Impact of Changing Epidemiology of HIV

by

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SOCIO-ECONOMIC IMPACT OF HIV

- INDIVIDUALS
- FAMILIES
- COMMUNITIES
- NATIONS

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SOCIO-ECONOMIC IMPACT OF HIV

- ON ECONOMY
- ON VULNERABLE GROUPS
- ON SOCIETY
- ON HUMAN DEVELOPMENT
- ON HEALTH RESOURCES

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SOCIO-ECONOMIC IMPACT OF HIV

"HIV IS SEEN AS A HEALTH PROBLEM, NOT A DEVELOPMENTAL PROBLEM"

- **THE IMPACT OF HIV ON DEVELOPMENT**
- **THE IMPACT OF DEVELOPMENT ON HIV**

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-E IMPACT ON HUMAN DEVELOPMENT

LOSS OF HUMAN RESOURCES FROM PREMATURE DEATHS

LOSS OF HR DUE TO ILL HEALTH (Reduced National Savings)

DECREASED PRODUCTIVITY

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MPACT OF HIV/AIDS ON HEALTH RESOURCES

INCREASED DEMAND FOR HEALTH SERVICES

INCREASED HOSPITALISATION

DECREASED MANPOWER DUE TO INFECTIONS OF HCWs

INCREASED COSTS

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HUMAN RESOURCES & HIV/AIDS (HEALTH)

- **INCREASED ADULT MORTALITY RATES**
  (up to 5-6 times)

- **EFFECTS OF HIV & TB ARE DISASTROUS**
  (eg. In Tanzania TB & HIV largest cause of death
  for 15 -59 age group)

- **IN ZAMBIA, WITHOUT AIDS, LE = 60 yrs**
  WITH AIDS, LE = 35yrs

UNAIDS

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VULNERABILITY TO HIV INFECTION
(POVERTY)

STRUCTURAL POVERTY
- Gender Imbalances
- Land Ownership Inequalities
- Ethnic & Geographic Isolation
- Poor Access to Services
- Low Status of Women

DEVELOPMENTAL POVERTY
- Rapid Population Growth
- Environmental Degradation
- Rural-Urban Migration
- Slums/ Dislocation

POVERY CREATED BY WAR
- Civil Unrest
- Social Disruption
- Refugee Population

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VULNERABILITY OF WOMEN (1)

- **EDUCATION**
  - Literacy rate
  - Poor Access to Information & Services
- **SOCIAL**
  - Inability to Negotiate use of Condoms
- **CULTURAL**
  - Sexual Coercion
  - Women's Low Status

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VULNERABILITY OF WOMEN (2)

- **RELIGIOUS**

  Women's Role without Rights of Choice

- **ECONOMIC**

  Economically Dependent

- **BIOLOGICAL**

  2-4 X higher risk of infection
  Vagina is a Receptacle

EMPOWERMENT OF WOMEN

- EDUCATION
- CULTURAL RE-ADJUSTMENT
- ECONOMIC INDEPENDENCE
- EQUAL OPPORTUNITY

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GLOBAL ESTIMATES HIV/AIDS EPIDEMIC (Dec 1997)

People Living with HIV/AIDS	**30.6 M**
Adults	**29.5 M**
Women	**12.1 M**
Children	**1.1 M**
New HIV Infections in 1997	**5.8 M**
Adults	**5.2 M**
Women	**2.1 M**
Children <15yrs	**1.1 M**
DEATHS due to AIDS in 1997	**2.3 M**
Adults	**1.8 M**
Women	**820,000**
Children	**460,000**
Cumm Total No. of AIDS Deaths	**11.7 M**
Adults	**9.0 M**
Women	**4.0 M**
Children	**2.7 M**

Around 16,000 New HIV Infections a day in 1997

- More than 90 % are in Developing Countries
- 1,600 are in Children under 15 years old
- About 14,000 are in Adults, of whom:

  > 40 % are Women

  > over 50 % are 15-24 years old

INFECTIONS IN IVDUs
UHKL (Feb. - Sept. 1998) (1)

Type of Infections	Number
TB (all Forms)	12
PTB	7
Extra-Pulm	5
TB Arthritis	2
Lung Infections:	
Bronchopneumonia	4
Lung Abscess	1
Staph. Abscess	2
PCP	3

INFECTIONS IN IVDUs
UHKL (Feb. - Sept. 1998) (2)

Type of Infections	Number
Endocarditis	3
Septicemia	1
Psoas Abscess	1
Cellulitis	4
Skin Abscess	3
Hepatitis	1
Cryptomeningitis	1
Femoral Art . Aneurysm	2

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DRUG THERAPY IN HIV INFECTION

FACTORS TO CONSIDER:

- Patient Compliance
- Drug Adherence
- Viral Resistance
- Available Options
- Costs
- Follow-up
- Maintenance

Practical Implications of the Biology of HIV-1 Drug Resistance (1)

- ***Genetic variants of HIV with any single and probably many double mutations (altho' less likely) preexist in all patients before treatment is started. Thus, partially suppressive regimens containing lamivudine (3TC) or certain NNRTIs rapidly fall because of breakthrough replication of preexisting resistant variants***
- ***Genetic variants with 3 or more resistance mutations probably exist rarely, if at all, in untreated patients. Thus potent combinations for viral escape are recommended.***

Practical Implications of the Biology of HIV-1 Drug Resistance (2)

- ***Preventing cummulative acquisition of resistance mutations requires potent combination regimens that suppress viral replication to below levels of detection of the most sensitive assays available (about 50 copies/uL)***
- ***Complex mixtures of genetic variants exist in all patients. Assays for drug resistance, both genotypic and phenotypic, may provide information only on the predominant circulating variants and may miss minor variants.***

