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# Assessment of progress towards universal health coverage for people with disabilities in Afghanistan: a multilevel analysis of repeated cross-sectional surveys

Jean-Francois Trani, Praveen Kumar, Ellis Ballard, Tarani Chandola



## Summary

**Background** Since 2002, Afghanistan has made much effort to achieve universal health coverage. According to the UN Sustainable Development Goal 3, target eight, the provision of quality care to all must include usually underserved groups, including people with disabilities. We investigated whether a decade of international investment in the Afghan health system has brought quality health care to this group.

**Methods** We used data from two representative household surveys, one done in 2005 and one in 2013, in 13 provinces of Afghanistan, that included questions about activity limitations and functioning difficulties, socioeconomic factors, perceived availability of health care, and experience with coverage of health-care needs. We used multilevel modelling and tests for interaction to investigate factors associated with differences in perception between timepoints and whether village remoteness affected changes in perception.

**Findings** The 2005 survey included 334 people, and the 2013 survey included 961 people. Mean age, employment, and asset levels of participants with disabilities increased slightly between 2005 and 2013, but the level of education decreased. Formal education and higher asset level were associated with improved availability of health care and positive experience with coverage of health-care needs, whereas being employed was only associated with the latter. Perceived availability of health care and positive experience with coverage of health-care needs significantly worsened in 2013 compared with in 2005 (227 [69%] perceived that services were available in 2005 vs 405 [44%] in 2013,  $p < 0.0001$ ; 255 [78%] perceived a positive experience in 2005 vs 410 [45%] in 2013,  $p < 0.0001$ ). Village remoteness increased in 2013 (no connectivity by paved road 186 [57%] in 2005 vs 797 [87%] in 2013,  $p < 0.0001$ ; mean time to reach health-care facility 64.3 min [SD 167.7] vs 84.4 min [107.7],  $p < 0.0001$ ) and negatively affected perception of health-care availability.

**Interpretation** Perceived availability of health care and experience with health-care coverage have not greatly improved for people with disabilities in Afghanistan, particularly in remote areas. Health policy in Afghanistan will need to address attitudinal, social, and accessibility barriers to health care.

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## Introduction

Central to the Sustainable Development Goals (SDGs) adopted by the UN on Sept 25, 2015, is the achievement of universal health coverage by 2030 (SDG 3, target eight).<sup>1</sup> Universal health coverage is defined in the SDGs as the entire population having access to quality health-care services without risk of exposure to financial hardship.<sup>2</sup> Core components of assessing universal health coverage include effectiveness, financial access, and population coverage. Criticisms, which began with the health-for-all goals of the Alma-Ata Conference in 1978 and still concern the SDG efforts, have warned that the process would inevitably increase inequality because the well connected and wealthy would benefit from improved services early, but poorer people would be left behind.<sup>3</sup> Furthermore, even if use of health care by different socioeconomic groups seems to be equitable, disadvantaged groups are

frequently offered services and treatments that are of lower quality or are less appropriate than those offered to their more advantaged counterparts.<sup>4</sup> The first global monitoring report of progress towards universal health coverage by the World Bank and WHO offered tentative claims of success in the expansion of universal health coverage, citing data indicating that growth in rural poor areas was outpacing that in high-income countries.<sup>2</sup> Unfortunately, low satisfaction associated with unmet needs linked to financial, physical, and attitudinal barriers to accessing services and being offered inappropriate services has been reported among people with disabilities, particularly those in low-income countries.<sup>5</sup> Parsons and colleagues,<sup>6</sup> for instance, showed that individuals with visible disabilities and HIV/AIDS in Lusaka, Zambia, were singled out and stigmatised by health-care providers when they sought testing for HIV and treatment.

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### Research in context

#### Evidence before this study

Since 2002, substantial effort has been made to rebuild the health-care system in Afghanistan, which was left in a dire condition after decades of conflict. The strategy of subcontracting non-governmental organisations to provide essential health services has led to important progress in several health-care indicators, including maternal and child mortality, malnutrition, and immunisation. We searched PubMed and Scopus, without language restrictions, for relevant articles pertaining to access to health-care, published between Jan 1, 2000, and Sept 27, 2016. We used the search terms “access” in title or abstract, (“healthcare” OR “health care” OR “healthcare system”), (“health services” OR “health infrastructure” OR “health system”), and (“Afghanistan” AND NOT “veteran” AND NOT “deployment” AND NOT “U.S. army” AND NOT “British army” AND NOT “Canadian army”). Our search identified 1297 articles. After reading the abstracts and excluding studies without the correct focus, we found 48 articles specifically related to access to health care or service use in Afghanistan. Among these, 15 investigated access to health care for vulnerable groups, particularly women, the poorest people, and people living in remote rural areas. These studies showed different and contradictory findings on equitable access to health care. Only two studies had assessed satisfaction with health care. One found that private facilities were better rated by users than government facilities. The poorest households were least likely to rate health services as good, particularly in rural areas. Less poor households were willing to pay for improved services. The second study found that client satisfaction and perception of quality was greater

than 70% between 2004 and 2008. Finally, only two studies investigated access to health care for people with disabilities. One showed that there was no major socioeconomic-related inequity in health-care use between people with and without disabilities in 2005. The other study, which used the same data, showed higher out-of-pocket expenditure and more difficulties in terms of access for people with disabilities than for people without disabilities 3 years after implementation of the Afghan Basic Package of Health Services.

