

# Humanitarian Needs Among Displaced and Female-Headed Households in Government-Controlled Areas of Syria

Shannon Doocy, PhD, and Emily Lyles, MSPH

**Objectives.** To identify unmet needs and assistance priorities of displaced and female-headed households in government-controlled areas of Syria.

**Methods.** In mid-2016, we undertook a survey of accessible areas, largely urban and government-controlled, to identify unmet needs and assistance priorities. We used a cluster design with probability sampling to attain a final sample of 2405 households from 10 of 14 governorates; 31 of 65 (47.7%) districts were included that are home to 38.1% of people in need.

**Results.** Displaced and female-headed households were more vulnerable than non-displaced and male-headed households in numerous sectors. Despite approximately half of surveyed households reporting receipt of humanitarian assistance in the preceding month and apparently effective targeting of assistance by vulnerability, unmet needs were nearly ubiquitous.

**Conclusions.** The humanitarian situation in inaccessible areas of Syria is likely to be considerably worse; thus, findings presented here likely underestimate humanitarian needs. Efforts to expand support to Syria's most vulnerable households are desperately needed as are innovative targeting and modalities that enable more efficient and effective assistance. (*Am J Public Health*. 2017;107:950–959. doi: 10.2105/AJPH.2017.303710)

The conflict in Syria, now in its sixth year, is the largest source of refugees worldwide with 4.9 million Syrians fleeing the country by late 2015 and an estimated 50 families displaced every hour since the onset of the conflict in 2011.<sup>1,2</sup> Although recent media attention has focused on Syrian refugees in neighboring countries and Europe, there are more than 6.6 million internally displaced people (IDPs), making Syria the country with the world's largest IDP population.<sup>3</sup> Unmet humanitarian needs are immense, with an estimated 13.5 million people in need (PiN) of assistance, approximately half of which are displaced.<sup>4</sup> Displaced populations often are more vulnerable and have greater unmet needs than conflict-affected populations that have not been displaced.<sup>3,5</sup> Reasons include greater likelihood of having experienced a traumatic event, loss of assets and possessions during flight,

diminished social networks and opportunities, and lack of familiarity or increased difficulty in accessing services.<sup>6,7</sup> In addition to displaced populations, female-headed households are also considered vulnerable because they may face greater challenges accessing services, have greater protection needs, or have fewer livelihood and income-generating opportunities.<sup>8–11</sup>

Many humanitarian needs in Syria remain unmet and the humanitarian assistance provided is often insufficient in terms of coverage or quantity distributed.<sup>12–14</sup> Inability to maintain humanitarian corridors and ceasefires, operational challenges, and funding shortfalls are major barriers to the

humanitarian response and factors that limit assistance to populations in need.<sup>4,15</sup> We undertook a household survey to assess needs and inform humanitarian assistance planning. Few large-scale multisectoral surveys have been undertaken in Syria since the onset of the conflict and, to our knowledge, this is the first attempt to describe the status of female-headed and displaced households. We characterized differences among displaced, female-headed, and other conflict-affected populations with regard to shelter, food security, water, sanitation, and education to present a picture of household-level humanitarian needs among vulnerable households residing in government-controlled areas of Syria.

## METHODS

We based sample size calculations on objectives of identifying unmet needs and assistance priorities and used the most conservative prevalence rate (50%), 80% power (1–B), and design effect of 1.5. We increased a minimum sample of 1600, which allowed for plus-or-minus-3% precision, to 2400 to provide increased power for regional comparisons. Few consistently reported and reliable population figures are available for Syria. We used a stratified multistage cluster design with probability proportional to size sampling, because of both challenges in attaining accurate population data and the

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desire for region-specific estimates and comparisons.

We divided accessible areas into 7 survey areas with, to the extent possible, a similar number of PiN. We used a 120 cluster multiplied by 20 household design; we allocated clusters with a stratified approach, in which areas with larger numbers of PiN were assigned 20 clusters and those with smaller numbers were assigned 10 clusters to allow for similar probability of selection across areas. Within each survey area, we assigned clusters proportionally at district then subdistrict levels by using recent population data from the United Nations Office for the Coordination of Humanitarian Affairs, which was perceived to be most reliable.<sup>16</sup> Because of limited accessibility, the assessment incorporated 10 of 14 governorates (Dier-ez-Zor, ar-Raqqa, Idleb, and Quneitra were not accessible); however, not all areas of included governorates were accessible (Figure 1). Assessment coverage areas are reported in detail elsewhere; however, in total, 31 of 65 (47.7%) districts were included that are home to 38.1% of PiN and a population of 4.1 million (S. Doocy and E. Lyles, written

communication, March 8, 2017).<sup>2</sup> Accessible areas were predominantly urban city centers (60%) with fewer clusters in peri-urban areas or remote cities (21%) and rural areas (19%). This distribution is reflective of the predominantly urban population (70%), high levels of urban need, and resulting urban-focused humanitarian response.<sup>2</sup>

We used ArcGIS version 10.4 (Esri, Redlands, CA) to identify random start points within subdistricts; we excluded those in unpopulated areas per Google Earth imagery. In developed areas, the nearest intersection, usually within 0.5 kilometer, served as the start point; the field team then reviewed start points to ensure accessibility. We sampled every third household in several directions; we used replacement sampling and, though it did not come up during data collection, we decided a priori to include no more than 2 households within an apartment building. We provided backup coordinates and an alternate start point to use in the event of insecure planned locations.

The questionnaire included content on demographics and background characteristics; household economy; shelter; water,

sanitation, and hygiene (WASH); nonfood items (NFIs); food security; health; receipt of humanitarian assistance; and unmet needs. (See Table 1 for indicators corresponding to specific sectors and Table 2 for indicators of unmet need and receipt of humanitarian assistance.)

