

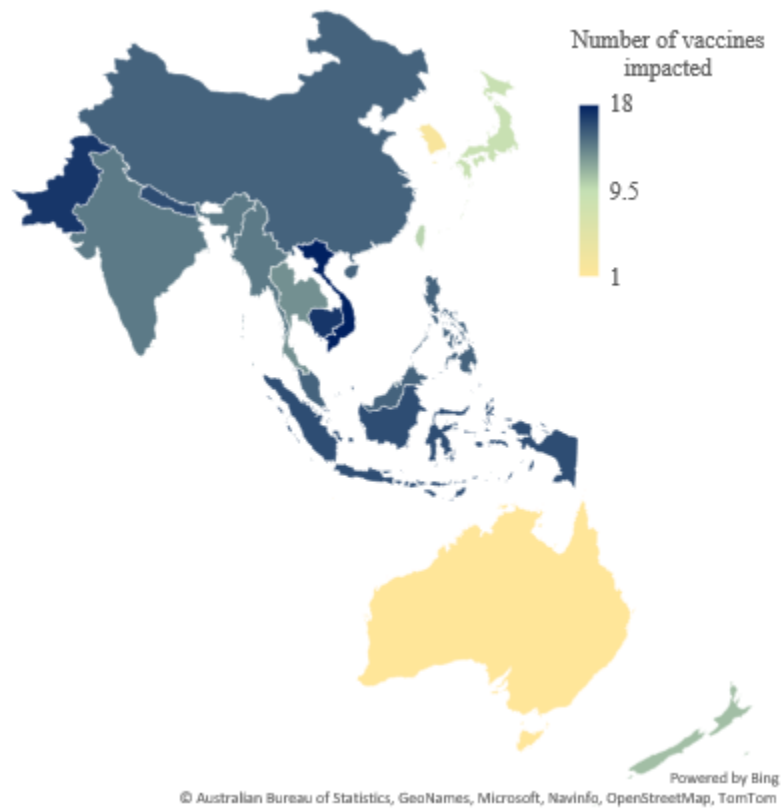
Impact of COVID-19 on routine immunisation in South-East Asia and Western Pacific: disruptions and solutions

Online appendix

Supplementary Figure 1: Countries that participated in the survey are shown in green. Map created with Mapchart.net.

