

# Quantifying movement patterns and vaccination status of high risk mobile populations in Pakistan and Afghanistan to inform poliovirus risk and vaccination strategy

(Supplementary Information)

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# 1 Methods

## 1.1 Definition of High Risk and Mobile Population (HRMP) types

HRMPs are classified into eight types based on their primary purpose of travel, including:

**Figure S1:** Definition of High Risk and Mobile Population (HRMP) types

HRMP type	Definition
<b>Nomads</b>	Nomad is a person with no settled home, who moves from place to place as a way of obtaining food, finding pasture for livestock, or otherwise making a living
<b>Seasonal Migrants</b>	Seasonal migrants are the individuals or groups that have settled home but move from one place to another due to change in season and come back to their place once the season is over e-g the movement from colder areas to hotter areas in winters and vice versa
<b>Agricultural migrants</b>	Agricultural migrant labour are the group of people that move from one place to another and provide agricultural labour e.g. harvesting, sowing. The timings of the movement depend on the crop season during the year
<b>Brick Kiln workers</b>	People involved in the process of brick making
<b>Economic migrants</b>	All other vulnerable migrant groups including beggars who move from one place to another for economic reasons.
<b>Internally displaced-person (IDPs)</b>	Displaced-persons are Pakistani's who have been forcibly displaced from their residence to some other place to seek safety from conflict, war, security situation, natural calamity etc.
<b>Returnees (EDPs)</b>	Returnees are Pakistani's who sought safety from conflict, war, security situation, natural calamity in another country and are voluntarily returning to Pakistan.
<b>Afghan Refugee</b>	Refugees are foreigners who have been forcibly displaced from their residence due to conflict, war, security situation, natural calamity etc. and have sought refuge in Pakistan.

## 1.2 Geodata

National, provincial and district boundaries for Pakistan and Afghanistan were obtained from the World Health Organization (WHO). The geographic size of provinces in Afghanistan are similar to districts in Pakistan and therefore, provinces were used as the geographic scale in Afghanistan (Figure S2).

**Figure S2:** Map of Pakistan and Afghanistan, with the first-level administrative boundaries.



## 2 Results

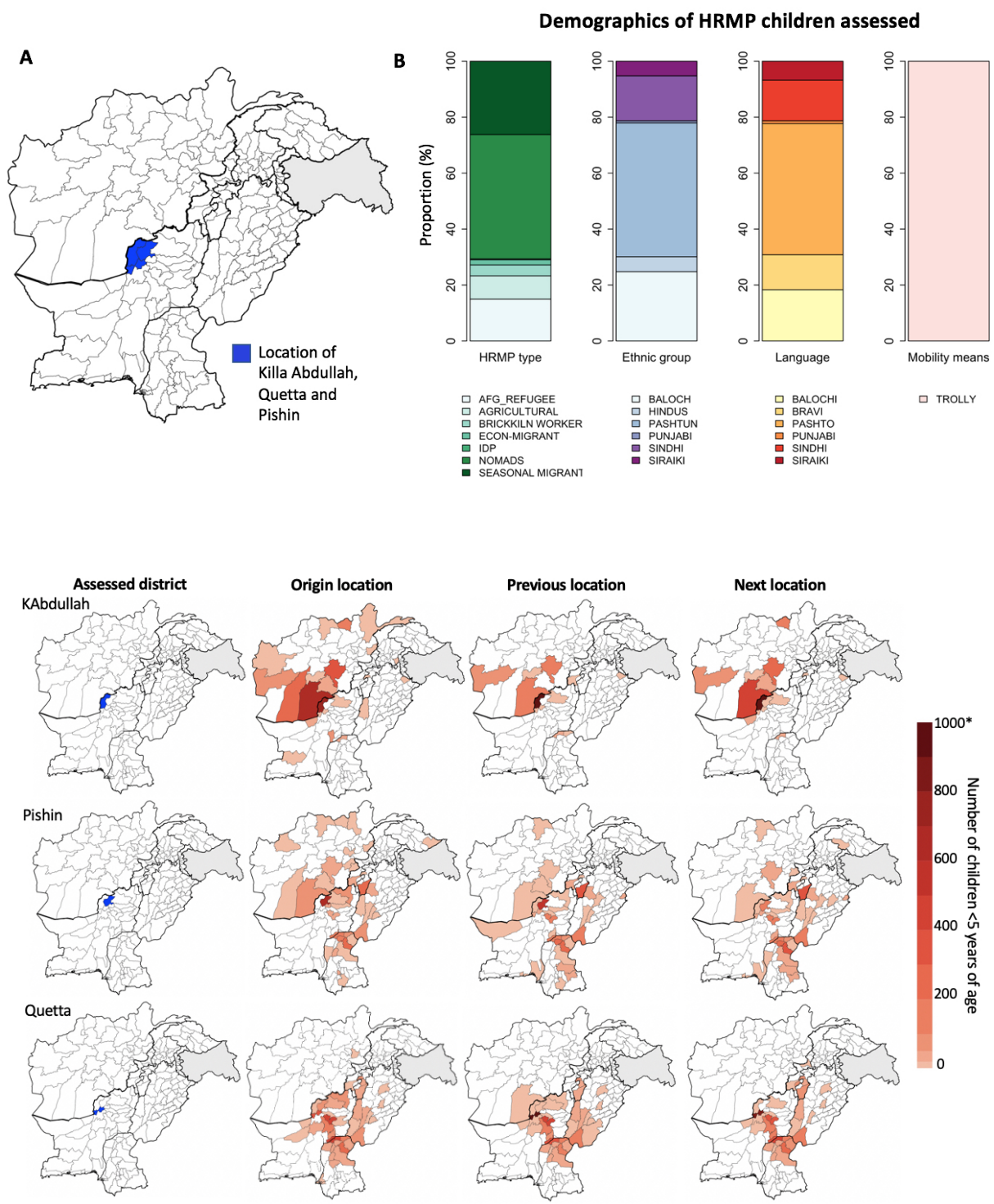
### 2.1 District-level HRMP assessment results

Here we present the detailed demographic information, movement patterns (overall and by HRMP type) and vaccination status for select district assessed.

#### 2.1.1 Quetta Block (Quetta, Killa Abdullah and Pishin districts)

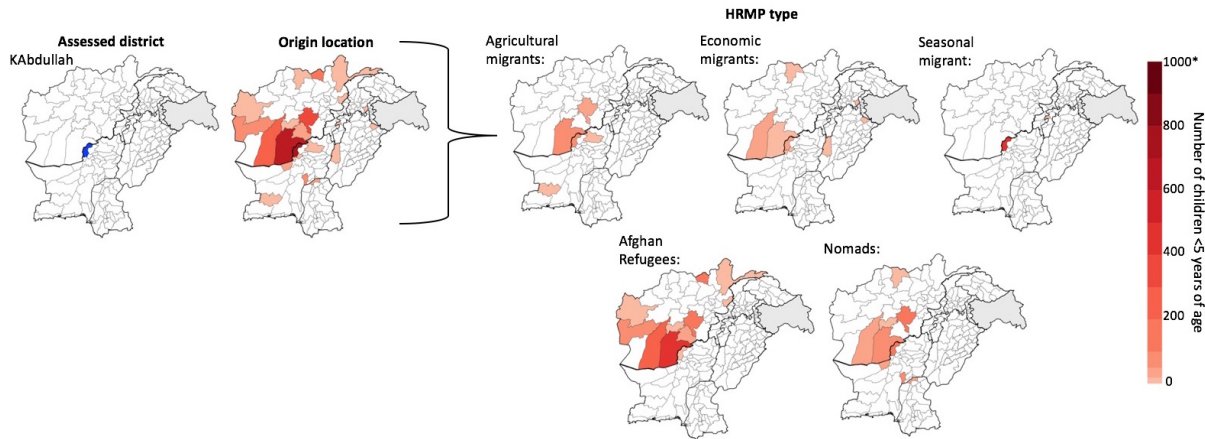
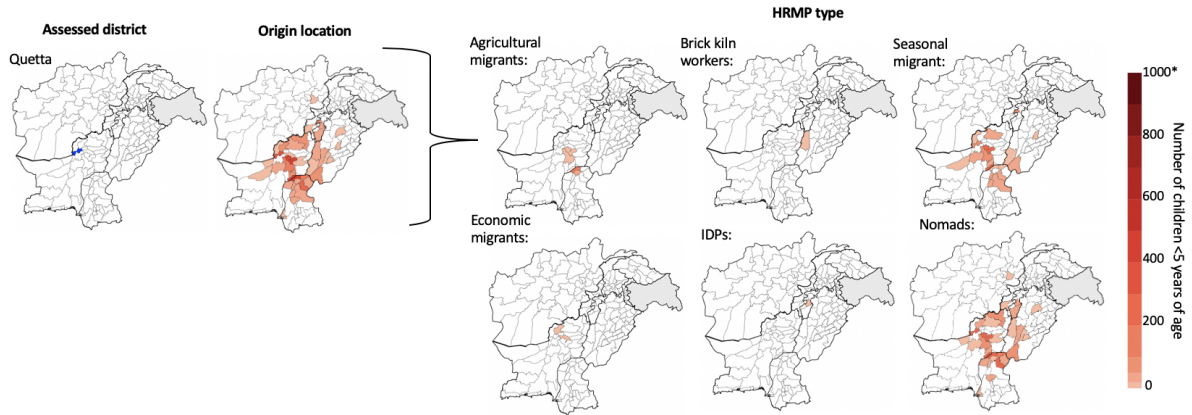
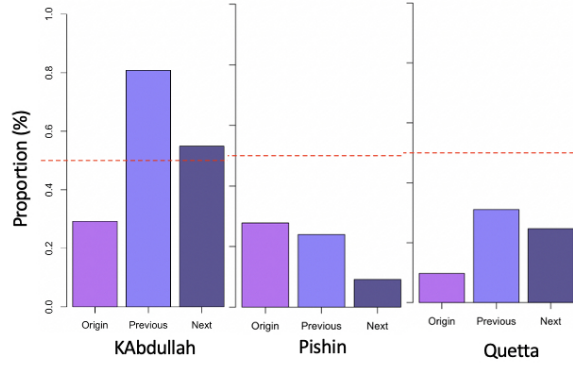
Assessment conducted in July 2017. Total number of children <5 years of age assessed was 2,441 (Killa Abdullah), 3,278 (Quetta) and 2,181 (Pishin)