To the extent possible, we adapted existing content from instruments used with Syrian populations to improve validity and comparability.<sup>17–21</sup> We conducted pilot testing with Syrian refugees in Lebanon and in Damascus to ensure appropriateness of content and translation. We used a training-of-trainers approach in which team leaders and study coordinators received 5 days of training in Lebanon; they later oversaw 2 days of interviewer training in their respective survey areas. We provided study guides, which included information on how to sample, how to approach households, the informed consent process, and instructions related to the questionnaire to serve as a reference for data collectors and to help ensure consistency across study locations. Most interviewers and all team leaders had previous experience conducting humanitarian assessments in Syria.

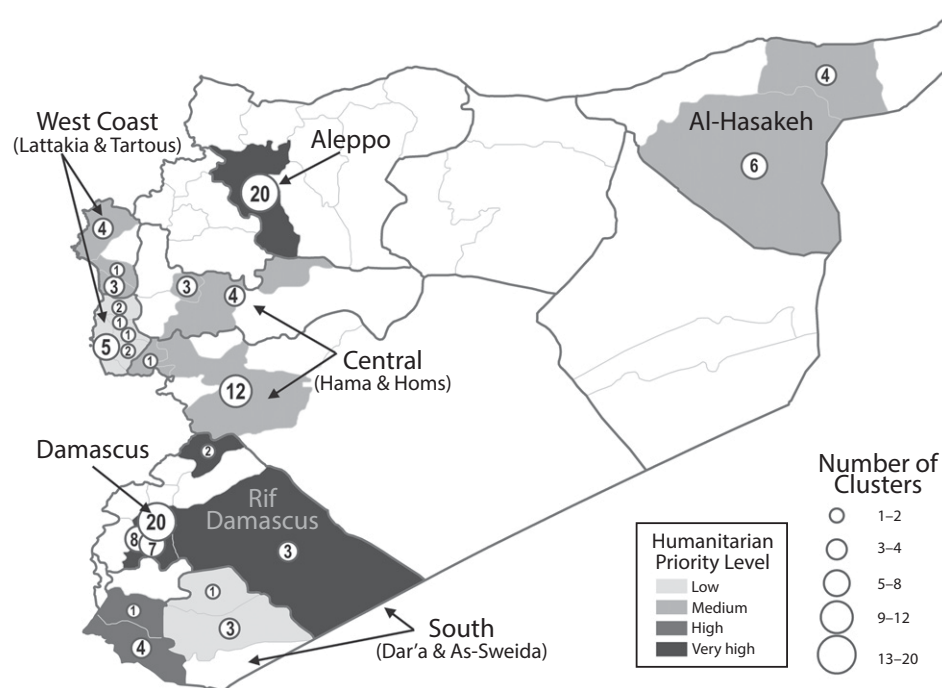


FIGURE 1—Survey Areas and Cluster Allocation by Humanitarian Priority: Syria, 2016

TABLE 1—Shelter, Food Security, Water and Sanitation, and Education by Household Vulnerability Characteristics: Syria, 2016

Variable	Displaced (n = 1027), No. or % (95% CI)	Not Displaced (n = 1331), No. % (95% CI)	Female-Headed (n = 424), No. % (95% CI)	Male-Headed (n = 1974), No. % (95% CI)	Survey Total (n = 2405), No. % (95% CI)
<b>Shelter</b>					
<b>Residence type</b>					
Entire apartment or house	80.7 (76.1, 84.6)	95.8 (93.9, 97.1)	86.8 (82.1, 90.4)	89.8 (87.4, 91.8)	89.2 (86.8, 91.3)
Other (shared or temporary)	19.3 (15.4, 23.9)	4.2 (2.9, 6.1)	13.2 (9.6, 17.9)	10.2 (8.2, 12.6)	10.8 (8.7, 13.2)
<b>Residence arrangement</b>					
Own or rent	76.4 (71.5, 80.8)	96.8 (95.4, 97.7)	87.0 (82.6, 90.4)	88.3 (85.9, 90.4)	88.1 (85.7, 90.2)
Other (e.g., hosted, stay without permission)	23.6 (19.2, 28.5)	3.2 (2.3, 4.6)	13.0 (9.6, 17.4)	11.7 (9.6, 14.1)	11.9 (9.8, 14.3)
<b>Crowding</b>					
No crowding	82.9 (79.7, 85.6)	92.6 (89.1, 95.0)	90.1 (86.2, 93.0)	88.0 (85.4, 90.1)	88.4 (86.0, 90.4)
Crowding (≥ 5 people/sleeping room)	17.1 (14.4, 20.3)	7.4 (5.0, 10.9)	9.9 (7.0, 13.8)	12.0 (9.9, 14.6)	11.6 (9.6, 14.0)
<b>Condition of accommodation</b>					
No repair or safety concern	50.8 (45.3, 56.3)	70.8 (65.6, 75.6)	62.0 (55.7, 68.0)	62.1 (57.5, 66.5)	62.1 (57.8, 66.2)
Concern(s) with accommodation	49.2 (43.7, 54.7)	29.2 (24.4, 34.4)	38.0 (32.0, 44.3)	37.9 (33.5, 42.5)	37.9 (33.8, 42.2)
Any above shelter concern	66.4 (61.5, 71.0)	34.3 (29.2, 39.7)	46.5 (40.6, 52.4)	48.6 (44.5, 52.8)	48.3 (44.3, 52.3)
<b>Food security</b>					
<b>Food Consumption Score</b>					
Acceptable	68.1 (62.4, 73.2)	81.7 (78.5, 84.6)	66.7 (60.6, 72.4)	78.0 (74.6, 81.0)	75.9 (72.4, 79.1)
Unacceptable	31.9 (26.8, 37.6)	18.3 (15.4, 21.5)	33.3 (27.6, 39.4)	22.0 (19.0, 25.4)	24.1 (20.9, 27.6)
<b>Household expenditures on food</b>					
≤ 74%	89.8 (84.8, 93.3)	84.8 (80.8, 88.1)	89.0 (84.1, 92.5)	86.8 (83.3, 89.6)	87.2 (84.0, 89.8)
≥ 75%	10.2 (6.7, 15.2)	15.2 (11.9, 19.2)	11.0 (7.5, 15.9)	13.2 (10.4, 16.7)	12.8 (10.2, 16.0)
<b>Extreme coping mechanisms use<sup>a</sup></b>					
No extreme coping strategies reported	36.1 (31.0, 41.5)	53.3 (48.4, 58.3)	44.6 (38.2, 51.1)	46.1 (41.8, 50.4)	45.7 (41.7, 49.9)
Use of extreme coping strategies	63.9 (58.5, 69.0)	46.7 (41.7, 51.6)	55.4 (48.9, 61.8)	53.9 (49.6, 58.2)	54.3 (50.1, 58.3)
Any above food security concern	73.8 (69.4, 77.8)	58.7 (54.1, 63.1)	68.4 (62.5, 73.8)	64.5 (60.6, 68.2)	65.3 (61.6, 68.8)
<b>Water and sanitation</b>					
<b>Regular water access</b>					
Regular access to running water	63.4 (56.2, 70.1)	63.8 (56.2, 70.8)	57.9 (48.7, 66.6)	64.8 (58.6, 70.6)	63.6 (57.3, 69.6)
No access to running water 24 h/d	36.6 (29.9, 43.8)	36.2 (29.2, 43.8)	42.1 (33.4, 51.3)	35.2 (29.4, 41.4)	36.4 (30.4, 42.7)
<b>Disruptions in water access (3 mo)</b>					
No extended disruptions	49.7 (42.6, 56.7)	53.7 (46.7, 60.5)	46.3 (38.3, 54.6)	53.3 (47.5, 59.1)	52.0 (46.1, 57.9)
No access for several d at a time	50.3 (43.3, 57.4)	46.3 (39.5, 53.3)	53.7 (45.4, 61.7)	46.7 (40.9, 52.5)	48.0 (42.1, 53.9)

