

## Health in the Occupied Palestinian Territory 2



# Maternal and child health in the occupied Palestinian territory

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The Countdown to 2015 intervention coverage indicators in the occupied Palestinian territory are similar to those of other Arab countries, although there are gaps in continuity and quality of services across the continuum of the perinatal period. Since the mid 1990s, however, access to maternity facilities has become increasingly unpredictable. Mortality rates for infants (age  $\leq 1$  year) and children younger than 5 years have changed little, and the prevalence of stunting in children has increased. Living conditions have worsened since 2006, when the elected Palestinian administration became politically and economically boycotted, resulting in unprecedented levels of Palestinian unemployment, poverty, and internal conflict, and increased restrictions to health-care access. Although a political solution is imperative for poverty alleviation, sustainable development, and the universal right to health care, women and children should not have to wait. Urgent action from international and local decision makers is needed for sustainable access to high-quality care and basic health entitlements.

### Introduction

Maternal and child health are important components of present and future population health in the occupied Palestinian territory, where roughly 40% of the population are women of reproductive age and children younger than 5 years.<sup>1</sup> Although the economic situation had been on a downward trend since the second *intifada* (popular uprising against occupation) in 2000,<sup>2</sup> living conditions worsened after the elections in January, 2006, which gave the political party Hamas control of the Palestinian Legislative Council and brought about a political and economic boycott by several countries in the international community.<sup>3</sup> Poverty in the occupied Palestinian territory has risen sharply, and more than a third of the population is classified as food insecure.<sup>4</sup> The Israeli-imposed system of several hundred checkpoints and barriers to movement has severely restricted access to services,<sup>5</sup> and these restrictions can be especially crucial in perinatal and child-health emergencies.<sup>6</sup>

In this report, we discuss the situation in the occupied Palestinian territory with respect to the fourth and fifth Millennium Development Goals (MDGs) for reduction of child mortality and improvement of maternal health, respectively, and we use the Countdown to 2015<sup>7</sup> indicators to assess coverage of priority interventions. However, because coverage indicators alone do not indicate the complexity of maternal and child health-care provision in a specific context,<sup>8</sup> we describe the broad context of service provision, which is characterised by challenges common to many low-income and middle-income countries, such as poverty, poor nutrition, and an overburdened public-health system, but which is also unique in terms of the presence of a military occupation and a state of protracted conflict.<sup>9</sup> Within the constraints of the present economic and political conditions, we propose changes for improvement of the services provided to women and children in the short term, and we make long-term

recommendations that presuppose a conducive political situation.

### Women: living conditions, education, and work

The cohesiveness and solidarity of the Palestinian family would seem to have a protective effect for all members of society, including women and children.<sup>10</sup> However, despite the positive aspects of family support, poverty and strongly gendered social roles increase the burden of women's household responsibilities and the health risks associated with housework and child care.<sup>11</sup> The average number of individuals in a household in the territory is 6·3 (5·9 in the West Bank and 7·0 in the Gaza Strip),<sup>12</sup> and living conditions are crowded.<sup>1</sup> Because women are the key carers, they bear the burden of dependency of the young, old, sick, and injured. Furthermore, after the deaths or imprisonment of their husbands, brothers, or sons, women have been obliged to take on additional roles as heads of households.<sup>13</sup> In 2006, women were the heads of 8·5% of households in the occupied Palestinian territory (9·1% in the West Bank and 7·0% in the Gaza Strip).<sup>12</sup>

Historically, Palestinian women have been among the most highly educated in the Arab world.<sup>14</sup> In 2005, the literacy rate among Palestinian women aged 15 years and

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	Occupied Palestinian territory	Jordan	Lebanon	Syria	Egypt
Married (age 15–19 years)	8·9% <sup>12</sup>	6·0% <sup>15</sup>	2·6% <sup>16</sup>	11·0% <sup>15</sup>	12·3% <sup>17</sup>
Consanguineous marriages	45·0% <sup>12</sup>	42·8% <sup>18</sup>	25·0% <sup>16</sup>	40·4% <sup>19</sup>	32·2% <sup>17</sup>
Married to first cousin	28·0%	26·0%	15·0%	..	17·5%
Birth intervals <18 months	27·0% <sup>12</sup>	15·2% <sup>18</sup>	..	..	8·6% <sup>17</sup>
Total fertility rate (child per woman)	4·5 <sup>12</sup>	3·7 <sup>18</sup>	1·9 <sup>16</sup>	3·8 <sup>19</sup>	3·1 <sup>17</sup>
Aged $\geq 15$ years and literate	88·9% <sup>20</sup>	84·7% <sup>21</sup>	86·3% <sup>16</sup>	75·4% <sup>19</sup>	43·6% <sup>21</sup>
Aged 15–49 years and participating in labour market	14·4% <sup>12</sup>	9·7% <sup>18</sup>	18·1% <sup>22</sup>	16·8% <sup>19</sup>	22·0% <sup>17</sup>

Table 1: Characteristics of women in the occupied Palestinian territory and selected Arab countries

	Neonatal mortality	Postneonatal mortality	Infant mortality	Mortality in children <5 years
<b>Occupied Palestinian territory</b>				
1990–94 <sup>31</sup>	16.3	11.0	27.3	33.2
1995–99 <sup>32</sup>	17.5	8.4	25.9	28.8
1999–2003 <sup>33</sup>	18.1	6.1	24.2	28.1
2002–06 <sup>1</sup>	20.0	7.6	27.6	31.6
Change for 1990–2006	22.7%	–30.9%	1.1%	–4.8%
<b>West Bank</b>				
1990–94	15.2	10.3	25.5	31.0
1995–99	17.0	8.0	25.0	27.5
1999–2003	14.8	5.4	20.2	23.6
2002–06	18.6	6.9	25.5	29.5
Change for 1990–2006	22.4%	–33.0%	0	–4.8%
<b>Gaza Strip</b>				
1990–94	18.0	12.2	30.2	37.0
1995–99	18.4	8.9	27.3	31.0
1999–2003	22.8	7.0	29.8	34.5
2002–06	22.1	8.6	30.7	34.9
Change for 1990–2006	22.8%	–29.5%	1.7%	–5.7%

Data are number of deaths per 1000 livebirths, unless otherwise indicated. Percentage change was calculated for the rates between 1990–94 and 2002–06. As judged by use of Spearman's trend tests, none of the changes in mortality rates for neonates, infants, and children (<5 years) during the four time points were significant.

**Table 2: Trends in infant and child mortality in the occupied Palestinian territory 5 years before survey**

	Year	Number of households interviewed	Number of livebirths*	Number of children (0–59 months) surveyed	Household response rate
Demographic survey <sup>34</sup>	1995	15 653	78 490	..	97.2%
Health survey <sup>35</sup>	1996	3722	..	4630	94.6%
Health survey <sup>36</sup>	2000	6204	26 074	6169	97.7%
Nutrition survey <sup>37</sup>	2002	5228	..	3331†	95.7%
Demographic and health survey <sup>38</sup>	2004	5799	22 478	4839	88.2%
Pan Arab project for family health survey <sup>12</sup>	2006–07	11 661	47 512	10 230	88.0%

\*Obtained from micro data. †Children aged 6–59 months (only in this survey).