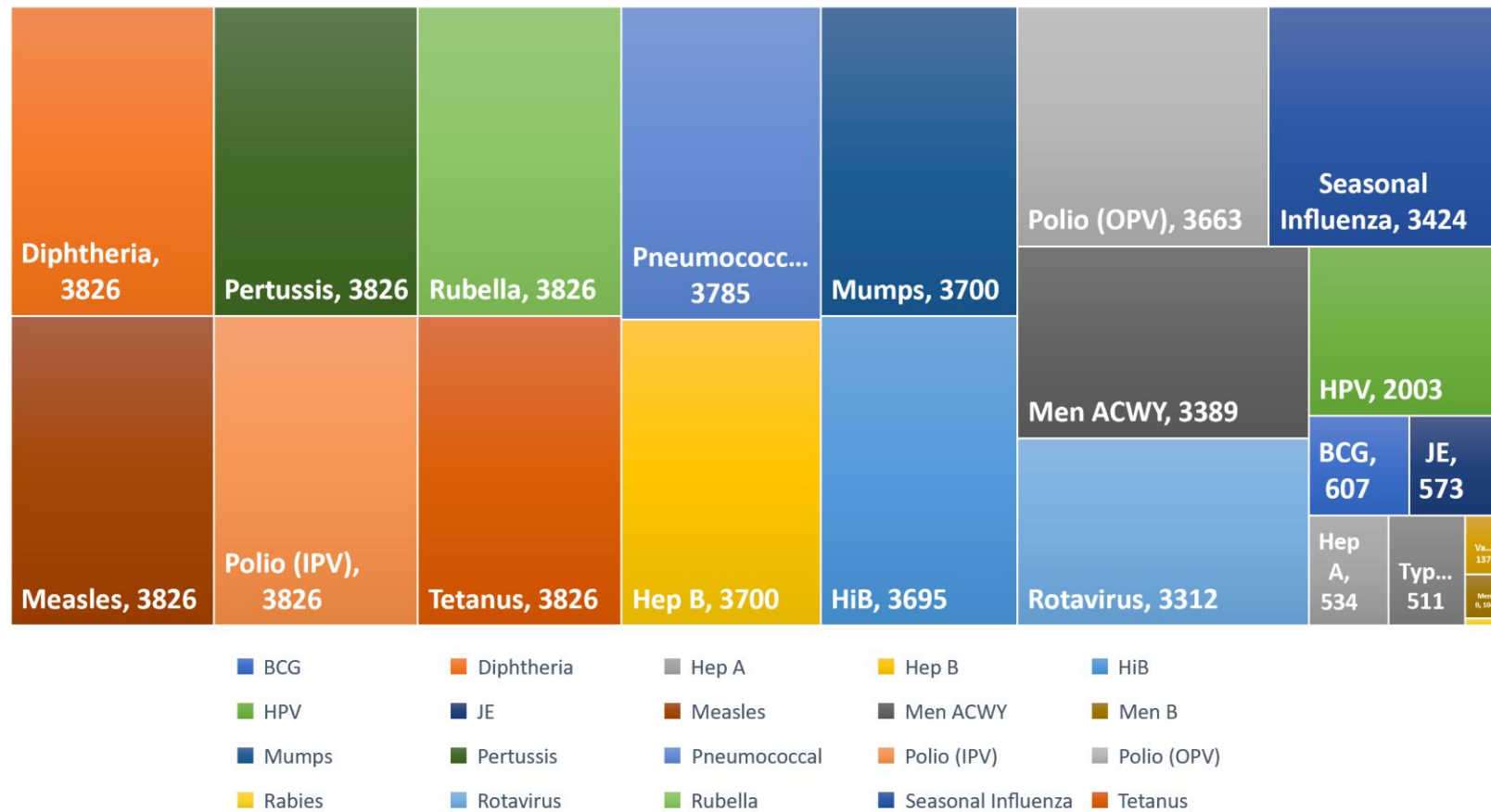


Supplementary Figure 2: Number of vaccines impacted in each country



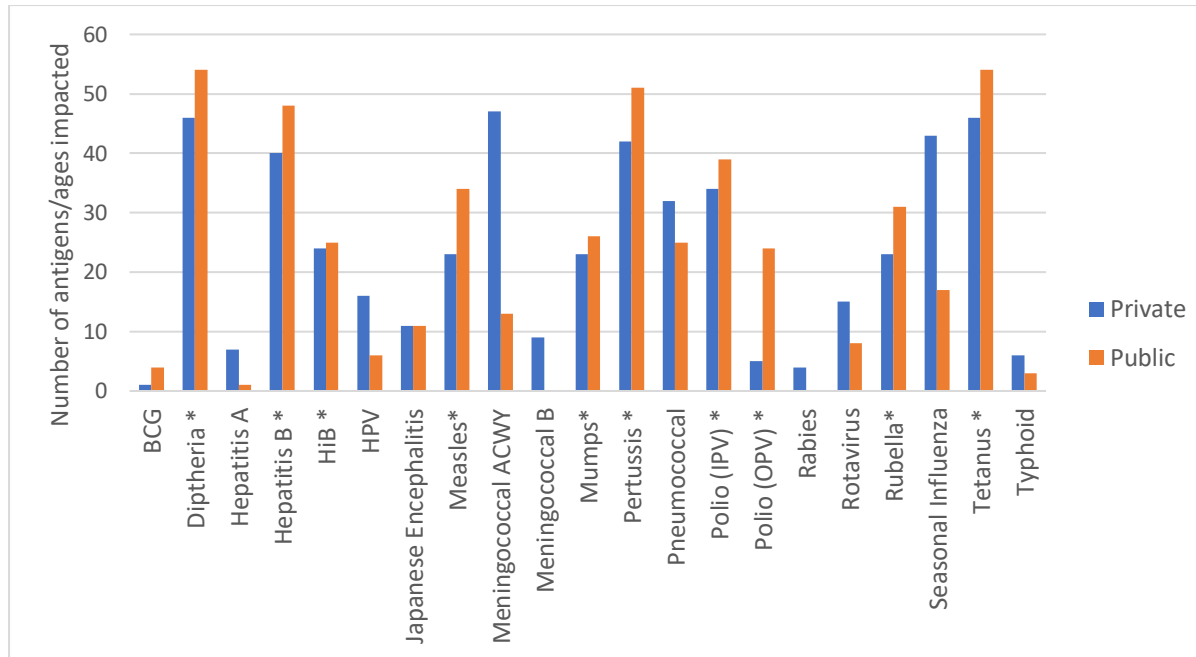
Note that South Korea appears cut off from mainland Asia, as North Korea was not included in the survey. Countries not participating in the survey are not included in the map.