#### Added value of this study

Our study adds data on change in perceptions of availability of health care and user experience with coverage of health-care needs among people with disabilities between 2005 and 2013 in Afghanistan. Our models incorporated individual-level and village-level predictors and used data from the same participants and provinces identified with the same screening instrument at two different timepoints.

#### Implications of all the available evidence

Progress made in the provision of public health services during and after conflict cannot be gauged without also considering health outcomes for the most disadvantaged groups, such as people with disabilities, the poor, people living in remote areas, those from minority ethnic groups, and people living in areas of conflict and in fragile states. Providing universal access to health care and covering all needs, including those of disadvantaged groups, contributes to improved health indicators and government legitimacy, which helps economic development and political stability.

The Basic Package of Health Services (BPHS) in Afghanistan represents the approach taken by the Government to promote free universal coverage at the primary-health-care level across the entire country. A performance-based contracting programme is used to deliver health services through non-governmental organisations.<sup>7</sup> First implemented in 2002 by the Ministry of Public Health, this strategy was a response to a dire health-care situation, when only 10% of the population lived within 1 h walking distance of a health-care facility, 7% had access to adequate sanitation, and 31% had access to safe drinking water.<sup>8</sup> With maternal mortality estimated to be 1600 per 100 000 livebirths, and infant and child mortality to be, respectively, 165 and 257 per 1000 livebirths, Afghanistan was ranked among the worst in the world for maternal and child health indicators.<sup>9</sup> Furthermore, a shortage of qualified health personnel, scarcity of financial resources, and poor infrastructure reduced the quality of those health-care services that were delivered.<sup>10</sup> The BPHS strategy emphasised priority access to the groups in greatest need, especially women, children, people with disabilities, and those living in extreme poverty.<sup>11</sup> Evidence

from other fragile states has shown that contracting out health care can improve quality and quantity of services in countries that lack the capacity to implement public health policies domestically.<sup>12</sup>

Nearly 15 years after the first implementation of the BPHS in Afghanistan, it is possible to ask questions about the effectiveness of the health strategy. A balance scorecard, developed by international researchers and the Ministry of Public Health in 2004 to assess improvement in health-care delivery through the BPHS, provides one source of data to assess the overall performance.<sup>13</sup> The balance scorecard is composed of six domains: patients' perspectives; staff's perspectives; structural capacity for service provision; technical quality of service provision; financial systems; and overall vision for the health sector. Patients' perspectives were measured by a quality index that included nine items. Preliminary analysis in the first 5 years of the BPHS showed a high degree of satisfaction among patients (83%, 86%, and 86% in 2004, 2005, and 2006, respectively), and a general improvement over time between 2004 and 2008.<sup>14</sup> On the basis of this evidence, international researchers have concluded that, despite

ongoing violence, the delivery of health services improved substantially after the BPHS was implemented. Deeper analysis, however, suggests that the picture of aid-supported health-care delivery is more complex, and that access was not equitable for the most vulnerable groups.<sup>15</sup> First, the underlying economic and material situation of the Afghan population, particularly in rural areas, has remained stubbornly unfavourable, with 30% of the population classified as being in extreme poverty.<sup>16</sup> Second, provision of basic needs, such as access to water and sanitation, has progressed little since 2001.<sup>16</sup> Third, despite an overall rise in the number of health-care facilities in Afghanistan,<sup>17</sup> many areas remain underserved or isolated, particularly those that are remote and insecure.<sup>18</sup> Many Afghans living outside major cities report concerns about quality of health services and the safety of travelling to public clinics, which have led them to opt for private health care that might not be any better than that received in public facilities.<sup>19</sup> Security has declined substantially since 2005, which has had a detrimental effect on the life of Afghans and the development effort. More than 3498 civilians were estimated to have been killed and 7920 injured in 2016, which was more than in any previous year.<sup>20</sup>

Echoing the warnings of critics of universal health coverage, the data suggest that as the process of reconstruction continues there is a serious risk of widening the gap between the majority, who benefit from peace and reconstruction, and members of marginalised groups, such as people with disabilities, who are left out of progress. To make credible claims of improvements in the public health system, information on health use and quality by marginalised groups must be taken into account, along with the recognition that the poor is a heterogeneous group with multiple sociodemographic factors, including disability, that might benefit or hinder access to quality health care.<sup>15</sup>

We investigated whether associations between key predictors of health-care access and satisfaction had changed for people with disabilities in 2005 and 2013. We use a multilevel modelling approach to assess the effects of variation at the individual and community (village) levels on availability of health care and user experience with coverage of health-care needs. We tested the hypothesis that if the BPHS is successfully providing low-cost, good-quality health care to all Afghans, availability of and user satisfaction with health-care services should have improved irrespective of place of residence and individual characteristics.