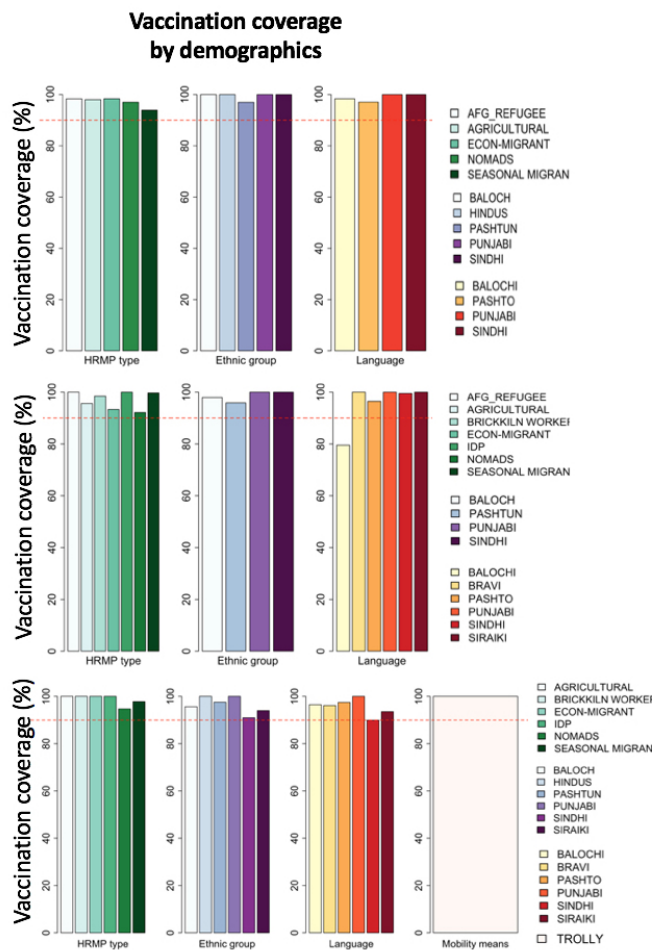
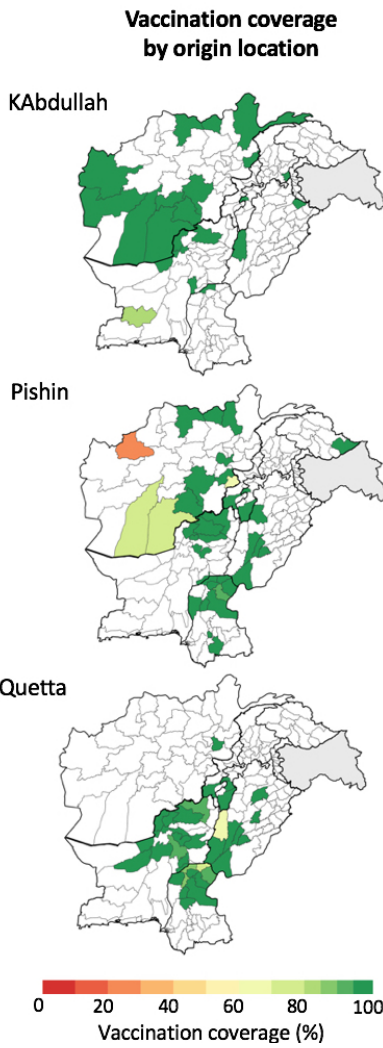
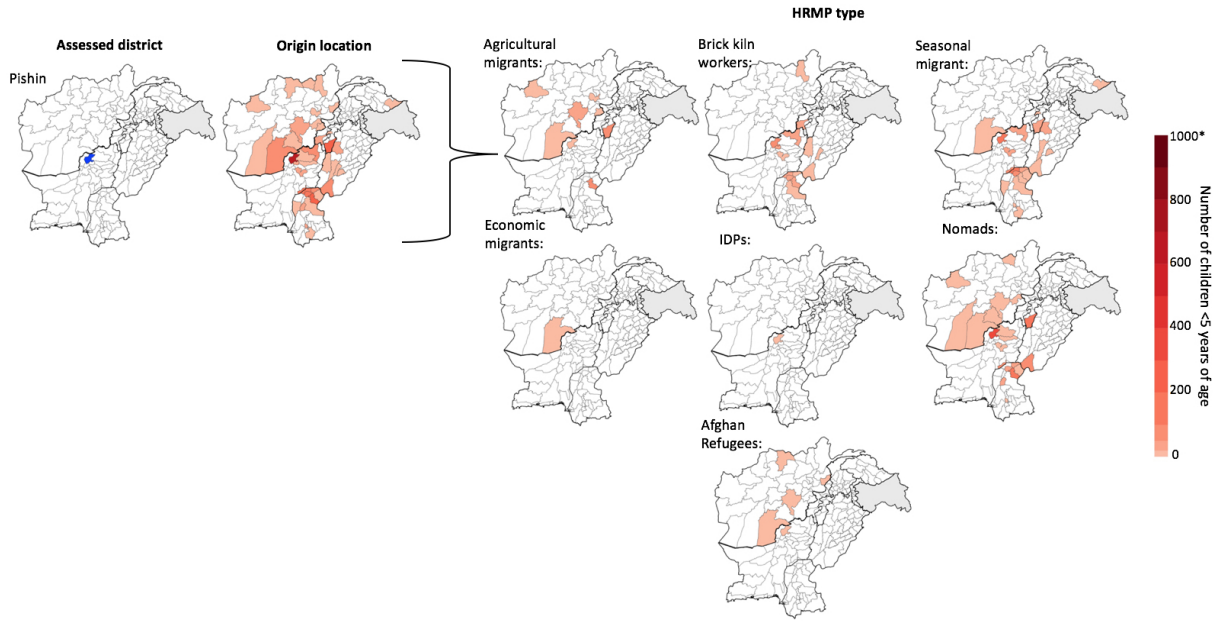
**Figure S3:** Demographics, movement patterns and vaccination status of HRMP children assessed in Quetta Block.





**Proportion of total movement coming from within district  
(based on origin, previous and next location)**

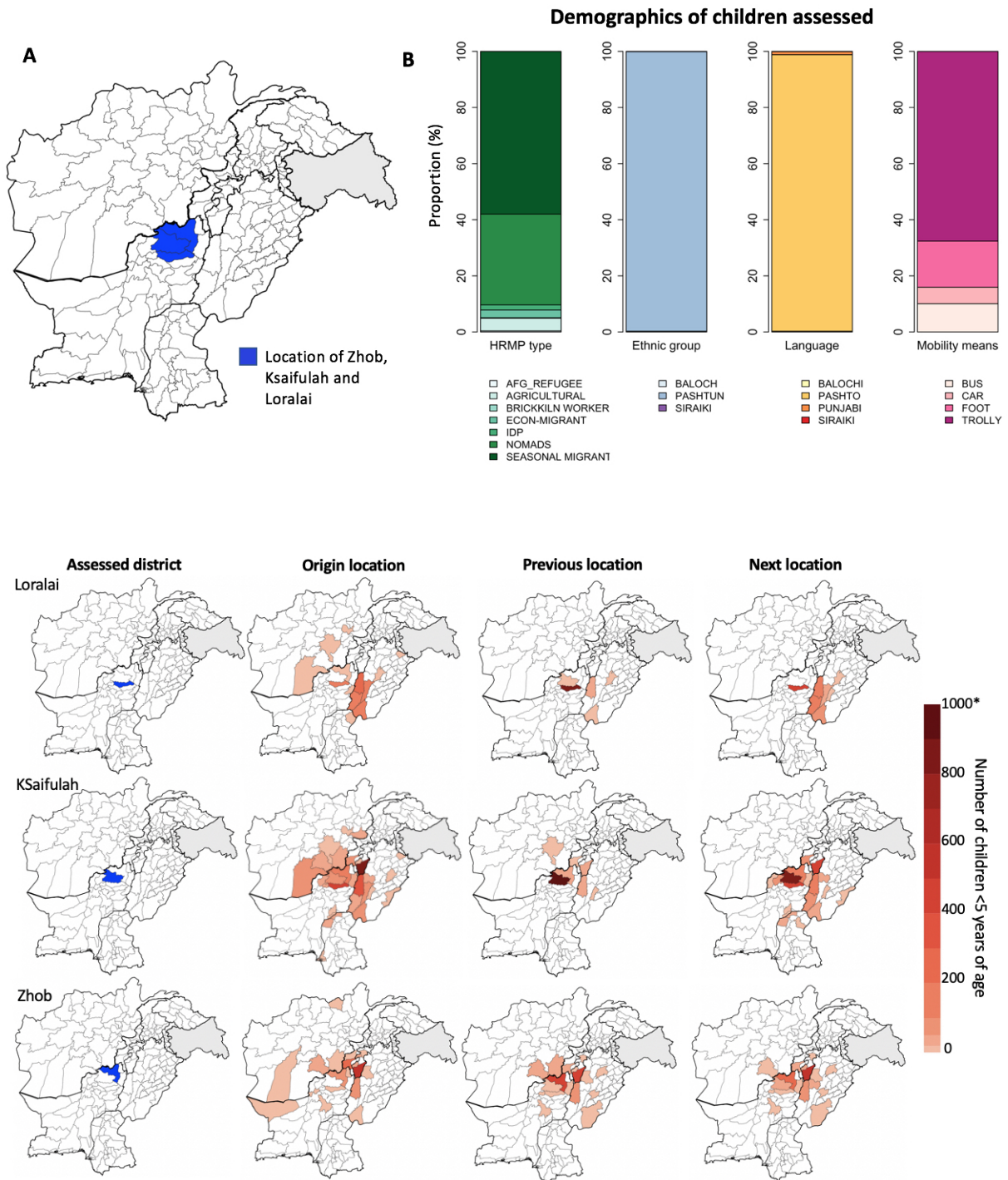




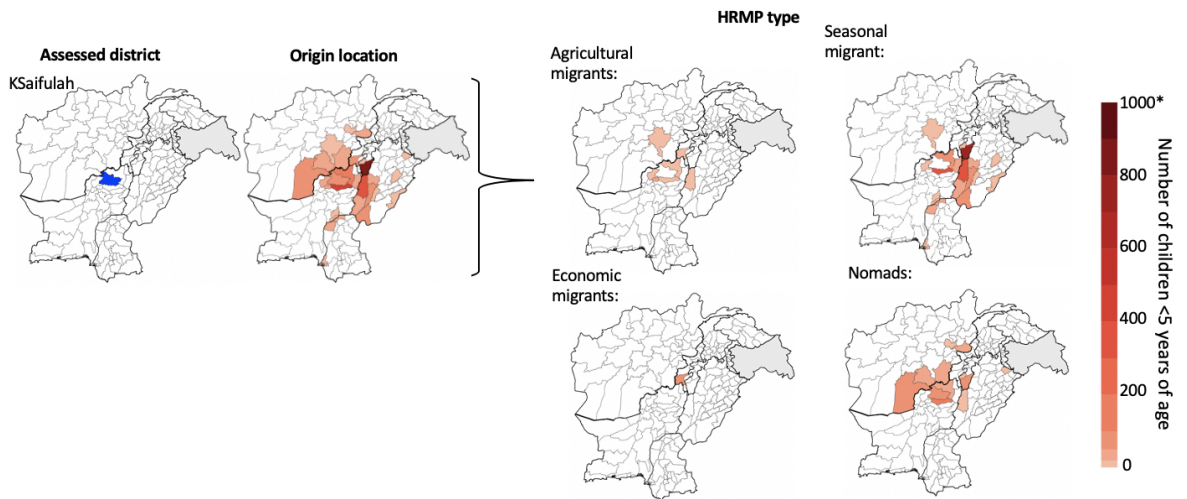
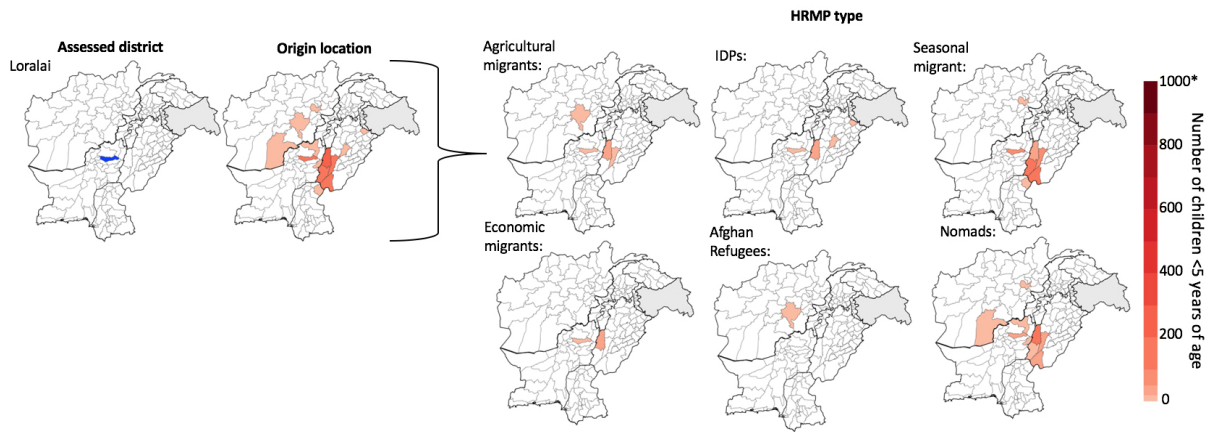
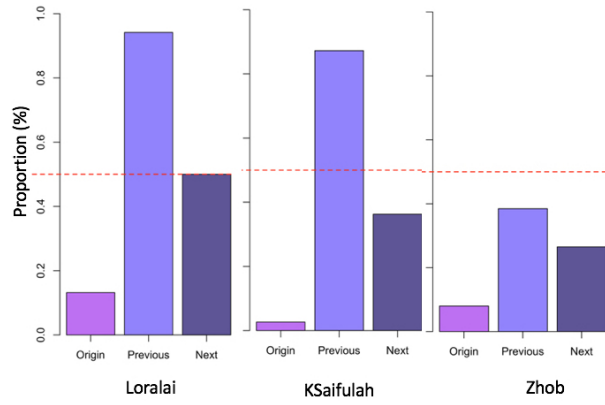
### 2.1.2 Zhob Division (Zhub, Killa Saifullah and Loralai districts)

