Countdown to 2015: assessment of donor assistance to maternal, newborn, and child health between 2003 and 2006

Giulia Greco, Timothy Powell-Jackson, Josephine Borghi, Anne Mills

Lancet 2008; 371: 1268–75

Health Economics and Financing Programme, London School of Hygiene and Tropical Medicine, London, UK
(G Greco MSc, T Powell-Jackson MSc, J Borghi PhD, Prof A Mills PhD)

Correspondence to:
Prof Anne Mills, Health Economics and Financing Programme, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, UK
anne.mills@lshtm.ac.uk

Summary

Background **To track donor assistance to maternal, newborn, and child health-related activities is necessary to assess progress towards Millennium Development Goals 4 and 5 and to foster donor accountability. Our aim was to analyse aid flows to maternal, newborn, and child health for 2005 and 2006 and trends between 2003 and 2006.**

Methods **We analysed and coded the complete aid activities database for 2005 and 2006 with methods that we developed previously to track official development assistance. For the 68 Countdown priority countries, we report two indicators for use in monitoring donor disbursements: official development assistance to child health per child and official development assistance to maternal and neonatal health per livebirth.**

Findings **Donor disbursements increased from US$2119 million in 2003 to $3482 million in 2006; funding for child health increased by 63% and that for maternal and newborn health increased by 66%. In the 68 priority countries, child-related disbursements increased from a mean of $4 per child in 2003 to $7 per child in 2006; disbursements for maternal and neonatal health increased from $7 per livebirth in 2003 to $12 per livebirth in 2006. Nonetheless, disbursements fell in some countries. After adjustment for other determinants, countries with higher under-5 mortality received more official development assistance per child, but official development assistance to maternal and newborn health did not seem to be well targeted towards countries with the greatest maternal health needs.**

Interpretation **Donor resource tracking should be continued to help hold donors accountable and encourage targeting of resources to countries with greatest needs.**

Funding **Partnership for Maternal, Newborn and Child Health.**

Introduction

Although there exists a lack of clarity on what constitutes an adequate target of aid disbursement to improve maternal, newborn, and child health to acceptable levels, evidence broadly points towards a substantial funding gap between what is needed to meet Millennium Development Goal (MDG) targets and what is currently invested in developing countries.[1–3] To ensure that sufficient resources become available, donors will need to play their part in providing additional funding to support national governments in meeting agreed targets. Monitoring of aid disbursements to maternal, newborn, and child health to those countries with the greatest need is an important part of the process to assess progress and promote donor accountability.

For the **Countdown initiative** see http://www.countdown2015mnch.org

We have previously developed and tested a method of tracking official development assistance in support of maternal, newborn, and child health-related interventions and services to recipient countries.[4] Our findings suggested that levels of official development assistance were broadly inadequate to make a substantial contribution towards filling the funding gap. This work also provided some indication that donor spending could be better targeted to countries with the greatest health needs, since the data showed substantial variation in per beneficiary donor assistance between priority countries.

Here, we update estimates of official development assistance to maternal, newborn, and child health to include the years 2005 and 2006, which allows us to undertake a more extensive analysis of trends over time. Specifically, we examine whether there has been a sustained increase in official development assistance to maternal, newborn, and child health and hence whether donors are living up to their promises to support countries to achieve MDG targets. Additionally, the determinants of aid allocations to developing countries are explored to elucidate the direction and intensity of financial flows to maternal, newborn, and child health. This study is part of the Countdown initiative, a collaborative effort that aims to support countries in meeting their commitments to global goals through monitoring mechanisms and effective use of information collected.

Methods

We analysed and coded the complete aid activities database for the years 2005 and 2006 with methods described previously.[4] We included all 22 donor countries and the European Union represented in the Development

	Indicator	Year	Source
Health need	Under-5 mortality	2005	SOWC 2007
Health need	DALYs lost to maternal and perinatal conditions	2002	WHO
Economic need	GNI per head	2005	World Bank
Scale	Population	2005	UN Population Prospect
Aid effectiveness	Corruption index (0–10, 0 highest)	2005	Transparency International*
Freedom	Political rights index (1–7, 1 highest)	2005	Freedom House†
Freedom	Civil liberties index (1–7, 1 highest)	2005	Freedom House†
Government commitment to health	Government expenditure on health as percentage of total government expenditure	2005	WHO

DALY=disability adjusted life-year. GNI=gross national income. SOWC=State of the World's Children report. *www.transparency.org. †www.freedomhouse.org.

