VOLUME 2

DISEASE CONTROL PRIORITIES • THIRD EDITION

Reproductive, Maternal, Newborn, and Child Health

DISEASE CONTROL PRIORITIES • THIRD EDITION

Series Editors

Dean T. Jamison
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DISEASE CONTROL PRIORITIES

Budgets constrain choices. Policy analysis helps decision makers achieve the greatest value from limited available resources. In 1993, the World Bank published *Disease Control Priorities in Developing Countries* (*DCP1*), an attempt to systematically assess the cost-effectiveness (value for money) of interventions that would address the major sources of disease burden in low- and middle-income countries. The World Bank's 1993 *World Development Report* on health drew heavily on *DCP1*'s findings to conclude that specific interventions against noncommunicable diseases were cost-effective, even in environments in which substantial burdens of infection and undernutrition persisted.

DCP2, published in 2006, updated and extended *DCP1* in several aspects, including explicit consideration of the implications for health systems of expanded intervention coverage. One way that health systems expand intervention coverage is through selected platforms that deliver interventions that require similar logistics but deliver interventions from different packages of conceptually related interventions, for example, against cardiovascular disease. Platforms often provide a more natural unit for investment than do individual interventions. Analysis of the costs of packages and platforms—and of the health improvements they can generate in given epidemiological environments—can help to guide health system investments and development.

DCP3 differs importantly from *DCP1* and *DCP2* by extending and consolidating the concepts of platforms and packages and by offering explicit consideration of the financial risk protection objective of health systems. In populations lacking access to health insurance or prepaid care, medical expenses that are high relative to income can be impoverishing. Where incomes are low, seemingly inexpensive medical procedures can have catastrophic financial effects. *DCP3* offers an approach to explicitly include financial protection as well as the distribution across income groups of financial and health outcomes resulting from policies (for example, public finance) to increase intervention uptake. The task in all of the *DCP* volumes has been to combine the available science about interventions implemented in very specific locales and under very specific conditions with informed judgment to reach reasonable conclusions about the impact of intervention mixes in diverse environments. *DCP3*'s broad aim is to delineate essential intervention packages and their related delivery platforms to assist decision makers in allocating often tightly constrained budgets so that health system objectives are maximally achieved.

DCP3's nine volumes are being published in 2015 and 2016 in an environment in which serious discussion continues about quantifying the Sustainable Development Goal (SDG) for health. *DCP3*'s analyses are well-placed to assist in choosing the means to attain the health SDG and assessing the related costs. Only when these volumes, and the analytic efforts on which they are based, are completed will we be able to explore SDG-related and other broad policy conclusions and generalizations. The final *DCP3* volume will report those conclusions. Each individual volume will provide valuable, specific policy analyses on the full range of interventions, packages, and policies relevant to its health topic.

More than 500 individuals and multiple institutions have contributed to *DCP3*. We convey our acknowledgments elsewhere in this volume. Here we express our particular gratitude to

the Bill & Melinda Gates Foundation for its sustained financial support, to the InterAcademy Medical Panel (and its U.S. affiliate, the Institute of Medicine of the National Academy of Medicine), and to the External and Corporate Relations Publishing and Knowledge division of the World Bank. Each played a critical role in this effort.

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Cover photo: Foune Kouyate waits to vaccinate her baby, Kadidia Goulibaly, at the Centre De Sante Communautaire De Banconi (ASACOBA), a health clinic in Bamako, Mali, on November 4, 2013. © Dominic Chavez/World Bank. Further permission required for reuse.
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Foreword

When I became the Deputy Director of the Child Survival Partnership in 2004, I knew the task at hand was a challenging one. We were only four years into the Millennium Development Goals (MDGs), but we already knew that moving the needle on maternal and child survival would take more headway and greater advances. Since then, and particularly since 2010, we have accelerated progress in an unprecedented manner, mobilized actors and partners, and improved our way of working.

We have undergone an extraordinary transformation, halving maternal and child mortality under the MDGs. As we transition to the Sustainable Development Goals (SDGs), we are in a much better position to achieve the global and equitable progress we seek for all people. Goal 3 of the 17 SDGs is "to ensure healthy lives and promote well-being for all at all ages." This broad goal embraces the unfinished agenda of the MDGs and goes beyond—to virtually end preventable maternal, newborn, and child deaths and to improve access to sexual and reproductive health, as well as access to medicines and vaccines. By moving toward this goal, we are working to protect the future and well-being of those closest to us: our mothers, children, and communities.

