MSF Crisis Alert:

The new face of an old disease: urgent action needed to tackle global drug-resistant TB threat

March 2014

MEDECINS SANS FRONTIERES
DOCTORS WITHOUT BORDERS

Executive summary: Global drug-resistant TB crisis demands mass mobilisation and new treatments

Tuberculosis is one of the gravest public health threats facing the world today, and is all the more serious as drug resistance takes a grip.

Tuberculosis (TB) is a curable disease, but an inadequate global response has allowed the growing epidemic of drug-resistant tuberculosis (DR-TB) to take hold. Drug-resistant forms of TB are much harder to cure: standard TB drugs don't work, and doctors must turn to long, arduous, complex and expensive treatment regimens that only cure half the patients at best.

DR-TB originally developed because of improper use of anti-TB medicines, and now these deadlier DR-TB strains are spreading from person to person, even to people who've never had TB before. Today there are nearly half a million new cases of multidrug-resistant TB a year, with drug-resistant forms of TB reported in virtually all countries worldwide.

Tuberculosis and drug-resistant forms of TB

One-third of the world's population, around two billion people, is infected with the TB bacterium but does not have active TB disease. This is often referred to as dormant or 'latent' TB. About 10% of these people develop the active form of the disease during their lifetime and become sick and potentially infectious. Every year, around eight million people worldwide fall ill from TB, and 1.3 million people die from the disease.[1] TB is airborne and contagious, and now new forms which cannot be cured with standard TB treatments are appearing at an alarming rate. The most widely reported strain is multidrug-resistant TB (MDR-TB), which is resistant to the two most powerful anti-TB drugs. Extensively drug-resistant TB (XDR-TB) is even harder to treat.

As new tools for diagnosing MDR-TB rapidly become more widely used, more and more people are being diagnosed, but only one in five people who need it can obtain treatment. And no matter where you live in the world, the only treatments available entail people swallowing well over 10,000 pills and having eight months of painful injections, with potentially horrific and long-lasting side effects.

As the numbers mount, developing countries face insurmountable drug costs, exacerbated by the long periods of care and management of side effects. It is perhaps little wonder that, with the high costs and the inadequate treatment, DR-TB care is so minimally available worldwide. Meanwhile the critical gap between the numbers of suspected DR-TB cases and those successfully treated leaves the airborne killer to spread indiscriminately.

"The DR-TB crisis is everybody's problem and demands an immediate international response. Each year we are diagnosing more patients with DR-TB, but the current treatments aren't good enough to make a dent in the epidemic. It doesn't matter where you live; until new short and more effective treatment combinations are found, the odds of surviving this disease today are dismal."

Sidney Wong,
MSF medical director

New short, safe and effective treatment combinations are key to unlocking the global DR-TB crisis, and today there is reason for hope. The first new TB drugs in 50 years, along with developments in diagnostic tests and new approaches to care, have real potential to radically improve patient outcomes. Yet no single drug can combat this disease, and merely adding new drugs to today's regimens won't solve the problems of complexity, toxicity, length and cost.

Unfortunately, patients remain years from getting the cures they desperately need unless governments, pharmaceutical companies and researchers quickly mobilise the necessary resources and political will. Collaborative research is urgently needed to find much improved treatment combinations that are fit for purpose, reasonably priced and able to be rolled out rapidly in resource-limited settings. In the meantime, increased efforts must be made to diagnose and treat more people with DR-TB today to save lives and slow the spread of this virulent disease.

1. Drug-resistant TB: a global giant of a public health threat

"Every death from TB is avoidable. Every death from TB is not due to a medical reason. Forget for a second about the technical nitty-gritty detail of tissue necrosis and compromised gas-exchange. In this modern age, all deaths from TB boil down to a lack of commitment from the international political community and the pharmaceutical industry to address this disease."

Emily Wise,
MSF TB doctor, UK blogs.msf.org/emilyw/2013/05/the-darkest-hour/

Mycobacterium tuberculosis (TB) is infamous for many reasons, not least as the biggest infectious killer of all time. Dating as far back as Ancient Egyptian times, the disease is present in most countries worldwide. For some, the spectre of TB may seem relegated to the past, enshrined in nineteenth century books and plays. For many others, however, the disease is all too alive, wreaking havoc in their bodies, their families and their communities. No matter how you view it, one thing is incontestable:

TB is one of the gravest public health threats facing the world today, and is all the more serious as drug resistance takes a grip.