Table 1: **Determinants of aid, year of data, and source of data**

	2003	2004	2005	2006
Total	2 119 382	2 056 875	2 935 428	3 481 703
Child health	1 414 952 (67%)	1 508 676 (73%)	2 034 680 (69%)	2 308 896 (66%)
Maternal and neonatal health	704 430 (33%)	548 199 (27%)	900 748 (31%)	1 172 807 (34%)
Source of aid flow				
Bilateral	1 296 375 (61%)	1 248 270 (61%)	1 811 920 (62%)	1 880 277 (54%)
Multilateral	650 515 (31%)	484 126 (24%)	615 244 (21%)	1 096 010 (31%)
Global health initiatives	172 492 (8%)	324 479 (16%)	508 265 (17%)	505 417 (15%)

Disbursements are in constant 2005 US$ (thousands). Percentages represent the proportion of total official development assistance to maternal, newborn, and child health for those particular line items.

Table 2: **Worldwide official development assistance to maternal, newborn, and child health by source of aid flow, 2003–06**

	2003	2004	2005	2006
General budget support	51 044 (2%)	86 216 (4%)	50 358 (2%)	68 650 (2%)
Health sector support*	31 036 (1%)	44 079 (2%)	66 722 (2%)	123 060 (3%)
Projects	2 037 302 (96%)	1 926 579 (94%)	2 818 348 (96%)	3 289 993 (95%)
Type of project				
General health care	710 543 (35%)	809 464 (42%)	936 225 (33%)	952 223 (29%)
Disease specific	134 082 (7%)	274 660 (14%)	447 492 (16%)	658 209 (20%)
MNCH specific	1 192 678 (59%)	842 456 (44%)	1 434 631 (51%)	1 679 562 (51%)
MNCH-specific projects				
IMCI	16 460 (1%)	18 302 (2%)	14 383 (1%)	6842 (0%)
PMTCT	3841 (0%)	3195 (0%)	18 080 (1%)	32 104 (2%)
Nutrition	113 364 (10%)	80 857 (10%)	114 105 (8%)	223 010 (13%)
Immunisation	552 084 (46%)	460 577 (55%)	519 977 (36%)	477 205 (28%)
Child health	41 048 (3%)	44 308 (5%)	180 686 (13%)	127 617 (8%)
Maternal health/safe motherhood	417 205 (35%)	207 602 (25%)	361 068 (25%)	346 159 (21%)
Non-specified MNCH	48 675 (4%)	27 614 (3%)	226 331 (16%)	466 625 (28%)

MNCH=maternal, newborn, and child health. IMCI=Integrated Management of Childhood Illness. PMTCT=prevention of mother-to-child transmission of HIV infection. Disbursements are in constant 2005 US$ (thousands). Percentage values represent the proportion of the total official development assistance to MNCH for those particular line items. *Includes basket funding.

Table 3: **Worldwide official development assistance to maternal, newborn, and child health by type of aid and purpose of projects between 2003 and 2006**

Assistance Committee of the Organisation for Economic Co-operation and Development (OECD). Additionally, we included the World Bank, UNICEF, the GAVI Alliance, and the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) as multilateral development organisations or global health initiatives. The UN Population Fund (UNFPA) would have been included but did not report to the Development Assistance Committee in either 2005 or 2006.

For all but one of the donors, we used data from the creditor reporting system database, maintained and administered by the OECD. The GAVI Alliance provided disbursement data on request. Global Fund disbursements were included in the database and checked for consistency with data available from the Global Fund website. The World Bank reports disbursement data for projects related to HIV/AIDS prevention and care only. Commitment data were used for all other World Bank projects as a next-best alternative. We could not estimate how the commitments were allocated over each year of the project lifetime. For consistency with previous analyses, we included the whole amount committed, acknowledging the fact that the results might not represent actual disbursement.

We present the results in aggregate terms by donor, and by the 68 recipient countries identified by the Countdown group as a priority in terms of child mortality and maternal mortality. The original list of priority recipients was expanded to include eight more countries with a high number of maternal deaths or maternal mortality ratio. To analyse trends across years, we converted estimates of official development assistance into constant 2005 US dollars. For each of the priority countries, we report on two indicators for use in monitoring donor disbursements: official development assistance to child health per child and official development assistance to maternal and neonatal health per livebirth. In reporting these indicators, we corrected for missing data over the 4 years by dropping those donors that did not report so as to ensure that trends were comparable and were not affected by changes in reporting status.

Estimates of the number of children under age 5 years (under-5) and the crude birth rate were taken from the World Population Prospect 2006. The framework of analysis allowed comparisons of disbursements for child health and maternal and neonatal health by types of donor (bilateral, multilateral, and global health initiatives).