The 2010–15 Global Strategy for Women's and Children's Health brought together hundreds of partners around the Every Woman Every Child movement to jointly achieve the ambitious goals for maternal and child health. Building on this progress, the United Nations (UN) Secretary-General, in September 2015, launched a follow-up roadmap for 2016–30 at the UN General Assembly, The Global Strategy for Women's, Children's, and Adolescents' Health. The new strategy aligns fully with the SDGs, embracing the vision of a future where we reach the highest attainable standard of health for all women, children, and adolescents. A new funding mechanism, The Global Financing Facility in Support of Every Woman, Every Child, aims to bring together existing and new sources of financing for "smart, scaled, and sustainable financing" to accelerate efforts to end preventable maternal, newborn, and child deaths by 2030.

Strategy, financing, and delivery of services need to be guided by the best available scientific knowledge on the efficacy of interventions and the effectiveness of programs. This volume of the *Disease Control Priorities*, third edition (*DCP3*) series, *Reproductive, Maternal, Newborn, and Child Health*, provides this rigorous knowledge base. Readers now have at their fingertips the most relevant technical information on which interventions, programs, service delivery platforms, and policies can best help all to reach the ambitious Global Goal 3 targets—maternal mortality rates lower than 70 maternal deaths per 100,000 live births, neonatal mortality rates of 9 per 1,000 live births, and stillbirth rates of 9 per 1,000 total births. It is a source of great pride to know that my WHO team, led by Professor Dr. Marleen Temmerman, Director of the Department of Reproductive Health and Research, contributed to this work. My team will continue its efforts to end preventable mortality worldwide and to achieve the three broad goals embraced by the new Global Strategy—survive, thrive, and transform.

We all have a role to play as we put this Global Strategy into practice in every corner of the globe. We need everyone's continued engagement, support, and commitments. We have the knowledge, the tools, and the will. A transformation by 2030 is within our reach.

Dr. Flavia Bustreo
Assistant Director-General, Family, Women, and Children's Health, World Health Organization

Preface

Reproductive, maternal, newborn, and child health (RMNCH) encompasses health concerns spanning the life course from adolescent girls to women before and during pregnancy to newborns and older children. In recent years, it has been recognized that appropriately addressing these concerns requires organizing services in a continuum of care that encompasses these stages in the life course. The rationale for the organization of the RMNCH volume is based on the link between interventions at each stage and health effects at that stage and future stages, and consequently the need to deliver integrated, preventive, and therapeutic interventions for mothers and children.

In considering interventions that span the RMNCH continuum, *DCP3* has departed from the disease-specific framing of interventions that was followed in previous editions. *DCP1*, published in 1993, largely focused on individual diseases and conditions with those regarding RNMCH. *DCP1* referred to the "unfinished agenda" that included major diseases, such as acute respiratory infection, diarrhea, malaria, and poliomyelitis, as well as malnutrition, HIV/AIDS and sexually transmitted infections, "excess fertility," and maternal and perinatal health, but it did not include the broader issue of neonatal health. In *DCP2*, published in 2006, nine of the 73 chapters were on RMNCH, reflecting the broader scope of that edition including a greater emphasis on noncommunicable diseases, health system strengthening, and cross-cutting issues.

The "unfinished agenda" of RMNCH continues to be as important today as it was in 1993. This volume contains 19 chapters that range from descriptions of the current levels and causes of reproductive ill health, maternal and child morbidity and mortality, undernutrition, and compromised child development, to consideration of preventive and therapeutic interventions, as well as cost-effectiveness of these interventions and health system considerations for their implementation. The volume gives particular attention to the efficient and effective use of delivery platforms to provide packages of interventions—a framing that supports country decision-making for universal health care. Despite our objective of covering a broad range of RMNCH topics in this volume, some topics of relevance to women and children were found to fit better in other volumes. These include surgical conditions, cancer, mental and developmental disorders, HIV/AIDS and sexually transmitted infections, malaria, injuries, and adolescent health and development.

RMNCH interventions have received significant attention in low- and middle-income countries and among international donors. The reasons for this include the high burden of disease and the evidence that many efficacious and cost-effective interventions are available to dramatically reduce the burden of ill health. The promulgation of the Millennium Development Goals, with their strong focus on RMNCH concerns, gave further impetus to implementation of the proven interventions. It has been important that review of the evidence for new interventions and program approaches has continued through academic journals such as *The Lancet*, *DCP,* and other critical exercises that have identified the needs and opportunities in RMNCH. Substantial success has been achieved with unprecedented declines in maternal and child mortality and fertility; however, problems remain, including large inequities among and within low- and middle-income countries in health services and outcomes.

