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PERFORMANCE EVALUATION SYSTEM OF HOSPITALS AND HEALTH DISTRICTS IN ETHIOPIA, TANZANIA AND UGANDA

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DOCTORS WITH AFRICA
CUAMM

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PERFORMANCE EVALUATION
OF HOSPITAL AND HEALTH DISTRICTS
IN ETHIOPIA, TANZANIA AND UGANDA

* List of indicators is reported in table 1 (chapter 2), on page 17 and following pages.

PERFORMANCE EVALUATION OF HOSPITAL AND HEALTH DISTRICTS IN ETHIOPIA, TANZANIA AND UGANDA

Performance evaluation system in healthcare is an evergreen topic that has involved scholars as well as practitioners from the beginning of this century. The Management and Health Laboratory (MeS Lab) of the Institute of Management of Sant'Anna School of Advanced Studies has been participating at the international debate on how to measure performance and how to make these tools useful for policy makers and managers since its foundation, in 2004.

The distinctive feature of the MeS Lab has been the adoption of a constructive approach, as the example of the Italian Regional Performance Evaluation System (IRPES) shared by a network of Italian Regional Healthcare Systems. This approach seeks to create a bridge between theory and practice with a win-win strategy both for researchers and practitioners. This implies a different way of doing research: it requires scholars' effort to involve practitioners, managers and professionals in the design and application of the mechanisms and managerial tools, considering the specific context and focusing on the impact of the performance evaluation systems on the improvement process. Although it requires different endeavours from scholars, it provides with a unique opportunity for studying the real world and collecting general recommendations or testing theoretical models that put together researchers and managers.

Whilst this can be done in a quite easy way in the country in which the MeS Lab is settled, the application of this approach in different countries requires, by all the actors involved in the process, a great ability to adapt the methodology to the new contexts in order to ensure its usefulness and validity.

This volume that reports the findings of this pilot study is interesting at least for two challenges: i) test and transfer the principles applied to the design of a performance evaluation system designed in a western country (Italy) to the African context and ii) compare healthcare performance of diverse settings and organizations among three different African countries.The high number of indicators calculated (around 120) is a good premise that confirms the fact that healthcare performance in African countries can be measured and that the partnership between CUAMM professionals and MeS Lab researchers has worked successfully.

I wish to thank CUAMM for trusting the Mes Lab team, and all the involved researchers coordinated by Prof. Milena Vainieri for their passion and enthusiasm, which are the very engines of good research.

Prof. Sabina Nuti
Rector of the Sant 'Anna School of Advanced Studies

Doctors with Africa CUAMM always considered performance evaluation of international cooperation projects and more in general of the health system and healthcare institutions as a fundamental dimension of its activities.

Since ten years, in our annual report we monitor the dimensions of accessibility, equity and quality of services delivered in the hospitals supported by our organization. Indeed, we believe that it is fundamental to monitor every healthcare activity in order to be accountable for our pursued objectives towards direct beneficiaries, namely patients, but also towards all the organizations, local governments and private donors that finance our services.

As a consequence of a process of sharing and comparison of evaluation and monitoring tools in place in low-income countries, it emerged the idea of a collaboration with the Management and Health Laboratory of the Institute of Management of the Sant 'Anna School of Advanced Studies in Pisa, a research group of experts in performance evaluation and monitoring of several Italian regional healthcare systems.

We are proud to affirm that, after only one year since our collaboration started, we were able to provide evidence of the applicability to four African settings supported by CUAMM of 117 indicators among the almost 400 that are in use in Italy.

We believe that this work is one first concrete step forward in order to have a tool that allows to work on the changes needed for governance and clinical processes, with the aim of improving in long lasting and responsible way the weaknesses of African healthcare systems.

Therefore, we warmly thank the Rector of the Sant 'Anna School of Advanced Studies, Prof. Sabina Nuti, who first dreamt of this collaboration, on behalf of the Professors and Researchers of the Management and Health Laboratory.

Don Dante Carraro
Director of Doctors with Africa CUAMM

1

INTRODUCTION

DOCTORS WITH AFRICA CUAMM

Introduction

Healthcare performance evaluation is a relevant topic in all health systems. Since 2000s several countries and international organizations have designed frameworks to assess health systems performance through the monitoring of different key dimensions (WHO, 2000; Arah et al., 2006; Smith et al., 2009). As for example, the OECD suggests accessibility, effectiveness, expenditure or cost, efficiency, equity or patient – centeredness (Smith, 2002).

More particularly, the last two decades saw an extensive effort to develop and implement Performance Evaluation Systems (PES) in high income countries (HIC) to evaluate the multidimensional performance of healthcare, with the purpose to improve performance of the health systems and the quality of the healthcare services. Instead, few evidences are reported in the literature on the evaluation of healthcare performance in low- and middle- income countries (LMIC). Moreover, when available, they refer to specific services or geographical settings and they do not compare performance using a multidimensional perspective (Shumba et al., 2013; Bhattacharyya et al., 2015; Veillard et al., 2017)(Shumba et al., 2013; Bhattacharyya et al., 2015; Veillard et al., 2017).

The present report collects and illustrates the results of a study aimed at understanding the core features and principles of a PES in the specific contexts in LMICs. More particularly, its primary objective is to evaluate and compare the performance of four different health care settings across national boundaries, providing policy makers and health care managers with a tool that can contribute to improving efficacy when assessing performance of health care services at hospital and district level.

The entities involved to conduct this study are four health districts and their reference hospitals in Ethiopia, Uganda and Tanzania. The hospitals and health districts selected for this study are the following:

- five "Woredas" in Shoa-west zone and St. Luke - Wolisso Hospital in the Oromia region, Ethiopia;
- Iringa District Council and Tosamaganga District Designated Hospital in the Iringa region, Tanzania;
- Napak district and St. Kizito - Matany Hospital in the northern region, Uganda
- Oyam district and Pope John XIII - Aber Hospital in the norther region, Uganda

In all these contexts the hospitals have the same institutional setting: they are private, faith-based and not for profit. These hospitals are part of the public health system and are mainly funded by both regional governments and out of pocket payments. Alongside, the health districts are managed by the regional government and are characterized by similar organizational models, featuring a wide variety of health care providers at different levels. Primary and secondary care is offered by dispensaries and health centres, which are spread within the reference territory and are intended to provide mainly outpatient services, e.g. prevention, health promotion, maternity, and some in-patient curative services. Tertiary care is provided by regional hospitals, which offer more specialized services, including consultation, emergency, and surgical services, and serve as referral hospitals for the districts. The distribution of facilities across levels of care reflect the healthcare needs of the population, with most cases treated at the district level, whilst more complex cases are referred to reference hospitals.

Nevertheless, these contexts differ with respect to these factors: epidemiological priorities and issues, organizational and governance models, levels of development of the hospitals and health districts information and IT infrastructure. For further detail on differences, Table 1 shows the main information related to the four hospitals and districts participating in this study.

Table 1. *List of the analysed hospitals and their relative health districts or catchment areas*

Country	Region	Health District*	Estimated population (Year 2019)	Reference Hospital	Hospital beds (2019)	Surface area (km2)	Population Density (citizens per km2)
Ethiopia	Oromia region	Five Woredas in Shoa-west zone (Wolisso Town, Wolisso Rural, Ameya, Wonchi, Goro)	611 315	St. Luke - Wolisso Hospital	200	27 000	22.6
Tanzania	Iringa region	Iringa District Council	300 571	Tosamaganga District Designated Hospital	165	19 256	15.6
Uganda	Northern region	Napak District	156 989	St. Kizito - Matany Hospital	250	4978.4	31.5
Uganda	Northern region	Oyam District	432 050	Pope John XIII - Aber Hospital	217	2190.8	197.2

*With regard to Ethiopia, the information reported in the cell does not refer to an institutional health district, but to the catchment area covered by Wolisso Hospital.

The development of a PES that compares local settings within supranational contexts may support the management and decision-making activities in three main different ways.

Firstly, the system can be adopted as a management tool. It helps identify good practices, providing opportunities to standardise processes and activities in a replicable manner which could be applied to other settings within the system. It also supports the identification of poor performances, thus highlighting potential areas of improvement. In addition, it may serve as a potential tool to appropriately allocate the resources available.

Secondly, another important aspect is related to the improved accountability of the in-

volved hospitals and health districts with respect to all stakeholders, including policy makers and key figures at political and governance level as well as national and international donors.

Thirdly, the system may work as a tool to foster capacity building in the professional environment. Particularly, it can promote the development of skills and competencies among professionals in data collection and analysis, sharpening their ability to adopt a population-based approach when interpreting the results. In addition, the PES could eventually accelerate the transition from traditional paper-based information system towards a fully digitalized information system.

The abovementioned objectives are made possible by the core features of the described system, which make it innovative in the field of performance measurement and evaluation in LMICs.

This system came into existence as the result of an action research carried out by the Management and Health Laboratory (MeS Lab) of the Institute of Management of the Sant'Anna School of Advanced Studies in Pisa and Doctors with Africa CUAMM (CUAMM), a leading Italian NGO in the delivery of healthcare services in Sub-Saharan African countries. This initiative has been characterized by the voluntary participation of the hospitals involved that, in collaboration with their respective health districts, have favourably welcomed the development of an integrated evaluation system (Bowerman et al., 2002). This aspect is important because the measurement of the integration of different care settings is challenging not only in terms of appropriate measures, but also in relation to their jointly acceptability by all healthcare providers and professionals involved in the delivery of healthcare services (Maslin-Prothero and Bennion, 2010; WHO, 2015).

Additionally, this project arised as a bottom-up initiative and it represents a scalable model that can be applied in different contexts at diverse system level. Therefore, these findings can be of interest also for decision makers at regional and national level.

Moreover, the effective graphical representation of results helps identify the different contributions of the variety of national and international actors involved in the healthcare system. Therefore, the MeS Lab-CUAMM PES combines different contributions in a unique representative solution and highlights the weaknesses and strengths of the integrated system as a whole.

In conclusion, this system is the fruit of a work in progress process oriented towards the identification of strengths in order to boost performance across different levels of the healthcare system.

Bibliography

Arah OA, Westert GP, Hurst J, Klazinga NS. 2006. A conceptual framework for the OECD Health Care Quality Indicators Project. International Journal for Quality in Health Care 18: 5–13.

Bhattacharyya O, Mossman K, Ginther J, et al. 2015. Assessing health program performance in low- and middle-income countries: Building a feasible, credible, and comprehensive framework. Globalization and Health 11.

Bowerman M, Francis G, Ball A, Fry J. 2002. The evolution of benchmarking in UK local authorities. Benchmarking: An International Journal 9: 429–49.

Maslin-Prothero SE, Bennion AE. 2010. Integrated team working: A literature review. International Journal of Integrated Care 10: 1–11.

Shumba C, Atukunda R, Imakit R, Memiah P. 2013. Measurement of health system performance at district level: A study protocol. Journal of Public Health in Africa 4: 4–7.

Smith PC. 2002. Measuring Up. Improving Health System Performance in OECD Countries. In: Organization for Economic Cooperation and Development.

Smith PC, Mossialos E, Papanicolas I, Leatherman S. 2009. Performance measurement and professional improvement. Cambridge University Press: 613–40.

Veillard J, Cowling K, Bitton A, et al. 2017. Better Measurement for Performance Improvement in Low- and Middle-Income Countries: The Primary Health Care Performance Initiative (PHCPI) Experience of Conceptual Framework Development and Indicator Selection. Milbank Quarterly 95: 836–83.

WHO. 2000. The World Health Report 2000. Health Systems: Improving Performance.

WHO. 2015. WHO global strategy on people-centred and integrated health services: interim report.

2

METHODOLOGY AND REPRESENTATION OF RESULTS

DOCTORS WITH AFRICA CUAMM

Introduction

The PES designed, developed, and implemented in Ethiopia, Tanzania and Uganda is inspired by the PES of Tuscany Region and in the Inter-Regional Performance Evaluation System (IRPES) implemented by the MeS Lab since 2004 and 2008, respectively (Nuti et al., 2012, 2016). It represents a voluntary based governance tool to support healthcare managers and policy makers at regional and local level.

The PES has been developed with scientific rigour in order to guarantee the correctness of computation, thus ensuring transparency of performance results and overcoming of self-referential attitudes.

The ultimate goal of this tool is to share a PES of the hospitals and health districts supported by CUAMM through the development and benchmarking of 117 indicators aimed at describing and analysing the multiple dimensions of healthcare delivery.

The phases that characterize the development of the PES built in collaboration with CUAMM are the following:

1. Selection of the indicators: assessment with health professionals and hospital managers of the most relevant information from extant literature and experience to be applied in their contexts;

2. Feasibility analysis: analysis with professionals of the opportunity and costs to grab data from both digital and paper informative systems already in place;

3. Data collection: support of the hospitals and health districts' professionals in extracting data in homogeneous way from different data health registers and information systems;

4. Standards identification: collaboration with a team of public health experts in order to identify standards to be applied to evaluate information collected and to perform graphical representations;

5. System validation: sharing of the preliminary results with a group of experts and professionals in order to receive their opinions and comments before the dissemination of the results;

6. Results dissemination: organization of a series of events for disseminating and returning results to health care managers to illustrate and eventually discuss on how to use them.

Architecture of the PES

In order to offer a multidimensional evaluation of healthcare performance, the results are analysed according to different perspectives. The different subsets, or dimensions, of indicators are intended to highlight the fundamental dimensions of healthcare performance. The eight dimensions, which are in turn subdivided into 23 areas of evaluation, are listed below:

- Regional Health Strategies
- Efficiency and Sustainability
- Users, staff and communication
- Emergency care
- Governance and quality of supply
- Maternal and Child care
- Infectious Diseases
- Chronic Diseases

The indicators included in the PES refer to the years 2017, 2018 and 2019 with the aim of better realizing the relevance of some phenomena and the assessment of the performance indicators.

Among the selected indicators, some have been considered as observation indicators over the three years while 48 indicators have been evaluated for 2019 according to the methodology designed and implemented as inspired by the IRPES. More particularly, the indicators have been calculated both at hospital and district level. The richness of information of the performance evaluation system comes from the valorization of a wide spectrum of data sources, which can be grouped under two broad categories: health and administrative registries for hospital indicators and District Health Information System (DHIS) of each country involved in the study for indicators calculated at residential level.

The indicators have been evaluated through the identification of five bands, considering the statistical distribution of indicators values. Evaluation scores have been built through an algorithm associating each band with a value in between 0 and 5, and a color from red to dark green. The bands construction varies according to the sign of the indicator that can be increasing or decreasing (Nuti et al., 2012).

The evaluation scores are determined based on international standards, when available, or on data assessment in benchmarking. Furthermore, the scores of some indicators are defined according to those already applied in the PES of Tuscany Region and in the IRPES. Each indicator has been evaluated by considering the identified reference standard across the hospitals and health districts included in the study. A context analysis was conducted to ascertain the consistency and sensibility of standards and indicators signs applied in the evaluation process. For further detail, see Table 1 provided below.

Figure 1 *The evaluation bands*

Table 1. *List of indicators shared between the network of health districts and hospitals*

Each dimension is subdivided into different areas of evaluation.
Observation indicators are reported in italics, whilst evaluation indicators in bold.

		Computation level	Page	Extremes of the evaluation bands									
	Regional Health Strategies												
Area	**Vaccination coverage**												
B7.10	*Vaccination coverage for tetanus (reproductive women)*	*Residence*	*50*										
B7.1A	**Vaccination coverage for measles**	**Residence**	**51**	0	89	89	92	92	95	95	98	98	100
B7.6	**Vaccination coverage against pneumococcal (PCV)**	**Residence**	**52**	0	89	89	92	92	95	95	98	98	100
B7.7A	**Pentavalent vaccine coverage (HIB; diphteria; pertussis, tetanus, HBV)**	**Residence**	**53**	0	89	89	92	92	95	95	98	98	100
B7.7B	**Vaccination coverage for polio**	**Residence**	**54**	0	89	89	92	92	95	95	98	98	100
B7.9	**Vaccination coverage for rota virus**	**Residence**	**55**	0	89	89	92	92	95	95	98	98	100
Area	**Hospital Attraction**												
C30.3.1.2	*Percentage of hospital admissions for patients resident in other districts*	*Hospital*	*56*										
C30.3.2.2	*Percentage of hospital admissions for patients resident in other districts - Complex cases*	*Hospital*	*57*										
	Efficiency and Sustainability												
Area	**Economic and financial viability**												
F1.1	**General economic equilibrium**	**Hospital**	**60**	-25.5	-19.1	-19.1	-12.6	-12.6	-6.2	-6.2	0.3	0.3	6.7
F1.2	**Economic equilibrium of health management**	**Hospital**	**61**	-11.4	-3.8	-3.8	3.7	3.7	11.3	11.3	18.8	18.8	26.4
F1.3	**Return on Investment (ROI)**	**Hospital**	**62**	-5.6	-2.7	-2.7	0.3	0.3	3.3	3.3	6.3	6.3	9.2
Area	**Per capita cost for healthcare services**												
F17.1A1	*Average cost for Inpatient Day Equivalent, PPP (current international $)*	*Hospital*	*63*										
F17.1A2	*Average cost for Inpatient Day Equivalent (without D&A), PPP (current international $)*	*Hospital*	*64*										
F17.3.1A	*Average cost for specialized care per procedure, PPP (current international $)*	*Hospital*	*65*										
F17.3.1.1	*Average cost for specialized care per procedure - medical department, PPP (current international $)*	*Hospital*	*66*										
F17.3.1.3	*Average cost for specialized care per procedure - operating theatre, PPP (current international $)*	*Hospital*	*67*										
F17.3.1.4	*Average cost for specialized care per procedure - department of surgery, PPP (current international $)*	*Hospital*	*68*										
F17.3.1.5	*Average cost for specialized care per procedure - maternity department, PPP (current international $)*	*Hospital*	*69*										
Area	**Assets and liability analyses**												
F3.1	**Availability Index**	**Hospital**	**70**	0.4	0.6	0.6	0.8	0.8	1	1	1.5	1.5	2
Area	**Assets and liability analyses**												
C2A.2	**Bed occupancy rate**	**Hospital**	**71**	0	70	70	75	75	80	80	85	85	90
C2A.3	**Average lenght of stay (ALOS) - inpatients**	**Hospital**	**72**	6.8	7.3	6.2	6.8	5.6	6.2	5	5.6	4.4	5

		Computation level	Page	Extremes of the evaluation bands									
	Users, staff and communication												
Area	**Assets and liability analyses**												
D18	**Percentage of hospitalized patients leaving against medical advice**	**Hospital**	**74**	1.4	1.8	1.1	1.4	0.7	1.1	0.4	0.7	0.0	0.4
E2A	**Percentage of staff absence**	**Hospital**	**75**	13.1	14.0	12.2	13.1	11.4	12.2	10.5	11.4	9.6	10.5
	Emergency care												
C16.10A	*Percentage of repeated admissions in Emergency Department within 96 hours*	*Hospital*	*78*										
	Governance and quality of supply												
Area	**Hospital - territory integration**												
C8B.1A	*Emergency room access rate, per 1.000 residents*	*Hospital*	*80*										
C17.1.4.8A	*Hospitalization rate for hospital admissions over 15 days, per 1.000 residents*	*Hospital*	*81*										
Area	**Healthcare demand management capability**												
C1.1A	*Hospitalization rate, per 1.000 residents*	*Hospital*	*82*										
C1.1B	*Per capita hospital beds, per 100.000 residents*	*Hospital*	*83*										
Area	**Care appropriateness of chronic diseases**												
C11A.1.1A	*Heart failure hospitalization rate per 100.000 residents (>15 years)*	*Hospital*	*84*										
C11A.2.1A	*Diabetes hospitalization rate per 100.000 residents (>15 years)*	*Hospital*	*85*										
Area	**Diagnostic appropriateness**												
C13.2A	*Average number of outpatient consult, per resident*	*Residence*	*86*										
C13.2B	*Average number of diagnostic procedures per patient (lab tests)*	*Hospital*	*87*										
C13.2C	*Average number of diagnostic procedures per patient (imaging)*	*Hospital*	*88*										
Area	**Quality of process**												
C16.4	*Percentage of admissions in Emergency Department hospitalised within 8 hours*	*Hospital*	*89*										

Area		Computation level	Page	Extremes of the evaluation bands									
Area	**Surgery variation**												
C18.9A	*Hysterectomy hospitalization rate, per 100.000 residents (women > 15 years)*	*Hospital*	*90*										
Area	**Repeated hospital admissions for any causes**												
C5.1E.A	*Repeated hospital admissions for any causes*	*Hospital*	*91*										
C5.1E.A1	*Repeated hospital admissions for any causes (medical department)*	*Hospital*	*92*										
C5.1E.A2	*Repeated hospital admissions for any causes (surgical department)*	*Hospital*	*93*										
C5.1E.A3	*Repeated hospital admissions for any causes (maternity department)*	*Hospital*	*94*										
Area	**Clinical risk**												
C6.4.1A	*Infection rate due to surgical wounds (emergency and elective surgery procedures)*	*Hospital*	*95*										
C6.4.2A	*Inpatient mortality rate in low-mortality cases*	*Hospital*	*96*										
C6.4.2B	*Inpatient mortality rate in high-mortality cases*	*Hospital*	*97*										
	Mother and Child care												
Area	**Maternal and child care - residence level**												
C7.28	**Proportion of pregnant women who attended ANC 4+ during the current pregnancy**	**Residence**	**100**	0	40	40	50	50	65	65	80	80	100
C7.29	**Drop out Rate of ANC1 to ANC + 4**	**Residence**	**101**	45	100	35	45	25	35	15	25	0	15
C7.30	**Proportion of pregnant women tested for syphilis**	**Residence**	**102**	0	50	50	60	60	70	70	80	80	100
C7.31	*Proportion of women with early PNC*	*Residence*	*103*										
C7.32	**Percentage of avoidable referrals**	**Residence**	**104**	0	35	35	50	50	65	65	80	80	100
C7.33A	*Percentage of deliveries in lower level units*	*Residence*	*105*										
C7.34	**Percentage of supervised deliveries in the catchment area (deliveries in the reference hospital and in the district' lower level units)**	**Residence**	**106**	0	55	55	65	65	75	75	85	85	100
Area	**Maternal and child care - hospital level**												
C7.1	*Percentage of C-section deliveries (NTSV)*	*Hospital*	*107*										
C7.1.1	**Percentage of caesareans**	**Hospital**	**108**	30	100	25	30	20	25	15	20	0	15
C7.1.4	*Percentage of elective caesareans (NTSV)*	*Hospital*	*109*										
C7.1.4A	*Percentage of elective caesareans*	*Hospital*	*110*										
C7.2	*Percentage of induced labours*	*Hospital*	*111*										
C7.20A	**Percentage of peri-/intra-partum asphyxia**	**Hospital**	**112**	5.7	7.1	4.3	5.7	3.0	4.3	1.6	3.0	0.2	1.6
C7.3	*Percentage of episiotomies (NTSV)*	*Hospital*	*113*										
C7.3A	**Percentage of episiotomies**	**Hospital**	**114**	36	44	28	36	20	28	12	20	0	12
C7.6	**Percentage of assisted deliveries (forceps or ventouse)**	**Hospital**	**115**	10	100	7.5	10	5.0	7.5	2.5	5	0	2.5
C7.7.1	*Paediatric hospitalization rate (<1 year) , per 1.000 residents*	*Hospital*	*116*										
C7.7A	*Paediatric hospitalization rate (0-12 years), per 1.000 residents*	*Hospital*	*117*										
C7D.19.1A	*Paediatric hospitalization rate for ARI (0-5 years), per 1.000 residents*	*Hospital*	*118*										
C7D.19.2A	*Paediatric hospitalization rate for gastroenteritis (<15 years), per 1.000 residents*	*Hospital*	*119*										

Infectious Diseases

		Computation level	Page	Extremes of the evaluation bands									
Area	**Infectious Diseases - Malaria**												
IDPM01	*Percentage of ANC visits during which a Long-Lasting Insecticidal Net (LLIN), or similar, is distributed*	*Residence*	*122*										
IDPM02	**Average number of SP doses per ANC visit**	**Residence**	**123**	0	1.5	1.5	2	2.0	2.5	2.5	3	3	100
IDPM03	**Percentage of confirmed malaria cases (BS+RDT)**	**Residence**	**124**	0	60	60	70	70	80	80	90	90	100
IDPM04	*Percentage of discharges for severe malaria*	*Hospital*	*125*										
IDPM05	**Percentage of treatments with ACT**	**Hospital**	**126**	130	150	120	130	110	120	100	110	90	100
IDPM06	**Percentage of IV/IM (parenteral artesunate or Quinine) treatments**	**Hospital**	**127**	130	150	120	130	110	120	100	110	90	100
IDPM07	*Percentage of malaria cases (< 5 years)*	*Hospital*	*128*										
IDPM08	*Percentage of deaths for malaria*	*Hospital*	*129*										
IDPM09	*ALOS (malaria cases)*	*Hospital*	*130*										
Area	**Infectious Diseases - Tuberculosis**												
IDPT01	**Percentage of treatments with isoniazide (IPT)**	**Residence**	**131**	0	60	60	70	70	80	80	90	90	100
IDPT02	**Percentage of TB cases undergoing the HIV screening**	**Residence**	**132**	0	90	90	92.5	92.5	95	95	98	98	100
IDPT03	*Percentage of positive TB cases on number of tests*	*Residence*	*133*										
IDPT04	**Percentage of confirmed TB cases on diagnosed cases**	**Hospital**	**134**	0	65	65	70	70	75	75	80	80	100
IDPT05	**Percentage of confirmed PTB**	**Residence**	**135**	40	60	60	70	70	80	80	90	90	100
IDPT06	**Percentage of positive Xpert cases**	**Hospital**	**136**	0	10	10	15	15	20	20	25	25	100
IDPT06.1	*Percentage of positive Xpert RR*	*Residence*	*137*										
IDPT07	**Percentage of treatments for extrapulmunary TB**	**Residence**	**138**	30	100	27.5	30	25	27.5	22.5	25	20	22.5
IDPT08	*Percentage of PTB MDR initiated treatments*	*Hospital*	*139*										
IDPT09	**Percentage of cured patients**	**Residence**	**140**	0	70	70	75	75	80	80	85	85	100
IDPT10	**Percentage of completed treatments**	**Residence**	**141**	0	75	75	80	80	85	85	90	90	100
IDPT11	*Percentage of deaths*	*Residence*	*142*										
IDPT12	**Percentage of interrupted treatments**	**Residence**	**143**	10	100	7.5	10	5	7.5	2.5	5	0	2.5
IDPT13	*Percentage of admitted patients due to TB*	*Hospital*	*144*										
Area	**Infectious Diseases - Gastroenteritis**												
IDPD02	**Average number of water sources by Hospital**	**Hospital**	**145**	0	0.2	0.2	0.4	0.4	0.6	0.6	0.8	0.8	1.0
IDPD03	*Availability of an hand washing programme (Hospital)*	*Hospital*	*146*										
IDPD04	**Average number of toilets per bed in IPD**	**Hospital**	**147**	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05
IDPD05	**Average number of toilets in OPD per number of rooms**	**Hospital**	**148**	0.0	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	1.0
IDPD06	*Percentage of positive stool tests (for parasites)*	*Hospital*	*149*										
IDPD07	*Percentage of gastroenteritis diagnosed (<5 years - Outpatient)*	*Residence*	*150*										
IDPD08	*Percentage of gastroenteritis diagnosed (>5 years - Outpatient)*	*Residence*	*151*										
IDPD09	*Percentage of diarrhoea cases with severe dehydration due to gastroenteritis and diarrhoea*	*Hospital*	*152*										
IDPD10	**Percentage of discharged patients for diarrhoea and gastroenteritis**	**Hospital**	**153**	9.1	100	7.9	9.1	6.7	7.9	5.4	6.7	0.0	5.4
IDPD11	*Percentage of diarrhoea cases (<1 year)*	*Residence*	*154*										
IDPD12	**Average number of ORS packages delivered per patient with diarrhoea (<5years)**	**Residence**	**155**	0	0.6	0.6	0.7	0.7	0.8	0.8	1	1	100
IDPD13	**Average number of Zinc Tablets doses delivered per patient with diarrhoea (<5years)**	**Residence**	**156**	0	0.6	0.6	0.7	0.7	0.8	0.8	1	1	100
IDPD14	**Percentage of deaths with a diagnosis of gastroenteritis**	**Hospital**	**157**	1.6	100	1.2	1.6	0.8	1.2	0.4	0.8	0	0.4
IDPD15	*ALOS for gastroenteritis*	*Hospital*	*158*										

Chronic Diseases

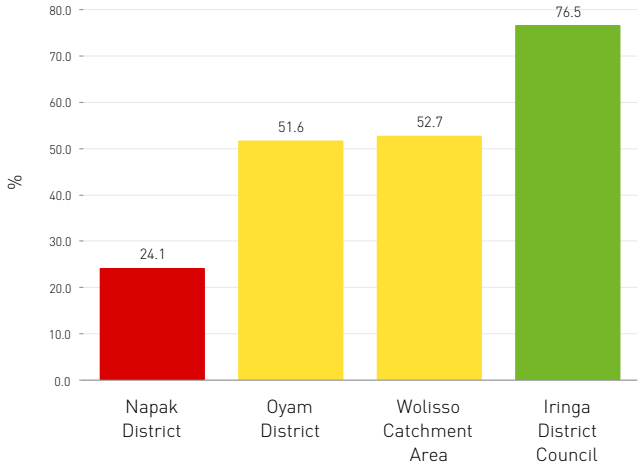
Area		Computation level	Page	Extremes of the evaluation bands									
Chronic Diseases - HIV													
CPHIV01	*Percentage of HIV screening coverage*	*Residence*	*160*										
CPHIV02	**Percentage of performed tests to pregnant women**	**Residence**	**161**	0	80	80	85	85	90	90	95	95	100
CPHIV03	**Percentage of HIV positive cases undergoing the TB screening**	**Residence**	**162**	0	80	80	85	85	90	90	95	95	100
CPHIV03.1	*Percentage of HIV patients screened for TB with Xpert*	*Hospital*	*163*										
CPHIV04	*Percentage of new diagnosed patients with CD4 < 350cell/ml*	*Hospital*	*164*										
CPHIV05	*Percentage of HIV+ patients with opportunistic infections (or advanced HIV)*	*Hospital*	*165*										
CPHIV06	*Percentage of malnourished patients followed in a HIV unit*	*Residence*	*166*										
CPHIV07	**Percentage of new HIV+ linked to ART**	**Residence**	**167**	0	75	75	80	80	85	85	90	90	100
CPHIV08	**Coverage rate of the therapy**	**Residence**	**168**	0	80	80	85	85	90	90	95	95	100
CPHIV09	*Average number of nutritional supplements delivered per patients currently on ART therapy*	*Residence*	*169*										
CPHIV10	**Percentage of VL tests over the patients undergoing ART therapy**	**Hospital**	**170**	0	80	80	85	85	90	90	95	95	100
CPHIV11	**Percentage of patients undergoing ART therapy and tested with VL with suppression of viremia**	**Hospital**	**171**	0	70	70	80	80	85	85	90	90	100
CPHIV12	*Percentage of deaths undergoing ART therapy (within 12 months)*	*Residence*	*172*										
CPHIV13	*ALOS (HIV admitted patients)*	*Hospital*	*173*										
Area	**Other Chronic Diseases**												
CP01	*Retention rate of chronic diseases*	*Hospital*	*174*										
CP02	*Hospitalization rate for chronic liver diseases, per 100.000 residents (>15 years)*	*Hospital*	*175*										
CP05	*Hospitalization rate of hypertension cases, per 100.000 residents (>15 years)*	*Hospital*	*176*										
CP06	*Percentage of admissions for stroke, per 100.000 residents (>15 years)*	*Hospital*	*177*										

Graphical representation of results

Return of results is based on the use of three different graphical solutions to provide an immediate and effective representation of performance in benchmarking.

a) Each indicator is represented by histograms. When considering evaluation indicators, two histograms are provided, namely the evaluation bands referring to 2019 and data in trend over the years 2017 – 2019. Instead, when considering observation indicators, only data in trend over the years 2017 – 2019 are provided. An example of the representation of an indicator evaluated and in trend is provided in Figures 2.1 and 2.2.

Figure 2.1 *Example of the representation of an evaluation indicator*



b) In order to provide an intuitive and concise representation of results at both hospital and residential level, the overmentioned evaluation scores are used to populate a target chart (the "dartboard" - see Figure 3), which consists of five coloured strips, from red to dark green, corresponding respectively to the five evaluation bands. The dots of the dartboard represents the performance of the indicators and are ordered following the evaluation dimensions. The indicators with very good performance are located at the center of the dartboard while those with very poor performance are located on the external band. In practical terms, the objective of the dartboard is to offer a picture of strengths and weaknesses of healthcare institutions and highlight the different contributions of involved national and international organizations (Nuti et al., 2012).

Figure 2.2 *Example of the representation of an indicator in trend*

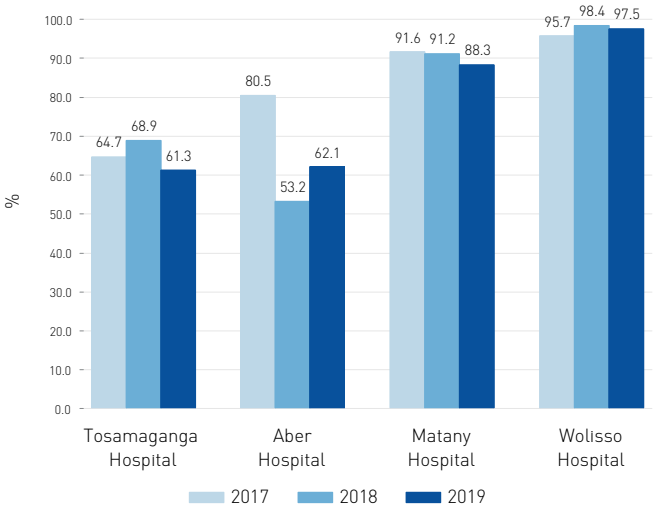
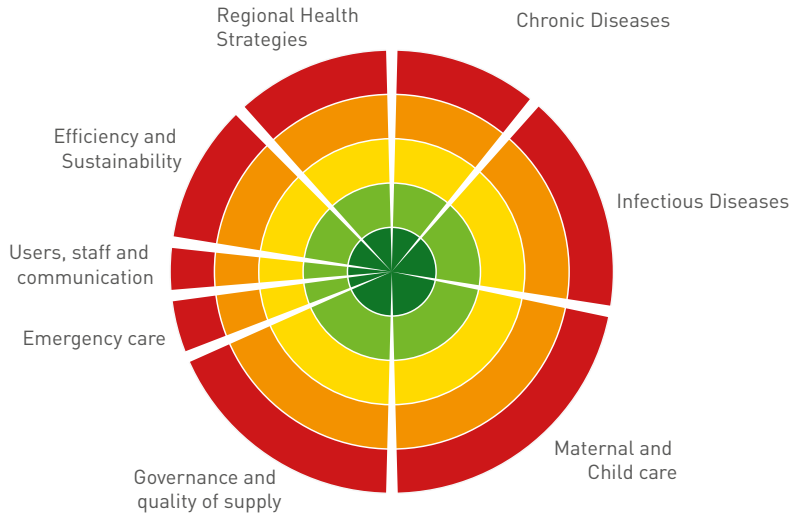
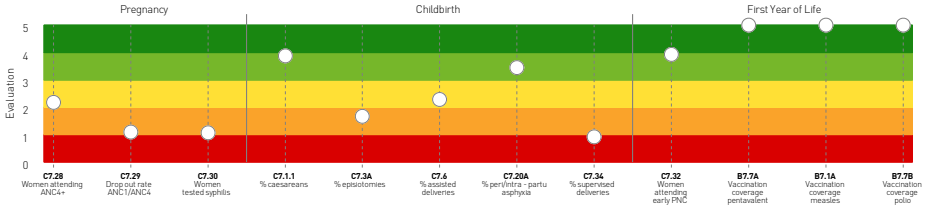


Figure 3 *The dartboard*



c) In order to understand if health services provision is organized so to respond to users needs, the "stave" has been realized to provide an integrated and continuous view of performance between different settings, considering the whole patient journey along different care pathways. Therefore, the stave allows readers to focus on the strengths and weaknesses that characterize the healthcare services delivery along the continuum of care. Also the stave uses five colour bands (from red to dark-green), now displayed horizontally and framed into different phases of healthcare services delivery. The identified care pathways are: the Maternal and Child care pathway (including pregnancy, childbirth and first year of life phases), the Infectious Diseases pathways (including prevention, diagnosis, treatment, and outcome phases) for both tuberculosis and gastroenteritis, and the Chronic Diseases pathway (including screening, diagnosis, treatment, and outcome phases) for HIV (Nuti et al., 2018). In particular, regarding the pathways of infectious diseases and HIV, MeS Lab and CUAMM researchers jointly designed and developed these staves considering the peculiarities of the epidemiological context characterizing the countries included in the analysis.
An example of the representation of a stave is provided in Figure 4.

Figure 4. *Example of a stave*



Bibliography

Nuti S, Noto G, Vola F, Vainieri M. 2018. Let's play the patients music: A new generation of performance measurement systems in healthcare. Management Decision 56: 2252–72.

Nuti S, Seghieri C, Vainieri M. 2012. Assessing the effectiveness of a performance evaluation system in the public health care sector: Some novel evidence from the Tuscany region experience. Journal of Management and Governance 17: 59–69.

Nuti S, Vola F, Bonini A, Vainieri M. 2016. Making governance work in the health care sector: Evidence from a 'natural experiment' in Italy. Health Economics, Policy and Law 11: 17–38.

Table 2. *List of indicators populating the Maternal and Child care pathway*

	Maternal and Child care pathway	
C7.28	Proportion of pregnant women who attended ANC 4+ during the current pregnancy	**Pregnancy**
C7.29	Drop out Rate of ANC1 to ANC + 4	
C7.30	Proportion of pregnant women tested for syphilis	
C7.1	*Percentage of C-section deliveries (NTSV)*	**Childbirth**
C7.1.1	Percentage of caesareans	
C7.1.4	*Percentage of elective caesareans (NTSV)*	
C7.1.4A	*Percentage of elective caesareans*	
C7.2	*Percentage of induced labours*	
C7.3	*Percentage of episiotomies (NTSV)*	
C7.3A	Percentage of episiotomies	
C7.6	Percentage of assisted deliveries (forceps or ventouse)	
C7.20A	Percentage of peri/intra-partum asphyxia	
C7.33A	*Percentage of deliveries in lower level units*	
C7.34	Percentage of supervised deliveries in the catchment area	
C7.32	Proportion of women with early PNC	**First Year of Life**
B7.1A	Vaccination coverage for measles	
B7.7B	Vaccination coverage for polio	
B7.9	Vaccination coverage for rota virus	
B7.7A	Pentavalent vaccine coverage (HIB; difteria; pertussis, tetanus, HBV)	
C7.7.1	*Paediatric hospitalization rate (<1 year) , per 1.000 residents*	
C7.7A	*Paediatric hospitalization rate (0-12 years), per 1.000 residents*	
C7D.19.1A	*Paediatric hospitalization rate for ARI (0-5 years), per 1.000 residents*	
C7D.19.2A	*Paediatric hospitalization rate for gastroenteritis (<15 years), per 1.000 residents*	

Observation indicators are reported in italics.

Table 3. *List of indicators populating the Infectious Diseases - Tuberculosis pathway*

Infectious Diseases - Tuberculosis pathway		
IDPT01	Percentage of treatments with isoniazide (IPT)	**Prevention**
IDPT02	Percentage of TB cases undergoing the HIV screening	
IDPT03	*Percentage of positive TB cases on number of tests*	**Diagnosis**
IDPT04	Percentage of confirmed TB cases on diagnosed cases	
IDPT05	Percentage of confirmed PTB	
IDPT06	Percentage of positive Xpert cases	
IDPT06.1	*Percentage of positive Xpert RR*	
IDPT07	Percentage of treatments for extrapolmunary TB	**Treatment**
IDPT08	*Percentage of PTB MDR initiated treatments*	**Outcome**
IDPT09	Percentage of cured patients	
IDPT10	Percentage of completed treatments	
IDPT11	*Percentage of deaths*	
IDPT12	Percentage of interrupted treatments	
IDPT13	*Percentage of admitted patients due to TB*	

Observation indicators are reported in italics.

Table 4. *List of indicators populating the Infectious Diseases - Gastroenteritis pathway*

Infectious Diseases - Gastroenteritis pathway		
B7.9	Vaccination coverage for rota virus	**Prevention**
IDPD02	Average number of water sources by Hospital	
IDPD03	*Availability of an hand washing programme (Hospital)*	
IDPD04	Average number of toilets per beds in IPD	
IDPD05	Average number of toilets in OPD per number of rooms	
IDPD06	*Percentage of positive stool tests (for parasites)*	**Diagnosis**
IDPD07	*Percentage of gastroenteritis diagnosed (<5 years - Outpatient)*	
IDPD08	*Percentage of gastroenteritis diagnosed (>5 years - Outpatient)*	
IDPD09	*Percentage of diarrhoea cases with severe dehydration due to gastroenteritis and diarrhoea*	
IDPD10	Percentage of discharged patients for diarrhoea and gastroenteritis	
IDPD11	*Percentage of diarrhoea cases (<1 year)*	
IDPD12	Average number of ORS packages delivered per patient with diarrhoea (<5years)	**Treatment**
IDPD13	Average number of Zinc Tablets doses delivered per patient with diarrhoea (<5years)	
IDPD14	Percentage of deaths with a diagnos of gastroenteritis	**Outcome**
IDPD15	*ALOS for gastroenteritis*	

Observation indicators are reported in italics.

Table 5. *List of indicators populating the Chronic Diseases - HIV pathway*

Chronic Diseases - HIV pathway		
CPHIV01	*HIV screening coverage*	**Screening**
CPHIV02	Percentage of performed tests to pregnant women	
IDPT02	Percentage of TB cases undergoing the HIV screening	
CPHIV03	Percentage of HIV cases undergoing TB screening	
CPHIV03.1	*Percentage of HIV patients screened for TB w/Xpert*	
CPHIV04	*Percentage of new diagnosed patients with CD4 < 350cell/ml*	**Diagnosis**
CPHIV05	*Percentage of HIV+ patients with opportunistic infections (or advanced HIV)*	
CPHIV06	*Percentage of malnourished patients followed in a HIV unit*	
CPHIV07	Percentage of new HIV+ linked to ART	**Treatment**
CPHIV08	Coverage rate of the therapy	
CPHIV09	*Average number of nutritional supplements delivered per patients currently on ART therapy*	
CPHIV10	Percentage of VL tests over the patient undergoing ART therapy	
CPHIV11	Percentage of patients undergoing ART therapy andf tested with VL with suppression of viremia	**Outcome**
CPHIV12	*Percentage of deaths undergoing ART therapy (within 12 months)*	
CPHIV13	*ALOS (HIV admitted patients)*	

Observation indicators are reported in italics.