We also examined the main determinants of official development assistance to maternal, newborn, and child health on the basis of characteristics of the 68 priority recipient countries. Specifically, we used a selection of

For the **OECD database** see http://www.oecd.org/dac/stats/idsonline

For the **Global Fund website** see http://www.theglobalfund.org/en

For the **World Population Prospect 2006** see http://esa.un.org/unpp

	2003			2004			2005			2006		
	Child health	Maternal and newborn health	Total	Child health	Maternal and newborn health	Total	Child health	Maternal and newborn health	Total	Child health	Maternal and newborn health	Total
Australia	20411	13203	33614	18453	17151	35604	3202	979	4181	52416	24161	76576
Austria	2111	1043	3154	2831	1088	3919	2582	1761	4343	4176	1729	5905
Belgium	8617	2994	11611	NA	NA	NA	16789	10324	27113	21283	11607	32889
Canada	39651	10884	50536	48080	19755	67836	66637	42644	109281	72376	31937	104313
Denmark	NA	NA	NA	18825	6914	25739	22823	8234	31057	18980	7793	26773
European Union	28938	26534	55472	43364	19054	62418	82443	58119	140562	155519	132686	288205
Finland	4125	3590	7715	NA	NA	NA	NA	NA	NA	6079	8022	14100
France	27288	16366	43654	38020	22986	61006	28095	12255	40350	5630	3068	8698
GAVI Alliance	121260	0	121260	189355	0	189355	206123	0	206123	178454	0	178454
Germany	33767	31825	65592	28940	9042	37982	31489	30622	62111	51663	33172	84835
Global Fund	43351	7881	51231	113903	21220	135124	252497	49645	302142	264475	62488	326963
Greece	12212	1711	13923	1239	1131	2370	8911	3308	12219	3343	3103	6445
Ireland	13852	4554	18406	22353	7723	30076	19673	5903	25576	20647	7969	28615
Italy	15668	5153	20822	15957	6306	22263	1719	1026	2745	NA	NA	NA
Japan	72515	47559	120074	65138	28136	93274	60601	24627	85227	113833	35161	148994
Luxembourg	NA	NA	NA	8782	2986	11769	5681	5939	11620	7823	6960	14783
Netherlands	35972	37060	73032	31212	32331	63543	38663	37667	76330	37735	48049	85784
New Zealand	2394	639	3033	3399	2973	6372	3671	2768	6439	3662	3285	6947
Norway	17960	13571	31530	20514	9411	29925	22266	14869	37134	32707	15060	47767
Portugal	902	1032	1934	1217	1316	2533	1608	1513	3121	1647	862	2509
Spain	20910	14443	35354	23219	14732	37951	26780	23021	49801	34868	25434	60303
Sweden	17010	16805	33815	22493	22433	44926	20194	44242	64436	43137	41171	84308
Switzerland	12484	3178	15662	13279	4563	17842	6845	5117	11963	13206	8775	21981
UNAIDS	NA	NA	NA	NA	NA	NA	1512	0	1512	NA	NA	NA
UNFPA	564	187318	187882	65	62090	62155	NA	NA	NA	NA	NA	NA
UNICEF	62301	16204	78505	61872	15881	77753	80184	16409	96593	61104	21210	82314
UK	150670	59226	209896	118686	63911	182597	230183	90585	320768	210742	114474	325216
USA	397271	105748	503019	404415	66331	470746	515914	310190	826104	448861	243674	692535
World Bank	252746	75910	328656	193064	88736	281800	277593	98984	376577	444530	280960	725490
Grand total	1414952	704430	2119382	1508676	548199	2056875	2034680	900748	2935428	2308896	1172807	3481703

Total disbursements are in constant 2005 US$ (thousands). NA=data not reported to creditor reporting system or, for UNAIDS, not possible to allocate to recipient countries. World Bank data are commitments.

Table 4: **Worldwide official development assistance to maternal, newborn, and child health by donor between 2003 and 2006**

predictor variables that were grouped under the following dimensions: health need, economic need, scale, aid effectiveness, freedom, and government commitment to health (table 1). Health need was defined as under-5 mortality in the case of child health and as disability adjusted life-years lost for maternal and perinatal conditions for maternal and newborn health. The indicators of aid effectiveness and freedom are commonly used in analyses of official development assistance.[5,6] Two ordinary least squares (OLS) regression models were estimated, with log of official development assistance to child health per child and official development assistance to maternal and newborn health per livebirth as the dependent variables. Average official development assistance per person for 2003–06 was used to account for the volatility of disbursements. We did standard regression diagnostics and checks to verify regression assumptions and to ensure that the models were specified correctly.

Role of the funding source

The study sponsor had no role in the study design, data analysis, data interpretation, or writing of the paper. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication.

