

**Title:****Estimated incidence of hospitalizations and deaths attributable to Respiratory Syncytial Virus infections among adults in Germany between 2015 and 2019****Author details:**

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Supplementary table 1. Definition of conditions classifying individuals as high risk patient

Nominating condition	ICD-10-GM	
	Code	Nomenclature
Chronic cardiac disease	I05	Rheumatic mitral valve diseases
	I06	Rheumatic aortic valve diseases
	I08.0	Rheumatic disorders of both mitral and aortic valves
	I09	Other rheumatic heart diseases
	I11	Hypertensive heart disease
	I13	Hypertensive heart and chronic kidney disease
	I21-I23	I21: ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction I22: Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction I23: Certain current complications following ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (within 28 day period)
	I24	Other acute ischemic heart diseases
	I25.2	Old myocardial infarction
	I20	Angina pectoris
	I25.8	Other forms of chronic ischemic heart disease
	I27	Other pulmonary heart diseases
	Z95.9	Presence of cardiac and vascular implant and graft, unspecified
	Z95.1	Presence of aortocoronary bypass graft
	I34-I39	I34: Nonrheumatic mitral valve disorders I35: Nonrheumatic aortic valve disorders I36: Nonrheumatic tricuspid valve disorders I37: Nonrheumatic pulmonary valve disorders I38: Endocarditis, valve unspecified I39: Endocarditis and heart valve disorders in diseases classified elsewhere
	I42	Cardiomyopathy
	I45	Other conduction disorders
	I49	Other cardiac arrhythmias
I50	Heart failure	

Nominating condition	ICD-10-GM	
	Code	Nomenclature
	I51	Complications and ill-defined descriptions of heart disease
	I70	Atherosclerosis
	Q21	Congenital malformations of cardiac septa
	Q24	Other congenital malformations of heart
	Q28	Other congenital malformations of circulatory system
	I46	Cardiac arrest
	I97.1	Other postprocedural cardiac functional disturbances
Chronic respiratory diseases	J40	Bronchitis, not specified as acute or chronic
	J41 J42	Simple and mucopurulent chronic bronchitis Unspecified chronic bronchitis
	J43	Emphysema
	J45	Asthma
	J47	Bronchiectasis
	J44	Other chronic obstructive pulmonary disease
	J60	Coal workers' pneumoconiosis
	J61	Pneumoconiosis due to asbestos and other mineral fibers
	J62	Pneumoconiosis due to dust containing silica
	J63	Pneumoconiosis due to other inorganic dust
	J64	Pneumoconiosis, unspecified
	J68	Respiratory conditions due to inhalation of chemicals, gases, fumes and vapors
	J69	Pneumonitis due to solids and liquids
	J70	Respiratory conditions due to other external agents
	E84	Cystic fibrosis
	J85	Abscess of lung and mediastinum
	J81 s	Pulmonary edema
J84.1 J84.8	Other interstitial pulmonary disease with fibrosis Other interstitial pulmonary disease	

Nominating condition	ICD-10-GM	
	Code	Nomenclature
	J84.0	Alveolar and parieto-alveolar conditions
	J98.4	Other disorders of lung
Diabetes mellitus	E10-E14	Diabetes mellitus
	E16	Other disorders of pancreatic internal secretion
	G63.2	Diabetic polyneuropathy
	H36.0	Diabetic retinopathy
	H35.0	Retinopathies of the ocular fundus and changes in retinal vessels
	H28.0	Diabetic cataract
	O24	Diabetes mellitus in pregnancy, childbirth, and the puerperium
Chronic liver disease	K70-K77	Diseases of liver
	Q44.6	Cystic disease of liver
Chronic kidney disease	I12	Hypertensive chronic kidney disease
	N00	Acute nephritic syndrome
	N04	Nephrotic syndrome
	N03	Chronic nephritic syndrome
	N05	Unspecified nephritic syndrome
	N17	Acute kidney failure
	N18	Chronic kidney disease (ckd)
	N19	Unspecified kidney failure
	N26	Renal sclerosis, unspecified
	N25	Disorders resulting from impaired renal tubular function
	N27	Small kidney of unknown cause
	N13.3	Unspecified hydronephrosis
	N28.8	Other specified disorders of kidney and ureter
	Z94.0	Kidney transplant status
	Z49	Encounter for care involving renal dialysis
Immunosuppression	B20-B24	Human immunodeficiency virus [HIV] disease
	D71	Functional disorders of polymorphonuclear neutrophils
	D72.0	Genetic anomalies of leukocytes