There are an estimated 450,000 new cases a year of multidrug-resistant tuberculosis (MDR-TB) reported in virtually all countries surveyed by the World Health Organization worldwide, and with extensively drug-resistant tuberculosis (XDR-TB) reported in 92 countries.[2]

Yet, many experts consider this estimate conservative due to the limited availability of DR-TB diagnosis. Without a proper diagnosis, conventional TB treatment fails, which in turn allows drug resistance to develop.

Once diagnosed, patients face a gruelling course of treatment. The current regimen recommended by the World Health Organization for treating MDR-TB[3] takes two years, including eight months of painful daily injections and swallowing up to 20 tablets a day. These medications are associated with horrible side effects, ranging from debilitating nausea and skin rashes to more serious side effects such as permanent deafness, renal failure and psychosis, which in some cases have driven patients to commit suicide. Even if a patient can tolerate all this, there is no guarantee of a cure, with global figures showing cure rates of around 48%[4] – in other words one in two people survive. This number is a lot lower in many places, where the quality of care and the availability of resources are lesser.

On top of that, each course of therapy costs health providers around US$4,000 per patient,[5] plus the additional costs of long periods of care and management of side effects.

"The problem is not in the future, it is here and now. Drug-resistant TB is too widespread and, in many places, too big of a problem to sit back and resignedly wait for a solution. It is quite simply one of the foremost public health threats the world faces today."

Grania Brigden,
MSF Access Campaign

MSF has treated people with TB around the world for the past 30 years – from chronic conflict zones in Somalia and South Sudan, to high-burden TB countries like Myanmar and Uzbekistan. In 2012, working closely with national TB programmes in many countries, MSF started 25,000 people on TB treatment in around 91 projects worldwide.

Our staff are witness to the breadth of the TB crisis as its spans the globe, and in recent years to the growing severity of DR-TB. In 2012, MSF treated 1,794 DR-TB patients, around 1,500 of whom had MDR-TB.

As the result of the roll-out of a new rapid diagnostic tool in MSF projects, we are diagnosing more and more people. At the same time, we are also finding growing numbers of people with XDR-TB.

"In countries where MSF works – like Armenia, Uzbekistan, India, Myanmar, South Africa, Swaziland, Ukraine and Lesotho – the number of people testing positive for MDR-TB and XDR-TB is staggering. The more MSF looks for DR-TB, the more we find it, along with a growing number of people presenting with DR-TB for the first time, indicating the direct spread of resistant forms from person to person."

