Supplementary File S2

Table A: Studies included in review showing vaccination uptake among different populations and countries (non-COVID-19 vaccines) (n=87)

	Author and year of study	Country(s)	Vaccine/ Disease reported	Study design and period of data collection	Study population, comparison group and sample size	Vaccine coverage/Uptake	Quality range
1.	Affani et al. (2020)[1]	Italy	Tetanus	Cross-sectional (Prevalence) (Serology) 2004-2019	Migrants/Refugees (Recent arrivals) - All ages (n=2,150)	**Sample (n=2,150):** AFR (49.4%, n=1,063), EMR (13.4%, n=289), EUR (10.8%, n=232), SEAR (10.2%, n=219), AMR (8.7%, n=186), WPR (7.5%, n=161). - 22.3% (480/2,150) had no protective antibodies (<0.10 IU / mL), - 45.2% (971/2,150) intermediate range (0.11-1.00 IU/mL) - 32.5% (699/2,150) high titer of antibodies (> 1.00 IU/mL). **-- Protective titer (>1.00 IU/mL) by region (n=699):** WPR (23.0%), AFR (27.2%), EMR (27.0%), AMR (42.5%), SEAR (49,3%), EUR (46.6%) **--Protective antibodies:** AFR (28.2%), EMR (28.0%).	Medium
2.	Ahmad et al. (2020)[2]	Denmark	Tuberculosis	Cross-sectional (Prevalence) 2017-2018	Refugee - Children <16 years (n=244)	**Valid BCG testing results (n=173)**: 51.6 % (126/244) vaccinated, 19.6% (47/244) not vaccinated/unknown	Low
3.	Bechini et al. (2018)[3]	Italy	Influenza	Prevalence 2015-2017	Disadvantaged areas (Deprivation) - Adults ≥ 65 years (n="not reported")	**Vaccine coverage 2015/16 and 2016/17 combined**: 54.7% - **2015/16**: 57.3% - **2016/17**: 53.8%	Medium
4.	Bell et al. (2020)[4]	England	BCG Influenza MMR	Qualitative (Semi-structured interviews) 2017-2018	Migrants (Romania and Roma) - Mothers (n=9) representing Children 0.5-21 years (n=28)	Of n=28 (71.4%) children, - 64.3% (18/28) children fully vaccinated - 17.9% (5/28) BCG only - 17.9% (5/28) unvaccinated	Medium
5.	Bielecki et al. (2019)[5]	Scotland	Influenza	Cohort (Prospective, Serology) 2015-2017	Migrants (Polish) - Children 5-12 years (n=387) Other children 5-12 years (n=535) - White British - Other identified ethnic minorities - Unknown ethnicity	**Polish**: Year 2016 (22.2%, 86/387), Year 2017 (25%, 93/372) - Difference (95% CI): 3.8% (–3.24–8.84%), p = 0.364 (NS) **White British**: Year 2016 (62.6%, 186/297), Year 2017 (70.7%, 205/290) - Difference (95% CI): 8.1% (0.47–15.73%), p = 0.038 **Other identified ethnic minorities**: Year 2016 (54.4%, 93/171), Year 2017 (60.9% 117/192) - Difference (95% CI): 6.49% (–3.68–16.68%), p = 0.211	Medium

						Unknown ethnicity: Year 2016 (55.2%, 37/67), Year 2017 (42.9%, 27/63) - Difference (95% CI): –12.3% (–4.9–29.5%), p = 0.161	
6.	Bielecki et al. (2020)[6]	Scotland	Influenza	Cohort 2016-2018	Migrants (Polish, Other ethnic minorities) - Children (Polish n=404, Other ethnic minorities n=577) Comparision - UK (n=883)	**Influenza vaccine uptake rates** By year and response (Immunised, Refused, Non-Returned questionnaire); (% Difference between 2017 & 2018 (95% CI) Significance) **Polish (n= 404)** **- Immunized:** Year 2016 (21.0%), Year 2017 (20.8%), Year 2018 (21.3%); 0.5% (−5.1–6.1%), p= 0.816 **- Refused:** Year 2016 (20.8%), Year 2017 (39.9%), Year 2018 (43.1%); 3.2% (−3.6–9.9%) p= 0.356 **- Non-Returned:** Year 2016 (45.3%), Year 2017 (39.4%), Year 2018 (35.6%); 3.8% (−2.8–10.5%), p= 0.265 **Other ethnic minorities (n=577)** **- Immunized:** Year 2016 (46.1%), Year 2017 (49.9%), Year 2018 (53.9%); 4.0% (−1.7–9.7%)p= 0.174 **- Refused:** Year 2016 (5.7%), Year 2017 (10.9%), Year 2018 (19.1%); 8.2% (4.1–12.3%)p< 0.0001 **- Non-Returned:** Year 2016 (36.6%), Year 2017 (39.2%), Year 2018 (27.0%); −12.2% (−6.7–17.6%)p< 0.0001 **UK (n=883)** - **Immunized:** Year 2016 (49.3%), Year 2017 (58.0%), Year 2018 (60.7%); 2.7% (−1.9–7.3%), p= 0.248 - **Refused**: Year 2016 (4.5%), Year 2017 (7.5%), Year 2018 (9.7%); 2.2% (−0.4–4.8%), p= 0.099 - **Non-Returned:** Year 2016 (33.7%), Year 2017 (34.5%), Year 2018 (29.6%); −4.9% (−0.5–9.2%), p< 0.05	Low

7.	Boddington et al. (2019)[7]	UK	Influenza	Case-control 2015-2016	Migrants (Ethnic minorities) - Children 2 to 16 years, general (n=977)	**Participants (n=977):** Vaccinated (30.4%, n=297), Not vaccinated (69.6%, n=680) **Participant ethnicity distribution:** Asian (n=20), Black (n=69), White (n=129), Other (n=745), Missing data (n=14) **By case/control groups and ethnicity group** - **Vaccinated (n=297):** Cases (26.3%), Control (73.7%) --- **Cases (n=78):** Asian (60%, 3/5), Black (25.8%, 8/31), White (24.6%, 14/57), Other (21.2%, 53/250) --- **Controls (n=219):** Asian (33.3%, 5/15), Black (36.8%, 14/38), White (34.7%, 25/72), Other (35.2%, 174/495), Missing (11.1%, 1/9) - **Not vaccinated (n=680):** Cases (39.7%), Control (60.3%) --- **Cases (n=270):** Asian (40% 2/5), Black (74.2%, 23/31), White (75.4%, 43/57), Other (78.8, 197/250), Missing (100%, 5/5) --- **Controls (n=410):** Asian (66.7%, 10/15), Black (63.2%, 24/38), White (65.3% 47/72), Other (64.8%, 321/495), Missing (88.9%, 8/9)	High
8.	Boukamel et al. (2020)[8]	Switzerland	**BCG**	Cohort 2015-2017	Newly arrived migrant - Children, Adolescents 0-18 years (n=253)	28% (72/253) BCG vaccination - 50% (6/11) false-positive tuberculin skin test - 24% (37/152) negative tuberculin skin test vaccinated with BCG (p = 0.03) - 6/43 (14%) BCG-vaccinated non-tuberculosis patients had false-positive tuberculin skin tests	High
9.	Brockmann, et al. (2016)[9]	Germany	Not specified	Cross-sectional (Prevalence) 2014-2015	Asylum Seekers - All ages (n=2256)	28% (642/2256) received at least one vaccination 89% (571/2256) vaccinated as part of the newly developed vaccination concept 6% vaccinated in accommodations not previously included in the new concept 58% vaccination rate in the enclosed accommodations Additional analysis of children who completed entire period of primary simmunisation (G4) for MMR, from 11th to 14th Month of life in the district - 38% (8/21) children were vaccinated against MMR (95% CI [21–66%]) - 85% of 2-year-olds in the Reutlingen district were vaccinated	Medium