Assessment conducted in August 2017. Total number of children <5 years of age assessed was 1,102 (Zhub), 2,462 (Ksaifullah) and 888 (Loralai)

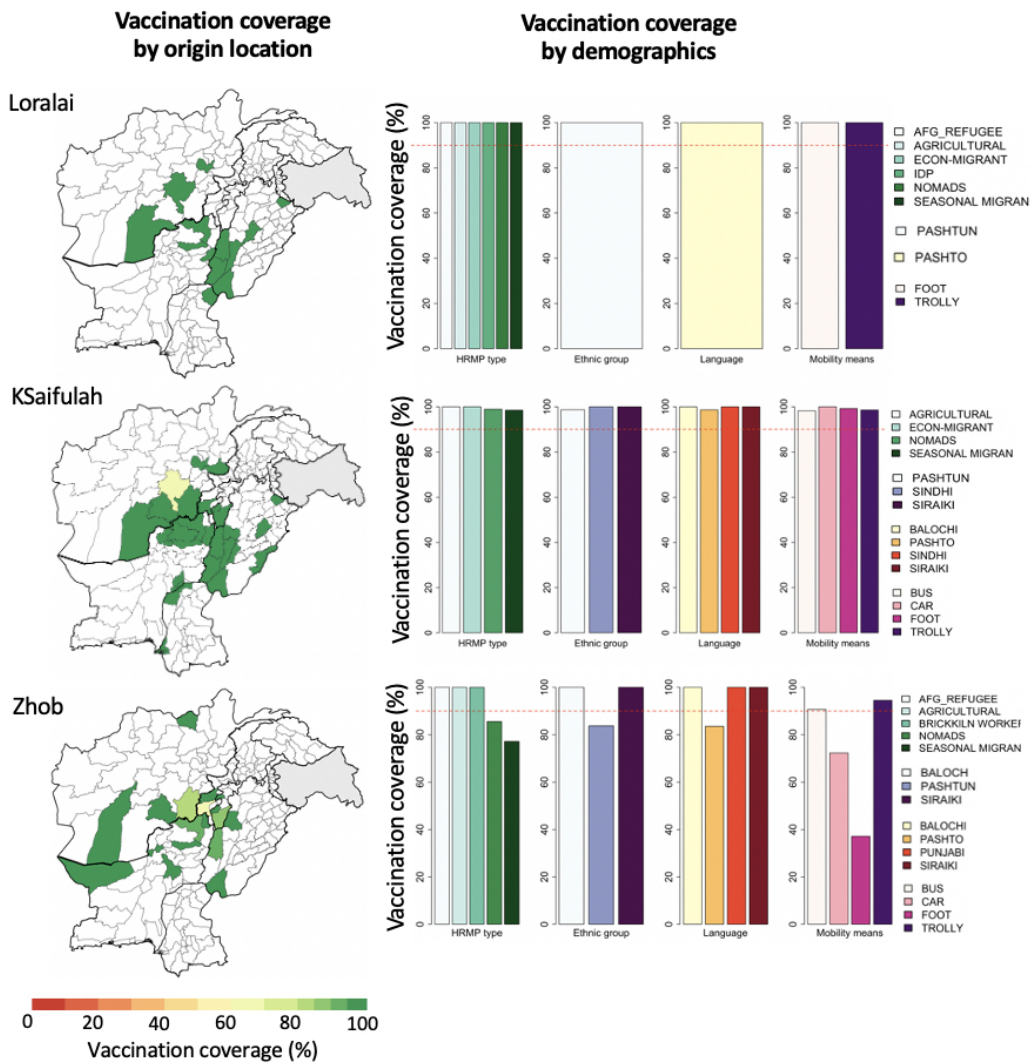
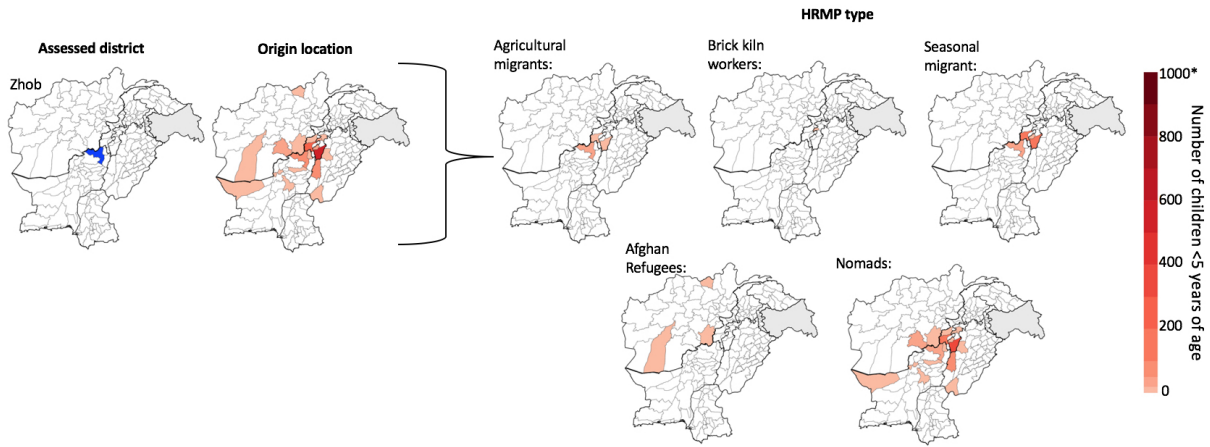
**Figure S4:** Demographics, movement patterns and vaccination status of HRMP children assessed in Zhob Division.