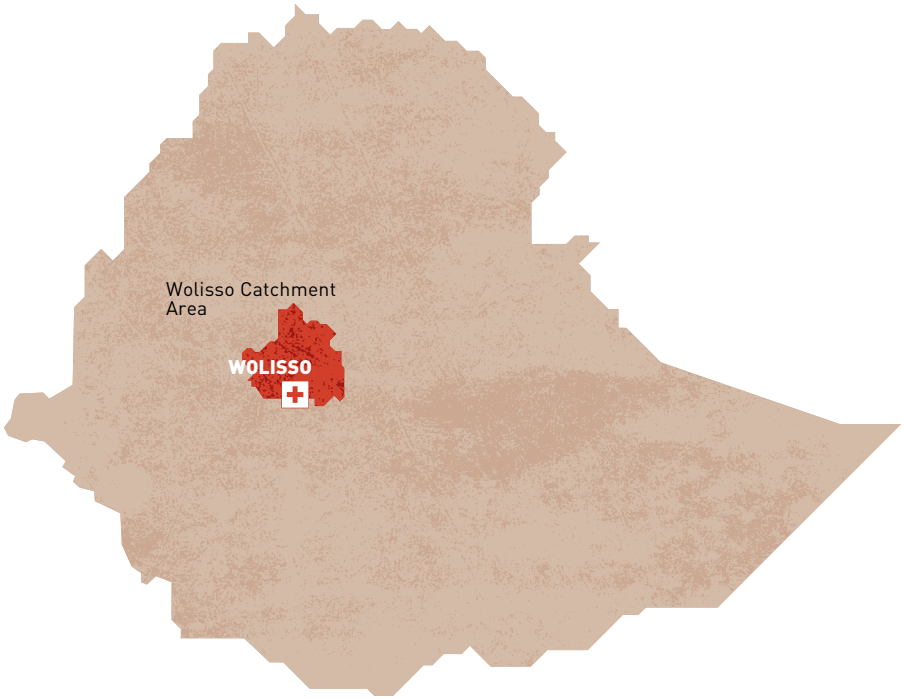
3

RESULTS 2019

DOCTORS WITH AFRICA CUAMM

ETHIOPIA

Wolisso Catchment Area



	Ethiopia	Italy	Ethiopia vs Italy
Population median age (1)	19.5	47.3	-59%
Life expectancy at birth (years) (1)	66.2	83.4	-21%
Maternal mortality ratio, deaths per 100,000 live births (1)	353	2.9	+12 072%
Under-five mortality, per 1,000 live births (2)	51	3	+1600%
Neonatal mortality, per 1,000 live births (2)	28	2	+1300%
Number of medical doctors (physicians), per 10,000 people (1)	1	40.9	-98%
TB prevalence rate at national level (4)	151	7	+2057%
Prevalence of HIV, total (% of population aged 15-49) (4)	0.9%	0.2%	+350%
Gini Index (5)	35	35.9	-3%
GDP per capita (current US$) (6)	$857.5	$33189.6	-97%
Human Development Index ranking position (1)	173/189	29/189	-114

Sources:
(1) United Nation Development programme (UNDP), 2018
(2) World Bank, 2019
(3) World Health Organization (WHO), 2018
(4) World Bank, 2019
(5) World Bank, 2015 - 2017
(6) World Bank, 2019

The Wolisso catchment area is located in the South West Shoa Zone, one of the eighteen zones of Oromia Region in central Ethiopia. The catchment area includes five health districts (referred to as a "woreda" in Ethiopia) inhabited by around 611 000 people. In the reference area primary care is offered by a total of 22 health centres that refer to the St. Luke Hospital - Wolisso Hospital, a private, not-for-profit institution established in the early 2000s.

Wolisso Hospital provides both outpatient and inpatient services. It has a total of 200 beds divided into eight wards: Medical (38 beds), Surgical (23), Paediatric (65), Neonatal unit (6), Orthopaedics (32), Delivery and Maternity (24) and Gynaecology (12). The outpatient department includes a 24hrs emergency service, Mother and Child clinic, Ophthalmology unit, Dental clinic, Mental and Orthopaedic units, the clinic for chronic-non communicable diseases, which comprise the Antiretroviral (ART) clinic. Laboratory, X-ray and ultrasound are the main diagnostic services offered by the hospital. Additionally, in 2019 the hospital provided 85 668 outpatient visits, 14 828 admissions and a total of 4 455 deliveries.

THE PERFORMANCE OF WOLISSO CATCHMENT AREA IN 2019

First of all, it is worth noticing that the aim of the present section is to interpret the performance of the health system as a whole. Indeed, the indicators calculated at residence level include the joint contribution of the health district and reference hospital staff, whilst the indicators calculated at hospital level illustrate specifically the hospital performance. The dartboards and the staves summarize and represent graphically the performance of the health system. The dartboard presents a very disperse configuration of evaluated indicators, although with a prevalence of indicators scored in the red evaluation band as counterposed to the central evaluation band which refers to a very good performance.

In reference to the efficiency and sustainability domain, it is possible to observe that there are opportunities for improvement actions with respect to the indicators of economic equilibrium of health management and the return on investment (ROI) at hospital level.

Concerning the strengths of this setting, it emerges that the reference hospital is managed in an efficient way (see indicators C2A.2 and C2A.3). Additionally, there are very positive performance results relative to all the indicators of vaccination coverage at residence level. Moreover, in the Maternal and Child care pathway, a positive performance is found also with regards to the percentage of caesarean sections and the percentage of peri/intra- partum asphyxia at the hospital level.

On the other hand, with regards to the domain "user, staff and communication" (see indicators D18 and E2A), according to the interpretation of the dartboard, the Wolisso hospital management should keep under control the percentage of patients leaving the hospital against medical advice and the percentage of staff absences. A quite poor performance can be observed also in the Maternal and Child care pathway, as it concerns the hospital indicators of the percentages of episiotomies and assisted deliveries performed.

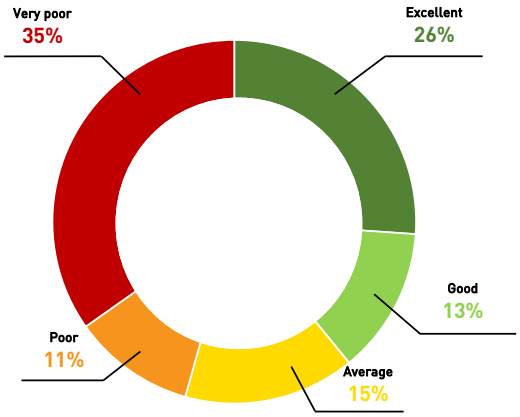
Additionally, at residence level, poor performance is reported relative to infectious and chronic diseases pathways (Tuberculosis, Gastroenteritis and HIV) as well as regarding malaria indicators, even if there are positive aspects emerging within each area. The criticalities are generally linked with the weaknesses of the health system and the dispersion of population over a broad territory, where prevention, diagnostics and therapy are not easily accessible. Moreover, the health system highlights some difficulties, in terms of diagnosis and appropriateness of care, with the management of malaria, although it is not an endemic disease or, on the contrary, as it is not an endemic disease, it does not represent a priority in terms of care delivery.

Focusing on the Tuberculosis pathway, it is low the percentage of people who are cured. Full adherence to treatment is very high, although the data include the interruptions of the therapy. Therefore, it emerges that there are poor capabilities of preventing and diagnosing tuberculosis effectively.

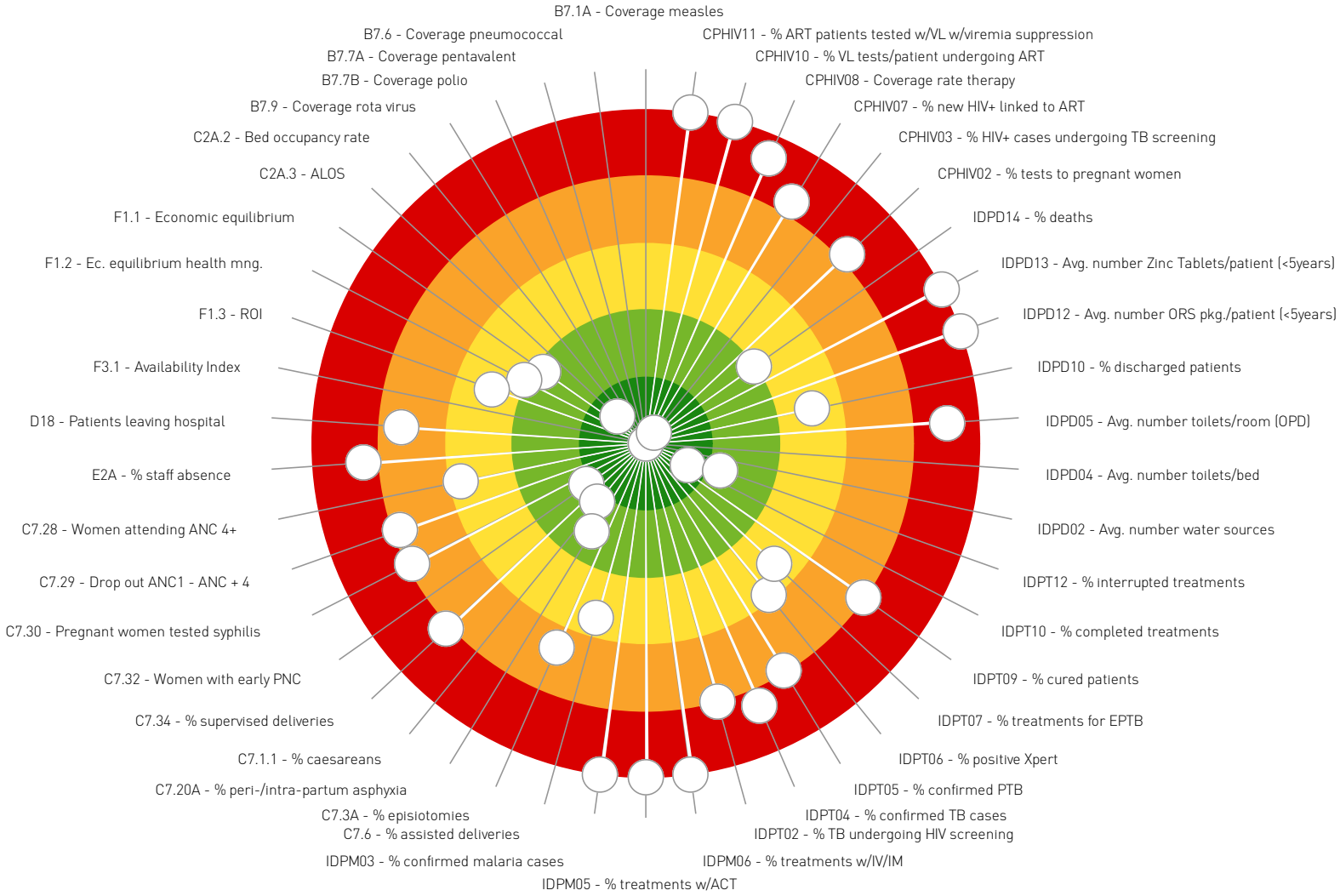
With regards to the Gastroenteritis pathway, some aspects related to prevention are optimal, but such observation does not hold for the delivery of nutritional supplements. It is worth noticing that the other indicators related to the treatment phase are not available in the Ethiopian DHIS system.

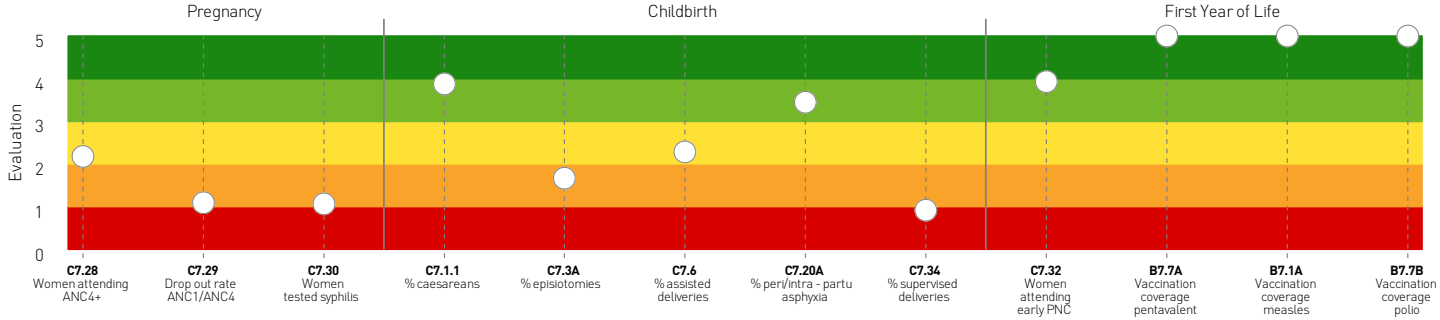
The most critical aspect regards the management of the chronic diseases – HIV pathway, where performance scores are slightly below the WHO reference standard of 80%, with the exclusion of the percentage of TB screening on HIV positive patients, of treatment and attained outcomes.

The donut chart below summarizes the stakes in percentage terms of the scores achieved by the evaluated indicators.

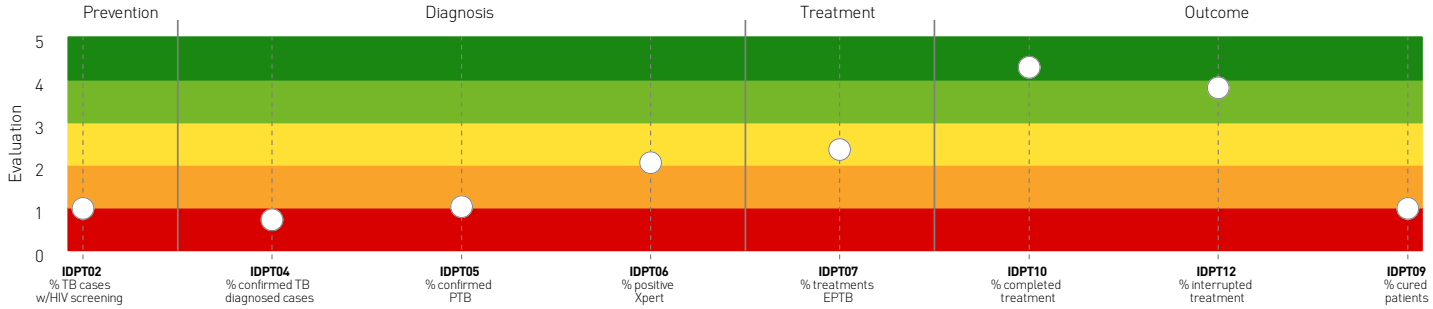


Dartboard
Wolisso Catchment Area - Year 2019

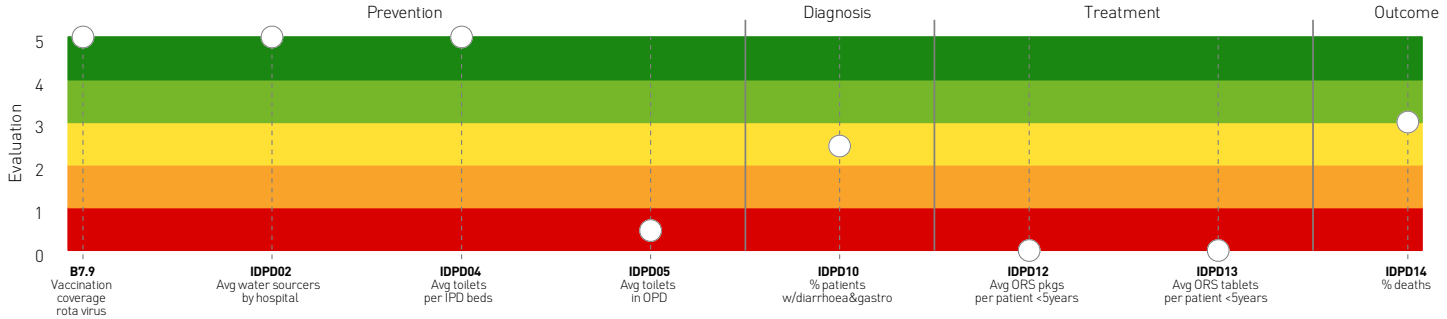




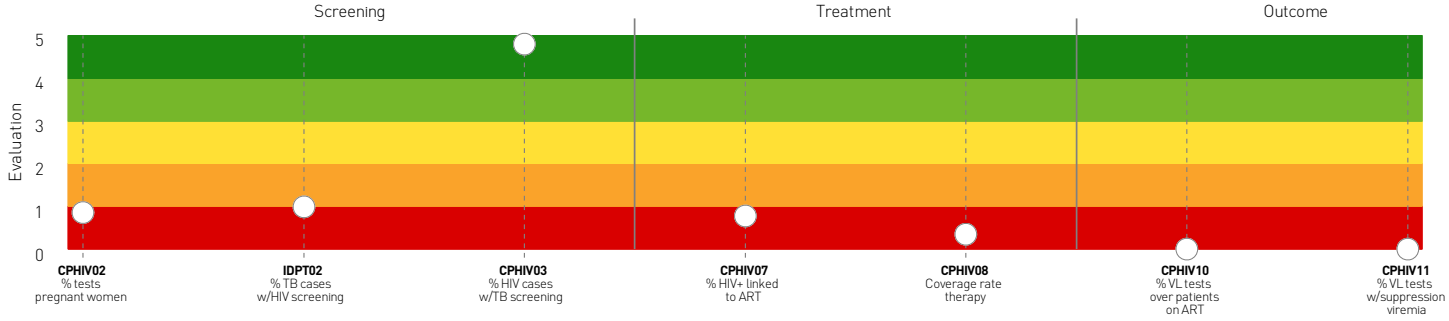
MATERNAL AND CHILD CARE PATHWAY



INFECTIOUS DISEASES - TUBERCULOSIS PATHWAY



INFECTIOUS DISEASES - GASTROENTERITIS PATHWAY



CHRONIC HIV PATHWAY

TANZANIA

Iringa District Council

	Tanzania	Italy	Tanzania vs Italy
Population median age (1)	18	47.3	-62%
Life expectancy at birth (years) (1)	65	83.4	-22%
Maternal mortality ratio, deaths per 100,000 live births (1)	398	2.9	+13 624%
Under-five mortality, per 1,000 live births (2)	50	3	+1567%
Neonatal mortality, per 1,000 live births (2)	20	2	+900%
Number of medical doctors(physicians), per 10,000 people (1)	0.4	40.9	-99%
TB prevalence rate at national level (4)	253	7	+3514
Prevalence of HIV, total (% of population aged 15-49) (4)	4.8%	0.2%	+2300%
Gini Index (5)	40.5	35.9	+13%
GDP per capita (current US$) (6)	$1122.1	$33189.6	-97%
Human Development Index ranking position (1)	159/189	29/189	130

Sources:
(1) United Nation Development programme (UNDP), 2018
(2) World Bank, 2019
(3) World Health Organization (WHO), 2018
(4) World Bank, 2019
(5) World Bank, 2015 - 2017
(6) World Bank, 2019

The Iringa District Council is one of the 113 health districts of the country and it is located in the region of Iringa, in South-Western Tanzania. The health district comprises a rural area outside Iringa, the regional capital city.
Primary care is provided by 89 dispensaries and health centres, serving an estimated population of approximately 255 000 inhabitants.

Tosamaganga District Designated Hospital was designed as the referral center for the health district. Although the hospital is a private facility, it has been officially integrated into the Tanzanian public health system since 2007. The hospital has a capacity of 165 beds distributed as follows: Medical wards (60 beds), Maternity ward (45), Paediatric ward (22), Surgical ward (28) with one major operating theatre, and Neonatal Unit (10). Moreover, the outpatient department includes Adult and Child clinic, Reproductive and Child Health (RCH), the Care and Treatment Centre (CTC), the TB unit, the Dental Unit, and the minor operating theatre. The Laboratory and Radiology departments provide lab tests, x-rays and ultrasounds. In 2019 the hospital offered 43 719 outpatient visits, 6 065 admissions and a total of 2 930 deliveries.

THE PERFORMANCE OF IRINGA DISTRICT COUNCIL IN 2019

First of all, it is worth noticing that the aim of the present section is to interpret the performance of the health system as a whole. Indeed, the indicators calculated at residence level include the joint contribution of the health district and reference hospital staff, whilst the indicators calculated at hospital level illustrate specifically the hospital performance. The dartboards and the staves summarize and represent graphically the performance of the health system.

In reference to the efficiency and sustainability domain, all indicators score very high in the dartboard except the indicator of hospital economic equilibrium that offers a scope for improvement.

The dartboard shows a high concentration of indicators scored with an excellent and good performance regarding all phases of the Maternal and Child care pathway, as a result of the particular commitment of the hospital management and local health authority on maternal and child health issues, supported by the several public health programmes implemented by CUAMM over the last years. The percentage of patients who leave against medical advice is very low confirming a very good performance.

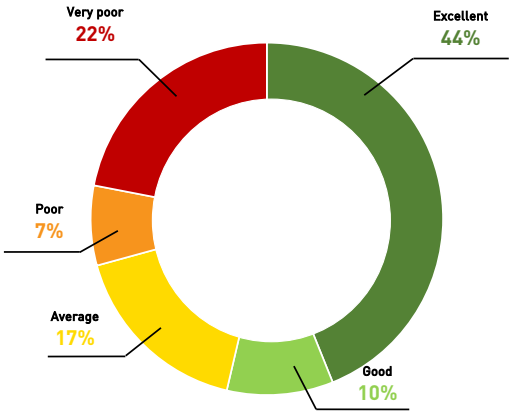
On the other hand, the observation of data suggests the need to keep under control the indicators relative to the vaccination coverage of pneumococcal, pentavalent, polio and especially rotavirus. In addition, it is possible to observe a certain degree of inefficiency concerning the hospital management, showing potential of improvement as far as it regards both the Average Length of Stay (ALOS) and the Bed Occupancy Rate (BOR). As counterposed to the excellent performance reported in the Maternal and Child care pathway, an element of weakness in the hospital performance is represented by the high percentage of caesarean sections performed.

Particular attention should be drawn on the criticalities pertaining to the indicator of vaccination coverage against rotavirus, marking the beginning of the first phase of the Infectious Diseases – Gastroenteritis pathway. Nevertheless, although the stave illustrates an average number of toilets per inpatient room that is not excellent, it is possible to observe good results regarding the prevention and diagnosis of such pathology. Instead, another challenge is represented by the outcome phase of the pathway, where a high number of deaths is reported due to diarrhoea and gastroenteritis.

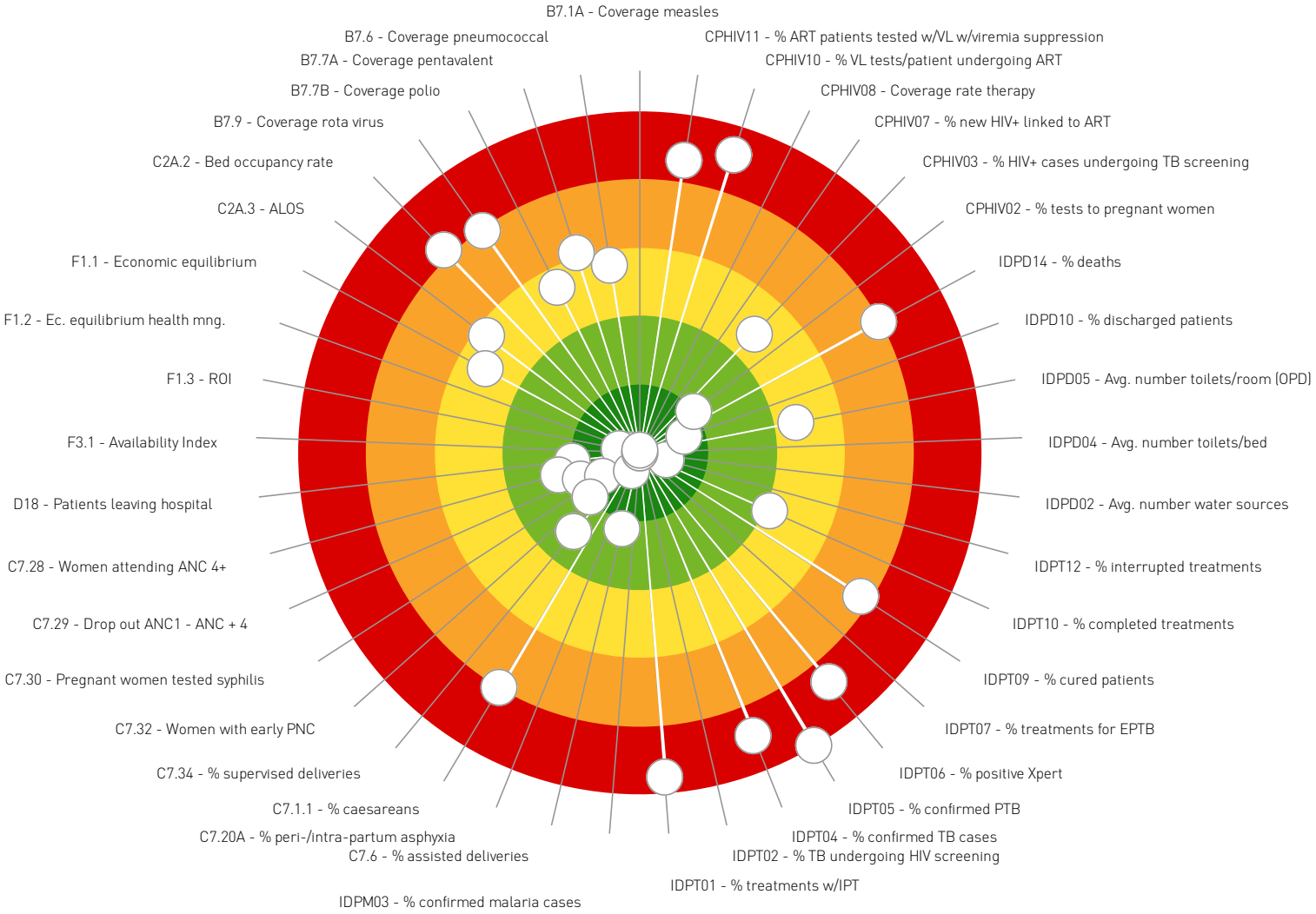
With regards to the Chronic Diseases – HIV pathway, it is possible to observe a good performance in the pathway management. This regards both screening and treatment phases, while pathway outcomes remain critical also in this case.

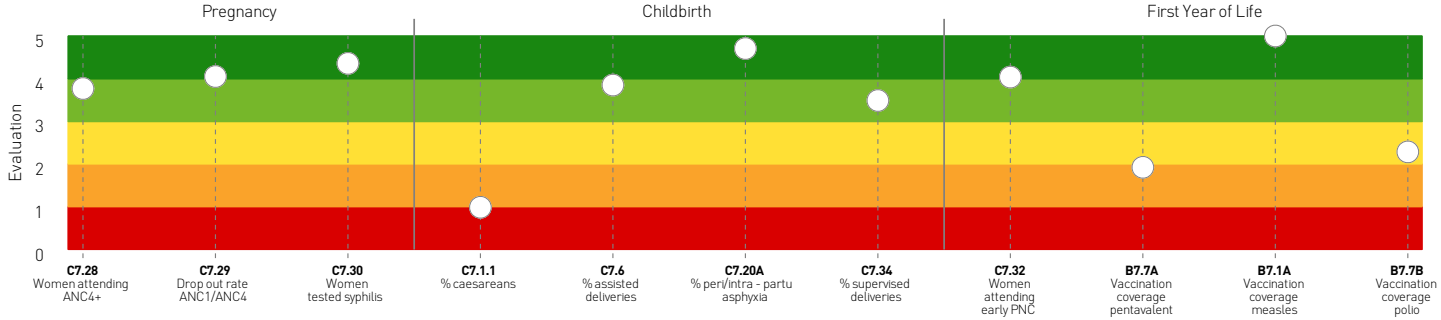
The greatest weakness is represented by the Infectious Diseases – Tuberculosis pathway, which presents complexities in terms of diagnostic quality, prevention and attained outcomes. More in particular, in this pathway positive aspects are related to screening procedure for HIV in patients affected by TB, the performance of EPTB initiated treatments and limited percentage of interrupted treatments.

The donut chart below summarizes the stakes in percentage terms of the scores achieved by the evaluated indicators.

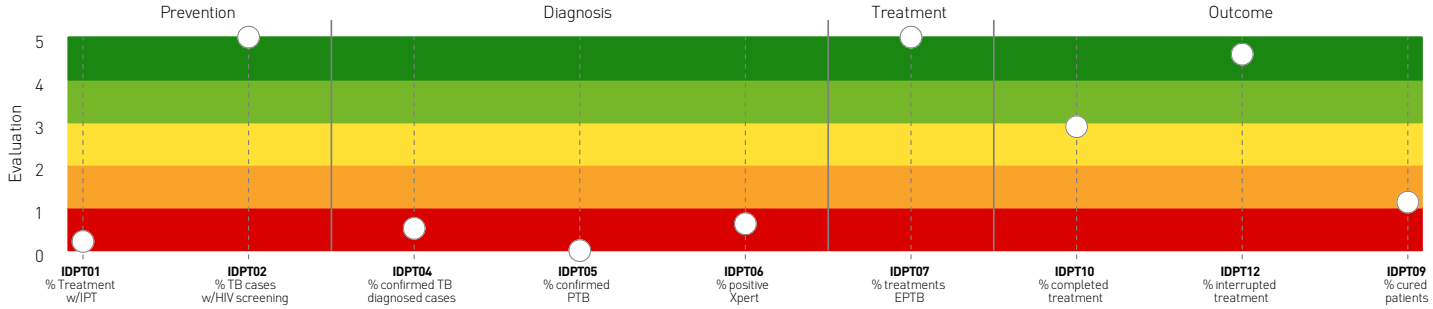


Dartboard
Iringa District Council - Year 2019

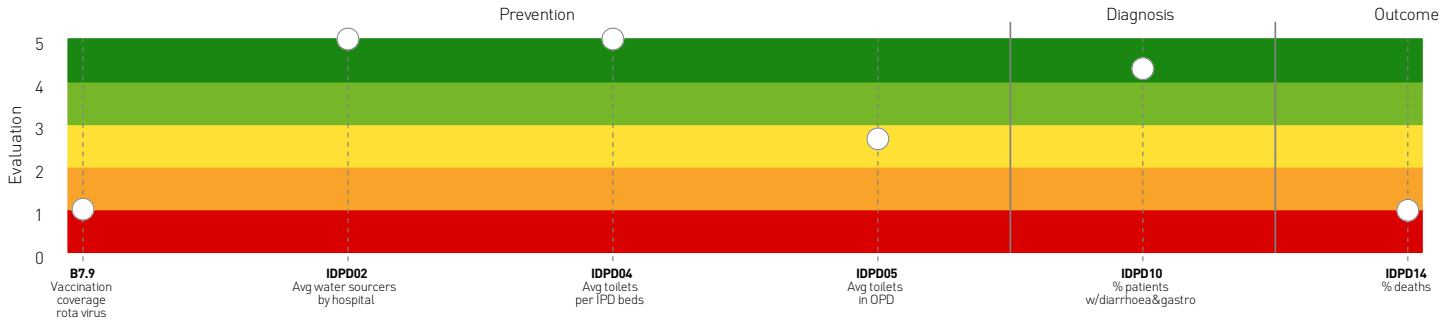




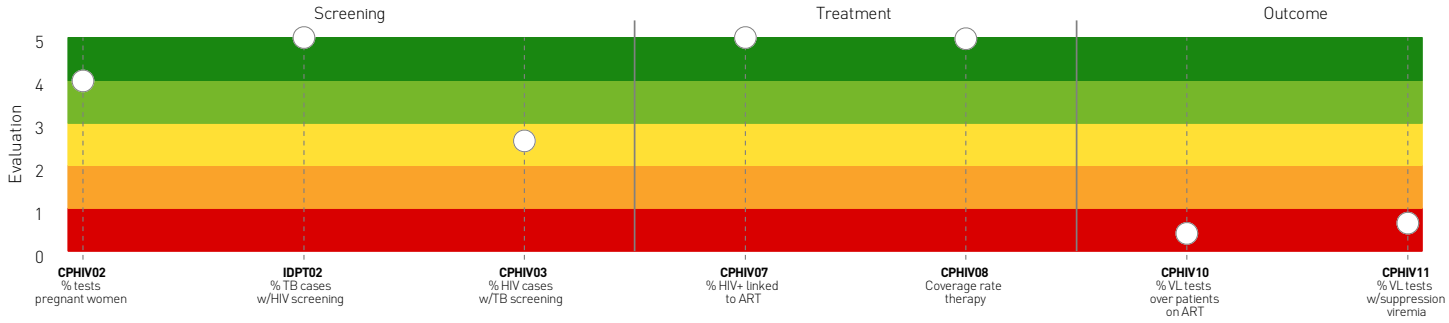
MATERNAL AND CHILD CARE PATHWAY



INFECTIOUS DISEASES - TUBERCULOSIS PATHWAY



INFECTIOUS DISEASES - GASTROENTERITIS PATHWAY



CHRONIC HIV PATHWAY

UGANDA

Napak District

	Uganda	Italy	Uganda vs Italy
Population median age (1)	16.7	47.3	-65%
Life expectancy at birth (years) (1)	63	83.4	-24%
Maternal mortality ratio, deaths per 100,000 live births (1)	343	2.9	+11 728%
Under-five mortality, per 1,000 live births (2)	46	3	+1433%
Neonatal mortality, per 1,000 live births (2)	20	2	+900%
Number of medical doctors(physicians), per 10,000 people (1)	0.9	40.9	-98%
TB prevalence rate at national level (4)	200	7	+2757%
Prevalence of HIV, total (% of population aged 15-49) (4)	5.8%	0.2%	+2800%
Gini Index (5)	42.8	35.9	+19%
GDP per capita (current US$) (6)	776.8	$33189.6	-97%
Human Development Index ranking position (1)	159/180	29/189	130

Sources:
(1) United Nation Development programme (UNDP), 2018
(2) World Bank, 2019
(3) World Health Organization (WHO), 2018
(4) World Bank, 2019
(5) World Bank, 2015 - 2017
(6) World Bank, 2019

The Napak District is located in the Karamoja region in North-Eastern Uganda, near the border with Kenya. The Karamoja region is a semi-arid and vulnerable region that is inhabited by a nomadic population. The district, which is in turn subdivided into 6 sub-counties and 200 villages, comprises 16 health centres providing primary healthcare services to approximately 157 000 people.

St. Kizito – Matany Hospital, a private, not-for-profit institution, was built at the beginning of the 70's and it is designed as the referral center for Napak district. The Hospital capacity constitutes 250 beds distributed through Obstetrics/Gynaecology, Internal Medicine, Tuberculosis, Paediatrics and general Surgery departments. Other services provided by the Hospital include: Diagnostic Laboratory, Diagnostic Imaging, General surgery, Orthopaedic and Physiotherapy, Counselling, HIV/AIDS Clinic, Antenatal Clinic, Prevention of Mother to Child Transmission (PMTCT). In 2019 the hospital offered 30 036 outpatient visits, 10 487 admissions and a total of approximately 1 500 deliveries.

THE PERFORMANCE OF NAPAK DISTRICT IN 2019

First of all, it is worth noticing that the aim of the present section is to interpret the performance of the health system as a whole. Indeed, the indicators calculated at residence level include the joint contribution of the health district and reference hospital staff, whilst the indicators calculated at hospital level illustrate specifically the hospital performance. The dartboards and the staves summarize and represent graphically the performance of the health system.

The dartboard shows an high dispersion of performance scores, with a wide prevalence of indicators that fall in the external evaluation bands of the dartboard (poor performance) and a quite small number of indicators located in the centre of the dartboard (excellent performance).

Considering the Efficiency and Sustainability domain, in the reference year a very poor performance is reported relative to the indicators of Economic Equilibrium, Economic Equilibrium in Health Management and Return on Investment (ROI). However, the availability index scores very well in the dartboard (dark-green evaluation band).

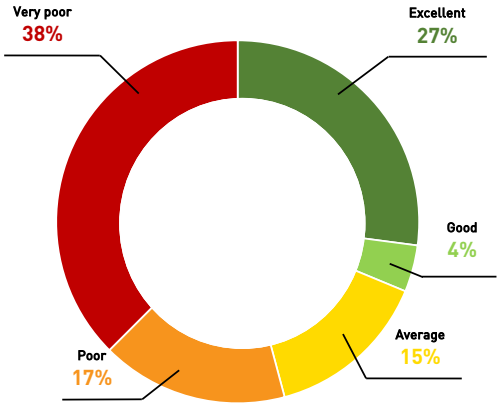
With regards to the strengths of the system, a great performance is reported in terms of Bed Occupancy Rate at the hospital level, which is unfortunately in contrast with the very bad performance in terms of Average Length of Stay. This is possibly due to the fact that the demand of healthcare services is met by the hospital structural capacity but there is poor appropriateness of care emerging from the length of hospitalizations.

Among the weaknesses of this setting, main criticalities are noteworthy concerning Maternal and Child care and all Infectious Diseases pathways, with a particular emphasis on the management of the Tuberculosis and Malaria pathways.

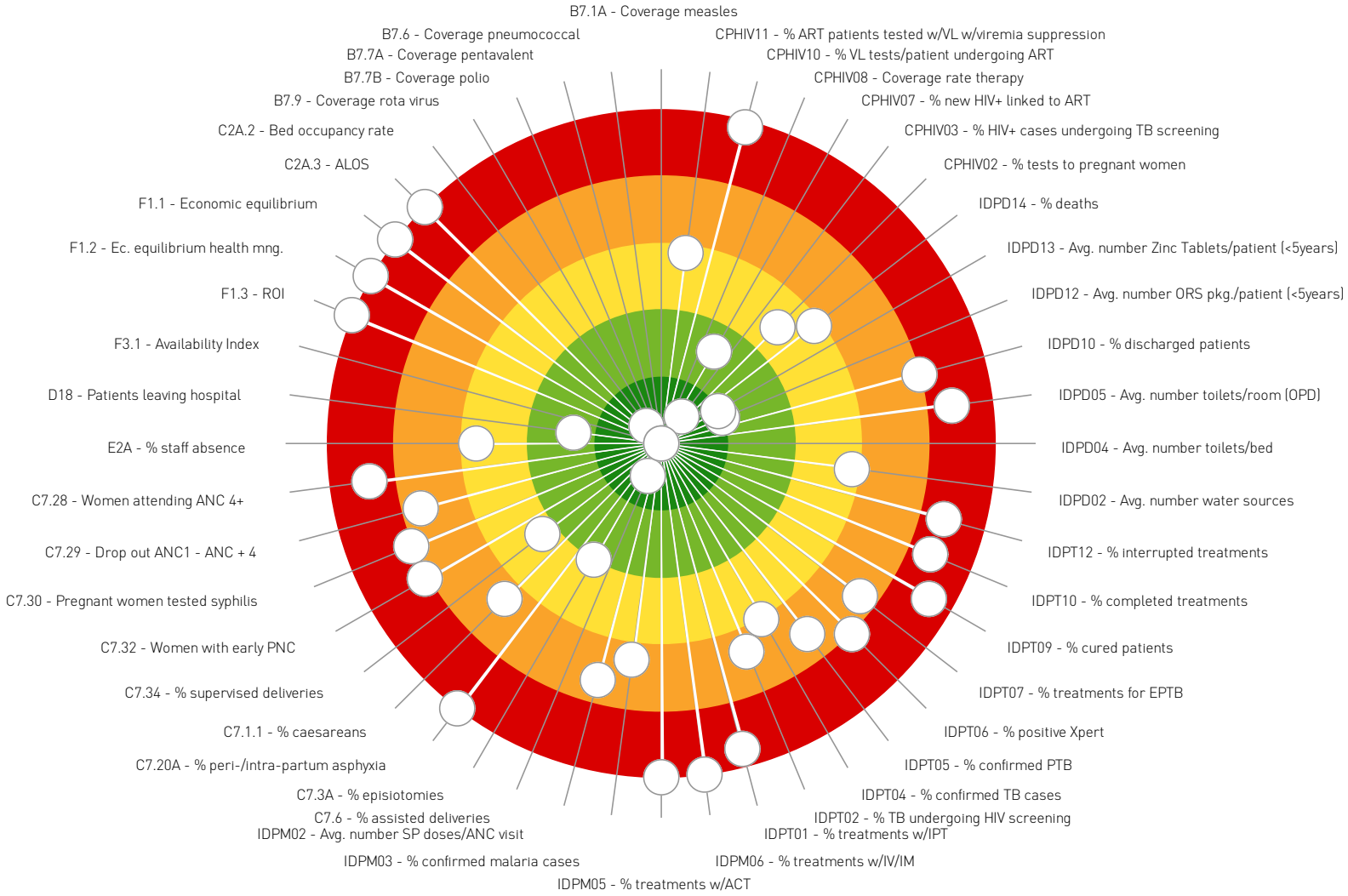
Instead, an ups and downs trend emerges by observing the Infectious Diseases – Gastroenteritis and Chronic Diseases – HIV pathways. Indeed, in both pathways, it can be observed that good results are obtained with respect to the treatment of these diseases at residence level, as well as to some aspects relative to prevention of gastroenteritis and HIV screening. On the other hand, a sufficient performance is not reported in the outcomes phase, with the challenge emerging with respect to the percentage of patients undergoing viral load tests among those who are currently followed in the ART clinics.

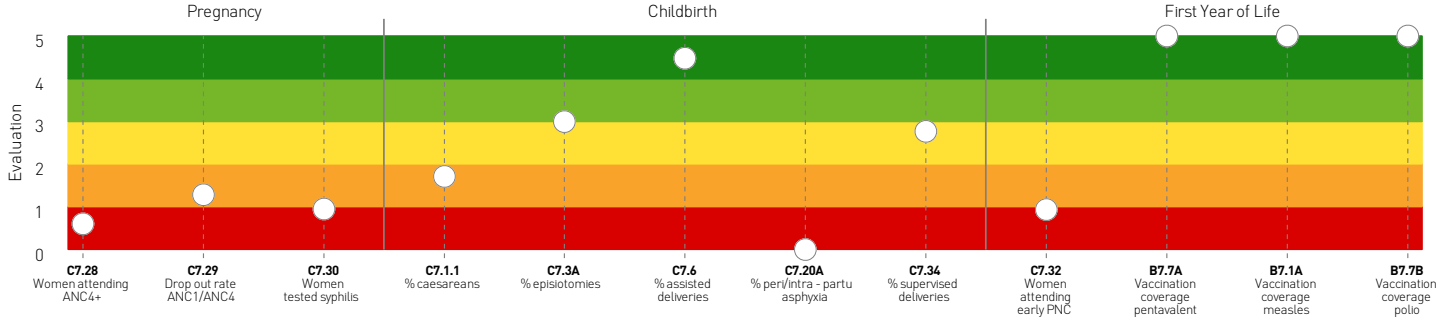
With regards to the Maternal and Child care pathway, there are potential areas of improvement pertaining to the antenatal care and childbirth phases, with the percentage of supervised deliveries (at residence level) and percentages of caesarean sections and episiotomies (at hospital level) performing slightly better than the indicator relative to the peri-intra partum asphyxia. Moreover, there is a weak capability of ensuring care continuity in the first year of newborn's life and the positive evaluation scores relative to the indicators of vaccination coverage could depend on an underestimation of the reference population.

The donut chart below summarizes the stakes in percentage terms of the scores achieved by the evaluated indicators.