## Methods

### Study design and setting

We used data from two large-scale population studies done in Afghanistan in 2005 and 2013. Data from the 2005 study were from a subsample of 13 provinces (72 clusters; figure 1) of 34 surveyed by the National Disability Survey of Afghanistan, a national cross-

sectional random sample survey done from December, 2004, until June, 2005.<sup>21,22</sup> The study used a three-stage random sampling design: 175 clusters were identified from a national database of 32 000 Afghan villages; in these clusters, villages were randomly selected from within 121 (of 397) districts. Within each selected village, 30 households were randomly selected and household heads were requested to participate in face-to-face interviews to identify whether any members of the family had disabilities. Interviews with heads of household and family members with and without disabilities were done by enumerators who were locally recruited under the supervision of a team of medical doctors from the Ministry of Public Health and international researchers. Disability was assessed with a 27-item questionnaire (in Dari or Pashto) developed, culturally adapted, and validated for the survey, and which was based on the International Classification of Functioning, Disability and Health and the capability approach.<sup>23,24</sup> People with disabilities identified by the screening tool were interviewed with a second questionnaire that asked about health conditions and accessibility to existing services, education, employment, income, livelihood, self-perception, and social participation.<sup>21</sup> Ethics approval for the study was obtained from the Committee on Human Research of the Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA, and the Ministry of Public Health of Afghanistan.

The 2013 villages and participants were identified from the home-based Disability Program Impact Evaluation study, a 3-year (2013–15) quasiexperimental assessment of the effects of a community-based rehabilitation programme.<sup>25</sup> Study participants were selected from one arm of the 2005 study, in the same 13 provinces as in the 2005 survey (figure 1), with a two-stage randomised cluster sampling technique, with villages (n=107) as the primary sample units. 60 households randomly selected from each village were surveyed with an updated version of the disability screening questionnaire that included 34 items focusing on individual functioning. People with disabilities who were identified by screening were interviewed with a locally developed and validated questionnaire that inquired about demographic characteristics, socioeconomic status, and access to rehabilitation and health services, individual functioning, social participation, and additional needs.<sup>21</sup> Ethics approval for the study was obtained from Washington University in St Louis, St Louis, MO, USA, and the Ministry of Public Health of Afghanistan. In the 2005 and 2013 surveys, caregivers were interviewed for children and people with limited cognitive capability.

### Outcomes of interest

We assessed the self-reported measures of availability of health care and user experience with coverage of health-care needs (table 1). These two factors are complementary indicators of the quality of health care that are included

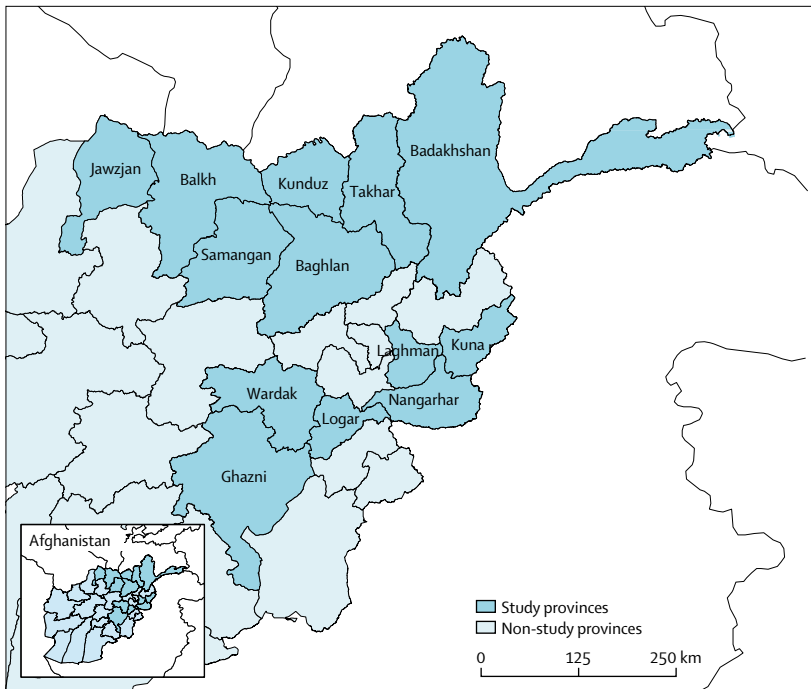


Figure 1: Afghan provinces included in the 2005 and 2013 surveys

in assessments of health-care systems in high-income countries,<sup>26</sup> and have begun to be used in low-income countries<sup>27</sup> and conflict-affected fragile states.<sup>13</sup> Measurement is important as part of a system of assessment that also includes effects on structural changes, resource use, staff satisfaction, health outcomes, equity, and user payments.<sup>28</sup>

In the 2005 study, health-care availability was assessed with the question “If you are sick, are health services available to you? Which ones?”, with seven possible responses: “health centre”; “hospital”; “specialised service: physiotherapy/orthopaedic centre”; “private clinic/doctor”; “pharmacy/chemist”; “female professional available”; and “no health care service”, of which respondents could choose as many as they wished. We took availability of a health-care centre, hospital, or specialised service to indicate good access. To check the robustness of this category, we re-estimated the model adding in private clinic or doctor as indicators of good access. Users’ perceived experience with coverage of health-care needs in 2005 was assessed with the question “Which available healthcare services were most useful to you to cover your health needs?” and the same possible response choices. User experience was classified as positive when a health-care centre, hospital, or specialised service was deemed useful and appropriate to health needs.

In the 2013 study, health-care availability was assessed with the question “If you are sick, can you get medical care in a clinic? An hospital? At a doctor?” with three possible responses for each source of care: “I can always get medical care”; “I can sometimes get medical care”; and “I cannot get medical care”. For the purposes of this study, we defined health-care availability as the ability to access some medical care service at all times. User experience with coverage of health-care needs in 2013 was measured with the question “Do you have health needs that have not been covered by healthcare services made available to you?”, to which the responses were “Yes, I do have healthcare needs that have not been covered” or “No, I do not have healthcare needs that have not been covered”. We classified users as being satisfied when an available service was perceived to have covered existing needs.