*Continued*

The assessment was conducted between April and June 2016 by a US-based international nongovernmental organization

(iNGO) and a Syrian partner with training and remote support from Johns Hopkins School of Public Health (JHSPH).

Interviews ranged from 20 to 45 minutes. To protect anonymity, we did not collect unique identifiers such as names, dates of

TABLE 1—Continued

Variable	Displaced (n = 1027), No. or % (95% CI)	Not Displaced (n = 1331), No. % (95% CI)	Female-Headed (n = 424), No. % (95% CI)	Male-Headed (n = 1974), No. % (95% CI)	Survey Total (n = 2405), No. % (95% CI)
<b>Toilet facilities<sup>b</sup></b>					
Improved toilet facility or sanitation	81.0 (74.7, 85.9)	89.9 (86.0, 92.8)	84.6 (78.0, 89.6)	86.5 (82.8, 89.6)	86.1 (82.3, 89.2)
Unimproved toilet facility or sanitation	19.0 (14.1, 25.3)	10.1 (7.2, 14.0)	15.4 (10.4, 22.0)	13.5 (10.4, 17.2)	13.9 (10.8, 17.7)
<b>Shared toilet facilities</b>					
Private toilet facility	90.9 (88.2, 93.1)	96.5 (95.3, 97.5)	93.4 (90.5, 95.5)	94.2 (92.7, 95.3)	94.0 (92.6, 95.2)
Shared toilet facility	9.1 (6.9, 11.8)	3.5 (2.5, 4.7)	6.6 (4.5, 9.5)	5.8 (4.7, 7.3)	6.0 (4.8, 7.4)
<b>Soap and hygiene products</b>					
Adequate supply	76.0 (72.1, 79.6)	84.7 (81.5, 87.4)	76.1 (71.7, 80.0)	81.9 (79.0, 84.5)	80.9 (78.2, 83.4)
Inadequate supply	24.0 (20.4, 27.9)	15.3 (12.6, 18.5)	23.9 (20.0, 28.3)	18.1 (15.5, 21.0)	19.1 (16.6, 21.8)
Any above WASH concern	70.0 (63.0, 76.2)	63.0 (56.4, 69.2)	71.9 (64.8, 78.1)	64.8 (59.1, 70.2)	66.2 (60.6, 71.3)
<b>Education</b>					
Overall school attendance <sup>c</sup>	690	622	181	1155	1342
All children attending school	77.8 (73.8, 81.4)	89.7 (86.6, 92.2)	79.0 (71.9, 84.7)	84.2 (81.7, 86.5)	83.5 (80.8, 85.9)
≥1 child not attending	22.2 (18.6, 26.2)	10.3 (7.8, 13.4)	21.0 (15.3, 28.1)	15.8 (13.5, 18.3)	16.5 (14.1, 19.2)

Note. CI = confidence interval; WASH = water, sanitation, and hygiene.

<sup>a</sup>Including reducing portion size; reducing number of meals eaten per day; reduced adult consumption to allow children to eat; restricting consumption of female household members; going entire days without eating; selling household assets, productive assets, house, or land; withdrawing children from school; involving children in income generation; engaging in high-risk or socially degrading jobs; sending members to eat elsewhere; and child marriage.