10.	Burström et al. (2020)[10]	Sweden	MMR	RCT (Quasi-experiment) 2013-2016	Disadvantaged areas - Children (n=261) Home visit intervention (n=81) compared two control groups [Control (n=74) and Rinkeby (n=106)]	**Received MMR vaccine:** 95% CI [(Intervention vs Both control groups), (Control vs Rinkeby), p-value] **0-36 months:** 95.1%, 94.6%, p= 0.019 **0-18 months:** 87.6%, 85.1%, p= 0.07 **18-36 months:** 95.1%, 94.6, p= 0.019	High
11.	Byrne et al. (2017)[11]	England	Pertussis Rotavirus	Cross-sectional - Maternal pertussis (2014-2015) - Infant rotavirus (2014-2016)	Disadvantaged areas - Adults (n=38,261 women) - Children (n=91,578 infants) National representation - Adults (n=191,533 women) - Children (n=459,074 infants)	**Coverage** % (n/N), **Adjusted coverage difference** compared with least deprived (difference, CI, p-value) **Most deprived areas** **- Pertussis (Mothers):** 49.4% (18,890/38,261), (−14·0, CI: −13·2 - −14·8, p= <0·001) **- Rotavirus (Infants):** 83.7% (76 606/91,578), (−4.4 (CI: −4·7- −4·0, p= <0·001) **National representation coverage** **- Pertussis (Mothers):** 57.4% (109,927/191,533), CI 57.2 – 57.6 **- Rotavirus (Infants):** 86.7% (398,187/459,074), CI 86.6 – 86.8	Medium
12.	Ceccarelli et al. (2018)[12]	Italy	Measles, Rubella	Cohort 2016	Asylum seekers (Eritrean, Malian, Gambian, Senegalese, Nigerian, Pakistan, Bangladesh) - Adults 18 to 60 years (n=256)	**Prevalence of measles IgG antigen positivity** - Eritrea (79.9%, 107/134), Nigeria (93.3%, 14/15), Gambia (2.6%, 19/23), Senegal (82.4%, 14/17), Mali (88%, 22/25), Pakistan (100%, 27/27), Bangladesh (100%, 15/15) - Seroprevalence observed for Senegal, Mali, Nigeria, Pakistan and Bangladesh measles IgG greater than vaccinal coverage reported by WHO after 1 dose of vaccine	Low
13.	Cuomo et al. (2019)[13]	Italy	HBV	Cross-sectional (Serology) 2016	Refugees, Asylum seekers, Economic migrants - Adults (n=304)	5.6% (17/304) HBsAG vaccinated - 12.2% (37/304) HBsAg positivity (CI 95% 0.08–0.16) - 2.3% (7/304) HbcAb isolated positivity (CI 95% 0.01–0.04) - 28.6% (87/304) Both HbcAb and HBsAb positivity as a previous HBV infection (CI 95% 0.23–0.33) - 28.6% (87/304) HBsAg negative (CI 95% 0.23–0.33) - 3.3% (10/304) HCVAb positivity (CI 95% 0.01–0.05) - 10.2% (31/304) TB positive at Mantoux test (CI 95% 0.07–0.14)	High

14.	Dam Larson et al. (2017)[14]	Denmark	General	Cross-sectional (Prevalence) 2015	Travellers - All ages (n=240) Migrants (Eritrea, Romania, Somalia, Thailand, Congo) - All ages (n=17)	289 diagnosed travel-related diseases **10 potentially preventable by vaccines:** influenza A (n=2), typhoid fever (n=2), military/non-pulmonary tuberculosis (n=3), Varicella zoster(n=1),, hepatitis A(n=1), Pneumococcalmeningitis (n=1) **All patients with vaccine-preventable diseases had unknown vaccination status,** except patients with one with typhoid fever (1=vaccinated) and tuberculosis (all from endemic countries, almost certainly BCG vaccinated)	Low
15.	Decuyper et al. (2019)[15]	Belgium	Routine and Non-routine vaccines	Cross-sectional (Data review) 2008-2016	Expatriate (Belgian) - Children 0-18 years (n=116)	87% (140/161) met routine vaccination recommendations - **Two doses HAV**: 9% (12/161) - **Typhoid**: 21% (29/161) - **Rabies full vaccination**: 8% (11/161) - **Incomplete but with at least one routine vaccine**: 10% (16/161) - **Yellow fever**: 61% (52/85) - **Meningococcal ACW135Y**: 28.6% (20/70) (16 unconjugated, 4 conjugated) - **BCG vaccine**: 84.7% (72/85) showed negative - **TST**; 13.9% (10/72) received a BCG vaccine	Medium
16.	Dixon et al. (2016)[16]	United Kingdom (England)	Rotavirus, T/D/Po/Pe, MenC Hib, Pneumococcal MMR1 MMR2	Cross-sectional (Data review) 2015	Irish travelling community - Children (n = 214) Non-Travellers - Children (n = 776)	**Travelling community** **- Rotavirus**: 47.6% (10/21) covered **- T/D/Po/Pe (2 months)**: 63.1% (135/214) **- T/D/Po/Pe (3 months)**: 59.2% (126/213) **- T/D/Po/Pe (4 months)**: 54.0% (114/211) **- MenC**: 52.0% (104/200) **- Hib**: 52.5% (105/200) **- Pneumococcal**: 47.4% (55/116) **- MMR1**: 54.0% (108/200) **- MMR2**: 46.7% (86/184) **- T/D/Po/Pe (B1)**: 45.7% (84/184) **- T/D/Po/Pe (B2)**: 15.2% (7/46) **- MenC (teenage B)**: 0% (0/32) **- HPV**: 3.6% (1/28) **Non-Travellers** **- Rotavirus**: 92.2% (59/64) **- T/D/Po/Pe (2 months)**: 95.7% (742/775) **- T/D/Po/Pe (3 months)**: 95.0% (735/774) **- T/D/Po/Pe (4 months)**: 94.6% (730/772) **- MenC**: 91.7% (687/749)	Low

						- Hib: 92.9% (696/749) **- Pneumococcal**: 89.2% (397/445) **- MMR1**: 95.5% (715/749) **- MMR2**: 89.3% (582/652) **- T/D/Po/Pe (B1)**: 89.9% (586/652) **- T/D/Po/Pe (B2**): 69.2% (110/159) **- MenC (teenage B)**: 58.8% (77/131) **- HPV**: 81.8% (72/88)	
17.	Ellis et al. (2020)[17]	United Kingdom	Not specified	Qualitative (Focus group, Interviews) 2018	Gypsy, Roma and Traveller - Adult women 15–54 years (n=7)	Mixed awareness of maternal vaccinations. Not all participants had been offered vaccinations, and there was hesitancy among those who were offered them. *'If I wasn't pregnant I would have had it, but I don't know, I didn't like the thought of it when I was having the baby, no.'* ***Focus group interviewee*** Childhood immunisations were a means to keep their children healthy and participants ensured that their children had all the infant vaccinations. *'The way I look at it, if you don't have it, if they did get something, it's your fault not getting this to save this baby. That's the way I look at it, one way or the other. It's like measles, everything can be dangerous, can't it?'* ***Individual interviewee 1***	High
18.	Elran et al. (2018)[18]	Israel	Not specified	Cross-sectional (Survey) 2014-2016	Religious groups - Children 2 to 30 months (n=1,504 parents)	**Vaccination by Religiosity (n=1,347, p= 0.014)** Orthodox (19.9%), Religious (32.9%), Traditional (33.2%), Secular (14.0%) **Full simmunisation completion:** 97% - Bedouins (99% of 393) - Ultra-Orthodox Jews (98% of 378) - Non-Bedouin Arabs (96 of 359) - Other Jews (95% of 374)	Medium

19.	Ergönül et al. (2019)[19]	Turkey	BCG, DaPT/IPA/HiB, PCV, Hep A, HepB, MMR, Varicella, Tetatnus, diphtheria	Narrative Review 2012-2016	Refugees - All ages, women and children 0 to 15 years (n=3,635,841)	**Vaccinations applied to Syrian children in camps and communities:** Year (number of vaccine given) **- BCG (up to 3 months old):** 2014 (18,290), 2015 (34,356), 2016 (68,196) **- DaPT/IPA/HiB:** 2014 (77,039), 2015 (131,098), 2016 (207,227), 2017 (451,594) **- PCV:** 2014 (64, 922), 2015 (125,796), 2016 (203,524), 2017 (291,839) **- HepA:** 2014 (11,847), 2015 (28,771), 2016 (33,949), 2017 (74,766) **- HepB:** 2014 (59,743), 2015 (100, 244), 2016 (148,172), 2017 (269,085) **- MMR :** 2014 (81,846), 2015 (105,069), 2016 (63,560), 2017 (192,268) **- VAR (Varicella)**: 2014 (9,178), 2015 (22,728), 2016 (39,393), 2017 (860,395) **- Td (Tetatnus and diphtheria):** 2014 (32,408), 2015 (34,704), 2016 (21,103), 2017 (27,430) **Overall coverage estimate:** >95%	Low
20.	Fabiani et al. (2017)[20]	Italy	Rubella	Cohort (Retrospective) 2011-2015	Immigrants - Adults (n=3,140 women) Comparison: - Italians (n=41,094 women)	**Vaccinated** **- Migrants**: 25.2% (797/3,140) **- Italians**: 40.2% (17,795/41,094) **Rubella Immunization Rate (RIR)-ratio compared to Italians** **- All immigrants:** (36.0% vs 60.2%, RIR-ratio= 0.60, CI: 0.57–0.63) **- Recent immigrants** (RIR-ratio = 0.47, 95% CI: 0.42–0.53) **- Immigrants from high migratory pressure countries (HMPC): Sub-Saharan Africa** (RIR- ratio = 0.41, 95% CI: 0.31–0.56), **Asia** (RIR-ratio = 0.42, 95% CI: 0.33–0.53) **Unaware of rubella simmunisation status**: 56.8% immigrants, 35.3% Italians	Medium
21.	Fortunato et al. (2018)[21]	Italy	Influenza	Analytical cross-sectional 2009-2016	Disadvantaged areas (Deprivation) - Adults ≥65 years (n= 152,770, as of 2015)	**Influenza vaccination coverage** averages 7 seasons: 2009-2010 to 2015-2016) **By deprivation group:** Low (76.98%), Medium-low (76.97%), Medium (75.66%), Medium-high (68.72%), High (61.12%)	High
22.	Fougère et al. (2018)[22]	Switzerland	HBV	Cohort (Prospective, Serology) 2014-2017	Newly arrived migrants (Iraq, Syria, Eritrea) - Children 1-5 years (n=200)	**Vaccination status (n=200)** 130 (65.0%) vaccination card before coming in Switzerland 100 (50.0%) Vaccination at birth 133 (66.5%) Vaccinated between 0 and 11 months **Antibody response** - 118 (59%) anti-HBs ≥ 1000 UI/L	High