These questions were tested for accuracy, completeness, and content validity by first defining the concept of health-care access by reviewing empirical and theoretical evidence in the literature. The two factors were deemed to be complementary indicators of effective access. Afghan medical and rehabilitation experts were asked whether the Dari and Pashto versions reflected the underlying concept of effective access to health care originally defined in English. For the 2005 survey, experts indicated that perception of both availability and usefulness of services to cover existing needs were good proxies for effective access based on health needs. In 2013, experts referred to availability and the absence of remaining needs as good proxies for effective access.<sup>29</sup>

Labels	
<b>Outcome variables</b>	
Availability of health care	Available or not available
Experience with coverage of health-care needs	Positive or negative
<b>Predictor variables</b>	
Level 1*	
Sex	Female or male
Age	Years
Education	No formal education or formal education
Ethnicity	Pashtun, Tajik, or minority
Type of disability	Physical, sensory, or mental and associated
Asset index	20% poorest, 20–80%, 20% richest
Working for monetary compensation	Yes or no
Cause of disability	By birth or acquired after birth
Year	NDSA 2005 or DPIE 2013
Level 2†	
Connectivity by a paved road	Yes or no
Time to reach clinic	Walking time to nearest health clinic (min)
<b>Grouping variable</b>	
Village	Village identification
NDSA=National Disability Survey of Afghanistan. DPIE=Disability Program Impact Evaluation Study. *Individual or household level (n=1245). †Village level (n=172).	
<b>Table 1: Outcome and predictor variables used in models of availability of health care and experience with coverage of health-care needs</b>	

Finally, we checked the questions with a small sample of people with disabilities. Respondents confirmed that access to health care was understood exclusively in terms of access to trained physicians or nurses in health-care facilities and that community health workers and traditional healers were excluded. They were asked questions to check understanding of our measurement aim (ie, effective access to health care free from various barriers), to identify the language they used to explain the situations of interest, and to ascertain their understanding of the questions in relation to the instrument's purpose.

The data collection teams in 2005 and 2013 were trained to explain the questions, give examples, and ask specifically whether respondents were satisfied with the treatment received at the health-care facility visited or whether they felt that their needs had not been met. Data collectors were also trained to probe for all types of barriers to health-care access, such as cost, physical accessibility (including transportation), and stigma.

### Statistical analysis

Initially we assessed the distribution of the factors associated with the two health-care outcomes at the individual or household level (level 1) and the village level (level 2) at each timepoint. We combined the data from the 2005 and 2013 surveys to analyse changes in the socioeconomic determinants of the availability of health care and experience with coverage of health-care needs.<sup>30</sup> We used multilevel logistic regression models with random intercepts to investigate associations with individual-level and village-level predictors. The individual-level variables were sex, age, education, ethnicity, cause of disability, type of disability, employment status, and asset index. We also introduced year as a level 1 variable with a fixed effect to distinguish between the 2005 and 2013 survey respondents. Wealth tertiles were calculated as a proxy of economic status with principal-components analysis and by deriving the asset tertiles from the first factor of the analysis.<sup>31</sup> The asset index used 12 factors: home, car, motorbike, bicycle, sewing machine, lamp, generator, refrigerator, pressure cooker, television, mobile phone, and radio. Village-level predictors were connectivity by paved road and time to reach the nearest health-care facility, which we used as measures of village remoteness.

To check for multicollinearity between predictors, we used a generalised variance inflation factor, which usually should not exceed five; none of the predictors had a factor greater than two, indicating no issues of multicollinearity. We also tested for a cross-level interaction between the variable year and the village-level variables to see whether the effect of the latter on availability of health care and experience with coverage of health-care needs had improved or worsened between 2005 and 2013.

The intraclass correlation coefficient measures the proportion of variance in the outcome variable that could

be explained by the groups. Unlike in multilevel linear regression, the individual-level (level 1) and village-level (level 2) variances are not directly comparable. Hence, we used the linear threshold model method to calculate the intraclass correlation coefficient for our two outcomes in a multilevel logistic model, with the formula:

$$\frac{V_a}{V_a + \left(\frac{\pi^2}{3}\right)}$$

where  $V_a$  is the village-level variance.

For availability of health care (model 1) and experience with coverage of health-care needs (model 2), we did a binomial logistic regression with individual characteristics, including year (model 1a and model 2a); a two-level model with explanatory individual-level and village-level variables but excluding year (model 1b and model 2b); and a two-level model with explanatory variables, including year (model 1c and model 2c). Additionally, for availability of health care we developed a fourth model (model 1d) that was a two-level model with explanatory variables and an interaction effect between year and the village-level variable time to reach clinic, as this variable was significant in model 1c. We took p values less than 0.05 to be significant. All analyses were done with R software (version 3.0.3).