<sup>b</sup>Definitions of improved versus unimproved per World Health Organization/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Unimproved toilet facilities included pit latrine without slab, open pit or ditch, and open air or no toilet.<sup>23</sup>

<sup>c</sup>Among households with school-aged children, aged 5–17 years.

birth, and residence location. We used verbal informed consent to ensure participation was anonymous, because of the minimal risk associated with participation in a needs assessment survey, and low levels of literacy. This is consistent with policies that permit waivers of consent documentation in which the only record connecting the participant to the research is the consent document, and that link poses a potential risk of harm to the participant if there is a breach of confidentiality, or where research presents no more than minimal risk of harm to participants and involves no procedures for which written consent is generally required outside the research context.<sup>22</sup> Participants were read a consent statement, and if they agreed to proceed, the interviewer requested to conduct the interview inside the dwelling to ensure privacy; however, respondents were also given the option to complete the interview outside if the respondent preferred or when it was not appropriate for an interviewer of the opposite sex to enter the dwelling.

Interviewers collected data on tablets with the Magpi mobile data platform (Android version 5.4.1, Datadyne LLC, Washington, DC). Partner organizations' staff supervised interviewers and JHSPH performed real-time review to ensure quality.

We analyzed data by using Stata version 13 (StataCorp LP, College Station, TX) with the SVY command to account for clustering. We conducted exploratory analysis to assess if differing nonresponse rates (0%–21%) needed to be accounted for and it was found unnecessary. Summary statistics were not weighted because sampling survey area probabilities were similar and confidence in data used to estimate probabilities was low. We included characteristics with statistical significance of  $P < .10$  in the adjusted logistic regression model based on adjusted Wald test results, which indicated that covariates with nonsignificant univariate associations do not significantly improve the model fit ( $P = .183$ ). We considered adjusted associations with 2-sided  $P < .05$  to be statistically significant.

The primary purpose of the assessment was to inform partners' humanitarian programming and the assessment was conducted by partner organizations' staff. We attained permissions to conduct the survey from local community leaders as needed in Syria by partner organizations and survey supervisors.

## RESULTS

A total of 2681 households were approached to participate, of which 10.3% ( $n = 276$ ) declined, yielding a final sample of 2405 households (response rate = 89.7%). Slightly less than half (42.7%; 95% confidence interval [CI] = 37.8, 47.7) of households were displaced and 17.7% (95% CI = 15.7, 19.8) of households were female-headed; only 1 household was headed by a child. Average household size was 5.1 (95% CI = 4.9, 5.3; range 1–22). A majority of households (65.4%; 95% CI = 61.9, 68.7) had children aged 17 years or younger and 29.3% (95% CI = 26.3, 32.4) had children younger