We intend for this volume to provide an update of the evidence and help to shape what can be implemented

in integrated packages of services for reproductive health, maternal and newborn health, and child health to achieve the new Sustainable Development Goals. In addition, we hope that consideration of delivery of interventions with greatest coverage and equity will prioritize strengthening of the three interlinked platforms: communities, primary health centers, and hospitals. We now have the knowledge and means to fully address the unfinished agenda of RMNCH and must not miss the opportunity and the obligation to act.

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Abbreviations

ACT	artemisinin-based combination therapy
AFHS	Adolescent Friendly Health Services
ANC	antenatal care
ARI	acute respiratory infection
ART	antiretroviral therapy
ASHA	accredited social health activist
BCG	Bacille Calmette-Guérin
BEP	balanced protein energy
BES	balanced energy and protein supplementation
BF	breastfeeding
BMI	body mass index
CBD	community-based distribution
CCM	community case management
CCT	conditional cash transfer
CEA	cost-effectiveness analysis
CF	complementary feeding
CFR	case fatality rate
CHERG	Child Health Epidemiology Reference Group
CHV	community health volunteer
CHW	community health worker
CI	confidence interval
CLTS	Community-Led Total Sanitation
CMAM	community-based management of acute malnutrition
CQI	continuous quality improvement
CRS	congenital rubella syndrome
CS	cesarean section
CSB	corn-soy blend
CYP	couple-years of protection
DALY	disability-adjusted life year
DHS	demographic and health survey
DPT	diphtheria, pertussis, and tetanus
DTP3	third dose of DTP
EBF	exclusive breastfeeding
ECEA	extended cost-effectiveness analysis
ECV	external cephalic version
EED	environmental enteric dysfunction

EPI	Expanded Program on Immunization
FBF	fortified blended flour
FRP	financial risk protection
GAM	global acute malnutrition
Gavi	Global Alliance for Vaccines and Immunization
GBS	Group B streptococcus
GDP	gross domestic product
GNI	gross national income
HAZ	height-for-age Z-score
HBNC	home-based neonatal care
HEP	health extension program
HEW	health extension worker
HiB	*Haemophilus influenzae* B
HICs	high-income countries
HIV	human immunodeficiency virus
HR	hazard ratio
HSV-2	herpes simplex virus-2
IAP	intrapartum antibiotic prophylaxis
iCCM	Integrated Community Case Management
ICD	International Classification of Diseases
ICPD	International Conference on Population and Development
IDA	iron deficiency anemia
IIV	inactivated influenza vaccine
IMCI	Integrated Management of Childhood Illness
IMNCI	Integrated Management of Neonatal and Childhood Illness
IMPAC	Integrated Management in Pregnancy and Childcare
IPT	intermittent preventive treatment
ITN	insecticide-treated bednet
IU	international unit
IUD	intrauterine device
IUGR	intrauterine growth restriction
IYCF	infant and young child feeding
JE	Japanese encephalitis
LBW	low birth weight
LHWs	Lady Health Workers
LICs	low-income countries
LiST	Lives Saved Tool
LMICs	low- and middle-income countries
LNS	lipid-based nutrient supplement
LRI	lower respiratory tract infections
LYS	life-year saved
MAM	moderate acute malnutrition
MD	mean difference
MDG	Millennium Development Goal
$MgSO_4$	magnesium sulphate
MICs	middle-income countries
MMR	maternal mortality ratio
MNP	multiple micronutrient powder
MUAC	mid-upper arm circumference
NIMS	Nutrition Impact Model Study
NMR	newborn mortality rate
NPV	net present value
OHT	One Health Tool

OOP	out-of-pocket
OPV	oral polio vaccine
ORS	oral rehydration solution
PBF	performance-based financing
PCV	pneumococcal conjugate vaccination
PPH	postpartum hemorrhage
PUFA	polyunsaturated fatty acids
QALY	quality-adjusted life year
RCT	randomized controlled trial
RDS	respiratory distress syndrome
RDT	rapid diagnostic test
RMNCH	reproductive, maternal, newborn, and child health
RR	relative risk
RUF	ready-to-use food
RUSF	ready-to-use supplementary food
RUTF	ready-to-use therapeutic food
SAM	severe acute malnutrition
SFP	supplementary feeding program
SGA	small for gestational age
STI	sexually transmitted infection
TFC	therapeutic feeding center
TFR	total fertility rate
UCTs	unconditional cash transfers
UHC	universal health coverage
UMICs	upper-middle-income countries
UN	United Nations
UNICEF	United Nations Children's Fund
UPF	universal public finance
USAID	United States Agency for International Development
VLY	value of a life-year saved
WASH	Water, sanitation, and hygiene
WHO	World Health Organization
WHZ	weight-for-height z-score
YICSSG	Young Infants Clinical Signs Study Group