated with that drug using Hand Out 5: *ARVs and Common Side Effects*. Then feedback to the main group about the common side effects of that drug and how you would manage these side effects

……..

……..

……..

……..

……..

……..

……..

**3**. **Case Scenario**

Read the following case scenario then ask the group the questions below.

**Nothando is a 34 year old lady, diagnosed with HIV 18months ago. For the first 14 months, Nothando was fairly well with a CD4 count between 350 and 500 cells/mm$^3$. She had occasional chest infections and skin rashes. However, with treatment for these infections, good nutrition and exercise and regular visits to the clinic, she was able to lead a normal life. However, 4 months ago, her health started deteriorating rapidly. Nothando had come to clinic with chronic diarrhoea, recurrent fever and shingles. She also had symptoms of TB. Blood tests revealed Nothando's CD4 count had dropped to 200 cells/mm$^3$. TB was confirmed and she commenced on TB treatment. The doctor explained that after the intensive phase of TB, Nothando could commence ARV drugs to help control the HIV. Nothando was very reluctant however as she had heard many stories about ARVs making people even sicker.**

**When Nothando returned to clinic at the end of the intensive phase of TB treatment, the Doctor raised the issue of ARVs again. Still Nothando was worried about taking them in case they made her feel worse than without them. However, she trusted the doctor and the nurses who had explained to her the benefits of ARVs.**

**Nothando left the clinic having been told by the doctor, nurse, counsellor and pharmacist how important it is to take ARVs exactly as prescribed. Nothando was given a chart explaining which drugs to take and when, which she understood. That evening, Nothando took her first dose of ARVs. The following night, Nothando woke in the night having had extremely vivid dreams. She was afraid what the ARVs were doing to her. The next night, she experienced these dreams again and also started feeling nauseous.**

**After a week, Nothando was exhausted and frightened. The dreams continued and she was now vomiting. Any improvement in her health that they had talked about at the clinic seemed to be a lie. Nothando felt she had been right all**

**along and should never have trusted them at the clinic. The rumours were true and she must stop the ARVs immediately.**

1) **Should Nothando stop taking the ARVs?**

……..

……..

2) **What should Nothando have done when she started feeling unwell?**

……..

……..

3) **Why did Nothando not go to the clinic?**

……..

……..

*4)* **What should have happened?**

……..

……..

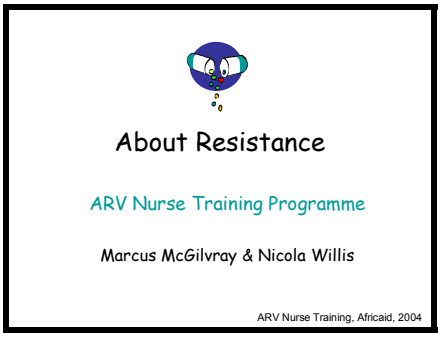
# Module 4: Resistance

## Module Objectives

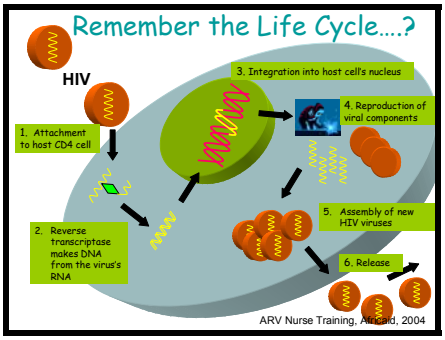
- To explain resistance in the context of Antiretroviral Drugs
- To equip nurses with a basic understanding of how resistance occurs
- To describe the impact of resistance on HIV disease at an individual and public health level
- To distinguish between 'monotherapy', 'dual therapy' and 'triple therapy' and their role in the development of resistance
- To discuss optimal strategies for preventing resistance
- To discuss the role of the nurse in preventing resistance

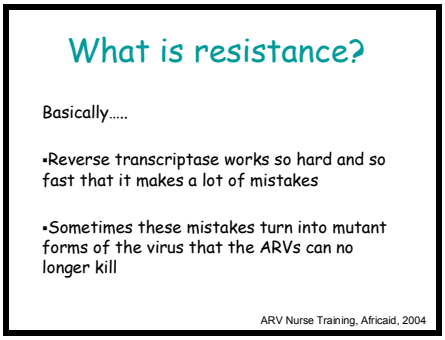
## Slide Presentation: Resistance

(All slides read from left to right)







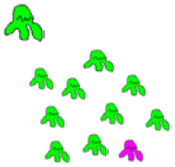



## To explain more….

•Left alone, HIV grows and multiplies inside the body.

•As it grows, HIV can change itself. This is called mutating.

•What will happen when we give one antiretroviral drug? (monotherapy)



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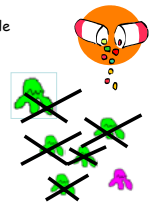
- With monotherapy, the antiretroviral drug is able to kill all of the original (unmutated) HIV

**BUT**

- the mutated virus is RESISTANT to the antiretroviral being used.



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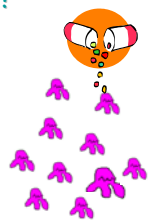
## Then……!

- The mutated HIV grows and multiplies, even in the presence of the antiretroviral.

•This virus is now RESISTANT and will continue to attack the immune system unless a different drug is used.



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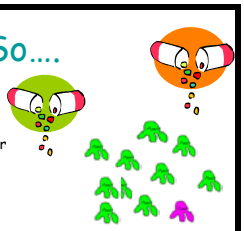
## So….

•Now we need another strategy

•Two drugs together (dual therapy) can keep all HIV from multiplying, even if it has mutated

- So if the purple virus is resistant to one drug (purple), it can be destroyed by the second drug



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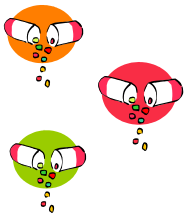
## Triple Therapy

•Now we understand why triple therapy works

•Two drugs together can keep all HIV from multiplying, even if it has mutated

•BUT, three drugs can work even better!



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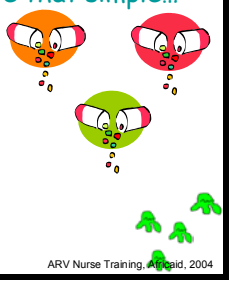
## If only it were that simple…

•Unfortunately, triple therapy is NOT able to cure HIV.

•HIV is a very tricky virus. While most of it is getting killed by triple therapy, a few viruses find places to hide where they are safe from triple therapy.



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## A big concern!

**If resistance develops:**

- Drugs start failing as virus is able to replicate
- As virus replicates, immune system is damaged
- OIs occur, progressing to AIDS

- Also, there are only limited drug options available!

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## Cross Resistance

Resistance to a drug in one class of ARV

commonly results in

Resistance to other drugs within that same class

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## Everyone is different!

