

Supplementary File

OpenClinic Implementation in Malian Health facilities

In Malian context, the project OpenClinic GA has been implemented since 2013 in 7 public and private health facilities: 2 University teaching hospitals (CHU-Grabriel Touré and CHU-IOTA), 1 Regional reference hospital, 3 Reference health centers and the vaccination program in Bamako (Projet VIDA). Malian health facilities studied were constituted by an university teaching hospital and 4 public reference health facilities:

- University Teaching Hospital-African Institute of Tropical Ophthalmology (CHU-IOTA)
- Nianankoro Fomba Hospital of Segou (HNFS)
- Reference Health Center of Commune 2 (CSREF2)
- Reference Health Center of Commune 3 (CSREF3)
- Reference Health Center of Commune 4 (CSREF4)

The following table shows the OpenClinic implantation beginning date and the features which are implemented per site.

site	Start OC	Patient ID	Visit encount	Admission encount	Patient invoice	Insurer invoice	Reason for encount	Diagnosis after hospit	Clinic information	Lab manage	Pharmacy manage	Internal report	GHB report
CHU-IOTA	5/2014	X	X	X	X	X						X	X
HNFS	2/2014	X	X	X	X	X	X		X	X		X	X
CSREF2	3/2014	X	X	X	X	X						X	X
CSREF3	3/2013	X	X	X	X	X						X	X
CSREF4	6/2013	X	X	X	X	X						X	X

Table 16. Situation of OpenClinic implementation in 4 Malian health facilities

The CSREF3 and CSREF4 were the first health facilities to implement OpenClinic in 2013. The other 3 health facilities integrated the project in 2014. For the implementation of the project OpenClinic GA, the 4 public hospitals received a partial funding from the Malian ministry of health through the National Agency Telehealth and Medical Informatics (ANTIM: *Agence Nationale de Télésanté et d'Informatique Médicale*). The Ministry funded the administrative and financial modules with an objective of improving the financial management of those health facilities. This finding that the use of the solution OpenClinic hospital management software could improve hospital financial management came out of the results of OpenClinic utilization at the University teaching hospital of Gabriel Touré. The University Teaching hospital IOTA funded the implementation of the OpenClinic system with its own funds.

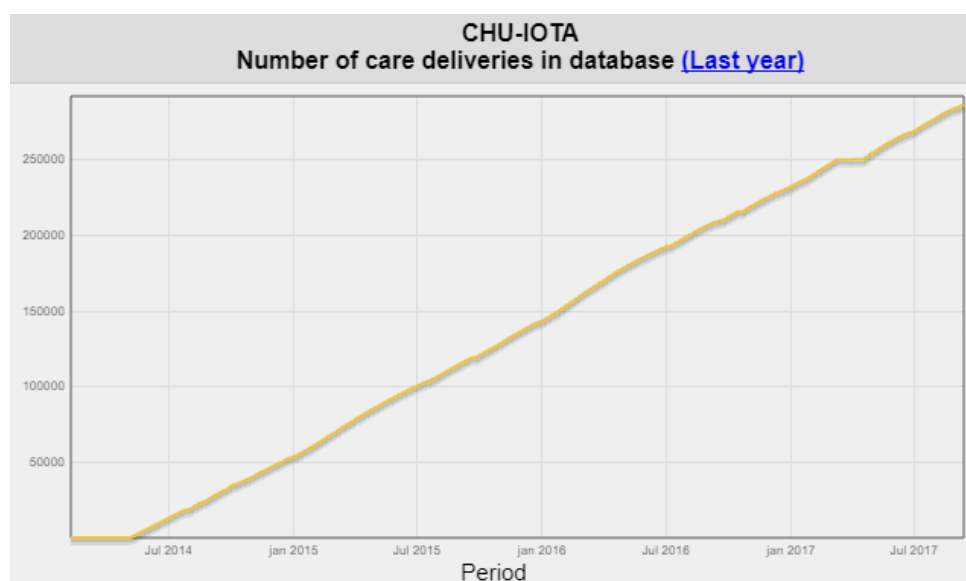
All hospitals use the system OpenClinic in their daily patients and invoices management. Only the HNFS hospital has irregularly added the reasons for encounter and some clinic information in the patient health records. This district hospital started also in May 2016 to use slowly the laboratory information management module. All health facilities had the ability to consult and print the activities reports and extract indicators sent to the Global Health Barometer (GHB).

