LUXOR OPERATIONAL RESEARCH HIGHLIGHTS

2019/2020

MEDECINS SANS FRONTIERES | LuxOR Luxembourg Operational Research

A MOMENT IN OR-TIME

"Prediction is very difficult, especially about the future." Danish physicist Niels Bohr's famous quote has certainly proven true in the current Coronavirus disease pandemic.

At MSF, we nonetheless expect this global pandemic will require us to rapidly adapt models of medical care around the world, leaving substantial evidence gaps to be filled over the coming years. At the same time, major public health challenges like malaria and measles persist in low and middle income countries and humanitarian settings, with the pandemic likely to exacerbate disease burdens, reducing access to essential care, and delaying much needed operational research.

In this year's LuxOR Highlights, we focus on some of the different research methodologies in our toolbox, and show how they help us to improve MSF's programmes and inform health policies in humanitarian settings: a case series on children suffering from severe malnutrition in Nigeria, improved surveillance of surgical site infections in Burundi, and a novel model to predict surges in malaria cases in South Sudan."

Jo Robays
Operational Research Coordinator

More information on LuxOR's work is available at **or.msf.lu**, and all MSF-supported studies published in peer-reviewed journals are available open-access at **fieldresearch.msf.org**.

RESEARCH FOR HUMANITARIAN ACTION

THE SCIENCE OF DOING BETTER

Operational research helps MSF to take an in-depth look at its programs and operations, evaluates what is working well, and shows what needs to be improved. Based in Luxembourg, the Operational Research Unit LuxOR undertakes research projects supporting humanitarian activities all over the world.

LuxOR shares findings with the international MSF movement and partner organizations, and advocates for evidence-based policy and practice changes with local and international stakeholders.

RESEARCH SUPPORT ON THE GROUND

To strengthen research capacities, medical data collection, and analysis, team members regularly support missions and projects. In 2019, LuxOR's field visits included Belgium, Cambodia, Cameroon, the Democratic Republic of The Congo, Egypt, Guinea, Iraq, Lebanon, Malawi, Mozambique, Nigeria, South Africa, and Zimbabwe.

Partnering with the World Health Organization and The Union, LuxOR team members facilitated dedicated research trainings in Luxembourg, Kenya, Nepal, South Africa, Sri Lanka, and Uganda.

OPEN ACCESS TO INVALUABLE EVIDENCE

Operational research studies are published in peer-reviewed scientific journals, and the results remain openly available to researchers and the global humanitarian community.

In 2019 alone, 77 MSF-supported studies were published covering 13 thematic areas, such as HIV and tuberculosis, infectious diseases, migration and surgery and emergency care.

TRANSLATING FINDINGS INTO ACTION

Study findings reveal valuable evidence to improve programs and close gaps in the access to care throughout MSF's projects. With a dedicated policy and practice strategy, LuxOR is working to move its research back into action, sharing key findings with operations and partners, planning for uptake, and measuring impact.

For the first time ever, LuxOR ran a dedicated course on translating operational research into policy and practice change in late 2019, directly supporting eight research projects from all over the world with tailored uptake strategies.

TREATING MALNUTRITION IN NIGERIA:
A CASE SERIES ON RARE SEVERE KWASHIORKOR DERMATOSIS

In Nigeria, severe acute malnutrition remains a serious health issue. Approximately two million children are affected every year, with only two in ten receiving treatment. In Médecins Sans Frontières' (MSF) therapeutic feeding program in Maiduguri, a case series documents three cases of Kwashiorkor dermatosis, a severe type of skin lesion caused by a protein deficiency.

Over 300 children are admitted to MSF's nutrition project in Maiduguri every month during the annual hunger gap from May-September, when crops are growing, but cannot be harvested yet. Up to 13% of them suffer from Kwashiorkor, a protein deficiency causing swelling of the face and limbs, an enlarged liver, and skin lesions and ulceration called Kwashiorkor dermatosis.