**TABLE 2—Receipt of Humanitarian Assistance and Unmet Needs: Syria, 2016**

Variable	Displaced (n = 1027), % of Households (95% CI)	Not Displaced (n = 1331), % of Households (95% CI)	Female-Headed (n = 424), % of Households (95% CI)	Male-Headed (n = 1974), % of Households (95% CI)	Survey Total (n = 2405), % of Households (95% CI)
<b>Unmet needs</b>					
Any unmet need	98.5 (96.8, 99.3)	94.9 (92.6, 96.5)	97.4 (93.3, 99.0)	96.3 (94.2, 97.6)	96.5 (94.7, 97.7)
<b>Top priority unmet need</b>					
More food	29.5 (24.7, 34.8)	29.4 (24.9, 34.4)	29.4 (23.9, 35.6)	29.3 (25.7, 33.2)	29.4 (25.8, 33.3)
Support for rent or improved shelter	28.1 (24.5, 32.1)	5.9 (4.4, 7.9)	15.2 (11.8, 19.3)	15.4 (13.1, 18.0)	15.4 (13.2, 17.9)
Medicines or health	8.2 (6.4, 10.5)	13.8 (11.6, 16.2)	14.2 (11.1, 18.1)	10.6 (9.1, 12.3)	11.2 (9.7, 12.9)
More security	7.9 (5.2, 11.7)	13.1 (9.7, 17.5)	11.4 (7.6, 16.7)	10.7 (7.9, 14.2)	10.8 (8.0, 14.3)
Better quality food	7.5 (5.5, 10.1)	10.5 (8.8, 12.5)	9.7 (7.1, 13.1)	9.4 (7.8, 11.2)	9.4 (7.9, 11.1)
Education or books	2.9 (1.9, 4.5)	4.2 (2.9, 6.0)	3.1 (1.7, 5.6)	3.9 (2.8, 5.2)	3.7 (2.8, 5.0)
Clothes or shoes	3.3 (2.3, 4.8)	2.4 (1.6, 3.5)	1.7 (0.7, 3.7)	3.1 (2.3, 4.3)	2.9 (2.1, 3.9)
Baby food	3.0 (2.0, 4.5)	2.5 (1.6, 3.8)	0.9 (0.3, 3.1)	3.1 (2.2, 4.3)	2.7 (1.9, 3.7)
Drinking water	1.4 (0.8, 2.5)	3.6 (2.4, 5.5)	2.8 (1.6, 4.9)	2.6 (1.7, 3.9)	2.6 (1.8, 3.8)
Cooking fuel, gas, electricity	1.1 (0.6, 1.9)	3.5 (2.4, 5.1)	2.4 (1.3, 4.4)	2.4 (1.6, 3.6)	2.4 (1.7, 3.5)
Other household assets	2.6 (1.6, .2)	1.4 (0.9, 2.2)	2.1 (1.0, 4.6)	1.9 (1.4, 2.7)	2.0 (1.4, 2.7)
Other <sup>a</sup>	3.0 (1.9, 4.8)	4.5 (3.2, 6.3)	4.5 (2.7, 7.3)	3.9 (2.8, 5.3)	4.0 (3.0, 5.4)
No unmet need	1.5 (0.7, 3.2)	5.1 (3.5, 7.4)	2.6 (1.0, 6.7)	3.7 (2.4, 5.8)	3.5 (2.3, 5.3)
<b>Any unmet need by sector</b>					
Food	66.8 (62.2, 71.1)	66.2 (62.3, 69.9)	66.4 (60.7, 71.7)	66.5 (63.1, 69.7)	66.5 (63.3, 69.5)
Nonfood item	29.7 (26.5, 33.2)	30.8 (27.0, 34.9)	24.8 (19.8, 30.6)	31.7 (28.7, 34.8)	30.4 (27.5, 33.5)
Health	20.9 (18.0, 24.3)	33.5 (30.4, 36.9)	35.5 (30.8, 40.6)	26.1 (23.7, 28.7)	27.8 (25.4, 30.2)
Shelter	45.3 (40.8, 49.8)	9.8 (7.8, 12.1)	24.1 (18.9, 30.2)	25.4 (22.1, 29.0)	25.3 (22.1, 28.8)
WASH	5.2 (3.8, 7.2)	12.2 (9.2, 16.1)	8.5 (5.7, 12.5)	9.1 (6.9, 11.9)	9.0 (6.9, 11.7)
Education	7.3 (5.6, 9.5)	9.2 (7.2, 11.8)	8.3 (5.5, 12.2)	8.7 (7.1, 10.7)	8.7 (7.1, 10.5)
Livelihoods	1.8 (0.7, 4.6)	3.2 (2.2, 4.6)	1.2 (0.5, 2.9)	3.2 (2.1, 4.8)	2.8 (1.8, 4.3)
Other	14.8 (11.1, 19.5)	23.8 (19.1, 29.2)	21.7 (15.7, 29.1)	19.4 (15.8, 23.6)	19.7 (16.0, 24.1)
<b>Receipt of humanitarian assistance in month preceding assessment</b>					
Any assistance received	60.1 (54.0, 65.8)	33.4 (28.1, 39.1)	49.5 (43.2, 55.8)	44.1 (39.6, 48.7)	45.1 (40.6, 49.7)
≥ 2 types of assistance received	15.6 (11.3, 21.1)	8.6 (6.4, 11.6)	13.2 (9.7, 17.7)	11.1 (8.7, 14.2)	11.6 (9.1, 14.7)
<b>Receipt of assistance by type</b>					
Food items	57.6 (51.4, 63.7)	31.0 (26.0, 36.3)	46.7 (40.6, 52.9)	41.7 (37.3, 46.3)	42.7 (38.2, 47.2)
Hygiene kits	8.3 (5.3, 12.7)	4.9 (2.9, 8.0)	5.2 (2.8, 9.3)	6.6 (4.7, 9.2)	6.4 (4.5, 9.0)
Food voucher	2.0 (1.3, 3.3)	3.0 (1.9, 4.6)	3.1 (1.8, 5.1)	2.4 (1.7, 3.5)	2.5 (1.8, 3.6)
Health care	2.1 (1.3, 3.6)	2.3 (1.5, 3.3)	2.6 (1.4, 4.7)	2.1 (1.5, 3.1)	2.2 (1.6, 3.1)
Unconditional cash	2.5 (1.4, 4.7)	1.8 (0.9, 3.4)	4.0 (2.0, 7.9)	1.7 (1.1, 2.7)	2.1 (1.3, 3.4)
Other types of assistance <sup>b</sup>	6.2 (4.6, 8.3)	2.4 (1.6, 3.6)	5.4 (3.7, 7.9)	3.7 (2.9, 4.8)	4.2 (3.3, 5.3)

Note. CI = confidence interval; WASH = water, sanitation, and hygiene.

<sup>a</sup>Includes psychosocial; fuel; cooking kits; sanitation; water or water storage items; rent subsidy; shelter materials or repairs; education materials; furniture, clothing, or household items; and other types.

<sup>b</sup>Includes categories reported by < 1% of households (vocational training, agricultural inputs, psychosocial support, youth activities, transportation, sanitation improvements, and kitchen utensils).

than 5 years; 37.1% (95% CI = 34.3, 40.0) had adults older than 60 years. Many households had members with special needs, the most common being chronic health conditions, reported by 43.3% (95% CI = 40.5, 46.1) of households; disabled members (12.6% of households; 95% CI = 11.1, 14.2); and pregnant or lactating women (7.7% of households; 95% CI = 6.5, 9.2).

## Shelter

Most families resided in unshared houses or apartments (89.2%; 95% CI = 86.6, 91.3); displaced households were significantly less likely to live in unshared dwellings compared with non-displaced households (80.7% vs 95.8%;  $P < .001$ ; Table 1). The proportion of households reporting renting or owning their accommodation, indicating more stable residence, was also significantly lower among displaced households in which arrangements were less formal and more tenuous (76.4% vs 96.8%;  $P < .001$ ). Crowding was not a major concern; only 11.6% (95% CI = 9.6, 14.0) of households reported 5 or more people per sleeping room, though a significantly higher proportion of displaced households (17.1%; 95% CI = 14.4, 20.3) reported crowding than nondisplaced households (7.4%;  $P < .001$ ). Overall, more than half (62.1%; 95% CI = 57.8, 66.2) of households resided in dwellings in good condition with the remaining 37.9% (95% CI = 33.8, 42.2) reporting various repair needs and safety concerns; dwelling concerns were more frequently reported by displaced than nondisplaced households (49.2% vs 29.2%;  $P < .001$ ).

We observed no significant differences in residence type, arrangement, crowding, or condition concerns between female- and male-headed households (Table 1). Despite relatively good outcomes reported for individual shelter indicators, overall, 48.3% (95% CI = 44.3, 52.3) of households reported any of these shelter concerns. Overall shelter concerns were similar in female-headed and male-headed households ( $P = .452$ ); however, displaced households were 3.79 (95% CI = 2.86, 5.03) times more likely to have a shelter concern than were nondisplaced households.