**Table 3: Surveys from Palestinian Central Bureau of Statistics**

older was 89% (table 1), and almost one in five had completed secondary education.<sup>20</sup> However, women's achievements in education have not been matched by their participation in the labour force. In the first quarter of 2006, about 13% of women aged 15 years and older were in the labour force compared with 67% of men.<sup>20</sup> The proportion increased with education, whereby 39% of women with post-secondary education contributed to the labour force in 2006.<sup>20</sup> This overall low participation rate should be understood within the context of a generally high unemployment rate among men and women, and women's common participation in the informal sector.<sup>13</sup> Indeed low labour-force-participation rates, despite increasing education of women, are characteristic of countries in the Middle East.<sup>23</sup>

## Marriage and childbearing patterns

Most Palestinian women marry at a young age and begin childbearing shortly thereafter,<sup>24</sup> a pattern that has persisted<sup>12</sup> despite the reported harmful health consequences of teenage pregnancies for mothers and their newborn babies.<sup>25</sup> In 2006, the median age at first marriage for ever-married women (aged 20–54 years) was 18 years (IQR 4).<sup>12</sup> About 9% of women aged 15–19 years were married, and 6% were either mothers or pregnant for the first time.<sup>12</sup> Birth spacing was short, even by regional standards (table 1), with 27% of women (aged 15–49 years) in 2006 reporting birth intervals shorter than 18 months.<sup>12</sup>

Consanguinity is a predominant feature of Palestinian marriages, with 28% of ever-married women (aged 15–54 years) married to a first cousin and 17% married to other relatives within their *hamula* (extended family) in 2006.<sup>12</sup> In a study<sup>26</sup> of the data for birth history from the 1995 Palestinian Demographic and Health Survey, an increased risk of infant and child mortality in consanguineous marriages was noted, whereas in another study,<sup>26</sup> reading disabilities in children of consanguineous parents were increased. A comparison of the consanguinity rates reported in the 1995 and 2004 Palestinian health surveys suggested that consanguinity might be slowly decreasing in the territory, but future trends in consanguinity are not clear since marriage patterns can be affected by the unstable political situation.<sup>26</sup>

Political conflict,<sup>14</sup> marriage at a young age, and restricted opportunities for participation in the labour force<sup>27</sup> might explain the extraordinarily high fertility rates, especially in the Gaza Strip, despite women being highly educated. Despite reductions, the fertility of women in the occupied Palestinian territory remains among the highest in the world.<sup>28</sup> In 2006, the total fertility rate was 4.5 births per woman for the 3 years before the survey (4.1 births per woman in the West Bank and 5.3 births per woman in the Gaza Strip),<sup>12</sup> which is much higher than in Israel (2.8 births per woman)<sup>29</sup> and most Arab countries. Indeed, among other countries in the region, the total fertility rate is higher only in Yemen (6.2 births per woman).<sup>29</sup> Fertility rates are high, at least in part, because that is what seems to be wanted.<sup>14</sup> In 2006, the mean family size considered ideal by Palestinian women was around five children, with some differences between the West Bank and Gaza Strip.<sup>12</sup>

With prevailing norms of modesty and social conservatism, common behavioural risk factors are expected to be infrequent in Palestinian women. As in other parts of the Middle East, religious and traditional customs, such as the prohibition of extramarital sex,<sup>30</sup> render women in Palestine at a lower risk of exposure to sexually transmitted diseases, including HIV/AIDS, than women in other societies. Tobacco smoking is reportedly infrequent in Palestinian women,<sup>12</sup> and although no studies are available, alcohol and drug abuse are also thought to be infrequent.

### Panel 1: Sources of data and methods of analysis

#### Surveys

Whenever available, data from the nationally representative surveys of the Palestinian Central Bureau of Statistics were used either as micro data or published reports (table 3). We believe that these survey data are of high quality because of the quality-control mechanisms applied in data gathering, input, and analysis (eg, anthropometric measures). When necessary, Palestinian Central Bureau of Statistics has received technical assistance from regional and international organisations, such as UNICEF, UN Population Fund (UNFPA), and the Arab League. Procedures in data gathering and entry are standardised through training. Pilot surveys and re-interview of samples of households ensure data quality. Response rates are generally high, and standardisation of practices means indicators can be compared over time.

#### Calculation of infant mortality rate

Infant and child mortality rates were estimated by use of a direct method based on the birth history data from several household surveys undertaken by the Palestinian Central Bureau of Statistics (table 3). In each survey, all ever-married women aged 15–49 years were asked about dates of birth (and if the child had died, age at the time of death) for each live-born child. Infant and child mortality estimates, for different periods preceding each estimate, were calculated directly from these data with the conventional synthetic cohort approach like the one used in the demographic and health surveys done by ORC Macro International.<sup>39</sup>

Some of the fluctuations, or absence of change or reversals in mortality rates, could have been attributed to changes in data quality. Assessment of quality showed that birth history data were not associated with major difficulties that would have any major effect on the estimates. Although retrospective birth history data provide reasonably good estimates compared with registration data and demographic models, these data are associated with specific limitations. The most important of which is the sex-selective omission of children who die during infancy, which could lead to a downward bias in the mortality estimates. Furthermore, the omission, if present, is also selective for the date of death and age of women. A preliminary examination of sex ratios at birth for children who died indicates some omission of infant girls in all the surveys as would be expected in countries where families have a preference for male children. However, the ratios for the 5 years before each survey date are within the expected ranges. The reports of age at death are yet another kind of error affecting the mortality estimates. Here, we assume that the underestimation is uniform across settings and surveys, since the analysis is based on the same kind of data and estimation methods. We are therefore confident that the minor reductions seen since the mid 1980s are within sampling variability.

#### Other sources of data

- Peer-reviewed reports of Palestinian health-care issues
- Yearly reports from Ministry of Health and reports from UN Relief and Works Agency
- Published reports or studies commissioned by agencies, such as WHO, UN Food and Agriculture Organisation, UNICEF, UNFPA, and Economic and Social Commission for Western Asia
- Published reports or studies by international organisations, such as Oxfam and Rand, and local organisations, such as Birzeit University

#### Limitations of some of the data sources

- Data from Ministry of Health are facility-based, and sometimes based on small populations (eg, women who received post-partum home visits in the Gaza Strip)
- Hospital records are incomplete (eg, indications for caesarean sections)
- Most studies are descriptive; we could not identify intervention-type studies

## MDGs 4 and 5

Table 2 shows the mortality rates for infants and children younger than 5 years in the West Bank and Gaza Strip and the percentage change with time. In the occupied Palestinian territory, mortality rates for 2002–06 were 27·6 deaths per 1000 livebirths for infants and 31·6 deaths per 1000 livebirths for children younger than 5 years. Table 3 and panel 1 show sources and methods for calculation of the mortality rates. After decades of improvement, infant mortality in the occupied Palestinian territory has not fallen much since around 1990 (panel 2), and mortality rates in children less than 5 years of age have changed little during this time. In fact, between 1990

and 2005, the occupied Palestinian territory has had the smallest reduction in mortality rates among children younger than 5 years compared with Arab countries (figure 1). Even countries with lower infant mortality rates, such as the United Arab Emirates, than those in the occupied Palestinian territory have had a larger decrease. A close look at components of the infant mortality rate shows that an apparent increase in neonatal mortality (death in the first 28 days) occurred between 1990–94 and 2002–06 (table 2). However, these changes were not significant.

The slow down in the reduction of infant mortality could be attributed to several reasons, including changes in the causes of death and deterioration in health conditions. The

## Panel 2: Trends in infant mortality rate in the occupied Palestinian territory

### 1950s to 1960s

Available estimates for Palestinians suggest that infant and child mortality continued to fall during the 1950s and 1960s.<sup>40</sup> On the basis of birth-history data from several household surveys undertaken by the Palestinian Central Bureau of Statistics since its inception, and with the method of synthetic cohort probabilities of death,<sup>41</sup> our estimate puts the infant mortality rate at about 120 per 1000 livebirths in 1960, down from about 200 in the late 1940s and early 1950s.