Practical Implications of the Biology of HIV-1 Drug Resistance (3)

- ***Prior treatment may select for resistant mutants that persist in lymphoid tissues but are no longer predominant or even detectable in the absence of drug pressure. Retreatment with the same drug may not be effective because of rapid selection of these mutants. Thus, genotypic and phenotypic assays must be interpreted in the context of drug treatment history.***

Source: Hirsch et al. JAMA 1998;279:1984-1991

POST-EXPOSURE PROPHYLAXIS (1)

- **EVALUATE THE SITUATION**
- **ELISA TEST ON SOURCE PATIENT**
- **INITIAL ELISA TEST**
- **COUNSELLING**
- **DRUGS**
- **FOLLOW-UP SCHEDULE**
- **FU PCR/VIRAL LOAD EVERY 3 mths**
- **PROTECTION**

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POST-EXPOSURE PROPHYLAXIS (2)

EVALUATE THE SITUATION:

- ***IMMEDIATE INFECTION CONTROL MEASURES***
- ***HISTORY FROM HCW***
  - ***Previous Risky behaviour***
  - ***Previous HIV Test &/results***
- ***ASSESS EXTENT OF EXPOSURE***
- ***COUNSELLING***
- ***TAKE BLOOD FOR ELISA TEST***

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POST-EXPOSURE PROPHYLAXIS (3)

ASSESS THE SOURCE PATIENT:

- HISTORY OF RISKY BEHAVIOUR
- PREVIOUS HIV TEST RESULT
- HISTORY OF DRUG TAKING
- HISTORY OF TAKING ANTI-RETROVIRALS
- TAKE BLOOD FOR HIV ELISA
- NO CONSENT NECESSARY

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POST-EXPOSURE PROPHYLAXIS (4)

- ***COUNSELLING***
- ***DRUG THERAPY***
  - **COMBINATION THERAPY**
  - **2RTIs + 1 PI (+/- 1 NNRTI)**

- ***FOLLOW-UP (MONITOR BLOODS)***
- ***REPEAT ELISA/PCR/VIRAL LOAD ASSAYS)***
- ***PROTECTION***

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FACTORS CONTRIBUTING TO ANTI-RETROVIRAL DRUG FAILURE DUE TO RESISTANCE

Drug Resistant Variants

Preexisting

Selected

Host Immune Failure

- CTLs
- **CD4+ Cell Function**
- **Chemokines**

Subinhibitory Drug Levels

- **Limited Potency or Distribution**
- **Incomplete Adherence**
- **Poor Absorption**
- **Rapid Clearance**
- **Protein Binding**
- **Nonactivation**
- **Drug-Drug interactions**

Leading to:

Persistent Viral Replication

Evolution of Drug Resistance

DRUG FAILURE

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Considerations for Choosing Initial Combination Therapy

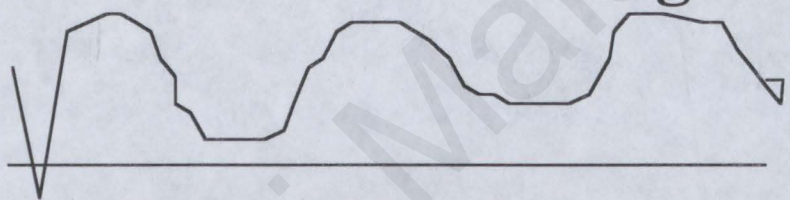
- Goal - Complete Viral Suppression
- Resistance to any of the drugs in the regime eg 3TC, Nevirapine, or delarvirdine - may result in incomplete viral suppression
- Drug Interactions, toxicity and likelihood of resistance of each component and the regimen as a whole must be assessed before initial therapy is started.

Source: Fauci AS, DHHS Guidelines, Updata Nov. 5, 1997

Summary

- **AZT-resistant strains occur in 10-16 % of patients in the USA and 6-12 % of patients in Europe**
- **AZT-resistance mutations persist in the absence of selective pressure from therapy, even in the presence of effective triple drug therapy**
- **Transmission of HIV with resistance to AZT occurs frequently, eg presence of AZT-resistance mutations in 10-28 % of cases of Primary HIV Infection tested in several cohorts**
- **Maternal-fetal transmission of AZT-resistance HIV has been documented.**

Patient Compliance **Drug Adherence**



INPUT **OUTPUT**

Drug Choice (Combi)

Viral Resistance

QOL
Well-being
Productive
Free from illness
Survival

INFECTIONS IN INTRAVENOUS DRUG USERS

- METHOD OF INJECTING
- USE OF UNCLEAN NEEDLES
- SHARING
- UNSANITARY CONDITIONS
- INTRODUCTION OF MICROBES
- INFECTIONS

INFECTIONS IN INTRAVENOUS DRUG USERS

LOCAL

- INFLAMMATION
- CELLULITIS
- ABSCESS

SYSTEMIC

- SEPTICEMIA
- BACTERIAL ENDOCARDITIS
- STAPH PNEUMONIA

BLOOD-BORNE

- SYPHILIS
- HEPATITIS B & C
- HIV

INFECTIONS IN INTRAVENOUS DRUG USERS

PREVENTION

DO NOT USE DRUGS

DO NOT INJECT, USE ORAL DRUGS

DO NOT SHARE

USE CLEAN NEELDES

POSTEXPOSURE PROPHYLAXIS

SOURCE HIV neg

Counselling &
FU Test

SOURCE HIV pos

Combi Drugs
Strongly
Recommended
(4-6 weeks)

SOURCE UNKNOWN HIV STATUS

Combi Drugs
Recommended
(Till results obtained from Source Pt.)

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