University Teaching Hospital-African Institute of Tropical Ophthalmology (CHU-IOTA)

The CHU-IOTA is a university teaching hospital center specialized in eye care and attached to the University of Bamako. It serves the population of Mali and throughout West Africa. It is also a center of excellence in ophthalmology training field, optometry, nursing, ophthalmic and optical technology. The hospitalization department is constituted by 3 operating theaters, a premedication room, a recovery room and 54-beds hospital beds mounted in 7 rooms. OpenClinic implementation at CHU-IOTA started in May 2014 with a direct complete administrative and financial modules use.

Technical specifications of CHU-IOTA	
OpenClinic server OS	Linux V3.2.0-29
Database server make	MySQL
Data load key figures 30/06/2016	
Configured users	73
Insurer plans used	6
Patient health records	124 053
Delivered health services	195 528
Patient invoices	177 909
Insurer invoices	10

At the end of June 2016, the data base was contained over 124,000 patients records and 195,000 health care deliveries invoiced to the patients as shown in the following graph.



Insurers invoicing is still manually managed at the hospital. After 2 years of UHC indicators monitoring at the CHU-IOTA, the global PHSC was 4.4%.

UHC at CHU-IOTA	#	%Insured (PHSP<=25%)	% Uninsured (PHSP>=75%)	PHSP	POOP
Patients	101 611	4.4%	81.7%	85.9%	13.77 USD
Outpatients	101 249	3.3%	81.9%	88.1%	9.25 USD
Inpatients	8 124	20.0%	79.0%	82.6%	70.11 USD

This indicator reached 20% in hospitalization. The PHSP averaged 86% and the POOP of 13.77USD. The inpatient POOP was higher (70.11USD). Only 2.7% were full health services covered and 99.1% of uninsured patients paid 100% of their health services consumed.

Insurance schemes at CHU-IOTA	#	FREE	CBHI	SHI	PHI	PATIENT
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Outpatient encounters	160 256	1.6%	0.2%	16.7%	0.0%	81.5%
Inpatient encounters	8 846	1.3%	0.1%	18.3%	0.0%	80.3%

The health insurance schemes used by the patients was essentially the SHI scheme constituted by AMO (*Assurance Maladie Obligatoire*) covered only the public agents and their families. The free care was only supported by the hospital through its social department and was funded by NGOs and projects that support the hospital in its operation activities. The PATIENT scheme was used in more than 80% of encounters.

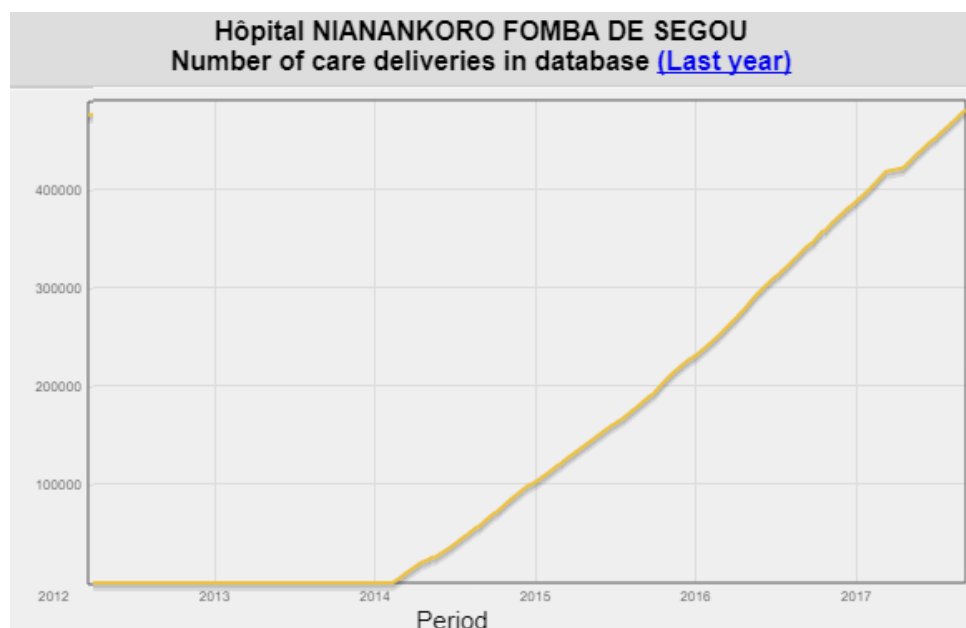
Nianankoro Fomba Hospital of Segou (HNFS)