Results

The volume of aid to maternal, newborn, and child health-related activities amounted to US$2935 million in 2005 and $3482 million in 2006 (table 2), representing just 3% of gross development assistance disbursements.[7]

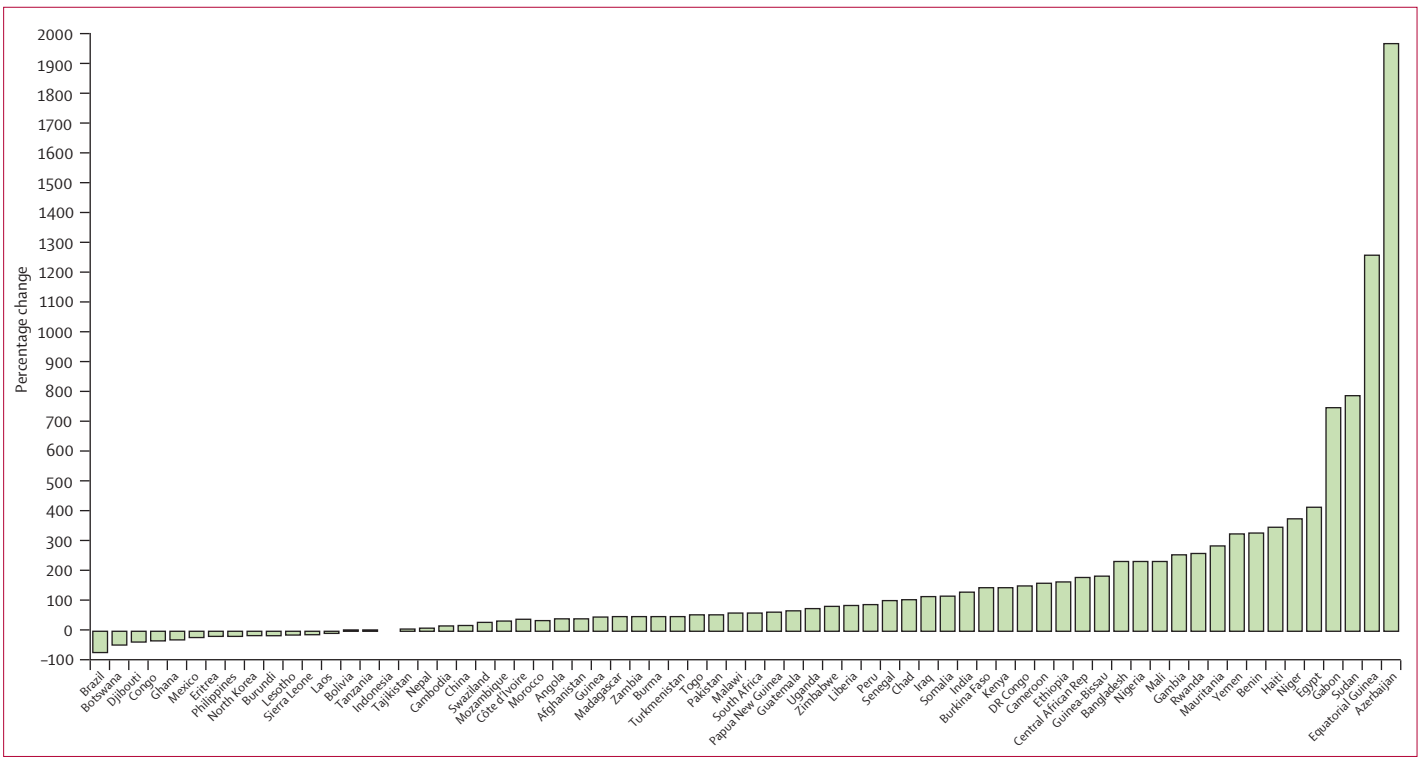

Figure: **Percentage change in total official development assistance to maternal, newborn, and child health between 2003 and 2006 by recipient country**

As in previous years, child health expenditure accounted for more than two-thirds of all official development assistance for these activities. Bilateral donors accounted for almost two-thirds of total aid to maternal, newborn, and child health (table 2). Together, the GAVI Alliance and the Global Fund disbursed more than $505 million per year.

The volume of official development assistance to maternal, newborn, and child health rose by 64% between 2003 and 2006 (table 2); there were increases of 63% in official development assistance to child health and of 66% to maternal and newborn health. Bilateral donors increased their contributions by 45%, whereas contributions from multilateral donors rose by 68%. Aid disbursement from the global health initiatives increased by almost 200% from 2003 to 2006.

As in previous years, the means of disbursement preferred by donors was through projects, which probably explains the variation seen in disbursement flows (table 3). General budget support and health sector support together shared between 3% and 6% of disbursed funds. The amount of aid designated for projects that target mothers and children exclusively increased by 41% to almost $1700 million in 2006, with immunisation being the major specific activity to target these groups. Projects oriented exclusively to nutrition amounted to $114 million in 2005 and $223 million in 2006, accounting for 8% and 13% of spending specific to maternal, newborn, and child health, respectively.

