

Multidrug and extensively drug-resistant TB (M/XDR-TB)

2010 GLOBAL REPORT ON
SURVEILLANCE AND RESPONSE



World Health
Organization

Multidrug and extensively drug-resistant TB (M/XDR-TB)

2010 GLOBAL REPORT ON
SURVEILLANCE AND RESPONSE



**World Health
Organization**

WHO Library Cataloguing-in-Publication Data

Multidrug and extensively drug-resistant TB (M/XDR-TB): 2010 global report on surveillance and response.

WHO/HTM/TB/2010.3

1.Tuberculosis, Multi-drug-resistant – epidemiology. 2.Tuberculosis, Multi-drug-resistant - diagnosis. 3.Drug resistance, Bacterial. 4.Antitubercular agents. 5.Bacteriological techniques. I.World Health Organization.

ISBN 978 92 4 159919 1

(NLM classification: WF 360)

© World Health Organization 2010

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

Cover: Photographs (top left) courtesy of Paolo Miotto, San Raffaele Scientific Institute, Milan, Italy; (top middle) courtesy of Damien Schumann/Lilly; (top right, bottom right) courtesy of Dominic Chavez/WHO; (bottom left) courtesy of Gunta Dravniece/WHO Collaborating Center, Riga, Latvia.

Designed by minimum graphics
Printed in France

Contents

Acknowledgements	v
Glossary	ix
Summary	1
Introduction	4
Part I: Surveillance of M/XDR-TB	5
1.1 Geographical coverage of anti-TB drug resistance data	5
1.2 Resistance to first-line anti-TB drugs, including MDR-TB	6
1.3 Risk factors for drug resistance: previous treatment, sex and HIV	10
1.4 Trends over time	15
1.5 Resistance to second-line anti-TB drugs, including XDR-TB	15
1.6 Estimated global burden of MDR-TB	17
Part II: Progress in the global response to M/XDR-TB	21
2.1 Scaling up laboratory services for diagnosis of M/XDR-TB	21
2.2 Reporting of MDR-TB patients and their treatment outcomes	23
2.3 Addressing other health systems considerations for the response to M/XDR-TB	25
2.4 Financing the care of drug-resistant TB patients in the 27 high MDR-TB burden countries	27
References	30
Annexes	31
Annex 1: Resolution WHA62.15	33
Annex 2: Methods	36
Annex 3: Continuous drug resistance surveillance data quality indicators	41
Annex 4: Continuous drug resistance surveillance	43
Annex 5: XDR-TB and resistance to fluoroquinolones, 2002–2009	46
Annex 6: Estimates of MDR-TB, by WHO region, 2008	48
Annex 7: Treatment outcomes	53

In memoriam

Sir John Crofton (1912–2009), whose pioneering work in the use of combination drug therapy for the treatment of tuberculosis has resulted in countless lives saved

“The greatest disaster that can happen to a patient with tuberculosis is that his organisms become resistant to two or more of the standard drugs. Fortunately we can prevent the emergence of drug resistance in virtually all cases if we take enough trouble to ensure that the best drug combinations are prescribed and that the patient takes them as directed. It is often not realized how venial a sin can result in ultimate disaster. It might be suggested that giving a risky combination of drugs, or even giving a drug alone, will not matter if it is only for a short time. It is true that it may not matter in a number of patients, but in some it can matter very much and may make all the difference between survival and death.

The development of drug resistance may be a tragedy not only for the patient himself but for others. For he can infect other people with his drug-resistant organisms. In such patients the disease would not be sensitive to the drug in question. A recent survey by the Medical Research Council (Fox et al., 1957) in various clinics all over the country has shown that no less than 5% of newly diagnosed patients were infected with organisms resistant to at least one of the three main drugs. If physicians come to apply thoroughly the present knowledge about preventing drug resistance, this percentage should steadily diminish”.

From *Chemotherapy of pulmonary tuberculosis*, by John Crofton, read to a plenary session at the Annual Meeting of the British Medical Association, Birmingham, England, 1958 (*British Medical Journal*, 1959, 5138(1):1610–1614).

Acknowledgements

This report was produced by a core team at the World Health Organization (WHO): Dennis Falzon, Philippe Glaziou, Ernesto Jaramillo, Fuad Mirzayev, Eva Nathanson, Charalambos Sismanidis, Wayne van Gemert, Diana Weil and Matteo Zignol. Wayne van Gemert was responsible for Part I. Dennis Falzon and Ernesto Jaramillo were responsible for Part II. Overall coordination was provided by Matteo Zignol. The structure and content were closely guided by the Director of the Stop TB Department, Mario Raviglione.