The "*Hôpital Nianankoro Fomba de Ségou*" (HNFS) has been created in July 2003 as a regional hospital located in Ségou in the center of Mali. HNFS is a 160-bed public regional reference hospital with an autonomy management. The hospital performs around 69,000 outpatient visits and 7,500 inpatient admissions per year.

The HNFS started its computerization early in 2011, with the installation of an internet connection, the purchase of IT equipments and the establishment of a local network. In February 2014, the hospital acquired the OpenClinic management system for improving its financial management after a one year-period of testing. The OpenClinic implementing was realized with the support of the ANTIM ICT team. The configuration of all parameters was done in the presence of this team, and monitoring in the use of the system was coordinated by the ANTIM. The integration of laboratory management and a good inpatient management started this year.

Technical specifications of HNFS	
OpenClinic server OS	Linux V3.2.0-29
Database server make	MySQL
Data load key figures 30/06/2016	
Configured users	129
Insurer plans used	6
Patient health records	148 353
Delivered health services	311 526
Patient invoices	229 918
Insurer invoices	39

From February 2014 to June 2016, the database exceeded 148.000 patient health records, 312,000 health care deliveries as expressed by the following graph.



Within that period, 230,000 patient invoices and 39 insurer invoices have been produced. After 2 years of UHC indicators monitoring, the global PHSC was 4.2%. This indicator reached 36.9% for inpatients. The PHSP averaged 84% and the POOP of 7.63USD. The inpatient POOP was 12.00USD and patient paid 64.6% in average of the total of the health services costs invoiced. Only 2.4% were full health services covered. And the total of insured patients paid 100% of their health services consumed.

UHC at HNFS	#	%Insured (PHSP<=25%)	% Uninsured (PHSP>=75%)	PHSP	POOP
Patients	143 663	4.2%	81.4%	83.6%	7.63 USD
Outpatients	143 340	4.1%	81.4%	83.9%	7.60 USD
Inpatients	935	36.9%	61.2%	64.6%	12.00 USD

The number of inpatients seems lower compared to the estimate of normal number of inpatients per year, the fact is that before May 2016, some inpatient encounters were managed as outpatient encounters. The inpatient encounters and beds management was improved this year.

Insurance schemes at HNFS	#	FREE	CBHI	SHI	PHI	PATIENT
Outpatient encounters	173 396	0.0%	0.0%	41.2%	0.0%	58.8%
Inpatient encounters	981	0.3%	0.0%	21.6%	0.0%	78.1%

The main health insurance scheme used by patients was SHI in 41% of outpatient encounters and 21.6% of inpatient encounters. The AMO and ANAM plan was the social health insurance used by insured patients. The free care was organized within hospital for social cases. The PATIENT scheme was still used in more than 58% of outpatient encounters and 78% of inpatient encounters.