						- 161 (81%) anti-HBs ≥ 100 IU/L (booster-type antibodies response) - 39 (19%) anti-HBs < 100 IU/L - 23 (11%) no detectable antibodies (<10 IU/L)	
23.	Fozouni et al. (2019)[23]	Germany	Measles Polio Tetanus	Cross-sectional (Survey) 2016	Refugee (Syria, Afghanistan, Iraq, Moldova - Children aged 1-5 (n=219)	**Tempelhof** camp (n=179) - 83 (47%) fully simmunised or partially simmunised and due to return - 92 (51%) partially immunized - 4 (2%) were unimmunised. Neukölln camp (n=40) - 2 (5%) were unimmunized - 37 (92.5%) were partially immunised, none were partially simmunised and due to return - 1 (2.5%) was fully immunised.	High
24.	Freidl et al. (2018) [24]	Netherlands	Diphtheria Hepatitis A and B Measles MMR Polio (type 1,2,3) Tetanus Varicella	Cross-sectional (Serology) 2016	Asylum seekers (Syria, Iran, Iraq, Afghanistan, Eritrea, Ethiopia) - Adults (n= 622)	**Self-reported childhood vaccines:** Vaccinated (84.6%, 526/615), Not vaccinated (2.4%, 15/615), Did not know (11.9%, 74/615) **Participant distribution:** Syria (n=297), Iran (n=109), Iraq (n=83), Afghanistan (n=75), Eritrea (n=56), Ethiopia (n=2) **Prevalence of protective antibodies (seroprotection)** **- Measles:** 88% (83-93%), all below 95% herd immunity threshold. Lowest Iran [overall (83.5%),18–25 years (70%)] **- Mumps:** 91% (81-95%). All met 93% immunity threshold, except Iraq (81%); Insufficient (Syrian 18–25 years, Iraqi >25 years) **- Rubella:** 94% (84-98%), Lowest Iraq [overall (84%),18–25 (88%)]; Insufficient [Syria 26–35 years (89.4%), Iraq 26–35 years (80%)] **- Varicella:** 96% (92-98%), all above 91% threshold **- Diphtheria:** 82% (65-88%). All met 80%, immunity threshold, except Afghanistan (65%); Full protection highest Iran (62%), lowest for Afghanistan (27%), Iraq (28%) **- Tetanus:** 98% (86-100%), High for all countries (96% to 100.0%) except Eritrea [over all (86%), 36–45 years (79%). Full protection highest for Iran (96%), lowest for Eritrea (41%) **- Polio type-1:** [91% (88-94%)]; Type-2 [95% (90-98%)], Type-3 [82% (76-86%)]. --- Only type-3 slightly below 86% herd immunity threshold Subgroups below threshold: Iraq 26–35-years (63% type-3), Eritrea 26–35-years (71% type-3, p= 0.027). **- Hepatitis A:** 84% (54-100%), Lowest Iran [overall (53.7%), 18 to 35 years (42–44%)]	Low

						- Hepatitis B (anti-HBs, vaccine induced immunity): 27% (8-42%), Lowest Iraq (8%)	
25.	Fritschi et al. (2021)[25]	Switzerland	Tuberculosis	Cross-sectional (Prevalence) 2013-2019	Refugee (Eritrea, Somalia, Afghanistan, Brazil, Sudan) - Children 0 to15 years (n=139)	**BCG vaccinated (written proof or scar) of notified cases:** Foreign born (57%, 17 cases), Swiss born (3%, 2 cases), Swiss Pediatric Surveillance Unit (SPSU) (20%, 19 cases) **- Significant associated factors**: birth country (p=0.001), BCG vaccination status (<0.001)	Low
26.	Führer et al. (2016)[26]	Germany	Tetanus Measles Hepatitis B	Cross-sectional (Survey) 2015	Asylum seekers - Adults and accompanying children (n=214)	**6.5 % (n = 14) of all respondents had a vaccination card** **Adult vaccination status (n=214)** **- Tetanus:** 28 % (n = 60) **- Measles (at least two doses):** 21.1 % (n = 58) **- Hepatitis B:** 15.4 % (n = 33) **Accompanying children (n=unspecified)** **- Tetanus: 40.7 % (n = 11)** **- Measles (at least two doses): 33.3 % (n = 9)** **- Hepatitis B: 22.2 % (n = 6)**	Low
27.	Ganczak et al. (2021)[27]	Poland	General	Qualitative (Focus groups, Interview) 2019	Migrants (Ukrainian) - Adults 18 to 45 years (n=22)	54.5% (12/22) fully vaccinated in home country (Ukraine) 9% (2/22) fully vaccinated except for BCG 45.5% (10/22) report their children were fully vaccinated in Ukraine/Poland 9% (2/22) did not receive early vaccinations	Low
28.	Georgakopoulou et al. (2018)[28]	Greece	MCV MMR	Cross-sectional (Surveillance) 2017-2018	Migrants (Roma) - All ages (n=1,844) Comparison - Non-minority Greek (n=763)	**Roma cases:** 94.4% (1741/1844), unvaccinated, 5.6% one dose of MCV **Non-minority Greek**: 72.6% (554/763) unvaccinated.	Low
29.	Glatman-Freedman et al. (2019)[29]	Israel	Influenza	Cross-sectional (Telephone survey) 2015-2016	Religious groups (Jews, Arabs) - Children 1–18 years (n=1,040)	- **Arabs**: 37.7%(171/454) - **Jewish**:23.0% (135/ 586) - Vaccination highest among children 1–4 years of age in both the Jewish and the Arab population	Low
30.	Godefroy et al. (2018)[30]	France	Measles	Case series 2017	Migrants (Roma) - All ages 6 months to 24 years (n=18)	18 cases of measles 83% (15/18) Not previously simmunised (unvaccinated) 17% (3/18)Vaccinated with 1st dose few days before onset of disease	Low
31.	Gorman et al. (2019)[31]	Scotland	Influenza, BCG	Qualitative 2018	Migrants (Polish) - Adults late 20s–over60 years (n=13 females)	Vaccinated (children of females) - 84.6% (11/13) - All of those not vaccinated are single-children	Medium

32.	Gorman et al. (2020)[32]	Scotland	Influenza	Cross-sectional (Survey) 2018	Migrants (Polish) - Parents (n=128)	42% vaccinating 39% declining 90% long term UK resident	Low
33.	Habersaat et al (2020)[33]	Romania	Measles	Cross-sectional (Telephone survey) 2018	Disadvantaged groups - Persons 13 months–18years - Ethnic minority (n=261) - Ethnic majority (n=259)	**Vaccination status (n=520)** - **Routine data:** 460 (88.5%) 0 dose, 47 (9.0%) 1 dose, 13 (2.5%) 2 doses - **Self-reported:** 161 (31.0%) 0 dose, 354 (68.1%) 1 dose, 5 (1.0%) Do not know Ethnic minorities disproportionally affected by measles. Most measles cases were unvaccinated and lived in low coverage areas.	Medium
34.	Hagstam et al. (2019)[34]	Sweden	Measles, Rubella	Cross-sectional (Prevalence) (Serology) 2014-2015	Immigrants (Asylum seekers) - Adults (n=1,344) Non-Asylum seekers (n=629)	**Asylum seekers** **- Measles (n=969)**: Positive (85%, 827/969), Indeterminate (5%, 47/969), Negative (10%, 95/969) **- Rubella (n=935):** Positive (94%, 884/935), Indeterminate (3%, 24/935), Negative (3%, 27/935) **Antenatal care** **- Measles (n=940):** Positive (70%, 654/940), Indeterminate (5%, 88/940), Negative (21%, 198/940) **- Rubella (n=984):** Positive (87%, 858/984), Indeterminate (6%, 54/984), Negative (7%, 72/984) **Measles (n=1,909)** - Considerable differences by geographic origin (44–97%) - **Highest measles seropositive:** Africa and Asia had highest median anti-measles IgG levels. Middle East and North Africa and Horn of Africa, 88% (783/886 and 172/195, respectively) - **Lowest measles seropositive:** Baltic countries (44%, 17/39), the Newly Independent States and Russia (67%, 36/54), former Yugoslavia and Albania (68%, 115/168), remaining countries in Eastern Europe (72%, 86/119), and Latin America (75%, 27/36). **Rubella (n=1,919)** - Varied less between geographic regions (90–99%) - **Highest rubella seropositive:** Eastern Europe (99%, 124/125),Western Europe (98%, 40/41), and the Baltic States (98%, 40/41). Middle East and North Africa (97%, 843/872) and from the Horn of Africa (95%, 188/198). **- Lowest rubella seropositive:** Former Yugoslavia and Albania	Low