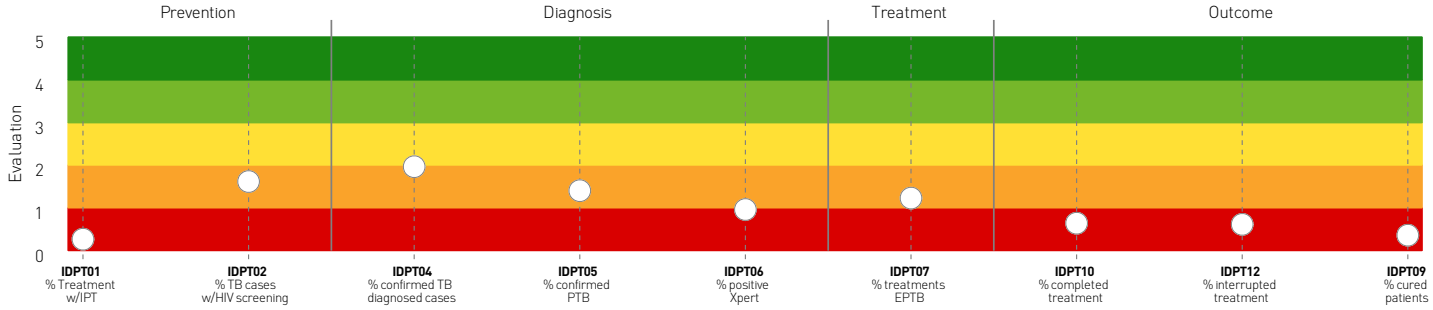


Dartboard
Napak District - Year 2019

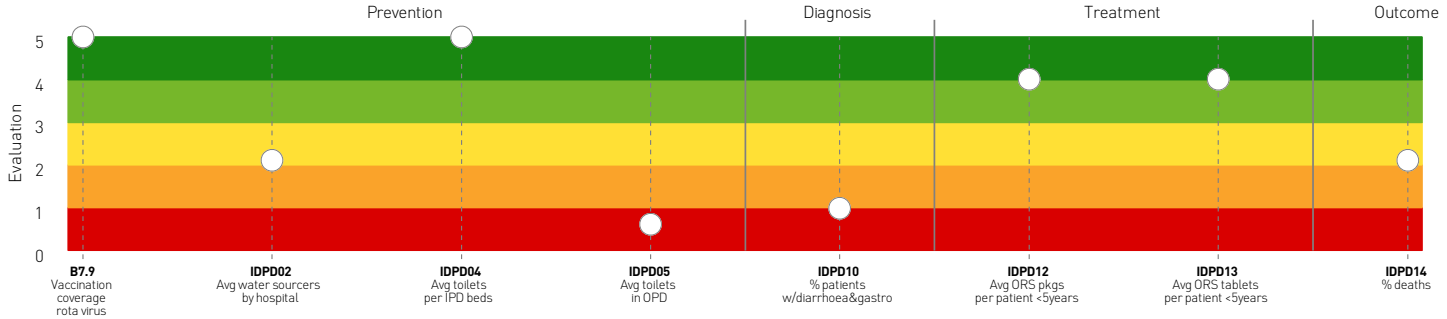




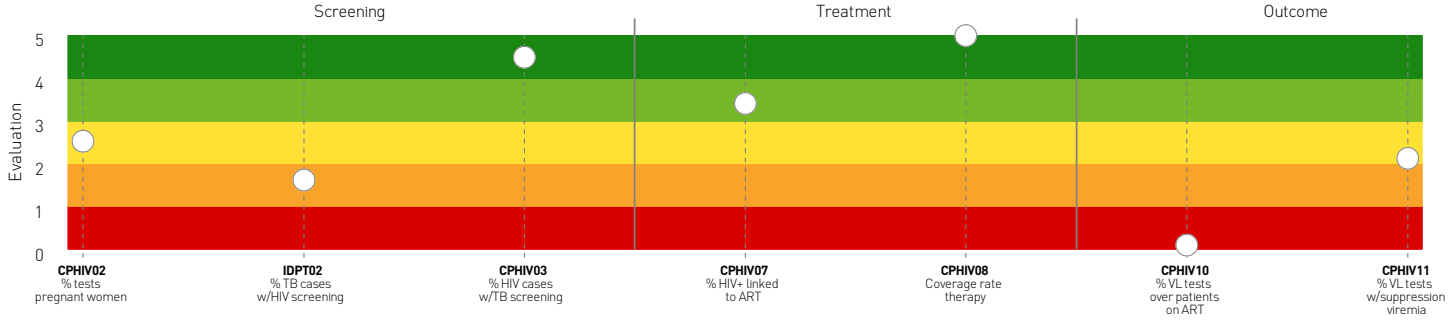
MATERNAL AND CHILD CARE PATHWAY



INFECTIOUS DISEASES - TUBERCULOSIS PATHWAY



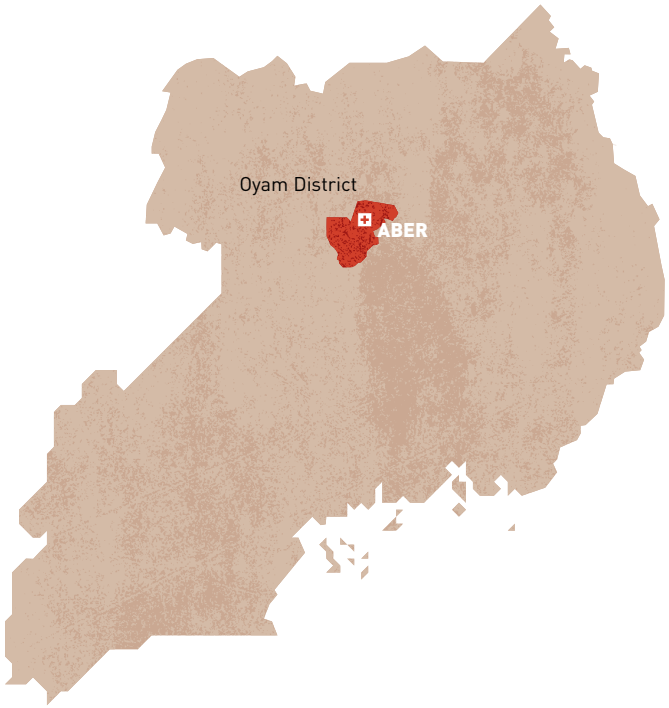
INFECTIOUS DISEASES - GASTROENTERITIS PATHWAY



CHRONIC HIV PATHWAY

UGANDA

Oyam District



	Uganda	Italy	Uganda vs Italy
Population median age (1)	16.7	47.3	-65%
Life expectancy at birth (years) (1)	63	83.4	-24%
Maternal mortality ratio, deaths per 100,000 live births (1)	343	2.9	+11 728%
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Human Development Index ranking position (1)	159/180	29/189	130

Sources:
(1) United Nation Development programme (UNDP), 2018
(2) World Bank, 2019
(3) World Health Organization (WHO), 2018
(4) World Bank, 2019
(5) World Bank, 2015 - 2017
(6) World Bank, 2019

The Oyam District is located in a rural region in the northern part of the country and in 2019 registered an estimated population of approximately 432 000. In comparison to the Napak district, the Oyam District covers a territory with a higher density of population and healthcare services are provided by 30 health facilities, including the reference Pope John XIII - Aber Hospital, a private not-for-profit facility.

The hospital offers both clinical and community-based services. Clinical services are provided through four inpatients departments: Internal Medicine, Obstetrics and Gynaecology, Paediatrics and surgery. The hospital also has an outpatient department with Diagnostic Laboratory, Diagnostic Imaging, Antenatal Clinic an HIV/AIDS Clinic. In 2019 the hospital provided a total 40 357 outpatient visits, 9 770 admissions and a total of 2 605 deliveries.

THE PERFORMANCE OF OYAM DISTRICT IN 2019

First of all, it is worth noticing that the aim of the present section is to interpret the performance of the health system as a whole. Indeed, the indicators calculated at residence level include the joint contribution of the health district and reference hospital staff, whilst the indicators calculated at hospital level illustrate specifically the hospital performance. The dartboards and the staves summarize and represent graphically the performance of the health system.

The dartboard shows a quite good balance between indicators presenting a good or excellent performance and those presenting poor performance levels.

With regards to the Efficiency and Sustainability domain, the dartboard shows a very good performance evaluation regarding the indicators of Economic Equilibrium and Availability Index and quite good performance evaluation regarding the indicators of Economic Equilibrium in Health Management and Return on Investment (ROI).

Indicators regarding vaccination coverage reveal poor performance outcomes for all the indicators analysed, even if the reference population estimates could influence the results. Focusing on prevention indicators, moreover, it is worth noticing that the average number of SP doses administered per antenatal care visit is quite low.

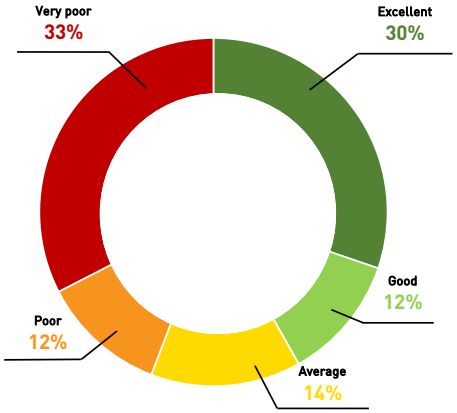
The management of the Maternal and Child care pathway shows diffuse difficulties, with a particular emphasis on the antenatal care and first year of life. Indeed, it represents one of the domains that deserve greater attention from the hospital and district managers. However, it is worth noticing that the indicators relative to the childbirth phase are scored slightly better, in particular the percentage of assisted deliveries with forceps or ventouse (see indicator C7.6) seems to be very low.

In reference to the Infectious Diseases – Tuberculosis pathway, difficulties are observed both in prevention and outcomes, as compared with a good diagnostic and therapeutic treatment quality both at hospital and residence level.

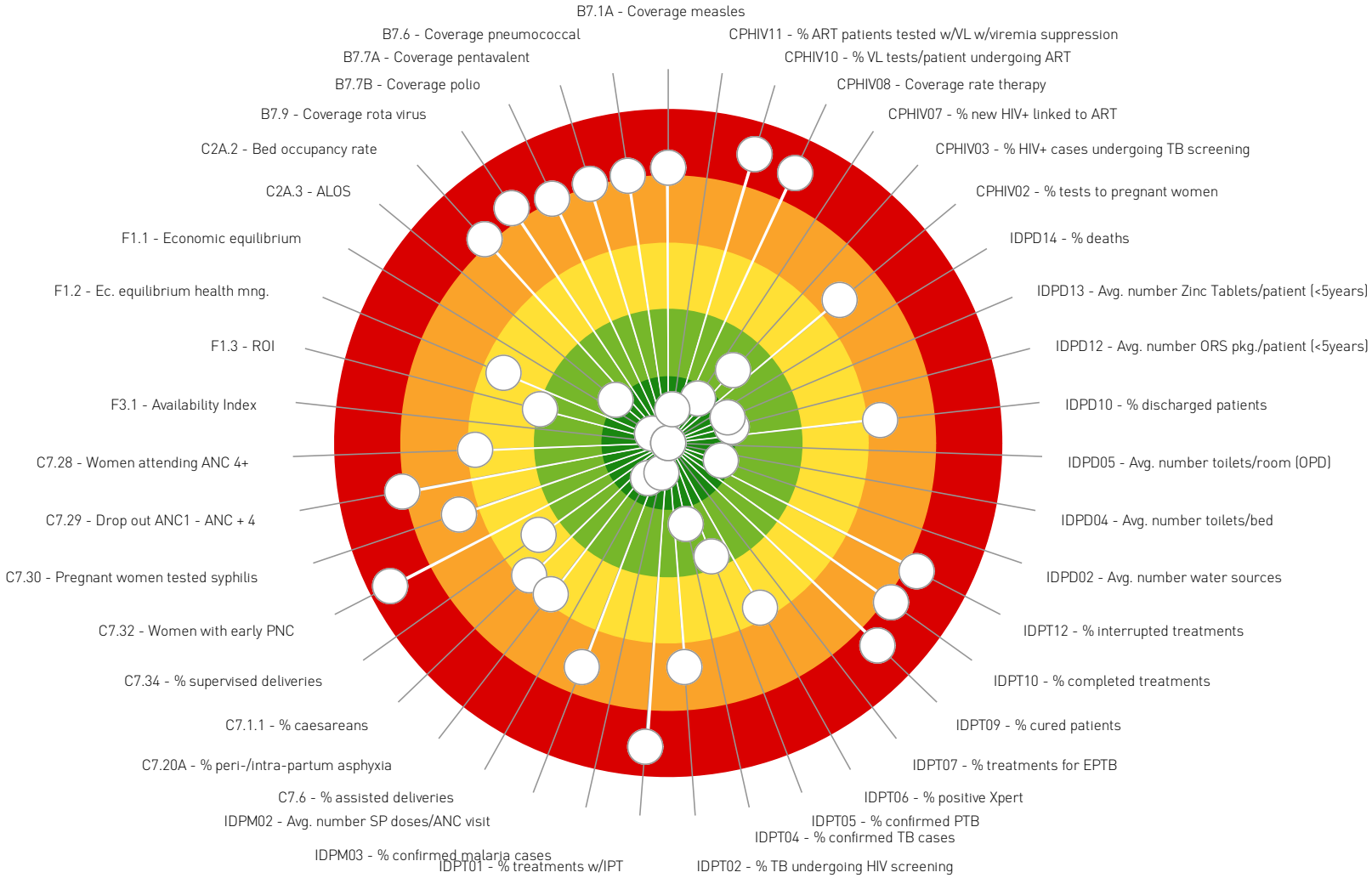
With regards to the Infectious Diseases – Gastroenteritis pathway, the evaluation system shows good results in the prevention phase at hospital level, except the indicator regarding the vaccination coverage against rotavirus, as well as treatment and outcome phases. Instead, it should be diminished the percentage of patients who are discharged with a diagnosis of diarrhoea and gastroenteritis from the reference hospital. In order to improve this aspect of performance, health district and hospital managers should collaborate to take in charge the patient timely at the residence level without putting the reference hospital under pressure due to an avoidable high hospitalization rate with a diagnosis of diarrhoea and gastroenteritis.

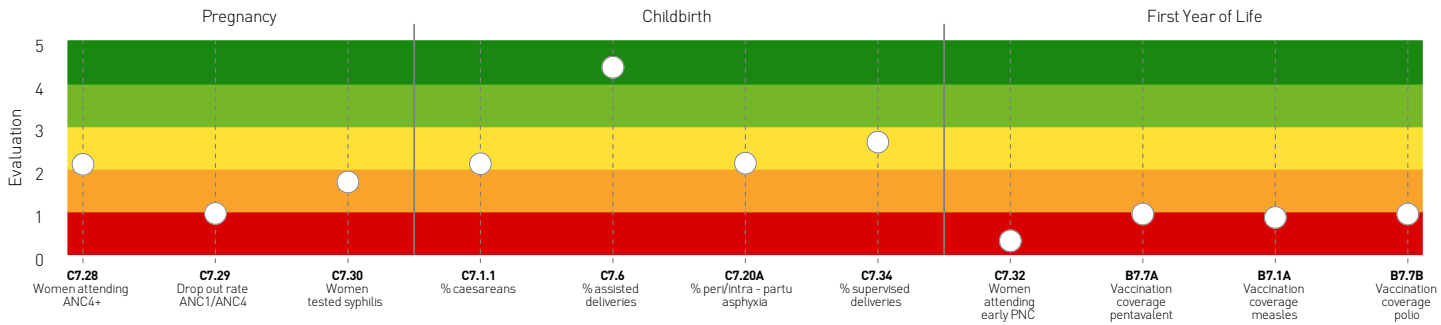
Considering the management of Chronic Diseases – HIV pathway, the treatment coverage is very low, such as the percentage undergoing the viral load tests among those followed in the ART clinics, whereas very good results are observed in terms of the proportion of patients that are positive to the HIV and start being treated in ART clinics, and of patients in ART clinics who underwent viral load test with viremia suppression.

The donut chart below summarizes the stakes in percentage terms of the scores achieved by the evaluated indicators.

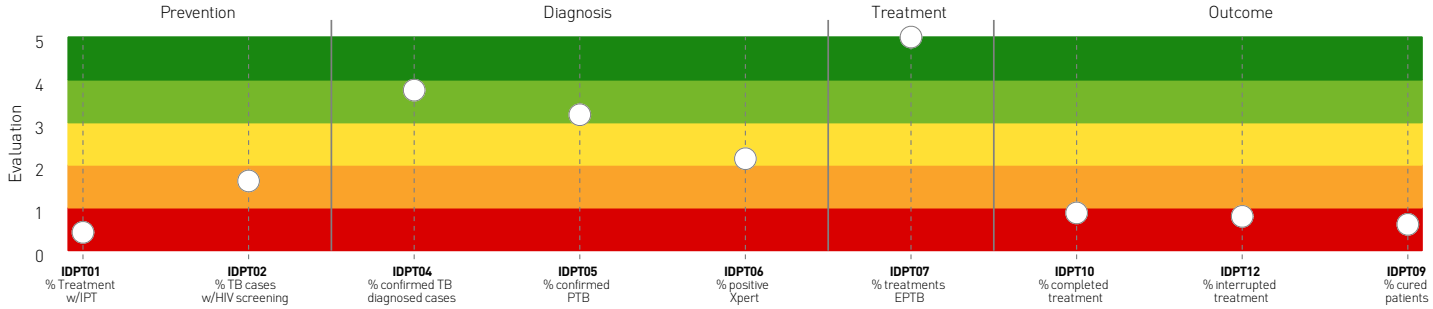


Dartboard
Oyam District - Year 2019

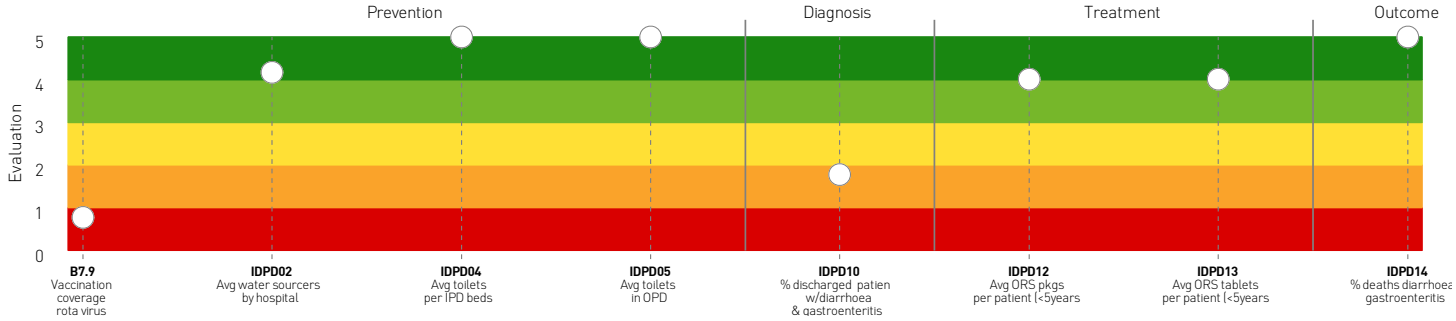




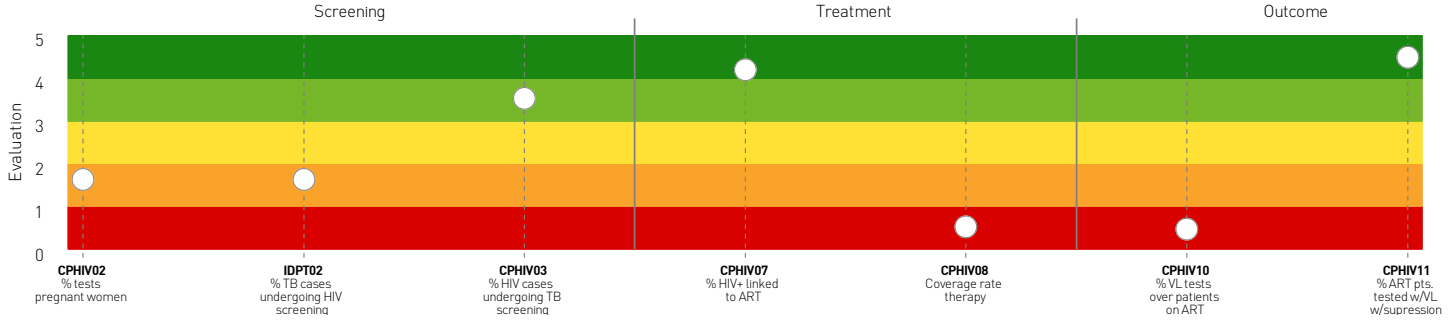
MATERNAL AND CHILD CARE PATHWAY



INFECTIOUS DISEASES - TUBERCULOSIS PATHWAY



INFECTIOUS DISEASES - GASTROENTERITIS PATHWAY



CHRONIC HIV PATHWAY

4

INDICATORS
2017 - 2019

DOCTORS WITH AFRICA
CUAMM

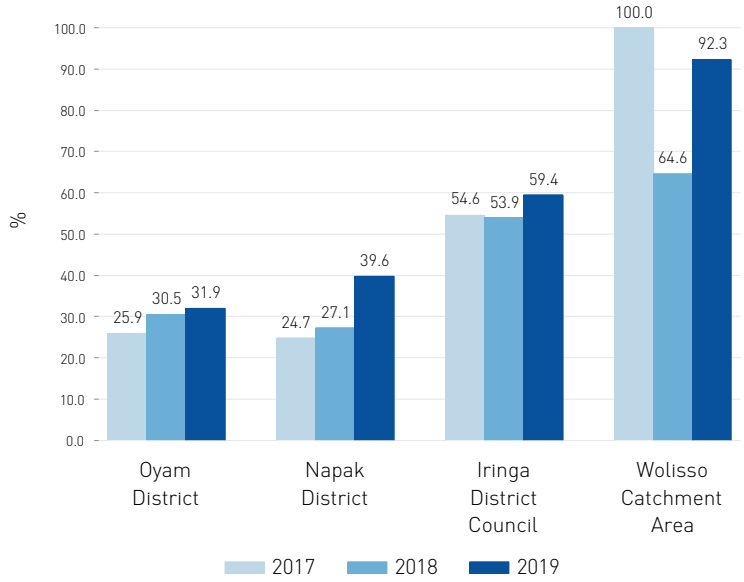
REGIONAL HEALTH STRATEGIES

DOCTORS WITH AFRICA CUAMM

B7.10 Vaccination coverage for tetanus (reproductive women)

Computational level : Residence

According to WHO recommendation, all women giving birth should be protected against tetanus. A dose of tetanus toxoid should be given at first contact or as early it is possible in pregnancy. If the mother is not immunized with the correct number of doses of tetanus toxoid vaccine, neither she nor her newborn infant are protected against tetanus at delivery. This indicator is an observation indicator. It is expressed as a ratio between the number of women who received at least two doses of vaccine to prevent tetanus during their pregnancy, as recommended by WHO, and the overall number of expected deliveries in the reference area.

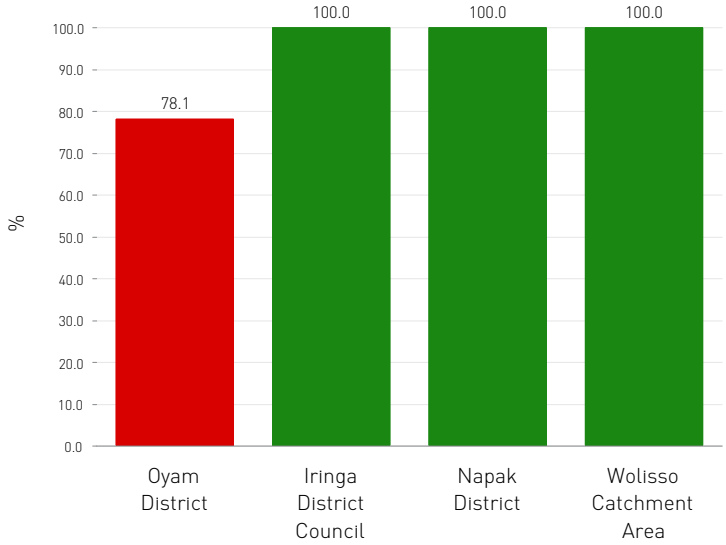


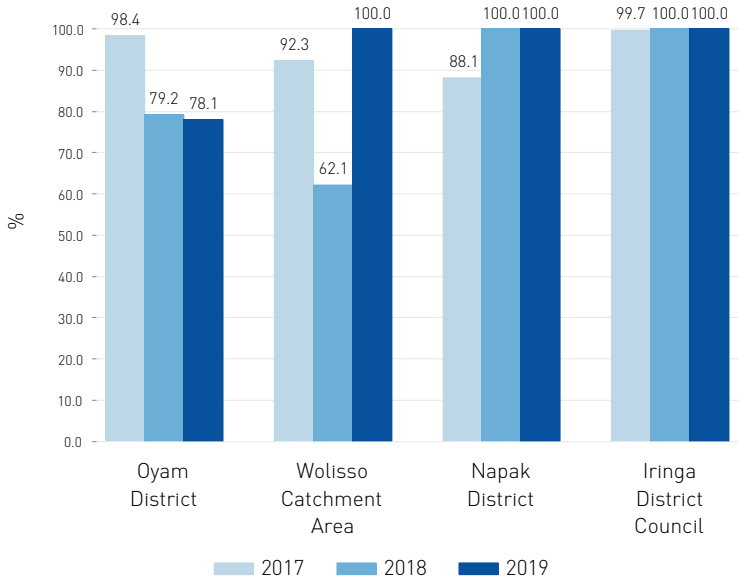
Numerator	Number of pregnant women who have received protetictive doses of TT (x100)
Denominator	Number of expected deliveries
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic source)

B7.1A Vaccination coverage for measles

Computational level : Residence

Measles is a highly contagious disease caused by a virus, which usually results in a high fever and rash, and can lead to blindness, encephalitis or death. This vaccine is a single vaccine preventing measles. The calculation of vaccine coverage for measles is the ratio between the percentage of vaccination cycles completed each year, and the number of children aged less than one year. The goal was fixed to 98% coverage of the target population based on the guidelines followed in the IRPES.



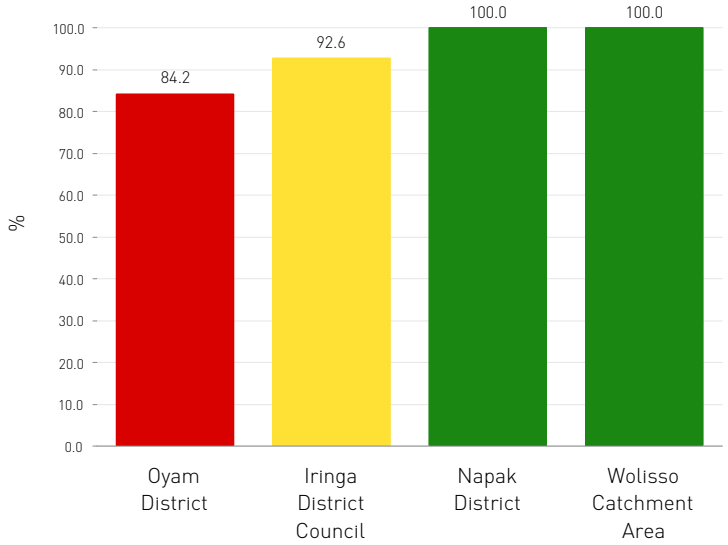


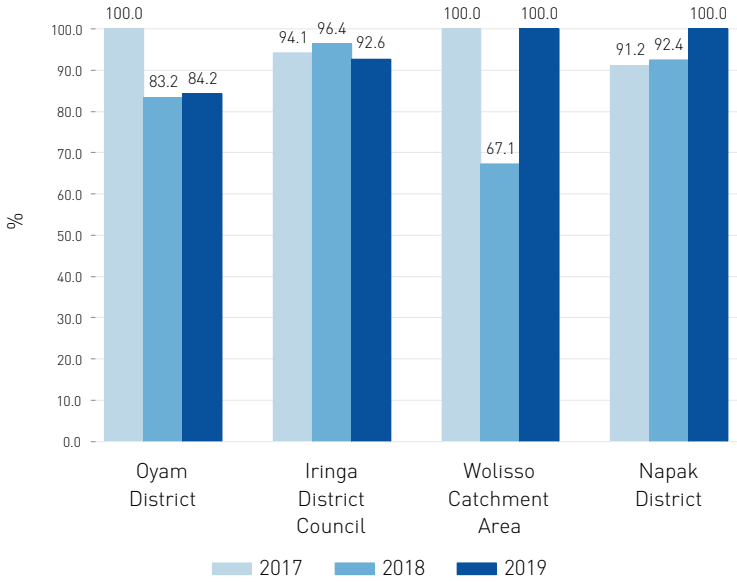
Numerator	Number of children under one year of age who have received measles vaccine (x100)
Denominator	Estimated number of infants aged less than 1 year
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic source)

B7.6 Vaccination coverage against pneumococcal (PCV)

Computational level : Residence

Pneumococcus (Streptococcus pneumoniae) belongs to a family of bacteria with approximately 80 subtypes, some of which are responsible for infections in childhood. Transmitted from person to person through saliva droplets, the bacterium is often found in the throat and nose of many healthy individuals, without producing symptoms. However, if it gets into the bloodstream, it can cause the so-called "invasive pneumococcal disease". Although this serious infection can affect people of all ages, the under-twos and especially chronic disease sufferers are mostly at risk. The availability of a safe, effective vaccine is the most important prevention tool against the most serious pneumococcal diseases in children. The goal was fixed to 98% coverage of the target population based on the guidelines followed in the IRPES.



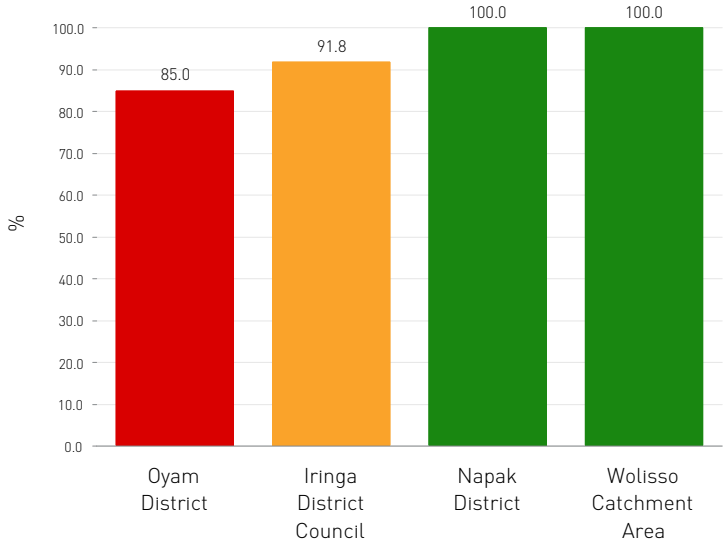


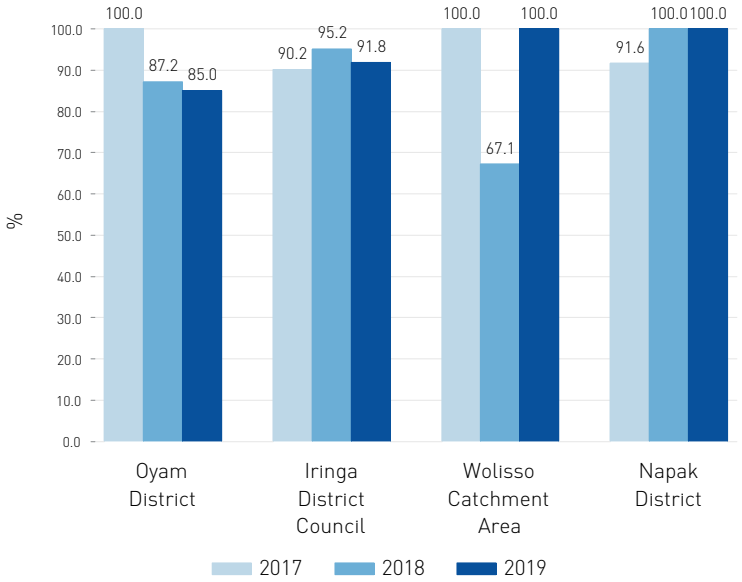
Numerator	Number of children under one year of age who have received third dose of pneumococcal vaccine (x100)
Denominator	Estimated number of infants aged less than 1 year
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic source)

B7.7A Pentavalent vaccine coverage (HIB; diphteria; pertussis, tetanus, HBV)

Computational level : Residence

Immunization is one of the most important public health interventions and a cost effective strategy to control the infectious diseases especially in children. Pentavalent vaccine contains 5 antigens designed to protect against pertussis, tetanus, diphtheria, viral hepatitis B and Haemophilus influenzae type B. The goal was fixed to 98% coverage of the target population based on the guidelines followed in the IRPES.



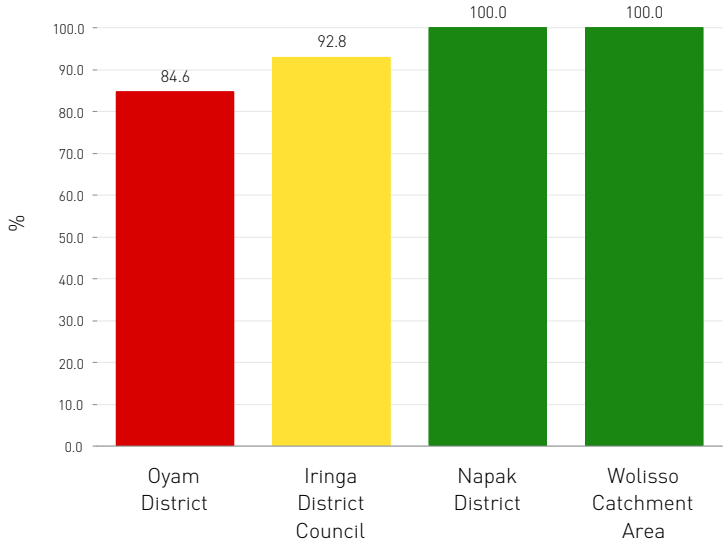


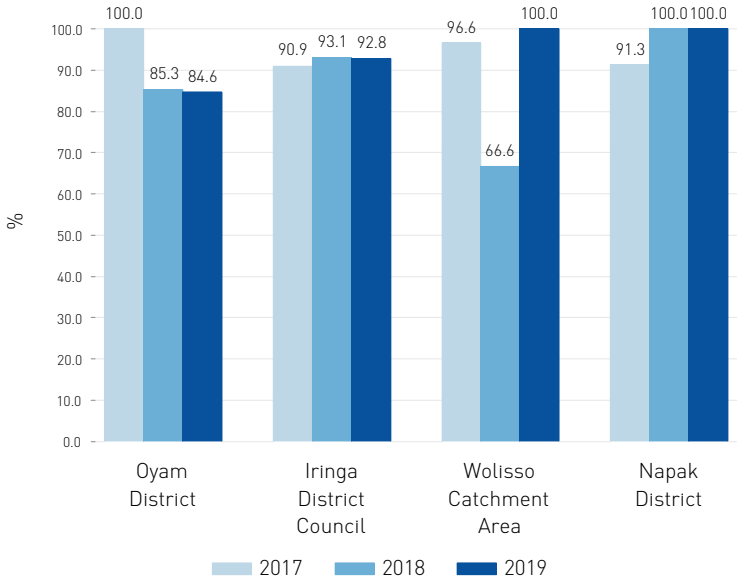
Numerator	Number of children under one year of age who have received third dose of pentavalent vaccine * 100
Denominator	Estimated number of infants aged less than 1 year
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic source)

B7.7B Vaccination coverage for polio

Computational level : Residence

Polio is a highly infectious viral disease that can cause irreversible paralysis. According to WHO data, in 2013, 84% of infants around the world received 3 doses of polio vaccine. This indicator is expressed as a ratio between the children that received at least three doses of vaccine to prevent polio in the reference year and the overall number of children aged less than one year. The goal was fixed to 98% coverage of the target population based on the guidelines followed in the IRPES.



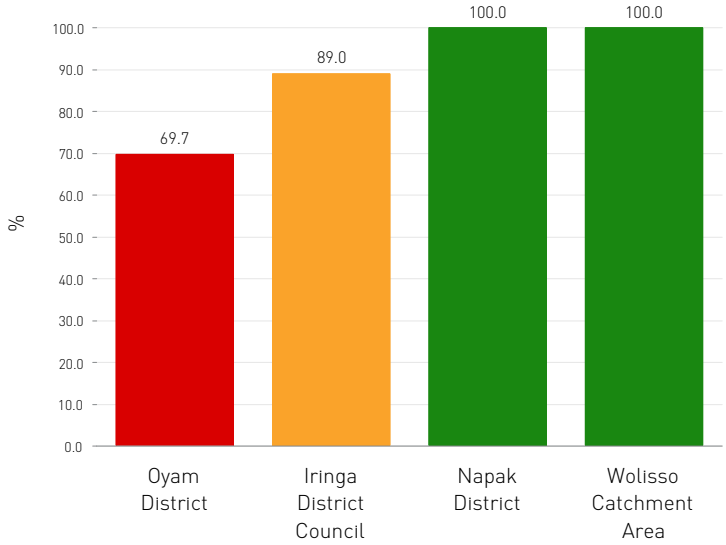


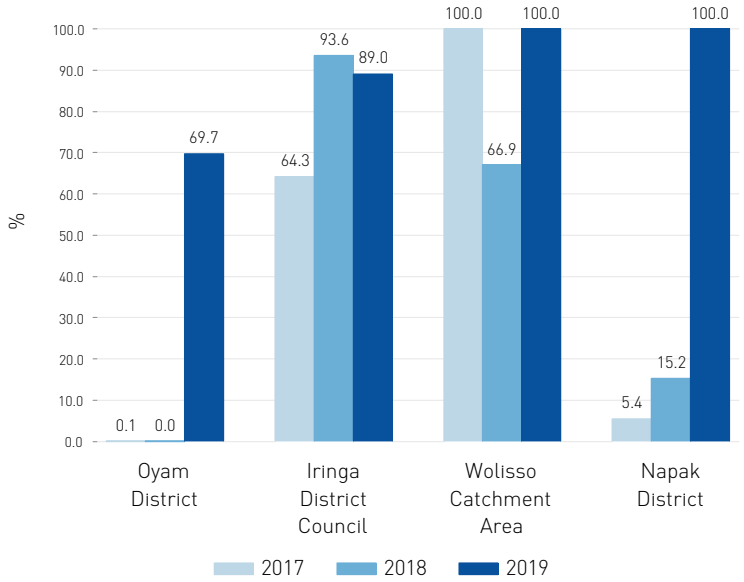
Numerator	Number of surviving infants who have received three doses of oral polio vaccine (x100)
Denominator	Estimated number of infants aged less than 1 year
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic source)

B7.9 Vaccination coverage for rota virus

Computational level : Residence

Since 2009 the WHO recommends the use of rotavirus vaccines in all national immunization programs and at the end of 2018 rotavirus vaccine was introduced in 101 countries. This indicator is expressed as a ratio between the children that received at least two doses of vaccine to prevent rota virus in the reference year and the overall number of children aged less than one year. The goal was fixed to 98% coverage of the target population based on the guidelines followed in the IRPES.



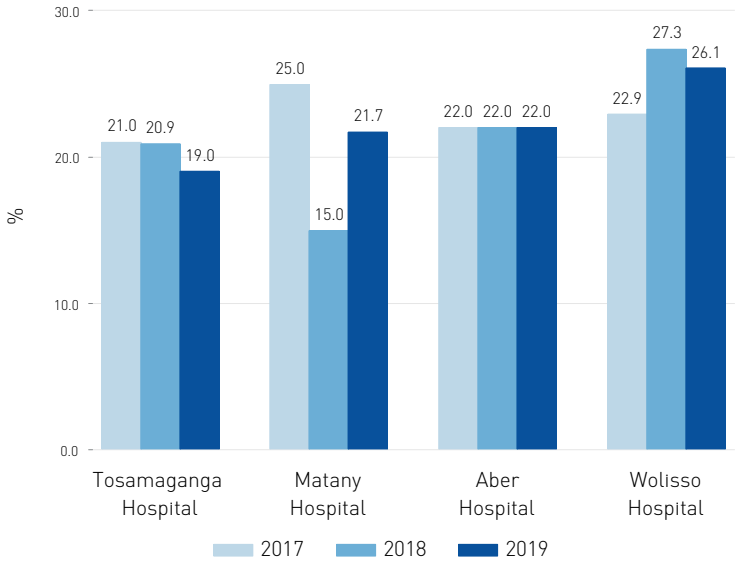


Numerator	Number of children under one year of age who have received 2nd dose of Rotavirus vaccine (x100)
Denominator	Estimated number of infants aged less than 1 year
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic source)

C30.3.1.2 Percentage of hospital admissions for patients resident in other districts

Computational level : Hospital

This measure monitors the percentage of hospital discharges delivered to patients resident in other districts. In LMICs there are many factors that can influence this ratio and, because of the complexity of the interrelatedness of such factors, this indicator is considered as an observation indicator. Attraction can be considered for each specific context and the same conclusion can not be drawn for every setting.

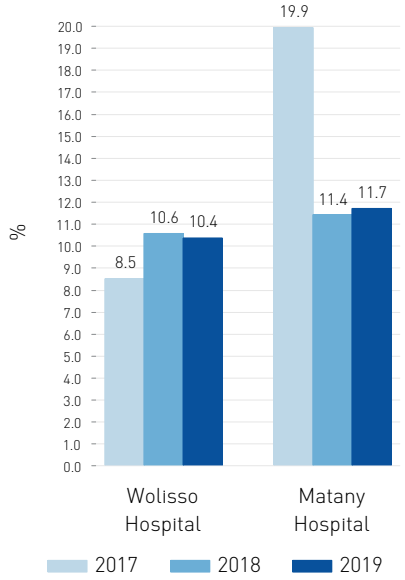


Numerator	Number of admissions for patients resident in other districts (x100)
Denominator	Number of inpatients
Sources	Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source); Tosamaganga hospital's registers (paper - based source); Aber hospital's registers (paper - based source)/Ugandan eHMIS/DHIS2 (electronic source)

C30.3.2.2 Percentage of hospital admissions for patients resident in other districts - Complex cases

Computational level : Hospital

This measure monitors the percentage of hospital discharges delivered to patients resident in other districts for complex related diseases. In LMICs there are many factors that can influence this ratio and, because of the complexity of the interrelatedness of such factors, this indicator is considered as an observation indicator. Attraction can be considered for each specific context and the same conclusion can not be drawn for every setting. The definition of " Complex and non complex condition" is based on individual experience and judgement considering the setting as well as the selection of diagnosis available in that specific context and present in the diangosis list of local HMIS. In the future, a more accurate codes diagnosis and defintion of complex/non complex with a broader consensus among physicians is envisaged.



Numerator	Number of admissions for patients resident in other districts – complex cases (x100)
Denominator	Number of inpatients
Sources	Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source)

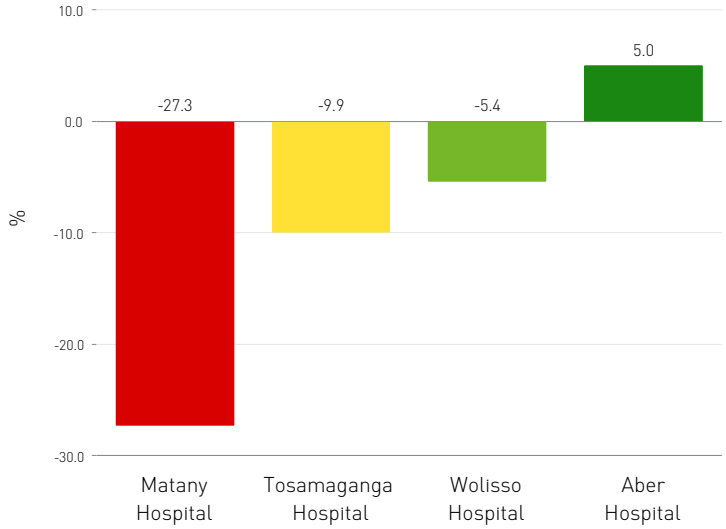
EFFICIENCY AND SUSTAINABILITY

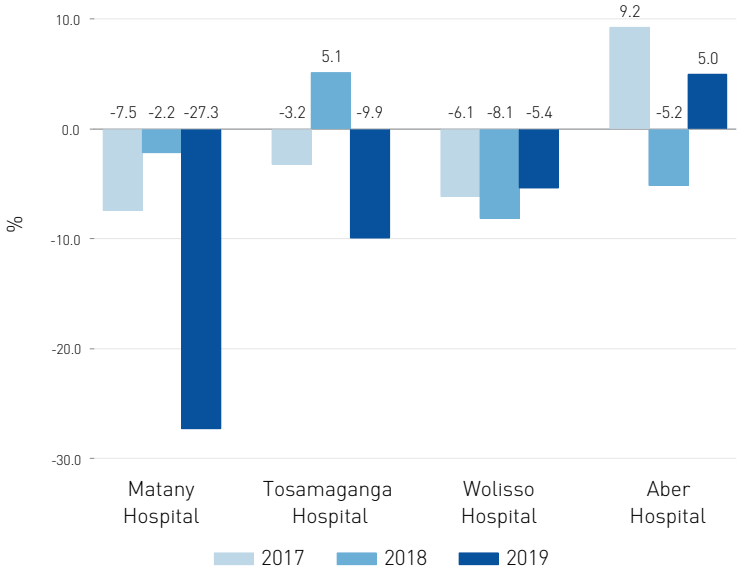
DOCTORS WITH AFRICA CUAMM

F1.1 General economic equilibrium

Computational level : Hospital

The general economic equilibrium is computed as a ratio between the net income and total revenues as reported in the hospital income statement. The indicator shows the ability of the management to lead hospital activities supporting costs in terms of budget, by considering the effect of all operations. The reference standard was established starting from the indications followed in the PES of the Tuscany Region.