NB!! people respond differently to these drugs

Whilst one regimen may suppress viral replication well in one person, another may develop resistance

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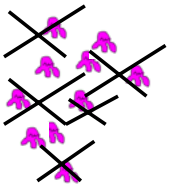
## Reducing Resistance….

The BEST way to reduce the development of resistance is:



to ensure maximum viral suppression using three drugs, taken as the correct dose, at the correct time, in the correct way

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## Public Health

- Resistant HIV may be transmitted to someone else
- If someone is infected with resistant HIV, they will be resistant to one or more ARVs, even though they have never taken them before
- Potentially, ARVs could become less help for people across South Africa due to resistance, as already being seen in Europe & the States.
- Abstinence and Safer Sex is the best way to prevent this occurring

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## Our role…….

Nurses have an essential role to play in reducing resistance through:

- Educating patients about resistance
- Recognising non-adherence
- Promoting adherence
- Laboratory testing for resistance
- Explaining to patients re resistance testing

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## Finally,

Resistance is one of the biggest challenges and threats to the success of ARVs,
both at an individual level and at broader, public health level

Nurses CAN make a big difference!

## Learning Exercises – 'Resistance' (Answers on Page 53)

### A. Questions

**1. What is 'resistance'?**

……..

……..

2. **How does resistance occur?**

……..

……..

**3. What is the advantage of triple ARV therapy over monotherapy?**

……..

……..

**4. Why may a patient who has developed resistance to D4T also be said to be resistant to AZT when he has never taken AZT before?**

……..

……..

**5. What is the best way to prevent resistance?**

……..

……..

**6. What is the effect of resistance at an individual level?**

……..

……..

**7. What is the effect of resistance at a public health level?**

……..

……..

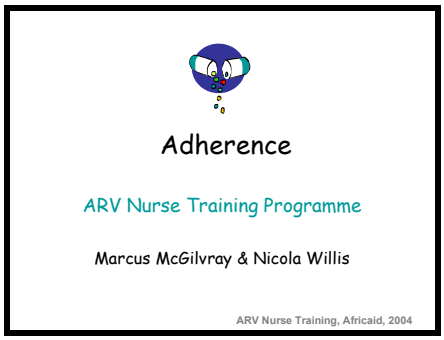
# Module 5: Adherence

## Module Objectives

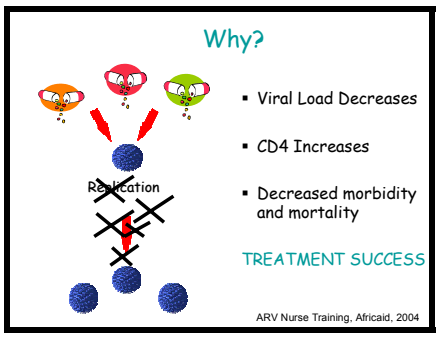
- To define adherence
- To demonstrate the importance of adherence to ARV drugs, both at an individual level and at a public health level
- To provide nurses with an understanding of the immense challenges faced by patients on ARV drugs
- To instil nurses with a sense of responsibility and significance in the promotion of adherence
- To equip nurses with strategies for supporting their patients and promoting adherence

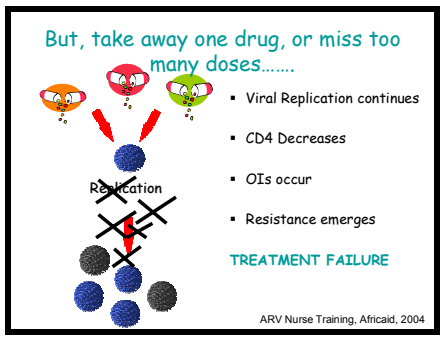
## Slide Presentation: Adherence

(All slides read from left to right)







## But…..

….. treatment success is largely dependent on the patient's ability to take the drugs **exactly as prescribed**

**This is known as ADHERENCE**

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## Adherence is…..

- The right drugs
- In the right way

- At the right time

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## Taking the right drugs….

Each drug is carefully investigated in the laboratory to ensure maximum potency against the virus

The right drugs and the right doses (ie number of tablets) MUST be taken

**Or…..sub-optimal suppression of the virus will allow viral replication and resistance to develop**

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## The right time…..

- Taking ARVs exactly on time is very important
- There is usually a window period of approximately one hour but this varies with drugs and people
- SO – better to stick to exact same time, or **viral load will increase and resistant virus may emerge!**

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## The right way

- Some drugs have dietary restrictions (i.e taken with or without food)
- Ignoring these can be like only taking half a dose – you will not absorb enough of the drug for it to work properly
- Viral load will increase & Resistance is more likely to occur

with or without

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## Dietary restrictions

**With!**

Nelfinavir
Ritonavir

(EFV – avoid fatty food)

**Without!**

DDI
Indinavir (or light meal)

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## How much adherence is good enough?

100%
20%
95%
50%
75%
60%
90%

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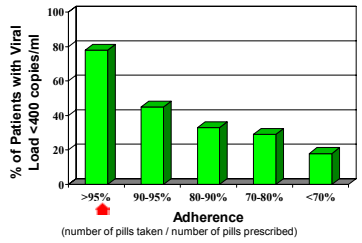
## Adherence and Viral Load

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!!

Many studies have shown that even missing one or two doses a week can have a big impact on the chance of successful treatment



So…….

Unfortunately, the answer is

**100%**

**Adherence**



## Take all these?.....for life?.....




## A HUGE challenge.....

There are many reasons why patients may struggle with adherence!

It may not be their fault

and

It is not just about remembering to take them!



## Factors affecting Adherence

- Patient Factors
  eg knowledge; attitude; unstable social circumstances; support network; state of health; lifestyle; disclosed?; lack of interest; drug addiction; depression; history of non-adherence
- Medication Factors
  eg pill burden; side effects; timing of doses; dietary requirements
- Patient-Health professional relationship
  eg communication and interpersonal skills; non-judgemental attitude; open, trusting relationship
- Health Services
  eg accessible clinic; pharmacy; experienced, well-trained staff; patient follow-up



## Our Role!

All people on ARVs need immense support and encouragement

**And nurses have an essential role to play**

- recognising & understanding difficulties faced by patients
- supporting patients and using appropriate interventions to promote adherence



## Promoting Adherence

….requires a
multidimensional, multidisciplinary, continuous approach

where the patient is supported & counselled
at every opportunity



## …..from the start!

**Promoting adherence must start from the very beginning, prior to treatment being commenced!!**

## Ready for ARVs….?

- Has patient disclosed to anyone?
- Is there support at home or through friends?
- Is there a treatment supporter?
- Is there a stable living situation?
- Does the patient understand ARVs, expected outcomes and side effects?
- Does patient understand need for intensive follow-up?

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- Does the patient have a plan how to take ARVs and not miss a dose?
- Does the patient understand the need to take treatment for life, even if there are no symptoms or he/she feels better?
- Does the patient understand the impact of non-adherence?
- Is the patient committed to participating in on-going care?

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## Take-home messages!