### 1970s to early 1980s

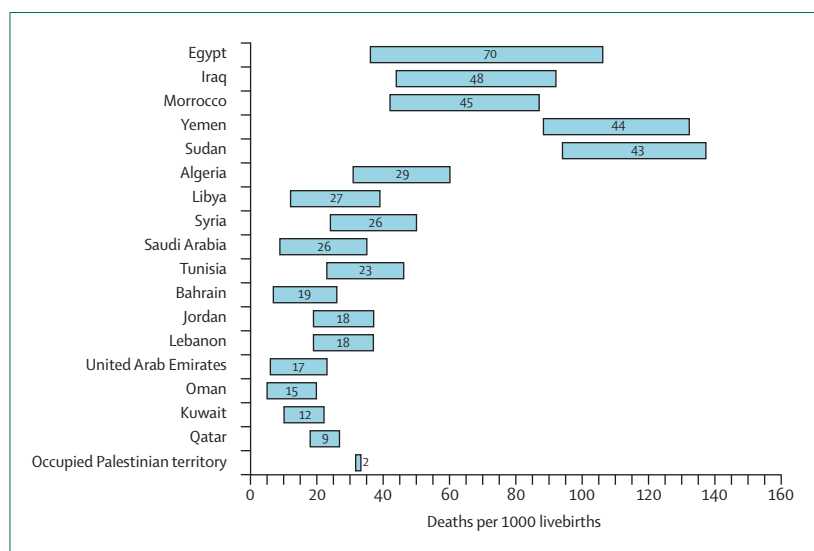
Throughout the 1970s and early 1980s, statistics produced by the Israeli military government showed a general improvement in the population's health in the West Bank and Gaza Strip, as indicated by infant mortality rates.<sup>42</sup> All available sources of information point to a substantial reduction in infant mortality, although the speed of reduction has been widely contested.<sup>43–46</sup>

### Mid to late 1980s

Infant mortality continued to fall rapidly during the early 1980s, with rates of reduction similar to those recorded during the 1960s and 1970s. However, after the onset of the first intifada in 1987, the reduction in mortality began to slow down at a rate of 25–27 per 1000. Although the trend for infant mortality rate was to improve with time, the rate in the occupied Palestinian territory lagged behind improvements in some neighbouring Arab countries despite Palestinian women being better educated.<sup>47</sup>

### 1990s to 2000

Infant mortality rate decreased by about 18 per 1000 between 1980 and 1985, but by 10 per 1000 during the subsequent 20 years. The overall change from 1990 until early 2000 was only 1% per year, and there has been no discernible downward trend in the reported rates since then.



**Figure 1: Reduction in mortality rates in children younger than 5 years between 1990 and 2005 in Arab countries**

Data from Murray<sup>48</sup> and Ahmad<sup>49</sup> and their colleagues. Estimates for occupied Palestinian territory for 1990–94 were not available; survey estimates were used.

causes of infant mortality have changed, such that infectious and diarrhoeal diseases are no longer leading causes. The main causes of infant deaths are now prematurity and low birthweight, and congenital

malformations.<sup>50</sup> As such, additional intervention strategies requiring increased intensive specialist care and financial investments might be needed to reduce infant mortality further. At the same time, the political and economic contexts should be considered—namely, the deterioration in Gaza community health services<sup>51</sup> and hospitals,<sup>52</sup> and the restrictions on access to tertiary centres in Israel and East Jerusalem for at-risk pregnancies and sick neonates.<sup>53</sup>

As in many other countries, accurate estimation of the maternal mortality is hindered by unreliable data and wide margins of uncertainty.<sup>54</sup> Panel 3 shows the different estimates in the occupied Palestinian territory and their sources. The improbably low estimation by the Ministry of Health suggests substantial under-reporting,<sup>57,58</sup> which is especially troubling since most babies are delivered in institutional settings. However, regular maternal audit activities at hospitals and near-miss investigations are not done, and the death registration system is generally unreliable because the cause of death is likely to be misclassified.<sup>58,60</sup> Data for maternal complications during delivery are scarce and can be unreliable, and those for maternal or neonatal readmissions after delivery are not readily available.

The Countdown to 2015<sup>7</sup> provides a common framework for assessment of progress towards the achievement of the fourth and fifth MDGs in countries with the highest burden of mortality in mothers or children. Although the occupied Palestinian territory is not one of the countries included in the initiative, the indicators of interventions and nutritional status are useful for description of the situation in the occupied Palestinian territory with respect to the achievement of the fourth and fifth MDGs. The perinatal health coverage indicators in the Countdown<sup>7</sup> for maternal, newborn, and child survival (table 4) in the occupied Palestinian territory seem to be much the same as (and in some cases better than) those of neighbouring Arab countries. However, for health services to provide sustainable health gains, quality of care is an important concern alongside high coverage across the perinatal continuum. Indicators show variations in the types of interventions in the continuum of care.<sup>66</sup> Coverage for antenatal care, skilled attendance at birth, and child immunisation is almost universal. As in other low-income and middle-income countries, interventions that are fairly simple to schedule and deliver have high coverage. Those that require a well functioning health system 24 h a day—such as emergency obstetric care and clinical care of ill newborn babies and children, and postnatal care necessitating community-based provision with prevention, support, and behaviour change—need complex service delivery and have low coverage.<sup>7,67</sup>

Health surveys show that antenatal care coverage, skilled attendance, and measles immunisation have been consistently very high since 2000.<sup>12</sup> Exclusive breastfeeding and immunisation with diphtheria, pertussis, and tetanus (third dose) have increased by about 10 percentage points each during that same period (from 16.7% to 26.5% for

### Panel 3: Estimates of maternal mortality in the occupied Palestinian territory: a wide range of uncertainty

- The demographic survey of the West Bank and Gaza Strip (done in 1995 by the Palestinian Central Bureau of Statistics)<sup>34</sup> provided credible and previously unavailable basic demographic data at an important time in the establishment of the Palestinian Authority, including an estimate of the maternal mortality ratio by use of the sisterhood method. In accordance with that survey, the estimate was 74 per 100 000 births, with the highest ratios noted for the youngest and oldest mothers.<sup>34,55</sup>
- An adjusted model-based estimate by WHO, UNICEF, and UN Population Fund estimated the maternal mortality ratio in the Palestinian territory in 2000 at 100 per 100 000 births.<sup>56</sup>
- In 2005, the Palestinian Ministry of Health estimated 15·4 maternal deaths per 100 000 births in the Gaza Strip and 1·8 per 100 000 births in the West Bank, but acknowledged the improbability of such estimates, citing probable under-reporting of deaths.<sup>57</sup>
- Maternal mortality ratios were 29·2 per 100 000 births in 2000 and 36·5 per 100 000 births in 2001 in a study<sup>58</sup> that assessed the deaths of 431 women with verbal autopsies. This study was facility based, however, and it included only the West Bank. The main causes of direct obstetric deaths identified in the study were post-partum haemorrhage, pre-eclampsia or eclampsia, postoperative haemorrhagic complication, and sepsis. Causes of indirect obstetric deaths were mostly uncertain.<sup>58</sup>
- In a retrospective audit of 1995–2002 by the UN Relief and Works Agency, maternal mortality ratios were 17·5 per 100 000 births in the West Bank and 23·7 per 100 000 births in the Gaza Strip.<sup>59</sup> The study, however, included a small number of deaths (16 in West Bank and 48 in Gaza Strip) and was limited to the refugee population. Most deaths took place post partum, and the causes were embolism, haemorrhage, and pre-eclampsia.<sup>59</sup>

exclusive breastfeeding and from 88·5% to 98·7% for the immunisation). The rise in caesarean-section deliveries has been significant between 2000 and 2008 (from 8·8% to 15·0%).<sup>12</sup>

A comparison of the indicators from the surveys over the past decade (1996–2006) shows that the prevalence of stunting has increased substantially.<sup>1</sup> Stunting, low height for age, which is an indication of chronic malnutrition and a risk factor for poor cognitive development,<sup>68</sup> has been rising since 1996, and, in 2006, was recorded in one in ten children (figure 2). Although in the West Bank between 1996 and 2006, stunting increased (from 6·7% to 7·9%), it was especially pronounced in the Gaza Strip, rising from 8·2%<sup>70</sup> to 13·2%.<sup>1</sup>

The prevalence of underweight and wasting have remained largely unchanged during the past decade. In 2000, 2004, and 2006, according to the national surveys in the occupied Palestinian territory, the prevalence of wasting was 1·4%, 2·8%, and 1·4%, respectively.<sup>1</sup> Importantly, because wasting is linked to acute malnutrition and could be affected by variations in such factors as humanitarian-aid assistance and military closures, it should be monitored in populations that could be especially vulnerable—such as those living in dire poverty or in areas affected by closures or by the separation wall.