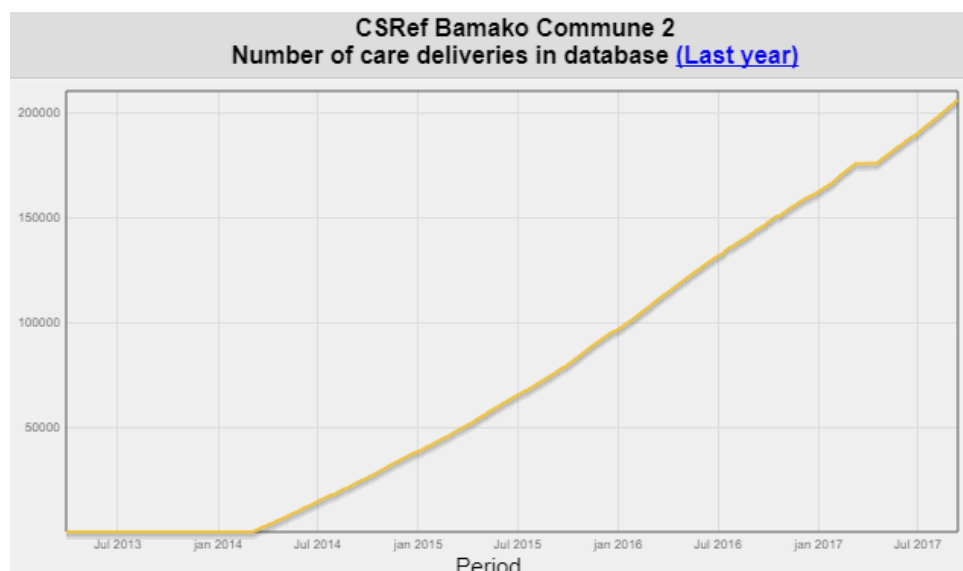
Reference Health Center Commune II (CSREF2)

The "Centre de Santé de Référence Commune II" (CSREF2) is located in Missira commune. The CSREF2 provides the first reference health services. It includes outpatient and inpatient departments in paediatrics, internal medicine, gynaecology and surgery. Other paramedical services are performed in this center: ophthalmology, dentistry, pre- and postnatal visits, family planning and vaccinations.

The OpenClinic implementation started early in 2014, but only administrative and financial modules have been well implemented. As seen above, the main objective of the ICT-HIMS implementation was to improve the financial management of the health facility.

Technical specifications of CSREF2	
OpenClinic server OS	Linux V3.2.0-29
Database server make	MySQL
Data load key figures 30/06/2016	
Configured users	23
Insurer plans used	8
Patient health records	364 730
Delivered health services	135 191
Patient invoices	123 882
Insurer invoices	1

Until June 2016, the data base of CSREF2 contained 364,730 patient health records created. The system recorded over than 135,000 health care deliveries invoiced in 123,882 patient invoices.



Production of insurers invoices had not yet started to be used in the system even if the data were encoded in the system, the health center continued to use manual method.

UHC at CSREF2	#	%Insured (PHSP<=25%)	% Uninsured (PHSP>=75%)	PHSP	POOP
Patients	85 279	3.1%	79.1%	74.4%	4.14 USD

The CSREF2 handled only outpatient visits in the OpenClinic system. The percentage of insured patients was only 3.1%. The PHSP was 74.4% and the POOP averaged 4.14USD. 1% of patients were full coverage, and all insured patients paid the total costs of their invoices.

Insurance schemes at CSREF2	#	FREE	CBHI	SHI	PHI	PATIENT
Patient encounters	120 562	0.0%	0.5%	36.4%	0.0%	63.1%

Concerning the patient health insurance coverage, SHI scheme through the AMO plan was the mostly used insurance. The community insurance scheme was essentially included the UTM (*Union Technique de la Mutualité*) used in 0.5% of encounters at CSREF2. We also met a small mutual initiative involving the Air pilots, the MUTAV (*Mutuelle de l'aviateur du Mali*) plan used in 0.02% of encounters. The PATIENT scheme was used in more than 63% of encounters.