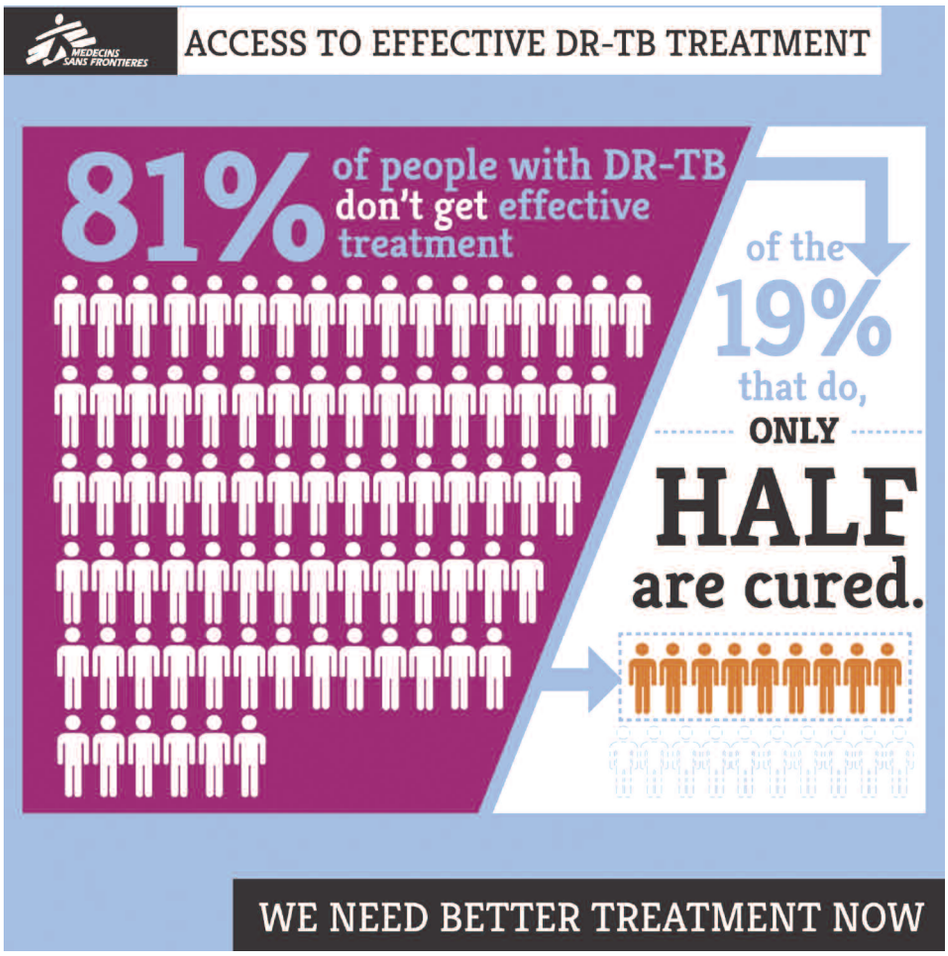
Bern-Thomas Nyang'wa,
HIV/TB specialist, MSF UK

In parts of eastern Europe and central Asia, such as Belarus and Kazakhstan, around one in three new TB patients are testing positive for drug-resistance, suggesting they were directly infected by someone else with a resistant form of the disease. MSF sees a similar proportion of first-time DR-TB patients at its project in Armenia, while in MSF's project in Uzbekistan we find MDR-TB in up to 40% of patients who have never had TB treatment before.

In India, where MSF provides TB care in Mumbai, Manipur, Nagaland and Chhattisgarh, we see different DR-TB epidemics, the most startling of which is in the megacity of Mumbai, where 60% of people live in slums. Across the country, MSF is diagnosing more and more DR-TB among new cases, especially among HIV-infected patients.

"Alarmingly, the patterns of resistance we find in Mumbai are increasingly extensive; more than half of the MDR-TB patients have resistance to fluoroquinolones, one of the most potent drugs currently available for DR-TB. And as access to full diagnosis is extremely limited, the great majority of patients remain undiagnosed or wrongly diagnosed and remain either untreated or put on inappropriate treatment regimens, thus fuelling the epidemic and worsening the situation."

Petros Isaakidis,
MSF epidemiologist,
Mumbai, India



In southern Africa, where countries have some of the highest rates of new TB cases per capita worldwide, the HIV epidemic is exacerbating the spread and virulence of DR-TB. With compromised immune systems, people living with HIV are up to 34 times more likely to develop active TB than those who are HIV-negative. TB remains a leading killer of HIV-positive people globally. In MSF's projects in Swaziland, 200 patients were diagnosed with DR-TB and began treatment in 2013, 85% of whom were co-infected with HIV. DR-TB cases accounted for 8% of the total number of TB cases diagnosed.

"Anyone can get TB. You don't know whose health is in what condition; you don't know who is sick, who is not sick, who's faithful to their medication and who's not. TB is just in the air. Whether you're poor or rich you can't stop it. There's no way you can stop it."

Genenikele,
XDR-TB patient, Swaziland, since died of XDR-TB

As the number of people presenting with DR-TB in MSF's projects grows, our staff are embracing new and patient-friendly approaches to save the lives of as many people as possible. Yet, in spite of these best efforts, we have not been able to achieve higher than 54% cure rates for MDR-TB, and far lower for XDR-TB.

As the DR-TB crisis becomes ever more pressing, doctors worldwide are struggling to provide even the most limited response exactly when it is needed the most. This leaves a critical gap between the numbers of suspected cases and those successfully treated, allowing the disease to spread relatively unchecked.