In the occupied Palestinian territory, undernutrition is of particular concern in view of frequent births,<sup>12</sup> short birth spacing,<sup>12</sup> rising poverty,<sup>2</sup> and deterioration in the quantity and quality of food.<sup>4,71</sup> The rapid deterioration in socio-economic and political conditions has added a new sense of urgency,<sup>72</sup> as rising food prices, falling incomes, and increasing unemployment jeopardise food security.<sup>71</sup> In the Gaza Strip, the situation is especially dire,<sup>73</sup> with 56% of population classified as food insecure compared with 25% in the West Bank. Nevertheless, closed areas in the West Bank are badly affected because of high un-

	Occupied Palestinian territory <sup>12</sup>	Jordan <sup>61</sup>	Lebanon <sup>16,62</sup>	Syria <sup>63,64</sup>	Egypt <sup>65</sup>
<b>Nutrition</b>					
Stunting (moderate and severe)	10%	9%	12%	22%	18%
Wasting (moderate and severe)	1%	2%	5%	9%	4%
Underweight	3%	4%	4%	10%	6%
Exclusive breastfeeding	27%	27%	..	29%	38%
Complementary feeding (6–9 months)	57%	70%	47%	37%	67%
Low birthweight	7%	..	..	9%	12%
Vitamin A supplementation	27%	..	10%	3%	14%
<b>Child health</b>					
Immunised with measles vaccine	97%	95%	96%	92%	97%
Immunised with 3 doses of diphtheria, pertussis, and tetanus	99%	98%	74%	..	94%
Immunised with 3 doses of Hib vaccine	..	..	..	..	..
<5 years with diarrhoea, had oral rehydration treatment and/or increased fluids	63%	64%	44%	34%	48%
Pneumonia, taken to appropriate health provider	73%	72%	57%	77%	73%
Pneumonia, given antibiotics	70%	..	46%	71%	52%
<b>Maternal and newborn health</b>					
Unmet need for family planning	12%	11%	..	11%	..
Antenatal visits (≥4) for women	90%	91%	71%	..	59%
Livebirths attended by skilled personnel	99%	100%	98%	93%	74%
<b>Caesarean section</b>					
Total	15%	16%	23%	15%	20%
Urban	15%	16%	..	15%	29%
Rural	15%	15%	..	15%	15%
Early initiation of breastfeeding (within 1 h)	65%	40%	41%	32%	43%
Postnatal visit for baby (within 2 days for home births)	..	8%	..	..	6%

(Continues on next page)



	Occupied Palestinian territory <sup>12</sup>	Jordan <sup>61</sup>	Lebanon <sup>16,62</sup>	Syria <sup>63,64</sup>	Egypt <sup>65</sup>
(Continued from previous page)					
<b>Coverage along continuum of care</b>					
Contraceptive use					
Modern	39%	41%	34%	43%	57%
Any method	50%	56%	58%	58%	59%
Antenatal visit (≥1) for women	99%	99%	96%	85%	70%
Skilled attendant at birth	99%	100%	98%	93%	74%
Postnatal care	30%	35%	52%	71%	58%
Exclusive breastfeeding	27%	27%	..	29%	38%
Immunised with measles vaccine	97%	95%	..	92%	97%
<b>Water and sanitation</b>					
Improved drinking water resources					
Total	89%	98%	100%	87%	98%
Urban	90%	99%	100%	94%	99%
Rural	88%	91%	100%	81%	98%
Improved sanitation facilities					
Total	80%	85%	..	97%	66%
Urban	84%	88%	100%	100%	85%
Rural	69%	71%	..	94%	52%

Data for malaria prevention and treatment, and prevention of mother-to-child HIV transmission were not included since malaria is not endemic in the occupied Palestinian territory and HIV incidence and prevalence are very low. Data for causes of maternal and child deaths are discussed elsewhere in this report. HC calculated unmet need for family planning and HAR calculated caesarean sections done in urban and rural areas. Data for *Haemophilus influenzae* type b (Hib) vaccine are not available for any of the countries in the table. Case definitions for pneumonia in children differ slightly between Pan Arab Family Health surveys (Palestinian territory and Lebanon) and demographic and health surveys (Jordan and Egypt). Data for postnatal care visits within 2 days for home births were available only for Jordan (8%) and Egypt (6%). In the Palestinian territory, only 3% of births take place at home or on the way to the hospital.

**Table 4: Intervention coverage for mothers, babies, and children in the occupied Palestinian territory and selected Arab countries (Countdown to 2015)**

employment, restrictions on movements, and wage depreciation.<sup>71,73</sup> In Gaza, half the surveyed population reported spending less on food; 89% bought food of lower quality; and 75% reported buying a reduced quantity of the food. Almost all respondents reported decreasing their intake of fresh fruits and vegetables, and animal protein.<sup>71,73</sup>

### Maternal and child health services

Assessment of maternal and child health services across the continuum of care, both throughout the life cycle and across the different levels of services,<sup>66</sup> shows that the challenges for effective provision are a function of the strength and performance of the health system as a whole.<sup>8</sup> Mataria and colleagues,<sup>74</sup> in this Series, have analysed the performance of the Palestinian health system with a WHO-suggested framework that assesses service delivery, workforce, medical products and technologies, financing, and leadership or stewardship issues. This report will provide specific examples from maternal and child health care. We describe the causes that contribute to the gaps in health care, such as the legacy of occupation, internal problems of the Palestinian National Authority, and counterproductive international

aid practices,<sup>74</sup> with the aim of showing the contextual complexities involved in building a health system, from informing policy to implementing effective care.

### Intervention coverage indicators

As the indicators for Countdown to 2015 have shown, delivery of specific interventions, such as antenatal care and childhood immunisations, has remained high despite political instability (table 4). However, other interventions along the continuum of perinatal care, such as timely access of women in labour to maternity facilities, have been affected by the increasing mobility restrictions, including checkpoints and the separation wall. Between 2000 and 2006, the Ministry of Health reported 69 cases of Palestinian women giving birth at Israeli checkpoints.<sup>75</sup> 10% of pregnant women in labour were delayed for 2–4 h on the road to the maternity facility, whereas the average time without roadblocks to reach health facilities was 15–30 min.<sup>75</sup> These numbers do not reveal women's anxiety throughout the pregnancy about reaching a place of birth and returning home safely.

Barriers to access complicate the organisation of health providers and services at different levels of care. Government clinics, though well distributed, do not provide 24 h care because of their restricted opening hours, by restricting what midwives or nurses are allowed to do, and by depending on the visit of the doctor from the city to provide services.<sup>76</sup> Responses to restricted access have consisted of initiatives from governmental and non-governmental parties, including mobile clinics, the creation of maternity homes, training of health-care workers for home deliveries, and networks of birth attendants to guide isolated family members by telephone through the birth process.<sup>77–79</sup> However, these fragmented attempts were constrained by drawbacks, such as high cost and insufficient training to ensure midwifery skills, and were not a substitute for the systematic and sustainable organisation of maternal and child care in the community with links to higher levels of care.<sup>77,80</sup>

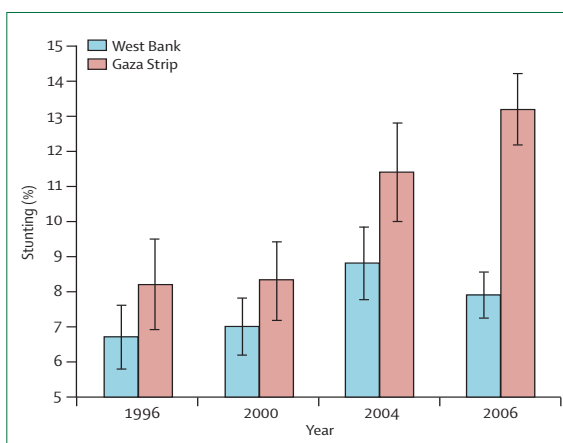
Although Countdown to 2015<sup>7</sup> is useful for tracking coverage of basic maternal and child health care, it does not assess the content of service packages or the quality of care.<sup>81</sup> This gap in monitoring might be crucial for assessment of the effectiveness of interventions and determination of how to move forward, since high coverage of poor-quality care might not improve maternal and child health outcomes.<sup>8</sup> The quality of care in the public sector is generally perceived as being poor.<sup>82</sup> Assessments of services have shown that maternal, newborn, and child health-care practices in the communities, clinics, and hospitals are not always based on interventions proven to be effective.<sup>76,83,84</sup> Gaps in best practices or misuse of unnecessary interventions slow progress in the achievement of MDGs, waste scarce resources, and could cause iatrogenic complications. For example, frequent antenatal care visits<sup>12</sup> with gaps in effective content,<sup>76</sup> short consultation time,<sup>76</sup> and women's reported dissatisfaction with clinical care

and providers' attitudes and interactions,<sup>76,85</sup> were indicators of poor quality. Forbidding family support during labour and delivery, frequent use of oxytocin to augment labour without sufficient monitoring and equipment to regulate the dose, no partogram, and inadequate newborn care were identified as inappropriate routine childbirth care.<sup>86</sup> Magnesium sulphate was not used as the treatment of choice for pre-eclampsia, despite availability and low cost.<sup>87</sup> Post-partum care with low coverage was mainly clinic based, usually took place after the critical period of the first few days after birth, and only about half of women receiving care were reported as having a physical examination or any family planning services.<sup>78</sup> These practices persist despite the introduction of protocols, guidelines, and detailed training workshops at all levels of reproductive health-care provision.