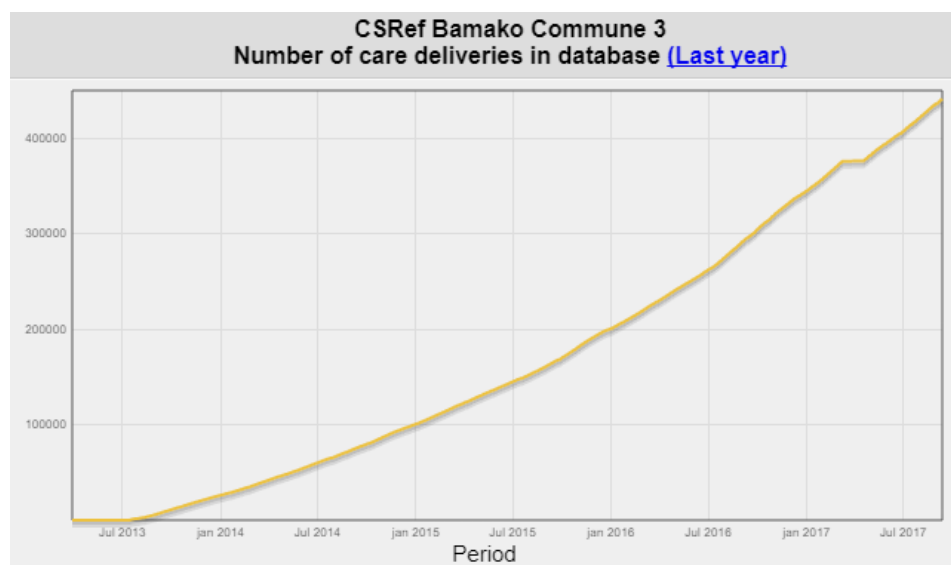
Reference Health Center Commune III (CSREF3)

The "Centre de Santé de Référence Commune III" (CSREF3) is located in Bamako-Coura commune. This health center counts 74 beds. It was ranked first in the performance contract initiated by the District of Bamako. The assessment was essentially based on the management of patient health records and of finances in health facilities. The use of an ICT-HIMS played a role in the performances improving of this health center.

The OpenClinic project started early in 2013 in CSREF3. The health center used OpenClinic administrative and financial modules immediately from the beginning after their configurations. Still the health center does not yet produced insurers invoices using the system. But the patients administrative and financial data enabled us to evaluate the UHC in this health center.

Technical specifications of CSREF3	
OpenClinic server OS	Linux V3.2.0-29
Database server make	MySQL
Data load key figures 30/06/2016	
Configured users	36
Insurer plans used	15
Patient health records	396 029
Delivered health services	269 165
Patient invoices	218 571
Insurer invoices	0

The use of financial module in OpenClinic GA started in July 2013. Until June 2016, the data base of CSREF3 contained over than 396,000 patient health records and 269,000 health services invoiced in 218,000 patient invoices.



At CSREF3, only 1.9% of patients were insured. For in patients, the PHSC was 11.4%. The PHSP averaged 70% for outpatients and 84% for inpatients.

UHC at CSREF3	#	%Insured (PHSP<=25%)	% Uninsured (PHSP>=75%)	PHSP	P00P
Patients	128 145	1.9%	74.2%	70.6%	4.58 USD
Outpatients	127 276	1.9%	74.1%	70.4%	4.55 USD
Inpatients	1 180	11.4%	82.8%	84.4%	8.21 USD

The POOP was 4.55USD in visit and 8.21USD in hospitalization. Only 1.2% of patients were full health services covered and the total of insured patients paid 100% of their health services consumed.

Insurance schemes at CSREF3	#	FREE	CBHI	SHI	PHI	Patient
Outpatient encounters	183 432	0.0%	0.1%	41.2%	0.0%	58.8%
Inpatient encounters	1 372	0.3%	0.0%	21.6%	0.0%	78.1%