- How many tablets should I take?
- What do they look like?
- How often do I need to take them?
- How exact do I have to be with timing?
- Are there any food or storage restrictions?
- What will happen if I miss doses?
- How can I fit these in to my daily routine?
- What should I do if I feel unwell on these drugs?

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## Practical Ideas

- Alarm clock
- Mobile phone
- Treatment supporter
- 'Normalise' in to daily life (eg TV programme, radio, meals)
- Pill box
- Colour-coded cards

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## Remember……

**These drugs are not easy!**

Patients must feel able to tell us that they are having difficulties or have missed doses.

Only then can we support and assist them

**We must listen, empathise & support!**

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## Learning Exercises: 'Adherence' (Answers on Page 54)

### A. Questions

**1**. **What do we mean by adherence?**

……..

……..

**2**. **For how long must patients remain adherent to ARVs?**

……..

……..

**3**. **How many doses of ARVs is it safe for a patient to miss in a month?**

……..

……..

**4**. **What happens if a patient is non-adherent to ARVs?**

……..

……..

**5**. **What signs *may* indicate that a patient is non-adherent?**

……..

……..

**6**. **List 5 factors which make adherence difficult**

……..

……..

### B. Group Work

**1. Barriers to Adherence**
Divide the group into small groups of 2-4 people and ask them to discuss issues that prevent good patient adherence.

**2. Nurses Role in Promoting Adherence**
Now ask the group to discuss ways of overcoming these issues.

**3**. **Case Scenario**

Read the case scenario then answer the questions below.

**Bongani is 29 years old and is HIV positive. He has been taking ARVS for 6 months. At his last clinic appointment, his blood results showed that the ARVs were working well for Bongani. His viral load had dropped to undetectable levels and his CD4 count had increased to 250 cells/mm$^3$. He was in very good health. However, at his next clinic appointment, his blood results were not so good. His viral load was increasing again and was no longer undetectable. His CD4 count had dropped to 200 cells/mm3.**

**Whilst talking with Bongani, you sense how disappointed he is with his blood results, particularly as he had been doing so well.**

**1) Why may Bongani's blood results have changed in this way?**

……..

……..

……..

……..

**2) How can you help Bongani?**

……..

……..

……..

……..

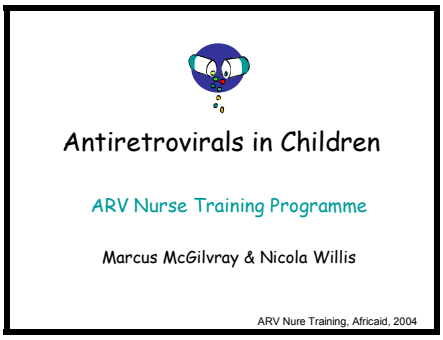
# Module 6: ARVs in Children

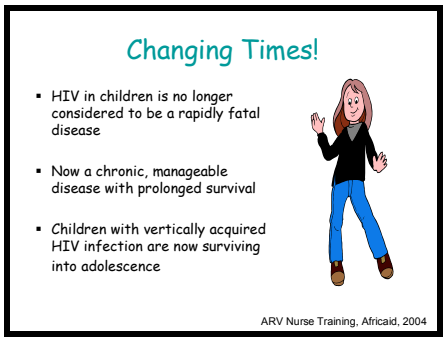
## Module Objectives

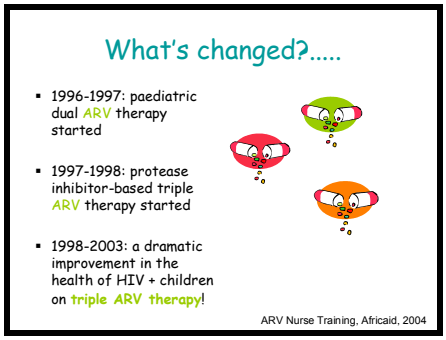
- To review the use of ARVs in children and their impact on disease progression
- To provide nurses with a general understanding of the differences in ARV use in children
- To ensure nurses have a good understanding of the challenges associated with the use of ARVs in children
- To equip nurses with the skills required for supporting children and their families taking ARVs

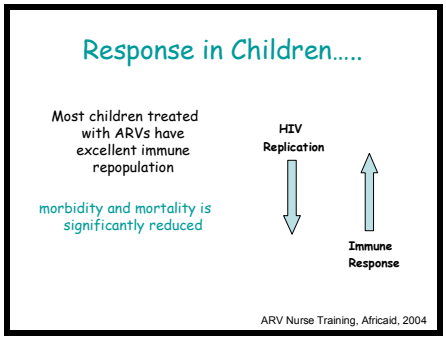
## Slide Presentation: ARVs in Children

(All slides read from left to right)



## But.....

Like adults.....

suppressing the virus
and
preserving the
immune system

is associated with
numerous challenges!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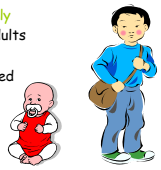
## .....not just little adults!

- Children have unique needs
- They are physically, developmentally and psychologically different to adults
- They should be managed and treated differently



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## CD4 counts

- Infants and children normally have higher CD4 counts
- As CD4 cell count varies with age, CD4 percentage is considered a more reliable marker of immunological status in children
- An understanding of this is essential in order to accurately assess disease progression

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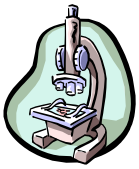
## Viral Load

- After starting ARVs, Viral load may decrease more slowly in children cf adults
- Infants may take longer to reach an undetectable viral load
- Only 40% of children may experience a reduction in Viral Load to <500copies



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## Aim of therapy

To maintain the child's immunological status at a level that prevents disease progression

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## ARV Drug Options

- ↓range of available/licensed drugs for children compared with adults
  eg EFV: cannot be used <3 years
- Most of usual NRTIs & NRTIs are available
  eg AZT, 3TC, ddI, d4T, NVP
- ? NVP Resistance following exposure in MTCT programme

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## Paediatric Drug Options

- Paediatric formulations not always available
  eg NFV: only available in tablets
  PIs: extremely unpalatable
- ARV syrups more expensive than tablets
- Relatively little research on ARVs & pharmacokinetic data due to the smaller population of potential subjects

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## Paediatric Doses

- children have different metabolism from adults
- higher doses of ARVS are usually necessary
- drug distribution and metabolism/elimination varies with growth and development
- Older children: surface area more accurately reflects drug metabolism and clearance than body weight (but over estimates doses for infants)

$$\text{Surface area (m}^2\text{)} = \sqrt{\frac{\text{weight (kg)} \times \text{height (cm)}}{3600}}$$

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## Side Effects

Toxicities are of great concern and increasingly problematic for children and families

….particularly as:

- children's bodies are still developing
- children may well be exposed to these drugs for much longer than adults

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## Mild side effects

Children commonly experience side effects

They are often transient and manageable with appropriate therapeutic intervention

Support and encouragement for the child and family is essential

- nausea
- vomiting
- diarrhoea
- abdominal pain
- skin rashes
- headaches

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## Severe side effects

Unfortunately, children on ARVs may also experience worrying long-term side effects

- lipodystrophy
- mitochondrial toxicity (NRTIs)
- bone density changes (PIs)
- lipidaemias with accelerated atherosclerosis (PIs)
- carcinogenicity (NRTIs)

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## Monitoring

- Regular blood tests are essential to identify toxicities and to ensure appropriate intervention and management
- This presents another challenge:

Few children willingly give their blood!