The three biggest donors of 2005 (the USA, World Bank, and the UK) disbursed $1523 million; the following year the three biggest donors were the USA, the World Bank, and the Global Fund, who collectively contributed $1745 million (table 4). In both years the amount accounted for more than half of total aid to maternal, newborn, and child health. Most donors increased their contribution between 2003 and 2006 (table 4). In 2006, eight donors disbursed more than double their contribution in 2003, and two of them (the European Union and the Global Fund) disbursed more than four times the 2003 amount. Only two donors—France and Greece—showed a decrease in maternal, newborn, and child health disbursements in 2006. Italy did not report data for this year, but disbursments had been reduced from $21 million in 2003 to less than $3 million in 2005.

Most developing countries received more total aid to maternal, newborn, and child health in 2006 than in 2003 (figure). In some countries—eg, Niger, Haiti, and Benin—there was a trebling in official development assistance received. Equatorial Guinea and Azerbaijan were exceptional cases, where the amount of official development assistance increased by more than twelve times. Of the 68 priority recipients, 16 (including Brazil, Congo, Ghana, and Burundi) saw total official development assistance to maternal, newborn, and child health fall by an average of 22%.

Table 5 presents estimates of total official development assistance and two indicators (aid disbursements to child

	Countdown 2005			Countdown 2006			Percentage change between 2003 and 2006	
	Total	To child health per child	To maternal and newborn health per livebirth	Total	To child health per child	To maternal and newborn health per livebirth	To child health per child	To maternal and newborn health per livebirth
Afghanistan	60 071	8·6	8·7	69 324	10·3	7·7	56%	–19%
Angola	47 474	12·0	16·1	19 873	5·4	4·8	52%	–14%
Azerbaijan	3063	4·3	3·4	9435	10·0	24·2	1511%	3188%
Bangladesh	204 654	8·4	16·5	113 303	3·3	15·1	241%	233%
Benin	12 152	7·8	3·6	35 724	19·6	20·5	279%	521%
Bolivia	10 241	6·2	11·1	14 298	7·9	17·9	–2%	–15%
Botswana	28	0·0	0·4	477	2·0	0·6	121%	–96%
Brazil	2348	0·1	0·2	2310	0·1	0·2	–74%	–65%
Burkina Faso	25 276	8·6	6·6	24 573	7·7	8·5	150%	97%
Burma	15 833	3·0	1·9	13 857	2·5	2·4	74%	–17%
Burundi	15 425	10·1	5·7	14 674	9·6	4·8	109%	–86%
Cambodia	20 355	6·9	22·4	13 132	3·9	16·2	–21%	178%
Cameroon	19 257	6·8	4·4	15 429	5·1	4·8	164%	94%
Central African Republic	5326	7·0	5·7	4524	5·7	5·5	154%	291%
Chad	11 524	4·9	5·4	5945	2·1	4·3	69%	204%
China	33 818	0·3	0·4	41 697	0·3	0·8	2%	50%
Congo	2421	2·7	3·0	1182	1·3	1·2	–35%	–15%
Côte d'Ivoire	8806	2·8	1·7	7307	2·4	1·0	33%	8%
Democratic Republic of the Congo	78 656	4·5	9·7	51 228	3·6	3·3	119%	260%
Djibouti	3494	24·9	22·3	1811	12·8	11·2	–30%	–58%
Egypt	17 163	1·3	3·3	25 449	2·0	4·0	296%	1219%
Equatorial Guinea	1504	14·3	12·7	4117	37·8	37·8	2608%	333%
Eritrea	7156	8·9	2·2	5847	5·1	10·4	–29%	–5%
Ethiopia	79 952	3·9	10·0	164 626	9·3	13·9	141%	222%
Gabon	4010	17·0	20·6	3469	13·6	22·2	717%	874%
Gambia	5484	21·2	11·1	3349	10·7	14·9	176%	1070%
Ghana	42 068	11·0	12·2	48 255	11·8	16·6	–26%	–37%
Guatemala	13 024	3·4	14·5	20 489	5·7	20·8	59%	72%
Guinea	21 877	9·2	19·1	8045	4·2	3·2	39%	35%
Guinea-Bissau	2876	6·3	11·9	1817	4·2	6·1	241%	76%
Haiti	12 949	6·7	23·0	18 555	11·1	24·0	241%	1017%
India	214 566	1·1	3·2	528 089	2·7	7·9	45%	1077%
Indonesia	36 347	1·1	2·8	73 034	2·0	6·8	–4%	7%
Iraq	94 518	16·7	26·9	80 029	10·5	36·7	40%	535%
Kenya	65 360	8·4	13·5	96 402	12·9	15·9	125%	170%
Laos	12 523	9·2	27·9	5959	4·7	10·4	–20%	19%
Lesotho	3395	10·2	19·7	1505	5·1	5·8	–8%	–36%
Liberia	6264	7·9	7·8	11 828	15·3	12·3	65%	175%
Madagascar	29 883	7·5	10·7	27 459	5·7	14·7	43%	40%
Malawi	37 000	12·0	17·9	51 094	14·5	32·6	48%	75%
Mali	24 898	6·4	13·0	29 009	7·6	13·4	188%	346%
Mauritania	2417	3·2	7·6	6658	7·3	27·4	184%	704%
Mexico	2338	0·1	0·5	2342	0·1	0·4	–15%	–33%
Morocco	8612	1·5	5·6	16 141	2·7	10·8	573%	–36%
Mozambique	46 586	9·7	19·7	49 666	10·8	17·3	19%	50%
Nepal	13 438	3·0	3·5	16 690	2·1	12·6	–36%	106%
Niger	16 927	5·0	4·7	33 459	9·1	10·4	271%	2647%