**Proportion of total movement coming from within district  
(based on origin, previous and next location)**



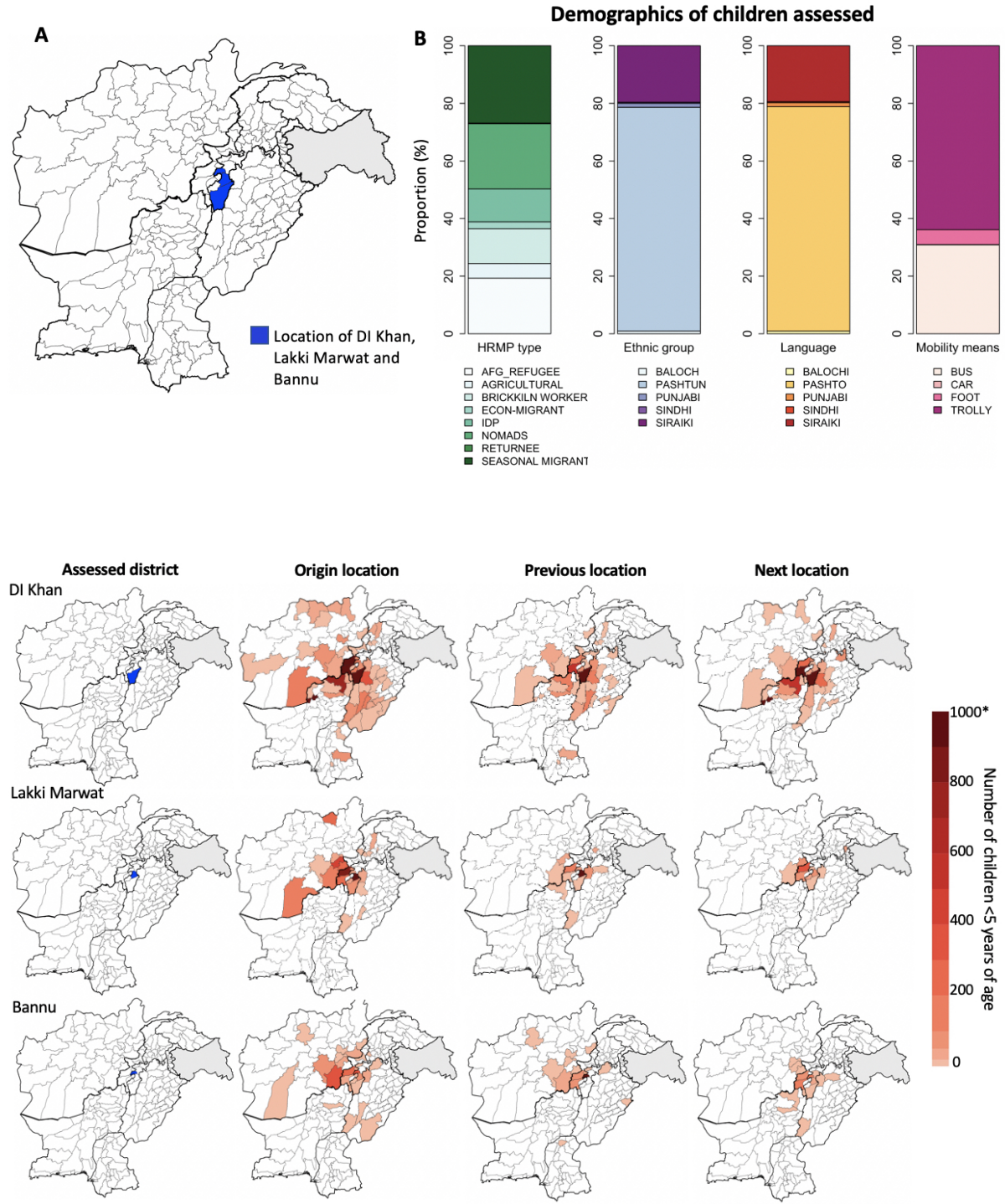




### 2.1.3 South KP (DI Khan, Lakki Marwat and Bannu districts)

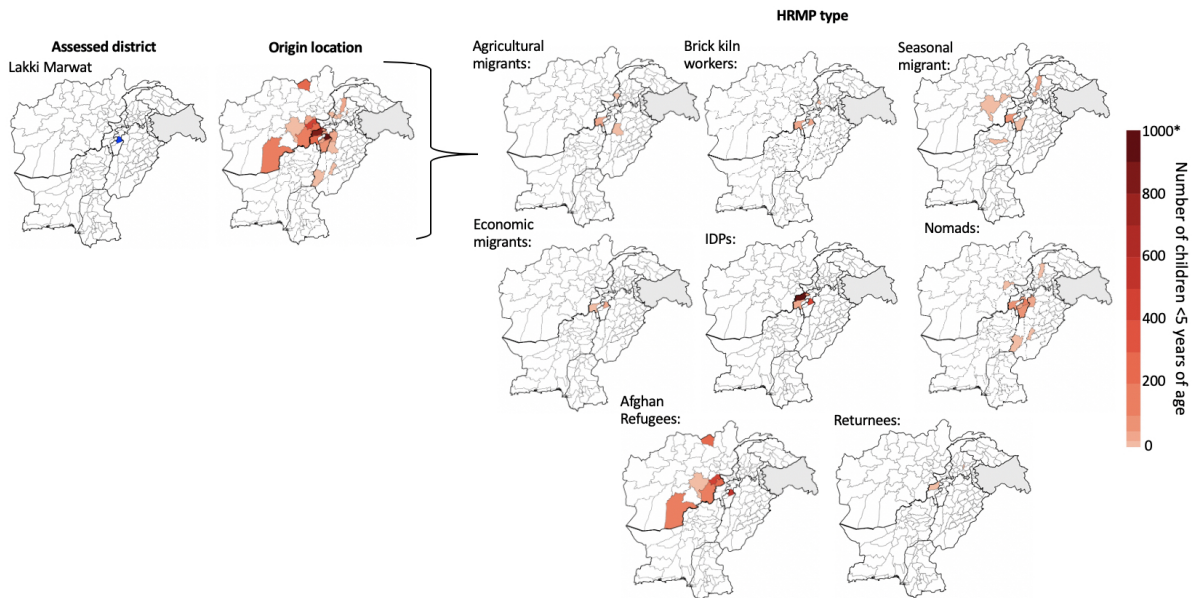
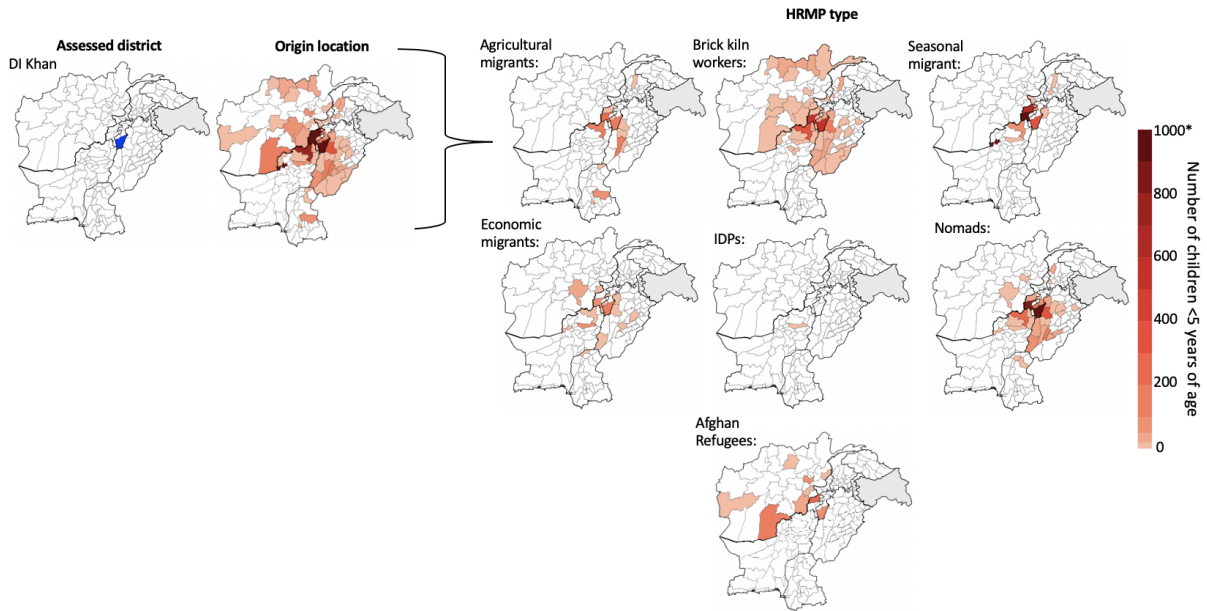
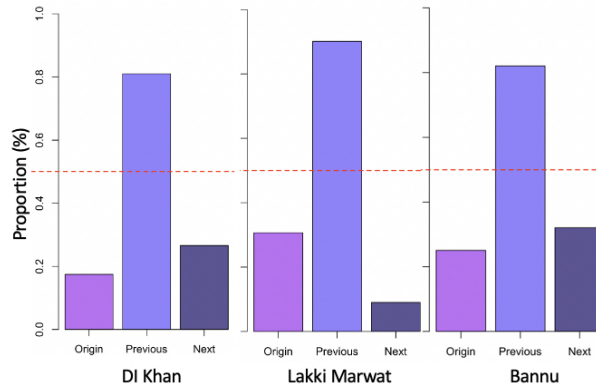
Assessment conducted in January 2018. Total number of children <5 years of age assessed was 9,166 (DI Khan), 3,788 (Lakki Marwat) and 1,404 (Bannu)

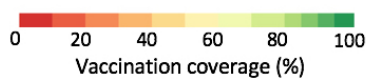
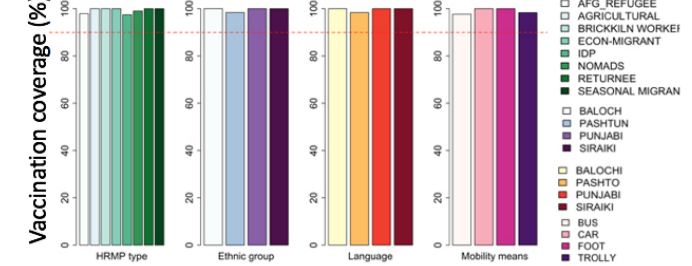
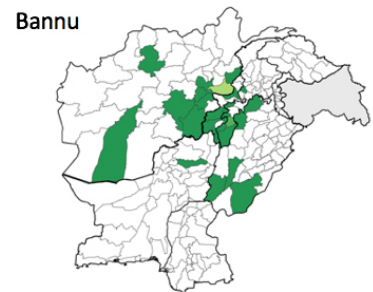
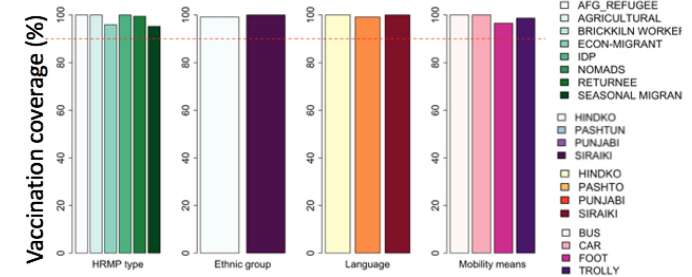
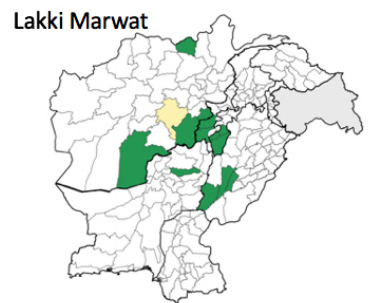
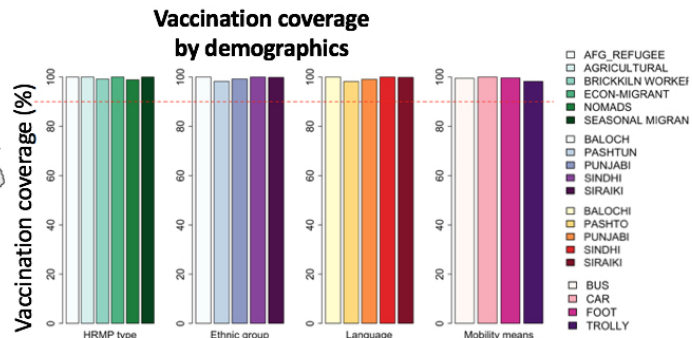
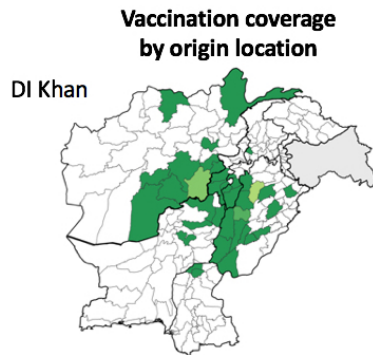
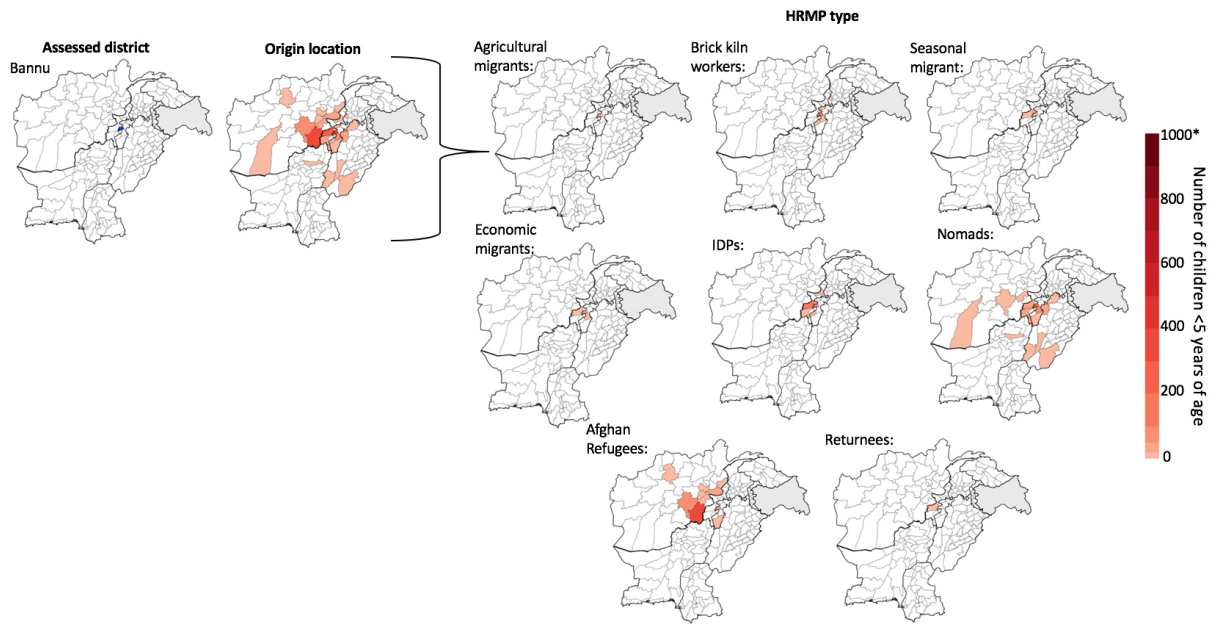
**Figure S5:** Demographics, movement patterns and vaccination status of HRMP children assessed in South KP.