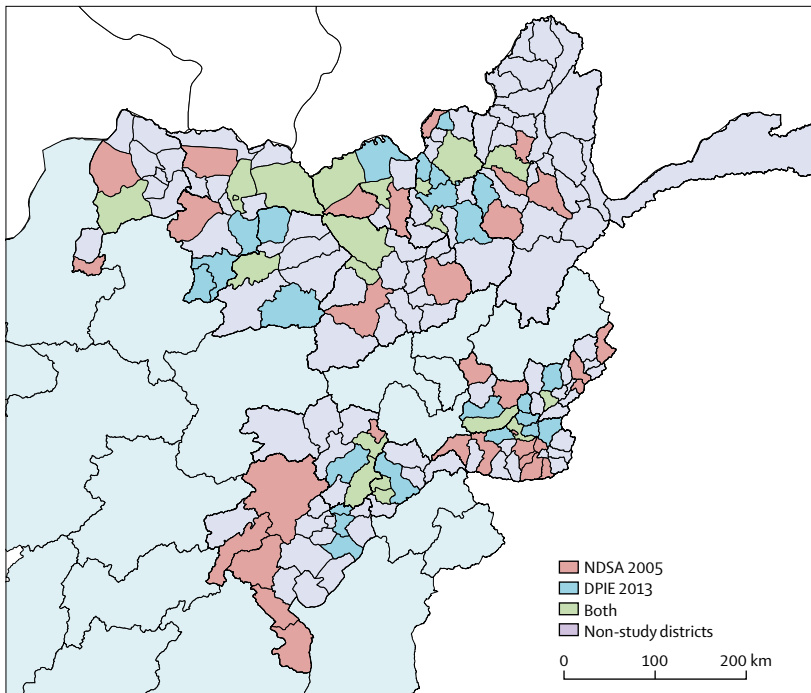
### Role of the funding source

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

### Results

In 2005, we interviewed 5130 heads of household in 171 villages and screened 38320 individuals. We identified 1038 individuals with severe disabilities (3%). In 2013, we interviewed 6000 heads of household in 100 villages and screened 39949 individuals. 960 individuals (3%) with severe disabilities were identified. Of 76 districts included in the surveys, 32 (42%) were part of the 2005 study only, 24 (32%) were part of the 2013 study only, and 20 (26%) were part of both (figure 2).

Most sociodemographic characteristics did not differ substantially between the 2005 and 2013 survey samples, except ethnicity and type of disability (table 2). Male respondents were over-represented in both years. Mean age, employment situation, and asset level of respondents were very similar in 2005 and 2013. The proportion of people with disabilities who had received some formal education decreased slightly, by around 5%, between the two surveys. In 2005 the Pashtun group represented almost half of the total sample, whereas in 2013, the Tajik and Pashtun groups were of the same size, with each making up around a third of the overall sample. The representation of minority groups slightly increased



**Figure 2: Districts involved in 2005 and 2013 surveys**  
 NDSA=National Disability Survey of Afghanistan. DPIE=Disability Program Impact Evaluation.

by 3% between 2005 and 2013. The proportion of people with physical disabilities increased from 40% of the sample in 2005 to 59% in 2013, whereas the proportion with mental and associated disabilities fell. In both 2005 and 2013, a fifth of respondents were employed. Disability acquired after birth increased from 51% in 2005 to 68% in 2013. Village connectivity by paved road had decreased and time to reach a health-care facility increased in 2013 compared with in 2005.

Between 2005 and 2013, there was a striking increase in the proportion of survey respondents for whom health care was not available (31% to 56%) and whose experience of coverage of health-care needs was negative (23% to 55%, table 2). In the unconstrained models of perceived availability of health care and experience with coverage of health-care needs, the intraclass correlation coefficients indicated that village-level variables accounted for 1·8% of variability in both. This value is quite high and suggests that use of two-level models to incorporate village-level variables is useful. Additionally, this finding reflects the nested structure of the data. Year had a random coefficient at the village level, which suggests that village-level factors associated with the availability of and experience with health care varied across survey years.

In all the models of availability of health care (table 3) we found strong, positive, and consistent associations with formal education and higher asset level. In model 1a, respondents with disabilities in the 2013 survey were more than three times less likely to report

	NDSA 2004-05 (n=329)	DPIE 2013-14 (n=916)	All (n=1245)
<b>Level 1 predictors</b>			
<b>Sex</b>			
Female	140 (43%)	348 (38%)	488 (39%)
Male	189 (57%)	568 (62%)	757 (61%)
Age (years)	31·1 (21·0)	30·9 (21·3)	31·0 (21·2)
<b>Education</b>			
No formal education	254 (77%)	748 (82%)	1002 (80%)
Formal education	75 (23%)	168 (18%)	243 (20%)
<b>Ethnicity</b>			
Pashtun	158 (48%)	326 (36%)	484 (39%)
Tajik	88 (27%)	327 (36%)	415 (33%)
Minority	83 (25%)	263 (29%)	346 (28%)
<b>Type of disability</b>			
Physical	131 (40%)	544 (59%)	675 (54%)
Sensory	80 (24%)	191 (21%)	271 (22%)
Mental and associated	118 (36%)	181 (20%)	299 (24%)
<b>Asset index</b>			
20% poorest	73 (22%)	187 (20%)	260 (21%)
20-80%	192 (58%)	547 (60%)	739 (59%)
20% richest	64 (20%)	182 (20%)	246 (20%)
<b>Working for monetary compensation</b>			
Yes	64 (20%)	190 (21%)	254 (20%)
No	265 (81%)	726 (79%)	991 (80%)
<b>Cause of disability</b>			
By birth	160 (49%)	290 (32%)	450 (36%)
Acquired after birth	169 (51%)	626 (68%)	795 (64%)
<b>Level 2 predictors</b>			
<b>Village connectivity by a paved road</b>			
Yes	143 (44%)	119 (13%)	262 (21%)
No	186 (57%)	797 (87%)	983 (79%)
<b>Time to reach health-care facility (min)</b>			
	64·3 (169·7)	84·4 (107·7)	79·1 (127·3)
<b>Outcome variables</b>			
<b>Availability of health care</b>			
Available	227 (69%)	405 (44%)	632 (51%)
Not available	102 (31%)	511 (56%)	613 (49%)
<b>Experience with coverage of health-care needs</b>			
Positive	255 (78%)	410 (45%)	665 (53%)
Negative	74 (23%)	506 (55%)	580 (47%)