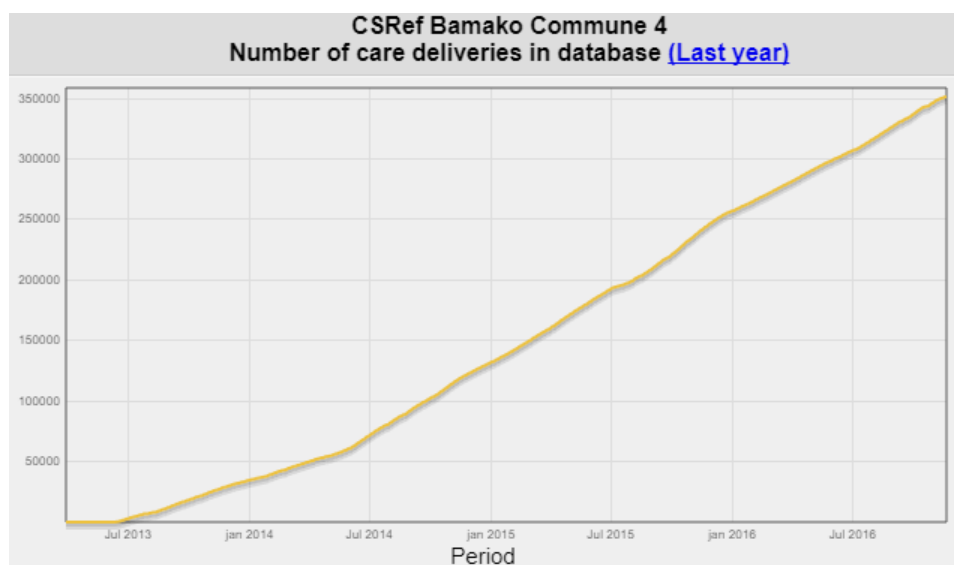
The main health insurance scheme used by patients was SHI in 41% of outpatient encounters and 21.6% of inpatient encounters. The AMO plan was principal the social health insurance used by insured patients. The free care was organised within the health center for social cases and one French NGO (ACTED *Solidarité internationale*) was active in this health facility by supporting vulnerable patients. The PATIENT scheme was still used in more than 58% of outpatient encounters and 78% of inpatient encounters.

Reference Health Center Commune IV (CSREF4)

The "Centre de Santé de Référence Commune IV" (CSREF4) is located in Lafiabougou commune. The CSREF4 is the first reference level in the health pyramid with the some medical and paramedical departments as the other reference health centers seen above. The health center counts 60 beds of admission. The CSREF4 and CSREF3 were the first health facilities to integrate the OpenClinic GA project in 2013. The implementation is organized in the same process that at CSREF 3 with the quick installation of the OpenClinic production version included administrative and financial modules. Also in this health center, the production of health insurers was still manual and using the system stopped at the patient administrative and financial records management.

Technical specifications of CSREF4	
OpenClinic server OS	Linux V3.2.0-29
Database server make	MySQL
Data load key figures 30/06/2016	
Configured users	67
Insurer plans used	71
Patient health records	453 894
Delivered health services	306 755
Patient invoices	252 375
Insurer invoices	8

From June 2013, when the project started, to June 2016, the database contained more than 453,000 patient health records, 306,000 health services delivered to the patients and 252,000 patient invoices produced.



At CSREF4, the PHSC was very lower (0.3%). The majority of patients (80%) had no health services coverage. The PHSP reached 80% of health service costs equivalent to a POOP of 4.40USD in average and 5.80USD for inpatients.

UHC at CSREF4	#	%Insured (PHSP<=25%)	% Uninsured (PHSP>=75%)	PHSP	P00P
Patients	188 529	0.3%	79.7%	79.1%	4.39 USD
Outpatients	188 111	0.3%	79.7%	80.8%	4.39 USD
Inpatients	473	4.4%	92.8%	96.2%	5.80 USD

There was no patient with a full health services coverage and the uninsured patients paid the total of their consumed health services.

Insurance schemes at CSREF4	#	FREE	CBHI	SHI	PHI	PATIENT
Outpatient encounters	238 832	0.0%	0.3%	34.0%	0.0%	65.7%
Inpatient encounters	499	0.0%	0.6%	6.6%	0.0%	92.8%

The main health insurance scheme used by patients was SHI through AMO plan. This plan was more used in outpatient encounters (34%).

The low level of use of the CBHI scheme was represented by some patients insured by the Mutual of Mali, UTM. The PATIENT scheme was used in over than 65% of encounters.