"This is no longer a choice; the problem of DR-TB is staring us in the face. People are filling our clinics and that number will only grow as rapid diagnosis is further rolled out. Medical providers need to do everything possible to save the lives of people with DR-TB today and prevent it spreading further. However, it is clear that the current treatment will not allow us tackle the scale of this problem. We desperately need new far shorter and more effective regimens to scale the mountain of DR-TB we see now."

Francis Varaine,
Head of MSF's TB International Working Group

Children with DR-TB

Jezza Neumann, True Vision

Nokubegha and her elder brother. Nokubegha's mother died of DR-TB shortly before she was diagnosed with the disease, Swaziland

The needs of children with DR-TB continue to be particularly neglected. Current methods of confirming the diagnosis of TB in children – who have difficulty coughing up phlegm – are invasive and still end up missing most cases. Research is urgently needed into methods that use samples that are easier to collect (like urine, blood or stools). So too are better treatment options; with no paediatric formulations available for DR-TB drugs, children have to take adult pills which have been crushed or split and then subdivided, with the risk of receiving the wrong dose. During treatment, children with DR-TB can find themselves confined to adult hospital wards for months at a time, far from their families, schools and other children.

However, it is possible to care for children more humanely. In Tajikistan, MSF has been running a TB programme for children since 2011. Hospital treatment – which can stunt children's development and put enormous strains on the whole family – is avoided. Instead they receive support from health staff and counsellors in their own homes, which makes the long course of treatment easier to take. Once the children are out of the infectious phase, our staff help them get back to normal life as soon as possible by educating their schools that it is safe for them to be back in the classroom.

"What needs to change is that we should get better medicine so we can make all the people in the hospitals better."

Nokubegha, Swaziland

2. Patients and staff around the world call for urgent change

MSF's commitment to push for better treatment regimens for DR-TB has been driven by the insights gained from patients into just how tough the current treatment regimen is, as well as by our staff who strive to save these people's lives against the odds.

Since 2011, DR-TB patients have been sharing their experiences more widely through the TB&ME patient blog, read by 140,000 people each year. Now patients themselves are calling for improved care and treatment with the DR-TB Manifesto, a public petition demanding urgent improvements to DR-TB care worldwide, which has garnered global support.

TB&ME

In their own words, TB patients from Australia to Zimbabwe recount their experiences of living with the disease and the issues that affect their lives, describing frankly the lows and highs of treatment, from discovering they have the disease, through side effects, relapses and stigma, to finally being cured. Currently there are 22 patients blogging from 13 countries. Find TB&ME at blogs.msf.org/tb

"We keep on preaching that this infection is curable, and yes it is, but how many deaths should occur for our government to start putting a foot down and say NO to the infection and the re-infections that occur in hospitals."

Xolelwa Joni, cured XDR-TB patient, South Africa.
blogs.msf.org/ tb/2014/02/ continuation-of-the-fight-against-normal-mdr-and-xdr-tb/

Lucky, UK

"You may be wondering what makes me feel lucky? It's the feeling that I am alive and going to be with my family. If I flashback, the feeling wasn't the same. When I was admitted to the hospital, it was the most dreadful day of my life. I had to leave my son who was four years old and I was shattered. I packed my bag with all the basics, like toothpaste and brush, and I still remember the moment my son asked me, 'mummy – where are we going, shall I get my bag?' How would I live without him? But finally the moment arrived and I left him behind in the car of one of my husband's friends. We reached the hospital and I was taken to the room, which appeared just like a dungeon with one small window. The nurse came in wearing a mask and asked my husband to leave. I felt like I was deserted and with no hope."

Gibson, Zimbabwe

"A tree goes through different seasons and is affected by various weather patterns. Some trees had scars – just like the ones I have on my heart – left by the pain of being abandoned by my mother. In life we see similar situations where people say hurtful things to us or about us that scar us. In the community scores of people say cruel, wounding things about people receiving HIV or TB treatment. However some of these trees with scars also have fruits, lovely flowers and bright green leaves. This supports me and encourages me as it is an indication that just because one has been hurt in the past by people's words or actions, one can overcome these obstacles and go on to live a beautiful, fruitful successful life."