Data are number (%) or mean (SD). NDSA=National Disability Survey in Afghanistan. DPIE=Disability Program Impact Evaluation Study.

**Table 2: Distribution of health-care predictor and outcome variables by cohorts**

availability of health care than those in the 2005 survey. In model 1b, which excluded survey year, the village-level factors were significantly associated with perceived availability of health care, with longer time taken to reach a health-care facility being associated with reduced availability, and connectivity by paved road almost doubling the odds of perceived availability. With survey

year included in model 1c, the village-level factors were no longer significantly associated with perceived availability of health care. This difference is probably due to increased village remoteness in 2013, reflected by reduced connectivity by paved road and increased time to reach a health-care facility. The interaction term between year and time to reach a facility was not significant in model 1d, meaning that, in 2005, villages further from health facilities had approximately the same access to health care as they did in 2013.

In the models of experience with coverage of health-care needs (table 4), model 2a showed that the odds of a positive experience were more than four times lower in 2013 survey than in 2005. In model 2b, which excluded survey year, the village-level factor of connectivity by paved road was significantly associated with positive experience with coverage of health-care needs. After including survey year in model 2c, neither village-level factor was significantly associated with positive experience, and can be explained by increased village remoteness in 2013. No interaction terms between the village-level factors or the individual-

level factors and survey year were significant, indicating that the effect of socioeconomic factors did not differ by year.

## Discussion

We present a critical examination of perceived availability of health care and experience with coverage of health-care needs at two timepoints for people with disabilities in Afghanistan, one of the most vulnerable groups. Our findings indicate that people with disabilities do not perceive any improvement in availability of health care despite a decade of international intervention and investment in the Afghan health-care sector. Indeed, our respondents perceived health-care services to be less available and less able to meet their needs than in 2005. Even after taking village remoteness into account, the time for people with disabilities to reach a health-care facility was longer and connectivity by paved roads was worse in 2013 than in 2005. These findings are at odds with research showing that the first 10 years of the BPHS has led to significant improvement in overall population

	Model 1a†		Model 1b‡		Model 1c§		Model 1d¶	
	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value
<b>Level 1 predictor variables</b>								
Female (vs male)	1.05 (0.81–1.36)	0.69	1.00 (0.75–1.36)	0.93	0.99 (0.74–1.33)	0.97	1.00 (0.74–1.35)	0.98
Age (years)	0.99 (0.98–1.00)	0.07	0.99 (0.98–1.00)	0.06	0.99 (0.98–1.00)	0.04	0.99 (0.98–1.00)	0.03
Formal education (vs no formal education)	1.64 (1.20–2.25)	0.002	1.62 (1.11–2.35)	0.01	1.55 (1.07–2.25)	0.02	1.55 (1.07–2.25)	0.02
Ethnicity (vs Pashtun)								
Tajik	0.98 (0.75–1.32)	0.93	0.82 (0.52–1.29)	0.40	0.89 (0.57–1.38)	0.62	0.90 (0.58–1.38)	0.63
Minority	1.30 (0.97–1.75)	0.08	0.99 (0.62–1.60)	0.99	1.07 (0.67–1.69)	0.76	1.10 (0.69–1.74)	0.67
Type of disability (vs physical disability)								
Sensory	0.95 (0.71–1.29)	0.78	0.97 (0.68–1.38)	0.87	0.92 (0.64–1.31)	0.65	0.92 (0.64–1.31)	0.66
Mental and associated	0.89 (0.65–1.21)	0.45	0.89 (0.63–1.28)	0.56	0.83 (0.58–1.18)	0.31	0.83 (0.58–1.18)	0.30
Asset index (vs 20% poorest)								
20–80%	1.95 (1.43–2.66)	<0.0001	1.68 (1.16–2.44)	0.005	1.75 (1.22–2.52)	0.002	1.74 (1.21–2.49)	0.002
20% richest	2.88 (1.96–4.26)	<0.0001	2.48 (1.53–4.01)	0.0002	2.63 (1.63–4.24)	<0.0001	2.59 (1.61–4.18)	<0.0001
Working for monetary compensation (vs not working)	1.29 (0.95–1.76)	0.09	1.26 (0.88–1.83)	0.18	1.26 (0.88–1.80)	0.20	1.26 (0.88–1.80)	0.20
Cause of disability acquired after birth (vs by birth)	0.88 (0.68–1.13)	0.32	0.78 (0.59–1.05)	0.11	0.84 (0.62–1.13)	0.25	0.84 (0.62–1.13)	0.25
2013 (vs 2005)	0.33 (0.25–0.44)	<0.0001	..	..	0.29 (0.18–0.48)	<0.0001	0.36 (0.21–0.61)	0.0002
<b>Level 2 predictor variables</b>								
Time to reach clinic (min)	..	..	0.998 (0.996–0.999)	0.02	0.998 (0.996–0.998)	0.02	0.999 (0.998–1.000)	0.32
Connectivity by paved road (vs no connectivity by paved road)	..	..	1.89 (1.11–3.21)	0.02	1.16 (0.68–1.97)	0.58	1.17 (0.69–1.98)	0.55
Interaction between time to reach clinic and year	..	..	..	..	..	..	0.99 (0.99–1.00)	0.09
Akaike information criterion	1628.1	..	1564	..	1541.8	..	1540.9	..
Negative log likelihood	-801.06	..	-766.99	..	-754.9	..	-753.44	..