**Proportion of total movement coming from within district  
(based on origin, previous and next location)**

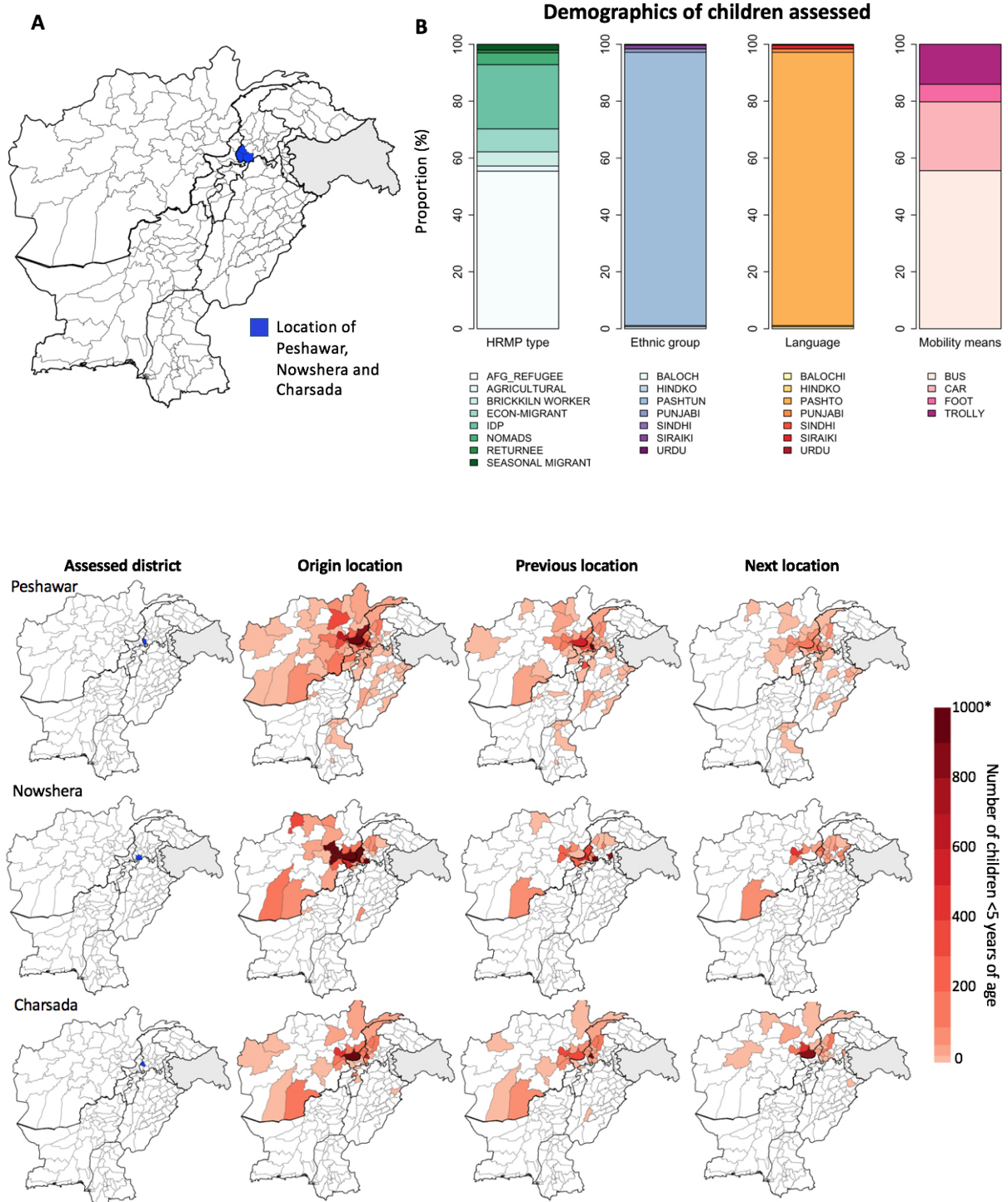




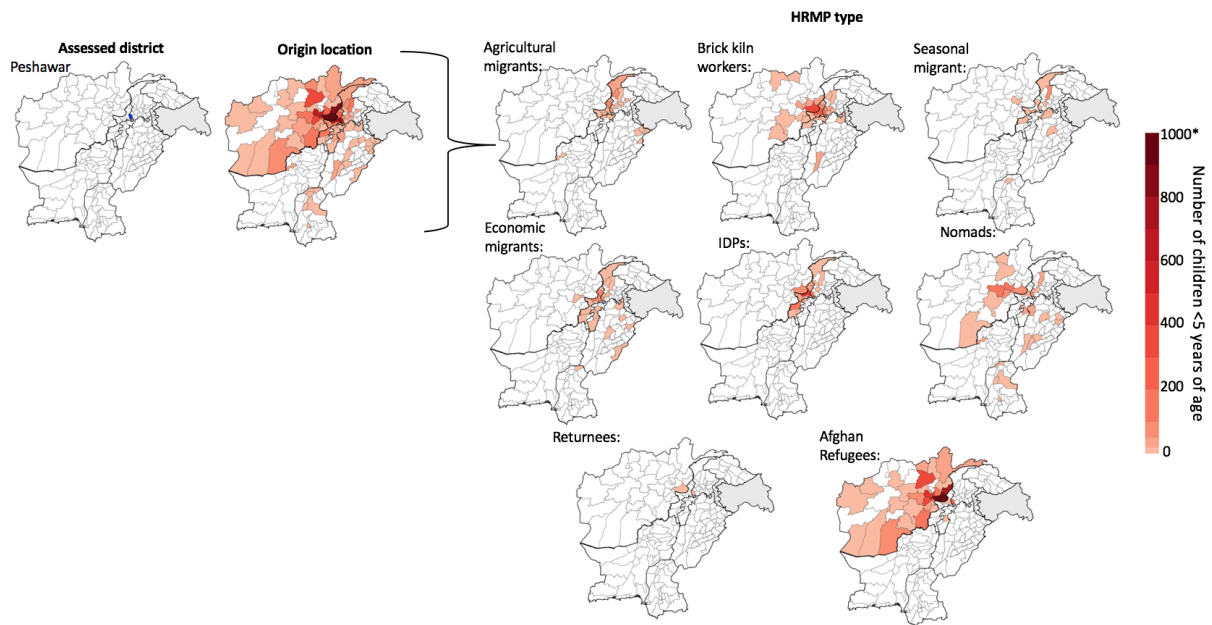
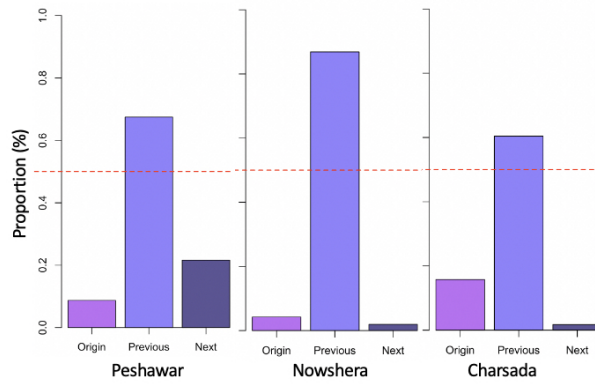
### 2.1.4 North KP (Peshawar, Nowshera and Charsada districts)

Assessment conducted in January 2018. Total number of children <5 years of age assessed was 8,361 (Peshawar), 28,785 (Nowshera) and 4,218 (Charsada)

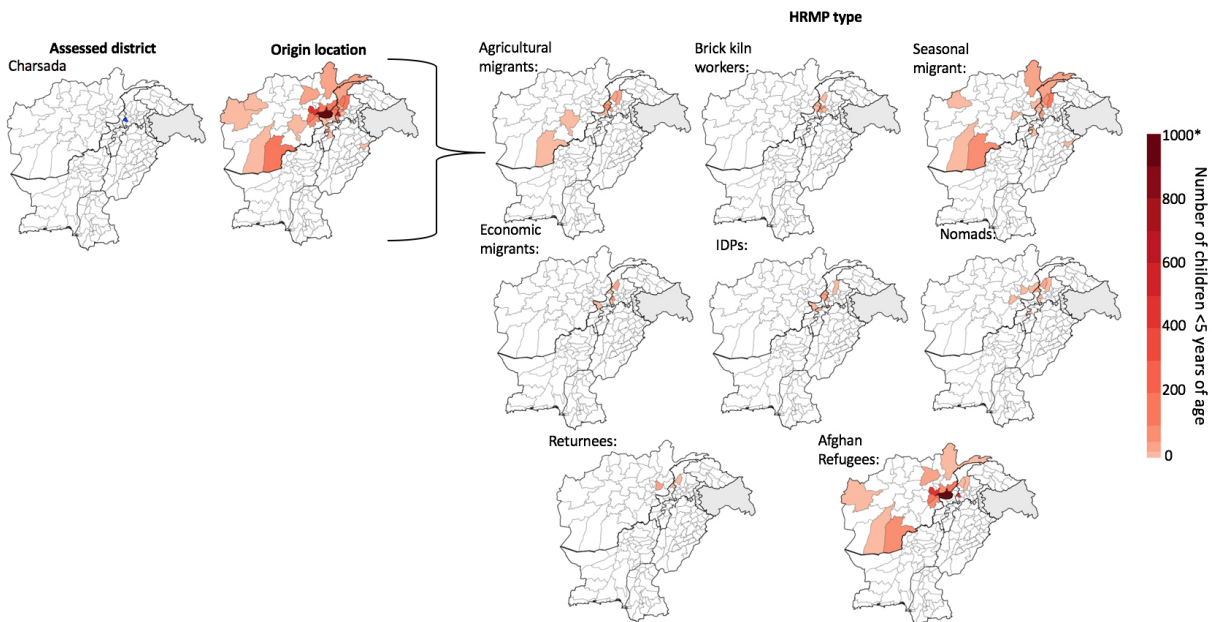
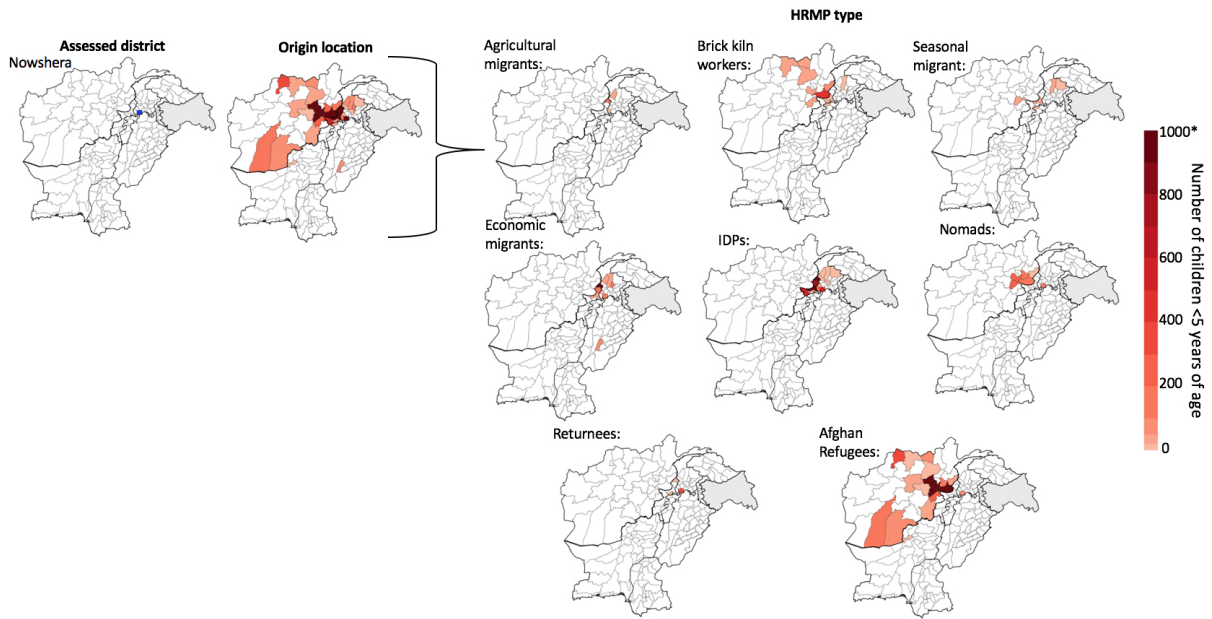
**Figure S6:** Demographics, movement patterns and vaccination status of HRMP children assessed in North KP.