						(90%, 154/171), Asia (292/372, 91%), and sub-Saharan Africa (51/55, 93%).	
35.	Haider et al. (2019)[35]	Scotland	Measles, Mumps, Rubella, third dose of the primary vaccine (TPV), pre-school booster (PSB)	Cohort (Retrospective) 2008-2018	Disadvantaged areas (Low SES area) - Children (n=329,897)	Uptake TPV and MMR 1 (>98.0%) **- Ten-year average uptake:** Highest for the primary vaccine(99.2%), lowest for 2nd MMR dose (94.2%) - Delay pronounced for 40% of most deprived population and immunisations scheduled at later ages. - Uptake significantly associated with deprivation for all vaccines except the pre-school booster - Differences in uptake for PSB when stratified by deprivation, especially for the middle class (deciles 4–7)	Low
36.	Hardelid et al. (2016)[36]	England Wales	Influenza	Cohort 2014 - 2015	Disadvantaged areas - Children, 2 and 4 years (n=57,545)	38.7% (95% CI 38.3% to 39.1%) of 57 545 children were vaccinated against influenza **Vaccination by deprivation group: (%, n/N)** **- Most deprived:** 30.5% (2369/7757) **- Least deprived:** 46.6% (6,113/13,110) - 19% in poorest areas less likely to receive influenza vaccine compared to wealthiest (ARR=0.81, 95% CI (0.77 to 0.86)).	Medium
37.	Hudečková et al. (2020)[37]	Slovakia	Measles Mumps Rubella	Cross-sectional (Prevalence) 2018	Migrants (Roma) - All ages 0–54 years (n=439)	>90% two-dose trivalent MMR vaccine 40.2% (175/435) unvaccinated or unknown vaccination status for measles Measles vaccination status: 60.1% (264/439) vaccinated - 31.2% (137/439) two doses - 28.9% (127/439) one dose - 35.3% (155/439) unvaccinated - 4.6% (20/439) unknown n=102 patients (with two-dose vaccination status) tested for antibodies against rubella and mumps - **Measles**: 66.7% (68/102) positive IgM, 23 (22.5 %) IgG antibodies against measles. - **Rubella**: 19.6% (20/102) seropositive IgG - **Mumps**: 58.8% (60/102) seropositive IgG	Medium
38.	Hungerford et al. (2018)[38]	UK	Influenza	Analytical cross-sectional (Ecological) 2004-2016	Disadvantaged areas (Low SES) - All ages (n=89,058)	Vaccine uptake lower than national targets in most neighbourhoods **Odds of vaccine uptake in most deprived compared to least deprived:** 24–59 months [30% lower (OR 0.70; 95% CI 0.66 to	High

						0.74; p<0.001)], 65+ years [10% lower (OR 0.90; 95% CI 0.88 to 0.92; p<0.001)]	
39.	Hungerford et al. II (2018)[39]	UK	Rotavirus	Quasi-experiment (Interrupted Time-series Analyses) 2013-2016	Disadvantaged areas (Low SES) - Children (n=18,259) Comparison - General population (n=31,836)	**Uptake of the 1st and 2nd (complete) dose of rotavirus vaccine** **- Most deprived population:** 1st dose (90.6%, 16,550/18,259), 2nd dose (84.9%, 15,505/18,259) **- General population:** 1st dose (91.4%, 29,108/31,836), 2nd dose (86.7%, 27,594/31,836) **Relative risk between for most deprived compared to least deprived** - **Risk of non-vaccination**: 1.54 (CI: 1.34–1.75) - **Risk of non-completion 2-doses:** 1.97 (CI 1.62–2.41)	Low
40.	Hvass et al. (2019)[40]	Denmark	Polio	Cross-sectional (Prevalence) (Serology) 2014 and 2016	Refugees - All ages 6months-76 years (n=475)	96% (454/475) available vaccination data 94% Complete WPV immunity -27 lacked antibodies against a least one serotype; 56.5% (17/23) followed complete simmunisation program (None lacked antibodies against all 3 polio types) - 6% (10/168) children lacked antibodies and all were family-reunified refugees (no children from Danish asylum centre) - Observed association between 20-30 years and lack of immunity against one or more polio types (p=0.001) - Originating from The Horn of Africa, 20-30 years and male gender associated with lack of immunity	Medium
41.	Hvass et al. (2020)[41]	Denmark	Measles	Analytical cross-sectional (Serology) 2016 - 2018	Refugees - All ages (n=513)	84.8% (435/513) had immunity against measles 15.2% (78/513) lacked antibodies (evenly distributed between countries of origin) Immunity increased with age, young children most vulnerable to infection(<19 years, 79.9%) vs (≥19 years, 89.1%)	High
42.	Iacoella et al. (2021)[42]	Italy	Tuberculosis, Hepatitis A and B, Influenza	Cross-sectional (Prevalence) 2021 (Based on population census with age distribution was from 2018)	Migrant (Homeless) - Adults (n=112) - Africa (n=28), Asia (n=6), South America (n=5), Europe (n=73, including Italy, n=34)	**Self-report immunization status (n=112):** - **Tuberculosis:** Yes (18.8%), No (48.2%), Do not know (33%) - **Hepatitis A**: Yes (15.2%), No (56.2%), Do not know (28.6%) - **Hepatitis B:** Yes (17%), No (55.3%), Do not know (27.7%) **- 2020-2021 Seasonal Influenza:** Yes (35.7%), No (64.3%), Do not know (0%)	Low
43.	Jablonka et al. (2017)[43]	Germany	Diphtheria HBV MMR HCV HIV Syphilis	Cross-sectional (Serology) 2015	Refugees - All ages 3–76 years (n=678)	**IgG levels for tetanus and diphtheria** **Tetanus (n=678)** - 43.7% sufficient IgG for long-term tetanus protection - 56.3% insufficient IgG and no secure long-term protection - 8.7% short-term protection from intermediate anti-tetanus IgG	Low

			Tetanus			but re-vaccination within next 2 years recommended - 47.7% immediate tetanus simmunisation boost necessary due to low yet protective tetanus IgG levels (19.8%) or extremely low and non-protective anti-tetanus levels (27.9%). **Diphtheria (n=678)** - 23.9% sufficient IgG for long-term diphtheria protection - 76.1% no long-term protection against diphtheria ((re-) vaccination needed) - 2.1% complete seronegativity - 45.6% low, unprotective diphtheria IgG - 28.5% short-term protective IgG levels, immediate booster vaccine required	
44.	Jablonka et al. II (2017) [44]	Germany	MMV	Cross-sectional (Prevalence) (Serology) 2015	Refugees - All ages (n=554)	**Overall seroprevalence % (CI); Complete protection (%)** - **Measles (n=552):** 89.9% (CI: 87.3–92.4%); 88.5% - **Rubella (n=554):** 86.6% (CI: 83.9–89.3%); 77.9% - **Varicella (n=554):** 91.2% (CI: 88.8–93.3%); 95.9% Disease specific seronegativity rates by top 5 countries (%, (95% CI)) **- Syria (n=243):** Varicella (1.6% (0.4–3.3), Rubella (13.2% (9.1–17.4), Measels (8.7% (5.2–12.3) **- Afghanistan (n=76):** Varicella 9.2% (3.0–15.5), Rubella (5.3% (1.2–11.1), Measels (5.3% (1.2–11.1) **- Iraq (n=42)**: Varicella (2.4% (0–8.5), Rubella (16.7% (6.1–28.6), Measels (16.7% (6.5–28.2) **- Pakistan (n=39)**: Varicella (17.9% (6.8–31.2), Rubella (2.6% (0–8.6), Measels (2.6% (0–8.6) **- Sudan (n=25):** Varicella (40% (21.1–60.0),Rubella (0), Measels 8% (0–20.0) - 76.9% underage refugees and 68.4-75% migrants in the adult groups completely MRV-protected - 27.9% of tested refugees showed incomplete seropositivity against all three diseases - Females had slightly but insignificantly lower MRV protection rate (68.9% vs. 73% in males). -Varicella immunity lowest in the youngest age group of both genders (seronegative): <18 years (10.1% male/4.5% female)	Low
45.	Jackson et al. (2017)[45]	United Kingdom	Diphtheria, tetanus, poliomyelitis, HPV, influenza, whooping cough	Cross-sectional Qualitative 2013-2015	Traveller communities - All ages (n= 174)	Self-reported Immunisation status of participants (n=174) - 33.9% (59/174) full vaccination - 23.0% (40/174) partial vaccinated - 6.3% (11/174) unvaccinated - 36.8% (64/174) missing response	Low

