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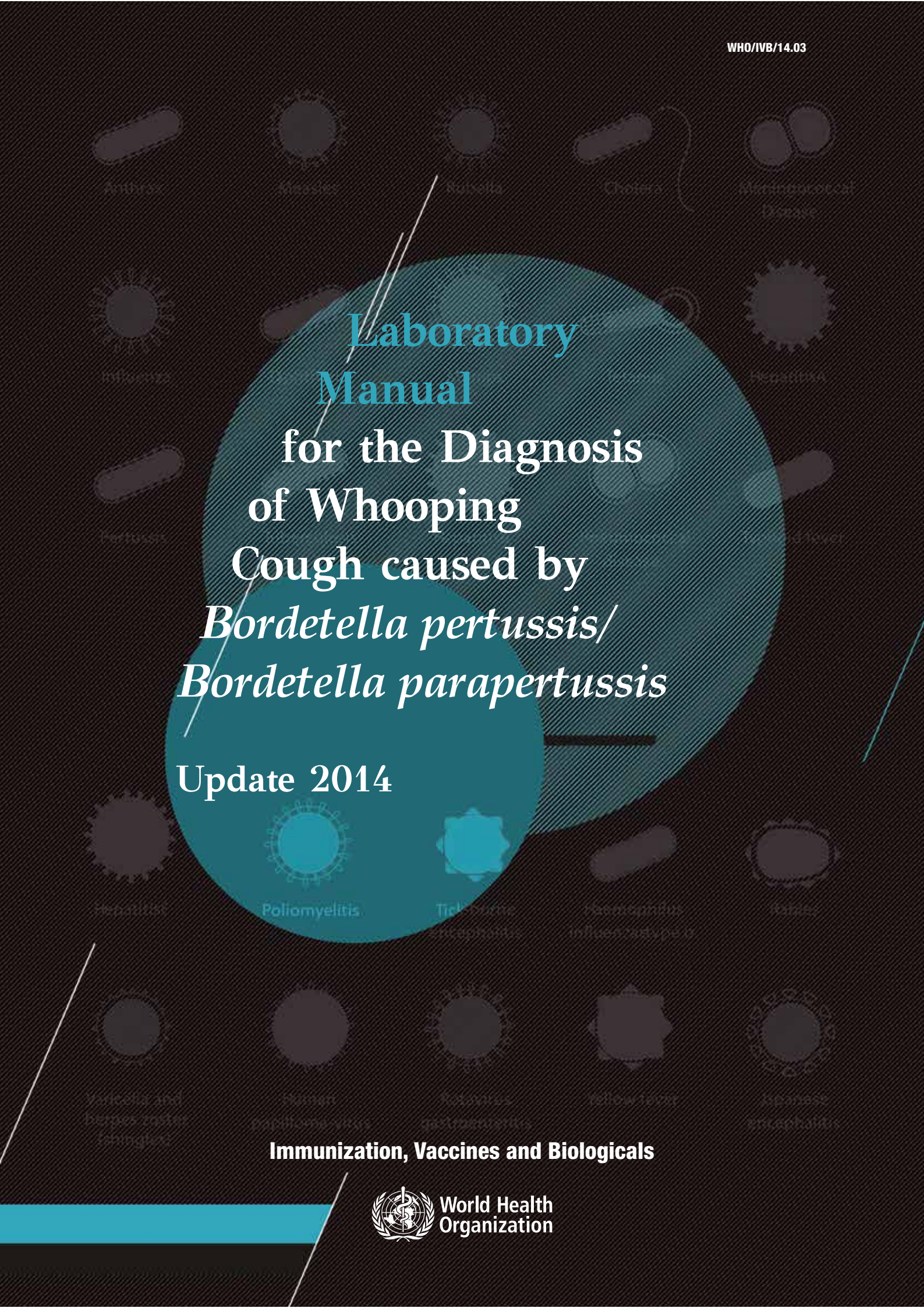

Laboratory Manual for the Diagnosis of Whooping Cough caused by *Bordetella pertussis*/ *Bordetella parapertussis*

Update 2014

Immunization, Vaccines and Biologicals

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Contents

Abbreviations & acronyms

AC-Hly	adenylate cyclase-haemolysin toxin
Ap	acellular pertussis
BG	Bordet Gengou (medium)
BGB	Bordet Gengou with blood
BSA	bovine serum albumin
DFA	direct fluorescent antibody
DNA	deoxyribonucleic acid
DTaP	diphtheria-tetanus acellular pertussis
DTP	diphtheria-tetanus-pertussis
DTwP	diphtheria-tetanus-whole cell pertussis
ELISA	enzyme-linked immunosorbent assay
EQA	external quality assessment
FHA	filamentous haemagglutinin
HPLC	high-performance liquid chromatography
Ig	immunoglobulin
IPC	internal process control
MLD	minimum level of detection
NIBSC	National Institute for Biological Standards and Control
NPA	nasopharyngeal aspirates
NPS	nasopharyngeal swabs
PBS	phosphate buffered saline
PCR	polymerase chain reaction
PEG	polyethylene glycol
PFGE	pulsed field gel-electrophoresis
PRN	pertactin
PT	pertussis toxin

RL	Reagan Lowe (medium)
RSV	respiratory syncytial virus
RT-PCR	real-time polymerase chain reaction
SPG	saccharose–phosphate–glutamate (solution)
Spp.	species
TCF	tracheal colonization factor
TCT	tracheal cytotoxin
UNG	uracil-DNA glycosylase
USA	United States of America
Vag	vir-activated genes
Vrg	vir-repressed genes
WHO	World Health Organization
wP	whole-cell pertussis

1. Introduction

Whooping cough is a worldwide infectious disease caused by the bacteria *Bordetella pertussis* and *Bordetella parapertussis*. It is a respiratory disease occurring after transmission of the bacteria from person- to-person in airborne droplets. The bacteria are highly infectious and unprotected close contacts are liable to become infected. Incidence is highest in children under five, except where infant vaccination programmes have been effective and a shift has occurred to adolescents.

Whooping cough is not only a childhood disease. It is dramatic for neonates and infants but can also be very severe for children and adults. For over 40 years, whole-cell pertussis vaccines have been very effective, preventing around 760 000 deaths worldwide every year. Nevertheless, pertussis disease continues to impose a high burden — there are still 50 million cases of pertussis disease and 300 000 deaths annually, mostly among infants.

Even in high-coverage countries, pertussis disease continues to cause severe illness and death among neonates and infants too young to have completed the primary vaccination series.

Active primary immunization against *B. pertussis* infection is recommended, with three doses of a vaccine consisting of either a suspension of killed bacteria (whole-cell pertussis (wP) or acellular pertussis (aP) preparations that contain 1–5 different components of *B. pertussis*. These are usually given in combination with diphtheria and tetanus toxoids adsorbed on aluminium salts (DTwP or DTaP). In terms of severe adverse effects aP and wP vaccines appear to have the same high level of safety; reactions are less commonly associated with aP vaccines. Similar high efficacy levels (more than 80%) are obtained with the best aP and wP vaccines, although the level of efficacy may vary within each group. Protection is greater against severe disease and begins to wane after about three years. Acellular pertussis vaccines do not protect against infection by *B. parapertussis*. The need and timing for additional booster doses