

MANGUA: An Electronic Medical Record System for HIV/AIDS

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Asociación de Salud Integral Guatemala
Fundación Sida i Societat

Antiretroviral Treatment Regional Technical Consultation
Santo Domingo, Dominican Republic
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Objectives



- General description of the MANGUA system
- MANGUA is used for:
 - *Collection of clinical data*
 - *Collection of indicators*
 - *Quality control*
 - *Other applications*
- Technical requirements
- Current situation in Guatemala
- Future challenges



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MANGUA System General Description





What is *MANGUA*?

- Project to computerize clinical and epidemiologic follow-up data of HIV infections and monitor Antiretroviral Treatment in Guatemala
- **MANGUA**
 - Management of Antiretrovirals in Guatemala

MANGUA - Objectives



- Develop and implement an application that will computerize HIV-positive patients' medical history
- Improve the quality and availability of clinical and epidemiological HIV indicators in the country
- Create and maintain a multicenter cohort of HIV-positive patients in Guatemala



Organization of project

- ***Designed specifically for Guatemala***
- Consists of a multidisciplinary team
- Appropriate to the Guatemalan epidemiological context
- Responds to the needs of hospitals and health personnel



Participating centers

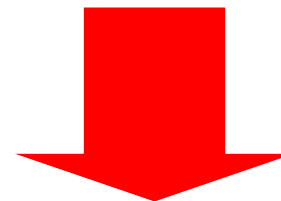
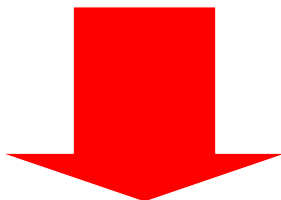
Family Clinic “Luís Angel García”,

Integrated Health Association (**ASI**)

General Hospital San Juan de Dios
Infectious Diseases clinic

Hospital Roosevelt (MCD)

**Fundació
Sida i Societat**



Data Management :
Data entry and analysis

Quality control support and
analysis of MCD

With support from **National AIDS Program in Guatemala**



MANGUA: Current Working Group



Multidisciplinary team of > 15 people

- **Medical team/Coordinator** □ Organizational-Clinical support
Dr. Samayoa, Dr. Casabona, Dr. Arathoon, Dr. Mejía , National AIDS Program
- **Technical team** □ Conceptualization support / Analysis
Dr. Ramírez, Dr. Villatoro, V.H. Fernández, J.Font, Dr. Sabidó, Dr. Isern
- **Information Systems team** □ Development Application / QC
M. Nikiforov, L.Serra, L.Arriaga, J.Figuerola
- **Digitization Team** □ Data entry
B.Estela, C.E.Chamalé, M.Salazar



MANGUA is used for...



1. *Systematic and automated collection of clinical data*
2. Generating indicators UNGASS – IAT
3. Quality control
4. Other important contributions



Patient Search



Search

Value		
Criteria		

Search

All

Clean

Results

Record Number	0235025
First Name	Maria
Last Name	Aldana
Date of Visit	05/07/2009 04/15/2009

New Visit



Patients: 2

Arrange patients by: First Name

First Name	Middle Name	First Last Names	Second Last Name	Record Number	Discharged
Maria	Eugenia	Aldana	Monroy	0235025	No
Victor	Manuel	Silverstre	Hernandez	0242025	No

New Patient

Reports

Accept

Exit

Patient Data- MANGUA

Files	Patient	Visit	Laboratory	Diseases	Treatments	Observation	Help
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Baseline Data

Record Number: 0235025	Identification Number: s20-45696
Hospital NHC: 3582009	Counseling Number: 0232580
First Name: Maria	Second Name: Eugenia
First Last Name: Aldana	Second Last Name: Monroy
Sex : Female Male	Date of Birth:
Country of birth: Guatemala	Department of birth: Quiche
Municipality of birth : Santa Cruz del Quiche	Country of residence: Guatemala
Department of residence: Guatemala	Municipality of residence:
Address:	
Phone:	Mobile phone: 5555-5555
Consent: Yes No	Identification code: F28028.....
Ethnicity: Ladino	Religion: Catholic
Marital status: Separated	Number of Children ____ Salary____
Education Level: Elementary (incomplete)	Occupation: Housewife
Blood Group:	RH Factor: positive
Date of first visit= 04/15/2009	Doctor: 13



Contact person

SAVE

CLOSE

Vital Signs - MANGUA

Files Patient Visit Laboratory Diseases Treatments Observations Help



VITAL SIGNS / FOLLOW UP

Date of visit: 05/07/2009		Type of visit : Follow-up		Next visit:	
PA: (mmHg)	T(C): 37	FC: (lpm)	FR (rpm): 20	Sat O2 (%)	
Height (cm)	Weight (pounds): 120	IMC__	Participates in EC?: No		
Karnofsky: 100- Normal, no complaints, no indication of disease					