Without regular wound cleaning to ensure the healing process, Kwashiorkor dermatosis patients are vulnerable to relentless infection. They require close observation and specialized medical care, posing a particular challenge in northeastern Nigeria, a region heavily affected by conflict and lacking essential medical supplies and resources. As the disease can lighten children's hair, parents often believe Kwashiorkor is caused by the sun, and seek help from traditional medicine, or delay medical treatment.

In a case series documenting Kwashiorkor dermatosis in three children, a team of operational researchers supported by LuxOR described the clinical presentation and case management, and additionally explored perspectives of Kwashiorkor patients' caretakers. Each of the children required admission with near constant monitoring and had to be cared for at the clinic for up to 38 days.

For children with severe forms of Kwashiorkor, the case series' key results call for a specific wound care training and treatment, and suggests for them to be observed on the same ward by a specially trained nurse. To prevent further infection, close attention to daily hygiene is equally important: changing bed sheets daily, using mosquito nets, and regularly cutting nails to avoid scratching.

A substantial communication gap was identified between the medical team and the primary caregivers. While family and community members play a critical role in ensuring hygienic practices and appropriate nutrition at home, they were not always informed of the link between skin lesions and malnutrition. This gap is now to be closed with better health messaging and information materials for caregivers.

In Maiduguri, MSF runs an inpatient therapeutic feeding centre (ITFC) with more than 70 beds.
© Yuna Cho/MSF

Case series are one of the oldest forms of research. Yet in the pyramid of evidence, they rank quite low as they cannot be replicated in other research. Nonetheless, they remain valuable for education, and help us understand and document rare health issues in humanitarian settings.

Engy Ali
Operational Research Advisor

FOCUS ON: Case series

Case series are a methodology to examine and document unique, highly contextual issues and rare medical conditions. Where small case numbers or a lack of sufficient data impede full quantitative or qualitative analysis, case series offer a true alternative to close knowledge gaps and shed light on prevention and treatment practices. In addition to Kwashiorkor, LuxOR-supported case series explored documented hippopotamus bite morbidity in Burundi, or bacteria infecting blood in Central African Republic. In 2019, LuxOR helped to develop a training initiative on conducting case series in humanitarian contexts, and continues to support thematic workshops in Senegal and Uganda.

THE FIGHT AGAINST ANTIBIOTIC RESISTANCE: MONITORING SURGICAL SITE INFECTIONS IN BURUNDI

Opened in 2015 as a response to politically fueled violence, L'Arche Kigobe is a MSF-supported Trauma Center in the center of Burundi's capital Bujumbura. As in many low-resource settings, infections occurring during surgeries or post-operative care are a major concern, adding to the increasing global threat of antibiotic resistance.

Initially established as an emergency project, L'Arche Kigobe Trauma Center quickly expanded services to meet a growing surgical demand. 4,157 surgical interventions took place in 2019 alone, despite a persisting lack of personnel, medical, and laboratory resources.

The increasing number of surgical interventions however also led to a surge in related health complications. Daunting estimates show that in low-resource settings like Burundi, one in ten patients will develop a surgical site infection. These infections occur after surgery in both post-operative care at the hospital or once a patient is discharged, and in severe cases can result in lifelong disability or death.

Surgical site infections are directly linked to the rapidly growing threat of antibiotic resistance. With more and more bacteria showing resistance against traditional antibiotics, the preventive treatment for patients is no longer effective. By using newer antibiotics, doctors in turn risk the bacteria developing new resistance to them, having fewer and fewer options for treatment down the line.

At the L'Arche Kigobe Trauma Center, an initial review of patient data showed the most frequent sources of surgical site infections occurred with the use of external fixators, a set of metal rods and screws stabilizing complex fractures through the skin.

In order to improve tracking of surgical site infections, the old manual paper register was updated to a digital database, and the reporting forms and notification system aligned with latest international guidelines. The new surveillance system also ensures patients are followed up with by health promotion staff or by phone after they leave the hospital.