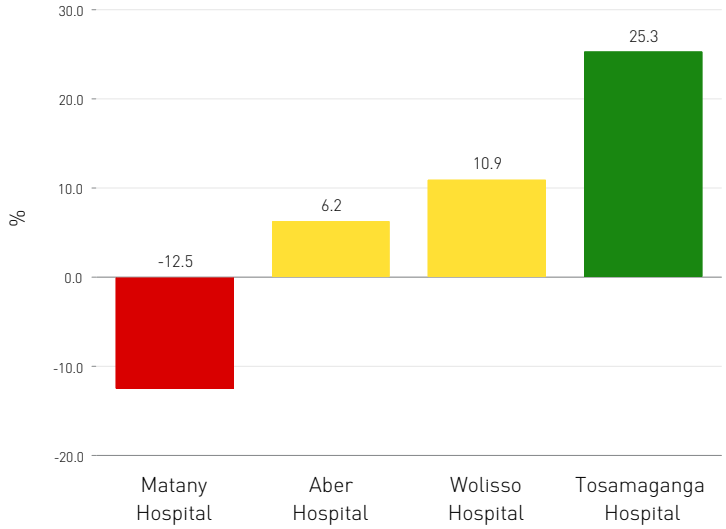


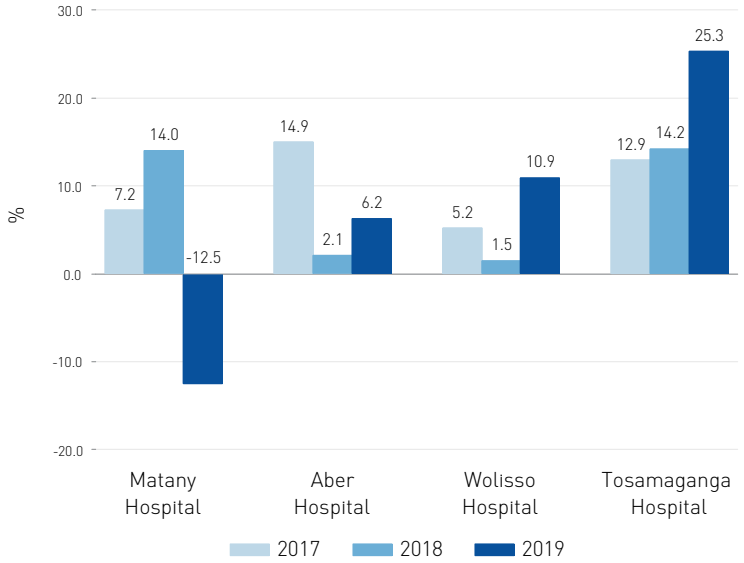
Numerator	Net income (x100)
Denominator	Total revenues
Sources	Hospitals income statements

F1.2 Economic equilibrium of health management

Computational level : Hospital

This indicator shows the hospital's ability to reach the economic balance relative to core operations, excluding either extraordinary factors (capital gains or contingent liabilities), or the positive or negative results based on the other operations. It is the ratio between health net margin (that is the equilavent of the EBITDA), calculated as the difference between revenues and operational costs. This index, widely used at international level, is known as Return on Sales ("ROS"). The reference standard was established starting from the indications followed in the PES of the Tuscany Region.



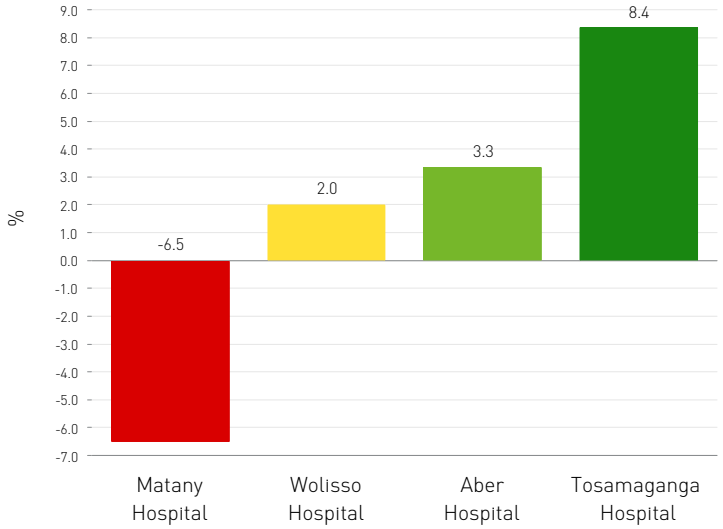


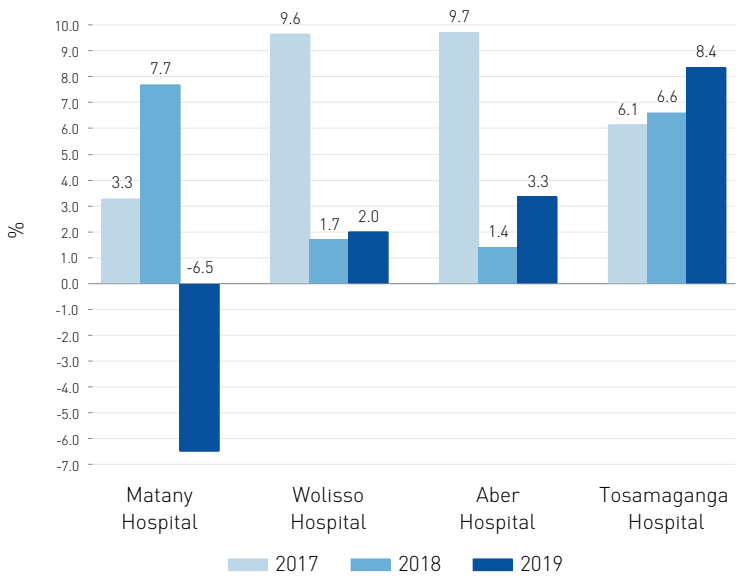
Numerator	Earnings before interest, taxes, depreciation, and amortization (EBITDA) (x100)
Denominator	Total revenues
Sources	Hospitals income statements

F1.3 Return on Investment (ROI)

Computational level : Hospital

This indicator is calculated as the ratio between the health net margin (difference between revenues and operational costs) and the capital invested. This indicator shows the efficiency of using the capital invested, that is equivalent to the return on investment ("ROI"). In the healthcare sector, in particular, it explaines the necessity to guarantee continuosly investements and the possibility to provide citizens with excellent services with adequate resoruces allocation. The reference standard was established starting from the indications followed in the PES of the Tuscany Region.



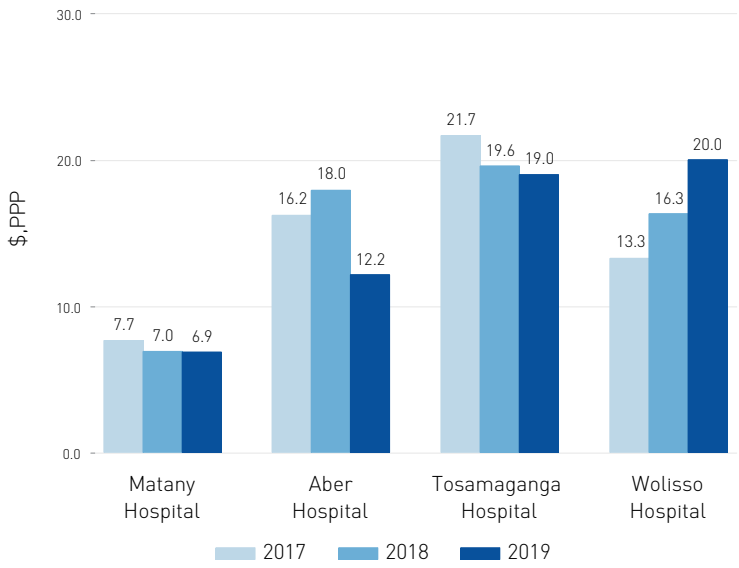


Numerator	Earnings before interest, taxes, depreciation, and amortization (EBITDA) (x100)
Denominator	Total assets
Sources	Hospitals income statements and Hospitals balance sheets

F17.1A.1 Average cost for Inpatient Day Equivalent, PPP (current international $)

Computational level : Hospital

This indicator measures the average inpatient cost at the hospital level. It is calculated as the total running expenses related to healthcare activities divided by the inpatient day equivalent, expressed as the sum of inpatient days and the number of outpatient visits multiplied by a standard coefficient equal to 4. Secondly, in order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

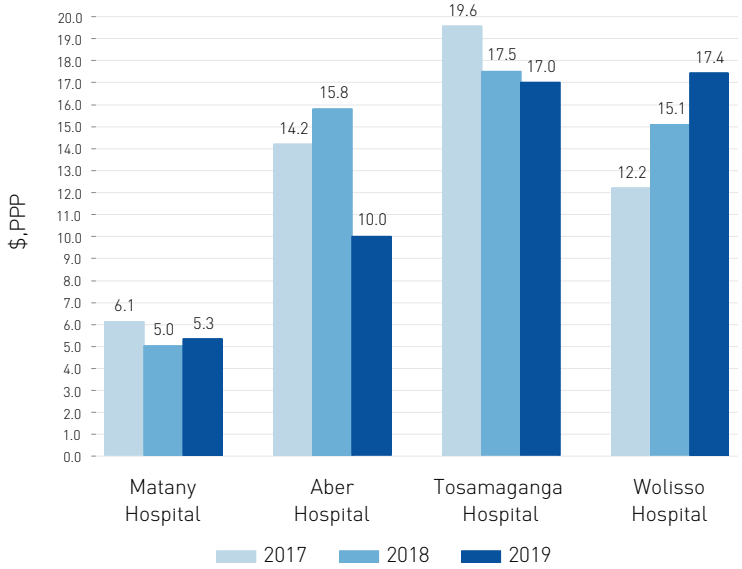


Numerator	Total running costs
Denominator	Inpatient Day Equivalent
Sources	Hospitals income statements and hospitals registers (electronic sources)

F17.1A.2 Average cost for Inpatient Day Equivalent (without D&A), PPP (current international $)

Computational level : Hospital

This indicator measures the average inpatient cost at the hospital level at the net of depreciation and amortization (D&A). It is calculated as the total running expenses related to healthcare activities (excluded D&A) divided by the inpatient day equivalent, expressed as the sum of inpatient days and the number of outpatient visits multiplied by a standard coefficient equal to 4. Secondly, in order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

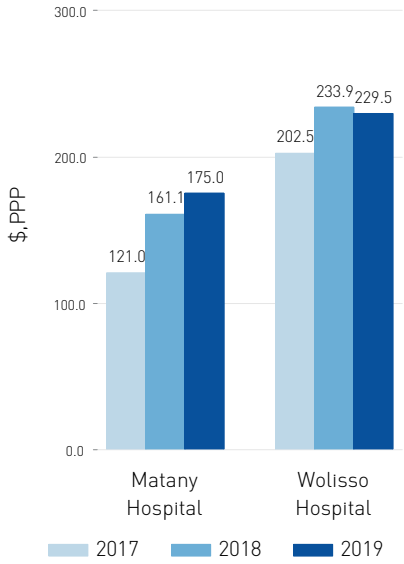


Numerator	Total running costs (excluding D&A expenses)
Denominator	Inpatient Day Equivalent
Sources	Hospitals income statements and hospitals registers (electronic sources)

F17.3.1A Average cost for specialized care per procedure, PPP (current international $)

Computational level : Hospital

This indicator monitors the average inpatient cost at the hospital level for specialized services. It is calculated as the total running expenses related to specialized activities divided by the reference accesses. In order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

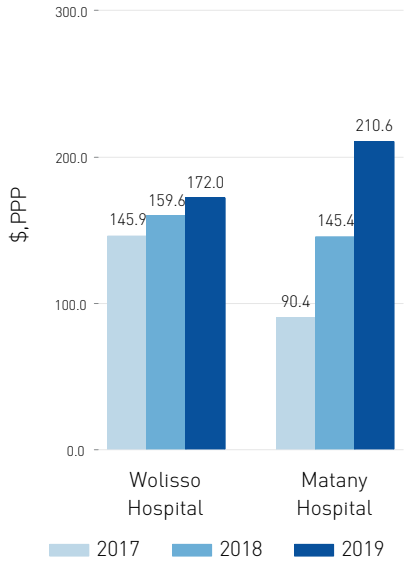


Numerator	Costs related to specialized care
Denominator	N. of accesses
Sources	Hospitals income statements and hospitals registers (electronic sources)

F17.3.1.1 Average cost for specialized care per procedure - medical department, PPP (current international $)

Computational level : Hospital

This indicator monitors the average inpatient cost at the hospital level for specialized services in the medical department. It is calculated as the total running expenses related to specialized activities in the medical department divided by the reference accesses. In order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

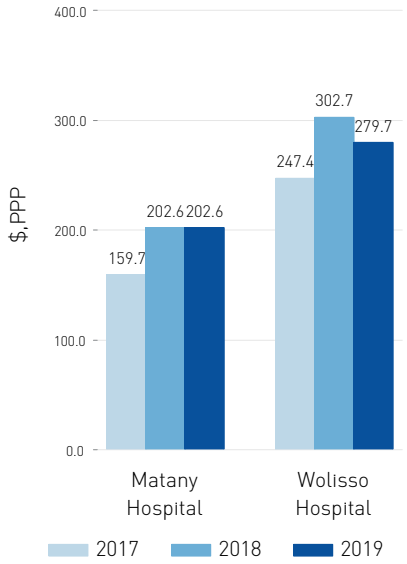


Numerator	Costs related to specialized care (medical department)
Denominator	N. of accesses (medical department)
Sources	Hospitals income statements and hospitals registers (electronic sources)

F17.3.1.3 Average cost for specialized care per procedure - operating theatre, PPP (current international $)

Computational level : Hospital

This indicator monitors the average inpatient cost at the hospital level for specialized services (all major operations) in the operating theatre. It is calculated as the total running expenses related to specialized activities in the operating theatre divided by the reference accesses. In order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

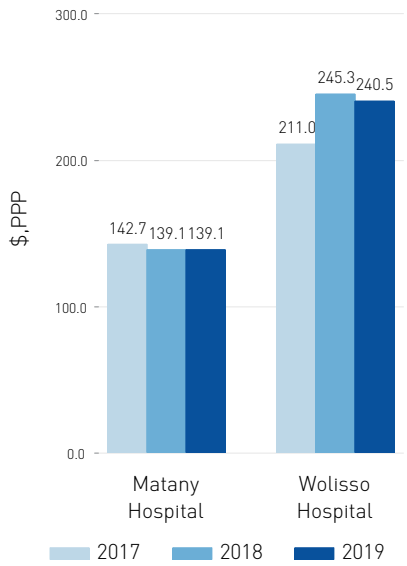


Numerator	Costs related to specialized care (operating theatre)
Denominator	N. of accesses (operating theatre)
Sources	Hospitals income statements and hospitals registers (electronic sources)

F17.3.1.4 Average cost for specialized care per procedure - department of surgery, PPP (current international $)

Computational level : Hospital

This indicator monitors the average inpatient cost at the hospital level for specialized services in the surgery department. It is calculated as the total running expenses related to specialized activities in the surgery department divided by the reference accesses. In order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

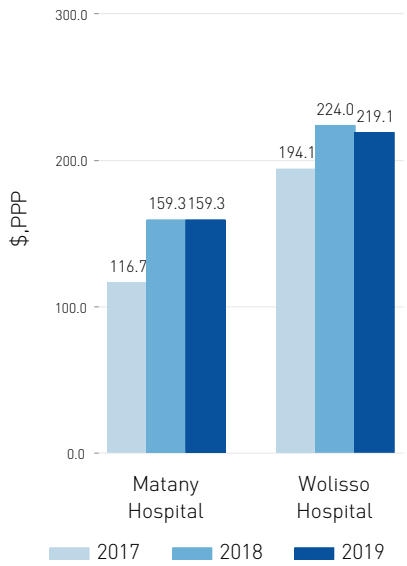


Numerator	Costs related to specialized care (department of surgery)
Denominator	N. of accesses (department of surgery)
Sources	Hospitals income statements and hospitals registers (electronic sources)

F17.3.1.5 Average cost for specialized care per procedure - maternity department, PPP (current international $)

Computational level : Hospital

This indicator monitors the average inpatient cost at the hospital level for specialized services in the maternity department. It is calculated as the total running expenses related to specialized activities in the maternity department divided by the reference accesses. In order to compare values between the different hospitals, all the average costs were adjusted according to the Purchasing Power Parity (PPP) conversion factor provided by the World Bank for each involved country.

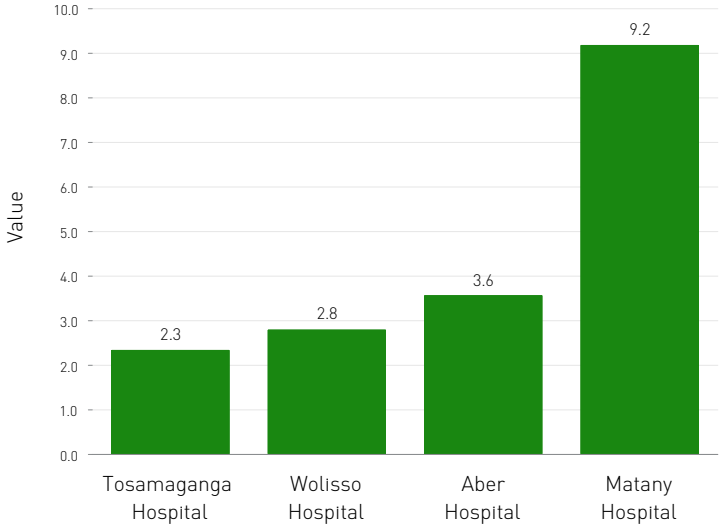


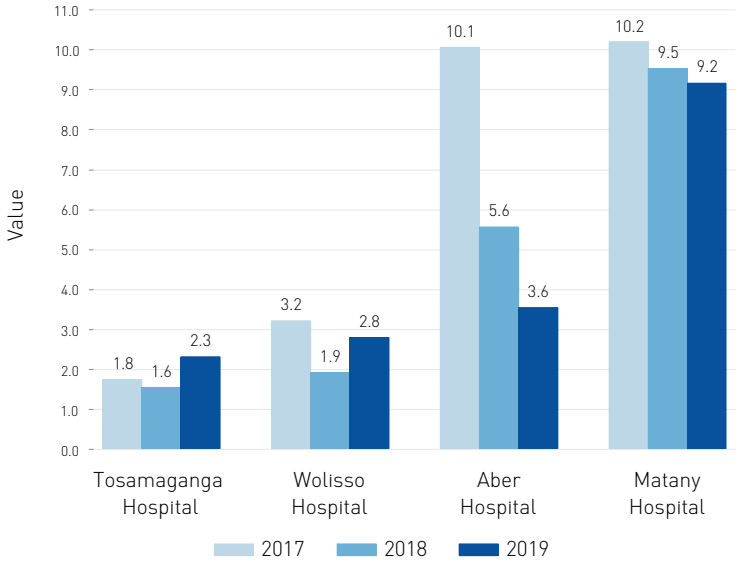
Numerator	Costs related to specialized care (maternity department)
Denominator	N. of accesses (maternity department)
Sources	Hospitals income statements and hospitals registers (electronic sources)

F3.1 Availability Index

Computational level : Hospital

The availability index assesses the hospital's solvency, intended as the ability to cope with short-term commitments through ordinary activities, namely short-term credits, cash, and inventories. The sources of data are extracted from the balance sheet. The reference standard was established starting from the indications followed in the PES of the Tuscany Region.



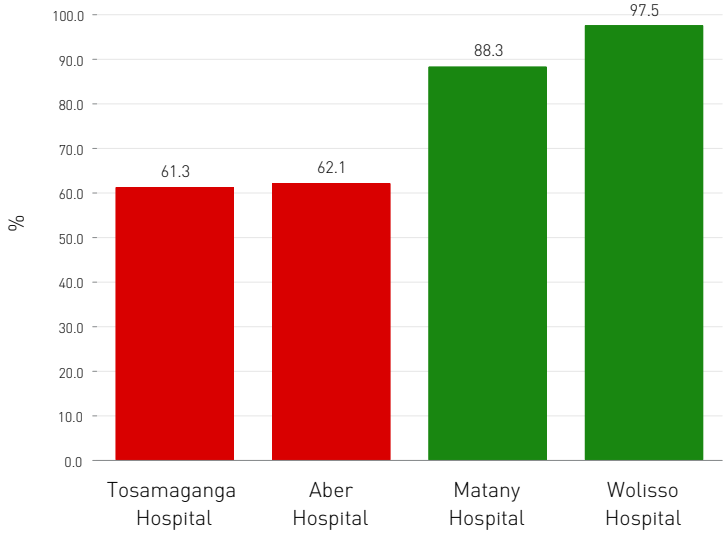


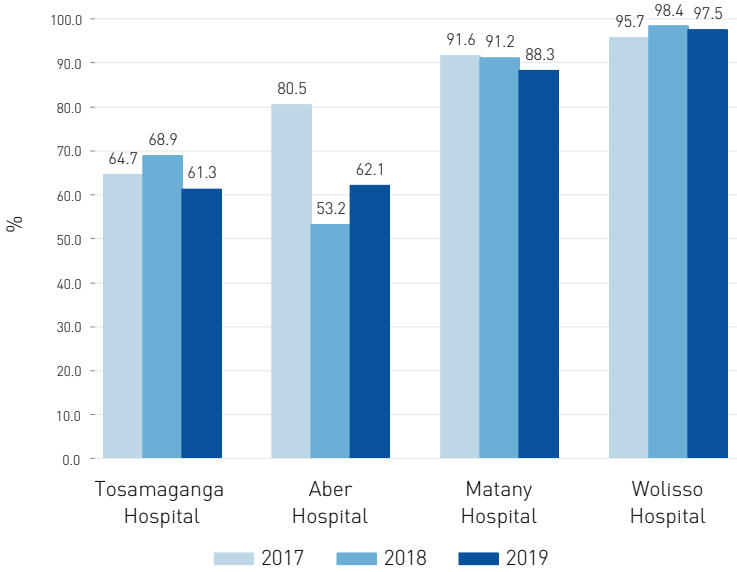
Numerator	Current Assets
Denominator	Current Liabilities
Sources	Hospitals balance sheets

C2A.2 Bed occupancy rate

Computational level : Hospital

The bed occupancy rate ("BOR") indicates the percentage ratio between the effective inpatient days and the total number of possible days of admissions (that are calculated by multiplying the number of beds by the days of the reference year). In an operational perspective, the BOR allows to understand the degree of efficiency by which hospitalizations are planned and managed and the resources used.



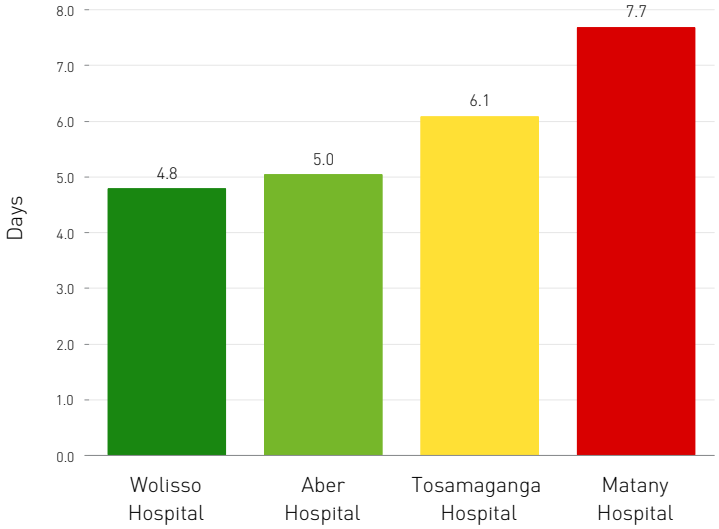


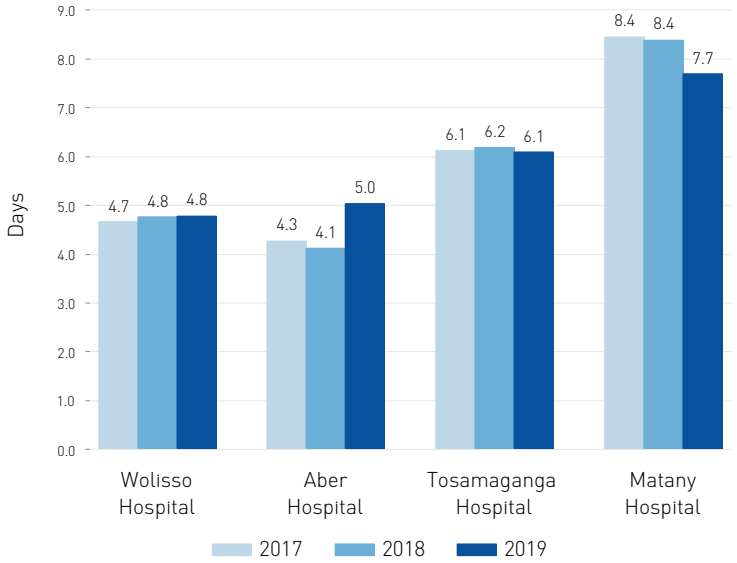
Numerator	Number of inpatient days (x100)
Denominator	Number of inpatient beds
Sources	Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source); Tosamaganga hospital's registers (paper-based source); Ugandan eHMIS/DHIS2 (electronic source)

C2A.3 Average lenght of stay (ALOS) - inpatients

Computational level : Hospital

The average length of stay in hospitals (ALOS) can be considered as an indicator of efficiency. All other factors being equal, a shorter stay will reduce the cost per discharge and shift care from inpatient to less expensive post-acute settings. The ALOS refers to the average number of days that patients spend in hospital and it is expressed as the ratio between number of inpatient days and number of inpatients. The OECD argues that longer stays in hospital could be determined by inefficient hospital processes causing delays in providing treatment; or by errors and poor-quality care or poor care co-ordination that cause patients' need for further treatment or recovery time.





Numerator	Number of inpatient days
Denominator	Number of inpatients (x365)
Sources	Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source); Tosamaganga hospital's registers (paper-based source); Ugandan eHMIS/DHIS2 (electronic source)

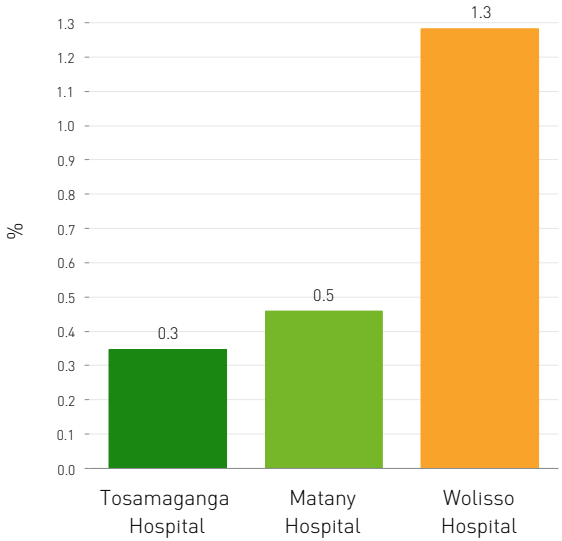
USERS, STAFF AND COMMUNICATION

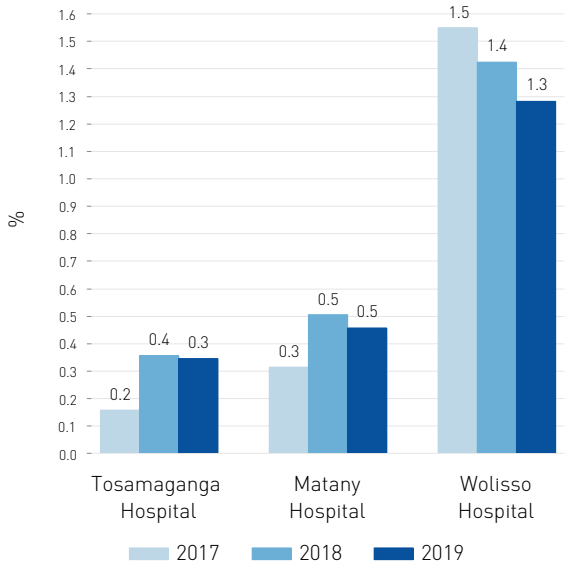
DOCTORS WITH AFRICA CUAMM

D18 Percentage of hospitalized patients leaving against medical advice

Computational level : Hospital

The patient can choose to "abandon" the hospital (the so called "self discharge"). The motivations behind such a decision may vary. This indicator has been included in the performance evaluation system. Since, in the majority of cases, this phenomenon can be considered as a proxy for patient dissatisfaction or it may be associated with social and antropological reasons. The standard was fixed based on the guidelines followed in the IRPES Network.



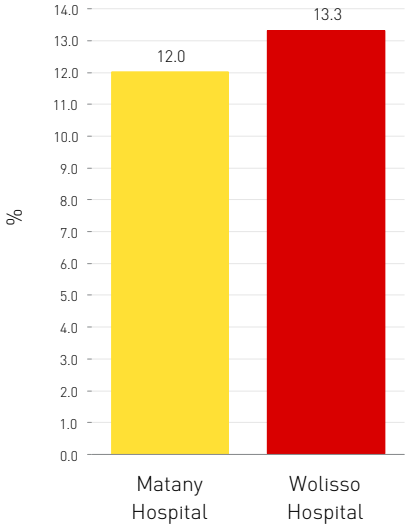


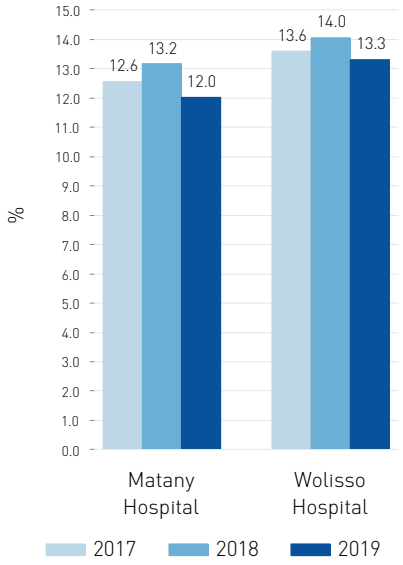
Numerator	Number of hospitalized patients leaving against medical advice (x100)
Denominator	Number of admissions
Sources	Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source); Tosamaganga hospital's registers (paper - based source); Aber hospital's registers (paper - based source)

E2A Percentage of staff absence

Computational level : Hospital

This indicator monitors the percentage of staff absence and it is considered a proxy of the organizational climate. The indicator is computed as the ratio between the days of absence for public holidays, annual leave, maternal leave and paternity leave, sick leave and the number of working days net of taken holidays. The standard was fixed based on the guidelines followed in the IRPES Network.





Numerator	Number of days of absence (x100)
Denominator	N. of working days (net of taken holidays) of all hospital's employees
Sources	Hospitals registers - human resources department (electronic sources)

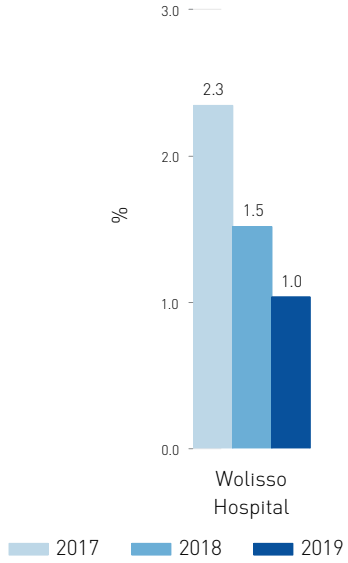
EMERGENCY CARE

DOCTORS WITH AFRICA CUAMM

C16.10A Percentage of repeated admissions in Emergency Department within 96 hours

Computational level : Hospital

Repeated admissions in Emergency Department within a short period of time may be due to ineffective and poor quality care by the Emergency Department. This indicator monitors the percentage of patients who are re-admitted in the Emergency Department (ED) within 96 hours since the last access, on the total number of accesses to the ED registered.



Numerator	Repeated admissions in Emergency Department within 96 hours (x100)
Denominator	N. of repeated admissions within 96 hours (for any reason)
Sources	Hospital's register - emergency department (electronic source)

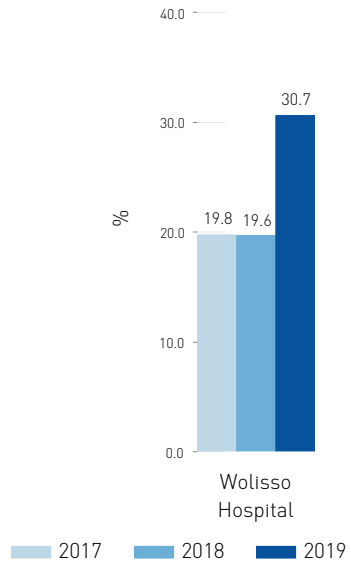
GOVERNANCE AND QUALITY OF SUPPLY

DOCTORS WITH AFRICA CUAMM

C8B.1A Emergency room access rate, per 1.000 residents

Computational level : Hospital

Admission rates to Emergency Department (ED) indicates the ratio between the overall number of accesses to ED of resident population and the residence population. This indicator does not monitor the activites of the ED but it is an indicator that indirectly measures the efficacy to respond to demand for care in the reference area.

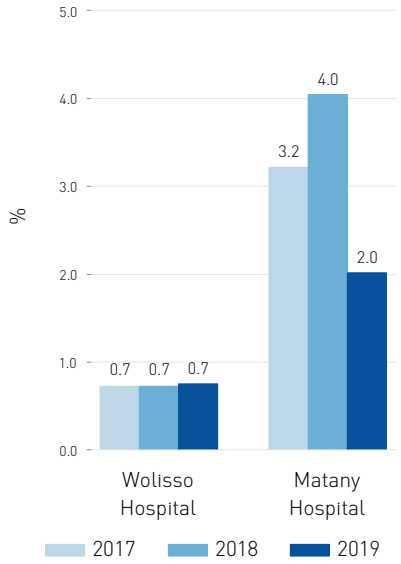


Numerator	Number of admissions in ED (x1.000)
Denominator	Estimated resident population
Sources	Hospital's emergency department register and Ethiopian HMIS/DHIS2 (electronic sources)

C17.1.4.8A Hospitalization rate for hospital admissions over 15 days, per 1.000 residents

Computational level : Hospital

This indicator illustrates the percentage of admissions lasting more than 15 days. It is calculated based on the reference population and not on the number of admissions. This indicator can be linked with the inefficiency or lack of district services that should take in charge patients in the post-acute phase. There may also be other contextual factors, also with reference to population groups, affecting this indicator that is not therefore evaluated.

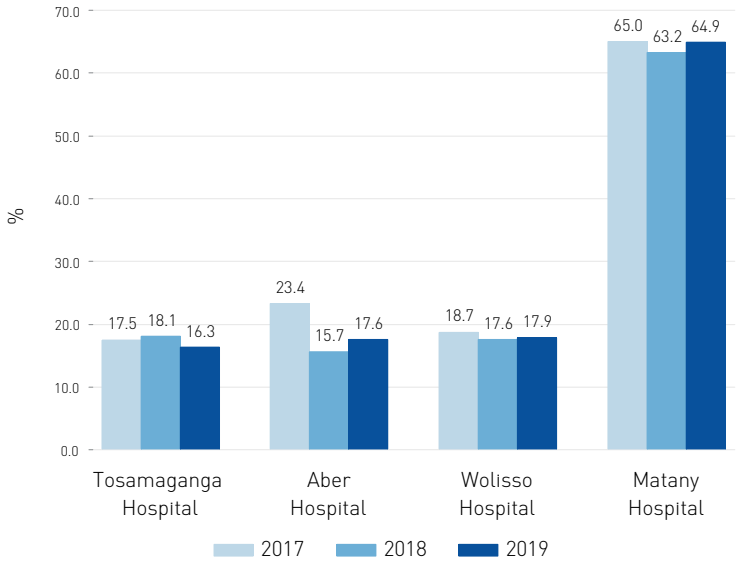


Numerator	Number of discharged patients with hospital admissions over 15 days (x1.000)
Denominator	Estimated resident population (> 1 year)
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources)

C1.1A Hospitalization rate, per 1.000 residents

Computational level : Hospital

The role of hospitals has progressively changed from being the place of reference for any kind of health problems to organizations able to provide care in response to acute and complex problems. Excessive recourse to hospitals implies an inappropriate use of resources. In LMICs hospitalization rates may vary according to a number of factors that can be interrelated and coxtext-specific. The denominator consists of the admissions of residence in that specific reference area.

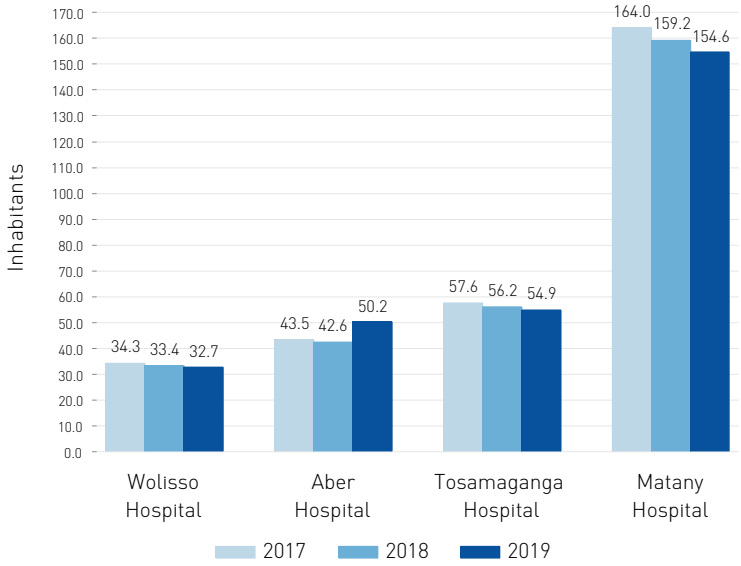


Numerator	Number of hospital admissions (x 1.000)
Denominator	Estimated resident population
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga hospital's registers (paper-based source) and Tanzanian DHIS2 (electronic source); Ugandan eHMIS/DHIS2 (electronic source)

C1.1B Per capita hospital beds, per 100.000 residents

Computational level : Hospital

This indicator shows the number of hospital beds per capita and it is based on the reference population. It provides a measure of the resources availability to deliver inpatients services, in terms of number of beds that are maintained, staffed and immediately available for use.

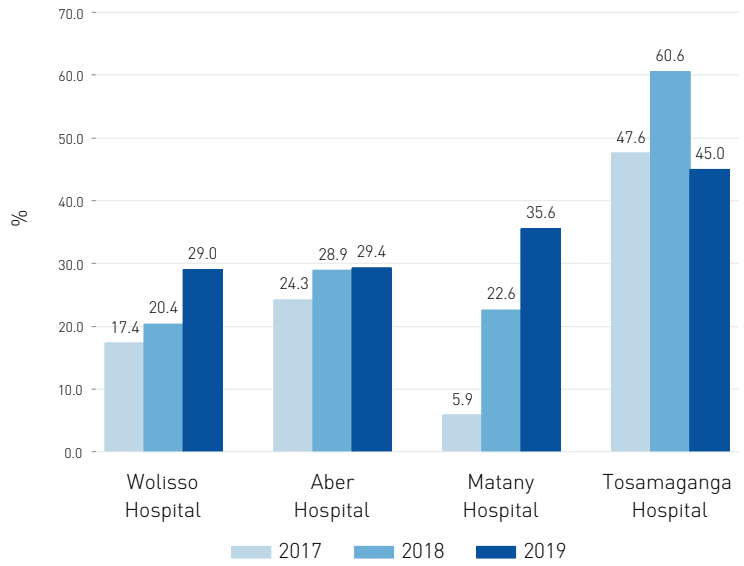


Numerator	Number of hospital beds
Denominator	Estimated resident population
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C11A.1.1A Heart failure hospitalization rate per 100.000 residents (>15 years)

Computational level : Hospital

In LMICs, as in HICs, the prevalence of heart failure has gradually increased. The challenge is to treat heart failures at residence level. Indeed, more accurate assessment of primary care appropriateness and effectiveness requires the addition of further information regarding the complexity of the cases considered. The denominator consists of the admissions of residence in that specific reference area. It is standardized by 100.000 inhabitants from the reference area.

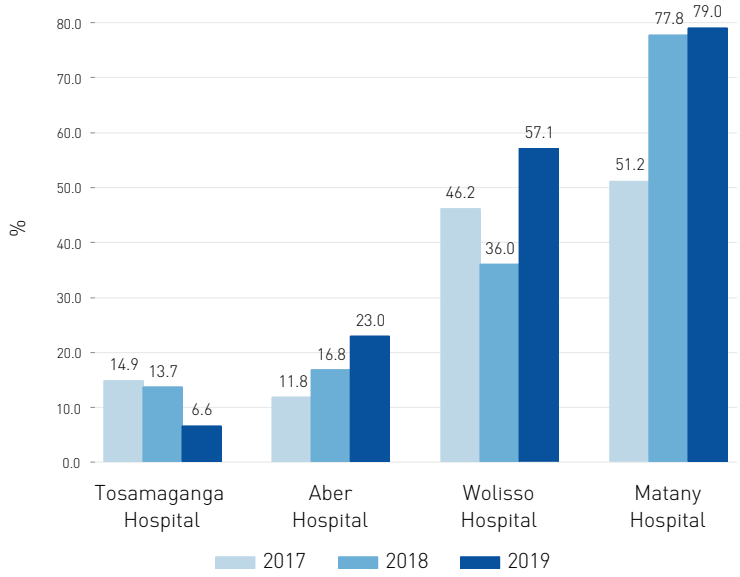


Numerator	Number of hospitalizations for heart failure per 100.000 residents aged >15 years
Denominator	Estimated resident population
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga hospital's registers (paper-based source) and Tanzanian DHIS2 (electronic source); Ugandan eHMIS/DHIS2 (electronic source)

C11A.2.1A Diabetes hospitalization rate per 100.000 residents (>15 years)

Computational level : Hospital

Diabetes is a chronic disease that can give rise to complications in the long-term, if not properly and constantly controlled. Decompensated diabetes may require hospitalization. Integrated disease management combining prevention, diagnosis and treatment is fundamental to avoid worsening of clinical conditions and subsequent hospitalization. The diabetes hospitalization rate is used as a proxy to monitor primary care organizational appropriateness. The denominator consists of the admissions of residence in that specific reference area. It is standardized by 100.000 inhabitants from the reference area.

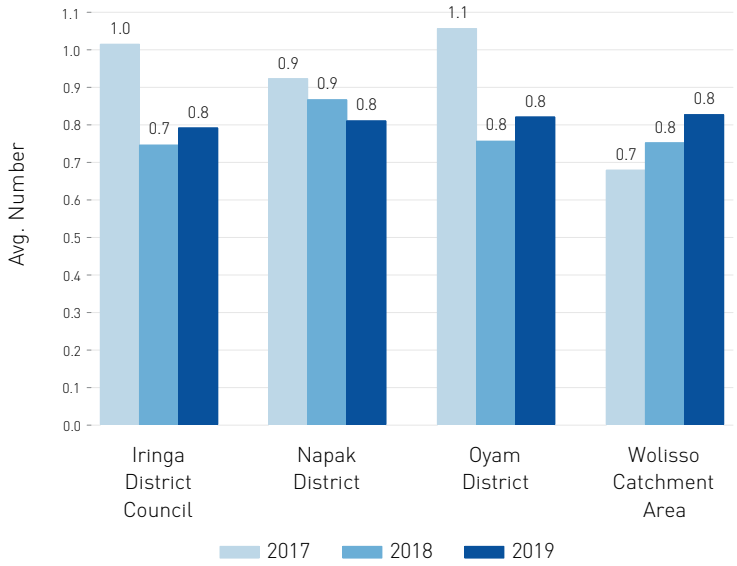


Numerator	Number of hospitalizations for diabetes per 100.000 residents aged >15 years
Denominator	Estimated resident population
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga hospital's registers (paper-based source) and Tanzanian DHIS2 (electronic source); Ugandan eHMIS/DHIS2 (electronic source)

C13.2A Average number of outpatient consult, per resident

Computational level : Residence

This indicator is an observation indicator. It measures the average number of consultations in the reference area, including all health centers and the respective hospital. It offers an overview of the number of visits provided in the reference area over the three years.

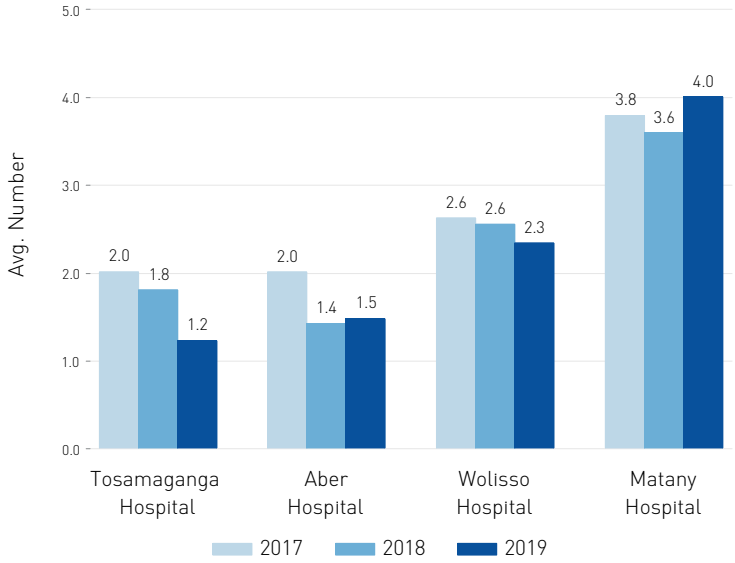


Numerator	Number of outpatient consults
Denominator	Estimated resident population
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C13.2B Average number of diagnostic procedures per patient (lab tests)

Computational level : Hospital

This indicator is an observation indicator. It measures the average number of lab tests in the hospital insisting on the reference area. It includes examinations for HIV, malaria and tuberculosis. It offers an overview of the number of lab tests provided in the reference hospital over the three years.