Stage type: CDC	WHO	Stage: B3	Nutrition consultation:	
Date of PAP test:		PAP Test	Pregnant: yes	
Pregnancy trimester:		Start of pregnancy:	End of pregnancy:	

Reason for visit:

History

Arrange by: Date of Visit

Date of Visit	Type of Visit	Weight	Kanofsky	Stage	Pregnant	Next Visit
5/7/2009	Follow-up	120	100	B3	Yes	
4/15/ 2009	First Visit	120	100	WHO Stage 2	Yes	



New Visit

Check Stage

SAVE

Close



Current ARV

Start Date: 4/15/2009	ARV: Nevirapine	Type: NAN
Dosage (mg)_____	Presentation_____	Administered: PO (orally)
Frequency:_____	Provider: Global Fund	Generic: _____
Units delivered: _____	Units returned: _____	Adherence: _____

Calculate adherence

Verify scheme

Finalize TTM

Side effects

Accept Cancel

CURRENT SCHEME

Start Date	ARV	ARV Type	Dosage	Presentation	Unit delivered	Adherence	Side effects
4/15/2009	Nevirapine	NAN					No
4/15/2009	Zidovudine/ Lamivudine						No



PREVIOUS SCHEMES

Scheme	Start Date	End date	Medications	Reason for change

New Treatment

Close



MANGUA is used for...



1. Systematic and automated collection of clinical data
2. ***Generating indicators UNGASS – IAT***
3. Quality Control
4. Other important contributions





Contribution to the National Monitoring and Evaluation Plan

- Generates standardized information regarding the HIV Epidemic
- Produces information periodically that is *opportune, valid and reliable*
- Complements epidemiological surveillance systems and homogenizes the reporting system



Generation of Reports and Indicators

- Standardized Reports of Activities and ARVs
- Indicators :
 - **UNGASS**
 - **Early warning indicators (to be developed)**

MANGUA : ARV Therapy and Opportunistic infections

Objective	UNGASS Indicators (M&E)
Ex 2: Comprehensive Care	2.1 Percentage of adults and children still alive with evidence available indicating that they are still in treatment 12 months after initiating ARV therapy
	2.2 Percentage of estimated cases of co-infections by HIV and tuberculosis that received treatment
	2.3 Percentage of adults and children with advanced HIV infections receiving ARV therapy

Global Fund Impact Indicators
Late detection (symptomatic cases) of PLWH that access integrated care centers
Incidence of Opportunistic Infections in people with AIDS

Area	Global Fund Indicator
Treatment:	Number of cases of PLWH receiving treatment for OI
	Number of adults receiving combined ARV treatment
	Number of PLWH with basic monitoring and follow-up



Contribution at the International Level – MANGUA

Other Indicators Vertical Transmission and key groups

Objective	UNGASS INDICATORS (MyE)
Ex. 1 Prevention	1.5 Percentage of HIV-positive pregnant women receiving ARV drugs to reduce risk of mother-to-child transmission



Objective	Area	Global Fund Indicator
1	Prevention: STI diagnosis and treatment	Number of people in specific groups (PLWH, FSW, MSM and incarcerated) diagnosed with an STI and treated according to established norms
2	PMTCT	Number and percentage of HIV-infected pregnant women receiving HIV treatment

Selected early warning indicators

I	Prescribing Practices for ART
II	Patients that stop treatment during the first 12 months of ART
III	Patients continuing with first line ART
IV	On-time collection of ARV medication in patients initiating ART
V	Timely compliance of ART consultation
VI	Continuity of ART supply
VII	Pill re-count by different centers using standardized instruments
VIII	Suppression of viral count at 12 months of first line ART
	When possible genotype



Current ARV

Start Date: 4/15/2009	ARV: Nevirapine	Type: NAN
Dosage (mg)	Presentation	Administered
Frequency:	Provider: Global Fund	Generic:
Units delivered:	Units returned	Adherence

Start Date	ARV	Type ARV	Dosage	Presentation	Unit delivered	Adherence	Side effects
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Scheme	Start date	End date	Medications	Reason for change
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Patient Search



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Search

Value:		
Criteria: Nhc		
Search	All	clean

Result

Record Number :
First Name:
First Last Name
Date of Visit:

New Visit

Patients

Arrange patients by: First Name

First Name	Second Name	First Last Name	Second Last Name	Record Number	Discharged

New Patient

Reports

Accept

Exit



Reports

Dates

Start Date: 4/1/2010

End Date: 5/1/2010



Select report

Report: Select report to show....