						Self-reported Immunisation status of participants' children (n=174) - 39.7% (69/174) full vaccination - 9.8% (17/174) partial vaccinated - 1.1% (2/174) unvaccinated - 25.3% (44/174) not applicable - 24.1% (42/174) missing response	
46.	Jenness et al. (2021)[46]	Norway	Measles	Cross-sectional (Prevalence) 2000-2016	Migrant (Somali) - Children ≤ 2 years (n=11,334)	**Children born between 2000-2006 (n=11,334):** 87% (9855/1,334) vaccinated, 13% (1479/1,334) unvaccinated **Measles vaccine coverage:** Children born to Somali parents (85%), National average (96%) - **Annual vaccine coverage reduction:** boys (−0.7, [95%CI−0.8 to−0.5]), girls (−0.2 [95% CI−0.4 to−0.0] - Mother's length of residency negatively associated with vaccine coverage (p< 0.001) - Measles vaccine coverage associated with area of birth (p< 0.001)	Medium
47.	Jones et al. (2016)[47]	France	Measles	Cross-sectional (Surveillance) 2016	Refugees (Calais and Grande-Synthe settlements) - Adult, Children (n=4,665)	**Measles vaccination**: 60% of target population (2,051/3,500) in Calais settlement 40% of eligible individuals (466/1,165) in the Grande-Synthe settlement	Medium
48.	Karasahin et al. (2021)[48]	Turkey	Hepatitis	Analytical cross-sectional 2011-2019	Migrants (Afghans) - All ages (n=9,197)	**Hep-B virus infection and immune status (n=9,197):** HBV infection (7%, 505/9,197), Acquired immunity (2.8%, 201/9,917), Isolated anti-HBc IgG positivity (0.7%, 68/9,197), Natural immunity (1.8%, 127/9,197), Never exposed or vaccinated (87.5%, 6,295/9,197) **Immune status by age** **- Acquired immunity (n=201):** 0-15years (10.1%, 57/201), 16-25years (1.5%, 74/201), 26-40years (2.9%, 39/201), ≥41years (7.6%, 31/201) **- Isolated anti-HBc IgG positivity (n=68):** 0-15years (0.7%, 4/68), 16-25years (0.9%, 46/68), 26-40years (0.8%, 15/68), ≥41years (0.7%, 3/68) **- Natural immunity (n=127):** 0-15years (1.8%, 10/127), 16-25years (1.5%, 71/127), 26-40years (1.7%, 23/127), ≥41years (5.7%, 3/127)	Low
49.	Klok-Nentjes et al. (2018)[49]	Netherlands	Not specified	Cross-sectional (Survey) 2016	Undocumented (Brazilain, Other nationalities) - Children (n=267)	88% undocumented children attending school vaccinated 50% of non-school-going children vaccinated **Participants having undocumented minor children (n=39)** - **Brazilian**: 95% (20/21) vaccinated - **Other nationality**: 72% (13/18) vaccinated	Medium

50.	Köse et al. (2017)[50]	Turkey	Hepatitis A, B and C	Cross-sectional (Prevalence) (Serology) 2014-2015	Refugee (Syrian) - Children 0-18 years (n=140)	**Seroprevalence sample for Hepatitis A, B, C and HIV** - **HBsAg (n=140):** Positive (4.2%, 6/140), Negative (95.8%, 134/140), - **Anti-HBs (n=140):** Positive (52.8%, 74/140), Negative (47.2%, 66/140) - **Anti-HCV (n=109):** Positive (1.8%, 2/109), Negative (98.2%, 107/109) - **Anti-HIV (n=88):** Positive (2.2%, 2/88), Negative (97.8%, 86/88) - **Anti-HAV IgG (n=86):** Positive (47.7%, 41/86), Negative (52.3%, 45/86) - HAV, HCV and HIV seroprevalence in Syrian refugee children similar to Turkish children; but HBsAg positivity more frequent and anti-HBs positivity less frequent	Low
51.	Letley et al. (2018)[51]	England	Childhood immunisations	Cross-sectional (Survey) Qualitative (Interview) 2015-2016	Religious groups (Jews) - Children (n=126)	**Survey (n=126)** - 78 (62%) up-to-date - 43 (34%) not up-to-date with immunisations - 4 (3%) unsure status **n=10 interviewed** - 5 (50%) fully vaccinated.	Low
52.	Loiacono et al. (2020)[52]	UK	Influenza	Cohort (Retrospective) 2011-2016	Migrants (Ethnic minorities) - Adults 18 to 65 years (n=3,391,975)	**Overall uptake**: 18–64 years (35.3%), 65+ years (74.0%) **- Asian**: 18–64years (44.8%), 65+years (74.8%) **- Black:** 18–64years (34.5%), 65+years (64.3%) **- Mixed/Other:** 18–64years (36.3%), (65+years (76.2%) **- Unknown:** 18–64years (31.8%), 65+years (70.6%) **- White:** 18–64years (38.0%), 65+years (77.1%) **Deprivation:** - Low SES: decreased odds of being vaccinated among older adults (0.75 =R vs 0.93 OR for higher SES)	Medium
53.	Louka et al (2019)[53]	Greece Netherlands	**Adult** (Influenza, polio, tetanus, HBV) **Children** (MMR, DTP, measles, mumps)	Cross-sectional (Survey) Qualitative (Interview) 2017-2018	Asylum seekers, Refugees (Afghanistan, Syria, Eritrea) - All ages (n=61)	**Adults (n=61):** - 86.9% (53/61) vaccinated in country of origin. - 19.7% (12/61) received additional vaccinations [influenza (n = 2), polio (n = 1), tetanus (n = 1), hepatitis B (n = 1), unknown (n = 7)] **Participants' with children (n=34)** - 91.2% (31/34) vaccinated in country of origin - 79.4% (27/34) received additional vaccinations in the hosting countries (mostly MMR (n = 3), DTP (n = 3), measles (n = 2) and mumps (n = 1).	Low

						- 38.7% (12/31) could not recall which vaccines were given to the children.	
54.	Mazzitelli et al. (2021)[54]	Italy	Hepatitis B	Analytical cross-sectional (Serology) 2015-2018	Migrants (Bangladesh, Congo, Eritrea, Gambia, Guinea, Iraq, Ivory Coast, Libya, Mali, Nigeria, Pakistan, Senegal, Syria) - All ages (n=330)	30% (99/330)received screening for HBV soon after their arrival in Italy (1st evaluation) **Pre-intervention** **- Screened group (n=99):** 6.1% HBSAg positive, 9.1% fully vaccinated, 64.6% eligible for vaccination, 11% natural immunization, 9.1% seronegative occult HBV infection OBI - **Never screened (n=231) prescribed HBV testing after consultation:** 12.1% (28/231) refused further testing, 7.3% (17/231) were HBsAg postive, 13.6% (29/231) natural immunity, 7.3% (17/231) seronegative OBI, 59.2% (140/231) were seronegative. **Intervention** - After first consultation and HBV testing prescription, 204/330 (61.8%) migrants eligible for vaccination. - 6 month follow-up: 56.9% (116/204) vaccinated, 17.6% (36/204) ongoing vaccination course, 17.1% (35/204) not started vaccination course, 8.3% (17/204) moved to other centres or were lost to follow-up - 1 year of follow-up (n=142): 92% (131/142) completed HBV vaccination, 1.4% (2/142) vaccination course ongoing, 6.3% (9/142) not started the vaccination, - At end (n=204): 30.4% (62/204) left their centres, 8.3% (17/204) still to complete the vaccination course.	Low
55.	Mellou et al. (2017)[55]	Greece	HAV	Cross-sectional (Prevalence) 2016	Refugees, asylum seekers, migrants (Syria, Afghanistan, Iraq) - All ages (estimated population n=4,494)	1,681 refugees vaccinated at the five camps 64.4% (1,082/1,681) children mass vaccinated 8% (134/1,681) close contacts aged 1–14 years vaccinated during ring vaccination 12.1% (203/1,681) of close contacts aged 15 years or older vaccinated during ring vaccination	Low