The rise in the rate of caesarean sections from 6·8% to 15·0% of all births in the past decade<sup>1</sup> is cause for concern because of suboptimum operating conditions, insufficiently trained physicians, frequent emergency operations, and poor postoperative care and follow-up.<sup>60</sup> Absence of data for indications or outcomes of caesarean sections restricts the analysis of this rising trend. Anxiety on the part of women and physicians about access to hospital and the subsequent desire to control the timing of birth has been reported by providers as a frequent reason for intervention. The long-term implications of the rising rate of caesarean section for maternal and child health are a concern, in view of the high fertility rate, probability of subsequent pregnancies and operative deliveries with an increased risk of complications,<sup>88</sup> and cost implications.<sup>89</sup>

In some cases, the challenge of human resources for maternal and child health in the occupied Palestinian territory has been less a matter of scarcity than of the effective use and distribution of existing resources.<sup>90</sup> This situation is linked both to the external restrictions on mobility disrupting the organisation and provision of services and to fundamental flaws in the planning of human resources,<sup>90</sup> which are maladapted for ensuring equity and sustainability in this particular context. The ratio of the number of doctors to the total population is more adequate than that of allied health professionals, though there are shortages in key specialties, such as neonatology (panel 4).

The scope of practice of midwives and nurses in the governmental and non-governmental clinics is restricted, despite their accessibility and women's preference for women providers.<sup>76</sup> UN Relief and Works Agency clinics for refugees follow a more accessible and sustainable model, in which midwives are the key providers of antenatal care, postnatal home visits, and family-planning services. Midwives in the government hospitals, in which 53% of births take place,<sup>38</sup> attend to all normal deliveries and assist in high-risk cases. However, severe under-staffing restricts their capacity to ensure safe childbirth,<sup>60,87</sup> and despite increasing caseloads and



**Figure 2: Stunting in children younger than 5 years in the occupied Palestinian territory by year and region**

Data from Palestinian Central Bureau of Statistics.<sup>1,69</sup> Stunting (height-for-age index) was determined by use of the international reference population defined by the US National Center for Health Statistics, as recommended by WHO and the US Centers for Disease Control and Prevention.<sup>37</sup> Children who were below -2 SD from the reference median were classified as stunted, and those who were below -3 SD from the reference median were classified as severely stunted.

#### Panel 4: Human resources for maternal and child health

Detailed information about the number of categories of health providers and their ratio per 1000 individuals are presented by Giacaman and colleagues<sup>28</sup> in this Series. For human resources in maternal and child health, attention needs to be drawn to the following points:

- Although data show that the number of physicians per 1000 individuals in the Palestinian territory (2·1) is similar to that in Jordan (2·0), the UK (2·3), and Canada (2·1) (although less than in Israel at 3·8), there is a shortage of nurses (1·7) and midwives (0·1).<sup>90</sup>
- For maternal and child health, there is a shortage of specialised professionals, especially neonatologists.<sup>90</sup> Although the medium-term development plan provides the number of physicians in various specialties, no distinct category for neonatologists exists. There are four neonatologists in the West Bank and none in Gaza Strip. In the West Bank, there are three neonatologists in East Jerusalem and Ramallah (central areas) and one in Bethlehem and Hebron (southern areas; Khammash H, Makassed Hospital, personal communication).
- According to the projections of medium-term development plan for 2015, there is a shortage of obstetricians, gynaecologists, paediatricians, and paediatric surgeons in the West Bank, whereas in Gaza, the shortage is only in obstetricians and gynaecologists.<sup>90</sup> Differences in certification requirements between the West Bank and Gaza Strip might account for these results. In both regions, there is also a shortage of anesthesiologists.
- Data for the number of midwives are inconclusive and vary according to the source.<sup>57,90</sup> According to the medium-term development plan, the total number of midwives in the West Bank and Gaza is 449. However, the reported number is probably inaccurate because only midwives working in hospitals are required to register with the Ministry of Health. For planning purposes, midwifery resources should be reported separately from the number of nurses for the WHO database of human resources. Furthermore, knowledge of the number of community midwives who can assist in home births is needed.
- About half of midwives are employed by the Ministry of Health.<sup>57</sup> However, they only make up 3·0% of Ministry of Health Staff in the West Bank and 0·9% in Gaza (compared with 36·0% and 41·0% for administrative staff, respectively).<sup>57</sup>

available applicants the numbers of midwives have not been increased.<sup>91</sup> Failure to license, support, and supervise a sufficient number of midwives to assist home births and to expand the use of community health workers for home-based maternal and newborn care is a missed opportunity to provide effective and simple interventions

#### Panel 5: Recommendations for improvement of maternal and child health in the occupied Palestinian territory

##### Health service delivery

###### Immediate

- Ensure uninterrupted access to the continuum of perinatal services by removal of checkpoints and barriers to access
- Strengthen community resources for health, such as training health workers in neonatal care, exclusive breastfeeding, and maternal and child nutrition
- Support and strengthen decentralised management of health services to avoid reliance on centralised facilities or services to which access might be difficult
- Support evidence-based practices and promote normal deliveries to avoid iatrogenic complications

###### Long-term

- Reach a political solution that would address movement restrictions and access limitations and allow for rational planning and system building
- Build on high coverage of services by improvement of quality of care. This recommendation includes emphasising evidence-based policies and care through context-specific protocols, targeted training, and supportive supervision and follow-up
- Design services on the basis of needs and involve women in planning and organisation of their health care

##### Workforce

###### Immediate

- Recruit and retain skilled physicians into the Ministry of Health through an incentive plan, especially in areas of deficiency such as neonatal care
- Broaden scope of practice and use of midwives and other allied health professionals both in clinics and in their communities, supported by appropriate policies and capacity building mechanisms

###### Long-term

- Implement a human-resource plan that addresses the long-term development of local capacity in specialised areas of maternal and child health care, including capacity building abroad or locally for needed cadre
- Expand the midwifery cadre and strengthen their preservice and inservice training

##### Health information

###### Immediate

- Develop and measure indicators that are sensitive to the effect of the present maternal and child health-care crisis and can identify vulnerable groups for targeted interventions
- Promote standardisation and accuracy of medical records
- Computerise records, audits, and reviews, and connect clinics with a central system

###### Long-term

- Strengthen hospital and clinical records to improve accuracy of reporting and accountability and allow for measurement of morbidities and complications
- Improve the death registration system
- Do audits to identify maternal and child deaths and their causes
- Build local capacity for maintaining effective surveillance systems

(Continues on next page)

to those most in need<sup>92</sup> in this context of restricted access. Obstetricians in the West Bank are poorly distributed and concentrated mainly in the private sector, and only two of six female obstetricians in the West Bank were on the staff of government hospitals. Low salaries and no incentives in the government sector have led to a situation in which most physicians also have a private practice,<sup>93</sup> compromising the quality of care in government institutions.

Mataria and colleagues<sup>74</sup> address in some detail the financing of the Palestinian health-care system. The deterioration in economic conditions has meant that an increased number of people are now paying for health services out of their own pockets.<sup>74</sup> The Presidential decree in 2000 making deliveries free in the governmental hospital has added a strain to the already understaffed and overwhelmed services. Similarly, other practices in maternal and child health, such as the use of physicians, rather than midwives or nurses, for antenatal and postnatal care, and the rise in caesarean deliveries, have implications for the financing and sustainability of the system.