Zolelwa Sifumba, South Africa

"Everything was going well for me and I was getting closer and closer to my dream [of finishing my medical studies and qualifying as a doctor], then TB got a hold of me. I could not believe it, parts of me still can't believe that this is what has happened to me and this is who I am. I am one of the unfortunate students that got sick while working at the hospitals... I was told by other people that have had MDR-TB that the depression was something that they struggled with too. So this was the treatment's doing. Not the disease it was treating but the treatment itself. MDR-TB almost took my life. The sadness that came as a result of it almost took my life."

Hosyat, Uzbekistan

"I was in hospital for two weeks. I made new friends. There were some patients who were on different periods of treatment among them. Talking to them kept my spirits up. Everybody needs somebody. I forgot my personal and family problems. One day I went out for a walk in the street with one girl who is the same age as me. We sang a Karakalpak traditional song as loud as we could. I felt so relieved afterwards as if something inside me had gone out. This song, which we sang together where there was nobody to hear us, had brought us great joy."

Ko Min Naing Oo, Myanmar

"TB first came into my life in June 2000 and kept coming back over the next 13 years, getting harder and harder for the doctors to treat it. I took many different kinds of pills and injections over the years, but nothing seemed to get the disease out of my body for good. It kept coming back, stronger than before. My health kept going up and down and it was really difficult. Finally I began treatment for DR-TB."

Christiaan, AKA the Fully Sick Rapper, Australia

"The more that people share their own stories of TB, the more quickly it will become accepted, then more conversations will happen around it, and it will be more likely that governments will open their eyes. The more people hear about the widespread health problems being caused, the more likely funding will be moved towards solving the problem! And that's good for everyone!"

"Test Me, Treat Me" DR-TB Manifesto campaign launched

The DR-TB Manifesto brings together the voices of patients, health staff and communities around the world, and calls for urgent improvements to DR-TB care worldwide.

The manifesto was born out of the experience of former patient Phumeza Tisle and her doctor, Jennifer Hughes, from South Africa. Phumeza, 24, was diagnosed with MDR-TB in 2010. It was only after she'd gone deaf from the treatment that she discovered she had XDR-TB. She spent four years battling the disease, supported by MSF staff, family and friends. During this time, Phumeza and Jennifer agreed to write a manifesto calling for better DR-TB care worldwide. Plans are underway to have Phumeza and Jenny present the DR-TB Manifesto this May at the World Health Assembly, where the future of the global TB response and care will be under discussion. **Sign now at: www.msfaccess.org/TBmanifesto/**

"Just a year ago I wrote the DR-TB manifesto, with the help of doctors and fellow TB patients. It simply states the demands that are needed: for one the current TB drugs are a nightmare... perhaps we need to involve politicians? Perhaps summon people who are highly respected, the likes of presidents? Maybe then those pleas and demands suddenly then will be things getting done... I'll be excited the day where there will be ONE drug for DR-TB, non toxic, and the day where there will be zero TB deaths. Now that day I will call it, HAPPY WORLD TB DAY!!"

Phumeza Tisile,
cured XDR-TB patient, South Africa
blogs.msf.org/tb/2014/02/approaching-world-tb-day

3. New ways of tackling DR-TB

Over the years, MSF has learned many lessons tackling TB and is committed to continually improving patient care. In our clinics we champion new approaches, including integrated HIV/TB care, rapid diagnosis, home-based care and counselling, working closely with national TB programmes. We document the results and implement research to provide evidence with which to advocate for better and more accessible patient care.

Rapid diagnosis, a test that can detect resistance to rifampicin – one of the most common anti-TB drugs – within two hours, has made it far easier to identify MDR-TB. MSF is rolling out the test as quickly as possible. The sooner people receive the correct treatment, the better their chance of cure and the sooner they cease to be infectious. Today, this remains the best form of prevention, until an effective vaccine can be found. The current available vaccine, Bacillus Calmette Guerin (BCG), has only limited effect.

However, the rapid diagnosis test is not perfect: it needs electricity to run, so is unsuitable for off-grid rural health centres; it only detects resistance to a single drug out of those most commonly used to treat TB; and it still does not meet the needs of diagnosing TB in children. A rapid point-of-care test, much like that used for malaria, is still much needed.

