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was established somewhat arbitrarily by Salminen et al because little clinical information was available to provide a better estimate for it.

Future studies should be carefully designed with a strong justification for the minimal clinically important difference. Antibiotics with broad enough coverage to treat appendicitis may cause the development of resistant organisms or *Clostridium difficile* infections. Given the balance between potential complications of antibiotic treatment or appendectomy for appendicitis, is 10% of patients with appendicitis not experiencing successful treatment with antibiotics clinically important? 30%? 50%? Investigators will need to determine and fully justify how much worse than appendectomy antibiotic treatment of appendicitis

must be before the notion of replacing appendectomy with antibiotic treatment is rejected.

Because appendectomy is performed to prevent major pelvic infection, the strongest design would be one showing that antibiotics could prevent pelvic abscesses as effectively as surgery. However, because pelvic abscess is infrequent, a trial using this outcome would need to enroll a very large number of patients.

The time has come to consider abandoning routine appendectomy for patients with uncomplicated appendicitis. The operation served patients well for more than 100 years. With development of more precise diagnostic capabilities like CT and effective broad-spectrum antibiotics, appendectomy may be unnecessary for uncomplicated appendicitis, which now occurs in the majority of acute appendicitis cases.

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## Development Assistance for Health Potential Contribution to the Post-2015 Agenda

Andy Haines, MD, MB, BS

**Despite economic growth** in low-income countries, the internal resources available to some governments will be inadequate to support the delivery of health care to their populations for years to come.<sup>1</sup> Approximately 150 million people worldwide experience catastrophic expenditure annually to cover out-of-pocket payments for health.<sup>1</sup> Despite substantial progress, 6.6 million children who were younger than 5 years died in 2012 and a quarter of all children younger than 5 years were stunted (having an inadequate height or length for age).<sup>2</sup> Almost 300 000 women died in 2013 of causes related to pregnancy and childbirth.<sup>2</sup> Against this background, the study by Dieleman and colleagues<sup>3</sup> in this issue of *JAMA* makes a substantial contribution to the current understanding of the flow of development assistance for health (DAH) and how these resources can contribute to the achievement of international health goals.

The authors made helpful distinctions between the primary sources of funding, the channels through which funding flows and the implementing institutions, as well as distinguishing between “commitments,” which may not be implemented, and actual disbursements that reflect the real

transfer of resources. Their report clearly demonstrated how, following a substantial increase in yearly funding between 2000-2010 from approximately \$7 billion to \$35 billion, DAH has essentially plateaued since 2010 as a result of constraints in government spending in many donor countries. The authors also documented changes in funding between health priorities (such as increased support of newborn and child health in recent years) and showed the importance of US government funding (especially for human immunodeficiency virus [HIV]/AIDS). Private sources and the UK government constitute the second and third most important sources of DAH as a whole. The importance of funding from the Bill and Melinda Gates Foundation is highlighted by the estimate that, since 1999, when it began providing DAH, the Gates Foundation has provided 5.6% of the total DAH.

The study is particularly timely because the United Nations' (UN's) millennium development goals (MDGs), which have shaped the international development agenda over the past 15 years, are due to be achieved this year. Progress by countries and across different goals has been highly variable.<sup>2</sup> The post-2015 development agenda is currently the subject of intergovernmental negotiations and the UN's sustainable development goals (SDGs) to be adopted at the forthcoming



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UN Summit (September 25-27, 2015) will differ in a number of important respects from the MDGs. The SDGs aim to be relevant to countries at all levels of development and encompass a wider range of sectors.<sup>4</sup> The Open Working Group on the SDGs of the UN General Assembly proposed that there will be 17 SDGs and no less than 169 targets to be achieved by 2030; potential indicators to assess progress toward those targets are currently under discussion.<sup>4</sup> The proposed targets are defined as aspirational global targets, with each government setting their own national target according to their circumstances.

Goal 3 of the SDGs—to “ensure healthy lives and promote well-being for all at all ages”—proposes ambitious targets for health including ending preventable deaths for newborns and children younger than 5 years; reducing the global maternal mortality ratio to less than 70 per 100 000 live births; ensuring universal access to sexual and reproductive health care services including for family planning; ending the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases; and, in a departure from the MDGs, reducing by one-third premature mortality from noncommunicable diseases.<sup>4</sup> Notably, a target within the third goal commits governments around the world to achieving universal health coverage (UHC), including “financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all.”<sup>4</sup> The current lack of funding for health system support and noncommunicable diseases, less than 10% of the total DAH, as noted by Dieleman and colleagues, suggests that achieving success with respect to noncommunicable diseases will be quite difficult.