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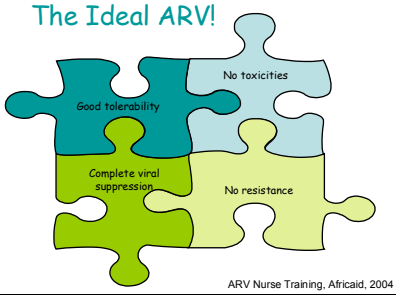
## The Ideal ARV!

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## If this ideal were available…..

…ARVs should be started as soon as a child is diagnosed!

**BUT**

It is still not clear whether the potential virological and immunological benefits of starting therapy early outweigh the problems with adherence, resistance and toxicity

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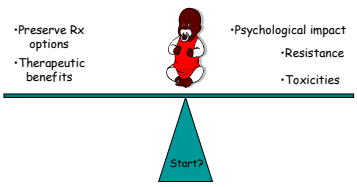
## So….

….starting ARVs is a balancing act

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## NB!

All children differ!

- 40-50% of vertically infected children survive to 9-10 years of age without ART
- Some may continue in to adolescence before ARVs indicated

Slow Progressors

V.

Rapid Progressors

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## When to Start? (WHO, 2002)

<18 months:
Paediatric Stage III, irrespective of CD4 cell %
Paediatric Stage I or II with CD4 <20%

18+ months:
Paediatric Stage III, irespective of CD4 cell %
Paediatric Stage I or II with CD4 <15%

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## What to Start?

Examples of common ARV regimens given to children

1a d4T/3TC and Lopinavir/Ritonaivr
(First line if previous exp to NVP within the last 12 mths)
1b d4T/3TC and NVP
(first line if no previous exposure to NVP in last 12 mths)
1c d4T/3TC and EFV (if older than 3yrs)

2a AZT/ddI and Lopinavir/Ritonavir
2b AZT/ddI and Efavirenz or NVP

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## Adherence

Is a HUGE challenge for adults……

**It is even more difficult with children!**

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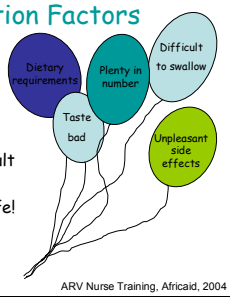
## Medication Factors

All children dislike medicine!

But ARVs are difficult **AND** must be taken for life!

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## Child/Family Factors

- Child's lifestyle
  Fitting ARVs around school & friends
- Child's lack of understanding
  Why do I need medicine?
- Children are usually reliant on their parent or carer for ARVS
  Is the parent sick/unable to administer ARVs?
  Has the parent had any negative experiences of ARVs?
  Is the parent adherent?
  How is the parent coping with own diagnosis AND child's?
  What is the parent's perception of the child's illness?

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## Promoting adherence

- Assessment of child & family prior to child commencing ARVs
- Assist families in developing routine for ARVs. ARVs should NOT dictate every aspect of daily life
- Open, supportive approach
- Age-appropriate explanations to child re need for medication
- Continuing support and re-assessment of each child and family's situation
- Support from other parents and children

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## Promoting adherence

- Trial runs
- Play therapy
- Sticker charts
- Art therapy
- Taking medication with parent
- Support groups

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## Remember…..

- ARVs cause great distress, anxiety and confusion for children
- It is equally difficult for parents, who are commonly under enormous strain with their own diagnosis and ARVs
- The child and family MUST be considered as a whole
- **They require immense support and encouragement**

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## Learning Exercises: ARVs in Children (Answers on Page 56)

## A. Group Work

### 1. Case Scenario

Read the following case scenario to the group, before answering the following questions.

**Faith is a 29 year old mother. Both Faith and her two year old daughter, Gracie, are HIV positive. Faith has been very unwell over the past six months. After treatment for toxoplasmosis, she started ARVs. Unfortunately, whilst she has recovered from toxoplasmosis, her overall health has remained poor. She gets recurrent chest infections. At clinic, Faith reveals that she frequently forgets to take her ARVs. In further discussion, she informs you that her husband died 8 months ago and she is feeling very depressed.**

**At the same clinic appointment, Gracie is also seen by the doctor. The doctor informs Faith that Gracie also requires ARV treatment now as her CD4 count has fallen below 200 cells/$mm^3$. Gracie has also been unwell with recurrent chest infections, severe weight loss and now shingles.**

**a) What concerns are there over Gracie stating ARV treatment?**

……..

……..

……..

……..

**b) What measures are required to ensure that Gracie receives the drugs she requires?**

……..

……..

……..

……..

# Module 7: The Role of the Nurse

## Module Objectives

- To describe the dynamic role of the nurse in the holistic care of a patient receiving ARV treatment
- To equip nurses with a sense of importance and belief in their role in the overall success of ARV treatment.
- To encourage nurses to consider the diversity of their role in the management of patients taking ARV drugs.

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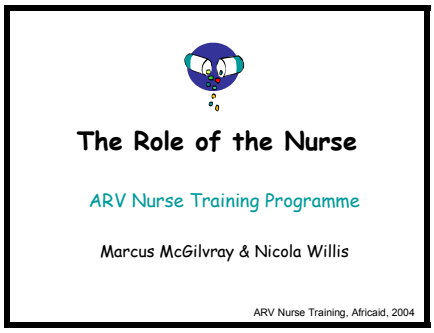
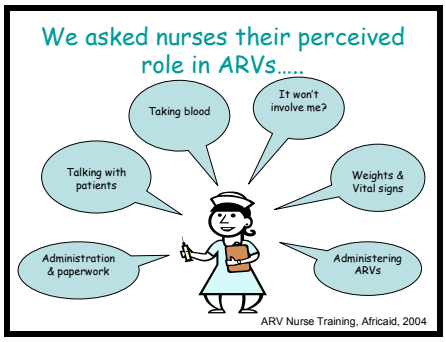
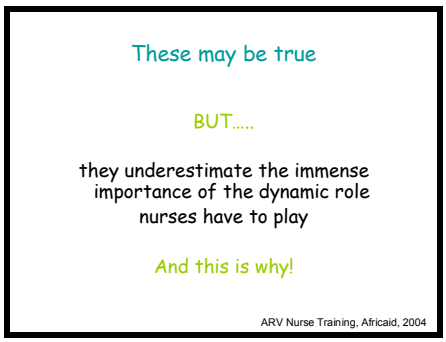
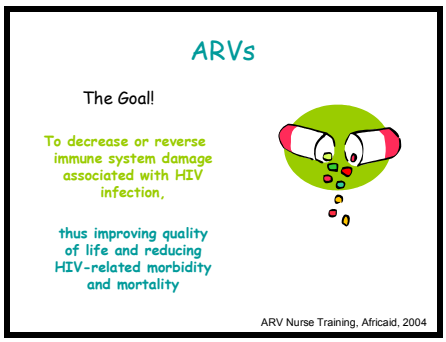
## Slide Presentation: The Role of the Nurse

(All slides read from left to right)



## The role of the nurse is……

…..to ensure that this goal is achieved!

that quality of life is improved for patients with HIV

by decreasing or reversing immune system damage with Antiretroviral drugs

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## How?