Nominating condition	ICD-10-GM	
	Code	Nomenclature
	M30	Polyarteritis nodosa and related conditions
	M32	Systemic lupus erythematosus (SLE)
	M35.0 H19.3	Sjögren syndrome, unspecified Sjögren syndrome with keratoconjunctivitis
	M33.2	Polymyositis, organ involvement unspecified
	M06	Other rheumatoid arthritis
	Z21	Asymptomatic human immunodeficiency virus [HIV] infection status
	Z94.0	Kidney transplant status
	Z95.3	Presence of xenogenic heart valve
	Z94	Transplanted organ
	Z51.0	Encounter for antineoplastic radiation therapy
	Z51.1	Chemotherapy session due to malignant neoplasm
	D37-D48	Neoplasms of uncertain or unknown behaviour
	C00-C14	Malignant neoplasms of lip, oral cavity and pharynx
	C15-C26	Malignant neoplasms of digestive organs
	C30-C39	Malignant neoplasms of respiratory and intrathoracic organs
	C40-C41 C43-C44 C45-C49 C50-C50	Malignant neoplasms of bone and articular cartilage Melanoma and other malignant neoplasms of skin Malignant neoplasms of mesothelial and soft tissue Malignant neoplasms of breast
	C51-C58 C60-63 C64-C68	Malignant neoplasms of female genital organs Malignant neoplasms of male genital organs Malignant neoplasms of urinary tract
	C69-C72	Malignant neoplasms of eye, brain and other parts of central nervous system
	C73-C75	Malignant neoplasms of thyroid and other endocrine glands
	C76-C80	Malignant neoplasms of ill-defined, other secondary and

Nominating condition	ICD-10-GM	
	Code	Nomenclature
		unspecified sites
	C81-C88	C81 Hodgkin lymphoma, C82 Follicular lymphoma, C83 Non-follicular lymphoma, C84 Mature T/NK-cell lymphomas, C85 Other specified and unspecified types of non-Hodgkin lymphoma, C86 Other specified types of T/NK-cell lymphoma, C88 Malignant immunoproliferative diseases and certain other B-cell lymphomas,
	C90.1 C91-C95	C90.1 Plasma cell leukemia C91 Lymphoid leukemia, C92 Myeloid leukemia, C93 Monocytic leukemia, C94 Other leukemias of specified cell type, C95 Leukemia of unspecified cell type
	D80-D84 and D89	D80 Immunodeficiency with predominantly antibody defects D81 Combined immunodeficiencies D82 Immunodeficiency associated with other major defects D83 Common variable immunodeficiency D84 Other immunodeficiencies D89 Other disorders involving the immune mechanism, not elsewhere classified
	T86	Complications of transplanted organs and tissue
	M32	Systemic lupus erythematosus
	M05; M06; M08	Rheumatoid arthritis
	L40	Psoriasis
	M07	Enteropathic arthropathies
	M31.5 M31.6	Giant cell arteritis with polymyalgia rheumatica Other giant cell arteritis
Neurological disorders	Q00-Q07	Congenital malformations of the nervous system
	G10-G14; G20-G26; G30-G32; G35-G37	Inflammatory diseases of the central nervous system, Systemic atrophies primarily affecting the central nervous system,
	G45-G46	G45 Transient cerebral ischemic attacks and related syndromes, G46 Vascular syndromes of brain in cerebrovascular diseases
	G70-G99	G70-G73 Diseases of myoneural junction and muscle, G80-G83

Nominating condition	ICD-10-GM	
	Code	Nomenclature
		Cerebral palsy and other paralytic syndromes, G90-G99 Other disorders of the nervous system

*ICD: International Classification of Diseases.*

Supplementary table 2. Parameter estimates for the final Quasi-poisson regression models for respiratory hospitalizations in patients without risk factors.