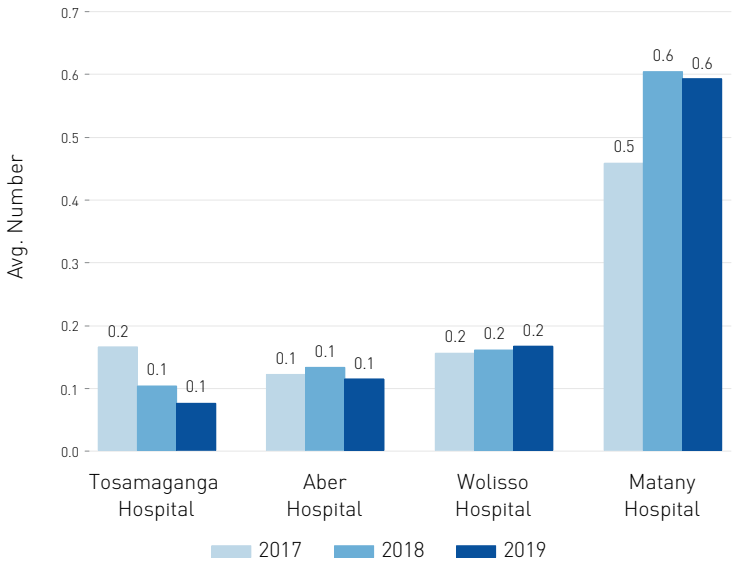


Numerator	Number of diagnostic procedures (laboratory tests)
Denominator	Number of patient discharges (OPD and IPD)
Sources	Hospitals registers - laboratory departments (electronic/paper-based); Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source); Tosamaganga hospital's registers (paper-based source); Ugandan eHMIS/DHIS2 (electronic source)

C13.2C Average number of diagnostic procedures per patient (imaging)

Computational level : Hospital

This indicator is an observation indicator. It measures the average number of diagnostic imaging in the hospital insisting on the reference area. It includes both ultrasounds and x-rays examinations. It offers an overview of the number of diangostic imaging provided in the reference hospital over the three years.

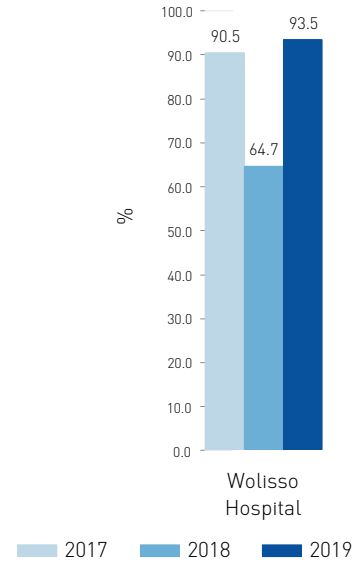


Numerator	Number of diagnostic procedures (imaging procedures)
Denominator	Number of patient discharges (OPD and IPD)
Sources	Hospitals registers - diagnostic departments(electronic/paper-based); Wolisso hospital's registers (electronic source); Matany hospital's registers (electronic source); Tosamaganga hospital's registers (paper-based source); Ugandan eHMIS/DHIS2 (electronic source)

C16.4 Percentage of admissions in Emergency Department hospitalised within 8 hours

Computational level : Hospital

The indicator allows evaluation of the effectiveness of the hospital as a whole, monitoring promptness in the management of patients who are referred by the Emergency Department (ED) for hospitalization or other medical exams. The indicator measures the percentage of patients with a length of stay in the ED of less than 8 hours, from the moment of the triage to discharge or transfer to another deparment.

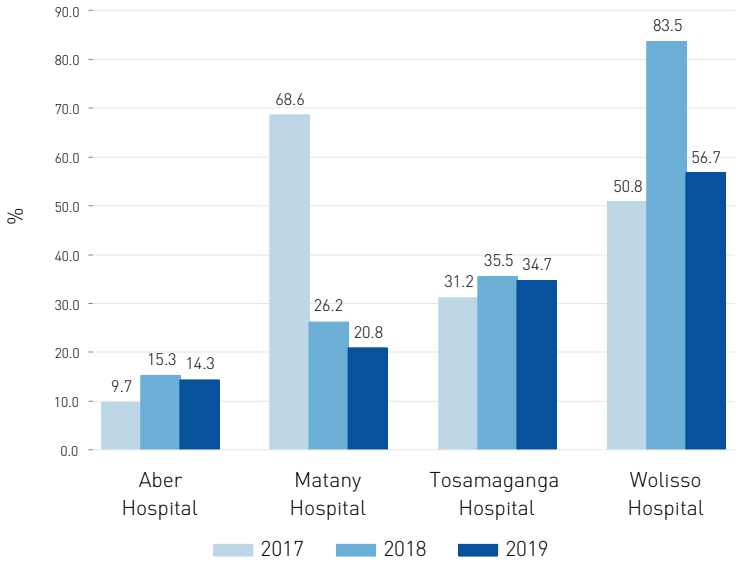


Numerator	Number of patients referred to one clinical or surgical hospital' department with a length of stay in ED of less than 8 hours (x100)
Denominator	Total number of patients referred to one clinical or surgical hospital' department from ED
Sources	Hospital's register - emergency department and hospital's registers (electronic sources)

C18.9A Hysterectomy hospitalization rate, per 100.000 residents (women > 15 years)

Computational level : Hospital

Hysterectomy is the surgical removal of the uterus and cervix. This indicator measures the percentage of women aged more than 15 years who underwent hysterectomy procedure for both benign and malignant cases. It is standardized by 100.000 inhabitants from the reference area.

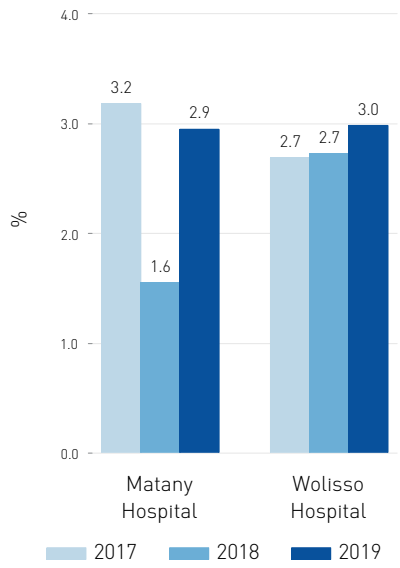


Numerator	Number of hospitalizations for hysterectomy procedures (x100.000)
Denominator	Estimated number of resident women aged > 15 years
Sources	Hospitals registers - surgical department (paper - based sources) and Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C5.1E.A Repeated hospital admissions for any causes

Computational level : Hospital

If appropriately treated, the patient should not be re-admitted before one month of discharge. The indicator measures the number of patients readmitted to a hospital within 30 days of the previous admission for any cases. The causes of re-admission can be due to individual and contextual factors and the indicator is not evaluated.

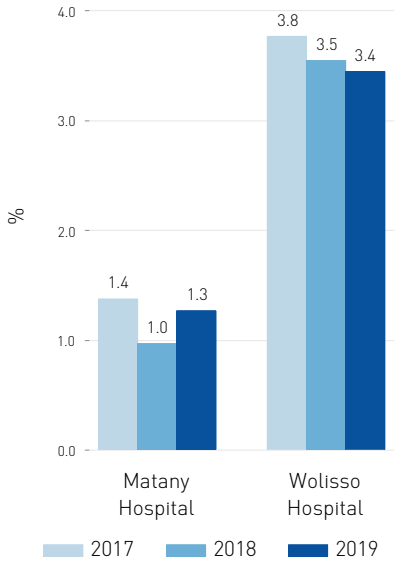


Numerator	Number of repeated hospital admissions within 30 days for any cases (x100)
Denominator	Number of admissions
Sources	Hospitals registers (electronic sources)

C5.1E.A1 Repeated hospital admissions for any causes (medical department)

Computational level : Hospital

The general indicator of repeated hospital admissions for any causes is here focused on medical problems. The indicator measures the number of patients readmitted to a hospital within 30 days of the previous admission for any causes in medical department. If appropriately treated in this department, the patient should not be re-admitted before one month of discharge.

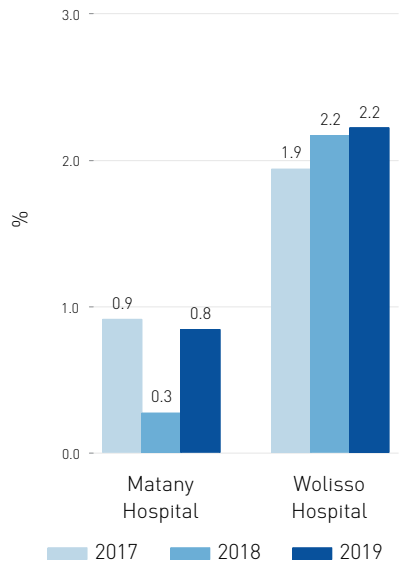


Numerator	Number of repeated hospital admissions within 30 days for any cases (medical department) (x100)
Denominator	Number of admissions (medical department)
Sources	Hospitals registers - medical department (electronic sources)

C5.1E.A2 Repeated hospital admissions for any causes (surgical department)

Computational level : Hospital

The general indicator of repeated hospital admissions for any causes is here focused on surgical problems. The indicator measures the number of patients readmitted to a hospital within 30 days of the previous admission for any causes in surgical department. If appropriately treated in this department, the patient should not be re-admitted before one month of discharge.

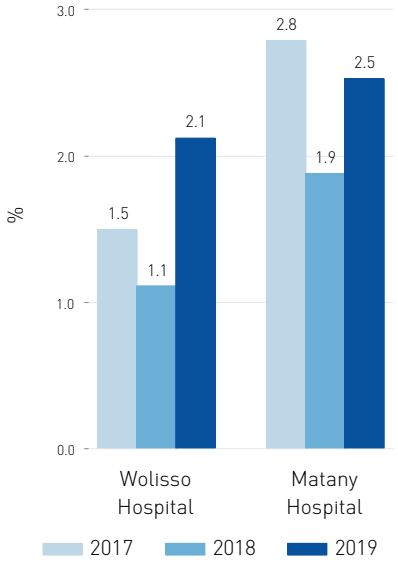


Numerator	Number of repeated hospital admissions within 30 days for any cases (surgical department) (x100)
Denominator	Number of admissions (surgical department)
Sources	Hospitals registers - surgical department (electronic sources)

C5.1E.A3 Repeated hospital admissions for any causes (maternity department)

Computational level : Hospital

The general indicator of repeated hospital admissions for any causes is here focused on maternal health problems. The indicator measures the number of patients readmitted to a hospital within 30 days of the previous admission for any causes in maternity department. If appropriately treated in this department, the patient should not be re-admitted before one month of discharge.

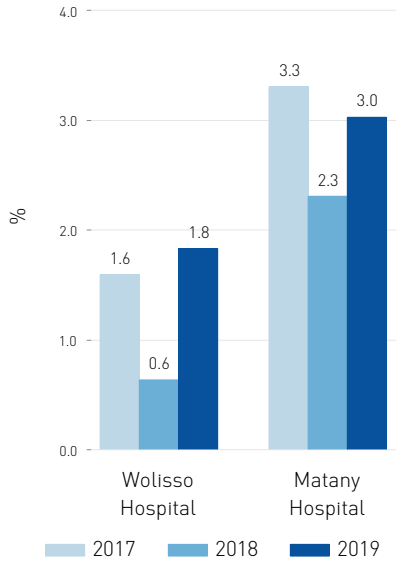


Numerator	Number of repeated hospital admissions within 30 days for any cases (maternity department) (x100)
Denominator	Number of admissions (maternity department)
Sources	Hospitals registers - maternity department (electronic sources)

C6.4.1A Infection rate due to surgical wounds (emergency and elective surgery procedures)

Computational level : Hospital

Surgical wound infection is a major subgroup of all nosocomial infections that are considered a serious public health risk and drain of resources from the health care system. The indicator monitors the infection rate due to surgical wounds assessed after at least 5 days from the surgical intervention.

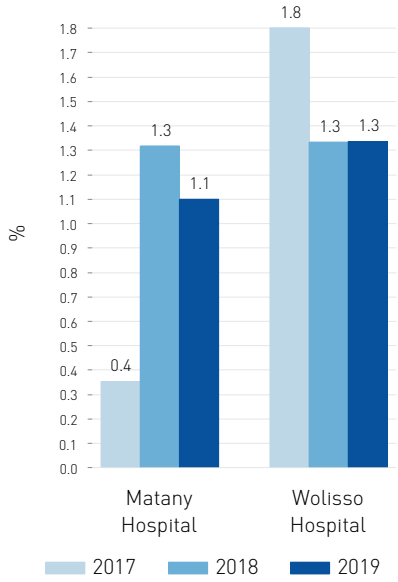


Numerator	Number of wound infections in patients assessed after at least 5 inpatient days (x100)
Denominator	Number of surgical patients with at least 5 inpatient days
Sources	Hospitals registers - surgical department (electronic sources)

C6.4.2A Inpatient mortality rate in low-mortality cases

Computational level : Hospital

Inpatient mortality rate can be considered as a predictor of the quality of care, but it requires adjustment for severity of illness. This indicator illustrates the inpatient mortality rate due to low-mortality causes. The definition of low-mortality cases was defined internally according to the hospital coding system. In the future a more accurate codes diagnosis and defintion of complex/non complex with a broader consensus among physicians is envisaged.

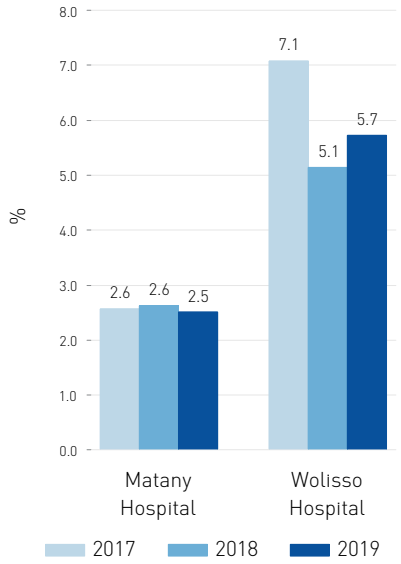


Numerator	Number of patients died with low complex cases mortality (x100)
Denominator	Number of discharged patients with low complex cases mortality
Sources	Hospitals registers - surgical department (electronic sources)

C6.4.2B Inpatient mortality rate in high-mortality cases

Computational level : Hospital

Inpatient mortality rate can be considered as a predictor of the quality of care, but it requires adjustment for severity of illness. This indicator illustrates the inpatient mortality rate due to high-mortality causes. The definition of high-mortality cases was defined internally according to the hospital coding systems and individual experience and judgement. In the future a more accurate codes diagnosis and defintion of complex/non complex with a broader consensus among physicians is envisaged.



Numerator	Number of patients died with high complex cases mortality (x100)
Denominator	Number of discharged patients with high complex cases
Sources	Hospitals registers - surgical department (electronic sources)

MATERNAL AND CHILD CARE

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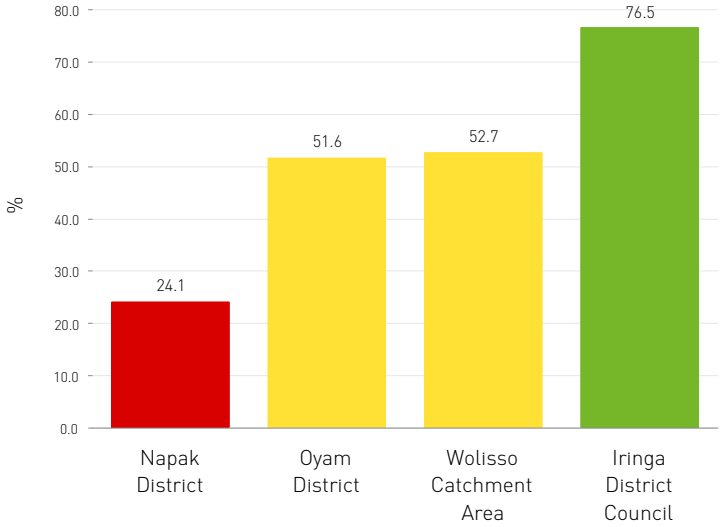
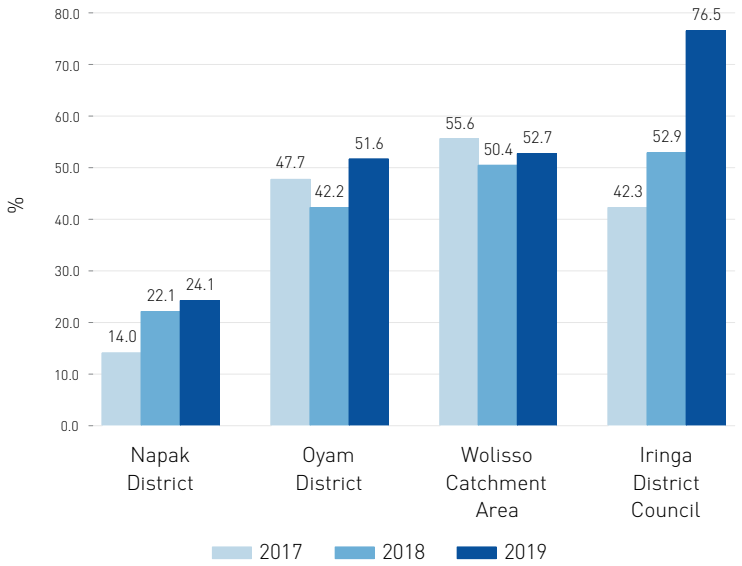
C7.28 Proportion of pregnant women who attended ANC 4+ during the current pregnancy

Computational level : Residence

The indicator measures the number of pregnant women who attended more than four ante - natal care (ANC) visits in the reference area with respect to the total number of expected deliveries in the reference year. The rationale of this indicator comes from the guidelines of the WHO that recommended a minimum of four antenatal care contacts (actually eight) to reduce perinatal mortality and improve women's experience of care. It was also used as an indicator for assessing maternal health in the context of the Millennium Development Goals (MDGs). The target adopted was fixed taking into account the WHO standards and the average value of this indicator among African countries.



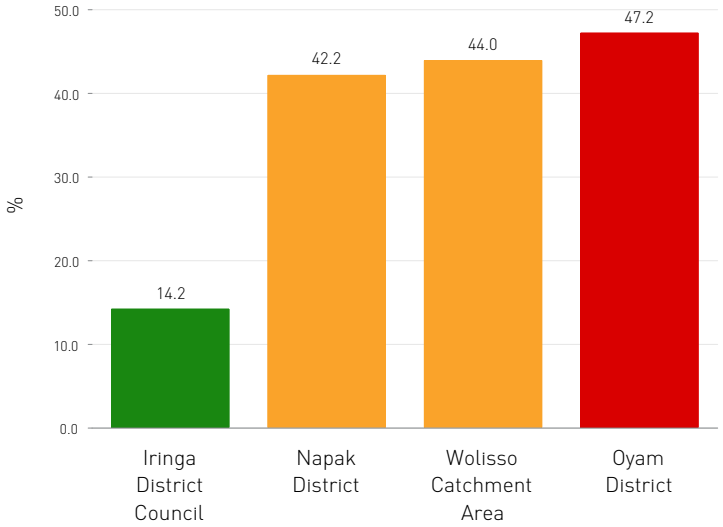


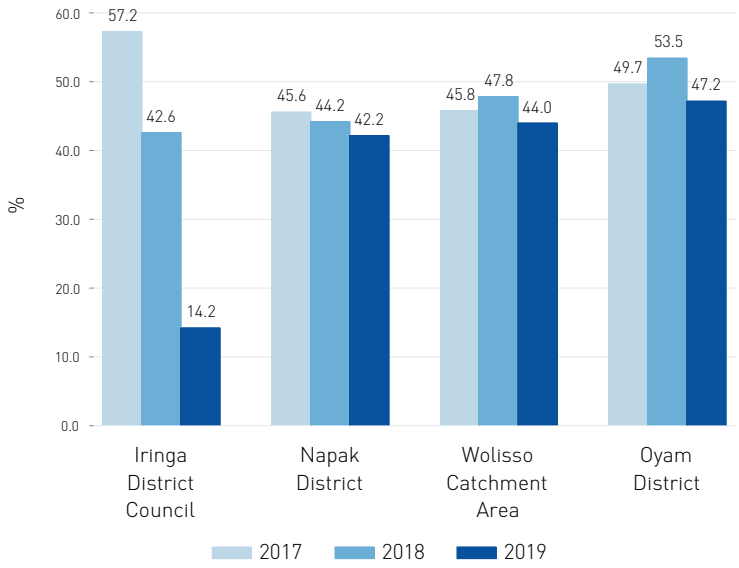
Numerator	Number of pregnant women who attended more than four ANC (x100)
Denominator	Total number of expected pregnancies
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C7.29 Drop out Rate of ANC1 to ANC + 4

Computational level : Residence

This indicator provides a view of the drop-out rate from ANC visits, namely the rate of pregnant women who did not attend up to 4 ANC visits in the reference area. The indicator contributes to capture pregnant women attending at least one ANC visit with a live birth within the reference area who were unable to attend the recommended four ANC visits and to point out the missed opportunity for health services to retain pregnant women within maternal care pathway. The target adopted was fixed taking into account the WHO standards and the average value of this indicator among African countries.



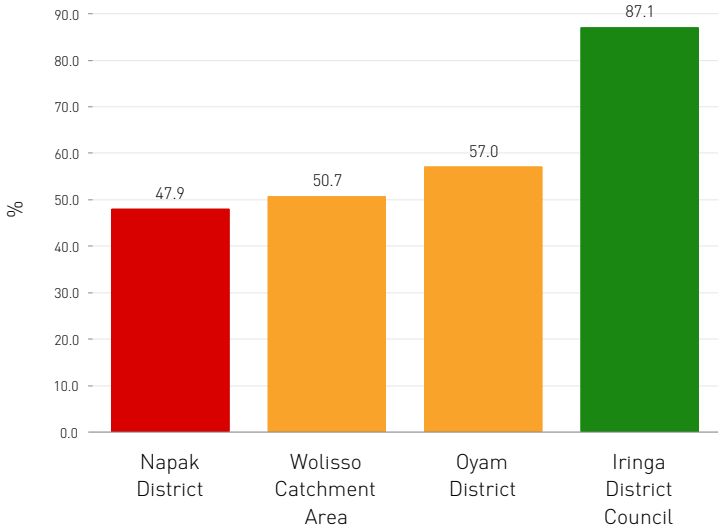


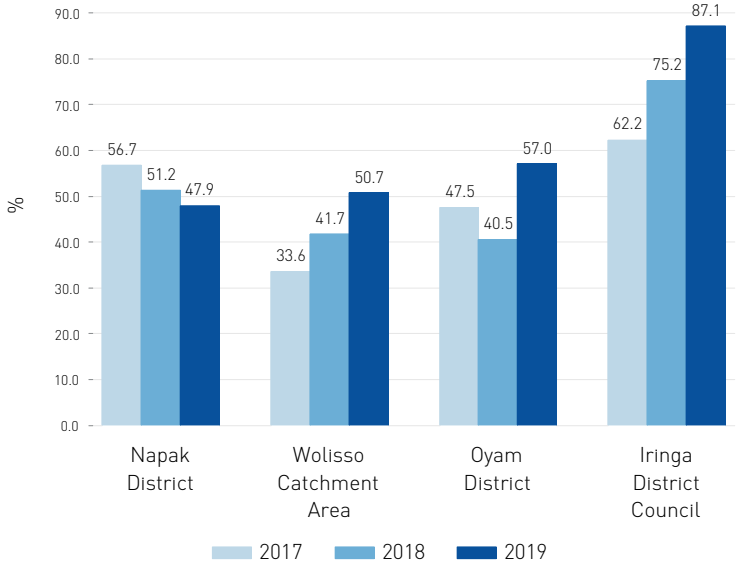
Numerator	(ANC visits I -ANC visits IV) (x100)
Denominator	ANC visits I
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C7.30 Proportion of pregnant women tested for syphilis

Computational level : Residence

Syphilis testing and treatment during pregnancy can effectively prevent adverse pregnancy outcomes related to syphilis. The WHO recommends the syphilis testing of all pregnant women within the basic ANC package in order to eliminate mother-to-child transmission of syphilis. This indicator shows the percentage of pregnant women who are tested for syphilis in the reference area. It is considered as a proxy of the quality of care because the output depends on the correct functioning of a wide series of healthcare activities. The target adopted was fixed taking into account the WHO standards and the average value of this indicator among African countries.



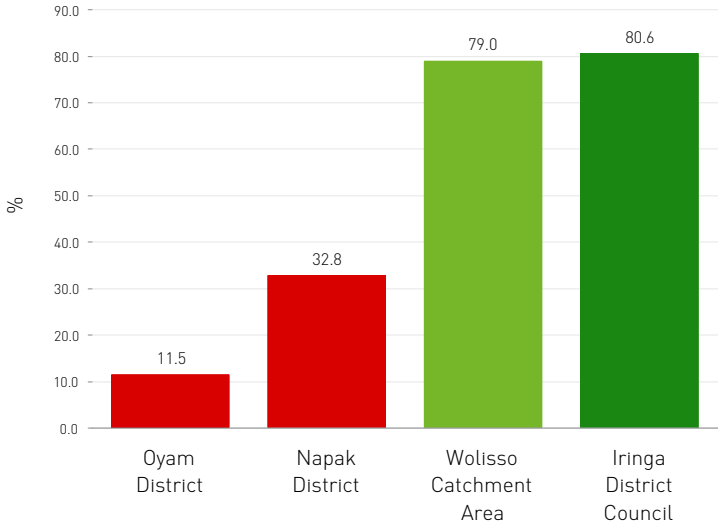


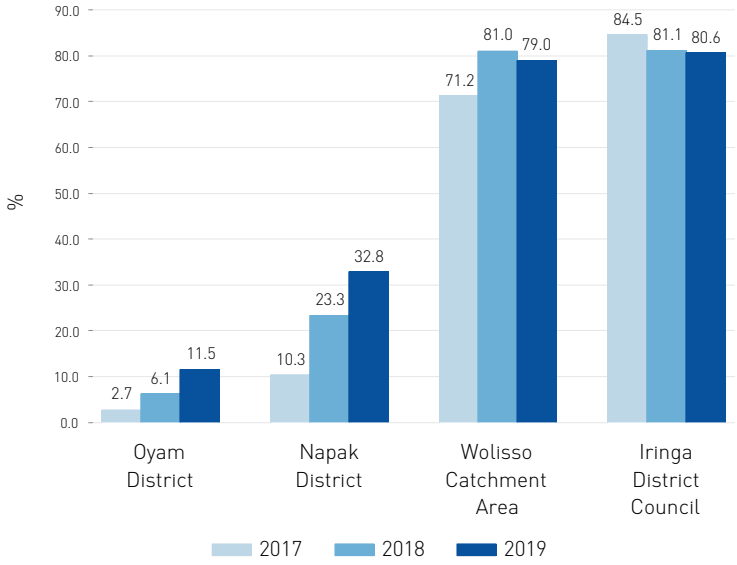
Numerator	Number of pregnant women tested for syphilis (x100)
Denominator	Total number of pregnant mothers attended at least one ANC visit
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C7.32 Proportion of women with early PNC

Computational level : Residence

The postnatal period is critical to the health and survival of a mother and her newborn, especially during the hours and days after birth. According to the WHO, lack of care in this vulnerable time period may result into death or disability as well as missed opportunities to promote healthy behaviours, affecting women, newborns, and children. This indicator illustrates the percentage of women who received at least one postnatal care visit within 7 days from childbirth with respect to the total number of expected deliveries in the reference year. The target adopted was fixed taking into account the WHO standards and the average value of this indicator among African countries.



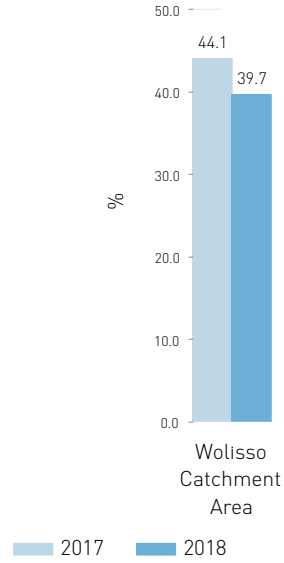


Numerator	Number of postnatal visits within 7 days of delivery (x 100)
Denominator	Number of expected deliveries
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C7.31 Percentage of avoidable referrals

Computational level : Residence

The referral system is particularly important in pregnancy care and childbirth for providing access to emergency obstetric care. However, the referral system should be used appropriately. The indicator is an observation indicator and it expresses the percentage of referrals from the residential health centers to the reference hospital that were evaluated as avoidable by a public health officer. This indicator is available only in the Wolisso area because these processes are monitored only there.

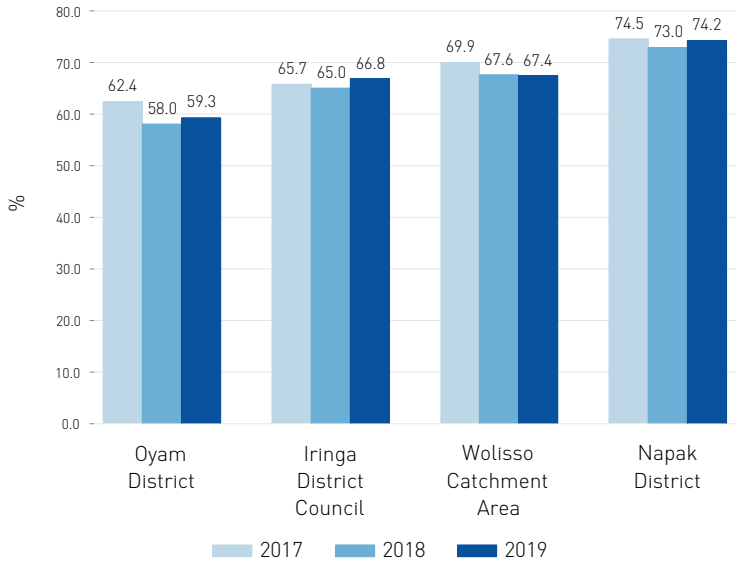


Numerator	Number of avoidable referrals (x100)
Denominator	Total number of referrals
Sources	Hospital's registers - public health department (paper-based source)

C7.33A Percentage of deliveries in lower level units

Computational level : Residence

This indicator expresses the percentage of deliveries which were performed at residential level and not in the hospital with respect to the total number of effective deliveries. It helps to monitor the proportion of deliveries that are managed in health centers at residence level. It is an observation indicator.

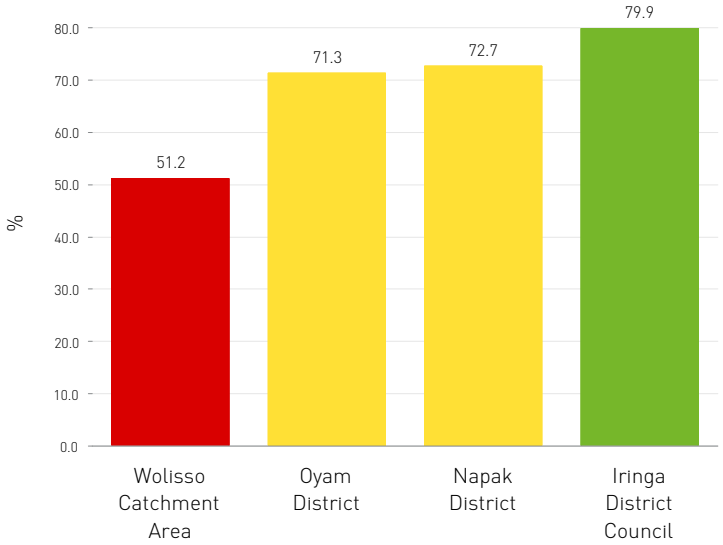


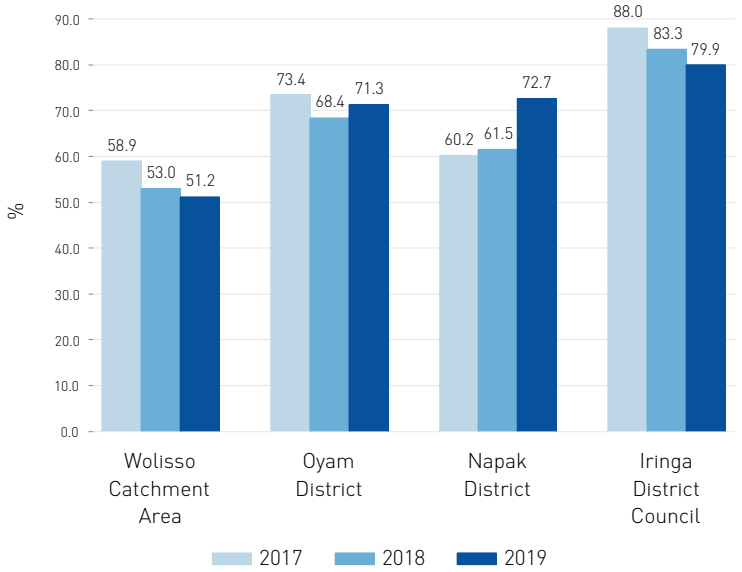
Numerator	Number of deliveries performed in HCs (x100)
Denominator	Total number of deliveries
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C7.34 Percentage of supervised deliveries in the catchment area (deliveries in the reference hospital and in the district lower level units)

Computational level : Residence

Supervised delivery has the potential to improve birth outcomes for both women and newborns since it should ensure safe birth, by reducing both actual and potential complications. This indicator shows the percentage of supervised deliveries performed by skilled health professionals both in the reference hospital and in lower level units with respect to the total number of expected deliveries in the reference area. The target adopted was fixed taking into account the WHO standards and the average value of this indicator among African countries.



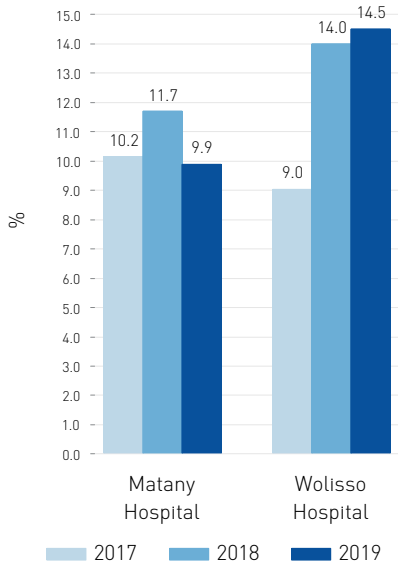


Numerator	Number of total assisted deliveries (x100)
Denominator	Number of expected deliveries
Sources	Ethiopian HMIS/DHIS2, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

C7.1 Percentage of C-section deliveries (NTSV)

Computational level : Hospital

The American College of Gynaecologists and Obstetricians suggests using a specific indicator that limits the analysis to the NTSV case-mix (Nulliparous, Term, Singleton, Vertex - NTSV), in order to compare hospital performance. This measure is also required by the Joint Commission. The percentage of caesarean section NTSV deliveries represents the most appropriate indicator to evaluate the quality of maternal care pathways delivered at hospital level. This indicator remains an observation indicator because data were not available in all the hospitals involved in the study.

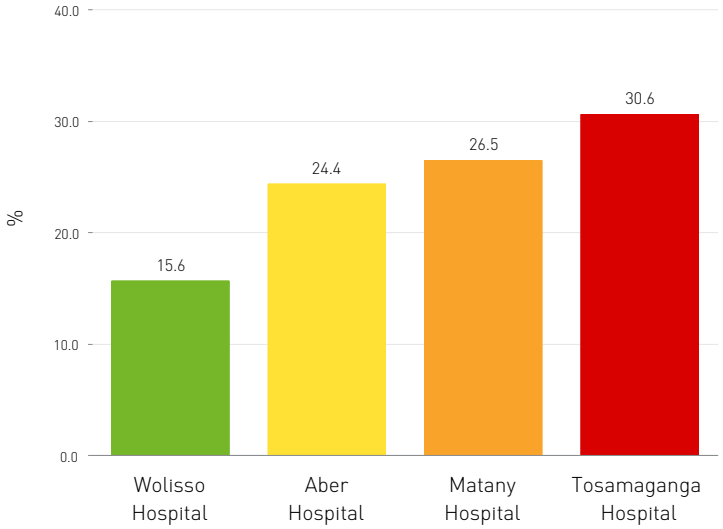


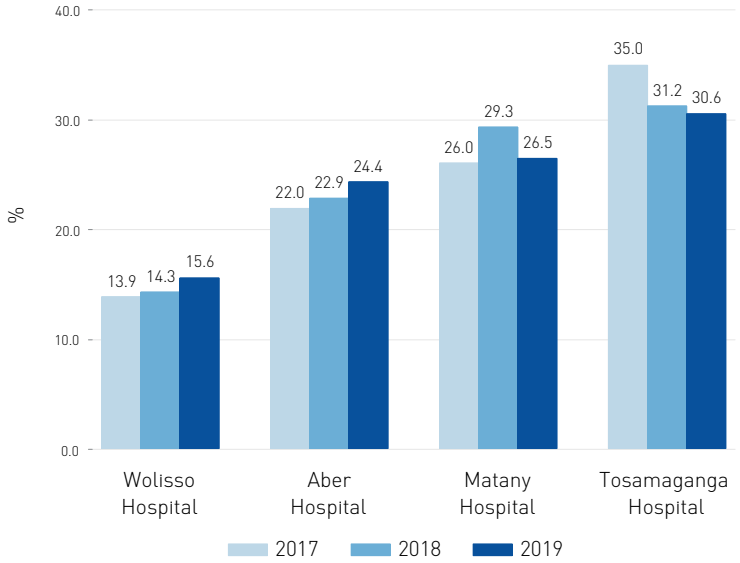
Numerator	Number of C-section NTSV deliveries (x100)
Denominator	Number of NTSV deliveries
Sources	Hospitals registers - maternity department (electronic sources)

C7.1.1 Percentage of caesareans

Computational level : Hospital

Although data comparison of caesarean sections among hospitals is more critical when including deliveries due to the variability between different groups of pregnant women, it is important to monitor the use of a caesarean section. This indicator expresses the raw percentage of deliveries performed with a caesarean section (all cases included). To evaluate this indicator, the target proposed by the WHO was adopted, which is fixed equal to 15%. The same target is currently in use in the IRPES Network as well.



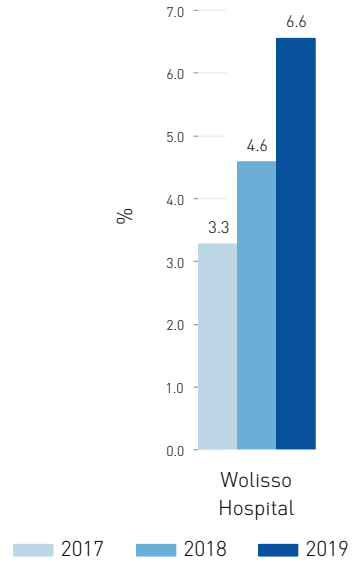


Numerator	Number of caesareans (x100)
Denominator	Number of deliveries
Sources	Hospitals registers - maternity department (paper-based and electronic sources)

C7.1.4 Percentage of elective caesareans (NTSV)

Computational level : Hospital

Considering the progressive rise of cesarean section rate in many countries, which is not associated with improvement in perinatal mortality or morbidity, the rationale of the indicator is to monitor the elective cesareans among the NTSV deliveries. This indicator refers to group 2b of the Robson Classification: NTSV deliveries (Nulliparous, Term, Singleton, Vertex - NTSV) with elective C-section. It measures the percentage of elective C-sections out of the total of NTSV deliveries and it is an observation indicator.

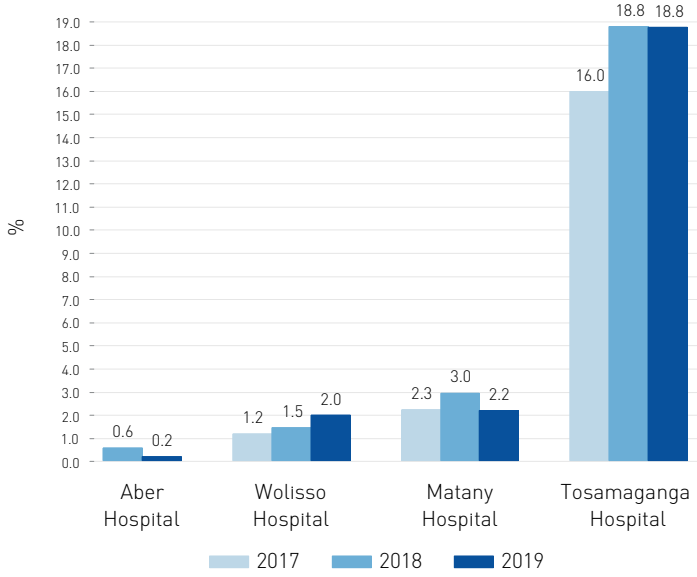


Numerator	Number of elective C-section NTSV deliveries (x100)
Denominator	Number of NTSV deliveries
Sources	Hospitals registers - maternity department (electronic sources)

C7.1.4A Percentage of elective caesareans

Computational level : Hospital

Considering the progressive rise of cesarean section rate in many countries, which is not associated with improvement in perinatal mortality or morbidity, the rationale of the indicator is to monitor the elective caesareans. This indicator expresses the percentage of deliveries performed with an elective caesarean section (all cases included). It is an observation indicator.

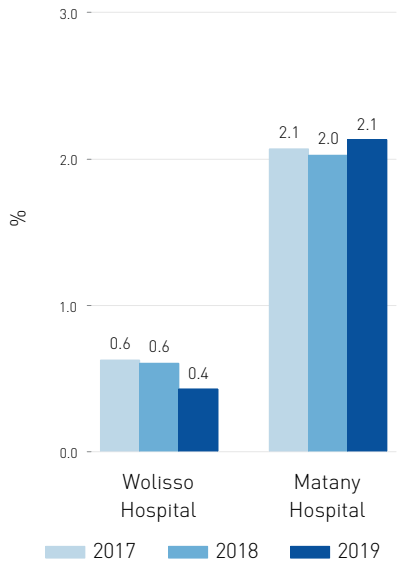


Numerator	Number of elective C-section deliveries (x100)
Denominator	Number of deliveries
Sources	Hospitals registers - maternity department (paper-based and electronic sources)

C7.2 Percentage of induced labours

Computational level : Hospital

Induction of labour is defined as the process of artificially stimulating the uterus to start labour. Induced labours should be used under specific medical indications only. However, the percentage of induced labours has been increasing in the last years in high income countries, as well as in some low- and middle-income countries. This indicator measures the induced labours on the total number of deliveries at hospital level and it is an observaton indicator.