We are always looking for ways of making treatment easier for patients and therefore less likely to quit their medication before the full course is over. The ways we do this in our projects vary according to the context and patients' needs, but generally involve integrating HIV and TB services, and providing outpatient care, delivered at patients' homes or within the community, to avoid unnecessary or long stays in hospital. Patients benefit from the support of family and friends, backed up by counsellors and by peer support groups, while remaining a part of their communities and in many cases being able to work or continue their education during treatment.

To learn more about innovative ways to tackle DR-TB today, see *Treating drug-resistant TB: What does it take?*
www.msf.org.uk/sites/uk/files/attachments/treating_dr_tb_low_res.pdf

4. New treatment regimens are key to turning the DR-TB crisis around

At the end of 2012, the first new TB drugs in nearly half a century caused a surge of excitement. In 2012 and 2013, bedaquiline and then delamanid gained conditional approval from the US Federal Drug Agency and the European Medicines Agency to treat the most severe forms of DR-TB. Along with a small number of other new TB compounds in the final stages of development, this signalled new hope for TB treatment.

No single drug, however, will cure TB. If new drugs are merely added to the current MDR-TB regimen, the resulting course of treatment will remain lengthy, cumbersome and toxic. What is urgently needed is a new combination of drugs that is shorter, more tolerable and capable of being implemented rapidly in countries where DR-TB is rife, containing medicines that TB has not had a chance to develop resistance to. Developing a new regimen is a priority to ensure that the new drugs are used to their maximum potential.

Today, however, a new drug regimen is a distant dream, as traditionally run clinical trials are years from finding an answer, and none, as yet, are combining the two newest and most promising drugs. There is an urgent need for research into new treatment regimens, designed to work best for patients in the lower to middle-income countries where they are most needed. A radical re-think into how new TB drug regimens are developed and tested is necessary to achieve this end as safely and swiftly as possible. An important first step will be to determine the compatibility of the new drugs.

“If it were at all possible for those who make the pills to come up with drugs with a shorter period of treatment, then she would have held on and finished her treatment and survived.”

Gogo, whose daughter died of DR-TB and whose son is now infected with the disease, Swaziland

Jezza Neumann, True Vision

MSF, together with other leaders in the field of TB, has devised eight key principles for designing a future DR-TB regimen. It should:

1. contain at least one new class of drug (ie that combats the disease in a new way)
2. be applicable for use against MDR-TB and XDR-TB
3. contain three to five effective drugs, each from a different drug class
4. be in the form of pills, to be taken orally, rather than injections
5. have a simple dosing schedule
6. have few side effects which require limited monitoring
7. have a maximum duration of six months
8. have minimal interaction with antiretroviral drugs for treating HIV

With the TB bacteria’s tendency to rapidly develop resistance, a robust pipeline of new drugs is needed. Right now the options are limited and the pipeline risks running dry. Overall, TB research and development is chronically underfunded – only 30% of the necessary funding is available today. MSF, with others, is looking at ways of re-defining the way TB research and development is conducted and funded so as to meet urgent medical priorities, rather than being driven by profit. www.msfaccess. org/push-pull-pool-who-tb-demo-project

“I feel sorry that, in this era of globalisation, we still use old, old drugs and we cannot eliminate TB.”

Erkin Chanasylova,
MSF doctor, Swaziland

Many patients, however, don’t have the luxury of time to await a new regimen, especially those with XDR-TB and those who are virtually untreatable. For these people, “compassionate use” programmes utilise the new drugs on patients for whom all other treatment has failed, giving them their only chance of survival. In Armenia, where MSF is running its first compassionate use programme using bedaquiline, patients and staff are enthused by the prospect of having new treatment options. MSF is now looking forward to initiating its second compassionate use programme using delamanid.

"In Armenia, before 2013, there were no treatment options for those failing MDR-TB treatment. That means a patient fails and ends up on the streets or in a palliative care centre or at home, waiting to die. But that has changed with the compassionate use programme."