Historically, nurses have provided holistic care for their patients, attending to their physical, psychological and social needs in order to promote quality of life

Patients requiring ARVs are no different and require our whole range of skills and expertise, right from the beginning and from then onwards…….

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## Starting ARVs

Early days are EXTREMELY influential in ARV success

Why?

- Patient is not ready? – he/she may be non-adherent
- Patient doesn't understand the drugs? – he/she may take them incorrectly
- Patient doesn't expect side effects? – he/she may be shocked and get 'put off' ARVs or not report any problems
- Patient feels alone and unsupported? – he/she may be frightened, reluctant to take drugs or to report any problems

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## Starting ARVs

Our diverse nursing role!

- Blood collection (baseline results eg CD4, VL, U&Es, FBC)
- Education for patient re ARVs (What are they?, Side effects)
- Counselling re starting ARVs
- Assessing ARV Readiness
- Liaising with MDT re ARV readiness
- Adherence support

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## Monitoring ARVs

ARV success depends on regular monitoring of their efficacy & safety

This is assessed using a combination of:

- Verbal Reporting: "I feel much stronger now"<br>"I keep getting headaches"<br>"My appetite is much better"<br>"I am having bad dreams"
- Clinical Examination: eg weight gain; 'looks better'; rash; jaundice
- Laboratory Testing: CD4, Viral Load, U&Es, FBC, Resistance testing

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## Nurses role in Monitoring

Verbal Reporting

- Nurses are often the first point of contact
- Patients often feel more comfortable raising issues with nurses
- Nursing activities (eg vital signs) provides opportunity for informal conversation re problems/issues

Assessment: Is patient experiencing any side effects? How are they feeling? Any problems?

Follow up: Referral of concerns to Doctor; Recognising urgent referrals; Good MDT communication

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## Nurses Role in Monitoring

Clinical Examination

- Again, nurses are often the first point of contact
- Clinical examination can take place during other activities eg blood taking

Assessment: Recognising ARV side effects (eg jaundice, rash) or improved patient health

Referral: Prompt, appropriate intervention

Counselling: reassurance for patient

Encouragement for patient doing well!!!

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## Laboratory testing

A variety of different blood tests are used to measure the efficacy and safety of ARVs

The results provide essential information re:

- Disease progression
- Is patient safe to continue taking regimen?
- Is the patient resistant to the ARV regimen?
- Is the patient at risk of OIs and in need of prophylaxis?
- Psychological support & encouragement for patient

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## And who takes the blood?

Nurses!!

….and we have a direct responsiblity to ensure that accurate results are obtained which may inform appropriate clinical decisions

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## Getting it right!

Correct clinical decisions depend on meaningful clinical laboratory information

This depends on proper specimen collection!

Common blood tests:

- CD4 Count
- Viral Load
- Safety Labs (FBC, LFTs, U&Es)
- Resistance Testing

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## Getting it wrong….

Improper technique may lead to danger signs being over-looked and/or mismanaged

Case scenario A

A patient is in his third month of ARVs. The wrong name is put on his blood sample so the results are lost. The doctor is therefore not aware that his LFTs are dangerously high.

Case scenario B

An urgent CD4 count is required for a patient. The blood bottle is insufficiently filled and the lab cannot get an accurate reading.

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## When taking blood……

- Correct patient labeling!
- Correct tube for test
- Correct volume for test
- Correct request form
- Securely attached label to bottle
- Clear, legible writing on bottle/form
- Secure, designated container for blood bottles

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## And don't forget…..

- Check patient details are correct!
- Label blood bottles before collection
- Always wear gloves for collection of specimens!!
- NEVER re-sheath a needle
- Dispose of used needle in near by sharps bin
- Then wash your hands
- Wear NEW gloves for the next patient!
- Take your time! A few moments longer may prevent needle sticks!

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## Nurses and Adherence

- Educate, educate, educate……
- Support, support, support……
- Counsel, counsel, counsel……

**You can never do this enough!!!**

**It is the single most important thing you can do for your patients**

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## Don't forget Safer Sex!

Safer Sex is essential to prevent:

- Transmission: someone on ARVs *can still transmit HIV*, even if their viral load is undetectable
- Re-infection: someone on ARVs may be re-infected with a different strain of HIV, making treatment success more difficult

Nurses should take every opportunity to counsel about safer sex practices

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## Variety of Roles

- Educating
- Counselling
- Assessing
- Managing
- Referring
- Administrating

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## Fulfilling these roles

- Knowledge!: Know your drugs, side effects, doses & dietary requirements
- Understanding: Be aware of the challenges and the psycho-social needs of YOUR patient
- Confidence: Your patient will look to you for advice, information and support

**THESE ALL ENHANCE NURSING CARE!**

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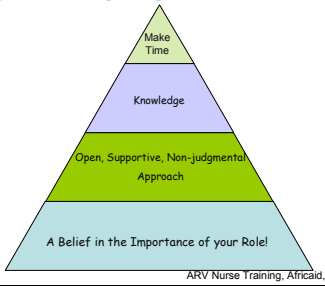
## 4 Steps to Getting it right!

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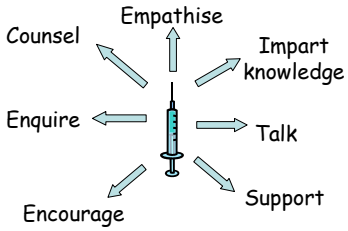
## SO…. Not just about TASKS

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## In summary…

Patients on ARVs face an immense challenge

Yours is an extremely exciting role,
where you CAN and WILL have a huge influence
on the success of ARV treatment
for your patients

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## Learning Exercises: 'The Role of the Nurse'

### A. Group Work

Divide the group in to pairs. Give each pair one of the following nursing roles, as discussed in the slide presentation:

- Educating
- Counselling
- Assessing
- Managing
- Administrating
- Referring

Ask each pair to discuss the following questions with reference to the role they have been given:

**1) When does the nurse engage in that role during the overall care of a patient on/considering ARVs?**

**Trainers prompt:** *Encourage trainees to think of all the occasions that they would be involved in that particular role when working with patients.*

*For example:*
*i) Nurses are **assessing** patients at different times: assessing vital signs, assessing adherence and assessing side-effects.*

*ii) Patients require **educating** in not just one issue but many different issues: safer sex, drug resistance, adherence and drug side effects.*

**2) Why is this important in the overall success of ARV therapy?**

***Trainers prompt:** Encourage trainees to think of a variety of different reasons why that role is so significant in ensuring ARV success.*

*For example:*
*i) Assessing adherence is vital to ensure patients are taking their ARVs as prescribed because adherence is one of the most important factors in treatment success.*

*ii) Educating patients about drug resistance is important in order to help them understand the importance of adherence whilst educating about drug side effects is important if patients are to recognise and report them.*

**3) What knowledge and skills do nurses require to fulfil the role effectively?**

Allow 15 – 20 minutes for this exercise and then allow trainees to feedback their responses to the group.