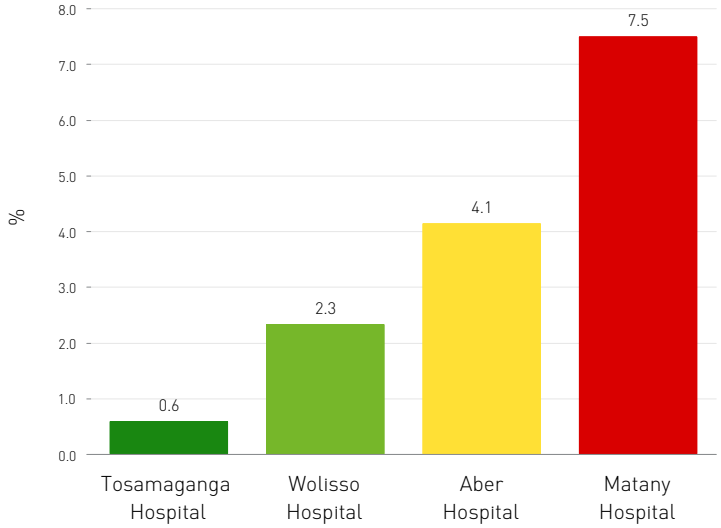


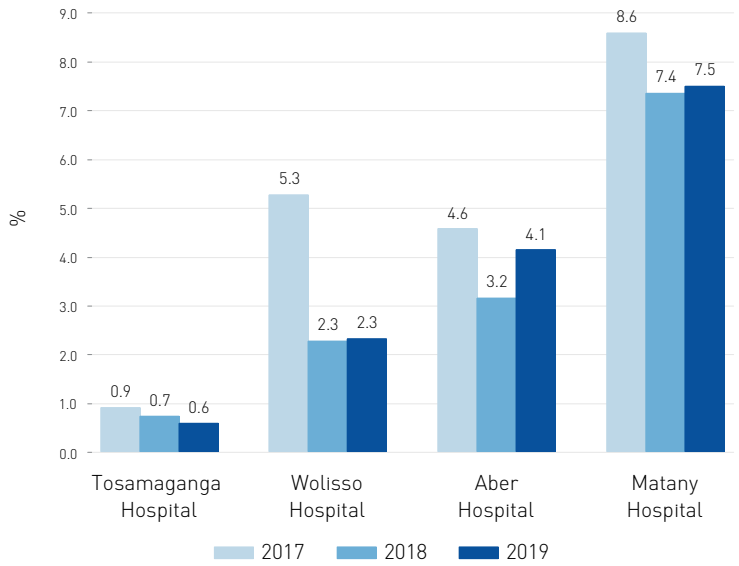
Numerator	Number of induced labours (x100)
Denominator	Number of deliveries
Sources	Hospitals registers - maternity department (paper-based and electronic sources)

C7.20A Percentage of peri-/intra-partum asphyxia

Computational level : Hospital

This indicator contributes to evaluate the services during the childbirth measuring the severe peri/intrapartum asphyxia. Birth asphyxia is caused by a lack of oxygen to organ systems due to a hypoxic or ischemic insult that occurs within close temporal proximity to labor (peripartum) and delivery (intrapartum). It is one of the primary causes of early neonatal mortality. The indicator refers to full-term births (>=37 weeks) with severe asphyxia or subject to hypothermia. In absence of a pre-defined standard, evaluation was performed starting from benchmarking data assessment.



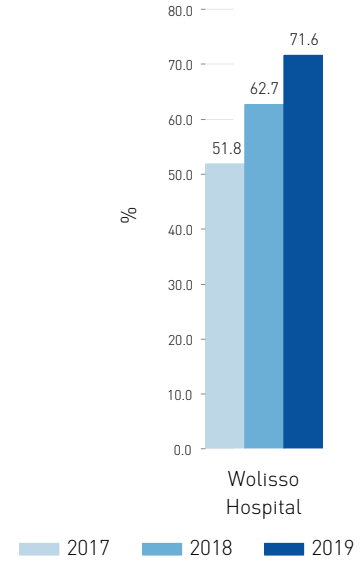


Numerator	Number of newborn children with a diagnosis of severe peri-/intra-partum asphyxia in NICU (Neonatal Intensive Care Unit) (x100)
Denominator	Number of newborn children
Sources	Hospitals paediatric registers (paper-based and electronic sources)

C7.3 Percentage of episiotomies (NTSV)

Computational level : Hospital

Episiotomy is a frequently used intervention during vaginal delivery. It has become a routine practice even without evidence of its effectiveness both in the short- and in the medium- and long-term. Indeed, according to the WHO policies, routine or liberal use of episiotomy is not recommended for women undergoing spontaneous vaginal birth. This indicator focuses only on nulliparous, term, singleton, vertex (NTSV) deliveries with episiotomies. It is an observaton indicator.

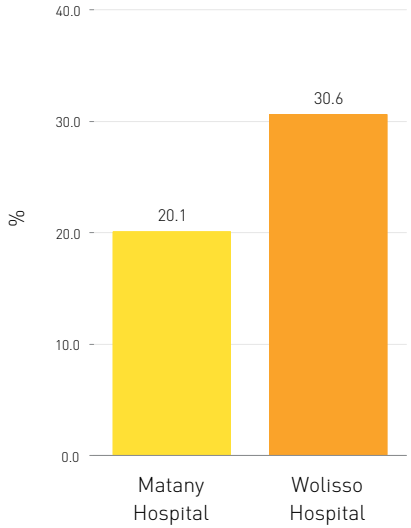


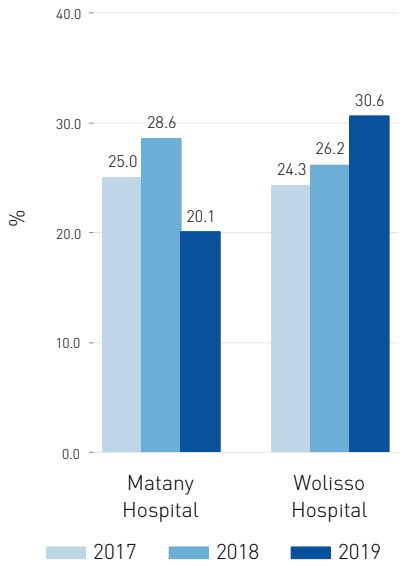
Numerator	Number of NTSV episiotomies performed (x100)
Denominator	Number of NTSV deliveries
Sources	Hospitals registers - maternity department (electronic sources)

C7.3A Percentage of episiotomies

Computational level : Hospital

Episiotomy is a frequently used interventions during vaginal delivery. It has become a routine practice even without evidence of its effectiveness both in the short, in the medium and long-term. Indeed, according to the WHO policies, routine or liberal use of episiotomy is not recommended for women undergoing spontaneous vaginal birth. This indicator expresses the percentage of episiotomies performed, when considering all the vaginal deliveries in the reference year at the hospital level. The standard of 12% was fixed based on the stardand emerging from the benchmarking in the IRPES Network.



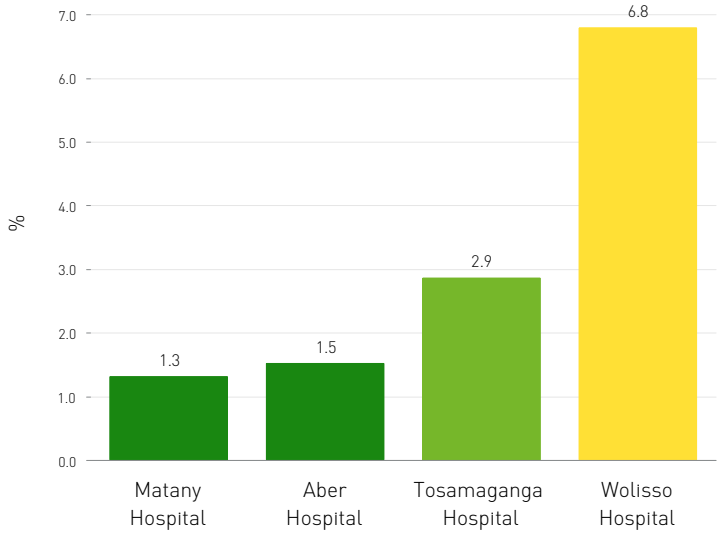


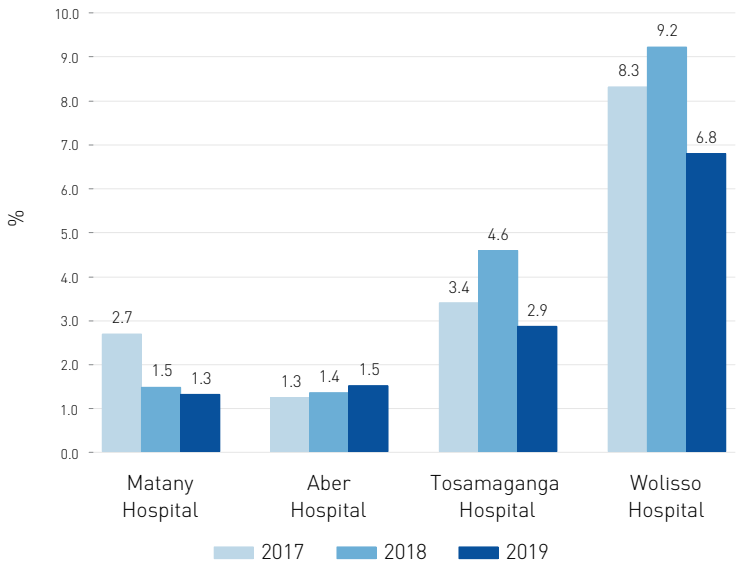
Numerator	Number of episiotomies performed for vaginal deliveries (x100)
Denominator	Number of vaginal deliveries
Sources	Hospitals registers - maternity department (paper-based and electronic sources)

C7.6 Percentage of assisted deliveries (forceps or ventouse)

Computational level : Hospital

Operative vaginal births refer to deliveries of the fetal head assisted either by vacuum extractor or by forceps. The indicator shows the percentage of vaginal assisted deliveries performed through the use of forceps or ventouse. It should be considered together with the percentage of caesarean births, in order to identify any possible correlation between a lower percentage of caesarean births and an increased use of operative deliveries. The standard of 2,5% was fixed based on the guidelines followed in the IRPES Network.



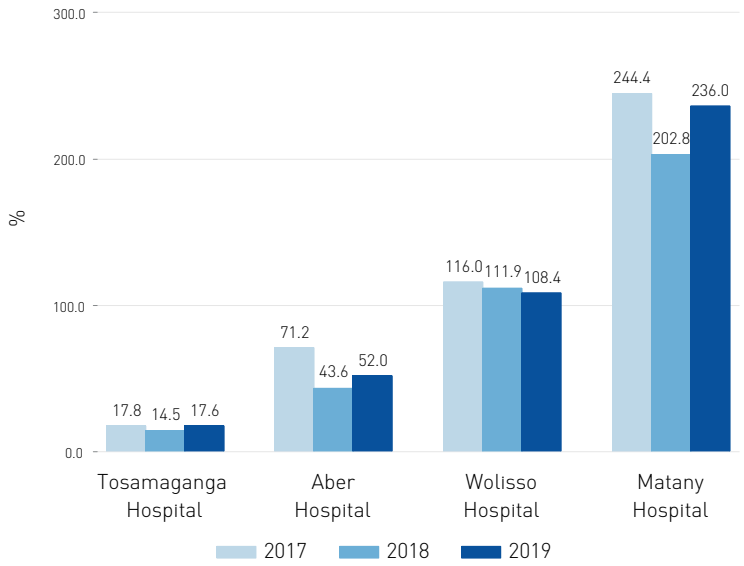


Numerator	Number of vaginal deliveries with forceps or ventouse (x100)
Denominator	Number of vaginal deliveries
Sources	Hospitals registers - maternity department (paper-based and electronic sources)

C7.7.1 Paediatric hospitalization rate (<1 year) , per 1.000 residents

Computational level : Hospital

The rationale of measuring hospitalization rate of children aged less than 1 year is to monitor how health organisations are able to answer to the children's health needs. In high income countries, the purpose is to keep hospitalizations low and prefer care at district level. In the areas of interest, this indicator may depend on the interconnectedness of a number of clinical, social and cultural factors peculiar of different contexts of analysis. For this reason it is an observation indicator.

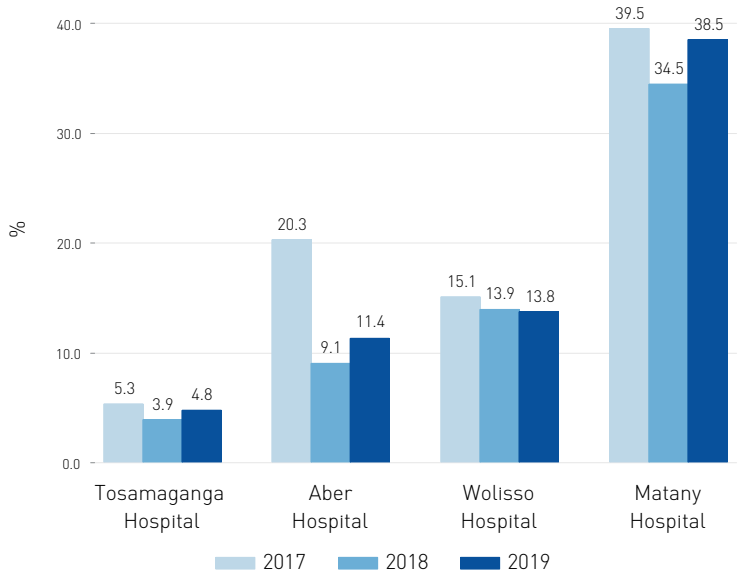


Numerator	Number of hospitalizations (< 1 year) (x1.000)
Denominator	Estimated resident population (<1 year)
Sources	Wolisso paediatric registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany paediatric registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga paediatric registers and Tanzanian DHIS2 (paper - based and electronic sources); Aber paediatric registers and Ugandan eHMIS/DHIS2 (paper - based and electronic sources)

C7.7A Paediatric hospitalization rate (0-12 years), per 1.000 residents

Computational level : Hospital

The rationale of measuring hospitalization rate of children aged less than 12 year is to monitor how health organisations are able to answer to the children's health needs. In high -income countries, the purpose is to keep hospitalizations low and prefer care at district level. The hospitalization rate of children in paediatric age (from 0 to 12) is standardized by 1.000 inhabitants from the reference area. In the districts of interest, this indicator may depend on the interconnectedness of a number of clinical, social and cultural factors peculiar of different contexts of analysis. For this reason it is an observation indicator.

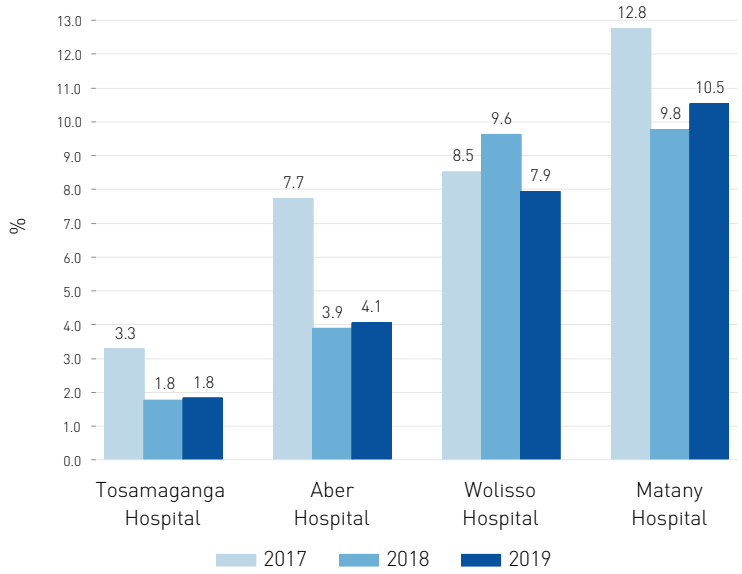


Numerator	Number of hospitalizations (< 12 years) (x1.000)
Denominator	Estimated resident population (<15 years)
Sources	Wolisso paediatric registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany paediatric registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga paediatric registers and Tanzanian DHIS2 (paper - based and electronic sources); Aber paediatric registers and Ugandan eHMIS/DHIS2 (paper - based and electronic sources)

C7D.19.1A Paediatric hospitalization rate for ARI (0-5 years), per 1.000 residents

Computational level : Hospital

In low-income countries, acute respiratory infections (ARI) are an important cause of hospitalization of children younger than 5 years. The hospitalization rate of children aged from 0 to 5 years for ARIs may depend on the interconnectedness of a number of clinical, social and cultural factors peculiar of different contexts of analysis. This indicator is standardized by 1.000 inhabitants from the reference area and it is an observation indicator.

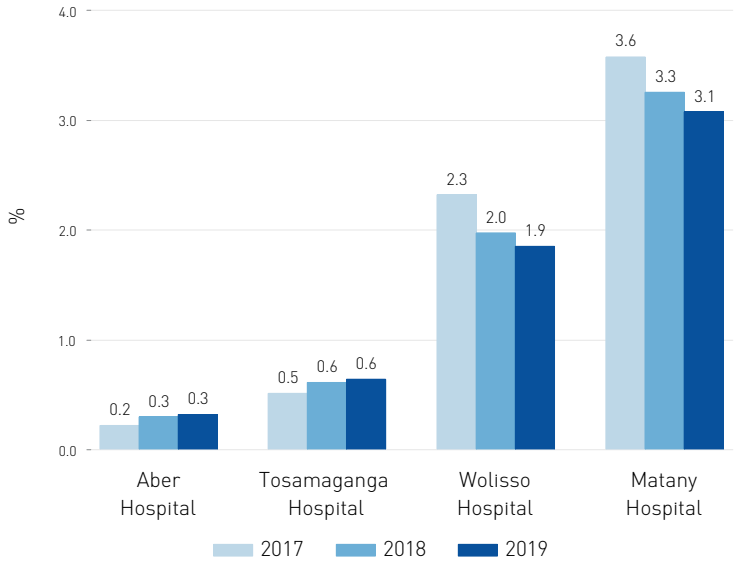


Numerator	Number of hospitalizations for ARI (0-5 years) (x1.000)
Denominator	Estimated resident population (<5 years)
Sources	Wolisso paediatric registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany paediatric registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga paediatric registers and Tanzanian DHIS2 (paper - based and electronic sources); Aber paediatric registers and Ugandan eHMIS/DHIS2 (paper - based and electronic sources)

C7D.19.2A Paediatric hospitalization rate for gastroenteritis (<15 years), per 1.000 residents

Computational level : Hospital

In low-income countries each year millions of children die because of acute gastroenteritis. Treatment at district level should be provided for these diseases and hospitalization is recommended for children who do not respond to oral rehydration therapy. The hospitalization rate of children aged less than 15 years for gastroenteritis may depend on the interconnectedness of a number of clinical, social and cultural factors peculiar of different contexts of analysis. This indicator is standardized by 1.000 inhabitants from the reference area. It is an observation indicator.



Numerator	Number of hospitalizations for gastroenteritis (<15 years) (x1.000)
Denominator	Estimated resident population (<15 years)
Sources	Wolisso paediatric registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany paediatric registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga paediatric registers and Tanzanian DHIS2 (paper - based and electronic sources); Aber paediatric registers and Ugandan eHMIS/DHIS2 (paper - based and electronic sources)

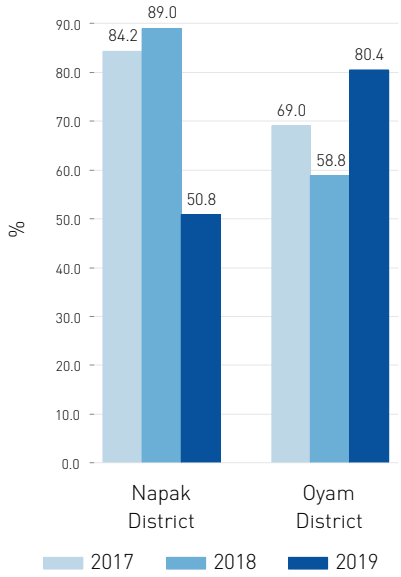
INFECTIOUS DISEASES

DOCTORS WITH AFRICA CUAMM

IDPM01 Percentage of ANC visits during which a Long-Lasting Insecticidal Net (LLIN), or similar, is distributed

Computational level : Residence

This indicator is an observation indicator. It expresses the percentage of ANC visits during which a LLIN was delivered to pregnant women for protection against malaria.

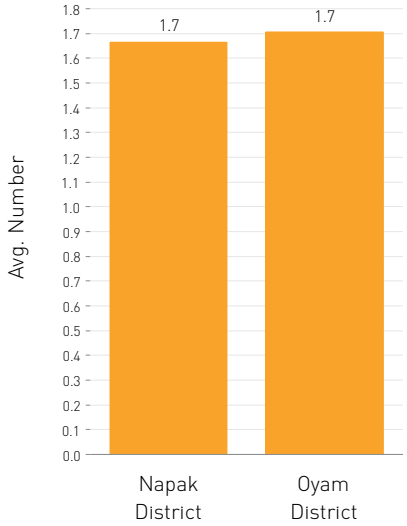


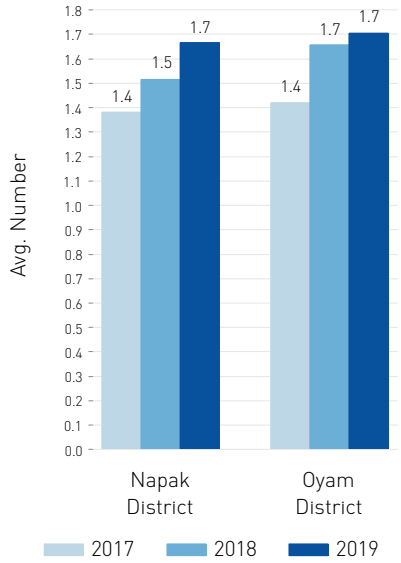
Numerator	LLIN (or similar) distribuited during the first ANC visit (x100)
Denominator	Number of first ANC visits
Sources	Ugandan eHMIS/DHIS2 (electronic source)

IDPM02 Average number of SP doses per ANC visit

Computational level : Residence

The indicator shows, in terms of average number, how many sulfadoxine-pyrimethamine (SP) doses were administered to pregnant women with respect to the total number of expected deliveries in the reference area. The standard of 3 doses per expected delivery was fixed based on the WHO guidelines.



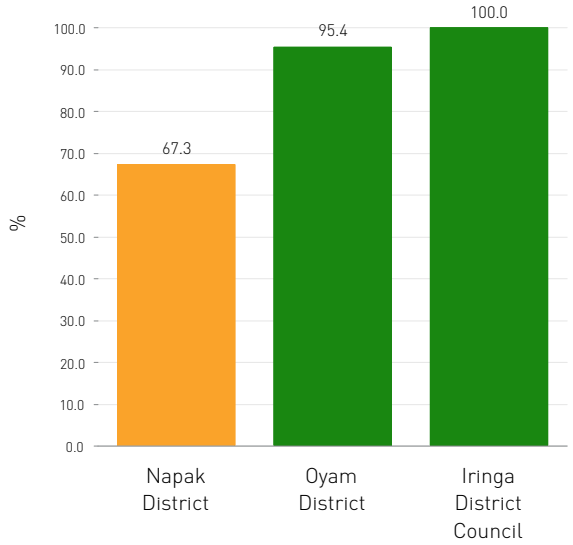


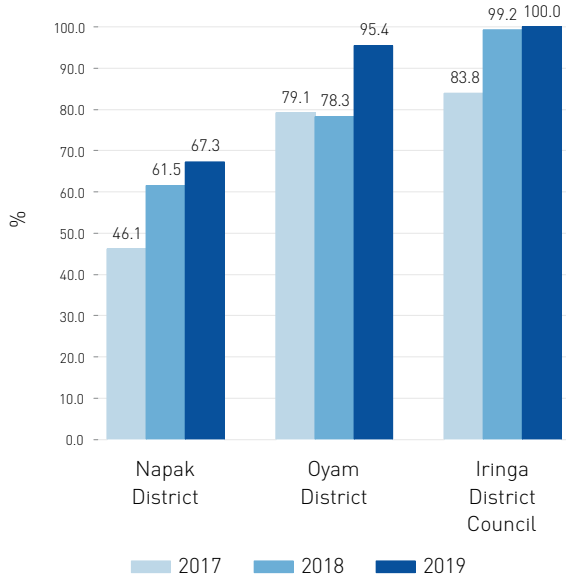
Numerator	Number of SP doses
Denominator	Number of first ANC visits
Sources	Ugandan eHMIS/DHIS2 (electronic source)

IDPM03 Percentage of confirmed malaria cases (BS+RDT)

Computational level : Residence

This indicator measures the percentage of malaria cases that were confirmed following the blood smear (BS) on a microscope slide and rapid diagnostic testing (RDT) examinations with respect of the total number of diagnosis of malaria cases. The standard of 90% was fixed based on the WHO standard.



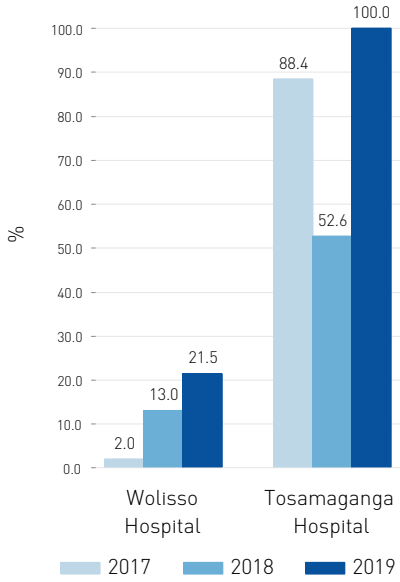


Numerator	Malaria cases confirmed (BS+RDT) (x100)
Denominator	Total number of diagnosis of malaria cases
Sources	Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPM04 Percentage of discharges for severe malaria

Computational level : Hospital

This indicator is an observation indicator at the hospital level. It provides the percentage of the total number of discharged patients with a diagnosis of severe malaria over the total number of patients discharged with a diagnosis of malaria. However, the indicator may depend on how severe malaria is defined and on the possibility to capture it correctly from the HIMS system, without mixing severe with non severe cases.

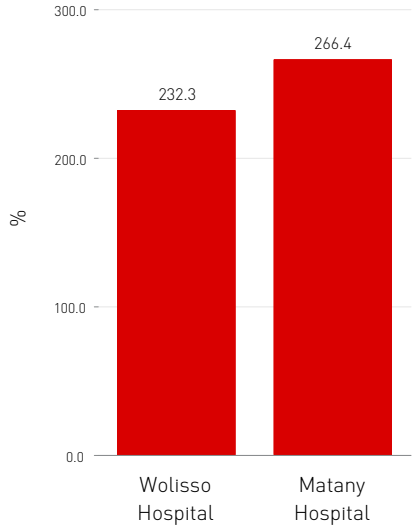


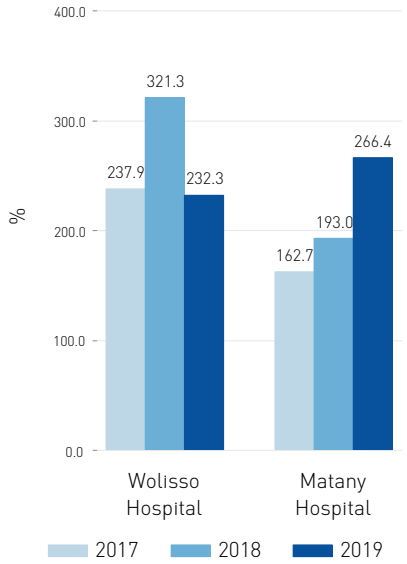
Numerator	Number of discharged with a diagnosis of severe malaria (x100)
Denominator	Number of patients discharged with malaria
Sources	Hospitals registers - medical departments (electronic sources)

IDPM05 Percentage of treatments with ACT

Computational level : Hospital

This indicator shows the percentage of patients treated with artemisinin-based combination therapy (ACT) over the total number of cases affected by malaria at the hospital level both in inpatient and outpatient deparments (IPD and OPD). The indicator plays a crucial role in defining the appropriateness of the treatment and helps identify problems of over/under treatment. The standard of 90% was fixed based on the WHO standard.



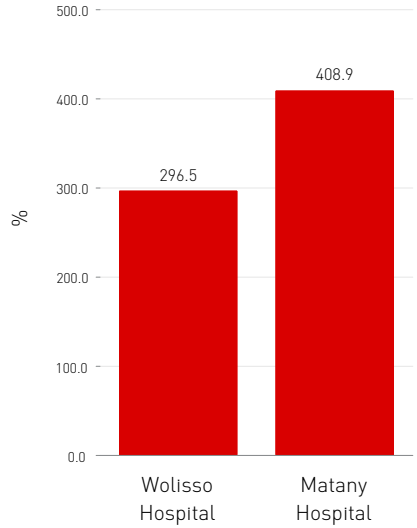


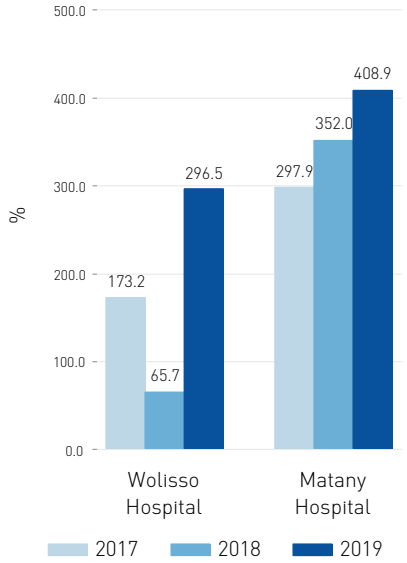
Numerator	Number of treatments with ACT (x100)
Denominator	Total number of malaria cases
Sources	Hospitals registers - medical departments (electronic sources)

IDPM06 Percentage of IV/IM (parenteral artesunate or Quinine) treatments

Computational level : Hospital

This indicator shows the percentage of patients treated with intravenous artesunate/parenteral quinine treatments over the total number of cases affected by malaria at the hospital level. The indicator plays a crucial role in defining the appropriateness of the treatment and helps identify problems of over/under treatment. The standard of 90% was fixed based on the WHO standard.



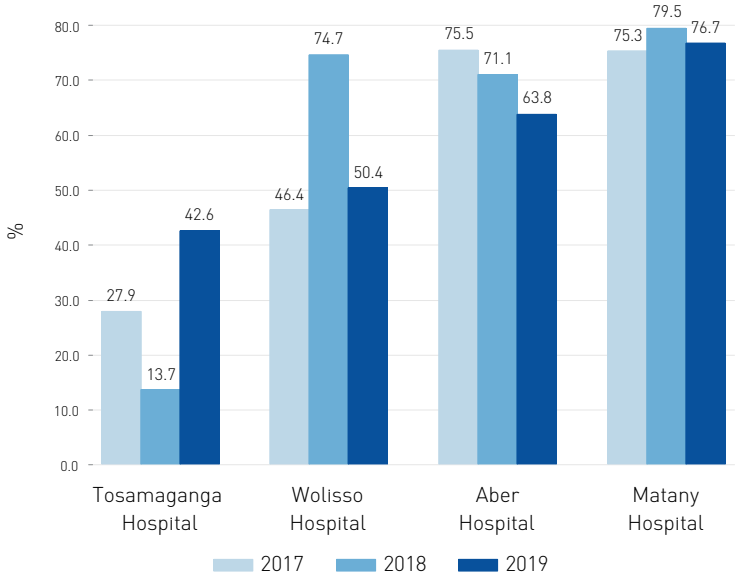


Numerator	Number of intravenous artesunate/parenteral quinine treatments (x100)
Denominator	Number of discharged patients with confirmed malaria
Sources	Hospitals registers - medical departments (electronic sources)

IDPM07 Percentage of malaria cases (< 5 years)

Computational level : Hospital

This indicator is an observation indicator at the hospital level. It gives the percentage of malaria cases in children aged less than five years over the total number of malaria inpatients. This indicator can be considered as a proxy of indication of endemic/ or epidemic situation of malaria in the reference area. If the situation is endemic, children are more affected than adults; this difference decreases if the situation is epidemic.

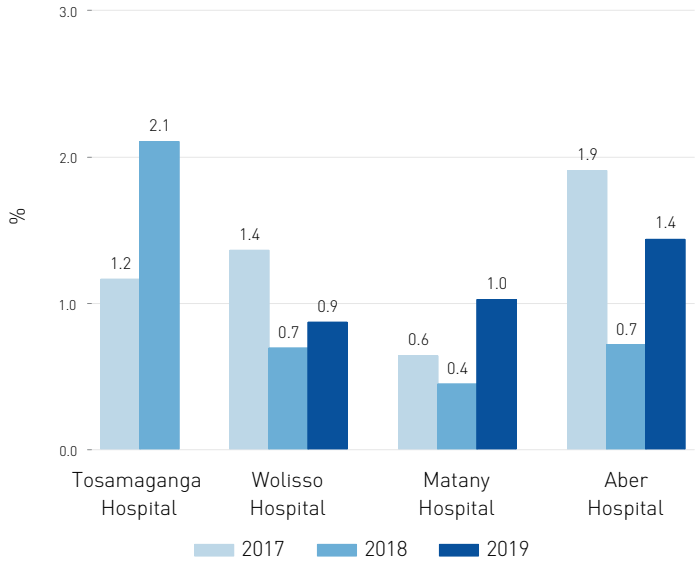


Numerator	Number of inpatients with malaria (children < 5 years) (x100)
Denominator	Number of inpatients with malaria
Sources	Hospitals registers - medical departments (electronic sources)

IDPM08 Percentage of deaths for malaria

Computational level : Hospital

This indicator is an observation indicator at the hospital level. It gives the percentage of deaths due to malaria over the total number of discharges for malaria.

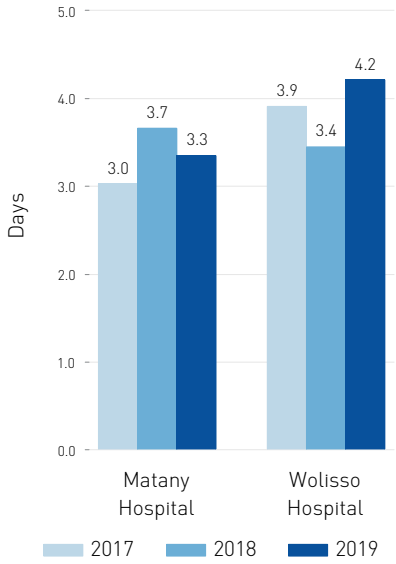


Numerator	Number of deaths with malaria (all ages) (x100)
Denominator	Number of discharged patients for malaria
Sources	Hospitals registers - medical departments (electronic sources); Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPM09 ALOS (malaria cases)

Computational level : Hospital

This indicator is an observation indicator at the hospital level. It provides a view of the average lenght of stay (ALOS) in hospital due to malaria. The indiator can be a proxy of severity of malaria cases treated at hospital level and, if compared with the percentage of severe malaria treated patients (indicator IDPM04), it can raise questions about the appropriateness of the defintion of severe malaria.

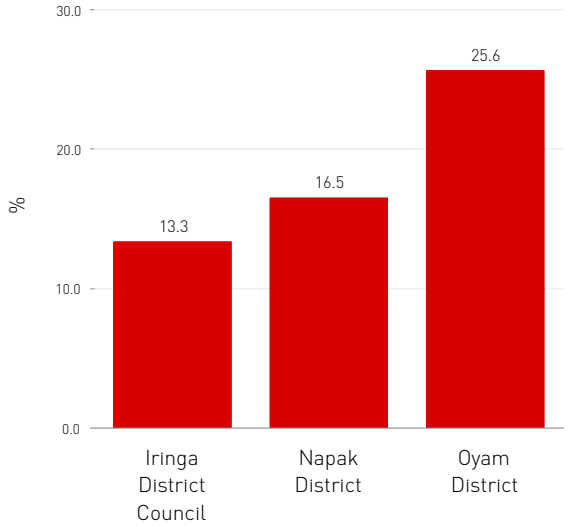


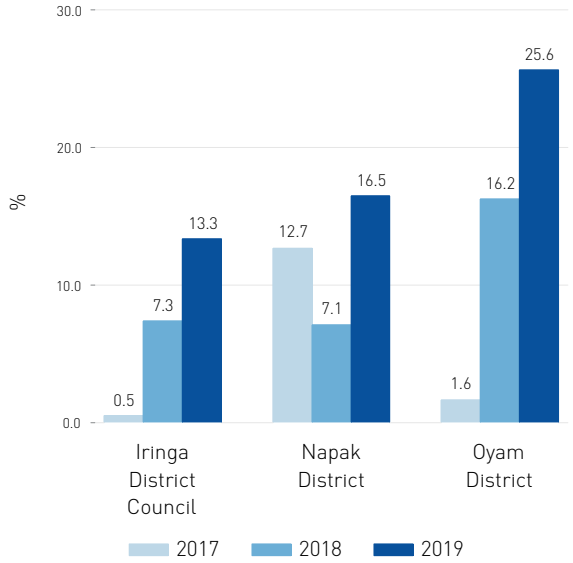
Numerator	Number of inpatient days for malaria
Denominator	Number of inpatients for malaria
Sources	Hospitals registers - medical departments (electronic sources)

IDPT01 Percentage of treatments with isoniazide (IPT)

Computational level : Residence

The indicator shows the percentage of isoniazide preventive therapy (IPT) in children aged less than five years. It represents a proxy of the ability of the system to perform contact tracing at the residence level, identifying patients eligible for prophylaxis as well as the possible infected ones, thus reducing the spreading of the disease. The standard of 90% was fixed based on the WHO standard.



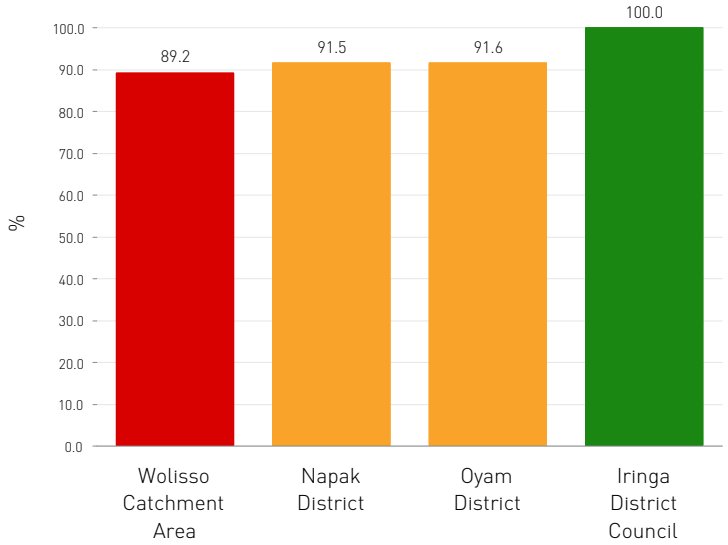


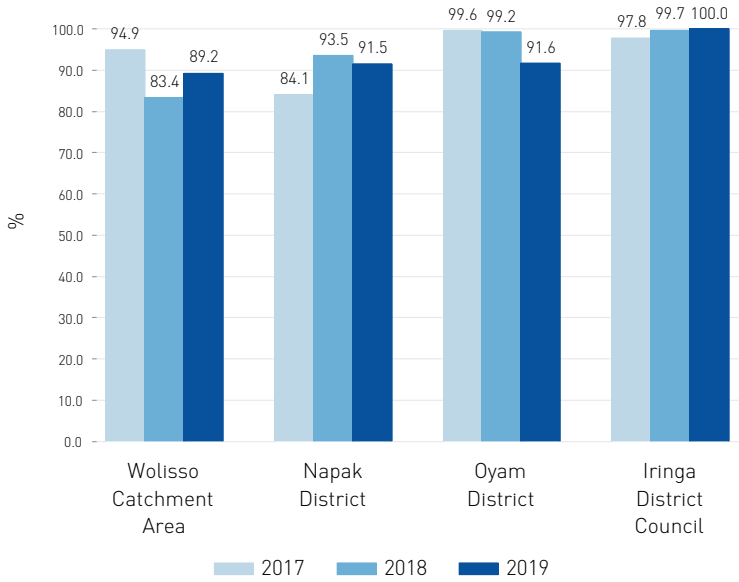
Numerator	Number of treatments with isoniazide (IPT) (x100)
Denominator	Total number of eligible treatments
Sources	Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT02 Percentage of TB cases undergoing the HIV screening

Computational level : Residence

This indicator expresses the percentage of TB patients who underwent an HIV screening during the reference year over the total number of patients diagnosed with TB in the reference area. The standard of 90% was fixed based on the WHO standard.



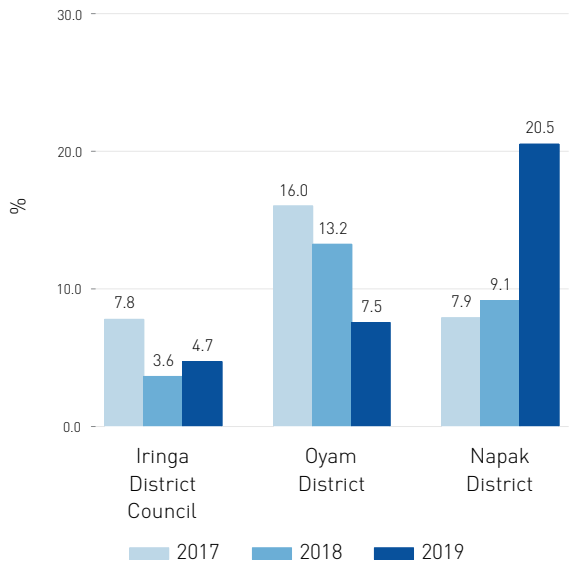


Numerator	Number of TB cases undergoing the HIV screening (x100)
Denominator	Number of TB diagnosed patients
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT03 Percentage of positive TB cases on number of tests

Computational level : Residence

This is an observation indicator at the residence level. It shows the percentage of positive diagnoses of TB confirmed through lab tests or Xperts with respect to the total number of tests performed over presumptive cases. It gives an indication of the capability of selecting potential positive cases and, consequently, it helps evaluate the quality of the laboratory processes.

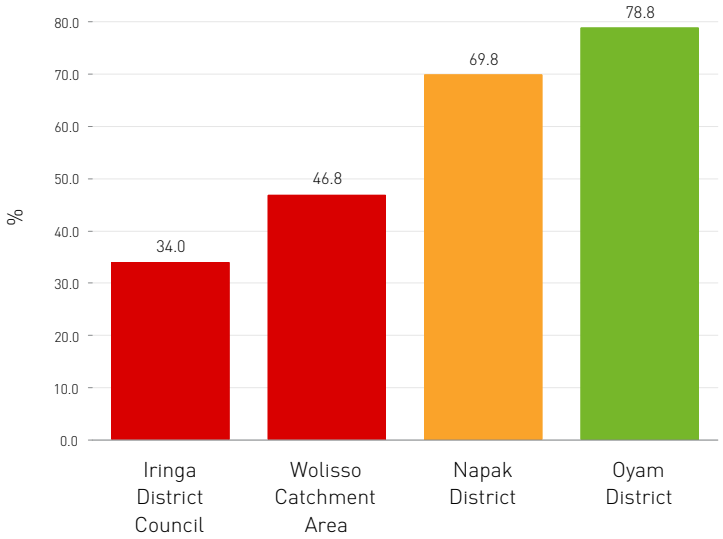


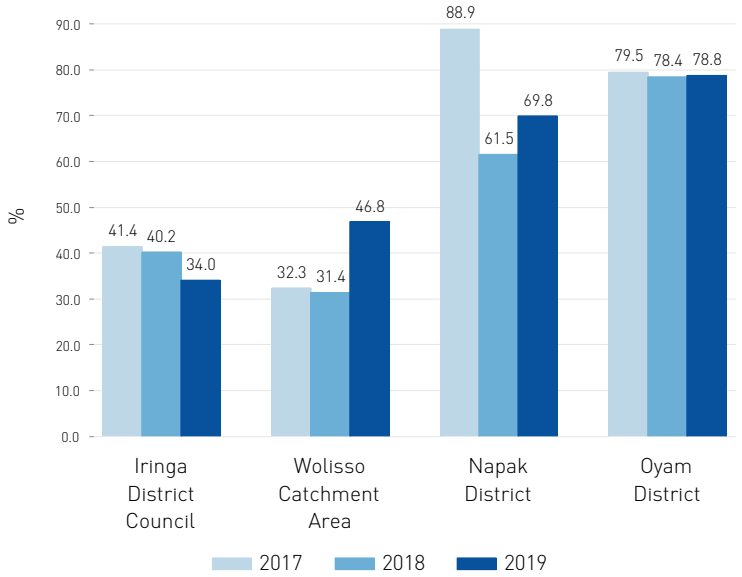
Numerator	Number of positive TB cases (confirmed by lab tests or Xpert) (x100)
Denominator	Number of tests (presumptive cases)
Sources	Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources) and WHO global tuberculosis reports

IDPT04 Percentage of confirmed TB cases on diagnosed cases

Computational level : Residence

This indicator expresses the percentage of bacteriologically confirmed polmunary TB patients (PTB) over the total number of patients diagnosed with TB in the reference year. The standard of 80% was fixed based on the WHO standard.