Patients in Treatment Report

Standard Report

ARV Report



Generate Report

Indicators: MANGUA Reports



File



Dates

Start Date: 4/1/2010

End Date: 5/1/2010

Indicators Selection

Show all Areas

Organization: All

Type

- 1.5 Monitoring and Evaluation National Plan UNGASS #5
- 2.1 Monitoring and Evaluation National Plan UNGASS #24
- 2.2 Monitoring and Evaluation Plan UNGASS #6

Area:

- 2.3 Monitoring and Evaluation Plan UNGASS #4
- 4.1 Monitoring and Evaluation National Plan Global Fund



Generate Report of Indicators



MANGUA Reports: Standard Report		User: UserCLI
		Hospital: San Juan de Dios
1.1 HIV + Patients with Follow-up visit during period:		0
# of new patients (first follow-up in period)		
# of patients with previous follow-up		
1.2 Distribution of reasons for discharge during follow-up:		
<u>Reason for discharge</u>	<u>#</u>	<u>%</u>
No results		
Total		
2.1 # of deaths during period		
Total # of deaths		
# of deaths during hospitalization		
2.2 Distribution of causes of death		
Reason for death	#	%
No results		
Total		100%

Record of HIV+ people Alive and in ARV treatment

- Cumulative number of PLWH: Cumulative number of PLWH up to reporting period
- PLWH that initiated cohort 24 months ago: number of PLWH discharged during reporting period moved 24 months earlier
- PLWH that started ARV treatment 24 months ago: number of PLWH that started treatment during reporting period (moved 24 months earlier)
- PLWH alive at 24 months of initiating treatment: number of PLWH that initiated ARV treatment during report period moved 24 months ealier and that are still alive during reporting period
- PLWH that stopped treatment before the 24 months of initiating treatment: Number of PLWH that started ARV treatment during reporting period moved 24 months earlier and that interrupted last treatment for whatever reason ($3 \geq$ months) before reporting period
- PLWH lost- to- follow- up before the 24 months of initiating ARV treatment: number of PLWH that started ARV treatment during reporting period moved 24 months earlier and that have no follow-up in the 6 months before the end date of the reporting period
- PLWH that died before the 24 months of initiating ARV treatment
 - a. Due to AIDS: number of PLWH that started ARV treatment during reporting period moved 24 months earlier and that died of AIDS ($CD4 < 200$) before the reporting period
 - b. Due to other causes: Number of PLWH that started ARV treatment during the reporting period moved 24 months earlier and that died of other causes (not AIDS) before the reporting period

Cumulative death cases by year

- PLWH deaths: number of PLWH that died during reporting period
- PLWH deaths in the last 12 months: number of PLWH that died during 12 months prior to the start date of reporting period
- Cumulative number of deaths: Number of PLWH that died up to the end date of reporting period

Number and percentage of PLWH alive 12 months after initiating ARV treatment: $n / N = \%$

n= Numerator: number of PLWH that started ARV treatment during the reporting period moved 12 months earlier and that are still alive during the reporting period

N= Denominator: number of PLWH that started ARV treatment during reporting period moved 12 months earlier

Number and percentage of PLWH alive 24 months after initiating ART treatment: $n / N = \%$





Survival

Indicator:

Survival information of HIV

People in treatment

Objective: Comprehensive Care

Type: Impact

Organization: Global Fund

Form 1.2 (comprehensive care- Impact)

	PLWH Cumulative	PLWH that indicated starting cohort 24 months ago	PLWH that indicated treatment	PLWH alive at 24 months of initiating treatment	PLWH that stopped before 24 months of initiating ART treatment	PLWH lost-to-follow-up before 24 months of initiating ART treatment
Years and longer						
Between 18 and 30 years						
Between 31 and 45 years						
Between 46 and 60 years						
Longer than 60 years						
1						





MANGUA is used for...



1. *Systematic and automated collection of clinical data*
2. Generating indicators UNGASS – IAT
3. ***Quality control***
4. Other important contributions