## Food Security

Food security was an area of considerable concern. The primary measure was the Food Consumption Score (FCS). Overall, 75.9% (95% CI = 72.4, 79.1) of households had an acceptable FCS; however, displaced and female-headed households were worse off by this metric (Table 1).<sup>17</sup> A significantly lower proportion of displaced households had an acceptable FCS compared with nondisplaced households (68.1% vs 81.7%;  $P < .001$ ) and female-headed households were significantly less likely than male-headed households to have an acceptable FCS (66.7% vs 78.0%;  $P < .001$ ). The proportion of households dedicating 75% or more of monthly expenditures to food purchases was 12.8% (95% CI = 10.2, 16.0); this proportion was similar in displaced versus nondisplaced households and female- versus male-headed households ( $P = .070$  and  $P = .321$ , respectively).

Use of any extreme coping mechanisms (e.g., reducing portion size; reducing number of meals eaten per day; reduced adult consumption to allow children to eat; restricting consumption by female household members; going entire days without eating; selling household assets, productive assets, house, or land; withdrawing children from school; involving children in income generation; engaging in high-risk or socially degrading jobs; sending members to eat elsewhere; and child marriage) was reported by 54.3% (95% CI = 50.1, 58.3) of households overall, and was significantly higher among the displaced compared with the nondisplaced (63.9% vs 46.7%;  $P < .001$ ) and similar between male- and female-headed households ( $P = .634$ ). More than half (65.3%; 95% CI = 61.6, 68.8) of households were distressed according to 1 or more of the food security indicators discussed. There were no significant differences in food security concerns between female- and male-headed households ( $P = .180$ ); however, displaced households were 1.98 (95% CI = 1.57, 2.51) times more likely to have a food insecurity concern compared with nondisplaced households.

## Water and Sanitation

Water access was fair with 36.4% (95% CI = 30.4, 42.7) of households reporting not having access to water 24 hours a day and 48.0% (95% CI = 42.1, 53.9) without water

access for several days at a time in the 3 months preceding the survey (Table 1). These indicators were similar between displaced and nondisplaced households ( $P = .907$  and  $P = .280$ , respectively), although we observed significant differences between female- and male-headed households. The proportion of female-headed households reporting not having access to water 24 hours a day was significantly higher than among male-headed households (42.1% vs 35.2%;  $P = .037$ ), as was the proportions of households without water access for several days at a time (53.7% vs 46.7%;  $P = .027$ ).

Use of improved toilet facilities (as defined by the World Health Organization/UNICEF Joint Monitoring Programme for Water Supply and Sanitation<sup>23</sup>) was reported by 86.1% (95% CI = 82.3, 89.2) of households overall, and, though similar between female- and male-headed households ( $P = .409$ ), unimproved toilet facilities were significantly more common among displaced compared with nondisplaced households (19.0% vs 10.1%;  $P < .001$ ). Shared toilet facilities were reported by 6.0% (95% CI = 4.8, 7.4) of households overall, and this was significantly higher among displaced households (9.1% vs 3.5%;  $P < .001$ ), though similar between female- and male-headed households ( $P = .484$ ). The majority of households (80.9%; 95% CI = 78.2, 83.4) were able to access adequate soap and hygiene products, but this proportion was significantly lower among displaced compared with non-displaced households (76.0% vs 84.7%;  $P < .001$ ) and among female-headed compared with male-headed households (76.1% vs 81.9%;  $P = .006$ ). Many households (66.2%; 95% CI = 60.6, 71.3) were in need according to 1 or more of the discussed WASH indicators. Although the proportion of households reporting WASH concerns was similar in displaced and nondisplaced households ( $P = .058$ ), odds of WASH concerns were 1.38 (95% CI = 1.06, 1.82) times higher for female-headed than male-headed households.

## Education and Unmet Needs

School attendance was high compared with other recent estimates, with 83.5% (95% CI = 80.8, 85.9) of households with school-aged children reporting that all

children currently attended school (Table 1).<sup>24</sup> Differences in school attendance were not statistically significant between female- and male-headed households (79.0% vs 84.2%;  $P = .054$ ) but were statistically significant between displaced and nondisplaced households (78.8% vs 89.7%;  $P < .001$ ). The odds of any child in the household not attending school were 2.48 (95% CI = 1.71, 3.60) times higher among displaced households than nondisplaced households, indicating greater challenges in education attendance among internally displaced populations.

Unmet needs were nearly ubiquitous with 96.5% (95% CI = 94.7, 97.7) of households reporting 1 or more unmet need. The most frequently reported priority needs included more food (29.4%), rent support or improved shelter (15.4%), health services or medications (11.2%), improved security (10.8%), and better quality food (9.4%; Table 2). When assessed by sector, food (66.5%), NFIs (30.4), health (27.8%), and shelter (25.3%) were the highest reported unmet needs (reported either as first-priority or second-priority unmet need). Unmet needs were higher among displaced than nondisplaced households (98.5% vs 94.9%;  $P < .001$ ) and types of priority unmet need also differed (Table 2); by contrast, the proportion with unmet needs was similar among female- and male-headed households ( $P = .498$ ). Unmet health needs were reported by a greater proportion of nondisplaced compared with displaced households (33.5% vs 20.9%;  $P < .001$ ) as were WASH needs (12.2% vs 5.2%;  $P < .001$ ); however, shelter needs were more common among displaced households (45.3% vs 9.8%;  $P < .001$ ). When analyzed by household head gender, we observed statistically significant differences in unmet needs in the NFI, health, and livelihoods sectors. Male-headed households had greater NFI and livelihoods needs than female-headed households (31.7% vs 24.8%;  $P = .018$  NFIs; 3.2% vs 1.2%;  $P < .001$  livelihoods); however, a significantly greater proportion of female-headed households reported unmet health needs (35.5% vs 26.1%;  $P = .010$ ).