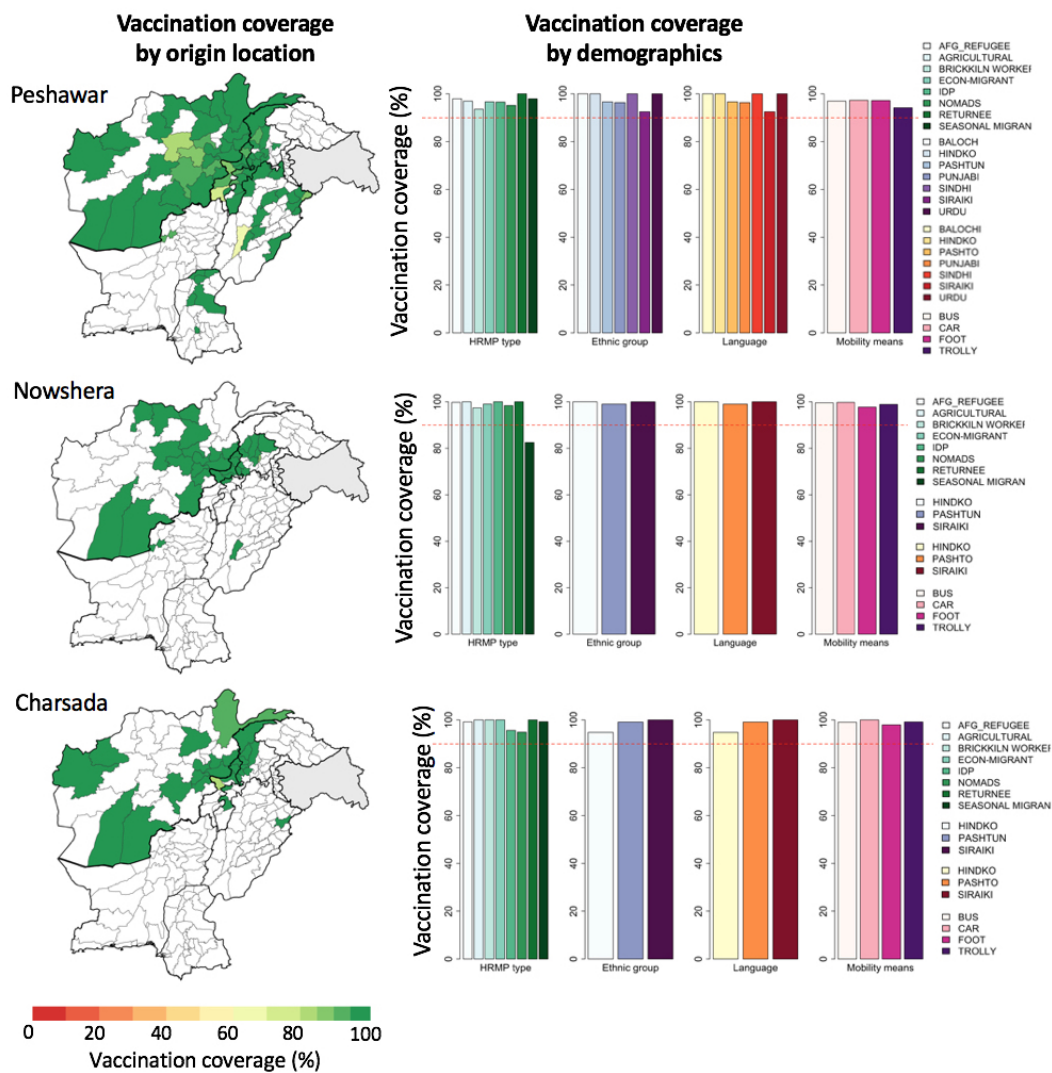


**Proportion of total movement coming from within district  
(based on origin, previous and next location)**







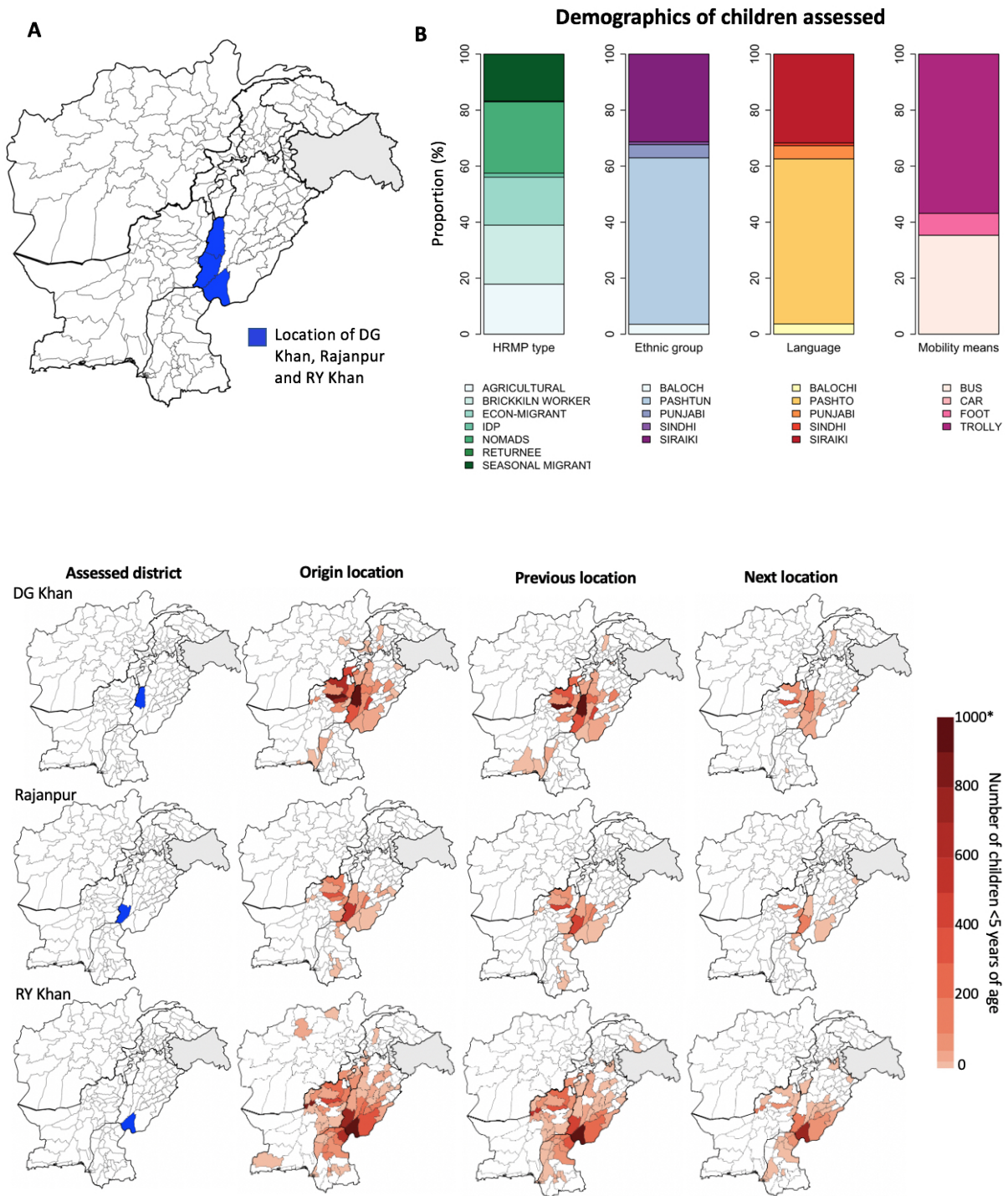


### 2.1.5 South Punjab (DG Khan, Rajanpur and RY Khan districts)

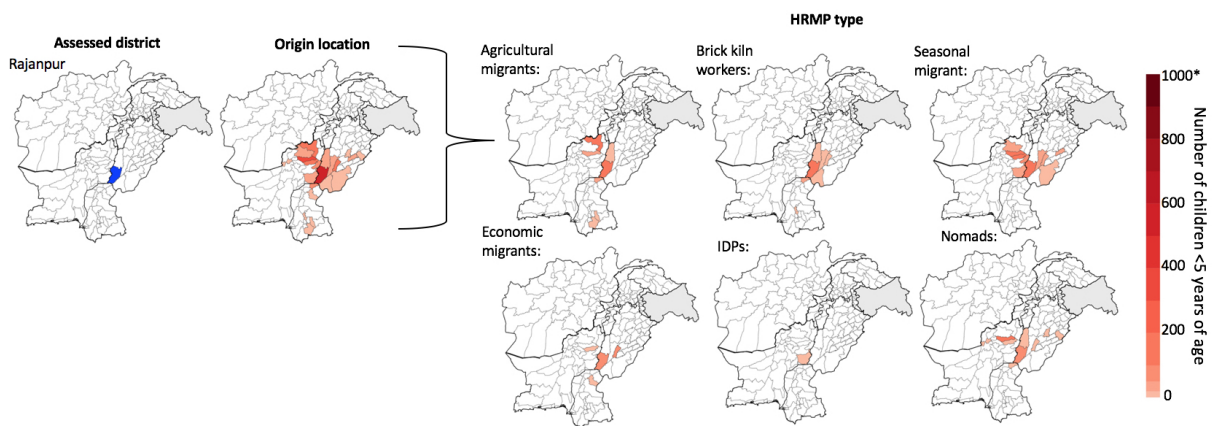