# Learning Exercises: Answers

## Module 1: 'Let's talk about HIV'

### A. Questions

**1. Which cells does HIV primarily target for replication?**
*CD4 cells, which are cells carrying a CD4 receptor on their surface. These are found on a variety of cells but primarily the T4 lymphocytes of the immune system.*

**2. Why does HIV 'need' CD4 cells?**
*Like all viruses, HIV cannot replicate on its own. It requires the 'machinery' of other cells. HIV must enter CD4 cells and use the cell to replicate, thus producing new HIV viruses.*

**3. What is the effect of HIV's attack on CD4 cells?**
*CD4 cells are essential in co-ordinating the immune system. When HIV uses CD4 cells for replication, it also destroys those CD4 cells. The immune system is therefore weakened and unable to fight off infections. Without medication to fight HIV, the immune system becomes weaker and weaker, opportunistic Infections occur and the patient develops AIDS. The eventual result is death.*

**4. What does 'latency' mean?**
*'Latency' refers to the period during which a patient is infected with HIV but is not experiencing signs and symptoms associated with HIV. This period varies greatly from one individual to the next. On average it lasts 8 – 10 years but it may be even longer in some people.*

**5. Using Handout 2: '*Life Cycle of HIV*' below, write in the different stages of HIV replication from 1 – 10**
*Answers are on Hand Out 1: 'The Life Cycle of HIV'*

**6. What are the clinical signs and symptoms associated with early infection (Stage I & II)?**
*In Stage I, the patient is asymptomatic although may have swollen glands under the arms, in the neck or in the groin. CD4 count is usually high, between 600 and 1500 cells/mm3 and the patient can fight off infections and live a normal life. By Stage II, the CD4 count has dropped to below 350 and infections are more common e.g., shingles, rash, skin infections, oral thrush and recurrent chest infections. Weight loss commences. It is still possible to continue with normal daily life, with the help of treatment for infections.*

**7. What are the clinical signs and symptoms associated with the later stages of HIV infection (Stage III & IV)?**
*In Stage III, the CD4 count drop even further to below 200 and the patient is said to have AIDS. More serious Opportunistic infections are more common, e.g., pneumonia, TB (although this may be seen at any stage), meningitis, oesophageal candidiasis, chronic diarrhoea and prolonged fever. Weight loss continues and normal activities become more difficult. By Stage IV, the CD4 count is extremely low, even reaching zero. Severe Opportunistic infections occur e.g. PCP pneumonia, extra-pulmonary TB, lymphoma, severe diarrhoea, encephalopathy, Kaposi's*

*sarcoma and CMV. The patient suffers extreme weight loss, is very sick and bedridden with death imminent.*

## B. Group Work

Patients will look to you for explanations about their condition. If patients are to have confidence in their nurse and receive clear, accurate information, it is vital that nurses are able to answer their questions appropriately. These role plays have been designed to help equip you with the skills to answer some common questions patients may have about their condition.

Practice some responses to the following questions.

**Typical Patient Questions:**

**1. What is the difference between HIV and AIDS?**
*HIV is the virus which attacks your immune system. When HIV enters the body you are said to be 'HIV infected' or 'HIV positive'. It does not mean you have AIDS. You may be HIV positive for a long time before you become unwell. However, over time HIV causes great damage to your immune system so that you start to get infections that you could normally fight off. These are called Opportunistic Infections.*

*When you start getting many of these Opportunistic Infections, you will have AIDS.*

**2. How does HIV make me sick?**
*When viruses enter the body, they are normally attacked by your immune system so that you do not become sick. HIV is also a virus, but unlike other viruses, HIV attacks the immune system itself. In other words, it destroys the very system that would usually fight against infection in the body.*

*HIV does this by using immune cells (tiny parts or building blocks of the immune system) known as CD4 cells, to replicate itself. HIV makes lots of new virus but destroys the CD4 cells in the process. This means the immune system becomes extremely weak and cannot protect you against infections.*

**3. What are these blood tests I have to have?**
*There are a variety of blood tests you may receive but there are two main tests which can show what the HIV is doing in your body.*

- *CD4 count which measures the number of CD4 cells in your blood. This tells you how strong your immune system is. The higher the CD4 count the better.*
- *Viral Load measures the amount of HIV in your blood. The lower the Viral Load the better.*

**4. What will happen to me now that I have HIV?**
*Everybody is different. Many people stay well for a very long time while others may become sick with different infections more quickly. What is important is to try and stay healthy for as long as possible. Various things are very important and include good nutrition, exercise, being immunised, having regular checks at the clinic, and having safe sex. You may also be given medication to prevent you from getting certain infections. ARV drugs will be given to you when you need them.*

## Module 2: How do ARVs work?

### A. Questions

**1. How do ARV drugs affect HIV disease?**
*ARV drugs **control** HIV disease, turning it from a progressive, terminal diagnosis to a long-term, manageable chronic illness. They do this by reducing the replication of HIV in the CD4 cells so that new viruses cannot be made. In this way, CD4 cells are protected and the immune system remains strong to fight infections.*

**2. Name the three main classes of ARV drugs**
- *NRTIs – nucleoside reverse transcriptase inhibitors*
- *NNRTIs – non-nucleoside reverse transcriptase inhibitors*
- *PIs – protease inhibitors*

**3. Where do ARVs work in the HIV Life Cycle?**
*Use **Hand Out 2: The Life Cycle of HIV**, to mark the different places where ARV drugs work.*

**4. What are the two main enzymes which current ARV drugs inhibit?**
- *Reverse Transcriptase, at the beginning of the Life Cycle*
- *Protease, at the end of the life cycle*

**5. What is the main goal of ARV therapy?**
*To decrease or reverse immune system damage associated with HIV*

**6. What are the main advantages of ARV drugs?**
*Improved quality of life, reduced sickness and prolonged life*

**7. When should ARV drugs be started?**
*Any patient with Stage IV disease OR any patient with Stage I, II or III and a CD4 count less than 200 cells/mm3.*

**8. What are the three main challenges of ARV drugs?**
*Resistance, Adherence & Side Effects*

**9. What three main factors are taken in to consideration before starting patients on ARV drugs?**
*CD4 count, Clinical Symptoms & Patient Readiness*