### Receipt of Humanitarian Assistance

Humanitarian assistance was received by 45.1% (95% CI = 40.6, 49.7) of households

in the month preceding the survey with 11.6% receiving multiple types of aid (Table 2). The most frequent assistance received was food items (42.7% of households) and hygiene kits (6.4%); 2.5% or less received aid in each of the other categories. Receipt of assistance was significantly higher among displaced than nondisplaced households (60.1% vs 33.4%;  $P < .001$ ). Displaced households were more likely to receive food assistance (57.6% vs 31.0%;  $P < .001$ ) and multiple types of assistance (15.6% vs 8.6%;  $P = .004$ ) compared with nondisplaced households. Receipt of humanitarian assistance also differed significantly by household head gender with a larger proportion of female-headed households receiving assistance (49.5% vs 44.1%;  $P = .030$ ). Receipt of multiple types of aid was similar between the 2 groups ( $P = .140$ ) whereas female-headed households were more likely than male-headed households to receive food (46.7% vs 41.7%;  $P = .041$ ) and cash assistance (4.0% vs 1.7%;  $P = .005$ ).

Results of univariate and multivariate logistic regression for predictors of receipt of humanitarian assistance are presented in Table 3. Receipt of any humanitarian aid was significantly associated with female household head, monthly expenditure quartile, and population type in both univariate and multivariate regression analyses. We observed no significant differences in receipt of humanitarian assistance by crowding, household head educational attainment, or presence of child household members in the final adjusted model. In the final model, female-headed households were 1.29 (95% CI = 1.04, 1.60) times more likely to receive humanitarian assistance than male-headed households and displaced households were 2.99 (95% CI = 2.13, 4.19) times more likely to receive assistance than were conflict-affected households. When compared by socioeconomic status, households in the lowest monthly expenditure quartile were the most likely to receive humanitarian aid; compared with the lowest expenditure quartile, adjusted odds of receiving aid were 29% (95% CI = 6%, 47%) lower for households in the second quartile and 26% (95% CI = 0%, 46%) lower in the highest quartile; the adjusted association for the

third quartile was not statistically significant ( $P = .070$ ).

### DISCUSSION

This is the only recent quantitative humanitarian assessment that covers a significant proportion of Syria; a detailed analysis of humanitarian needs by sector and geographic region is presented elsewhere (S. Doocy and E. Lyles, written communication, March 8, 2017). It is important to note that we conducted this assessment in government-controlled areas, which are less likely to have been directly impacted by the conflict and likely experienced lesser amounts of violence and infrastructure destruction than inaccessible and non-government-controlled areas.<sup>25,26</sup> Services are likely to be more accessible and functioning in areas included in the assessment than elsewhere in Syria. Furthermore, the sample was from predominantly urban areas, which are likely to have better access to services than rural areas.<sup>2</sup> Findings should not be generalized to Syria more broadly because of these contextual differences and the likely greater humanitarian needs in non-government-controlled areas compared with locations included in this assessment. Despite that, this study characterizes important humanitarian needs among 2 common vulnerable groups—displaced and female-headed households—and offers a useful examination of humanitarian assistance targeting by select household characteristics. Findings indicate that both displaced and female-headed households were more vulnerable than were nondisplaced and male-headed households, respectively, and for many indicators, displaced households were worse off than female-headed households.

There is limited recent primary evidence of needs and vulnerability of Syrian households, and little to no data are provided on disparities by displacement status or by household head gender. Despite the dearth of primary data, some reports indicate overall increased vulnerability of female-headed households with the changing social dynamics in Syria.<sup>27,28</sup> With respect to shelter, displaced households were the most vulnerable population group, which is perhaps not

TABLE 3—Odds of Receiving Humanitarian Assistance: Syria, 2016

Variable	Sample Characteristics		Odds of Receiving Humanitarian Assistance <sup>a</sup>	
	Assistance Received (n = 1085), % (95% CI)	No Assistance Received (n = 1320), % (95% CI)	Crude OR (95% CI)	Adjusted OR (95% CI)
Female-headed household	19.4 (16.8, 22.3)	16.2 (14.1, 18.6)	1.25 (1.02, 1.52)	1.29 (1.04, 1.60)
Household with children	68.7 (64.0, 73.0)	62.7 (58.8, 66.3)	1.31 (1.06, 1.61)	1.09 (0.87, 1.36)
Crowding (≥ 5 people/sleeping room)	11.8 (9.4, 14.7)	11.4 (8.7, 14.9)	1.04 (0.71, 1.50)	...
Monthly expenditure quartile				
Lowest	25.2 (21.0, 29.8)	19.6 (17.0, 22.5)	1 (Ref)	1 (Ref)
Second	20.5 (18.0, 23.2)	22.5 (19.8, 25.4)	0.71 (0.54, 0.94)	0.71 (0.53, 0.94)
Third	21.0 (18.1, 24.3)	22.3 (20.0, 24.9)	0.73 (0.52, 1.03)	0.72 (0.51, 1.03)
Highest	33.4 (29.5, 37.5)	35.5 (31.9, 39.3)	0.73 (0.53, 1.01)	0.74 (0.54, 1.00)
Household head education				
None	14.3 (11.6, 17.5)	14.2 (11.7, 17.1)	1 (Ref)	
Primary	24.7 (21.5, 28.2)	26.7 (23.7, 29.8)	0.92 (0.70, 1.20)	...
Preparatory	21.8 (19.3, 24.6)	18.5 (16.0, 21.2)	1.17 (0.82, 1.67)	...
Secondary or higher	39.2 (33.9, 44.7)	40.7 (36.1, 45.4)	0.95 (0.65, 1.40)	...
Population type				
Conflict-affected <sup>b</sup>	40.9 (35.0, 47.1)	67.2 (61.2, 72.7)	1 (Ref)	1 (Ref)
Displaced	56.9 (50.5, 63.0)	31.1 (25.7, 37.0)	3.01 (2.16, 4.18)	2.99 (2.13, 4.19)
Returnee <sup>c</sup>	2.2 (1.2, 4.1)	1.7 (0.9, 3.3)	2.08 (1.36, 3.19)	2.08 (1.37, 3.14)

Note. CI = confidence interval; OR = odds ratio.