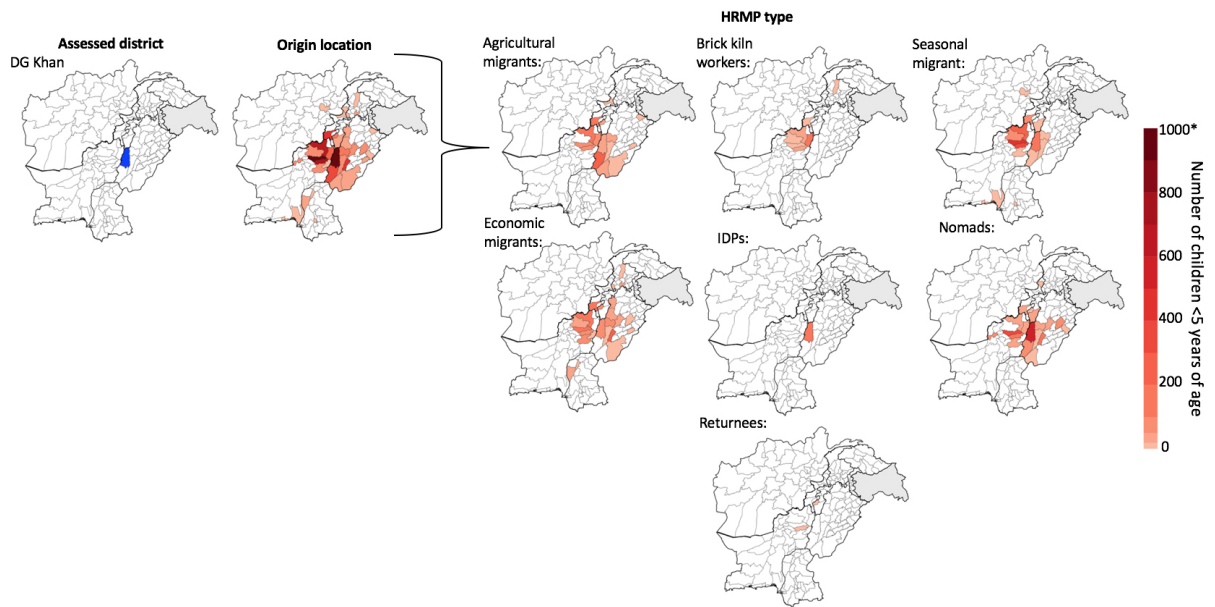
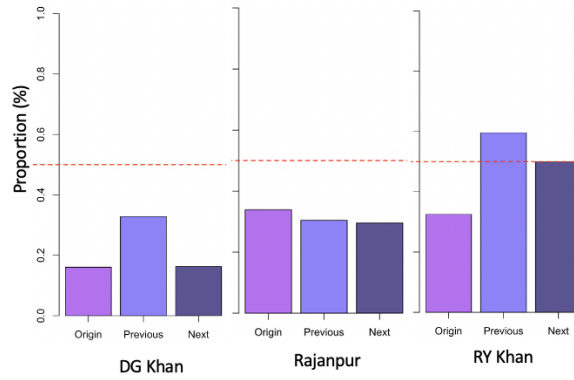
Assessment conducted in October 2017. Total number of children <5 years of age assessed was 5,797 (DG Khan), 1,598 (Rajanpur) and 9,448 (RY Khan)

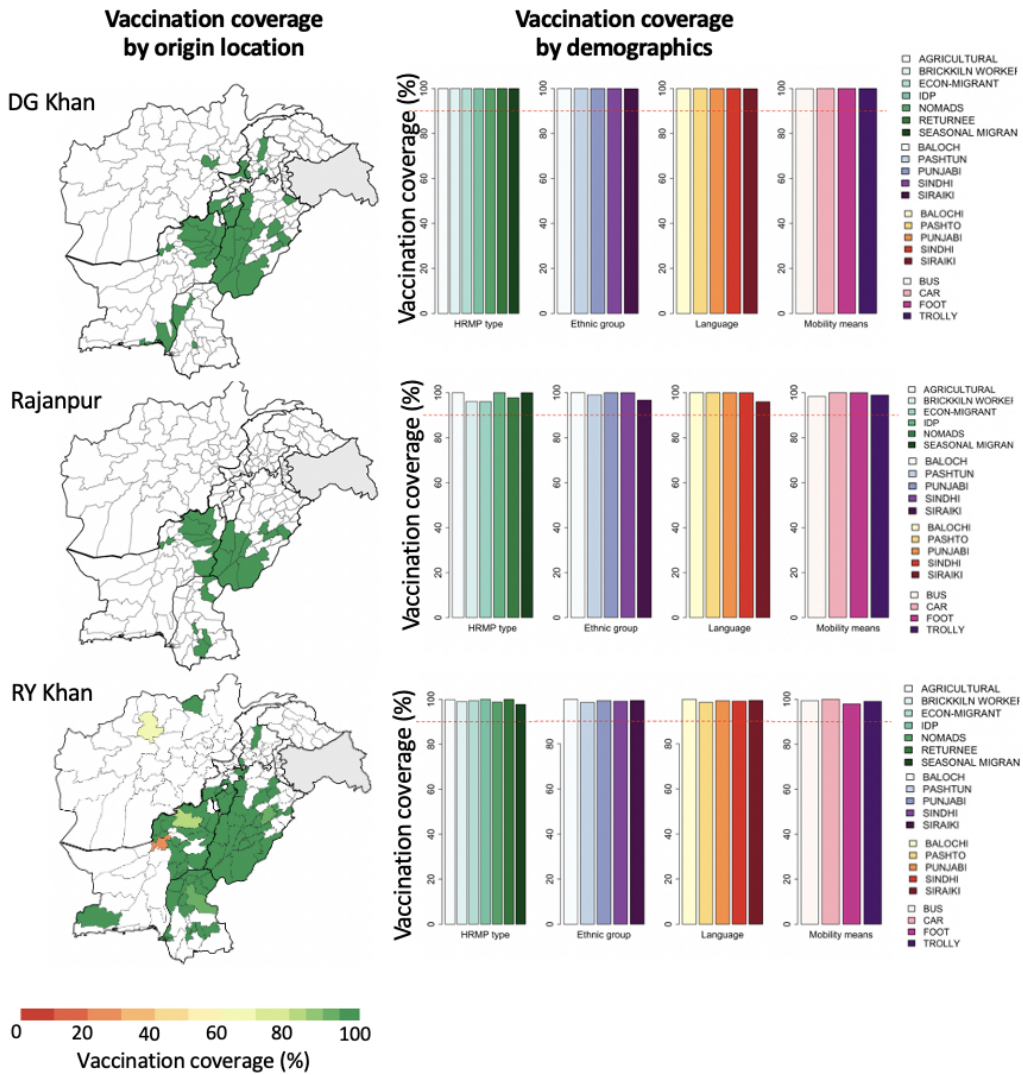
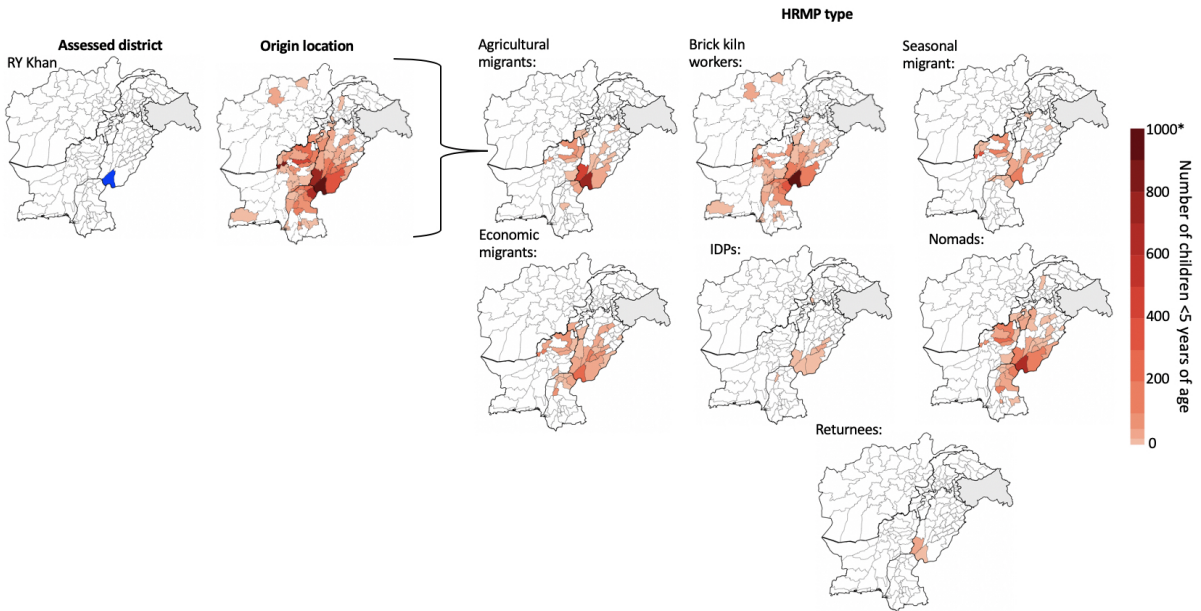