Quality control of data

1) Quality Assurance

- Activities that ensure quality of data prior to data entry. EMCD's task

Data entry

2) Quality Control

- Monitoring and maintaining quality of data entered in MANGUA

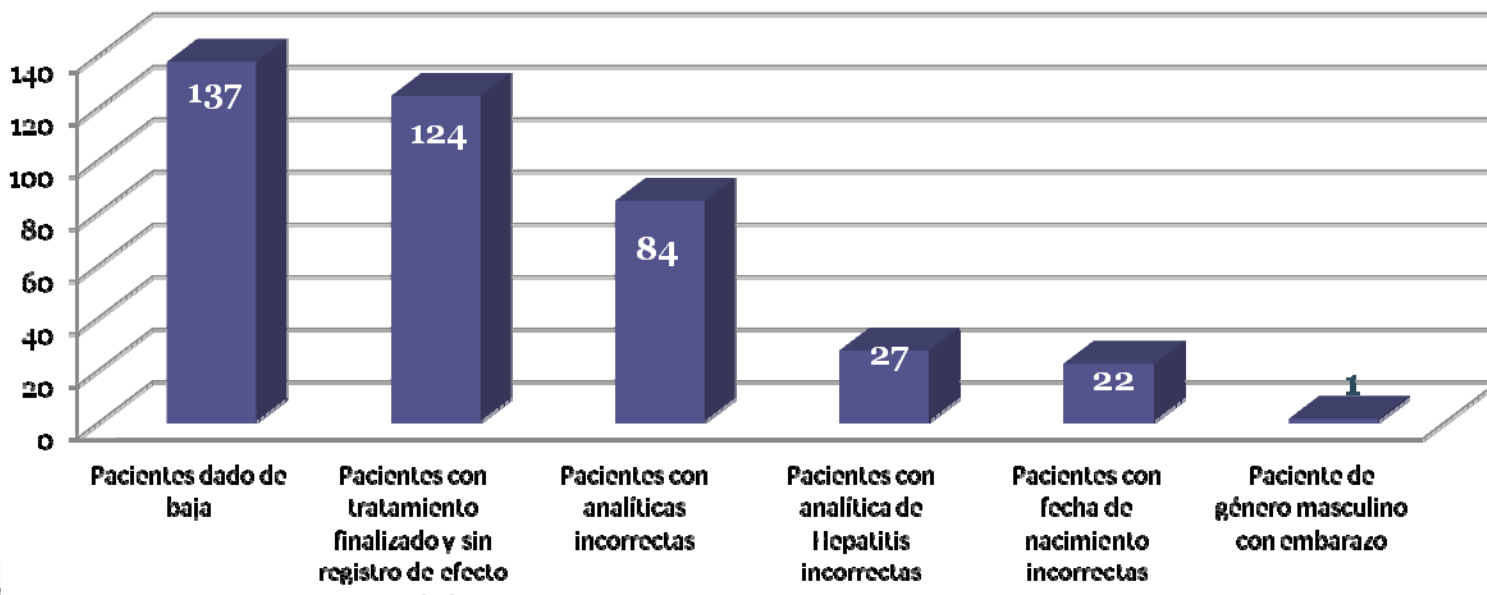
Data entry corrected

Entering corrected data

3) Data management

- Management and processing data during analysis

Example of errors



Patients discharged

Patients with treatment completed and no recorded side effects

Patient with incorrect analysis

Patients with incorrect analysis for hepatitis

Patients with incorrect birth dates

Pregnant Male patient

Quality Control



MANGUA is used for...



1. Systematic and automated collection of clinical data
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International contribution, applied research Formation of a prospective cohort



Consolidation of the MANGUA project will allow:

- Expand the number of participating centers**
 - *Only prospective multicentre study of PLWH in the region*
- Access to quality information about the epidemic at the country level
- Conduct applied research about the HIV epidemic
- Participate in observational studies with an international scope



**Introduced in MCDs up to December 2009, Family Clinic Luis Angel Garcia:
2458 patients.**



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MANGUA Technical requirements



Computer Characteristics

- The computer system used was Visual Basic.NET
- Stored in SQL Server or Access*
- Operating system: Windows XP or other*



- The program is installed at each terminal with access to the database in the local network.
- Possibility of working in a network.*
- . Each user will have a name and password
- . Security and confidentiality of data
- User manual



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Current situation in Guatemala



Implementation Workshops (induction, installation, follow-up)





Status of MANGUA's Implementation in Guatemala



□ **Reference hospital**

- **Family Clinic Luis Ángel García, ASI Hospital General San Juan de Dios Famil**
 - *Screen inputs development and evaluation*
 - *Application and quality control, on-line installation*
 - *Installation in SQLS*
 - *Work online*

□ **1 Hospital Nacional de Escuintla**

- *Application and FSIS Projects*
- *Application*

□ **2 1 Regional Hospitlas**

□ **11 Departmental hospitals covering most regions in the country**





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Challenges





Challenge ... 1



- Export pre-existing databases to MANGUA Application
- Update data
- Procurement and maintenance of equipment
- Training personnel



Challenges ... 2



- Consolidate MANGUA application within a quality control program
- Develop local capabilities
- Use application online
- Program sustainability



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Thank you





Asbitta