Supplementary Figure 3: Total all-age population (millions) in countries reporting each vaccine impacted.



It should be noted that the represented populations do not account for ages targeted for routine vaccination, nor do they account for the age groups reported as impacted. The intention is to provide an indication of the relative scale of the population potentially at risk if declines in vaccination coverage rates were to lead to increases in transmission of vaccine preventable diseases.

Supplementary Figure 4: Number of antigens impacted in the public and private healthcare settings. Antigens were counted individually for each age group and each country



BCG, bacillus Calmette-Guérin; HiB, *Haemophilus influenzae* B; HPV, human papilloma virus; IPV, inactivated polio vaccine; OPV, oral polio vaccine

What was the VCR during the PEAK of COVID-related disruptions? (in % terms, whole numbers, NO RANGES please), enter 'INA' if info not available.					Please indicate whether this is estimated or reported	If reported, please paste links/ references to data. If estimated, please indicate (where possible) any information this was based on	Have the public/ private markets been similarly affected?	Please briefly describe any differences in disruptions in public vs private market	Were there any geographical/ regional differences in the impact on VCR?	If yes, please briefly describe how they differed (e.g. urban more impacted than rural, a particular province more impacted)	Has the VCR returned to normal as of 1st June 2020?
Early infancy (0 to 8weeks)	Infants and toddlers (9w to <24m)	Pre-school and school-entry age (2y to <7y)	Children and adolescents (7 to <18y)	Adults and elderly (18y+)							
Same list of antigens as in Section 2											

Section 4: Reasons for Disruption		
	Please indicate which of the below were a reason for disruption of the coverage of routine immunisation?	Please rank these reasons in order of importance/relevance
Supply-chain disruption		
Travel/movement restrictions by Government		
Consumers' fear of infection		
Consumers' priority change		
Accessibility to healthcare system/HCPs		
Affordability issues		
Consumers' lack of awareness		
Government deprioritisation of the vaccine		
Lack of guidelines on catch-up/delayed immunization		
Others, please list:		