OR=odds ratio. \*Compared with no availability of health care. †Binomial logistic regression, including year. ‡Multilevel model with grouping variable village and without year as a predictor. §Multilevel model with grouping variable village and including year as a predictor. ¶Multilevel model with grouping variable village, year as a predictor, and the interaction between time to reach clinic and year. || Time to reach clinic vs no availability of health care and 2005 vs 2013.

**Table 3: Multilevel logistic regression analyses for availability of health care\***



health-care outcomes.<sup>14,17</sup> Alonge and colleagues,<sup>32</sup> for instance, reported that, under certain circumstances (flexibility in the decision-making process of how funds are engaged to deliver health care), contracting out health services provision is effective in reducing the gap in service use between poor and non-poor people in Afghanistan.

Despite no overall benefit for people with disabilities, an important finding in our study was that availability of health care was greatest for the most privileged within this vulnerable group. Education and wealth were significant and independent predictors of positive perception of availability of health care, and being employed was a significant predictor of coverage of health-care needs. Additionally, education and wealth have well established associations with reduced odds of self-reported morbidity<sup>33,34</sup> and use of health-care services and with increased perception of health-care quality<sup>35</sup> in the general population and among people with disabilities.<sup>30,36</sup> We found no significant differences in the outcomes of interest based on sex, age, ethnicity, or disability type or cause, although discrimination based on those demographic and social characteristics among persons with disabilities has been shown previously in Afghanistan.<sup>15</sup> Women, elderly people

with disabilities from minority ethnic groups, and people facing stigmatisation because of the cause of disability do not report better experiences and satisfaction with health care, despite the official aim to prioritise these groups.<sup>11</sup> The lack of access to high-quality health-care services is similar to that for vulnerable groups in various other low-income countries.<sup>37,38</sup>

People with disabilities living in non-remote villages reported better perceived availability of health care than those living in remote villages, although no improvement was seen between 2005 and 2013. The claims of improved quality of care in Afghanistan,<sup>17</sup> therefore, do not seem to apply to remote, hard-to-reach, and potentially dangerous areas where health care is delivered primarily by non-governmental organisations. Our findings confirm those from other studies that distance to health-care facilities, out-of-pocket expenditure, and lack of security, as well as negative perception of services offered, explain poor access for vulnerable people.<sup>18,19</sup>

We have found no studies that had investigated access to health care for vulnerable groups in countries where subcontracting of health-care services has been implemented. However, our findings add to the growing evidence of major constraints affecting equitable

	Model 2a†		Model 2b‡		Model 2c§	
	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value
<b>Level 1 predictor variables</b>						
Female (vs male)	0.90 (0.70-1.17)	0.46	0.87 (0.65-1.17)	0.38	0.85 (0.64-1.14)	0.28
Age (years)	1.00 (0.99-1.00)	0.80	0.99 (0.99-1.00)	0.84	0.99 (0.99-1.00)	0.78
Formal education (vs no formal education)	1.34 (0.98-1.84)	0.06	1.28 (0.88-1.86)	0.19	1.22 (0.85-1.77)	0.27
Ethnicity (vs Pashtun)						
Tajik	0.81 (0.61-1.07)	0.12	0.67 (0.42-1.06)	0.09	0.75 (0.48-1.15)	0.19
Minority	0.95 (0.70-1.28)	0.71	0.73 (0.45-1.19)	0.21	0.80 (0.51-1.27)	0.35
Type of disability (vs physical disability)						
Sensory	0.99 (0.73-1.34)	0.96	0.89 (0.62-1.28)	0.55	0.85 (0.60-1.21)	0.38
Mental and associated	0.85 (0.62-1.15)	0.30	0.89 (0.62-1.26)	0.52	0.80 (0.56-1.14)	0.22
Asset index (vs 20% poorest)						
20-80%	0.92 (0.68-1.25)	0.59	0.73 (0.51-1.05)	0.09	0.77 (0.54-1.10)	0.16
20% richest	1.10 (0.75-1.62)	0.63	0.84 (0.52-1.35)	0.49	0.90 (0.56-1.43)	0.66
Working for monetary compensation (vs not working)	1.50 (1.10-2.04)	0.009	1.47 (1.02-2.11)	0.03	1.47 (1.02-2.10)	0.03
Cause of disability acquired after birth (vs by birth)						
2013 (vs 2005)	0.90 (0.70-1.17)	0.44	0.77 (0.57-1.03)	0.08	0.84 (0.63-1.13)	0.27
2013 (vs 2005)	0.23 (0.17-1.77)	<0.0001	..	..	0.19 (0.11-0.31)	<0.0001
<b>Level 2 predictor variables</b>						
Time to reach clinic (min)	..	..	0.99 (0.99-1.00)	0.88	0.99 (0.99-1.00)	0.87
Connectivity by paved road (vs no connectivity by paved road)	..	..	3.16 (1.79-5.59)	<0.0001	1.64 (0.96-2.80)	0.07
Akaike information criterion	1614.4	..	1587.7	..	1545.8	..
Negative log likelihood	-794.18	..	-778.82	..	-756.92	..