### B. Group Work

1. **How do ARV drugs work?**
See Handouts 3 and 4 for the answers to this

2. **Why should I take ARVs?**
*ARV drugs 'control' HIV disease. Without them, HIV gradually destroys your immune system, making it more and more difficult for you to fight infections. Although everyone is different and some people will remain well for a long time, there WILL come a time when your immune system becomes weaker and weaker, you will get increasingly severe infections and eventually not be able to survive these.*

*However, ARV drugs control HIV by slowing down the damage it does to the immune system. When HIV replicates (reproduces), it damages the immune system. It also produces more and more virus. By preventing the virus from reproducing, ARVs protect the immune system, making you stronger and more able to fight infections.*

*Although everybody is different and it is not possible to say that ARVs will definitely help you live much longer with a better quality of life, people with HIV all over the world, including South Africa, are now living for years longer than they had expected, with far fewer sicknesses and living normal lives.*

*The ARV drugs will NOT remove HIV from the body so it is NOT a cure. But they are providing new hope and a new lease of life for many, many people.*

## 3. Case Scenario

### How have the ARVs helped Nkosnati?

*Prior to commencing ARVs, Nkosnati's viral load was extremely high and his CD4 count extremely low. This showed that HIV was overwhelming his immune system and had destroyed most of his CD4 cells, leaving him with very little defence against severe Opportunistic Infections like Cryptococcal meningitis.*

*When he started ARVs, HIV replication was slowed down considerably. By taking 2NRTIs (AZT and 3TC) and 1NNRTI (Efavirenz), the replication of HIV was inhibited in the early stages of its life cycle in two different ways. AZT and 3TC inhibited the enzyme Reverse Transcriptase in one way whilst Efavirenz inhibited it another. The result was a strong suppression of HIV replication. In turn, the number of viruses dropped dramatically. So, with fewer viruses around to infect and destroy CD4 cells, CD4 cells were able to build up again, providing an improved immune system for Nkosnati. He is now much stronger as a result.*

## Module 3: Side Effects

### A. Questions

**1. Name some of the more common side effects associated with ARVs**
*Nausea, diarrhoea, vomiting, headache, abdominal pain, skin rash*

*2.* **Why is regular monitoring of Full Blood Count, U&Es and LFTs so important for patients taking ARVs?**
*ARVs can be toxic to the liver, kidneys and blood cells. Any damage may be detected by taking regular blood tests to identify changes in blood levels from the normal range as early as possible. There is then plenty of time for the medical team to decide what to do for the patient.*

*3.* **What must a patient be told when starting Nevirapine?**
*If they experience a rash when starting Nevirapine, they must come to the clinic immediately.*

4. **How can a nurse best help patients when they first start ARVs?**
*Patients need to know that they may experience side effects, how to recognise them and what to do if they occur. This requires that the nurse takes the time to ensure patients have correct, clear information about their drugs and are confident what to if they experience any side effects.*

*5.* **If a patient arrives at clinic with yellow eyes, what may be the cause and what should you do as a nurse?**
*ARVs may be toxic to the liver. The patient may have jaundice and must be referred immediately to a doctor for appropriate management.*

6. **Whilst taking vital signs from a patient taking ARVs, you ask the patient how she is managing with them. The patient becomes very distressed and informs you she is finding it very difficult indeed, due to the diarrhoea she experiences on a daily basis. What should you do for your patient?**
*First and foremost, she must be praised highly for doing so well by continuing with her ARVs. She must be reassured that she is not alone and has lots of people in the clinic to support her. Explain to her that although the diarrhoea may be due to the ARVs, it is necessary to take some stool specimens in case she has an infection. Then, ensure she is seen by the Doctor for further investigation. The Doctor may prescribe anti-diarrhoeal medication to help alleviate the symptoms. Encourage her that diarrhoea is a very common side effect of ARVs and often passes. Remind her again of the importance of adherence, offering support at all times.*

### B Group Work

**3**. **Case Scenario**

1) **Should Nothando stop taking the ARVs?**
*No, she should not stop them herself. If she does, the virus will be able to start replicating again and she may even develop strains of HIV that are resistant to the drugs. However, she should be seen by a Doctor who will decide on appropriate action.*

2) **What should Nothando have done when she started feeling unwell?**

*She should have gone to the clinic to tell the clinic staff that she was experiencing side effects. Then she could be supported with explanations that these side effects are quite common and should pass. She could have been given drugs to help reduce the vomiting and given advice about fluid intake and diet. She could be given a great deal of encouragement for taking the drugs so well and the benefits of ARVs stressed again. The side effects would hopefully be alleviated and Nothando could continue to take the ARVs and start feeling a lot better.*

3) **Why did Nothando not go to the clinic?**

*Nothando was let down as she had not been made aware of the particular side effects that may occur. So the side effects she experienced were a great shock to her and confirmed all her fears about ARVs. She therefore lost faith in those that should be supporting her. Also, she had not been told what to if she did experience any side effects.*

*4)* **What should have happened?**

*Nothando should have been warned of the possible common side effects associated with her drugs. She should have been told what to expect and then been reassured that these are quite common but do usually pass. She should know that, in the meantime, the clinic staff will always be there to support her in order that she can continue with ARVs and gain from their full benefits.*

## Module 4: Resistance

### A. Questions

**1. What is 'resistance'?**
*Resistance is where HIV becomes 'resistant to' or 'unaffected by' ARV drugs. The ARV drugs being taken are no longer able to suppress replication of HIV.*

2. **How does resistance occur?**
*Resistance begins when Reverse Transcriptase makes mistakes as it copies the viral RNA to make viral DNA. Any viral DNA copied with 'mistakes' goes on to make mutant forms of virus which are not affected by the ARVs being taken. If given the opportunity, they will replicate quickly and become plenty in number. The ARVs are unable to control these mutated viruses and are said to be resistant to the ARVs.*

**3. What is the advantage of triple ARV therapy over monotherapy?**
*Monotherapy, one ARV drug alone, is unable to suppress HIV enough and resistant virus emerges. However, if three drugs are used (i.e. triple therapy), when the virus becomes resistant to one drug, there are two other drugs in the system to destroy it. Triple therapy therefore has a much greater effect on inhibiting HIV replication. This is particularly so when different classes of drugs are used. Resistance is much less likely to emerge.*

**4. Why may a patient who has developed resistance to D4T also be said to be resistant to AZT when he has never taken AZT before?**
*This is known as 'cross resistance'. When HIV becomes resistant to an ARV drug being taken, HIV may also be resistant to other drugs within that same class, even if they have never been taken. D4T and AZT are both NRTIs.*

**5. What is the best way to prevent resistance?**
*Strict adherence is the best way to prevent resistance occurring. If drugs are taken exactly as prescribed, this limits the possibility of viral replication and that resistant virus may emerge.*

**6. What is the effect of resistance at an individual level?**
*If a patient becomes resistant to the ARVs being taken, HIV will start replicating again as the ARVs are unable to control it. Viral Load will increase again and CD4 count will decline as CD4 cells are destroyed by rapidly replicating virus. That particular regimen will no longer be effective for that patient. Future treatment options are limited as there are finite drug options available, particularly where cross resistance occurs.*