(Continues on next page)

	Countdown 2005			Countdown 2006			Percentage change between 2003 and 2006	
	Total	To child health per child	To maternal and newborn health per livebirth	Total	To child health per child	To maternal and newborn health per livebirth	To child health per child	To maternal and newborn health per livebirth
(Continued from previous page)								
Nigeria	121 482	4·8	3·0	196 470	6·9	7·5	166%	1626%
North Korea	3518	1·9	0·9	2473	1·3	0·8	–12%	20%
Pakistan	93 860	2·2	10·7	90 804	3·5	3·4	36%	165%
Papua New Guinea	3778	3·3	6·4	16 965	12·2	39·0	21%	174%
Peru	20 567	4·6	12·5	13 219	2·8	7·8	71%	109%
Philippines	7254	0·4	1·6	11 495	0·8	1·4	–24%	–11%
Rwanda	22 642	12·5	12·8	42 160	20·7	27·1	188%	599%
Senegal	24 482	9·8	16·3	33 121	11·4	28·1	64%	208%
Sierra Leone	6696	5·5	5·7	11 099	9·3	8·1	2%	–46%
Somalia	8252	4·5	4·4	11 711	5·8	8·0	97%	155%
South Africa	23 796	3·5	5·9	20 927	3·1	4·4	71%	17%
Sudan	67 629	9·2	15·4	81 519	11·1	17·6	617%	1620%
Swaziland	2069	14·9	1·4	1690	10·4	7·8	11%	124%
Tajikistan	9870	9·6	9·9	6212	6·0	5·9	–8%	52%
Tanzania	108 065	14·7	13·7	66 601	8·0	12·3	–1%	–16%
Togo	6763	5·6	4·6	3828	3·1	2·9	47%	53%
Turkmenistan	1148	2·1	1·0	1029	1·8	1·2	62%	–16%
Uganda	67 999	9·8	7·8	71 147	9·4	11·4	62%	85%
Yemen	35 942	6·0	17·5	20 686	3·0	11·7	248%	440%
Zambia	83 357	30·0	52·0	58 798	23·5	24·3	41%	42%
Zimbabwe	9265	7·2	18·5	22 098	6·6	28·1	16%	319%

Data for total disbursements are in constant 2005 US$ (thousands). Per child and per livebirth data are in constant 2005 US$.

Table 5: **Aggregate official development assistance to maternal, newborn, and child health, to child health per child, and to maternal and newborn health per livebirth in 2005 and 2006, and percentage change for the two categories between 2003 and 2006**

health per child and to maternal health per livebirth) by recipient country for the years 2005 and 2006, as well as the percentage change between 2003 and 2006. Of the 68 Countdown priority countries, 52 countries saw increases in official development assistance to child health per child between 2003 and 2006, on average by 200% per country. 50 countries also saw official development assistance to maternal and newborn health per livebirth rise, on average by more than 400%. Some countries, including Angola, Burundi, Morocco, and Burma received more assistance for activities that targeted children, but less for maternal and newborn health. Nepal, Cambodia, Tajikistan, and Laos saw a reduction in official development assistance to child health but an increase in that for maternal and newborn health-related activities. Three countries (Brazil, Mexico, and Tajikistan) identified by Countdown as priorities only for child health have seen a reduction in child-health assistance. Lesotho, Bolivia, and Eritrea, priorities in terms of maternal mortality only, have seen a decrease in aid for maternal health-related activities. Across the 68 priority countries, disbursement for activities that target children increased from a mean of $4 per child in 2003 to just over $7 per child in 2006, and aid for activities oriented to improve maternal and neonatal health increased from a mean of $7 per livebirth in 2003 to $12 per livebirth in 2006. However, some countries—eg, the Philippines, Congo, and North Korea—still receive as little as $1 per child, or much less.