OR=odds ratio. \*Compared with negative experience with coverage of health-care needs. †Binomial logistic regression, including year. ‡Multilevel model with grouping variable village and without year as a predictor. §Multilevel model with grouping variable village and with year as a predictor.

**Table 4: Multilevel logistic regression analyses for positive experience with coverage of health care needs\***

delivery of health-care services in Afghanistan. Previous studies have highlighted perception of public health services as inadequate due to long waiting times, unavailability of staff and high-quality supplies, preference for private or traditional and religious providers, high costs and increased difficulty of access for vulnerable groups, and poor access in remote areas and those not under government control.<sup>15,18,19</sup>

Our study has some important limitations. First, we have no longitudinal data, but rather compare two cross-sectional surveys done around 9 years apart. Therefore, the statistical power of our estimates is not as strong as they would have been in a longitudinal study, as we might not have accounted for all the differences between survey respondents. However, the challenges of following the same cohort through time in a post-conflict setting such as Afghanistan might have led to a high level of attrition, which would have diminished any advantages. Second, respondents' perceptions of availability of health care and experience with coverage of health-care needs were each measured with single questions rather than by multi-item questionnaires.<sup>13</sup> The questions, however, were formulated by a comprehensive process of validation that included testing of content validity and language with experts and potential respondents to establish clarity and understanding of concepts. Finally, we did not compare the perceptions of people with and without disabilities. Therefore, we can only argue that access did not improve for a specific group within the time span we investigated. Nevertheless, we identified differences in structural determinants of health, such as connectivity by a paved road and distance to health-care facility, that have worsened between the two timepoints and might explain why people with disabilities face worsening access.

Our findings suggest that the effort to increase health coverage for all Afghans has been unevenly applied. Several factors could potentially explain this disparity. First, disability and mental health were second-tier priorities until the BPHS review in 2004. Even after disability rehabilitation became a priority, the resources allocated to health services were insufficient to meet the additional needs. The primary BPHS international funders made a commitment to provide US\$4·55 per person for basic health-care coverage, and available data show that the cost of provision of the BPHS was less than \$6 per person.<sup>39,40</sup> WHO, however, estimated in 2001 that it would cost \$34 per person to provide basic curative services and reach health-related Millennium Development Goals.<sup>41</sup> Second, policy priorities cannot ensure that people with disabilities are able to access health-care services. Stigma adversely affects access to and use of health care among people with disabilities in Afghanistan and elsewhere.<sup>15,42</sup> The lack of change in perceptions about availability and coverage of health care between 2005 and 2013 might mean that stigma and

negative attitudes of health-care staff are still prevalent. Furthermore, absence of transportation, lack of paved roads, and distance to clinics constitute specific barriers to accessing health-care facilities. Finally, there is a shortage of trained medical staff to address the rehabilitation needs of people with disabilities, especially learning and mental disabilities.

The UN has recently adopted the SDGs, and our findings hold important lessons for low-income countries. People with disabilities were not included in the Millennium Development Goals and have not benefited overall from progress made to eliminate poverty. SDG3, target eight, however, is aimed at achieving universal health coverage, and progress in coverage of health services for vulnerable sub-populations, such as people with disabilities and, especially, women alone with children, the elderly, poor, and uneducated, and those living in remote rural areas, needs to be tracked. A central tenet of the SDGs is collection of reliable, specific, and detailed data on health-care quality. Our study makes an important contribution to this effort through its methods and results.

To achieve universal health coverage for vulnerable groups, including people with disabilities, it will be necessary to intervene at multiple levels. Outreach programmes should be implemented by community health workers. Increasing the numbers of such workers and promoting a community-based health-care and education system to promote hygiene and prevention of diseases, treat common childhood disorders, communicable diseases, such as malaria, and provide basic reproductive health advice will contribute to the prevention of many disabilities. Furthermore, additional training of community health workers to assess disability and address stigmatisation of people with disabilities will improve the experience of coverage of health-care needs. Coupling teams of community health workers with community-based rehabilitation workers might be a useful way to provide basic services to people with disabilities. Referrals to hospitals or rehabilitation centres should also be considered. Finally, coverage might be improved by training health-care workers at all levels of the health-care system about disabilities and their associated issues to fight stigma. In sum, therefore, a comprehensive, well planned, and well resourced approach to prioritising the needs of the most vulnerable, particularly people with disabilities, is needed if socioeconomic development is to be improved for all.

#### Contributors

J-FT designed the study and wrote the paper. J-FT and EB collected and supervised collection of data and entered and cleaned the data. J-FT, PK, and EB did the analysis. J-FT, PK, and TC interpreted the data. TC provided technical support. All authors read and amended drafts of the paper and approved the final version.

#### Declaration of interests

We declare no competing interests.

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