Parameter	18-44 years		45-59 years		60-74 years		≥75 years	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
$\beta_0$	96.719	2.325	50.281	1.411	21.264	0.821	11.658	0.827
$\beta_1$	-0.031	0.013	-0.007	0.008	0.026	0.005	0.027	0.014
$\beta_2$	NA	NA	NA	NA	NA	NA	0.000	0.000
$\beta_3$	NA	NA	NA	NA	NA	NA	NA	NA
$\beta_4$	NA	NA	NA	NA	NA	NA	NA	NA
$\beta_5$	4.524	2.196	0.867	1.409	1.671	0.878	0.669	0.570
$\beta_6$	7.861	1.615	4.528	0.944	0.701	0.538	1.511	0.422
$\beta_7$	-0.799	1.615	0.070	0.959	0.737	0.549	0.145	0.414
$\beta_8$	-5.664	1.462	-0.649	0.947	-0.307	0.595	-0.168	0.372
$\beta_9$	0.165	0.054	0.133	0.033	0.094	0.020	0.046	0.015
$\beta_{10}$	0.084	0.085	0.072	0.052	0.044	0.031	0.070	0.024

Parameter  $\beta_0$  is the coefficient associated with the baseline number of events,  $\beta_1$  to  $\beta_4$  are coefficients associated with the aperiodic time trend,  $\beta_5$  to  $\beta_8$  are coefficients associated with the periodic time trend, and  $\beta_{(8+l)}$  are coefficients associated with appropriately lagged activity of pathogen  $l$  with  $l = 1, \dots, L$  where  $L = 2$  (RSV and influenza). In this table,  $\beta_9$  represents the coefficient associated with influenza and  $\beta_{10}$  represents the coefficient associated with RSV. Note that this does not necessarily reflect the order of the inclusion of the respective parameters into the models.



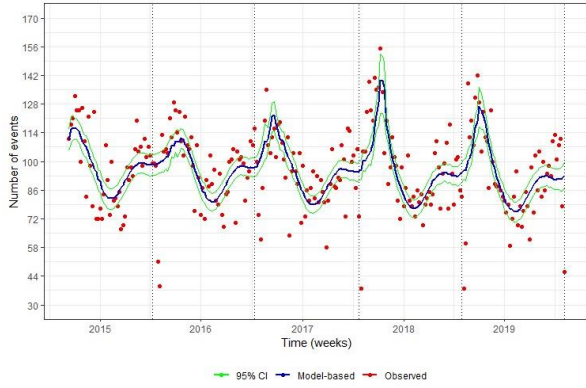
Supplementary table 3. Parameter estimates for the final Quasi-poisson regression models for respiratory hospitalizations in patients with risk factors.

Parameter	18-44 years		45-59 years		60-74 years		≥75 years	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
$\beta_0$	111.266	2.590	224.215	4.659	345.516	6.048	372.397	8.309
$\beta_1$	-0.032	0.015	0.075	0.027	0.375	0.036	0.752	0.138
$\beta_2$	NA	NA	NA	NA	NA	NA	-0.001	0.000
$\beta_3$	NA	NA	NA	NA	NA	NA	NA	NA
$\beta_4$	NA	NA	NA	NA	NA	NA	NA	NA
$\beta_5$	-0.051	2.695	4.902	4.653	13.480	6.093	31.633	5.642
$\beta_6$	4.809	1.643	10.253	3.145	10.719	4.149	22.234	4.249
$\beta_7$	-2.247	1.701	-1.329	3.195	1.340	4.189	7.674	4.164
$\beta_8$	-3.539	1.853	-4.447	3.165	-2.893	4.144	-2.003	3.758
$\beta_9$	0.156	0.056	0.370	0.105	0.757	0.142	1.109	0.147
$\beta_{10}$	0.168	0.090	0.308	0.168	0.622	0.223	1.020	0.226

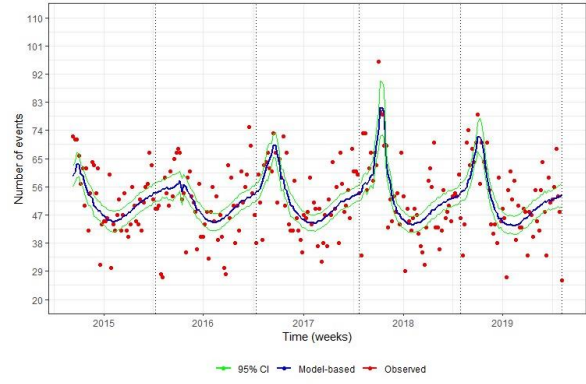
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Supplementary figure 1. Weekly estimated versus observed all respiratory hospitalized cases in people aged 18-44 (A), 45-59 (B), 60-74 (C), and  $\geq 75$  years (D) without risk factors and in people aged 18-44 (E), 45-59 (F), 60-74 (G), and  $\geq 75$  years (H) with risk factors