56.	Mellou et al. (2019)[56]	Greece	MMR, DTaP, polio, pneumococcal, Hib, HBV	Cross-sectional (Prevalence) 2017-2018	Refugees, asylum seekers, newly arrived migrants (Afghanistan, Syrian, Iraqi) - All ages	**57,615 vaccinated in 25 camps** MMR (36.5%), DTP (12.74%), Polio (13.3%), Pneumococcal disease (10.3%), Hib (12.5%), Hepatitis B (12.5%) **Vaccinated refugee children at 25 camps (n=3,786)** - MMR (n=3,501): 1st dose (81.2%), 2nd dose (45%) - DTP (n=1,509): 1st dose (46.3%), 2nd dose (24.5%) - Polio (n=1,509): 1st dose (46.7%), 2nd dose (24.5%) - Pneumococcal disease (n=1,509): 1st dose (49.7%), 2nd dose (17.7%) - Hib (n=1,509): 1st dose (46.2%), 2nd dose (24.5%) - Hepatitis B (n=1,509): 1st dose (48.6%), 2nd dose (24.7%)	Medium
57.	Mueller-Hermelink et al. (2018)[57]	Germany	BCG	Cross-sectional (Prevalence) 2015-2016	Asylum seekers (Syrian, Iraqi, Afghan, others) - Children 0 to 15 years (n=1,379)	**BCG** vaccinated 57.6% (558/968) **BCG Vaccinated children infected with TB** **LTBI**: 58.6% (34/58) **Active TB**: 62.5% (5/8) **LTBI and active TB**: 39.1% (39/66))	Medium
58.	Mylius et al, (2019)[58]	Germany	Not specified	Cross-sectional (Retrospective database analysis) 2016–2018	Undocumented migrants - All ages (n=236)	**People visiting a VS in 1st year of study (n= 236)** **-** 3.8% (9 people) vaccinated 13 times (4 children, 4 women, 1 man) **Advice seekers in 2nd year of study who received a treatment certificate (n=196):** - 68% answered the questions about vaccinations - 59% could not remember having a vaccination document - 18% remembered a vaccination document but unsure where it was - 23% had it according to their own information, sure about one	Low
59.	Nakken et al. (2018)[59]	Denmark	DTaP/IPV/Hib, Prevnar/Pneumococcal MMR	Cross-sectional (Retrospective database analysis) 2015	Asylum seekers (Syrian, Afghan, Stateless Palestinians, Iranian, Iraqi, Eritrean Somali) - Children, Adolescents (n=2,126)	1328 vaccinations after health screening - 60% adequately vaccinated - 7% partly vaccinated - 33% inadequate vaccinations compared to national guidelines **Unvaccinated or unknown vaccination:** - Boys (37%, 499/1350) vs Girls (27%, 209/776) - 0- to 5-year olds (22%, 122/556), 6- to 11- year olds (26%, 189/728), 12 and 17 years (48%, 404/842) **Received lowest number of total vaccinations distributed**: Iraqis (5%), stateless Palestinians (7%), Iranians (7%) and Eritreans (7%)	High

						Least likely to be vaccinated: Afghans (57%) and Eritrean (54%)	
60.	Natan et al. (2016)[60]	Israel	Influenza	Cross-sectional (Survey) 2015	Muslims - Parents of children ≤12 years (n=200)	**Parents who vaccinated their children** were younger (M = 32, SD = 5.7) than parents who did not vaccinate their children (M = 32, SD = 5.7) (t(4.0), df = 198, $p < 0.05$). **Parents who vaccinated their children** had fewer children (M = 2.3, SD = 0.9) than parents who did not vaccinate their children (M = 2.7, SD = 1.0) (t(3.2), df = 198, $p < 0.05$).	Low
61.	Nidzvetska et al. (2017)[61]	Ukraine	Not specified	Qualitative (Semi-structured interviews) 2016	Internally displaced persons - Adults (n=9 mothers)	**General lack of routine child vaccinations after displacement** - Women taking their children for postnatal check-ups and simmunisation found no vaccines in stock. - Reason associated with a lack/rupture of stocks was poor economic state of the country following the conflict. - Waiting for vaccines takes from one month to more than a year *"My child has not received a single vaccine, since they were not available. We missed an opportunity to get vaccination when it was there for one week, and now they told us to wait for another year" (resp. 4)*	Medium
62.	Norman et al. (2021)[62]	Spain	MMR, Varicella (VZV), Hepatitis A and B	Cross-sectional (Prevalence) (Serology) 2018-2019	Migrants - Adults (n=468)	468 patients: Africa (52.5%, of which 88.2% from sub-Saharan Africa), Latin America (38.5%), Other areas (9%) **Positive seroprevalence** **- Rubella:** Overall (90.5%, 380/420); Africa (91.6%, 219/239), Latin America (87.4%, 125/143) **- Measles:** Overall (83.3%, 339/407); African (93.3%, 224/240), Latin America (82.1%, 115/140) **- Mumps:** Overall (83.3%, 339/407); Africa (90.1%, 9209/232), Latin America (75.9%, 104/13) **- Varicella:** Overall (91.4%, 308/337); >90% in migrants from all areas. **- Hepatitis B:** immunised (16.9%, 77/456), positive HBV surface antigen (5.9%, 27/456), evidence of past infection (28.3%, 129/456) **- Hepatitis A:** Overall (89.7%, 402/448); Africa (97.1%, 234/241), Latin America (82.7%, 139/168)	Low

63.	Öztaş et al. (2020)[63]	Turkey	BCG, CPV HAV HBV MMR OPV Varicella **Five-component combined vaccine**	Cross-sectional (Survey) 2017	Migrants (Syria) - Children (n=2,827)	2,193 (77.6%) at least one vaccination 634 (22.4%) never vaccinated **Appropriate immunization doses:** - **BCG**: 36.1% (n = 1,020) - **CPV**: 24% (n = 685) - **HAV**: 5.4% (n = 154) - **HBV**: 26.5% (n = 750) - **MMR**: 3.8% (n = 107) - **OPV**: 11.3% (n = 320) - **Varicella**: 21.1% (n = 596) - **Five-component combined vaccine:** 25.5% (n = 722) **Never vaccinated immunizations**: - **BCG**: 62.5% (n = 1,768); - **CPV**: 58% (n = 1,641) - **HAV**: 76.0% (n = 2,148) - **HBV**: 54.7% (n = 1,547) - **MMR**: 76.6% (n = 2,166) - **OPV**: 70.8% (n = 2,001) - **Varicella**: 66.8% (n = 1,889) - **Five-component combined vaccine:** 64.6% (n = 1,826)	Low
64.	Perniciaro et al. (2018)[64]	Germany	Invasive pneumococcal disease (IPD)	Case-control (Retrospective, Unmatched) 2014-2017	Refugee - Children (n=21) Comparison - German born children (n=405)	(PCV13 vaccinated vs unvaccinated) **Refugee children (n=21): (9%, 2/21) vs (86%, 18/21)** **By year:** - **2014–15 (n= 3):** All unvaccinated - **2015–16 (n= 12):** (17%, 2/12) vs (83%, 10/12) - **2016–17 ((n= 6):** All unvaccinated **Germany-born children (n=405): (68%, 276/405) vs (21%, 85/405)** **By year:** - **2014–15 (n= 107):** (68%, 73/107) vs (18%, 19/107) - **2015–16 (n= 122):** (70%,86/122) vs (17%, 21/122) - **2016–17 ((n= 176):** (66%, 117/176) vs (26%, 85/176) *- Study also reports VT (Vaccine type) serotype, Non-VT serotype, Resistant to >3 classes of antimicrobial drugs (data not extracted)*	Low
65.	Perry et al. (2020)[65]	Wales	MMR, DTP, meningococcal	Cross-sectional (Prevalence) 2014-2018	Asylum seekers - Children (n=388) Comparison: Local children (n=56,473)	**Asylum-seeking children (n=388):** Measles 73.7% (286/388), Tetanus 73.5% (285/388), Men C 76.0% (295/285) **Local children (n=56,473):** Measles (89.4%), Tetanus (89.3%), Men C (88.3%) - **Significant difference (P< 0.05) in coverage:** Measles (15.6%), tetanus (15.9%), Men C (12.3%)	Low