Ten months into the launch of the new surveillance system, nearly 200 patients were systematically followed up over the course of 30 days, and 20 cases of surgical site infections and respective treatment were identified. The collected data is further used to continuously improve infection prevention, as well as control practices and identify potential treatment failures.

A patient with an external fixator at MSF's "L'Arche de Kigobe" trauma center in Bujumbura. © Evrard Ngendakumana/MSF

MSF and other health actors need to start engaging in the fight against antibiotic resistance. Even where we face access or resource challenges, there are things we can do to tackle resistance, through better infection and control practices and improved surveillance systems. Facing the tremendous global health challenge that is antibiotic resistance is an ongoing battle.

Anita Williams
Operational Research Advisor

FOCUS ON: Tackling antibiotic resistance

Antibiotic resistance is a major threat to global health, and an increasingly important research focus of health and humanitarian actors around the world. Several evidence gaps persist on contributing factors such as resistance patterns, overprescription of antibiotics, patients not complying with instructions and the use of antibiotics in the agricultural sector.
To facilitate thematic research in MSF projects, in late 2020 LuxOR will be launching a dedicated Structured Operational Research Training Initiative (SORT IT). In three course modules, field and medical staff plan, implement and publish a research project with direct operational relevance to their projects and missions.

DEALING WITH DATA GAPS:
PREDICTING MALARIA SURGES IN SOUTH SUDAN

During the rainy season from April to November, hundreds of thousands of people in South Sudan are at risk of contracting malaria. Due to missing data and unreliable reporting, predicting peaks in the number of malaria cases is challenging. Operational research suggests linear regression as a novel model to estimate surges of malaria patients, allowing for better planning of preventive measures and treatment capacities.

Caused by parasites transmitted by female *Anopheles* mosquitoes, malaria remains a dangerous and often deadly disease. 228 million people were estimated to be infected globally in 2018 alone, and over 400,000 died. Infants and young children are especially at risk, making for over two thirds of malaria deaths worldwide.

In South Sudan, malaria accounts for 68 percent of all illnesses and 72 percent of deaths reported in health facilities. In some months during the rainy season, patient numbers can double at hospitals and paediatric wards.

While a preventable disease, protective measures such as bed nets and environmental spraying, as well as sufficient treatment facilities need to be made available when patients need them the most. To predict sudden increases in malaria cases, Médecins Sans Frontières (MSF) and other humanitarian actors use mathematical models estimating future cases based on historical data.

Yet in South Sudan, fragmented, missing, or non-comparable data impede the validity of predictive standards like weekly averages with standard deviations.

A LuxOR-supported study therefore tested a moving linear regression model as an alternative, requiring only eight weeks of previous data to predict disease surges.

To benchmark the new model with older standards, the study additionally used a complete influenza data set from Norway as a testing ground. Here, the linear regression performed comparably well to calculating the weekly averages and adding standard deviations – the current standard method used by MSF. For malaria data from five MSF projects in South Sudan, linear regression correctly identified several exceptional malaria occurrences including one direct operational response by MSF.

The study results suggest the linear regression model is a valid early warning indicator to predict surges in malaria cases where only limited disease surveillance data is available. It has the potential to improve emergency preparedness and reduce outbreak response times, saving lives in the fight against malaria.

A mother and her child under mosquito nets at the pediatric ward of the Old Fangak hospital in South Sudan.
© Frederic Noy/MSF

As operational researchers, we regularly support surveillance and epidemiological studies of infectious diseases in humanitarian settings. The Coronavirus disease is affecting all of our medical projects around the world. Setting up reliable surveillance and monitoring tools from the start is key to respond to this outbreak amid some of the most vulnerable populations around the world.