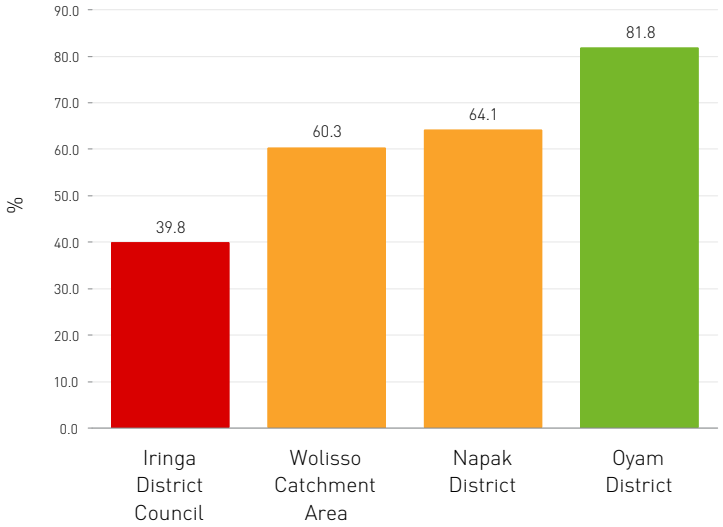


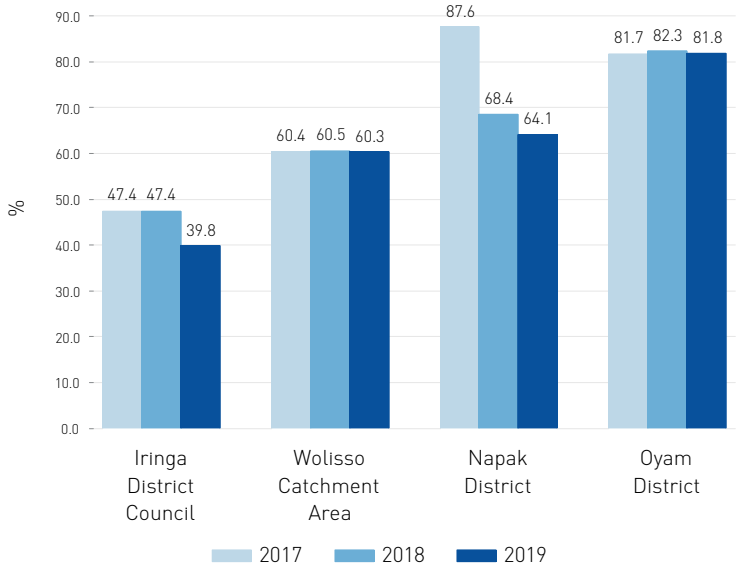
Numerator	Number of positive PTB cases (bacteriologically confirmed) (x100)
Denominator	Number of TB diagnosed patients
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources)

IDPT05 Percentage of confirmed PTB

Computational level : Residence

This indicator expresses the percentage of bacteriologically confirmed polmunary TB patients (PTB) over the PTB cases in the reference year. It evaluates the diagnostic capacity, including the diagnosis of other pulmonary conditions in addition to TB. The standard of 90% was fixed based on the WHO standard.



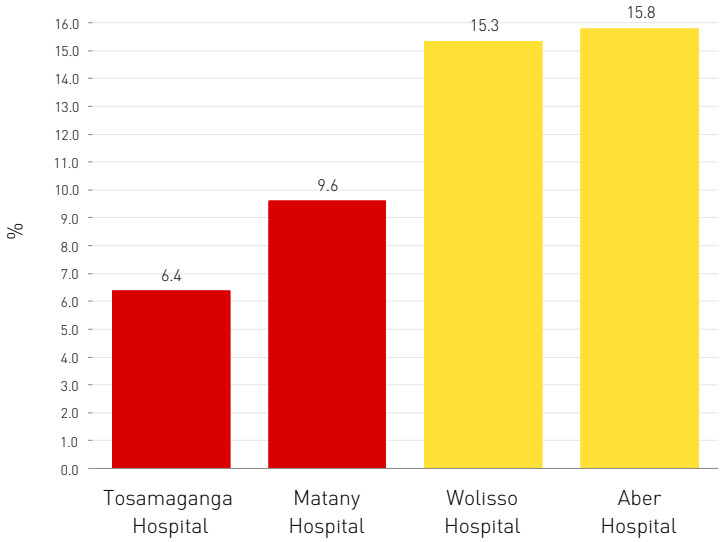


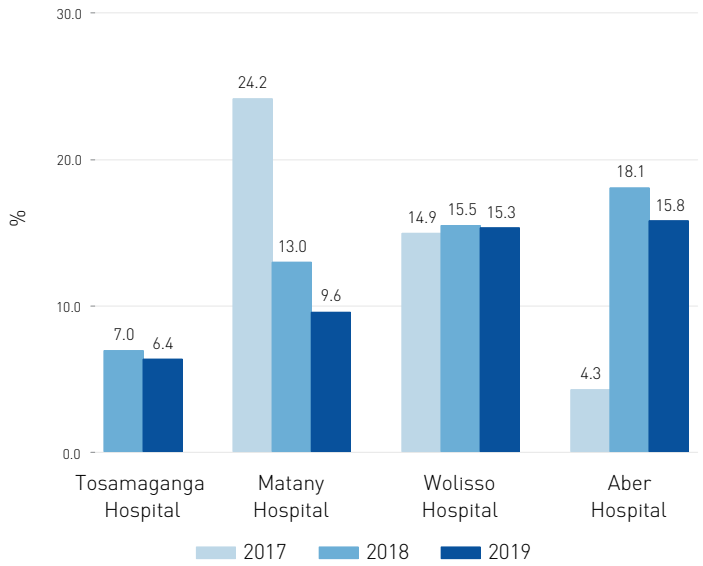
Numerator	Number of positive PTB cases (bacteriologically confirmed) (x100)
Denominator	Number of PTB cases
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT06 Percentage of positive Xpert cases

Computational level : Hospital

This indicator expresses the percentage of positive Xpert cases over the total number of Xpert examinations performed in the reference year. It is related to the utilization of Xpert in an efficient way. Xpert has to be used only according to strict indications in order to get the appropriate measures of positive cases. The standard of 25% was fixed based on the WHO standard.



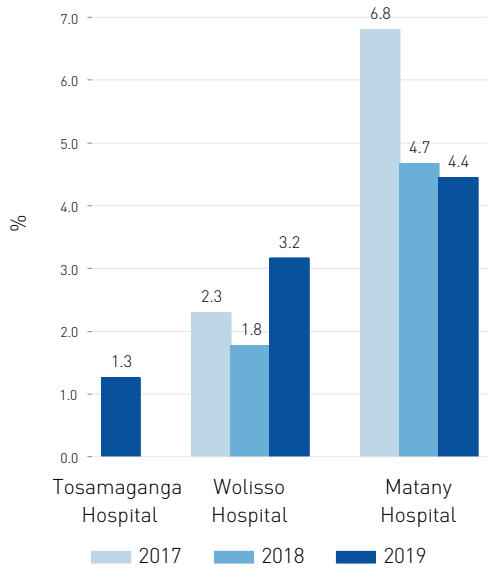


Numerator	Numer of positive Xpert cases (x100)
Denominator	Number of Xpert cases
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources)

IDPT06.1 Percentage of positive Xpert RR

Computational level : Hospital

This is an observation indicator at the residence level. It shows the percentage of positive Xpert rifampicin-resistance (RR) over the total number of positive TB cases diagnosed with Xpert.

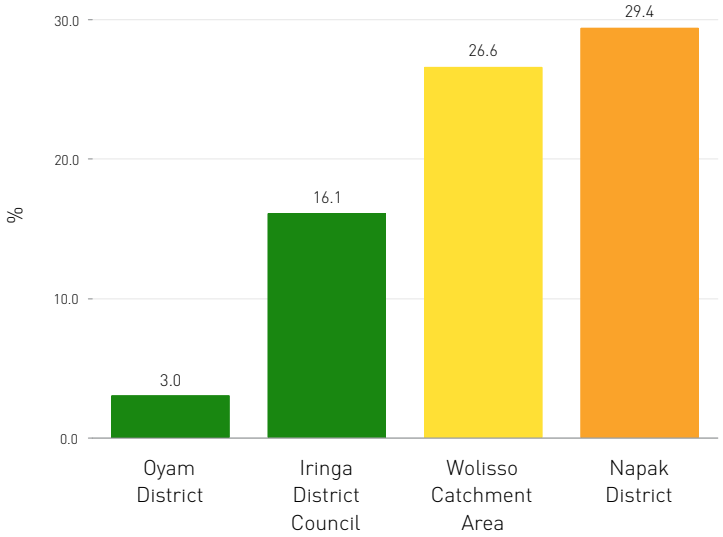


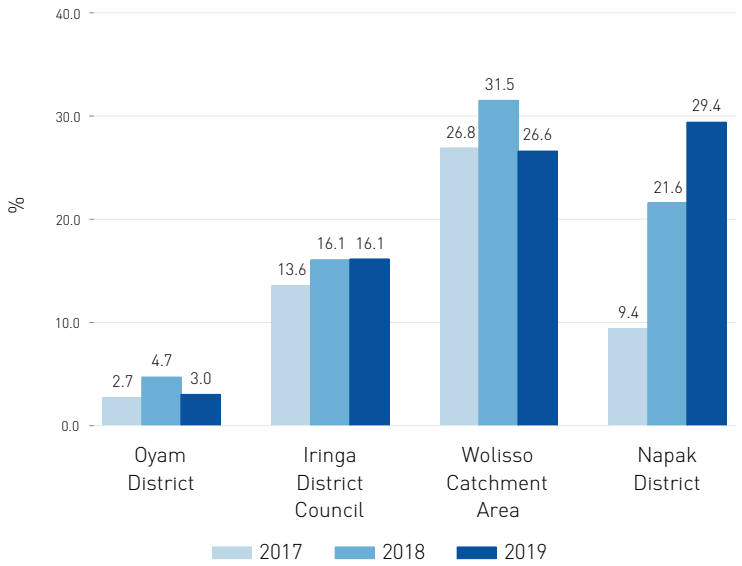
Numerator	Number of positive Xpert RR (x100)
Denominator	Number of positive Xpert
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources)

IDPT07 Percentage of treatments for extrapulmunary TB

Computational level : Residence

The indicator expresses the percentage of patients treated for extra-pulmonary TB (EPTB) over the total number of TB diagnoses in the reference year at the residence level. It gives an evaluation of the diagnostic capacity and it helps diagnose other conditions in addition to extrapulmonary TB. The standard of 22,5% was fixed based on the WHO indications according to local epidemiological context analysis.



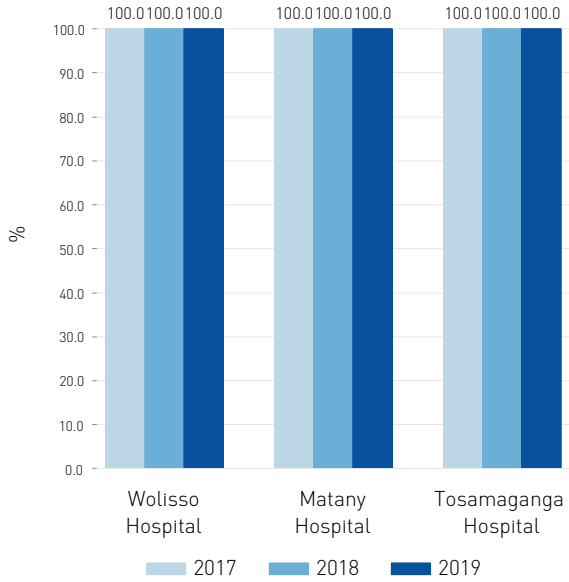


Numerator	Number of treatments “initiated” for extrapolmunary TB (x100)
Denominator	Number of TB diagnoses
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT08 Percentage of PTB MDR initiated treatments

Computational level : Hospital

This indicator is an observation indicator at the hospital level. It is calculated as the ratio between the number of multidrug-resistant (MDR) initiated treatments and the number of multidrug-resistant (MDR) diagnoses.

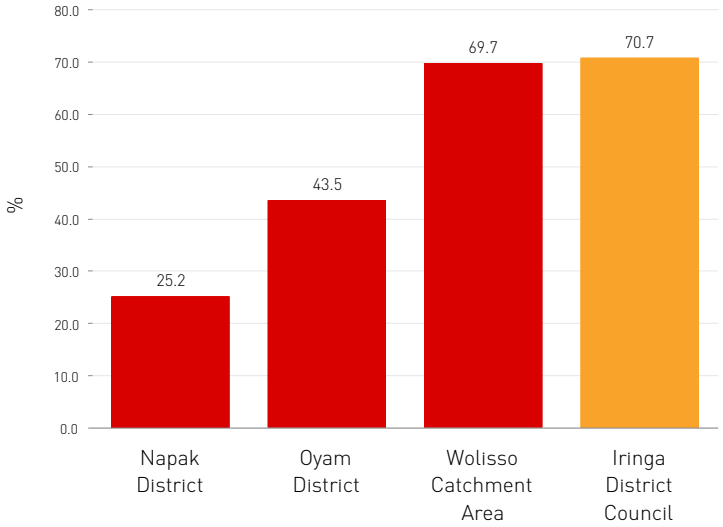


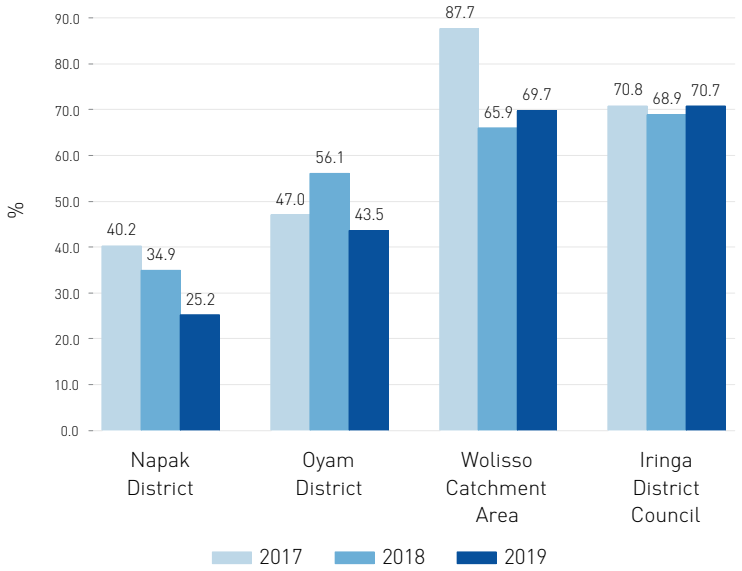
Numerator	Number of MDR initiated treatments (x100)
Denominator	Number of MDR TB diagnoses
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources)

IDPT09 Percentage of cured patients

Computational level : Residence

This indicator shows the percentage of cured TB patients over the total number of TB positive diagnosed patients in the reference year. Patients are defined "cured" when they are negative for two times consequently in three months. The standard of 85% was fixed based on the WHO guidelines.



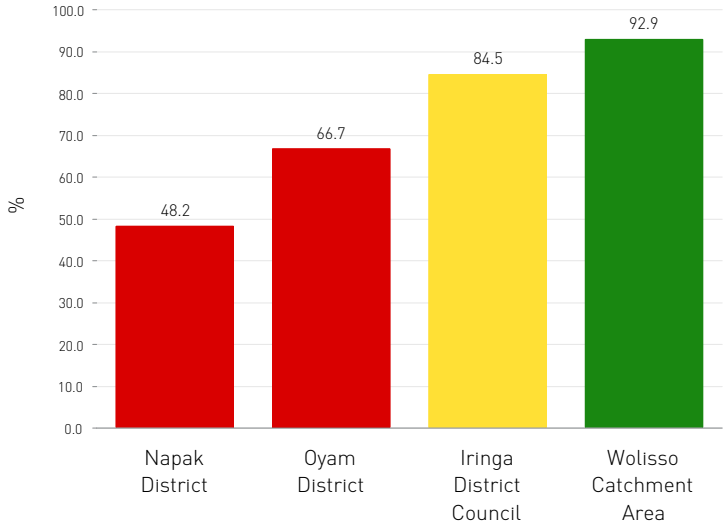


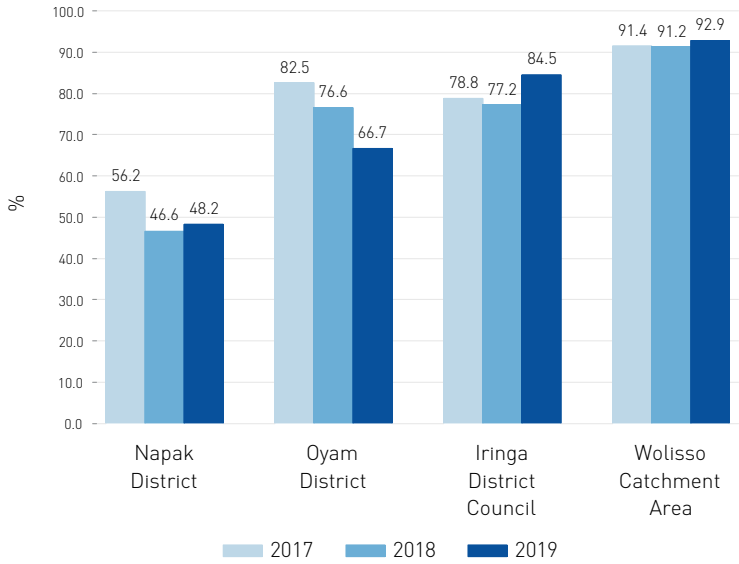
Numerator	Number of cured patients (x100)
Denominator	Number of PTB+ (bacteriologically confirmed)
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT10 Percentage of completed treatments

Computational level : Residence

This indicator shows the percentage of TB patients who completed the treatment in the reference year over the total number of TB diagnosed patients. The standard of 90% was fixed based on the WHO guidelines.



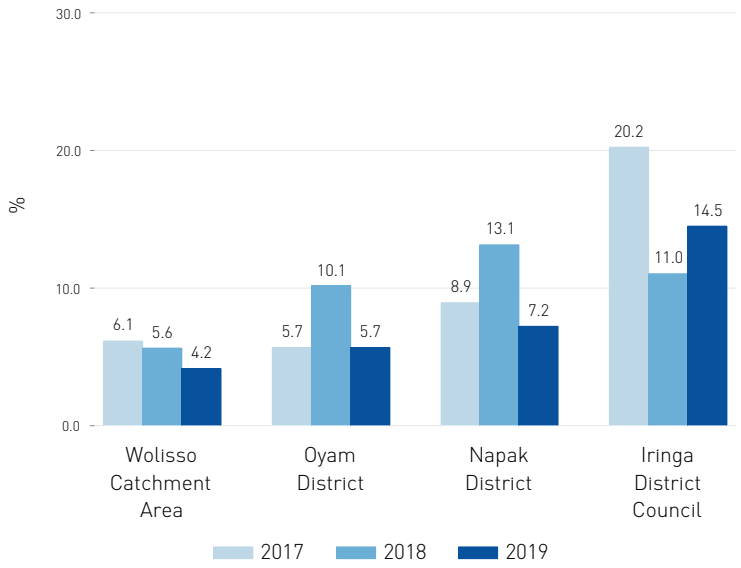


Numerator	Number of completed treatments (x100)
Denominator	Number of treated cases
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT11 Percentage of deaths

Computational level : Residence

This indicator is an observation indicator at the residential level. It expresses the percentage of TB patients who died in the reference year over the total number of TB diagnosed patients.

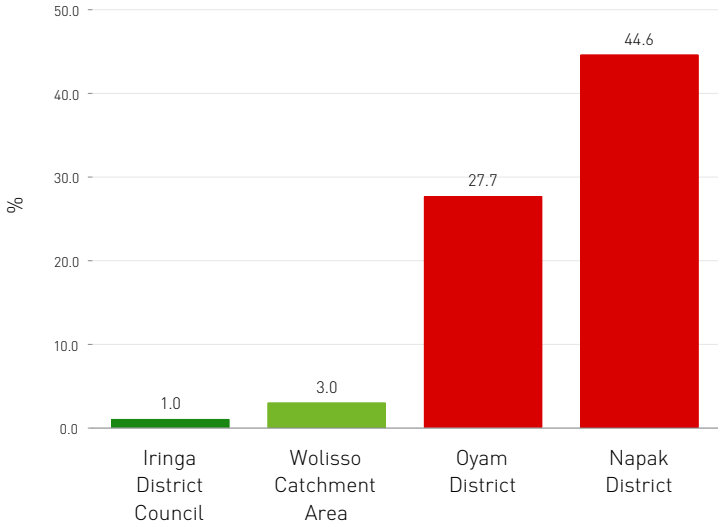


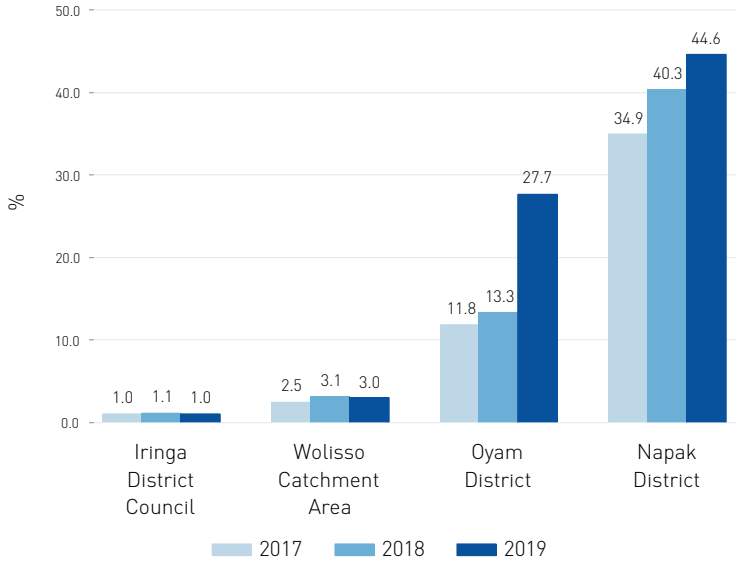
Numerator	Number of deaths (x100)
Denominator	Number of treated cases
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT12 Percentage of interrupted treatments

Computational level : Residence

This indicator gives the percentage of TB patients who interruprted the treatment in the reference year (all causes included) over the total number of TB diagnosed patients. The standard of 2,5% was fixed based on the WHO guidelines.



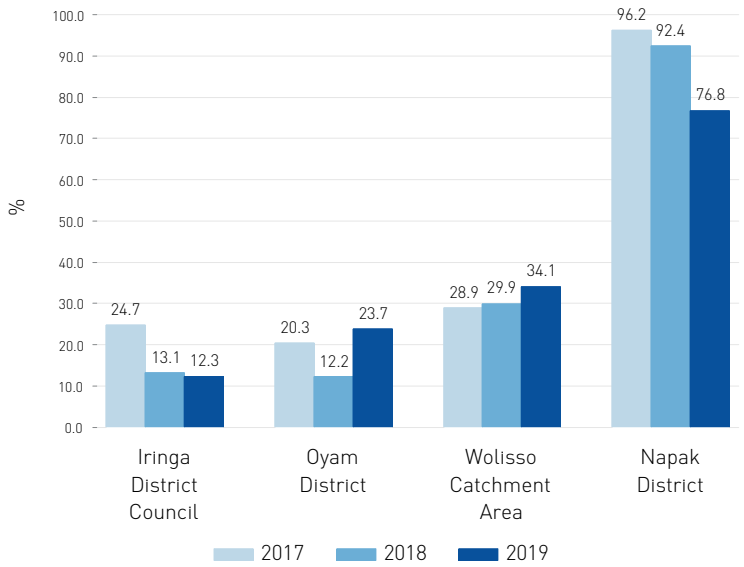


Numerator	Number of interrupted treatments (x100)
Denominator	Number of treated cases
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPT13 Percentage of admitted patients due to TB

Computational level : Residence

This indicator is an observation indicator at the hospital level and it shows the percentage of TB patients who were admitted in the reference hospital in the reference year. It gives an idea of the relevance of the hospital in terms of overall diagnostic capacity of the health system.

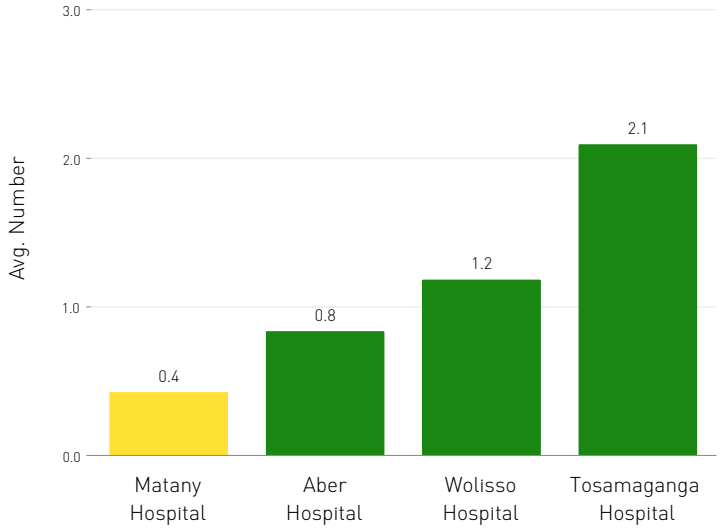


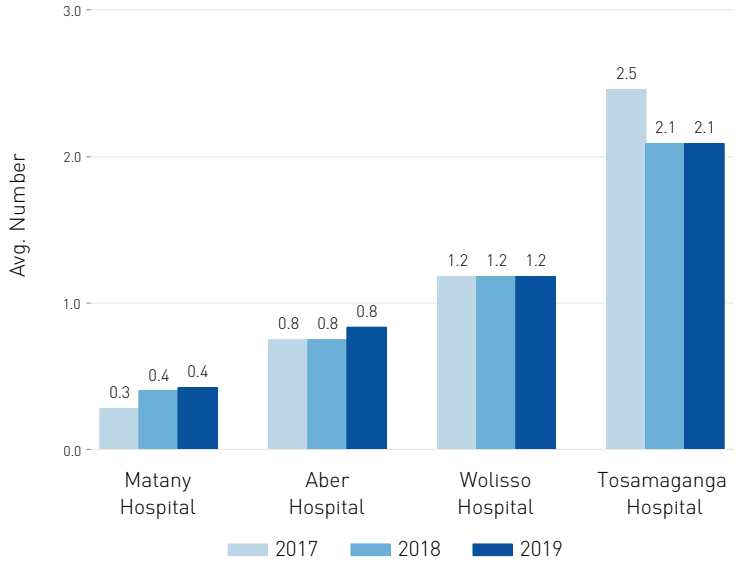
Numerator	Number of admitted patients for TB in reference hospital (x100)
Denominator	Total number of TB cases at residence level
Sources	Hospitals registers - medical departments (electronic sources) and Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD02 Average number of water sources by Hospital

Computational level : Hospital

This indicator is calculated to evaluate the average number of water taps by each hospital room. The standard number equals 0,8 according to the Infection Prevention Control (IPC) of the WHO Framework.





Numerator	Number of water taps
Denominator	Total wards and outpatient rooms
Sources	Hospital tecnhical departments

IDPD03 Availability of an hand washing programme (Hospital)

Computational level : Hospital

This is a qualitative indicator that results from the answers provided to the following question: "Does the hospital have an hand washing programme?", with possible answer options "Yes" or "No".

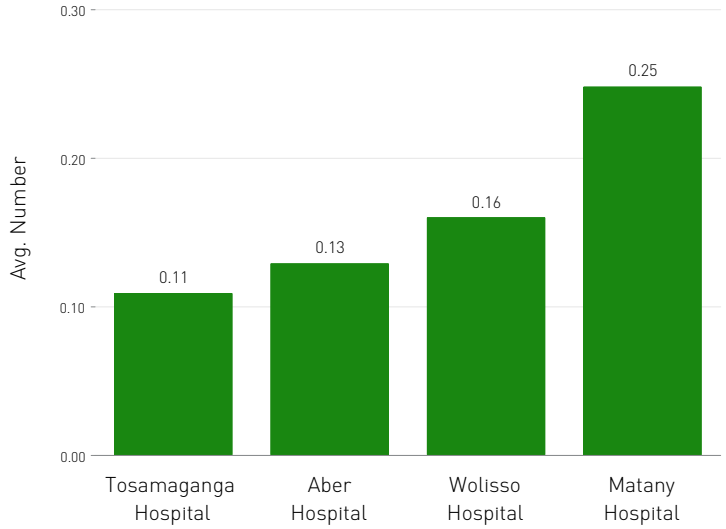
Hospital	Availability of an hand washing programme
St. Luke Hospital - Wolisso Hospital	NO
Tosamaganga District Designated Hospital	NO
St. Kizito - Matany Hospital	YES
Pope John XIII - Aber Hospital	NO

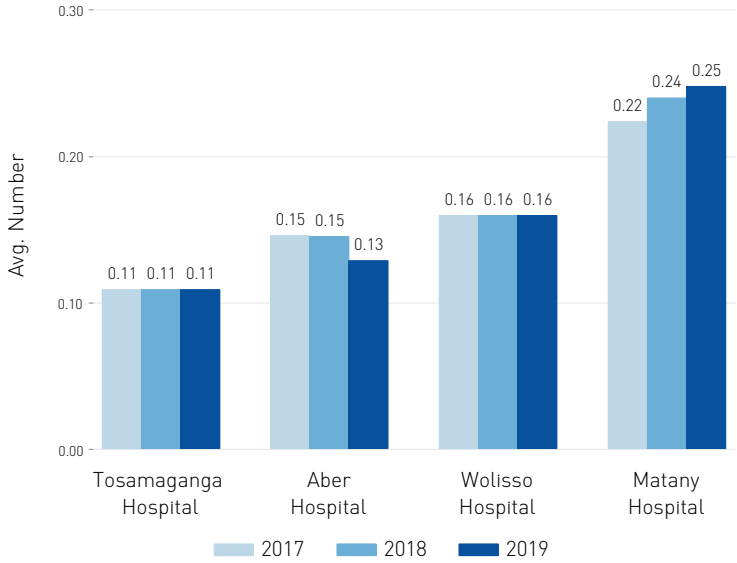
Numerator	-
Denominator	-
Sources	Hospital tecnhical departments

IDPD04 Average number of toilets per bed in IPD

Computational level : Hospital

This indicator is calculated to evaluate the average number of toilets by hospital bed. The standard equals 0,05 (namely one toilet every 20 beds) according to the Infection Prevention Control (IPC) of the WHO Framework.



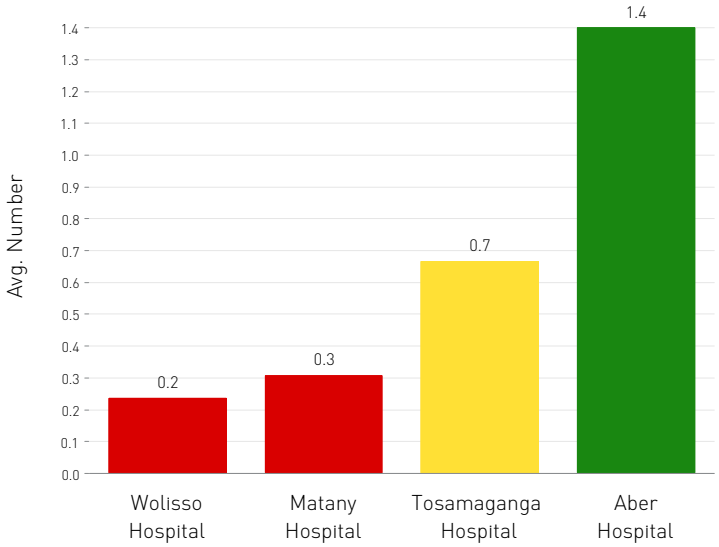


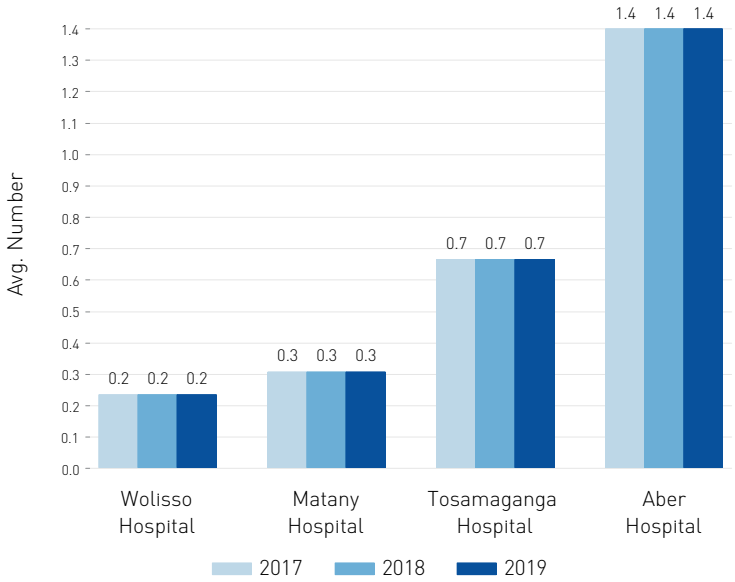
Numerator	Number of toilets
Denominator	Number of beds
Sources	Hospital tecnhical departments

IDPD05 Average number of toilets in OPD per number of rooms

Computational level : Hospital

This indicator is calculated to evaluate the average number of toilets per number of rooms in the outpatient department (OPD). The standard number equals 0,80 according to the Infection Prevention Control (IPC) of the WHO Framework.



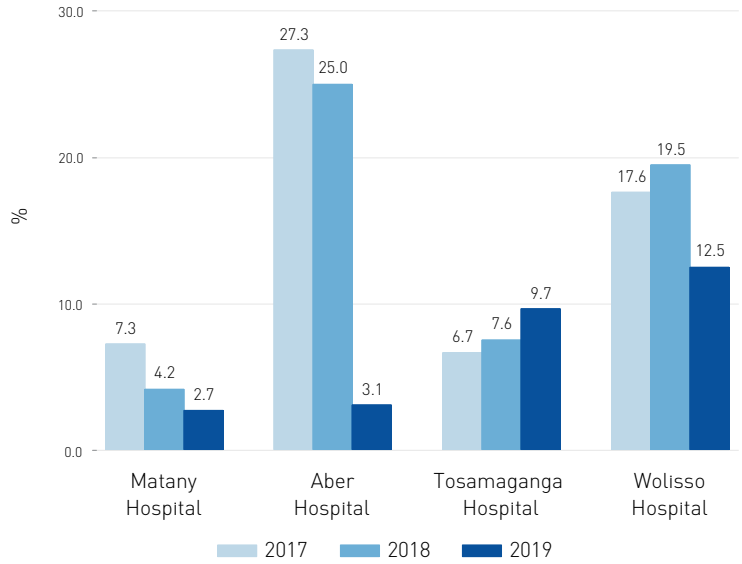


Numerator	Number of toilets in outpatient department (OPD)
Denominator	Number of rooms in outpatient department (OPD)
Sources	Hospital tecnhical departments

IDPD06 Percentage of positive stool tests (for parasites)

Computational level : Hospital

This indicator is an observation indicator and it expresses the percentage of positive stool tests over the total number of faeces examinations provided by the laboratories of the reference hospital.

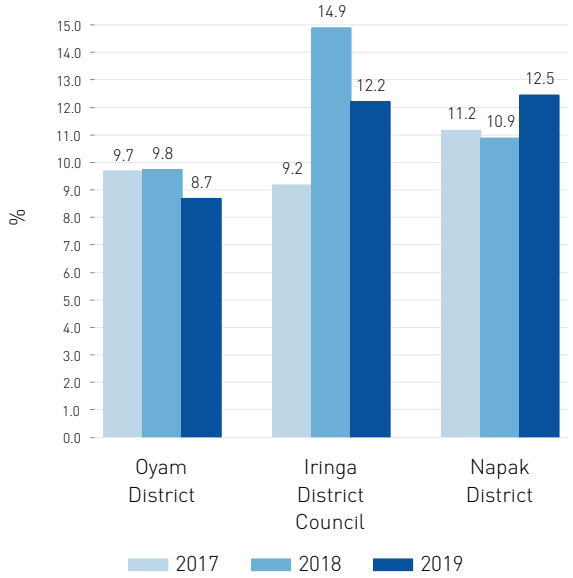


Numerator	Number of positive stool tests (for parasites) (x100)
Denominator	Total faeces examinations
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources)

IDPD07 Percentage of gastroenteritis diagnosed (<5 years - Outpatient)

Computational level : Residence

This indicator is an observation indicator at the residential level and provides the percentage of patients (aged less than five years) who were diagnosed with gastroenteritis in the reference year.

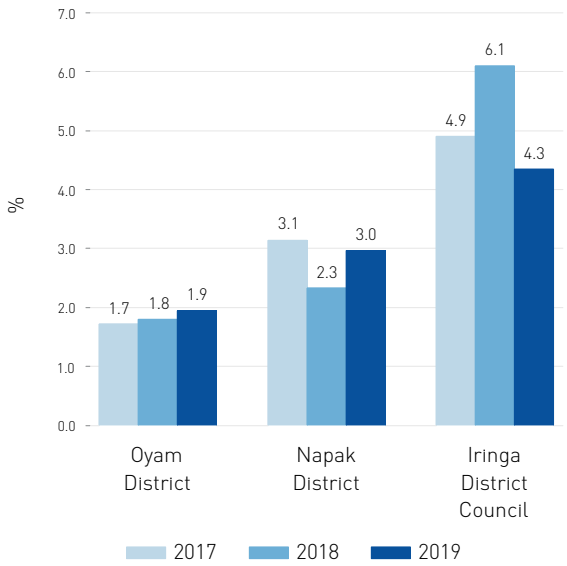


Numerator	Number of gastroenteritis diagnosed (<5 years) in OPD and HCs (x100)
Denominator	Number of OPD access for children <5yr
Sources	Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD08 Percentage of gastroenteritis diagnosed (>5 years - Outpatient)

Computational level : Residence

This indicator is an observation indicator at the residential level and provides the percentage of patients (aged more than five years) who were diagnosed with gastroenteritis in the reference year.

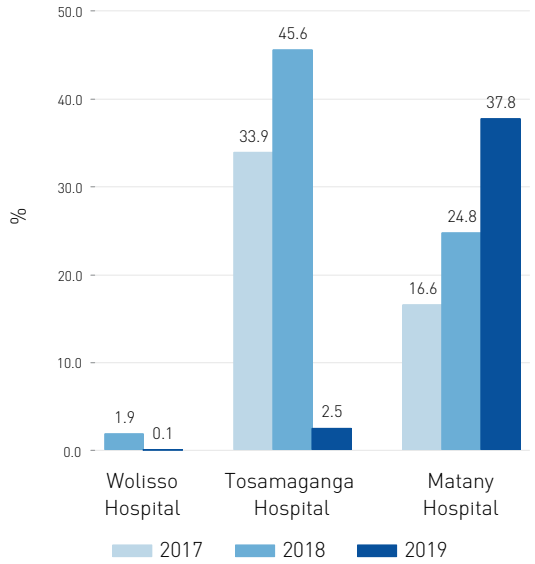


Numerator	Number of gastroenteritis diagnosed (>5 years) in OPD and HCs (x100)
Denominator	Number of OPD access f>5yr
Sources	Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD09 Percentage of diarrhoea cases with severe dehydration due to gastroenteritis and diarrhoea

Computational level : Hospital

This indicator is an observation indicator at the hospital level and reports the percentage of patients diagnosed with severe dehydration due to gastroenteritis and diarrohea. It gives an indication of the relevance of the complicated cases as a proxy of preventive measure or management of early conditions. Also, it depends on the ability of the HMIS to capture the severe cases.

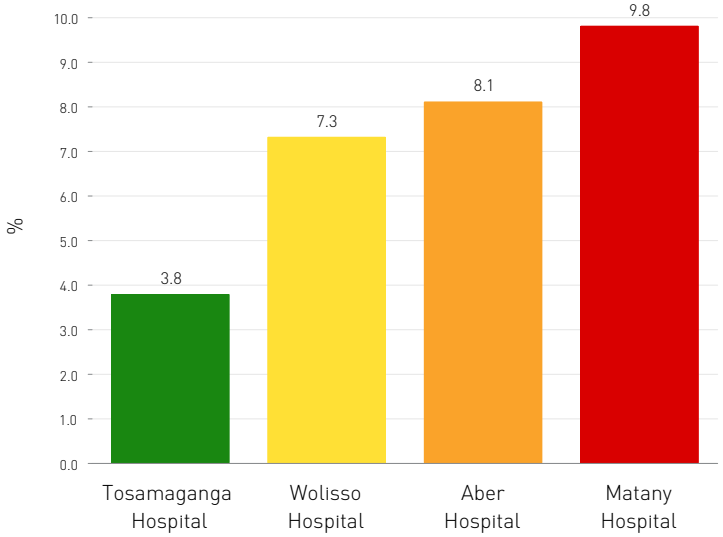


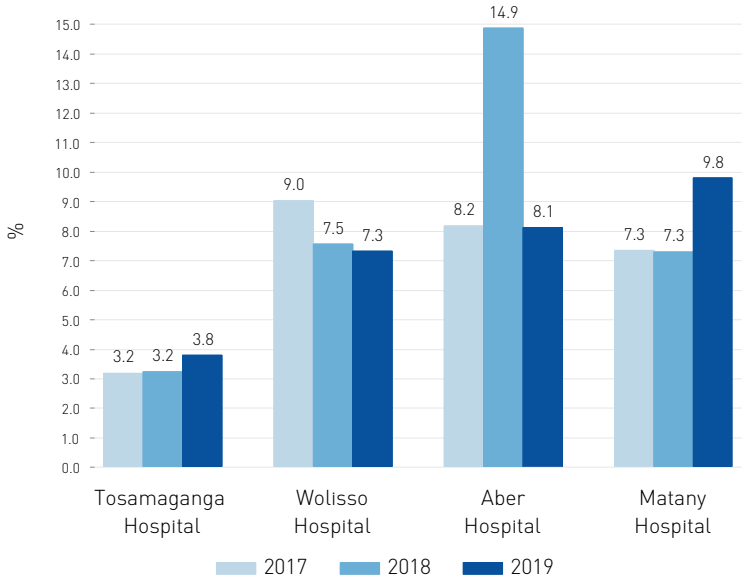
Numerator	Number of diarrhoea cases with severe dehydration (x100)
Denominator	Total number of cases
Sources	Wolisso and Matany hospital's registers, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD10 Percentage of discharged patients for diarrhoea and gastroenteritis

Computational level : Hospital

This indicator is calculated to evaluate the percentage of discharged patients for diarrhoea and gastroenteritis over the total number of patients discharged from the hospital during the reference year. The standard of 5,4% was fixed starting from benchmarking data assessment. It is therefore a proxy of appropriateness of admissions that should be only for moderate/ severe cases.



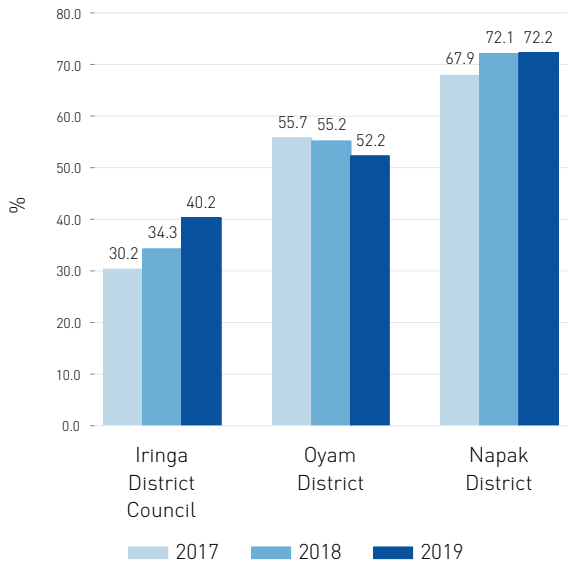


Numerator	Number of discharged patients for diarrhoea and gastroenteritis (x100)
Denominator	Total number of discharged patients (adults and children)
Sources	Wolisso and Matany hospital's registers, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD11 Percentage of diarrhoea cases (<1 year)

Computational level : Residence

This indicator is an observation indicator at the residential level and provides the percentage of patients (aged less than one year) who were diagnosed with diarrhoea in the reference year.