**7. What is the effect of resistance at a public health level?**
*Millions of people around the world could benefit from ARV drugs. However, ARV resistant HIV may be transmitted. In other words, if an individual is resistant to ARVs, he may infect someone else with this resistant virus. They will also be resistant to those ARVs and unable to take them when they need them. Like Multi drug resistant TB, the potential for widespread ARV-resistant HIV is a great concern as it could render ARVs useless.*

## Module 5: Adherence

### A. Questions

**1**. **What do we mean by adherence?**
*Adherence mans taking ARVs exactly as prescribed, that is, the right drugs, at the right time, in the right way. Any difference is non-adherence.*

**2**. **For how long must patients remain adherent to ARVs?**
*Strict adherence must be maintained for as long as they are taking them.*

**3**. **How many doses of ARVs is it safe for a patient to miss in a month?**
*None! 100% adherence is the ideal for maximum benefit.*

**4**. **What happens if a patient is non-adherent to ARVs?**
*HIV will no longer be fully suppressed so will be able to start replicating again. Resistant viruses may also emerge.*

**5**. **What signs *may* indicate that a patient is non-adherent?**

- *Viral Load starts increasing again*
- *CD4 count starts dropping again*
- *The patient's health starts deteriorating and Opportunistic Infections occur.*
- *The patient is unsure about the names, doses or timings of his drugs when asked*
- *The patient has not brought pill boxes for re-filling for a long time*

(It must be stressed that these signs do not **always** mean someone is non-adherent)

**6**. **List 5 factors which make adherence difficult**

Possible answers:

- *Pills must be taken every day for life*
- *Medicine must be taken in spite of unpleasant side effects*
- *Tablets may be difficult to swallow*
- *Tablets sometimes taste bad*
- *Patients may get confused about which drugs to take, when and how to take them*
- *Patients often have to take many tablets, several times a day*
- *Patients must fit them in to their lives (daily activities, visiting friends, work)*
- *Patients may be concealing the drugs from friends and family*
- *Some ARVs have dietary restrictions, complicating daily routine*
- *Patients may be too unwell to take them correctly*
- *Patients must make sure that they have their drugs with them if they travel*

### B. Group Work

**1. Barriers to Adherence**
In your groups, discuss Divide the group into small groups of 2-4 people and ask them to discuss issues that prevent good patient adherence.

**2. Nurses Role in Promoting Adherence**
Now ask the group to discuss ways of overcoming these issues.

## 3. Case Scenario

**1) Why may Bongani's blood results have changed in this way?**

*There are two main possibilities:*

*a) Bongani may be very unlucky in that he has been taking his ARVs exactly as prescribed BUT the virus has managed to fight around them. In turn, HIV has started replicating again (increasing viral load) and started to infect and destroy CD4 cells once more (decreasing CD4 count).*

*b) Bongani may be non-adherent to his ARVs. This could mean a number of things, such as:*

- *He may be missing just a few doses every now and then*
- *He may be taking them at different times each day*
- *He may have stopped taking them completely*
- *He may be taking it with fatty meals (Ideally, Efavirenz should not be taken with fatty foods if maximum absorption is to occur)*
- *He may be taking the wrong number of tablets for one or all three drugs*

**2) How can you help Bongani?**

*Above all, Bongani needs a great deal of support and encouragement. He will only feel able to discuss any problems he may be having with adherence if he feels he can trust and confide in a supportive and non-judgmental nurse. Always remember, adherence is an immense challenge and you are there to identify any problems he may be having with adherence and to help him overcome them. Only then, can he hope for achieving undetectable viral load and improved CD4 count again.*

*Firstly, you must try to identify whether Bongani is adherent to his ARVs. This does not just mean asking him whether he is taking his drugs. You must be sure he knows what adherence means – that he must take the right drugs, at the right time, in the right way, every single time. You may quickly realize that Bongani has started taking doses late or even missing some. For example, may be he has started a new job and this has made it difficult to take drugs exactly on time as he gets home late? Or maybe he has become confused about which drugs to take when?*

*All this can be identified through gentle, sensitive questions about when Bongani takes his medicines, what he takes and when.*

*Alternatively, Bongani may have started experiencing unpleasant side effects associated with his ARVs which may be putting him off taking them. Again, a sensitive, open-approach can facilitate conversation about these difficulties.*

*Once problems have been identified, Bongani may be helped and supported with appropriate intervention. This may involve reinforcement about the need for strict timing, practical ideas about how to take the drugs on time or further investigation of side effects and drugs to alleviate symptoms.*

*A combination of approaches may be required but the overall effect is the same – you will be able to help Bongani to adhere to the ARVs in order that he can hopefully achieve an undetectable viral load once more.*

## Module 6: ARVs in Children

### A. Group Work

### 1. Case Scenario

**a) What concerns are there over Gracie stating ARV treatment?**
*Gracie is a two year old child and therefore dependent on her mother for everything. This includes ARV drugs. If Faith forgets to take her own drugs, it is likely that she will forget to give Gracie her drugs.*

*Faith has an enormous amount to cope with in her life including her own diagnosis and sicknesses, grief for her husband, her daughter's diagnosis and how she was infected and worry for her daughter's future in the event of Faith's death.*

*The need for Gracie to commence ARV drugs is an overwhelming challenge for a mother already struggling to cope. If Faith cannot remember Gracie's drugs, Gracie will become increasingly unwell. Even if Faith is able to remember Gracie's drugs, 2 year old children can be extremely reluctant to take medicines. Faith would need to be giving Gracie syrups at least twice a day, every day. This could be an exhausting struggle and strain on both Faith and Gracie at a period when quality time together is of enormous importance. In addition, Gracie may experience side effects to the ARVs and she will require additional support and care from her mother. This will also contribute further to Faith's concerns.*

**b) What measures are required to ensure that Gracie receives the drugs she requires?**
*Both Faith and Gracie have significant needs. Gracie needs ARVs and she must receive them. Every effort must therefore be made to ensure that this is achieved. Her mother requires a great deal of support in her own right. However, her needs are exacerbated by Gracie's need for ARVs.*

*A multi disciplinary approach is required with particular emphasis on the social workers and counsellors. Faith requires a great deal of psychosocial support in order to help her cope with her own circumstances before she can start to think about coping with Gracie. Support groups can have a profound effect on individuals' ability to cope. Meeting with other people in her situation may help Faith greatly, if she is wiling to attend the group. With appropriate intervention, she may be helped to cope more which will, in turn, help Gracie. A treatment supporter may be of great benefit as he/she could supervise and ensure that both Faith and Gracie receive their medication.*

*Faith and Gracie will require close follow up and a continuing supportive, non-judgmental approach if they are to receive the care and support they desperately need. Only then can they both receive optimal ARV treatment and achieve increased quality of life and prolonged life.*

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