	Coefficient	*t* stat	p>|t|
ln (under-5 mortality)	0·50	2·550	0·014
ln (income per head)	–0·24	–2·260	0·028
ln (population)	–0·31	–4·360	0·000
Corruption	–0·10	–1·300	0·198
Civil liberty	–0·23	–1·470	0·148
ln (health commitment)	–0·01	–0·080	0·936
Constant	6·86	2·920	0·005
R^2	0·6188		
Adjusted R^2	0·5757		
Observations	60		

Table 6: **OLS estimation of log (official development assistance) to child health per child between 2003 and 2006**

In the child health regression model (table 6), the coefficients on child mortality, income per head, and population were significant (all $p<0·05$). The coefficient

	Coefficient	t stat	P>|t|
ln (DALYs lost)	0·36	1·550	0·127
ln (income per head)	–0·11	–0·890	0·378
ln (population)	–0·28	–4·000	0·000
Corruption	–0·10	–1·180	0·243
Civil liberty	–0·03	–0·160	0·877
ln (health commitment)	0·05	0·310	0·758
Constant	6·75	2·890	0·006
R^2	0·4159		
Adjusted R^2	0·3498		
Observations	60		

DALY=disability adjusted life-year.

Table 7: **OLS estimation of log (official development assistance) to maternal and newborn health per livebirth between 2003 and 2006**

for health need was positive, indicating that countries with higher under-5 mortality received more official development assistance per child, with each percentage increase in mortality resulting in a 0·5% increase in official development assistance to child health per child. The coefficient on income was negative, suggesting that wealthier countries received less aid per child. Aid to child health also decreased with population size such that, for each percentage increase in population size, there was a 0·31% reduction in official development assistance to child health. Government commitment to health, corruption, and indicators of freedom (both political and civil) did not seem to be important determinants of official development assistance to child health.

Although the direction of coefficients on the explanatory variables in the maternal and newborn health model were as expected (table 7), only population size was significant—ie, countries with larger populations received less official development assistance. Of particular concern is the fact that official development assistance to maternal and newborn health was not associated with the degree of need, as represented in the model by disability adjusted life-years lost.

Discussion

The volume of official development assistance to maternal, newborn, and child health rose from $2119 million in 2003 to $3482 million in 2006, with increases of 63% for child health and 66% for maternal and newborn health. There was improved targeting to the 68 priority countries, with an almost doubling of disbursement per beneficiary. Both multilateral agencies and bilateral donors increased their contribution between 2003 and 2006 on average by 57%, whereas disbursements from global health initiatives for maternal and child health rose by almost 200%. However, despite a general increase in aid to maternal, newborn, and child health, some priority countries have seen a reduction in development assistance. Despite the re-affirmation of donor commitment in the Paris Declaration on Aid Effectiveness to sustain partner countries in their domestic developmental strategies, general budget support and health sector support still maintain collectively a share of only 5%, and the bulk of assistance is delivered through projects.

Our data indicate that disbursements of assistance are highly volatile and variable between years, as has been shown previously.[8] This volatility makes effective planning and provision of appropriate levels of funding for various strategic priorities difficult for developing countries, especially those that are highly dependent on aid. Donors to maternal, newborn, and child health need not only to provide long-term commitments but also to coordinate themselves collectively such that funding at the country level does not fluctuate excessively year on year. Some of the variation seen here is driven by large-scale programmes such as the malaria booster project of the World Bank, the poliomyelitis eradication campaign, and those of the global health initiatives. Changes in maternal, newborn, and child health aid flows towards conflict countries such as Afghanistan, Iraq, and Sudan is explained largely by projects that target emergency health care, whereas changes in indicators in India are mainly driven by one very large World Bank project on child and reproductive health in 2006.

Few donors have made public the factors that affect the intensity and direction of their official development assistance. Many studies have sought to understand the determinants of development aid flows. Most studies describe and interpret aid allocation between recipient countries against certain normative criteria, including human rights, aid effectiveness, economic growth, and corruption, to investigate donor preferences.[5,9–12] Some studies describe how much each recipient country should receive according to its need.[13–15] However, no studies have explored determinants of sub-sector aid allocations, such as maternal and child health.

Several studies[5,16] have found considerable evidence that the trend of aid flows is affected by factors that diverge from the actual needs of recipients, such as strategic and political reasons, colonial ties, trade openness, conflict, and democracy. In particular, Alesina and Dollar[5] have shown that bilateral aid allocations are shaped by political and strategic preferences, since donors favour those countries who share the same political position. As shown here, aid flows to maternal, newborn, and child health are not only driven by bilateral donors, but also by multilateral agencies and global health initiatives, which have an increasingly important role. This change is likely to be a positive development in terms of linking allocations more closely to health needs. Our data suggest that, while controlling for other factors, countries with the greatest child health needs do receive more assistance for improving the health of children. However, this does not seem to be the case for maternal and newborn health. We tested other indicators to proxy maternal and newborn health need, including the

maternal mortality ratio and rate of neonatal mortality, but these were also non-significant. That the governance and freedom indicators were not significant is perhaps not surprising, since most of the funds flow through projects and therefore bypass government systems. There are thus few reasons to expect levels of official development assistance to be sensitive to governance and political or civil freedom.