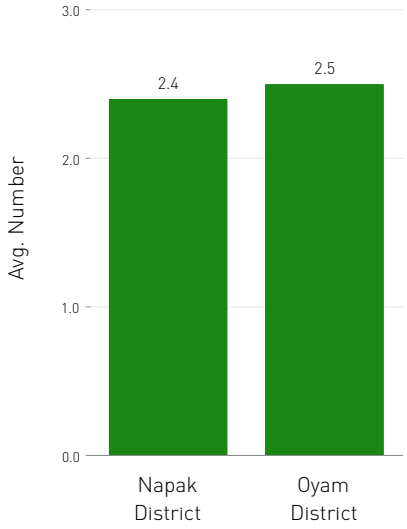


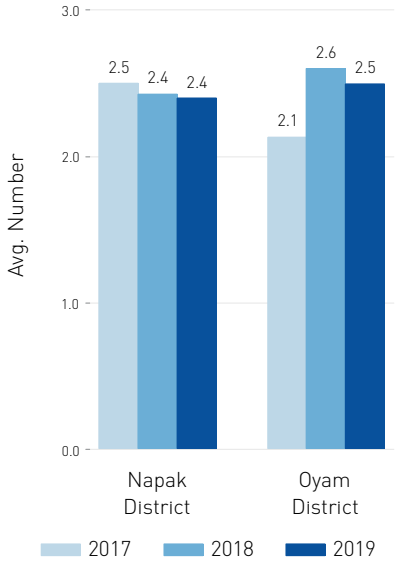
Numerator	Number of diarrhoea cases (<1 year - acute cases) (x100)
Denominator	Total number of diarrhoea cases
Sources	Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD12 Average number of ORS packages delivered per patient with diarrhoea (<5years)

Computational level : Residence

This indicator measures the average number of Oral Rehydration Salts (ORS) tablets delivered to patients (aged less than five years) at the residential level. The standard of one tablet per patient was fixed according to the WHO guidelines.



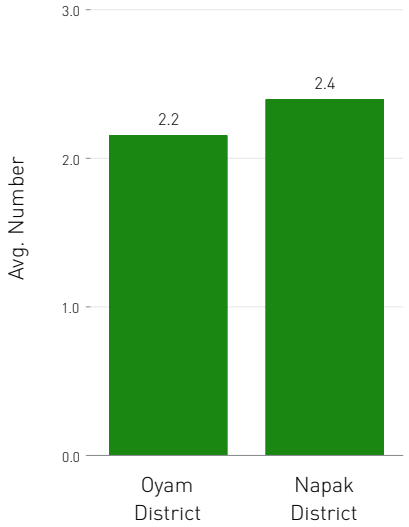


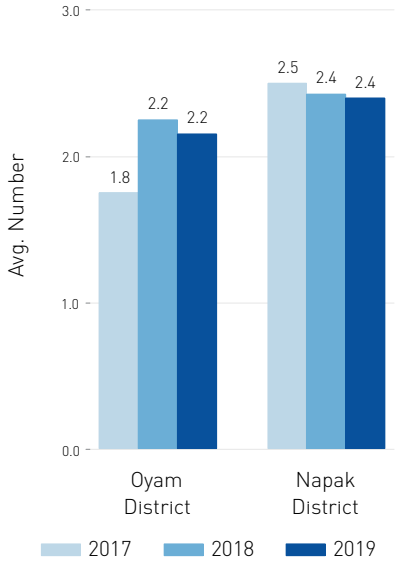
Numerator	Number of ORS packages delivered (Hospital + Health Centers)
Denominator	Total number of diarrhoea cases (<5 years)
Sources	Ugandan eHMIS/DHIS2 (electronic sources)

IDPD13 Average number of Zinc Tablets doses delivered per patient with diarrhoea (<5years)

Computational level : Residence

This indicator measures the average number of Zinc tablets delivered to patients (aged less than five years) at the residential level. The standard of one tablet per patient was fixed according to the WHO guidelines.



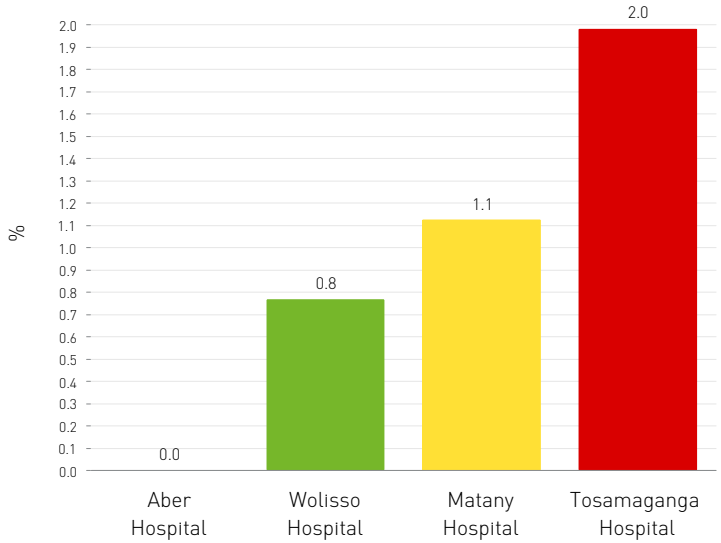


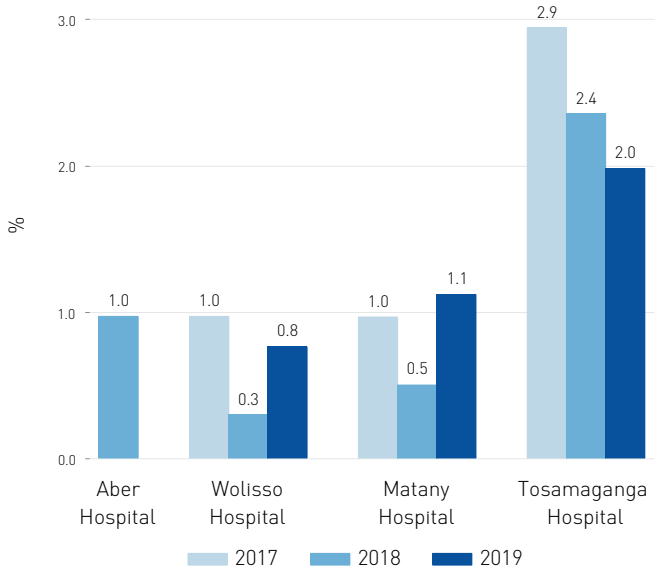
Numerator	Number of Zinc Tablets doses delivered (Hospital + Health Centers)
Denominator	Total number of diarrhoea cases (<5 years)
Sources	Ugandan eHMIS/DHIS2 (electronic sources)

IDPD14 Percentage of deaths with a diagnosis of gastroenteritis

Computational level : Hospital

This indicator is calculated to evaluate the percentage of deaths with a diagnosis of gastroenteritis and diahorrea in the reference hospital among patients aged less than five years. The standard of 0,4% was fixed starting from benchmarking data assessment.



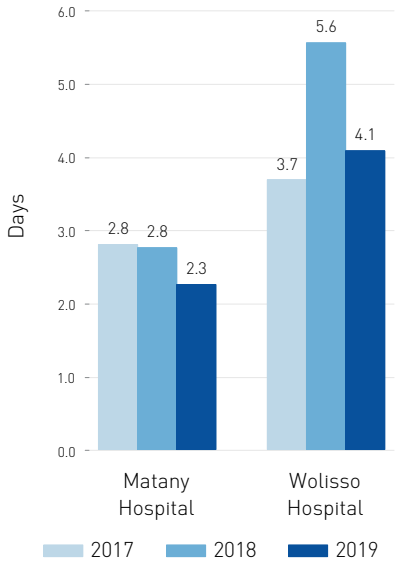


Numerator	Number of deaths diagnosed with gastroenteritis (patients aged < 5 years) (x100)
Denominator	Number of discharged patients with a diagnosis of gastroenteritis (patients aged < 5 years)
Sources	Wolisso and Matany hospitals registers, Tanzanian DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

IDPD15 ALOS for gastroenteritis

Computational level : Hospital

This indicator is an observation indicator at the hospital level. It provides a view of the average lenght of stay (ALOS) in hospital due to gastroenteritis. It is a proxy of appropriatness of admission: when ALOS decreases, probably too many less severe cases are admitted.



Numerator	Number of inpatient days for gastroenteritis
Denominator	Total number of inpatients (for gastroenteritis)
Sources	Wolisso and Matany hospitals registers - medical department (electronic sources)

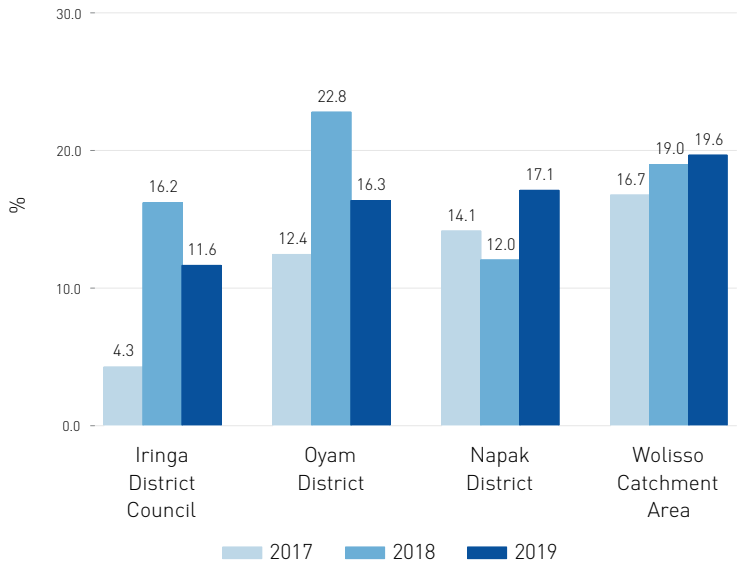
CHRONIC DISEASES

DOCTORS WITH AFRICA CUAMM

CPHIV01 Percentage of HIV screening coverage

Computational level : Residence

This indicator is an observation indicator and it illustrates the percentage of HIV screening coverage, expressed as the ratio between the total number of tests and the number of admissions in the outpatient department both in the reference hospital and in the lower level units.

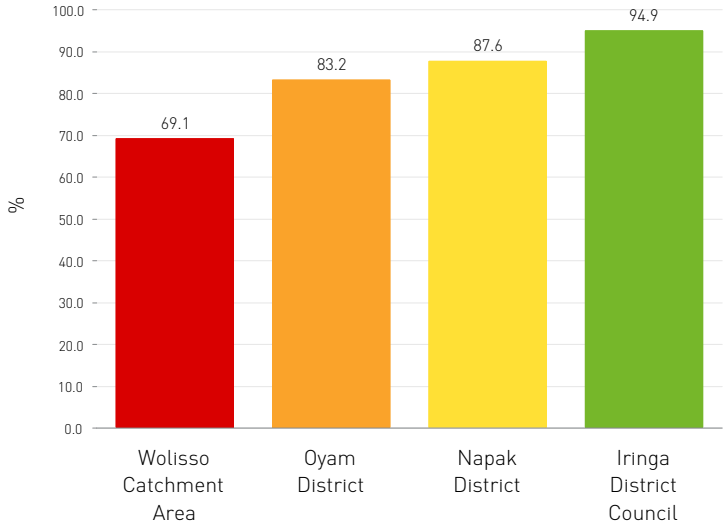


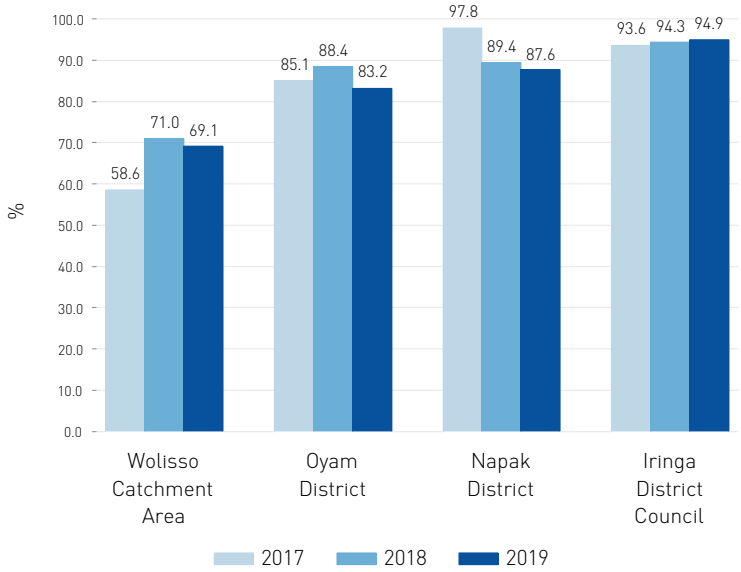
Numerator	Number of performed tests (x100)
Denominator	Number of admissions in OPD (hospital and HCs) and IPD
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV02 Percentage of performed tests to pregnant women

Computational level : Residence

This indicator is calculated to evaluate the HIV screening coverage among pregnant women followed at hospital and discrict level. The standard of 95% was fixed according to the WHO guidelines.



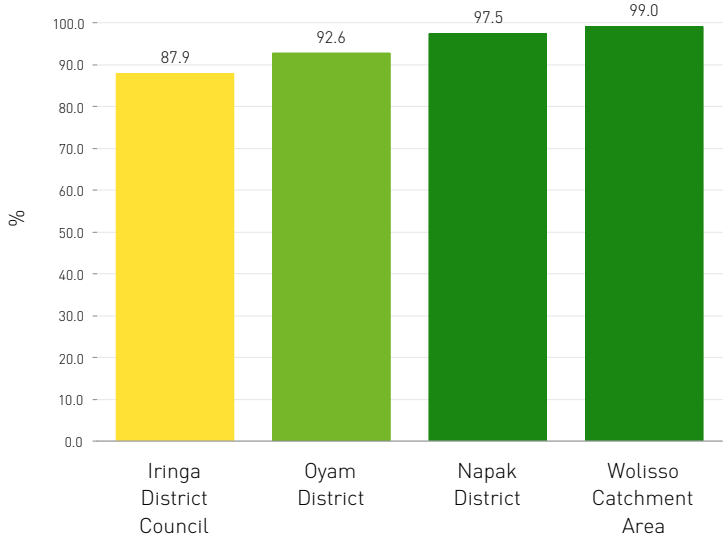


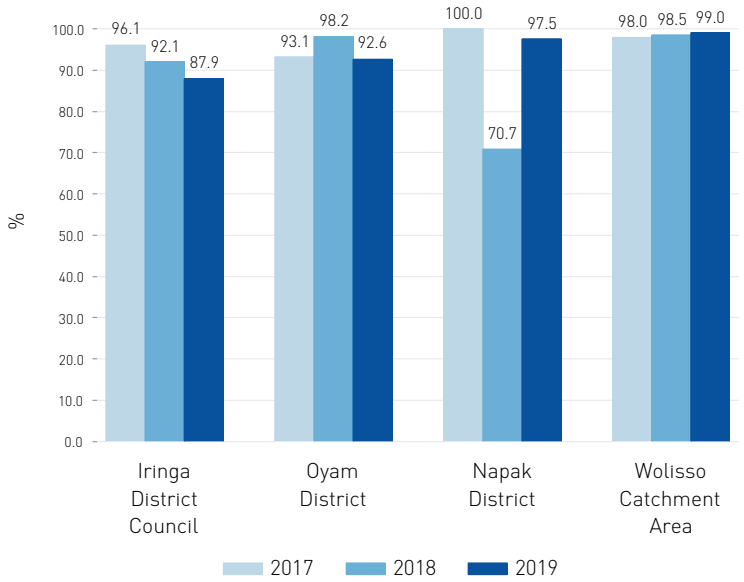
Numerator	Number of HIV performed tests to pregnant women followed at residence level (x100)
Denominator	Total number of pregnant women with at least one ANC visit
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV03 Percentage of HIV positive cases undergoing the TB screening

Computational level : Residence

This indicator expresses the percentage of HIV positive patients who underwent a TB screening by means of all testing methods (sputum, symptom questionnaire, Xpert) during the reference year over the total number of HIV positive patients diagnosed in the reference area. The standard of 98% was fixed based on the WHO standard.



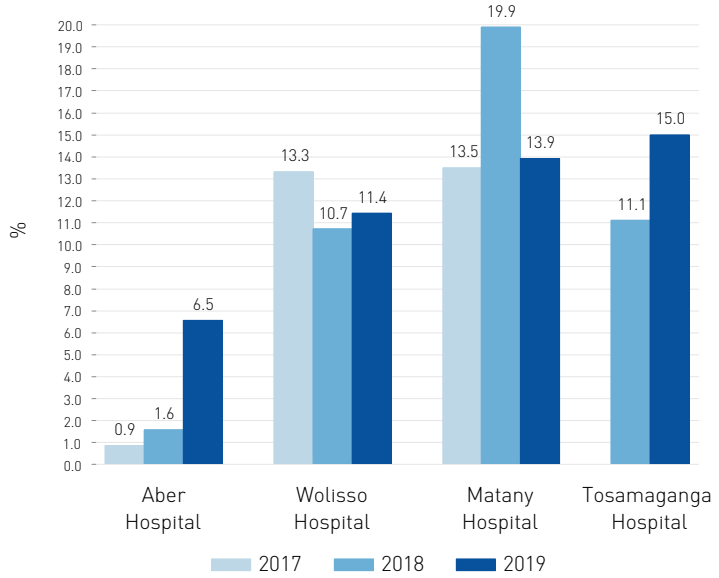


Numerator	Number of HIV cases undergoing the TB screening (sputum, symptom questionnaire, Xpert) (x100)
Denominator	Number of HIV+ cases
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV03.1 Percentage of HIV patients screened for TB with Xpert

Computational level : Hospital

This indicator is an observation indicator and represents a specific trait of the indicator CPHIV03, relative to the percentage of HIV positive patients who undewent TB screening only with Xpert. Such measure is then divided by the total number of HIV positive patients screened for TB.

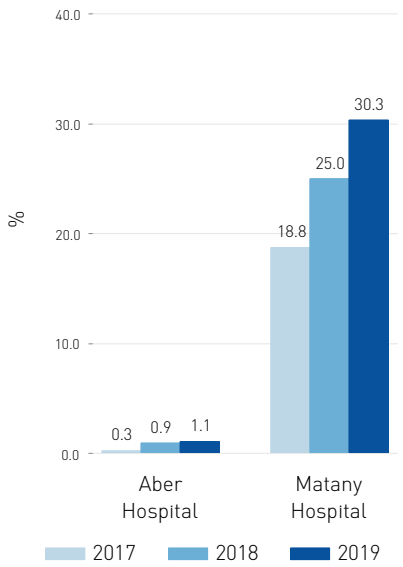


Numerator	Number of HIV patients screened with Xpert for TB (x100)
Denominator	Number of HIV + screened patients for TB
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources) and Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV04 Percentage of new diagnosed patients with CD4 < 350cell/ml

Computational level : Hospital

This indicator is an observation indicator that includes all those cases of HIV diagnosis with CD4 less than 350 cell/ml. It can be used as a proxy of the inability of the healthcare system to timely take care of these patients.

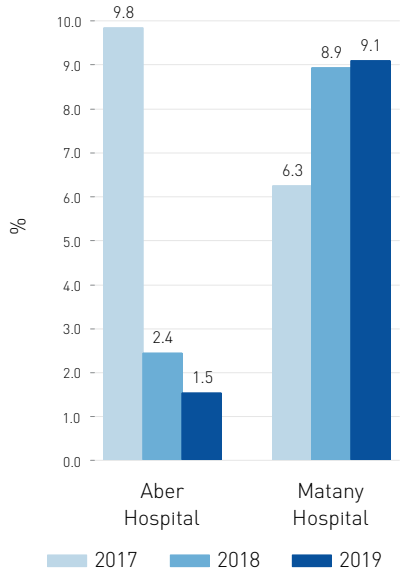


Numerator	Number of diagnosed patients with CD4 < 350cell/ml (x100)
Denominator	Number of new diagnosed HIV+ patients
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources) and Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV05 Percentage of HIV+ patients with opportunistic infections (or advanced HIV)

Computational level : Hospital

This indicator is an observation indicator and it expresses the percentage of positive HIV patients diagnosed with opportunistic infections. It can be used as a proxy of the inability of the healthcare system to timely take care of these patients.

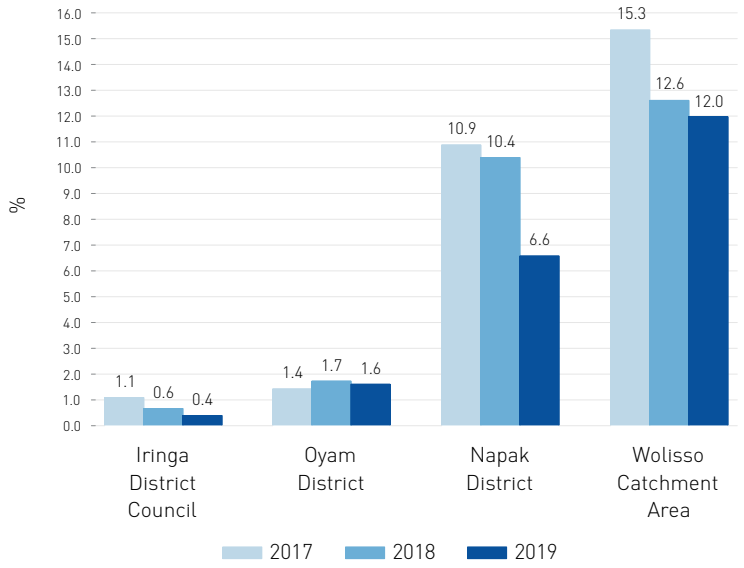


Numerator	Number of HIV+ patients with opportunistic infections diagnosed at the time of HIV diagnosis (x100)
Denominator	Number of new HIV+ patients diagnosed
Sources	Hospitals registers - laboratory departments (electronic and paper-based sources) and Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV06 Percentage of malnourished patients followed in a HIV unit

Computational level : Residence

This indicator is an observation indicator and it repors the percentage of malnourished patients that are currently followed in ART clinic at residence level.

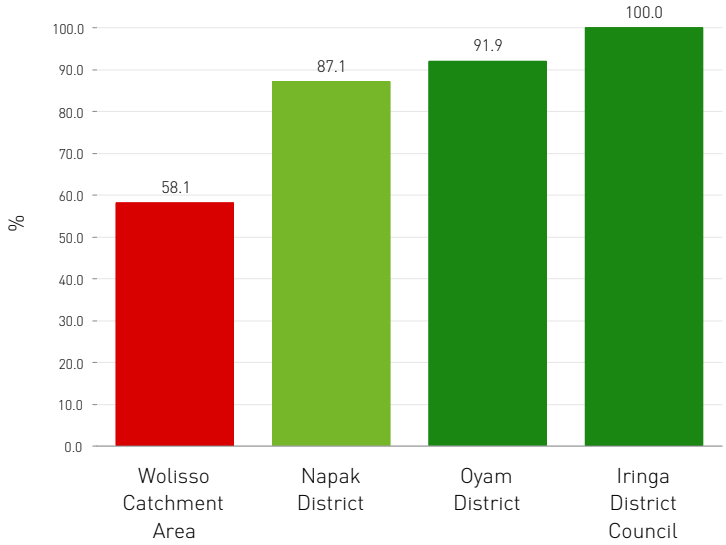


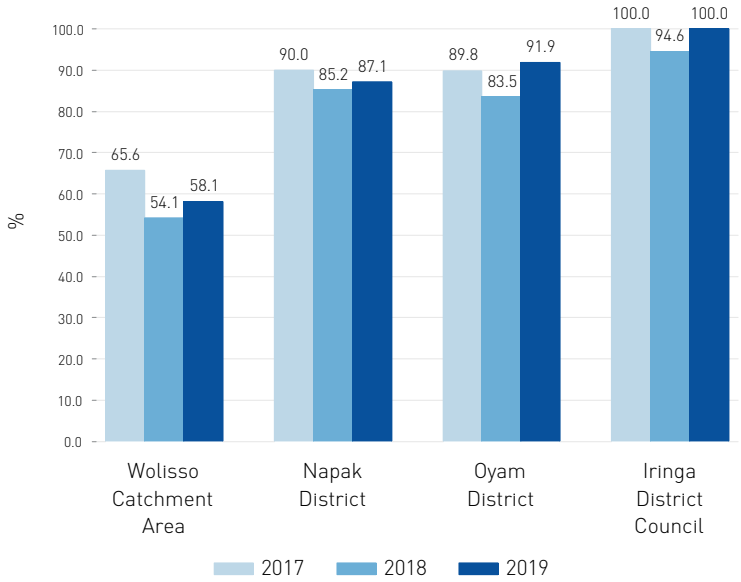
Numerator	Number of HIV+ malnourished patients currently on ART in a HIV unit (x100)
Denominator	Number of patients currently in HIV unit
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV07 Percentage of new HIV+ linked to ART

Computational level : Residence

This indicator is calculated to evaluate the percentage of positive HIV cases who started the therapy in an ART clinic at the residential level, over the total number of HIV patients tested positive during the reference year. The standard of 90% was fixed based on the WHO standard.



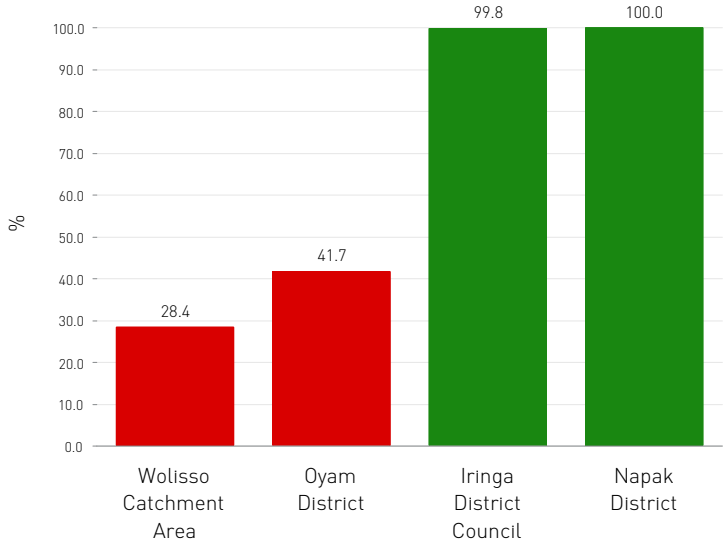


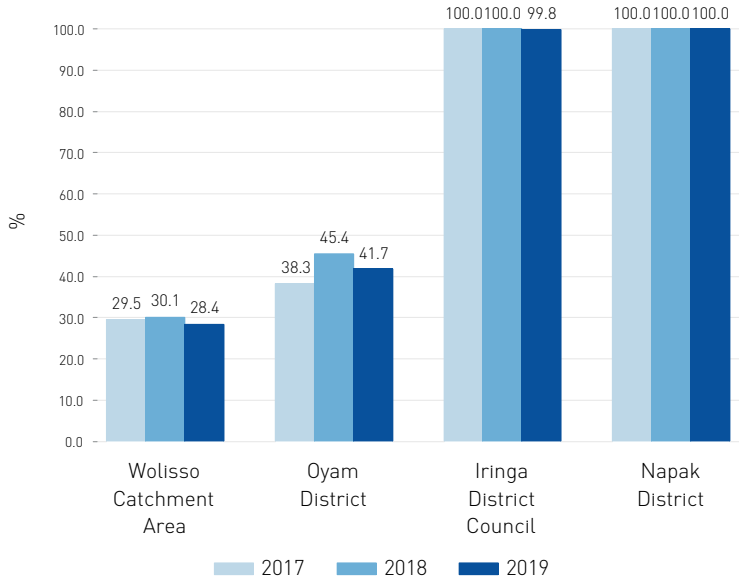
Numerator	Number of HIV+ starting ART (x100)
Denominator	Number of new patients tested HIV+ in OPD and IPD
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV08 Coverage rate of the therapy

Computational level : Residence

This indicator is measured to estimate the coverage rate of the therapy, by setting a ratio between the number of positive patients that are currently followed in an ART clinic and an estimation of the prevalence of the HIV among residents in the reference area. The standard of 95% was fixed based on the WHO standard.



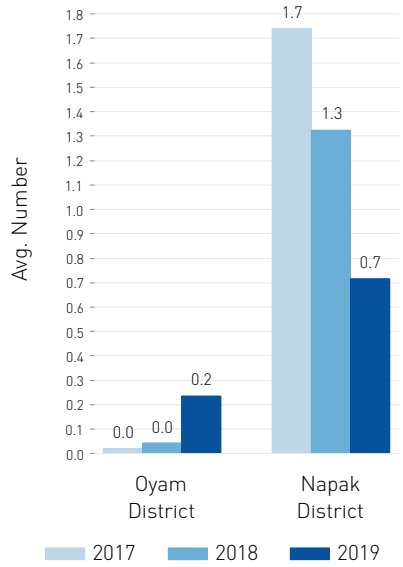


Numerator	Number of HIV+ patients currently on ART therapy (x100)
Denominator	Number of HIV+ residents (estimated)
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV09 Average number of nutritional supplements delivered per patient currently on ART therapy

Computational level : Residence

This indicator is an observation indicator and it measures the average number of nutritional supplements delivered, such as Plumpinat, enriched flavour, to each HIV patient currently followed in an ART clinic in the reference area.

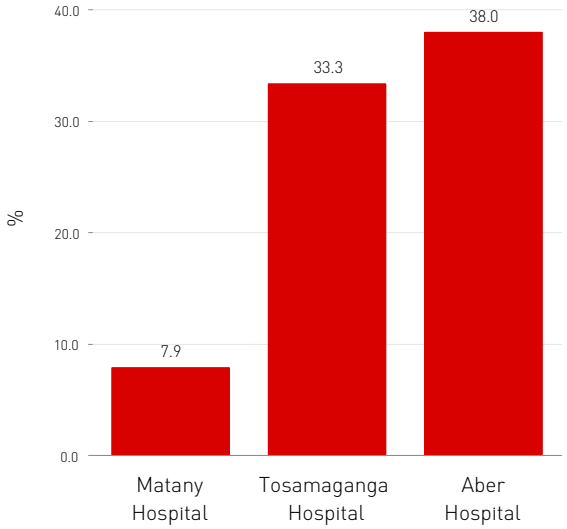


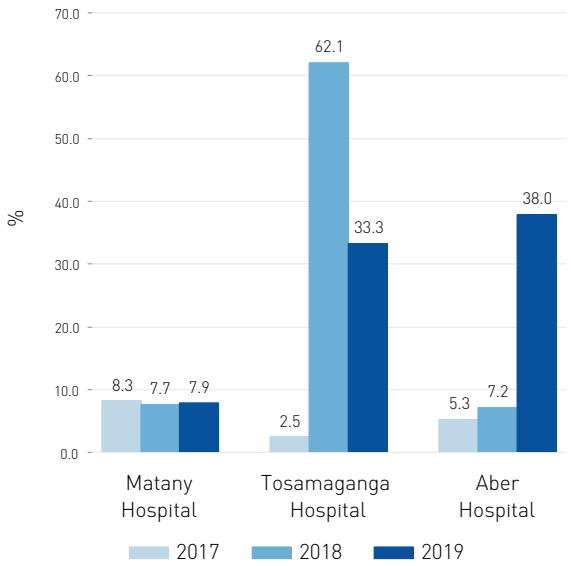
Numerator	Number of nutritional supplements (Plumpinat, enriched flawour ect.) delivered
Denominator	Number of patients currently on ART therapy
Sources	Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV10 Percentage of VL tests over the patients undergoing ART therapy

Computational level : Hospital

This indicator provides the percentage of patients undergoing viral load (VL) tests over those that are currently followed in the ART clinic of the reference hospital. This indicator is calculated only at hospital level because data for the reference area were not available. The standard of 95% was fixed based on the WHO standard.



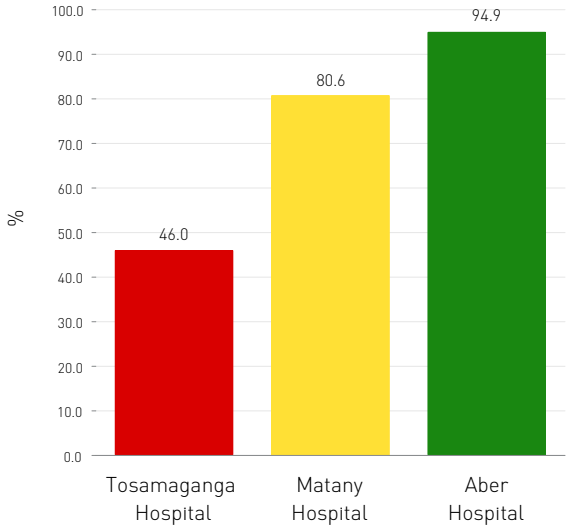


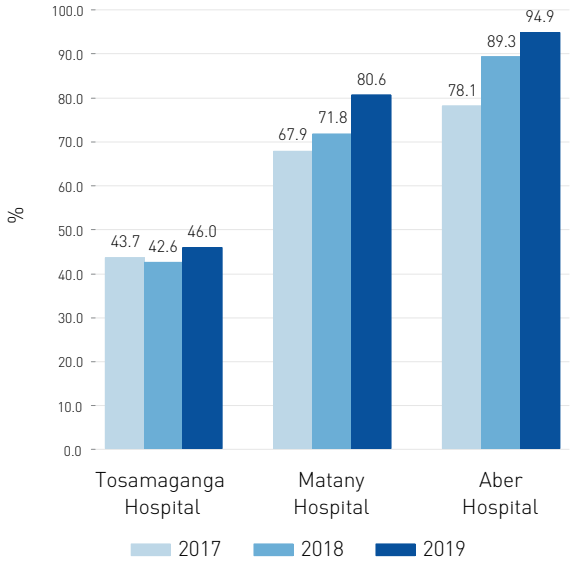
Numerator	Number of patients undergoing VL tests (x100)
Denominator	Number of patients currently on ART therapy
Sources	Hospitals registers - ART clinic/CDC departments (paper-based sources) and Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV11 Percentage of patients undergoing ART therapy and tested with VL with suppression of viremia

Computational level : Hospital

This indicator provides the percentage of patients undergoing viral load (VL) tests with viremia suppression over those that are currently followed in the ART clinic of the reference hospital and were tested with a VL test within the last 12 months. This indicator is calculated only at hospital level because data for the reference area were not available. The standard of 90% was fixed based on the WHO standard and clinical protocol implemented by the health authorities involved in the present study.



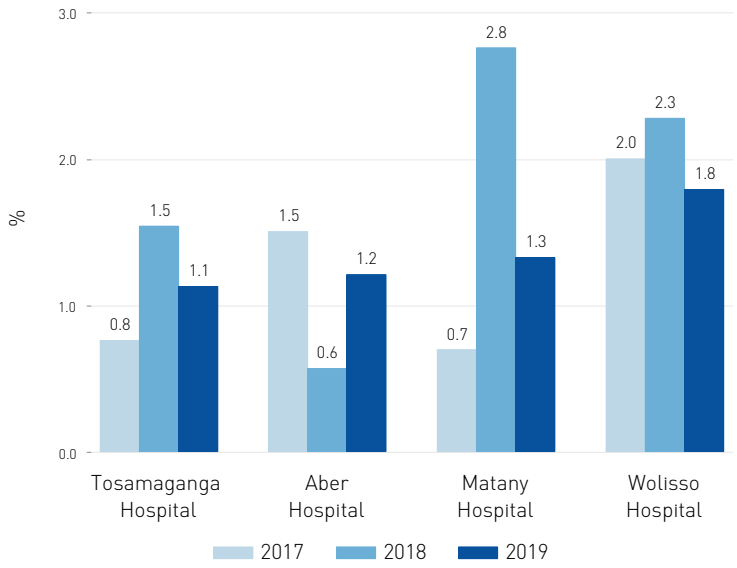


Numerator	Number of patients undergoing VL tests with viremia suppression (x100)
Denominator	Number of patients currently on ART therapy and tested with VL within last 12 months
Sources	Hospitals registers - ART clinic/CDC departments (paper-based sources) and Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV12 Percentage of deaths undergoing ART therapy (within 12 months)

Computational level : Hospital

This indicator is an observation indicator at the residential level that expresses the percentage of HIV patients who died while undergoing an ART therapy in the reference area within the last 12 months.

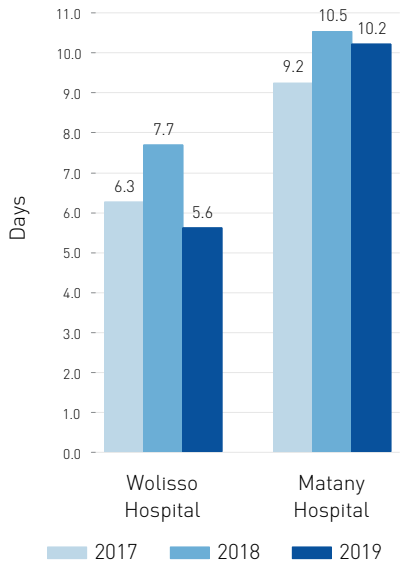


Numerator	Number of patients undergoing ART therapy who died within 12 months from the beginning of the therapy (x100)
Denominator	Number of patients who started ART therapy as of at least 12 months
Sources	Ethiopian HMIS/DHIS2, Tanzanian ETL/DHIS2, Ugandan eHMIS/DHIS2 (electronic sources)

CPHIV13 ALOS (HIV admitted patients)

Computational level : Hospital

This indicator is an observation indicator at the hospital level and it provides a view of the average lenght of stay (ALOS) in hospital due to HIV related health issues and complications.

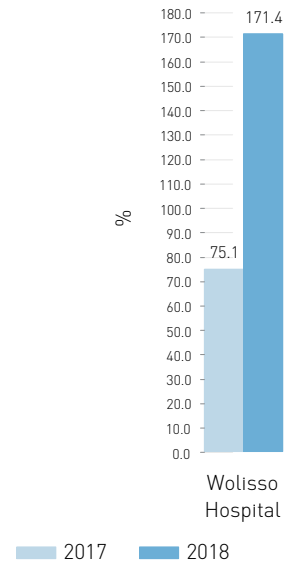


Numerator	Number of inpatient days for HIV and its complication
Denominator	Number of inpatients for HIV and its complications
Sources	Wolisso and Matany hospitals registers - medical department (electronic sources)

CP01 Retention rate of chronic diseases

Computational level : Hospital

As chronic patients are diagnosed with diabetes, hypertension, cardiopathy and/or a combination of all, this indicator aims at measuring the retention rate of patients who started therapy as of at least 12 months, over the total number of chronic patients diagnosed at least 12 months earlier than the beginning of the therapy.

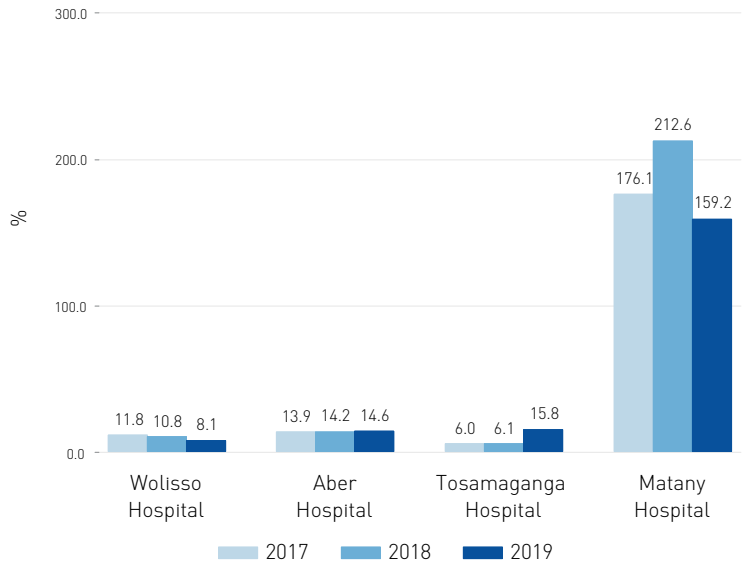


Numerator	Number of patients undergoing the therapy who started as of at least 12 months (x100)
Denominator	Total number of chronic patients diagnosed at least 12 months before the beginning of the therapy
Sources	Hospital's registers

CP02 Hospitalization rate for chronic liver diseases, per 100.000 residents (>15 years)

Computational level : Hospital

This is an observation indicator at the hospital level that provides the hospitalization rate for chronic liver diseases standardized by 100.000 residents in the reference area aged more than 15 years.

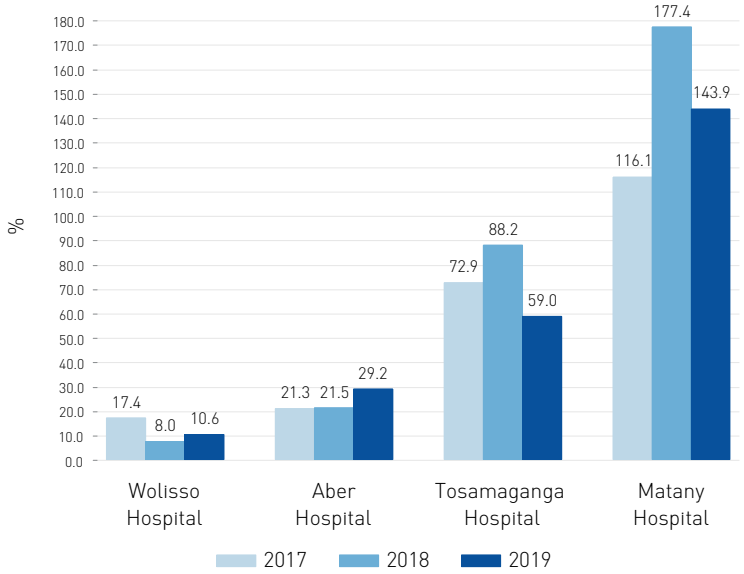


Numerator	Number of admissions for Chronic Liver Diseases (x100.000)
Denominator	Estimated resident population (>15 years)
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga hospital's registers (paper-based source) and Tanzanian DHIS2 (electronic source); Ugandan eHMIS/DHIS2 (electronic source)

CP05 Hospitalization rate of hypertension cases, per 100.000 residents (>15 years)

Computational level : Hospital

This is an observation indicator at the hospital level that provides the hospitalization rate for hypertension standardized by 100.000 residents in the reference area aged more than 15 years.

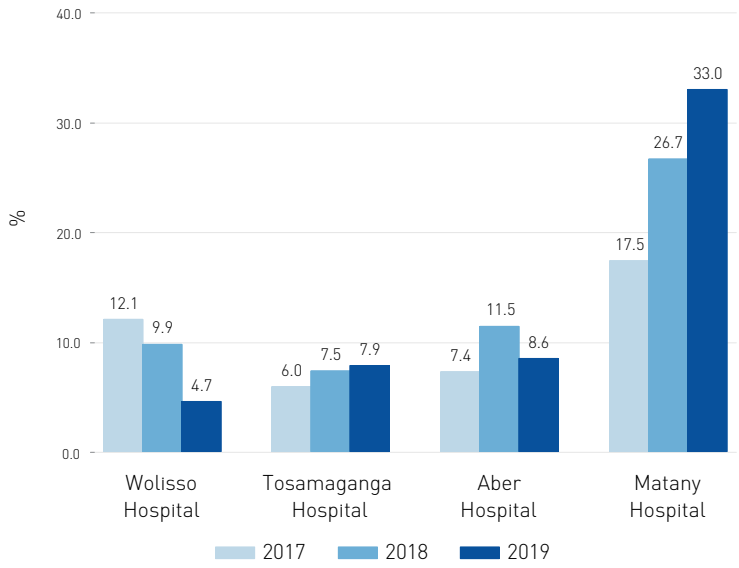


Numerator	Number of admissions for Hypertension (x100.000)
Denominator	Estimated resident population (>15 years)
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga hospital's registers (paper-based source) and Tanzanian DHIS2 (electronic source); Ugandan eHMIS/DHIS2 (electronic source)

CP06 Percentage of admissions for stroke, per 100.000 residents (>15 years)

Computational level : Hospital

This is an observation indicator at the hospital level that provides the hospitalization rate for stroke in patients older than 20 years standardized by 100.000 residents in the reference area aged more than 15 years.



Numerator	Number of admissions for stroke (> 20 years) (x100.000)
Denominator	Estimated resident population (>15 years)
Sources	Wolisso hospital's registers and Ethiopian HMIS/DHIS2 (electronic sources); Matany hospital's registers and Ugandan eHMIS/DHIS2 (electronic sources); Tosamaganga hospital's registers (paper-based source) and Tanzanian DHIS2 (electronic source); Ugandan eHMIS/DHIS2 (electronic source)

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management e sanità

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