All members of the core team contributed to the writing of the report. Dennis Falzon, Wayne van Gemert and Matteo Zignol managed data. Dennis Falzon, Philippe Glaziou, Charalambos Sismanidis, Wayne van Gemert and Matteo Zignol reviewed and analysed data and prepared the figures and tables. Philippe Glaziou and Charalambos Sismanidis led the revision of estimates of MDR-TB incidence and mortality.

In addition to the core team, many staff at WHO headquarters and regional offices provided valuable input to the report. Among the colleagues listed below, we thank in particular Samiha Baghdadi, Andrei Dadu, Laura Gillini, Khurshid Alam Hyder, Wilfred Nkhoma and Daniel Sagebiel for their major contributions to data collection and review; Christopher Fitzpatrick, Katherine Floyd and Inés García Baena for analysis of financial data and assistance with developing the section on financing; Tom Hiatt and Hazim Timimi for organizing the WHO global TB data collection system and extracting data from it; Tom Hiatt for helping with the development of maps; Christin Chevalley for her vital administrative support; and Karen Ciceri for editing the report.

WHO headquarters Geneva: Léopold Blanc, Christin Chevalley, Karen Ciceri, Janet Coutin, Chris Dye, Marcos Espinal, Christopher Fitzpatrick, Katherine Floyd, Inés García Baena, Christopher Gilpin, Christian Gunneberg, Tom Hiatt, Tauhid Islam, Wieslaw Jakubowiak, Judith Mandelbaum-Schmid, Paul Nunn, Rose Pray, Glenn Thomas, Hazim Timimi, Mukund Uplekar, Lana Velebit and Karin Weyer.

WHO African Region: Shalala Ahmadova, Alabi Gani, Joel Kangangi, Rahevar Kalpesh, Bah Keita, Kefas Samson, Wilfred Nkhoma, Angélica Salomão and Nee-ma Simkoko.

WHO Region of the Americas: Rafael Lopez-Olarte, Mirtha del Granado and Laura Gillini.

WHO Eastern Mediterranean Region: Samiha Baghdadi, Salem Barghout, Amal Bassili and Akihiro Seit.

WHO European Region: Evgeny Belilovsky, Pierpaolo de Colombani, Andrei Dadu, Irina Danilova, Alain Disu, David Mercer, Dmitry Pashkevich, Valentin Rusovich, Roman Spataru, Gombogaram Tsogt and Richard Zaleskis.

WHO South-East Asia Region: Mohammad Akhtar, Erwin Cooreman, Khurshid Alam Hyder and Nani Nair.

WHO Western Pacific Region: Cornelia Hennig, Pieter Van Maaren, Daniel Sagebiel, Fabio Scano and Li Yuhong.

Development of this report would not have been possible without the collaboration of national TB control programme managers and their staff, who supplied the data for the foundation of this report. Managers and staff of sites providing MDR-TB treatment under the approval of the Green Light Committee generously provided data on treatment outcomes. Managers and staff of the Damien Foundation Bangladesh also provided surveillance data from their project.

The authors sincerely thank all contributors of data for their invaluable cooperation.

WHO African Region: Cisse Amadou, Eric Bafende, Adama Marie Bangoura, Joconiah Chirenda, Gerrit Coetzee, Themba Dlamini, Saidi Egwaga, Gasana Evariste, Michael Gasana, Paula Samo Gudo, Jacquemin Kouakou, Hillary Kipruto, Farai Mavhunga, Omphemestse Mokgatihe, Lindiwe Mvusi, Fulgence Ndayikengurukiye, Thaddée Ndikumana, Norbert Ndjeka, Emmanuel Nkiligi, Grace Kangwagye Nkubito, F. Rujeedawa, Hind Satti, Easo Yedmel Christian Serge and Joseph Kimagut Sitienei.

WHO Region of the Americas: Mirian Alvarez, Cesar Bonilla Asalde, Marta Isabel de Abrego, Christian Acosta, Cecilia L. De Arango, Robert del Aguila, Zeidymata Azofeifa, Dráurio Barreira, Jaime Bravo, Christian Garcia Calavaro, Kenneth G. Castro, Espana Cedeno, Felurimonde Chargles, Mercedes F Esteban Chiotti, Stefano Barbosa Codenotti, Ada S. Martinez Cruz, Xochil Alemán de Cruz, Celia Martiney de Cuellar, Richard D'Meza, Angela Diaz, Edward Ellis, Zulema Torres Gaete, Victor Gallant, Manuel Zuniga Gajardo, E. Areli Paredes Garcia, Anna Esther Reyes Godoy, Carla Jeffries, Martin Castellanos Joya, Fernet Leandre, Carlos Alberto Marcos Ayala Luna, Jorge Augusto Iniguez Luzziaga, Belkys Marcelino, Yndira Morales, Kathleen Moser, Jean Pape, Maria Del Carmen Bermudez Perez, Orlando Aristides Sequeira Perez, CP Tomasa Portillo, Julio Garay Ramos, Leonarda Reyes, Adalberto Rodriguez, Maria Rodriguez, Miriam Nogales Rodriguez, Jorge Rodriguez-De Marco, Mirian Román, Miguel Rosa, Andrea Y Maldonado Saavedra, Rula Aylas Salcedo, Roberto Tardio, Clarita Torres, Robison Valerie, Reina Valerio, Cecilia Varela, Daniel Vazquez, Maritza Velasco, Jose Olinder Nicolas Zambrano and Nydia Zelaya.