Saiful Qayyum,
MSF medical coordinator in Armenia

Until a new and effective treatment regimen is found, a potential interim solution for certain countries could be the 'short course regimen for MDR-TB', trialled on patients in Bangladesh in 2010.[6] This study showed promising results for this nine-month regimen as compared to the two-year regimen. MSF is currently trialling this in Swaziland and Uzbekistan, and looks forward to reporting on the results in the near future. MSF is also implementing it in Chad, South Sudan and Democratic Republic of Congo, as the shorter treatment period is more suitable in places where people may be displaced from their homes due to conflict or other crises, and so may not have consistent access to medical care. However, the nine-month regimen uses the same drugs as current treatments so can only be a stopgap solution while better treatments are being developed.

"Every day patients ask our staff why the treatment is so long, with so many drugs, so painful, with so many side effects. Because of this, while waiting for new drugs, in January 2014 MSF started treatment with a short-course DR-TB regimen which lasts nine to 12 months. Though an improvement in time, the side effects of the drugs used for this regimen continue to cause problems for the patients. People show enormous resilience in taking the toxic and painful treatment; however there is an urgent need for shorter and better treatment."

Kees Keus,
MSF medical coordinator, Swaziland

5. No time to lose: act now to curb the TB time bomb

MDR-TB patient, Swaziland. Sven Torfinn

"I feel like tuberculosis at present is like a time bomb. And it will blast at any time."

Samsuddin Khan,
MSF TB doctor, Mumbai, India

Immediate action is required to save more lives today and prevent a far worse emergency tomorrow.

MSF's work treating DR-TB shows that lives can be saved now, assisted by rapid diagnosis, by new approaches to care, and – for those with no other hope – by compassionate use programmes. There is a desperate need for increased efforts to diagnose and treat DR-TB cases; governments and the international community have a responsibility to scale up existing programmes to close the yawning treatment gap that currently allows the disease to spread unhindered.

At the same time, it is clear that current treatments are failing patients and impeding medical programmes from increasing care to meet the scale and severity of the DR-TB crisis. The numbers of people affected are simply too big, and the current treatments too impractical and too costly.

A NEW, SHORT, TOLERABLE, MUCH LESS TOXIC, MORE EFFECTIVE AND AFFORDABLE TREATMENT REGIMEN IS KEY TO TURNING THE DR-TB CRISIS AROUND.

Patients, medical staff and communities around the world are demanding this, and MSF, with decades of tackling TB, is convinced of it. To this end, MSF calls upon governments, donors, pharmaceutical companies and researchers to mobilise urgently:

- High-burden TB countries must lead the fight against DR-TB: ensuring the political will and funding necessary to save more lives today and lay the foundations for new treatment regimens; facilitating the registration of new drugs, implementing compassionate use programmes, and supporting research into new treatment combinations.

- Donor governments must make it a priority to drive forward TB programmes and research and provide the necessary support and funding. The majority of international funding comes through the Global Fund to fight AIDS, TB and Malaria (GFATM), which must set ambitious targets to support national programmes to increase care and to implement the most effective new approaches.

- Pharmaceutical companies and researchers must speed up efforts to find better treatment combinations through innovation and collaboration, making the most of new drugs. Treatments must be made affordable and accessible to middle and lower-income countries where they are most urgently needed.

"Let us accept the fact we are faced with a TB epidemic. We need to get together and fight for our survival so that there can be a future for the next generation. Because if we give up the fight now, the children are finished."

Gogo, whose daughter died of DR-TB and whose son is now infected with the disease, Swaziland

To learn more about what can be done to tackle the DR-TB crisis see 'The Final Frontier: Treating drug-resistant TB' Policy Film - http://www.msf.org.uk/final-frontier-treating-drug-resistant-tb

You have a role too! Each and every individual can raise awareness of this issue and demand that those responsible for guarding national and international public health are doing all they can to tackle DR-TB. You can show your support by signing our DR-TB Manifesto, to be presented to the World Health Assembly in May 2014, at www.msfaccess.org/TBmanifesto/

