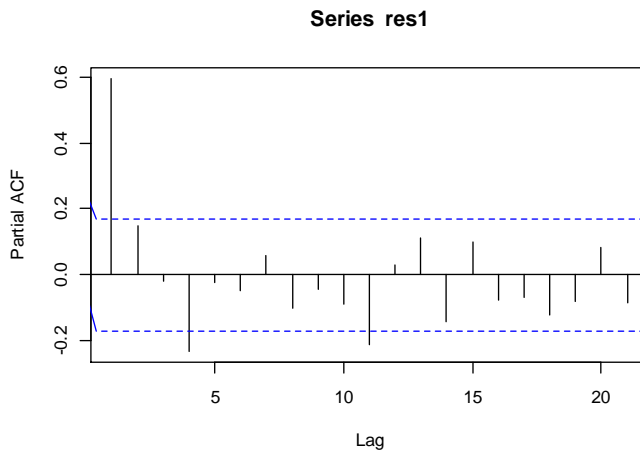
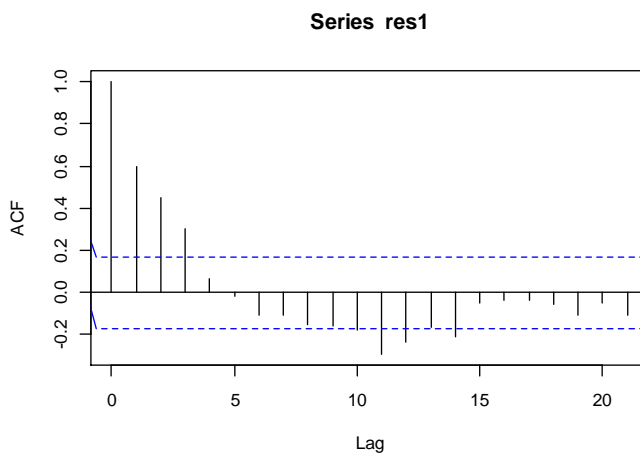
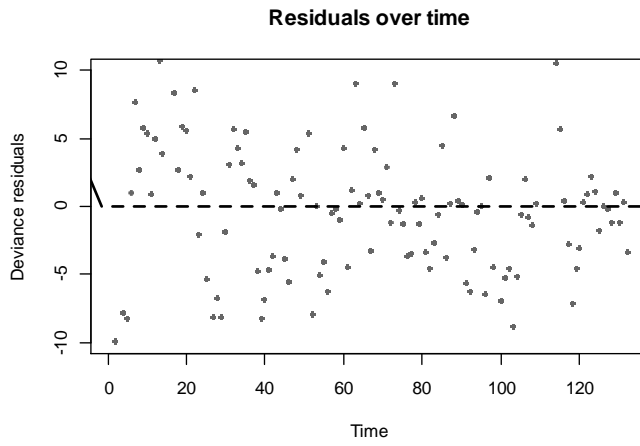


Supplementary Figure 1. Age-stratified monthly incidence of (a) all-cause pneumonia, (b) pneumococcal pneumonia and (c) limb fracture, during 2004-2017



Supplementary Figure 2. Residual plots, autocorrelation and partial autocorrelation functions for the overall all-cause pneumonia

Supplementary Table 1. Sensitivity analysis for the time-lag of PCV introduction on the changes of all-cause pneumonia admission

Age groups	Time-lag	Effect	IRR*	95% CI	P-value
Overall	No lag	Level change	1.0117	0.8496-1.2047	0.8959
		Slope change	0.9965	0.9932-0.9998	0.0378
	3 months lag	Level change	0.9954	0.8288-1.1954	0.9605
		Slope change	0.9967	0.9934-0.9999	0.0452
	6 months lag	Level change	0.9764	0.8075-1.1806	0.8049
		Slope change	0.9970	0.9936-1.0003	0.0778
	12 months lag	Level change	0.9498	0.7834-1.1516	0.6002
		Slope change	0.9972	0.9939-1.0004	0.0824
0-19 y	No lag	Level change	1.4434	1.0274-2.0278	0.0344
		Slope change	1.0016	0.9958-1.0074	0.5925
	3 months lag	Level change	1.4531	1.0173-2.0755	0.0399
		Slope change	1.0015	0.9956-1.0074	0.6223
	6 months lag	Level change	1.4659	1.0097-2.1284	0.0444
		Slope change	1.0014	0.9951-1.0076	0.6684
	12 months lag	Level change	1.5130	1.0068-2.2739	0.0463
		Slope change	1.0008	0.9945-1.0072	0.8007
20-64 y	No lag	Level change	1.2223	1.0263-1.4558	0.0244
		Slope change	0.9995	0.9964-1.0026	0.7677
	3 months lag	Level change	1.2125	1.0095-1.4563	0.0393
		Slope change	0.9997	0.9966-1.0029	0.8620
	6 months lag	Level change	1.2166	1.0071-1.4698	0.0421
		Slope change	0.9996	0.9964-1.0028	0.8029
	12 months lag	Level change	1.1899	0.9674-1.4634	0.0997
		Slope change	0.9999	0.9966-1.0032	0.9424
65+ y	No lag	Level change	0.9055	0.7839-1.0459	0.1771
		Slope change	0.9928	0.9904-0.9953	< 0.0001
	3 months lag	Level change	0.8829	0.7758-1.0047	0.0589
		Slope change	0.9930	0.9908-0.9951	< 0.0001
	6 months lag	Level change	0.8583	0.7338-1.0038	0.0558
		Slope change	0.9933	0.9907-0.9959	< 0.0001
	12 months lag	Level change	0.8141	0.6872-0.9644	0.0173
		Slope change	0.9935	0.9908-0.9961	< 0.0001