66.	Perry et al. II (2020)[66]	Wales	Pertussis	Analytical cross-sectional 2013-2017	Disadvantaged areas (Low SES) - Children (n=163,733)	**Overall uptake:** 1st dose by 12 weeks (87.9%), 3 doses by 24 weeks (87.1%), 3 doses by 52 weeks (96.3%) **- 3 doses uptake by deprivation:** Most deprived (97.1%), least deprived (98.2%) --- **Uptake decrease:** Most deprived (Year 2013, 97.8%) to ((Year 2017, 95.5%), Least deprived (Year 2013, 98.3%) to (Year 2017, 97.6%) **Vaccination timeliness by deprivation:** - **3 doses on time:** Most deprived: [73.2%(2013) – 76.9% (2017)] vs least deprived (83.1% – 87.3%) - **3 doses by 20 weeks:** Most deprived (63.8%) vs least deprived (79.6%) - **3 doses by 24 weeks:** Most deprived (81.5%) vs least deprived (91.9%)	High
67.	Pohl et al. (2017)[67]	Switzerland	General	Cross-sectional (Prevalence) 2015	Refugee - Children (n=93)	93 of 105 admissions analysed 58.1% (54/93) sImmunisation status not documented in medical records 35.5% (33/93) Vaccine status was unknown 6.5% (6/93) Vaccination status documented 3.2% (3/99) Received vaccination during hospitalisation	Low
68.	Rath et al (2018)[68]	Germany	Not specified	Cross-sectional (Survey) 2015-2016	Migrants, Asylum-seekers - Children (n=405)	73% with up-to date on immunisations 39% Received scheduled simmunisations since migration 22% with vaccination record 46.4% lost vaccination record during migration	Medium
69.	Sane et al. (2016)[69]	Finland	Diphteria	Case report 2015	Asylum seeker - All ages (n=30)	30 exposed residents 66.7% (20/30) vaccinated against diphtheria, mostly adolescents from Afghanistan	Medium
70.	Serre-Delcor et al. (2018)[70]	Spain	HBV	Cross-sectional (Retrospective) 2013-2016	Asylum seekers - All ages (n= 303)	82.5% (250/303) preliminary test conducted 66.2% (192/290) HBV vaccination indicated **Dose among those that reported being vaccinated** (n=192) 3-doses (21.9%), 2-doses (34.4%), 1-dose (21.9%), Did not start vaccination schedule (21.9%)	Medium
71.	Shahbabi et al. (2021)[71]	Israel	Influenza, HPV	Cross-sectional (Prevalence) 2019	Religious and ethnic groups (Northern Bedouin, Druse , Muslim, Arab - Christians , secular Jewish , traditional Jewish) - Adults, mothers (n=693)	**Uptake by religion** **- Influenza vaccine:** Bedouin (74%), Druze (74%), Muslim (60%), Religious Jews (26%), Secular Jews (38%) **- HPV:** Bedouin (99%), Druze (92%), Muslim (92%), Religious Jews (33%), Secular Jews (53%) **Uptake by ethnicity**	Medium

						- Arabs: Influenza (62%), HPV (90%) **- Jewish: I**nfluenza (34%), HPV (46%),	
72.	Staehelin et al. (2019)[72]	Switzerland	TD, MMR, VZV, Hep B	Cross-sectional (Prevalence) (Serology) 2016-2017	Asylum seekers (Eritrean) - All ages (n= 133)	133 study participants (20 women, 113 men) **Hepatitis B status:** Immunity from vaccination (0.8%), Susceptibility (69.9%), Existing chronic hepatitis B (1.5%), Immunity from previous infection (21.8%) **Seropositivity by gender (gender difference non-significant)** **- Diphtheria:** women (57.9%), men (74.8%) (non-significant) **- Tetanus:** women (94.8%), men (41.1%) (significant P<0.001) **- Measles:** women (73.7%), men (76.6%) (non-significant) **-Varicella:** women (89.5%), men (95.3%) (non-significant) **- Anti-HBc:** women (15.8%), men (26.2%) (non-significant) **- Anti-HBs:** women (15.8%), men (17.8%) (non-significant) **- Rubella:** only women (78.9%)	Low
73.	Stein-Zamir et al. (2017)[73]	Israel	MMR,MMRV, DTaP	Qualitative (Focus groups, Interviews) 2015	Religious group (Jewish ultra-orthodox) - Adults (n= 87 Mothers) Comparison - District coverage rate	**Jewish ultra-orthodox** **- DTaP4 vaccine** (77–82%) - **MMR1\ MMRV1 vaccine** (91–94%) **District coverage** - **Low DTaP4 vaccine** (89%) - **Low MMR1\ MMRV1** (96%)	Medium
74.	Stein-Zamir et al. (2019)[74]	Israel	HBV3, DTaP-IPV-Hib4, PCV3, MMR/MMRV1, HAV1 and HAV2	Cohort (Prospective) 2009-2016	Religious groups (Jews) - Children ≤ 7 years (n=3,098)	**Age-specific vaccination rates different points:** - **HBV3**: 31.5%, 82.8%, 90.8% (at 7, 12, 24 months) - **DTaP-IPV-Hib4**: 27.7%, 64.8%, 80.2% (at 13, 18 and 24 months) - **PCV3**: 37.6%, 64.1%, 72.6% (at 13, 18, 24 months) - **MMR/MMRV1**: 58.3%, 85.2%, 90.8% (at 13, 18, 24 months) - **HAV1**: 48.6%, 78% (at 19, 24 months) **48 months:** 82–95% children up-to-date **HBV3** (94%), **DTaP-IPV-Hib4** (91%), **PCV3** (79%), **MMR/MMRV1** (95%), **HAV1** (92%), **HAV2** (82%) **7 years:** **HBV3** (1.7%), **DTaP- IPV4** (3.1%), **PCV3** (1%), **MMR/MMRV1** (1.2%), **HAV2** (8%)	High

75.	Suppli et al. (2018)[75]	Denmark	MMR, HPV	Cohort (Register-based) 2014-2015	Migrant - Children (n=9,692 girls 14 years)	**Uptake of Vaccination by mothers' ethnicity (n=9692):** Non-western immigrant (11.9%), Western immigrant (2.4%), Danish born (85.7%) **Odds for vaccination for compared to Danish born (OR (95% CI)** - **Lacking only MMR (n=2026, 173 MMR vaccine administered):** Non-western [1.01 (CI: 0.59–1.74)], Western (not reported) **- Lacking both HPV and MMR (n=2726)** **--- 121 MMR vaccine administered:** Non-western [1.0 (0.47–2.11)], Western [1.65 (0.58–4.72)] **--- 148 MMR & HPV vaccine administered**: Non-western (1.54 (CI: 0.87–2.72), Western [1.54 (0.59–3.99)]	High
76.	Tayfur et al. (2019)[76]	Turkey	Measles, Polio	Cross-sectional (Prevalence) (Retrospective Observational Registry) 2011-2016	Refugees (Syrian) - All ages (n=2,854,968)	**- Living in the camps unvaccinated:** Polio (25%), Measles (33%) **- Living outside the camps unvaccinated:** Polio (45%), Measles (41%)	Medium
77.	Taylor et al. (2019)[77]	England	HBV	Cross-sectional (Survey) 2013-2015	Hard-to-reach populations - All ages (n=346)	52.3% (**/346) full vaccine course (3 doses) 65.6% (227/346) at least one dose **From vaccinated (n=227**) **3-doses** (79.7%), 2-**doses** (11.5%), **1-dose** (6.6%) **HBV vaccination (n=346):** Complete (52.3%, 181/346), Incomplete (37.6%, 130/346), Unknown (10%, 35/346) **By ethnicity**: **- Black African (n=25)**: Complete (36%, 9/25), Incomplete (64%, 16/25) **- Black Other (n=45):** Complete (60%, 27/45), Incomplete (35.6%, 16/45), Unknown (4.4%, 2/45) **- White (C/E-Central and Eastern)European (n=82):** Complete (45.1%, 37/82), Incomplete (40.2%, 33/82), Unknown (14.6%, 12/82) - **White Other (n=160):** Complete (55.6, 89/160), Incomplete (33.1%, 53/160), Unknown (11.3%, 18/160) - **Mixed/Other (n=32):** Complete (56.3%, 18/32), Incomplete (34.4%, 11/32), Unknown (9.4%, 3/32) -**Unknown (n=2):** Complete (50%, 1/2), Incomplete(50%, 1/2) --- Being female associated with lower vaccine uptake (2.37 [1.24–4.57], 0.01)	High