WHO Eastern Mediterranean Region: Nadia Abusabra, Ali Al-Lawati, Rashid Al-Owaish, Assan Al-Tuhami, Abdullatif Alkhal, Saeed Alsaffar, Naima Ben Cheikh, Essam Elmoghazy, Mohamad Gaafar, Amal Galai, Dhikrayet Gamara, Dhafer S. Hashim, Ali Mohammed Hussain, Lahsen Laasri, Fadia Maamari, Rachid Fourati-Salah Ben Mansou, Issa Ali Al Rahbi, Khaled Abu Rumman, Mtanios Saade and Mohammed Tabena.

WHO European Region: Preben Aavitsland, Ibrahim Abubakar, Elmira Djusudbekovna Abdurakhmanova, Natavan Alikhanova, Aftandil Shermamatovich Alisherov, Odorina Tello Anchuela, Delphine Antoine, António Fonseca Antunes, Coll Armanguè, Gordana Radosavljevic Asic, Margarida Rusudan Aspindzelashvili, Andrei Petrovich Astrovko, Venera Bismilda, Oliver Blatchford, Thorsteinn Blondal, E.C. Boettger, Olivera Bojovic, Hamza Bozkurt, Manuela Gheorghiu-

Marica, Panayiota Marouchos, Wanlin Maryse, Donika Mema, Narine Mezhliumyan, Vladimir Milanov, Nicolae Moraru, Gulnora Murmusaeva, Zdenka Novakova, Joan O'Donnell, Marie Claire Paty, Elena Pavlenko, Brankica Perovic, Vagan Rafaelovich Poghosyan, Cristina Popa, Bozidarka Rakocevic, Filomena Rodrigues, Elena Rodríguez-Valín, Karin Rønning, Kazimierz Roszkowski, Petri Ruutu, Eugeniy Sagalchik, Saidulo Makhmadalievich Saidaliev, Dmitri Sain, Roland Salmon, Branislava Savic, Firuza Teshaevna Sharipova, Elena Igorievna Skachkova, Aleksandar Simunovic, Brian Smyth, Janos Strausz, Silva Tafaj, Stefan Talevski, Atyrkul Toktogonova, Aigul Sultanovna Turzymbaeva, Dilrabo Djumabaevna Ulmasova, Gulnoz Tulkunovna Uzakova, Piret Viiklepp, Olga Vladimirovna, Cveta Vragoterova, Gerard de Vries, Jiri Wallenfels, Maja Zakoska and Hasan Zutic.

WHO South-East Asia Region: Sunil de Alwis, L S Chauhan, Roksana Hafiz, Nazrul Islam, Usha Jayasuriya, Badri Nath Jnawali, Thandar Lwin, Pushpa Malla, Aung Kya Jai Maug, Win Maung, Abdul Hamid Salim and Chewang Rinzin.

WHO Western Pacific Region: Paul Aia, Cecilia Teresa T. Arciaga, Susan Barker, Ernesto A. Bontuyan Jr, Richard Brostrom, Susan Bukon, En Hi Cho, Kuok Hei Chou, Mao Tan Eang, Marites C. Fabul, Yasumasa Fukushima, Anna Marie Celina G. Garfin, Ingrid Hamilton, Helen Heffernan, Nobukatsu Ishikawa, Andrew Kamarepa, Seiya Kato, Dovdon Khandaasuren, Liza Lopez, Wang Lixia, Tam Cheuk Ming, Dorj Otgontsetseg, Cheng Shiming, Tieng Sivanna, Wang Yee Tang, Sok Thim, Thelma E. Tupasi, Rosalind G. Vianzon, Khin Mar Kyi Win and Byung Hee Yoo.

The authors also express their gratitude to Emmanuelle Dubout and Lydia Panchenko for their assistance with data management, and Sue Hobbs of minimum graphics for providing design and layout of the report. Their contributions have been greatly appreciated. We would also like to thank Giorgio Roscigno and Akos Somoskovi from the Foundation for Innovative New Diag-

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_29050