The inadequacy of the health information system<sup>74</sup> means that effective maternal and child health interventions are difficult to plan based on prevalence of diseases and outcomes, delivery mechanisms, and health behaviours specific to this context. Rates of pregnancy-related admissions, intrapartum complications, and maternal and neonatal readmission after birth are not available. Neither audits nor equity assessments have been integrated into the system.<sup>94</sup> Uncoordinated and vertical donor projects have led to duplication of medical records and interventions to improve the health information system. In addition to the gaps in local data, few systematic reviews about the delivery of particular health goals have focused on low-income and middle-income countries.<sup>95</sup>

Gaps in the quality of health service provision are partly due to the insidious interactions between restrictions on mobility and the legacy of occupation that has stifled the development of good governance and the culture of accountability. The weak leadership and internal divisions of the Palestinian National Authority<sup>74</sup> have also seriously affected its role of stewardship in maternal and child health. Failure to plan on the basis of a system of equitable and sustainable services with context-specific delivery strategies has led to restricted access and poor quality of care, waste of resources, and an overcrowded public sector with inappropriate use of human resources, vertical approaches, and sometimes ineffective interventions.<sup>9,80</sup> The top to down authoritative system of management, based on political rather than professional appointments and little public consultation, has affected the capacity of the health services to function.<sup>96</sup> A fundamental requirement is an increased concern for stewardship, gender inequalities, and teamwork, with appropriate distribution of tasks and strategies to reach poor women wherever they are.



## What should be done, what can be done?

Provision of effective protection of maternal and child health is dependent on a complex network of relations, combining political, technical, and social interactions.<sup>97</sup> Although improvements in the provision of preventive and some curative services to promote normal birth and healthy mothers and children can be achieved with incremental changes, lives cannot be saved without access to 24 h curative services to deal with unpreventable complications.<sup>98</sup> Such an achievement requires a political solution of unrestricted mobility, ensuring access to services. Availability of emergency obstetric care and high-quality birth attendance for all depends on a strengthened health system, which can only be achieved through a concerted effort and the commitment of the Palestinian National Authority, donors, and political decision makers to overcome the external and health-system constraints.

Panel 5 shows the specific recommendations, which recognise not only the long-term changes that need to be implemented but also the immediate short-term interventions that could alleviate hardship and improve care.

Although improvement of services in the ways we have outlined is important, the basic rights of women and children to health cannot be secured through the health sector alone. A public-health approach is needed that acknowledges the broad determinants of women's health, such as security, poverty alleviation, and freedom of movement. These determinants require a continuing effort nationally and internationally against social injustice and inequity. National political commitment is certainly needed to improve the life and future of Palestinian women and their children. But without international commitment to a just political and economic solution to the problems encountered by the population of the occupied Palestinian territory, all other measures are likely to prove temporary and superficial.

### Contributors

All authors participated in the conceptualisation and writing of the report, and have seen and approved the final version to be published.

### Conflict of interest statement

GW is a trustee for the UK charity Medical Aid for Palestinians. The other authors declare that they have no conflict of interest.

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### References

- 1 Palestinian Central Bureau of Statistics. Palestinian family health survey, 2006: preliminary report. Ramallah: Palestinian Central Bureau of Statistics, 2007.
- 2 World Bank. West Bank and Gaza economic developments and prospects—March, 2008. West Bank and Gaza: World Bank, 2008. <http://go.worldbank.org/A6Y2KDMCJ0> (accessed Dec 1, 2008).

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### Medical products and technology

#### Immediate

- Ensure availability of necessary products and medications, such as anaesthesia, antibiotics, misoprostol and magnesium sulphate, and iron with appropriate dietary advice

#### Long-term

- Plan equitable distribution and regulation of technology

### Financing

#### Immediate

- Ensure continued financial access to perinatal care through insurance

#### Long-term

- Equitable distribution of resources among regions and across different levels of health care

### Stewardship/leadership

#### Immediate

- Base appointments on abilities and qualifications
- Include women and allied health professionals in leadership roles
- Assume a strong coordination role between donors to promote sustainable development in addition to humanitarian aid and to avoid duplication of resources and projects

#### Long-term

- Create a culture of responsibility and accountability, and promote good clinical governance, on the basis of research, audit, fair appraisals, and continued education
- Assume an effective role in coordination with donors to promote sustainable development

- 3 Stanforth R. Poverty in Palestine: the human cost of the financial boycott. April 2007. Oxfam briefing note. Oxford, UK: Oxfam International Secretariat, 2007. [http://www.oxfam.de/download/Palestinian\\_Aid\\_Crisis.pdf](http://www.oxfam.de/download/Palestinian_Aid_Crisis.pdf) (accessed March 31, 2008).
- 4 Food and Agriculture Organisation of the United Nations and United Nations World Food Program. Comprehensive food security and vulnerability analysis. Jerusalem: Food and Agriculture Organisation of the United Nations and United Nations World Food Program, 2007.
- 5 UN Relief and Works Agency. United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), November 2007. UNRWA emergency appeal 2008. Gaza Strip: United Nations Relief and Works Agency, 2008. <http://www.un.org/unrwa/emergency/appeals/2008-appeal.pdf> (accessed Feb 11, 2008).
- 6 Murray S, Pearson S. Maternity referral systems in developing countries: current knowledge and future research needs. *Soc Sci Med* 2006; **62**: 2205–15.
- 7 Countdown Coverage Writing Group and on behalf of the Countdown to 2015 Core Group. Countdown to 2015 for maternal, newborn, and child survival: the 2008 report on tracking coverage of interventions. *Lancet* 2008; **371**: 1247–58.
- 8 Countdown Working Group on Health Policy and Health Systems. Assessment of the health system and policy environment as a critical complement to tracking intervention coverage for maternal, newborn, and child health. *Lancet* 2008; **371**: 1284–93.
- 9 Giacaman R, Abdul-Rahim HF, Wick L. Health sector reform in the occupied Palestinian territory (OPT): targeting the forest or the trees? *Health Policy Plan* 2003; **18**: 59–67.
- 10 Courbage Y, Todd E. La famille arabe et la crise de transition. In Courbage Y, Todd E, eds. *Le Rendez-vous des civilisations*. Paris: Seuil, 2007.
- 11 Ahmad-Nia S. Women's work and health in Iran ; a comparison of working and non-working mothers. *Soc Sci Med* 2002; **54**: 761.
- 12 Palestinian Central Bureau of Statistics. Palestinian family health survey, 2006: final report. Ramallah: Palestinian Central Bureau of Statistics, 2007.