						--- Intravenous drug use associated with protection against incomplete HBV vaccination (p = 0.004) --- Common reasons for incomplete vaccination: never being offered vaccine or not returning for further doses	
78.	Tchidjou et al. (2018)[78]	Italy	Not specified	Cross-sectional (Serology) 2012-2016	Adopted - Children (n=108)	55.6% (60/108) at least one dose of vaccine 51.1% (24/47) of non-vaccinated children were more than 6 years (p=0.149)	High
79.	Tessier et al. (2018)[79]	UK	Influenza	Cross-sectional (Prevalence) 2015-2017	Disadvantaged areas, Religious groups - All age (n=7,596)	**General Vaccine uptake:** - **Children 2-4years**: 2015/16 (31.5%), 2016/17 (34.5%) **- 16 to <65years:** 2015/16 (45.5%),2016/17 (49.4%) **- ≥65year:** 2015/16 (71.0%), 2016/17 (70.6%) **- All pregnant women:** 2015/16 (42.3%),2016/17 (44.9%) **Crude uptake (%)** **- By deprivation:** **--- Most deprived:** 2015/16 (26.7%), 2016/17 (29.0%) **--- Least deprived:** 2015/16 (39.5%), 2016/17 (42.9%) **- By Ethnicity** **--- Black minority ethnicity quartiles (34+% vs <5% LSAO):** 2015/16 (25.4% vs 36.6%), 2016/17 (27.8% vs 39.1%) **By religion** **- Jewish (>0% vs 0% LSOA):** 2015/16 (29.5% vs 32.0%), 2016/17 (32.7% vs 35.0%) **- Muslims (6+ vs 0% LSOA):** 2015/16 (26.1% vs 36.5%), 2016/17 (28.6% vs 39.6%)	High
80.	Van Den Heuvel R. et al. (2018)[80]	Germany	Measles	Cross-sectional (Prevalence) 2018	Asylum Seekers (Turkey, Syria, Iraq, Iran, Nigeria, Afghanistan, Guinea, Albania, Somalia, Pakistan) - Ages 1-49 year (n=4,606)	73% Measles immunization rate **- sImmunisation rate by age cohorts:** 1-4 years of age (67%), 10-14 years (78%) **- Main reasons for non-vaccination against measles:** refusal (21%), being ill (2%), pregnancy (2%), "other" (1%)	Low

81.	Veronesi et al. (2019)[81]	Italy	Polio	Cross-sectional (Prevalence) (Serology) 2004-2017	Migrants - All ages (n=2,138)	2,138 blood samples collected **Seroprotection** **Antibody titers below ≥1:8:** poliovirus type-1 (94.0%), type-2 (88.4%), type-3 (15.0%) **Antibody titers below <1:8:** poliovirus type-1 (6.0%), type-2 (7.7%), type-3 (15%) **All strains:** Triple positive (79.2%), Triple negatives (1.3%)). **Protection against 3 types :** 79.2% **WHO region :** AMR (75.4%), AFR (79.6%), SEAR (87,4%), EUR (70%), EMR (81.5%), WP (80.1%) - Non-seroprotection stratifying by WHO region of origin: WPR highest against poliovirus 1 (8.8%), European Region highest against polio 2 and 3 (respectively 11.7% and 24.6%).	Low
82.	Vita et al. (2019)[82]	Italy	Hexavalent, MMR, Pneumococcal, MCV, HBV, diphteria, tetanus, pertussis, polio, MMRV	Cross-sectional (Database review) 2013-2017	Asylum seekers (Africans, Asians) - All ages (n=3,941)	85% (3,350/3,941) vaccinated 4252 vaccinations administered (95% of minors, 85% of adults) **Children vaccinated (n=112)** - **Hexavalent vaccine** (84%), **MMRV** (100%), **Pneumococcal** (94%), **MCV** (86%), **HBV** (53%), **DTaP-IPV** (31%), **Polio** (6%) **Adults vaccinated (85%, n=3249)** - **Polio** (94%), **Varicella zoster** (4.5%), **Pneumococcal** (3.1%), **DTaP-IPV** (1%) **When vaccines were delivered directly upon arrival in the centre** - 10.5% vaccinated in the first three years (2013 -2015) - 66% in the last year (2016-2017)	Low
83.	Vu et al. (2020)[83]	Switzerland	Hepatitis A and B	Cross-sectional (Prevalence) (Serology) 2015- 2016	Immigrants (Sub-Saharan Africa, Eastern Europe) - Adults ≥18 years (n=96)	96 female sex workers: predominantly undocumented immigrants (60%) from Africa and Eastern Europe with no health insurance, one participant (1%) Swiss-born. **History of hepatitis B vaccination:** Yes (20%, 19/96), No (63%, 61/96), Does not know (17%, 16/96) **Received combined hep-A and hep-B vaccine:** Yes (76% , 73/96), Not needed (24%, 23/96)	Low
84.	Ward et al. (2017)[84]	UK	Shingles/VZV	Cohort 2014/2015	Migrants (Ethnic minorities) - Adults ≥70 years, general population (n=502,058)	35.6% (178,808/502,058) eligible adults had ethnicity recorded **Crude vaccine coverage:** 59.5% (95%CI: 59.3–59.7 **Coverage by deprivation:** most deprived (54,1%) vs least deprived (64.1%) **Coverage by ethnicity:** Black Caribbean (42.1%), Black-African	Medium

						(43.1%), Black other (40.2%), Chinese (45.2%), Indian (5.7%), Pakistani (49.2%) White-British (60.7%, CI: 60.5–61.0)	
85.	Watkinson et al. (2022)[85]	UK	Influenza	Cohort (Retrospective) 1 December 2020 - 18 April 2021	Migrants (Ethnic minorities) - Adults ≥18 years (n=1,099,503)	**Influenza vaccine uptake:** 55.71% (419,314/752,715) eligible **Ethnic minorities (compared to White British group)** - Inequalities in vaccine uptake were widest amongst 'White and Black Caribbean'(HR 0.63, 95% CI 0.58 to 0.68) and 'White and Black African'(HR 0.67, 95% CI 0.63 to 0.72). - Uptake slightly higher in other ethnic group (HR1.11,95% CI 1.09 to 1.12) and Bangladeshi (HR1.08,95%CI1.05to 1.11). Overall, ethnic inequalities in vaccine uptake were wider for COVID-19 than influenza vaccination for 15 of 16 minority ethnic groups. COVID-19 vaccine uptake inequalities also existed amongst individuals who previously took up influenza vaccination.	Medium
86.	Werber et al. (2017)[86]	Germany	MMR	Cross-sectional (Surveillance) 2014-2015	Asylum seekers (Bosnia and Herzegovina, Serbia, Syria, Others) - All ages (n=32 homes)	1,344 cases of measles Available vaccine information (n = 1,258) 86% (n=1,086) unvaccinated 12% (146/1,258) asylum seekers unvaccinated **Post-exposure vaccination evaluation in n=32 asylum seekers homes** - 7/32 no detailed information - 7/32 no post-exposure intervention performed - 3/18 home vaccination within recommended 72h after detection of measles - 15/18 homes, 16 cases notified - 47% (1,133/2,390) vaccination offered to all inhabitants in 8 homes - 53% (706/1,344) reached	Medium
87.	Yakut et al (2020)[87]	Turkey	Influenza Pertussis	Cross-sectional (Survey) 2015-2016	Disadvantage (**Low socioeconomic group)** - Adult pregnant women (n=465)	**Acceptance rates (n=465)** - **Influenza** (19.8%), **Pertussis** (11.2%)	Medium

NOTE:

B1 = booster 1
B2 = booster 2
BCG = Bacillus Calmette–Guérin vaccine
CPV = Conjugated Pneumococcal Vaccine
DTaP = diphtheria, Tetanus, acellular Pertussis
DTP = Diphtheria, Tetanus, Pertussis
GRT = Gypsy, Roma, and Traveller communities
HAV = Hepatitis A vaccine
HBcAB= total Hepatitis B core antibody
HbeAb = Hepatitis B e antibodies
HbeAg = Hepatitis B e antigen
HBsAb = Hepatitis B antibody
TST = Tuberculin Skin Test
HbsAb = Hepatitis B surface antibodies
HBsAg; Hepatitis B surface antigen
HBV = Hepatitis B vaccine
HCV = Hepatitis C vaccine
HCVAb = Hepatitis C virus antibodies
Hexavalent vaccine = Diphtheria, Tetanus, Pertussis, Poliomyelitis, Hemophilus Influenza, Hepatitis B)
Hib = Haemophilus influenzae type B vaccine
HIV = Human Immunodeficiency Virus
HPV = Human Papillomavirus
IgG = Immunoglobulin G antibody
IPV = Inactivated polio vaccine
LTBI = Latent TB Infection
MCV = Meningococcal vaccine
MenC = Meningitis C vaccine
MMR = Measles, Mumps, Rubella Vaccine
MMR1 = First dose of measles-mumps-rubella vaccine
MMR2 = Second dose of measles-mumps-rubella vaccine
MMRV = Measles-Mumps-Rubella-Varicella Vaccine
NIP = National Immunisation Program
PCV = Pneumococcal Conjugate Vaccine
OR = Odds Ratio
T/D/Po/Pe = Tetanus, Diphtheria, Polio, Pertussis
TB = Tuberculosis
Teenage B = Teenage Booster
VCR = Vaccination Coverage Rate
PSB = Preschool booster
AFR = African Region
AMR = Region of the Americas
SEAR =South-East Asia Region
EUR = European Region
EMR = Eastern Mediterranean Region
WHO = World Health Organisation
WPR = Western Pacific Region
LSOA = Lower Layer Super Output Areas

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