<sup>a</sup>Model selection based on adjusted Wald test results, which indicated that covariates with nonsignificant univariate associations do not significantly improve the model fit ( $P = .183$ ).

<sup>b</sup>Conflict-affected include nondisplaced households within Syria that have been, directly or indirectly, affected by the conflict.

<sup>c</sup>Returnees include those previously displaced for a time that have since returned to their original home.

unexpected. The greatest shelter needs were for repairs, which are particularly important given the onset of winter. A substantially larger number of IDPs in need of shelter and NFIs were identified in United Nations Office for the Coordination of Humanitarian Affairs' 2016 Syria Humanitarian Response Plan (4.3 million vs 3.1 million host community members) and this is reflected in the number of people targeted for shelter or NFI assistance with 3.6 million IDPs targeted compared with 2.6 million host community members.<sup>2</sup> With respect to water and sanitation, access to water was a greater concern than access to sanitation; however, contrary to other sectors, displacement status was not related to water access. Instead, female-headed households reported inferior access to water as well as greater needs for hygiene items suggesting that female-headed households should be prioritized for water and sanitation interventions.

With respect to food security, both female-headed and displaced households were significantly more likely to have

inadequate food consumption and displaced households had the highest rates of adverse coping mechanism use. Interestingly, displaced households were most likely to receive food assistance, indicating that the scale and amount of assistance provided are potentially insufficient—in particular for displaced populations—given the high level of food insecurity that persists. This conflicts with United Nations Office for the Coordination of Humanitarian Affairs—reported figures on food security needs that, despite reporting IDP and female-headed households among the most vulnerable groups, place host communities at a greater need (4.7 million host community members with food security need vs 4 million IDPs) and targeting figures (4 million host community members targeted for food security assistance vs 3.5 million IDPs).<sup>2</sup> Going forward, food and cash assistance programs should target both female-headed and displaced households, although displaced households should be prioritized as they appear to be the most food insecure.

Despite overall high attendance rates, school attendance was lower among displaced households, indicating that this group could benefit from additional targeting of assistance. As reported elsewhere, cost was a major barrier to enrollment, which could be addressed relatively easily through humanitarian programs.<sup>24</sup> One potential explanation for reported high attendance is that the assessment focused on urban locations in government-controlled areas, where destruction was not as widespread and where services are likely still functioning. At the start of 2016, the number of IDPs in need of education assistance (5.4 million) was 18 times that of host community members (0.3 million), supporting the evidence of higher need in these populations.<sup>2</sup> Finally, female-headed households reported the greatest unmet health needs, suggesting that this could benefit from targeted health interventions or other interventions aimed at addressing health service access and use.



## Limitations

Triangulation and the stratified design may have reduced sampling bias, but given the limitations of available population data and ongoing displacement, it is likely the sample is unrepresentative. Many areas were inaccessible; thus, findings are not nationally representative and probably present a better-than-actual characterization of the situation in which the most severely affected areas with the greatest unmet needs were inaccessible; this was especially true in Aleppo, one of the most severely impacted areas, where the majority of the city was inaccessible.<sup>29</sup>

The training-of-trainer method, particularly given the extended period between trainings and use of paper questionnaires in some locations, may have contributed to poor data quality. Because of length limitations, we did not assess some key sectors including health, NFIs, and protection in sufficient depth to triangulate and, thus, they are not presented.

## Public Health Implications

Targeting of humanitarian assistance appeared appropriate with displaced, female-headed households and households with lower socioeconomic status being more likely to receive humanitarian assistance than were corresponding comparison groups. However, despite approximately half of surveyed households reporting receipt of humanitarian assistance in the preceding month and apparently effective targeting of assistance, unmet needs were nearly ubiquitous. Though needs reported in this article focus on shelter, food security, WASH, and education, deficiencies in these areas are closely associated with overall population health. Inadequate shelter and WASH increases risk to exposure, injuries, and communicable diseases, among other health risks, and food security is associated with poor health states ranging from malnutrition to noncommunicable diseases.<sup>30,31</sup> Similarly, education has been tied to morbidity, mortality, and other health risk factors in various settings.<sup>32</sup>

Such links between deficiencies in these sectors and poor population health represent additional cause for concern for those in Syria. The humanitarian situation in areas not accessible to the survey team is likely to be

considerably worse; thus, findings presented here likely underestimate the true scope of humanitarian needs. As the conflict endures, response capacity will continue to be limited, because of both access restrictions and funding shortfalls, and the situation is likely to worsen.<sup>15</sup> Efforts to expand support to Syria's most vulnerable households—both in terms of coverage levels and amounts—are desperately needed as are innovative targeting and transfer modalities that can enable more efficient and effective humanitarian assistance. **AJPH**

## CONTRIBUTORS

S. Doocy was involved in the study design, provided technical support during data collection and analysis, and led the writing of the article. E. Lyles provided technical support during planning and implementation, led data analysis, and was involved in writing the article.

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## HUMAN PARTICIPANT PROTECTION

The Johns Hopkins School of Public Health (JHSPH) institutional review board determined that JHSPH was not engaged in human research because JHSPH had no interaction with human participants and was not obtaining identifiable data.

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