- 13 Kuttab E. Social and economic situation of Palestinian women 2000–06, February, 2007. E/ESCWA/ECW/2007/technical paper 1. <http://www.escwa.un.org/information/publications/edit/upload/ecw-07-tp1-e.pdf> (accessed April 2, 2008).
- 14 Fargues P. Protracted national conflict and fertility change: Palestinians and Israelis in the twentieth century. *Popul Dev Rev* 2000; 26: 441–82.
- 15 Rashad H, Osman M, Roudi-Fahimi F. Marriage in the Arab world. Washington, DC: Population Reference Bureau Policy Brief, 2005.
- 16 The Arab League (social sector) and the Republic of Lebanon (the central administration of statistics). Lebanon family health survey, 2004: principal report. Lebanon: The Arab Project for Family Health, 2006.
- 17 El-Zanaty F, Ann Way. Egypt Demographic and Health Survey 2005. Cairo: Ministry of Health and Population, National Population Council, El Zanaty Associates, and ORC Macro, 2006. <http://www.measuredhs.com/pubs/pdf/FR176/08Chapter08.pdf> (accessed Sept 21, 2008).
- 18 Department of Statistics (Jordan) and ORC Macro. Jordan Population and Family Health Survey 2002. Calverton: Department of Statistics and ORC Macro, 2003. <http://www.measuredhs.com/pubs/pdf/FR138/04Chapter04.pdf> (accessed Sept 21, 2008).
- 19 PAPFAM. Syria 2001 family health survey. Cairo: Pan Arab Project for Family Health, 2001. <http://www.papfam.org/papfam/summery.htm> (accessed Sept 21, 2008).
- 20 Palestinian Central Bureau of Statistics. Women and men in Palestine: issues and statistics, 2006. Ramallah: Palestinian Central Bureau of Statistics, 2006.
- 21 UN Development Programme, Regional Bureau for Arab States. The Arab human development report 2005. Towards the rise of women in the Arab world. New York: United Nations Development Programme, Regional Bureau for Arab States, 2006.
- 22 PAPFAM. The Lebanese family health survey 2004. Cairo: PAN Arab Project for family Health, 2004. <http://www.papfam.org/papfam/lebenontable.htm> (accessed Sept 21, 2008).
- 23 Fargues P. Women in Arab countries: challenging the patriarchal system? *Reprod Health Matters* 2005; 13: 46.
- 24 Khawaja M. The recent rise in Palestinian fertility: permanent or transient? *Popul Stud* 2000; 54: 331–46.
- 25 WHO and UNFPA. Married adolescents: no place of safety. Geneva: World Health Organization, 2006.
- 26 Assaf S, Khawaja M. Consanguinity trends and correlates in the Palestinian territories. *J Biosoc Sci* 2008; 41: 107–24.
- 27 Khawaja M. The fertility of Palestinian women in Gaza, the West Bank, Jordan, and Lebanon. *Population* 2003; 58: 273–302.
- 28 Giacaman R, Khatib R, Shabaneh L, et al. Health status and health services in the occupied Palestinian territory. *Lancet* 2009; published online March 5. DOI:10.1016/S0140-6736(09)60107-0.
- 29 Population Reference Bureau. 2007 World Population Data Sheet. Washington, DC: Population Reference Bureau, 2008.
- 30 Makhoulf Obermeyer C. HIV in the Middle East. *BMJ* 2006; 333: 851–54.
- 31 Palestine Central Bureau of Statistics. Demographic Survey, micro-data. Ramallah: Palestine Central Bureau of Statistics, 1995.
- 32 Palestinian Central Bureau of Statistics. Health survey, micro-data. Ramallah: Palestinian Central Bureau of Statistics, 2000.
- 33 Palestinian Central Bureau of Statistics. Demographics and health survey, micro-data. Ramallah: Palestinian Central Bureau of Statistics, 2004.
- 34 Palestinian Central Bureau of Statistics. The demographic survey in the West Bank and Gaza Strip: final report. Ramallah: Palestinian Central Bureau of Statistics, 1997 (in Arabic).
- 35 Palestinian Central Bureau of Statistics. The health survey in the West Bank and Gaza Strip: 1996—basic report. Ramallah: Palestinian Central Bureau of Statistics, 1999 (in Arabic).
- 36 Palestinian Central Bureau of Statistics. Health survey—2000: final report. Ramallah: Palestinian Central Bureau of Statistics, 2001.
- 37 Palestinian Central Bureau of Statistics. Nutrition Survey—2002: analytical report. Ramallah: Palestinian Central Bureau of Statistics, 2003.
- 38 Palestinian Central Bureau of Statistics. Demographic and health survey—2004: final report. Ramallah: Palestinian Central Bureau of Statistics, 2006.
- 39 Curtis SL. Assessment of the quality of the data used for direct estimation of infant and child mortality in DHS-II surveys. Occasional papers 3. Calverton: ORC Macro International, 1995.
- 40 Hill A. The Palestinian population of the Middle East. *Popul Dev Rev* 1983; 9: 88.
- 41 Rutstein SO. Infant and child mortality: levels, trends and demographic differentials. *World Fertil Surv Comp Stud* 1984; 43.
- 42 State of Israel. Ministry of Health. Health and health services in Judea, Samaria, Gaza and Sinai 1980–81. A report by the Ministry of Health of Israel to the Thirty-Fourth World Health Assembly, Geneva, May 1981. Jerusalem: Ministry of Health, 1981; 39.
- 43 State of Israel. Health and Health Services in Judea, Samaria and Gaza 1982–83, Report of the Minister of Health of Israel to the Thirty-Sixth World Health Assembly, World Health Organization, Geneva, May, 1983. Jerusalem, March 1983; 4.
- 44 Puyet JJ. Infant mortality studies conducted among selected refugee camp communities in the near east. Vienna: United Nations Relief and Works Agency for Palestinian Refugees in the Near East, 1979.
- 45 Tamari S, Giacaman R. The social impact of the introduction of drip irrigation techniques in a Palestinian peasant community in the Jordan Valley. Ramallah: Birzeit University, 1980.
- 46 Schmelz UO, Nathan G, Kenvin J, et al. Multiplicity study of births and deaths in Judea, Samaria and Gaza Strip-North Sinai, technical publications series number 44. Jerusalem: Israel Central Bureau of Statistics, 1977.
- 47 Infant and child mortality. In Heiberg M, Ovensen G, eds. Palestinian society in Gaza, West Bank, and Arab Jerusalem. A survey of living conditions. FAFO-report 151. Oslo, 1993; 60.
- 48 Murray C, Laakso T, Shibuya K, Hill K, Lopez AD. Can we achieve Millennium Development Goal 4? New analysis of country trends and forecasts of under-5 mortality to 2015. *Lancet* 2005; 370: 1040–54.
- 49 Ahmad OB, Lopez AD, Inoue M. The decline in child mortality: a reappraisal. *Bull World Health Organ* 2000; 78: 1175–91.
- 50 Palestine Central Bureau of Statistics. Annual report-2008. Palestinian Children-Issues and Statistics. Child statistics series (number 11). Ramallah: Palestine Central Bureau of Statistics, 2008.
- 51 Walley J, Lawn J, Tinker A, et al. Primary health care : making Alma-Ata a reality. *Lancet* 2008; 372: 1001–07.
- 52 Amnesty International UK, CARE International UK, CAFOD, Christian Aid, Médecins du Monde UK, Oxfam, Save The Children UK, Trócaire. The Gaza Strip a humanitarian implosion. Oxford: Oxfam, 2008. [http://www.oxfam.org.uk/resources/downloads/oxfam\\_gaza\\_lowres.pdf](http://www.oxfam.org.uk/resources/downloads/oxfam_gaza_lowres.pdf) (accessed April 2, 2008).
- 53 WHO. Access to health services for Palestinian people: case studies of five patients in critical conditions who died while waiting to exit the Gaza Strip. West Bank and Gaza: World Health Organization, 2008.
- 54 Nanda Geeta, Switlick K, Lule E. Accelerating progress towards achieving the MDG to improve maternal health: a collection of promising approaches. HNP discussion paper. Washington, DC: International Bank for Reconstruction and Development/World Bank, 2005.
- 55 Pedersen J. Mortality. In: Pedersen J, Randall S, Khawaja M. Growing fast: the Palestinian population in the West Bank and Gaza Strip. Norway: Fafo Institute for Applied Social Science, 2001; 135–52.
- 56 WHO. Maternal mortality in 2000: estimates developed by WHO, UNICEF and UNFPA. Geneva: World Health Organization; 2004.
- 57 Ministry of Health. Health Status in Palestine 2005. Annual report. Palestine: Ministry of Health, 2006.
- 58 Al Adili N, Johansson A, Bergström S. Maternal mortality among Palestinian women in the West Bank. *Int J Gynaecol Obstet* 2006; 93: 164–70.
- 59 Mousa F, Madi H. Maternal mortality among Palestine refugee women. Amman: UN Relief and Works Agency Health Department, 2004.
- 60 Hassan S. Needs assessment of maternity services in Ramallah governmental hospital, West Bank. Ramallah: Institute of Community and Public Health, Birzeit University, 2006.
- 61 Department of Statistics (Jordan) and ORC Macro. Jordan population and family health survey 2002. Calverton: Department of Statistics and ORC Macro, 2003. <http://www.measuredhs.com/pubs/pdf/FR138/00FrontMatter.pdf> (accessed April 16, 2008).