**Figure S7:** Demographics, movement patterns and vaccination status of HRMP children assessed in South Punjab.



**Proportion of total movement coming from within district  
(based on origin, previous and next location)**



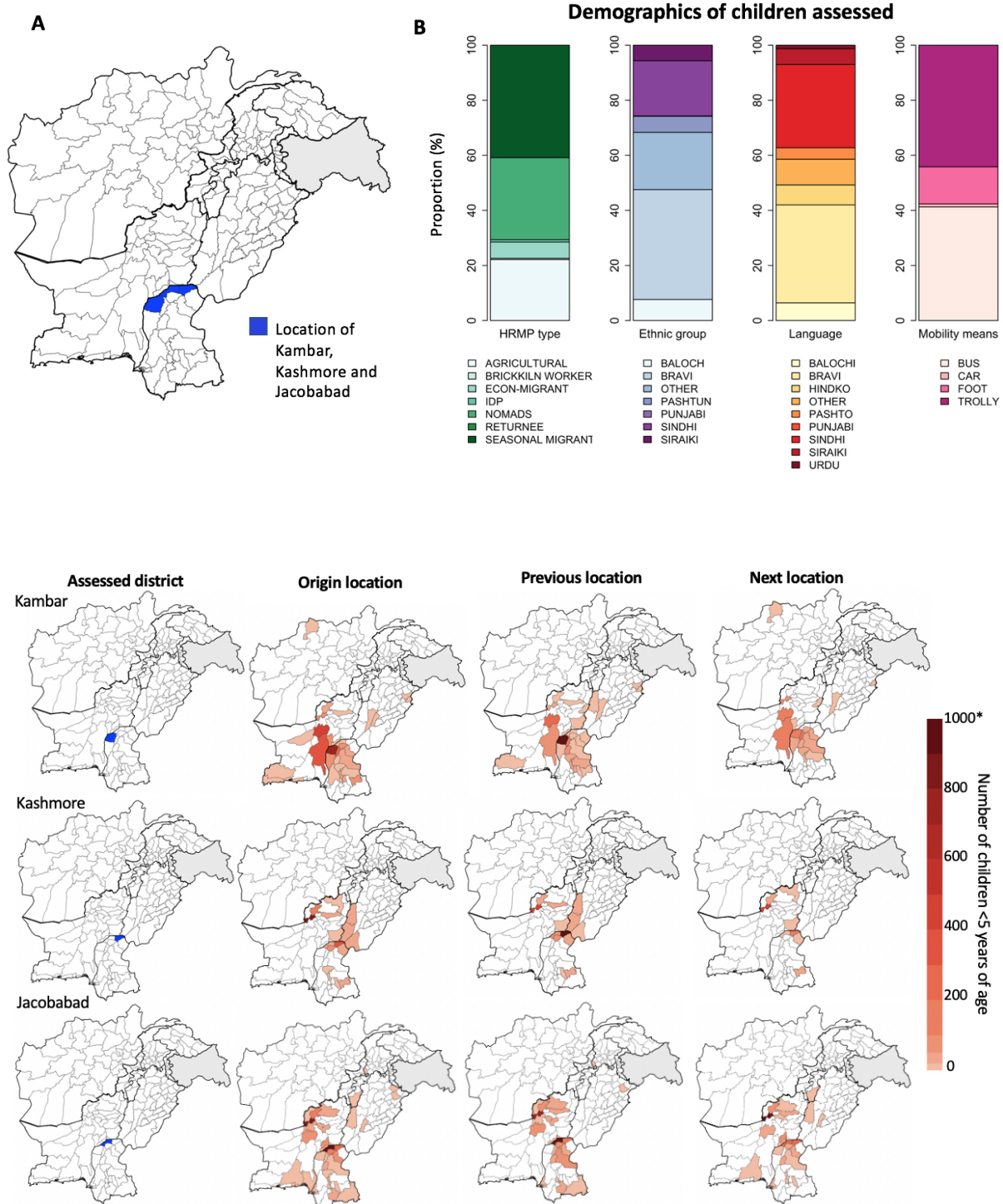




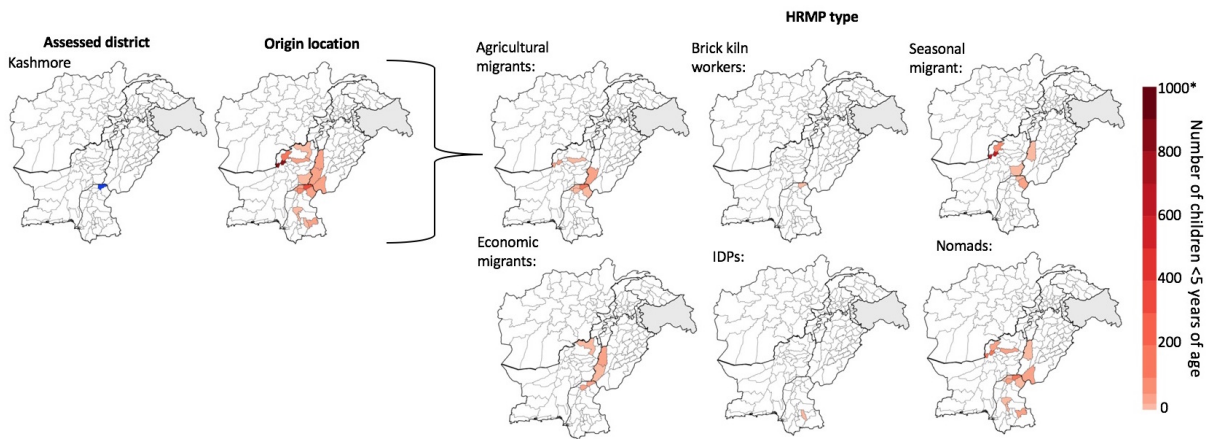
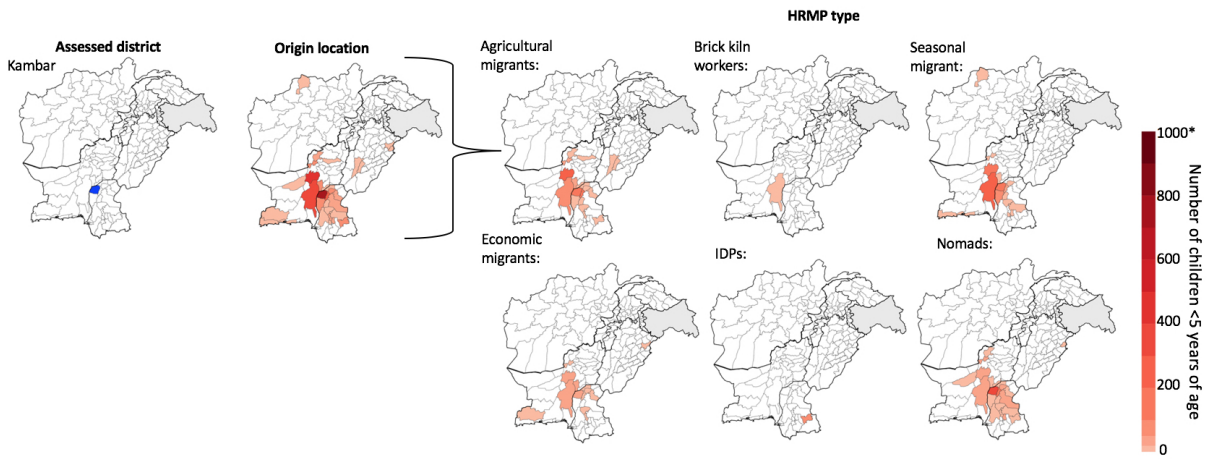
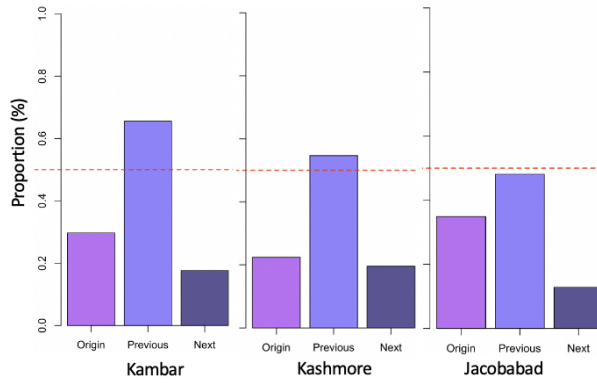
### 2.1.6 North Sindh (Kambar, Kashmore and Jacobabad districts)

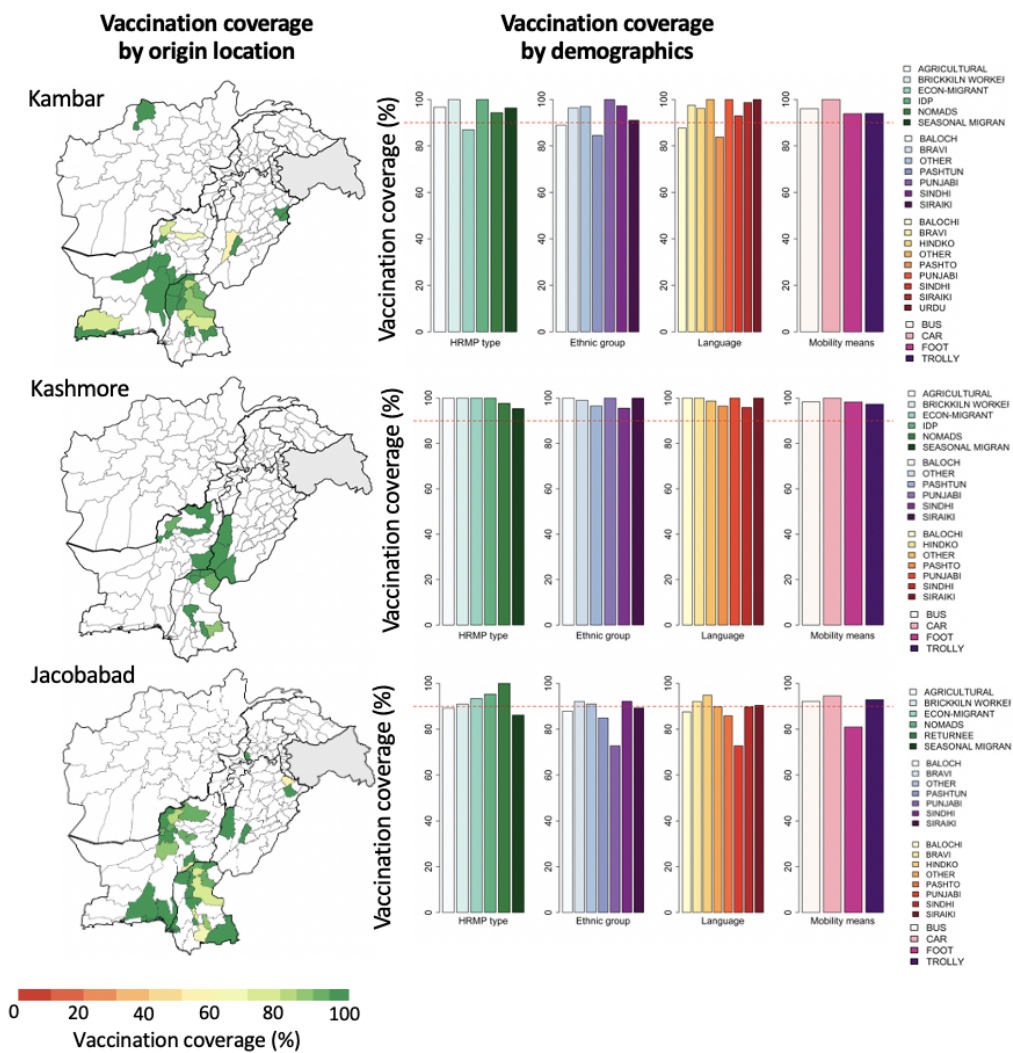
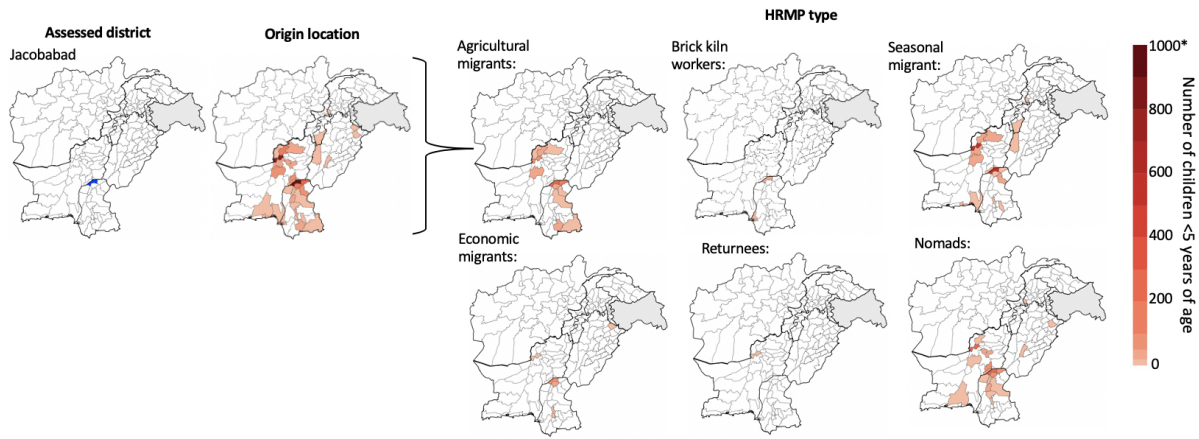
Assessment conducted in December 2017. Total number of children <5 years of age assessed was 2,388 (Kambar), 1,689 (Kashmore) and 2,920 (Jacobabad)

**Figure S8:** Demographics, movement patterns and vaccination status of HRMP children assessed in North Sindh.



**Proportion of total movement coming from within district  
(based on origin, previous and next location)**





### 2.1.7 Karachi

Assessment conducted in December 2017. Total number of children <5 years of age assessed was 12,658



**Figure S9:** Demographics, movement patterns and vaccination status of HRMP children assessed in Karachi.