Section 5: Measures to reduce vaccination disruption			
Please share examples of measures undertaken by different stakeholders to minimise vaccination disruption	Has this measure been implemented already?	Has the impact of this measure been evaluated?	Where impact has been evaluated, please share the summarised results of the evaluation.
Please share examples of public health measures undertaken by the Government or public health bodies to minimize vaccination disruption (e.g. policy, programmes). Please focus on examples that were successful, and provide a summary of the measure taken, and indicate any key characteristics of the measure that were important to its success.			
Please share examples of private health sector initiatives to minimize vaccination disruption (e.g. patient journey innovation such as vaccination drive throughs in Philippines). Please focus on examples that were successful, and provide a summary of the measure taken, and indicate any key characteristics of the measure that were important to its success.			
Please share examples of measures undertaken by the Sanofi Pasteur team (or other vaccine companies) to minimize vaccination disruption (e.g. Bilateral ZOOM meeting between CH & PH; Medical 360 by DE; Vaccines Confidence Initiative by ES). Please focus on examples that were successful, and provide a summary of the measure taken, and indicate any key characteristics of the measure that were important to its success.			
If you have any examples of measures taken that were unsuccessful in minimising disruption, please provide a short description, and any key characteristics that may have contributed to the lack of success.			

Section 6: Other information of relevance	
Please feel free to share any other information of importance/relevance to the subject of this questionnaire	

Supplementary Table 2: Modified Ng and de Colombani's framework¹ for assessing the fitness to purpose of proposed solutions

Category	Criterion	Question	Yes	No
Context	Relevant	Is this initiative relevant to the COVID-related situation? (Based on top three reasons for disruption)	1	0
		Is this initiative relevant to the setting of the jurisdictions during COVID-related situation? (income level, geographical barriers, etc)	1	0
Process	Community participation	Have the members of the community been involved? (Public and private side)	1	0
		Was the synergy with community participation considered during programme development and implementation?	1	0
	Righteous	Does it bring tangible benefits outweighing the risk of not doing it?	1	0
		Does it demonstrate respect for individual autonomy and privacy?	1	0
		Have the vulnerable groups been considered?	1	0
	Replicable	Is this initiative generalisable to other settings/jurisdictions?	1	0
Timeliness	Can the initiative be implemented within a period of 1 month?	1	0	
Outcomes	Effective	Can the direct impact be measured for this initiative?	1	0
		Did it achieve desirable outcomes?	1	0
	Efficient	Did the initiative use locally accessible resources?	1	0
		Does this initiative use currently existing resources?	1	0
	Sustainable	Does it have the potential to continue through local ownership after pandemic?	1	0
		Is it financially viable in the long term (run on its own)?	1	0

¹ Ng E, de Colombani P. Framework for Selecting Best Practices in Public Health: A Systematic Literature Review. *J Public Health Res* 2015;4(3):577

Supplementary Table 3: Vaccines in use in each country.

Country	Population (thousands)	Vaccines in routine use
Australia	25 398	Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Meningococcal B, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Brunei	445	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Cambodia	16 716	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Japanese Encephalitis, Rabies
China	1 425 200	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Hong Kong	7 548	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Meningococcal B, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
India	1 383 198	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Indonesia	272 223	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rubella, Seasonal Influenza, Tetanus, Hepatitis A, Typhoid, Japanese Encephalitis
Japan	126 496	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Japanese Encephalitis, Varicella
Malaysia	32 869	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Myanmar	54 808	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Nepal	30 260	BCG, Diphtheria, Hepatitis B, HiB, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rubella, Seasonal Influenza, Tetanus, Hepatitis A, Typhoid
New Zealand	4 834	Diphtheria, Hepatitis B, HPV, Measles, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Varicella
Pakistan	208 362	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Hepatitis A, Typhoid
Philippines	109 703	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Singapore	5 935	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Meningococcal B, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Varicella
South Korea	51 507	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus
Taiwan	23 818	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Mumps, Pertussis, Pneumococcal, Polio (IPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Hepatitis A, Japanese Encephalitis
Thailand	69 411	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rubella, Seasonal Influenza, Tetanus, Japanese Encephalitis
Vietnam	98 360	BCG, Diphtheria, Hepatitis B, HiB, HPV, Measles, Meningococcal ACWY, Meningococcal B, Mumps, Pertussis, Pneumococcal, Polio (IPV), Polio (OPV), Rotavirus, Rubella, Seasonal Influenza, Tetanus, Japanese Encephalitis, Rabies