There is no evidence that less corrupt governments receive more aid than others.[6,17] Our findings show that the measures of corruption and government commitment to health were not significant for child or maternal health—ie, countries that are less corrupt or show a greater commitment to health are not necessarily rewarded with more aid.

Although the reliability of the methods used here has been tested,[4] there are inevitably limitations that result from missing data. The data presented here were produced by analysis of the creditor reporting system database maintained by the OECD. Yearly data are reported by donors with varying degrees of delay, are released after a period of time by the OECD, and are updated intermittently—the data for 2006 were sufficiently complete to be analysed only in mid-February, 2008. Nonetheless, the completeness of reporting by donors has improved over time, as evident in the decreasing number of donors for whom data are unavailable. Indeed, missing data were mainly for small donor countries, and are thus unlikely to affect the broad conclusions drawn. A further limitation is that we allocated funds to maternal, newborn, and child health by analysis of project descriptions provided by donors. These descriptions can be vague, poorly translated by the donor, or in languages that had to be translated with online translation services. Additionally, allocation to purpose codes in the database (eg, basic health care, training, infrastructure) could have been inconsistent with the project descriptions. Futher, data could also have been missing because they can only be included when the recipient country can be identified; regional or multicountry projects might have been excluded. Lastly, World Bank data represent commitments rather than disbursements. However, the expression of these data is consistent across all years and does not affect the trend, although analyses are more vulnerable to the effect of variable allocations, as shown by the World Bank India project.

This study demonstrates the value of year on year analysis of donor assistance to maternal, newborn, and child health. These analyses, for example, show that although expenditure is increasing, it is still far from sufficient; additional investments are needed. Despite the Paris declaration, the great bulk of disbursements are still through projects rather than sector or budget support. Analyses, such as those presented here, must continue to be done so that donor commitments can be monitored and assessed to make sure that the most needy countries are benefiting.

Contributors

All authors participated in the study design, analysis and interpretation of the data, and writing of the manuscript. All authors saw and approved the final version of the manuscript.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgments

This study was funded by the Partnership for Maternal, Newborn and Child Health. Chris Lane provided important inputs on the design of the analysis of aid determinants.

References

1 Johns B, Sigurbjörnsdóttir K, Fogstad H, Zupan J, Mathaid M, Tan-Torres Edejer T. Estimated global resources needed to attain universal coverage of maternal and newborn health services. *Bull World Health Organ* 2007; **85:** 256–63.

2 Stenberg K, Johns B, Scherpbiera RW, Tan-Torres Edejer T. A financial road map to scaling up essential child health interventions in 75 countries. *Bull World Health Organ* 2007; **85:** 305–14.

3 Greco G, Powell-Jackson T, Borghi J, Mills A. Economic and financial analysis of scaling up child, newborn and maternal health. London: London School of Hygiene and Tropical Medicine, 2007.

4 Powell-Jackson T, Borghi J, Mueller DH, Patouillard E, Mills A. Countdown to 2015: tracking donor assistance to maternal, newborn, and child health. *Lancet* 2006; **368:** 1077–87.

5 Alesina A, Dollar D. Who gives foreign aid to whom and why? *J Econ Growth* 2000; **5:** 33–63.

6 Alesina A, Weder B. Do corrupt governments receive less foreign aid? *Am Econ Rev* 2002; **92:** 1126–37.

7 OECD. Statistical annex of the 2007 development co-operation report. http://www.oecd.org/dac/stats/dac/dcrannex (accessed March 31, 2008).

8 Bulir A, Hamann AJ. Aid volatility: an empirical assessment. *IMF Staff Papers* 2003; **50:** 64–89.

9 White H, McGillivray M. How well is aid allocated? Descriptive measures of aid allocation: a survey of methodology and results. *Dev Change* 1995; **26:** 163–83.

10 Bobba M, Powell A. Aid effectiveness: politics matters: working paper 601. Washington, DC: Inter-American Development Bank, 2007.

11 Chauvet L. Socio-political instability and the allocation of international aid by donors. *Eur J Pol Econ* 2003; **19:** 33–59.

12 Neumayer E. Do human rights matter in bilateral aid allocation? A quantitative analysis of 21 donor countries. *Soc Sci Q* 2003; **84:** 650–66.

13 Llavador HG, Roemer JE. An equal-opportunity approach to the allocation of international aid. *J Dev Econ* 2001; **64:** 147–71.

14 Collier P, Dollar D. Aid allocation and poverty reduction. *Eur Econ Rev* 2002; **46:** 1475–500.

15 Lane C, Glassman A. Bigger and better? Scaling up and motivation in health aid. *Health Affairs* 2007; **26:** 935–48.

16 Maizels A, Nissanke MK. Motivations for aid to developing countries. *World Dev* 1984; **12:** 879–900.

17 Svensson J. Foreign aid and rent-seeking. *J Int Econ* 2000; **51:** 437–61.