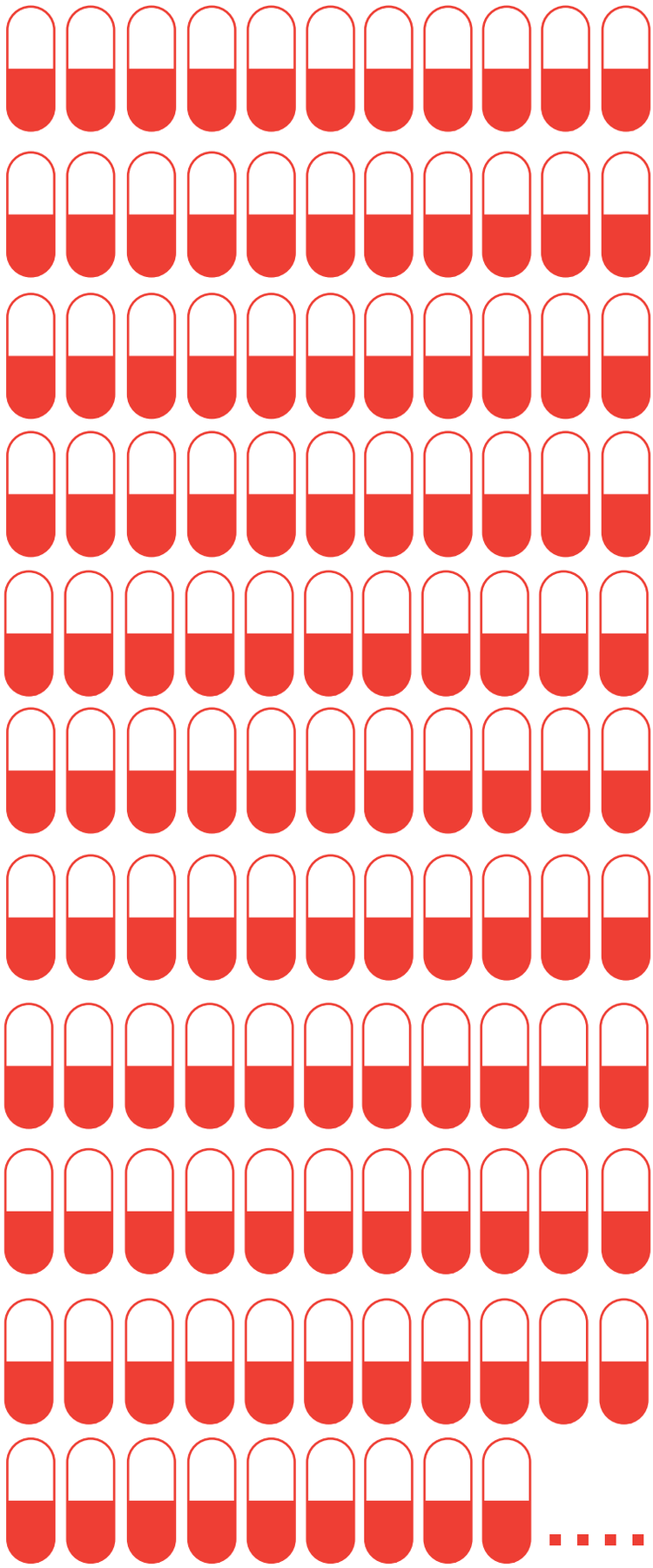
Notes

1 TB factsheet 104, World Health Organization, March 2014. Available at: www.who.int/mediacentre/factsheets/fs104/en/
2 MDR-TB factsheet, World Health Organization, October 2013. Available at: www.who.int/tb/challenges/mdr/mdr_tb_factsheet.pdf?ua=1
3 Principles for designing future regimens for multidrug-resistant tuberculosis, World Heath Organization bulletin, March 2013. Available at: www.who.int/bulletin/volumes/92/1/13-122028/en/
4 MDR-TB factsheet, World Health Organization, October 2013. Available at: www.who.int/tb/challenges/mdr/mdr_tb_factsheet.pdf?ua=1
5 DRTB drugs under the microscope, MSF Access Campaign and International Union Against Tuberculosis and Lung Disease, 3rd edition, October 2013. Available at: www.msf.org.br/arquivos/Doc/Publicacoes/msf_tb_report_utm3rdedition-2013.pdf
6 Known as the 'Van Deun study'. Available at: www.ncbi.nlm.nih.gov/pubmed/20442432

Front cover photo: Jezza Neumann, True Vision.
Design/artwork: Sue Grant 01848 200331

MEDECINS SANS FRONTIERES
DOCTORS WITHOUT BORDERS

How many pills does it take...



TOTAL PILL COUNT: 14,600