Abbreviations: CI: confidence interval; IRR: incidence rate ratio

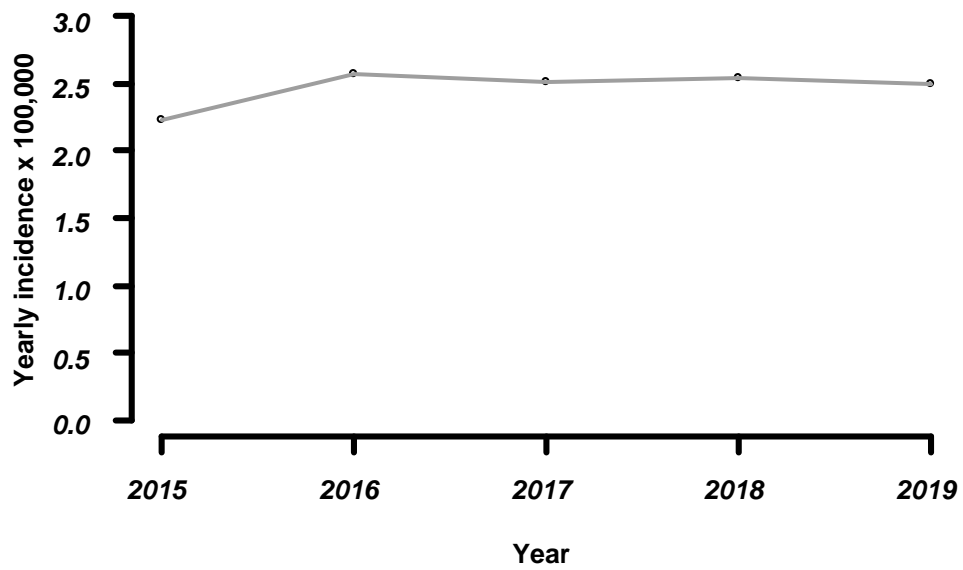
Note: * Incidence rate ratio for change in PCV introduction incidence per month post intervention.

Supplementary Table 2. Sensitivity analysis for admission intervals on the changes of all-cause pneumonia admission

Age groups	Time interval	Effect	IRR*	95% CI	P-value
Overall	> 1 day	Level change	1.0117	0.8496-1.2047	0.8959
		Slope change	0.9965	0.9932-0.9998	0.0378
	> 30 days	Level change	1.0396	0.8909-1.2132	0.6217
		Slope change	0.9973	0.9944-1.0002	0.0637
	> 60 days	Level change	1.0549	0.9084-1.2250	0.4834
		Slope change	0.9976	0.9948-1.0003	0.0813
0-19 y	> 1 day	Level change	1.4434	1.0274-2.0278	0.0344
		Slope change	1.0016	0.9958-1.0074	0.5925
	> 30 days	Level change	1.4468	1.0274-2.0374	0.0344
		Slope change	1.0016	0.9958-1.0074	0.5929
	> 60 days	Level change	1.4560	1.1121-1.9062	0.0063
		Slope change	1.0016	0.9971-1.0061	0.4789
20-64 y	> 1 day	Level change	1.2223	1.0263-1.4558	0.0244
		Slope change	0.9995	0.9964-1.0026	0.7677
	> 30 days	Level change	1.2240	1.0402-1.4402	0.0149
		Slope change	1.0003	0.9974-1.0031	0.8469
	> 60 days	Level change	1.2275	1.0415-1.4467	0.0145
		Slope change	1.0002	0.9974-1.0030	0.8930
65+ y	> 1 day	Level change	0.9055	0.7839-1.0459	0.1771
		Slope change	0.9928	0.9904-0.9953	< 0.0001
	> 30 days	Level change	0.9330	0.8132-1.0704	0.3225
		Slope change	0.9937	0.9913-0.9960	< 0.0001
	> 60 days	Level change	0.9471	0.8282-1.0830	0.4266
		Slope change	0.9940	0.9918-0.9963	< 0.0001

Abbreviations: CI: confidence interval; IRR: incidence rate ratio

Note: * Incidence rate ratio for change in PCV introduction incidence per month post intervention.



Supplementary Figure 3. Annual incidence of invasive pneumococcal disease in HK, 2015-2019

Data available on Centre for Health Protection, Department of Health.

<https://www.chp.gov.hk/en/statistics/data/10/26/43/3829.html>