- 62 Millennium Development Goals indicators: the official United Nations site for the MDG indicators. <http://millenniumindicators.un.org/unsd/mdg/Data.aspx> (accessed April 16, 2008).
- 63 Millennium Development Goals Indicators: the official United Nations site for the MDG Indicators. <http://mdgs.un.org/unsd/mdg/Data.aspx> (accessed April 16, 2008).
- 64 Central Bureau of Statistics, Pan-Arab Project for Family Health/League of Arab States, Unicef. Syrian Arab Republic multiple indicator cluster survey 2006. Syrian Arab Republic, February 2008. [http://www.childinfo.org/files/MICS3\\_Syria\\_FinalReport\\_2006\\_Eng.pdf](http://www.childinfo.org/files/MICS3_Syria_FinalReport_2006_Eng.pdf) (accessed Jan 9, 2009)
- 65 El- Zanaty F, Way A. Egypt Demographic and Health Survey 2005, Cairo: Ministry of Health and Population, National Population Council, El Zanaty Associates, and ORC Macro, 2006. <http://www.measuredhs.com/pubs/pdf/FRI76/00FrontMatter00.pdf> (accessed April 16, 2008).
- 66 Kerber K, de Graft-Johnson JE, Bhutta Z, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. *Lancet* 2007; **370**: 1358–69.
- 67 Bhutto Z, Ali S, Cousens S, et al. Alma-Ata: rebirth and revision 6. Interventions to address maternal, newborn, and child survival: what difference can integrated primary health care strategies make? *Lancet* 2008; **372**: 972–89.
- 68 Grantham-McGregor S, Bun Cheung Y, Cueto S, Glewwe P, Richter L, Strupp B, and the International Child Development Steering Group. Developmental potential in the first 5 years for children in developing countries. *Lancet* 2007; **369**: 60–70.
- 69 Palestinian Central Bureau of Statistics. Health survey on maternal and child health in the West Bank and Gaza Strip, 1996: analytical reports series (number 1)—child health. Ramallah: Palestinian Central Bureau of Statistics, 1999.
- 70 Palestine Central Bureau of Statistics, 1998. The Health Survey in the West Bank and Gaza Strip-1996: Analytical Report Series (1), Child Health in the West Bank and Gaza Strip. Ramallah: Palestine Central Bureau of Statistics, 1998 (in Arabic).
- 71 WFP/UNRWA/FAO. Joint rapid food security survey in the Occupied Palestinian Territory. World Food Programme, United Nations Relief and Work Agency, Food and Agriculture Organization, 2008. [http://www.un.org/unrwa/publications/pubs08/RapidAssessmentReport\\_May08.pdf](http://www.un.org/unrwa/publications/pubs08/RapidAssessmentReport_May08.pdf) (accessed Sept 19 2008).
- 72 World Bank. Palestinian economic prospects: aid, access and reform. Economic monitoring report to the ad hoc liaison committee, Sept 22, 2008. World Bank, 2008. [http://siteresources.worldbank.org/INTWESTBANKGAZA/Resources/AHLCSept15\\_08.pdf](http://siteresources.worldbank.org/INTWESTBANKGAZA/Resources/AHLCSept15_08.pdf) (accessed Nov 30, 2008).
- 73 UN Office for the Coordination of Humanitarian Affairs. Gaza Strip humanitarian fact sheet. United Nations Office for the Coordination of Humanitarian Affairs, 2007. [http://www.ochaopt.org/documents/Gaza\\_Fact\\_Sheet\\_December\\_2007.pdf](http://www.ochaopt.org/documents/Gaza_Fact_Sheet_December_2007.pdf) (accessed Sept 19, 2008).
- 74 Mataria A, Khatib R, Donaldson C, et al. The health-care system: an assessment and reform agenda. *Lancet* 2009; published online March 5. DOI:10.1016/S0140-6736(09)60111-2.
- 75 Human Rights Council. Implementation of General Assembly Resolution 60/251 of 15 March 2006 Entitled "Human Rights Council". The issue of Palestinian pregnant women giving birth at Israeli checkpoints, Feb 23, 2007 A/HRC/4/57. Human Rights Council, 2007. <http://daccessdds.un.org/doc/UNDOC/GEN/G07/109/90/PDF/G0710990.pdf?OpenElement> (accessed Oct 31, 2007).
- 76 Institute of Community and Public Health. Evaluation of the UNFPA Reproductive Health Sub Program (oPt) 2001–05. Ramallah: Institute of Community and Public Health, Birzeit University, 2006.
- 77 Health, Development, Information and Policy Institute. Health and segregation II. The impact of the Israeli separation wall on access to health care services, an updated research. Ramallah: Health, Development, Information and Policy Institute, August 2005.
- 78 Sarriot EG, Rose JS, Nour N. Assessment of the Maram project. A program of USAID/WB&G, strategic objective 7. Washington, DC: IBM Business Consulting Services, 2004; 11–14.
- 79 Wick L. Building the infrastructure, modeling the nation: the case of birth in Palestine. *Cult Med Psychiatry* 2008; **32**: 328–57.
- 80 Giacaman R, Wick Laura, Abdul-Rahim H, Wick Livia. The politics of childbirth in the context of conflict: policies or de facto practices. *Health Policy Plan* 2005; **72**: 129–39.
- 81 Haines A, Cassels A. Can the millennium development goals be attained? *BMJ* 2004; **329**: 394–97.
- 82 World Bank, Bisan Center for Research and Development. The role and performance of Palestinian NGOs: in health, education and agriculture. World Bank, Bisan Center for Research and Development, 2006.
- 83 Kalter H, Khazen R, Barghouthi M, Odeh M. Prospective community-based cluster census and case-control study of stillbirths and neonatal deaths in the West Bank and Gaza Strip. *Paedr Perinat Epidemiol* 2008; **22**: 321–33.
- 84 Wick L, Mikki N, Giacaman R, Abdul-Rahim H. Childbirth in Palestine. *Int J Gynaecol Obstet* 2005; **89**: 174–78.
- 85 Giacaman R, Abu-Rmeileh NME, Wick L. The limitations on choice: Palestinian women's childbirth location, dissatisfaction with the place of birth and determinants. *Eur J Public Health* 2007; **17**: 86–91.
- 86 Wick L, Mikki N. Childbirth in Palestine: Reported practices and evidence-based guidelines. Ramallah: Institute of Community and Public Health, Birzeit University, 2004.
- 87 Hassan-Bitar S, Wick L. Evoking the guardian angel: childbirth care in a Palestinian Hospital. *Reprod Health Matters* 2007; **15**: 103–13.
- 88 Jackson N and Paterson-Brown S. Physical sequelae of caesarean section. *Best Pract Res Clin Obstet Gynaecol* 2001; **15**: 49–61.
- 89 Villar J, Valladares E, Wojdyla D, et al. Cesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet* 2006; **367**: 1819–29.
- 90 Palestinian National Authority. Ministry of Health. Health Planning Unit. National strategic health plan. Medium term development plan 2008–10. Palestine: Palestinian National Authority, Ministry of Health, Health Planning Unit, 2008.
- 91 Schoenbaum M, Afifi A K, Deckelbaum R J. Strengthening the Palestinian health system. Santa Monica: RAND Corporation, 2005. [www.rand.org/pubs/monographs/2005/RAND](http://www.rand.org/pubs/monographs/2005/RAND) (accessed Jan 29, 2008).
- 92 Knippenberg R, Lawn J, Darmstadt G, et al. Systematic scaling up of neonatal care in countries. *Lancet* 2005; **365**: 1087–98.
- 93 Hamdan M, Defever M, Abdeen Z. Organizing health care within political turmoil: the Palestinian case. *Int J Health Plann Manage* 2003; **18**: 63–87.
- 94 Countdown 2008 Equity Analysis Group. Mind the gap: equity and trends in coverage of maternal, newborn, and child health services in 54 Countdown countries. *Lancet* 2008; **371**: 1259–67.
- 95 Lavis J, Posada F, Haines A, Osei E. Use of research to inform public policymaking. *Lancet* 2004; **364**: 1615–21.
- 96 Sayigh Y, Shikaki K. Strengthening Palestinian public institutions. Task force report. New York: Council on Foreign Relations, 1999.
- 97 Loveday P, McPake B, Parkhurst J. Improving maternal health: getting what works to happen. *Reprod Health Matters* 2007; **15**: 28–37.
- 98 Donnay F. Maternal survival in developing countries: what has been done, what can be achieved in the next decade. *Int J Gynecol Obstet* 2000; **70**: 89–97.