Veerle Hermans
LuxOR Programme Officer

FOCUS ON:
Surveillance and research support in the COVID-19 pandemic

In the wake of the global Coronavirus disease pandemic, LuxOR supports MSF epidemiologists and medical coordinators in the field with the design and implementation of disease surveillance and monitoring tools. Research advisors are part of MSF's COVID-task force in Brussels, advising on evidence gaps, testing, surveillance strategies and operational research requests. The team also helps assembling and reviewing all medical guidance materials developed in-house, making it publicly available for partners and medical actors.

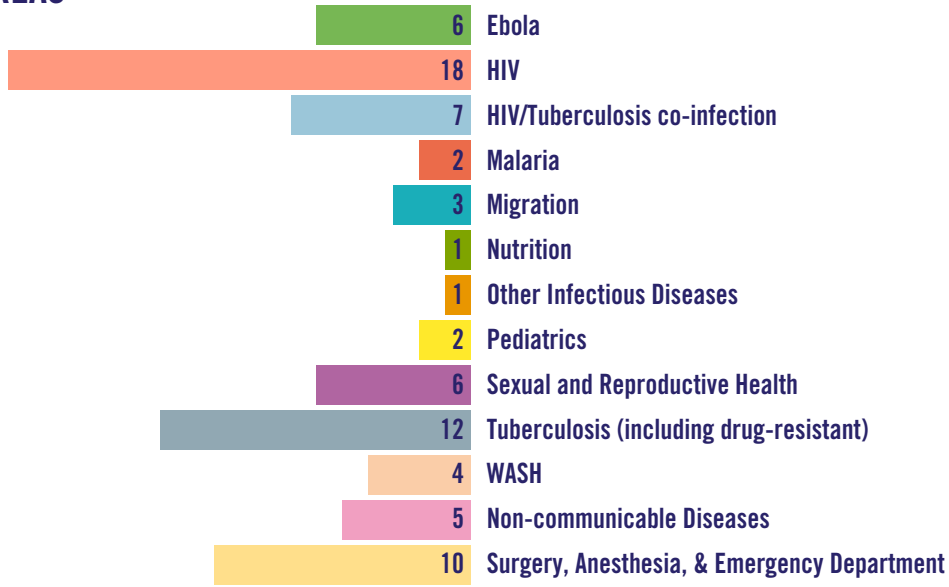
MSF OPERATIONAL RESEARCH: KEY NUMBERS AND EVENTS

MSF OPERATIONAL CENTRE BRUSSELS SUPPORTED

77

studies, reviews, and viewpoints published in peer-reviewed journals in 2019.

THEMATIC RESEARCH AREAS



11 TEAM MEMBERS SUPPORTING

OVER **66** ONGOING STUDIES WORLDWIDE

Assessing functional interdependence of a trauma patient in Maroua, Cameroon.
© Samuel Sieber/MSF

42 PARTICIPANTS IN **6** LUXOR-SUPPORTED RESEARCH TRAININGS IN KENYA & LUXEMBOURG

SORT IT operational research training course in 2018 in Entebbe, Uganda.
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NEW OPERATIONAL RESEARCH FRAMEWORK

Over the course of 2019, MSF's Operational Research Unit LuxOR and the Southern Africa Medical Unit developed and launched a new framework streamlining support for research requests from missions and projects around the world.

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OPERATIONAL RESEARCH DAY

LuxOR Research Advisor Julita Gil Cuesta presenting at one of the three panels of the annual OR Day in Brussels in June 2019.

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DEDICATED POLICY & PRACTICE TRAINING

In December 2019, LuxOR piloted a first dedicated course for research uptake and evidence-informed policy and practice change in Luxembourg.

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Front Cover Photo:
Maiduguri, the capital city of Borno state, hosts around one million displaced people from across the region. Many of them live in the camps informally set up where basic needs such as shelter, food, hygiene facilities and healthcare are insufficient and people are living in dire conditions.
© Yuna Cho/MSF

Back Cover Photo:
MSF outreach teams in Ethiopia get mosquito traps that they will distribute to refugee households.
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