Mandatory prepayment from pooled funds will be necessary to ensure UHC with financial risk protection. One estimate suggests that annual government health expenditure should be approximately \$86 per capita to provide access to priority services compared with \$15 (42% of total health expenditure) currently in low-income countries.<sup>5</sup> Even if the 33 low-income countries met an expenditure target of 5% of their gross domestic product on health from domestic sources, they would not currently be able to meet the \$86 per capita spending target.<sup>5</sup> Continuing flows of DAH from high-income countries will therefore be essential to support progress toward the SDG for health, including the aspiration to provide UHC. Meanwhile, there is increased scrutiny of foreign aid budgets amidst concerns that aid money may not be spent effectively and efficiently to achieve the desired ends<sup>6</sup> and downward financial pressures on government budgets in many donor countries.

How can funding be sustained and increased in the face of austerity as well as ensuring efficient use of funding that is available? The UN aid spending target of 0.7% of gross domestic product on international aid<sup>2</sup> has only been met by a few countries. In 2013, only 5 countries—Sweden, Norway, Luxembourg, Denmark, and the United Arab Emirates—had met or exceeded the 0.7% aid spending target and were joined in 2015 by the United Kingdom.<sup>7</sup> Although renewed progress on reaching this target is necessary, innovative financing mechanisms should be exploited, such as the air-

line or carbon taxes that fund UNITAID<sup>8</sup> and the potential for recycling fossil fuel subsidies to support UHC.<sup>9</sup> New major emerging economies of Brazil, Russia, India, China, and South Africa (ie, the BRICS) could become increasingly prominent contributors. For example, between 2005 and 2010, Brazil and India increased their foreign aid expenditure by more than 20% and China and South Africa by about 10%, often using different approaches to Western donors, based on their own recent experience of scaling up access to health care.<sup>10</sup> Other potential sources of funding include various climate change funds to support adaptation or mitigation efforts, some of which have potential benefits to health.<sup>11</sup>

There is growing pressure for accountability and better evidence of what works in DAH. Many countries have agreed to the principles of aid effectiveness embodied in the Paris Declaration on Aid Effectiveness (2005) and the Accra Agenda for Action (2008),<sup>12</sup> which emphasize the need to support national efforts in low-income countries as well as greater harmonization of donor activities to enhance efficiency and reduce demands for parallel information collection systems. There are differences between funders in the extent to which they fund public-private partnerships (such as Gavi and the Global Fund), nongovernmental organizations, and UN agencies and provide budget support directly to governments. As noted in the study by Dieleman et al, the United States, for example, tends to channel substantial proportions of its funding through its own bilateral agencies. However, there are too many channels and implementing institutions for DAH and a number of proposals have been advanced for reform including a “principal financier” institution to channel funds more coherently to nationally owned health systems accompanied by transparent monitoring and accountability.<sup>13</sup> Improved approaches to attributing health improvements to DAH are also needed,<sup>6</sup> including building evaluation capacity in low-income countries and developing national evaluation platforms for natural, quasi-experimental or experimental studies of innovative programs. These will need to take into account the potential for biased reporting when future funding depends on performance.

The majority of DAH tends to be directed at specific diseases or age groups, such as children and newborns, and only a minority is directed at strengthening health systems, supporting the general organization and delivery of care. Dieleman and colleagues found that, since 1990, 28.0% of DAH focused on maternal health and newborn and child health and 23.2% focused on HIV/AIDS. Relative to their associated disease burdens, maternal health and HIV/AIDS received substantially more DAH than other health focus areas, but other factors, such as cost-effectiveness of interventions and consistency with national priorities, also need to be considered in prioritizing investments in health.

Careful assessment is needed of the relative investment through different channels and implementing agencies as well as between disease-specific programs and broader strengthening of health systems, together with the need to avoid unintended adverse consequences of investments (such as reductions in human resources available for essential health services due to competition between different programs for

staff [for example due to salary differentials]). Donors need to avoid distorting existing health systems by preferential funding for vertical (disease-specific) programs.<sup>14</sup>

Increasingly DAH should be seen within the context of the SDGs, including the emerging noncommunicable disease epidemic, which is leading to a double burden of disease in many countries and underscores the need for development of resilient health systems that are able to cope with changing disease burdens (particularly by delivering affordable interventions through primary health care),<sup>15</sup> together with robust public health policies in areas such as tobacco control. Many determinants of disease and noncommunicable disease risk factors that are responsible for large burdens of disease are outside the control of health care services in sectors such as transport, food and agriculture, energy, housing,

and urban planning, which are also reflected in the SDGs. Policies in these sectors should be assessed for co-benefits to health in addition to their primary aim (eg, by reductions in air pollution from reduced coal combustion or increased physical activity from policies to encourage walking and cycling in urban areas).<sup>16</sup> In this way, aid across a range of sectors can be harnessed to improve health and complement DAH focused on health care delivery.

Finally, work such as that described in the study by Dieleman et al should be supported and expanded. Additional data are needed to provide better evidence for decision making and strengthen the case for funding to address the health problems of poor populations living in low-income countries that cannot fund the provision of essential health care for their own populations in the near future.

#### ARTICLE INFORMATION

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