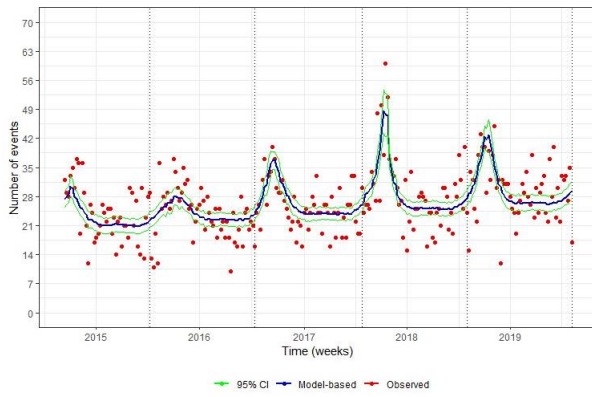
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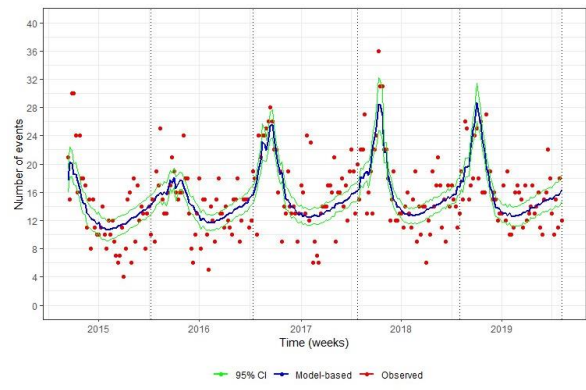
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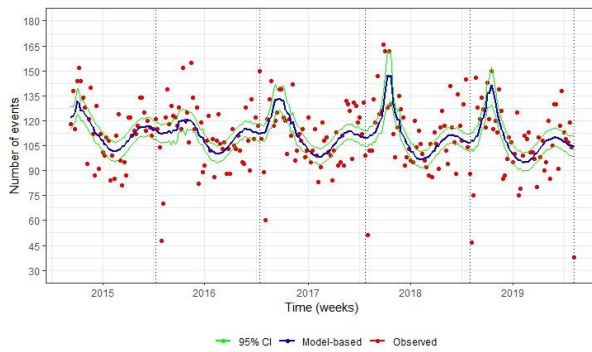
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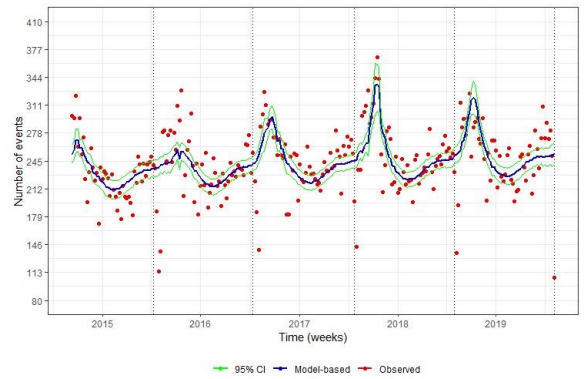
D



E



F

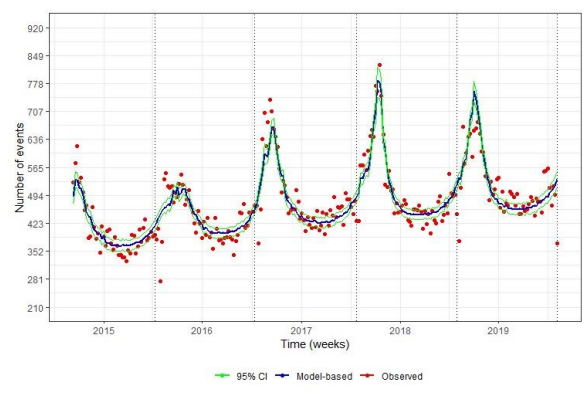
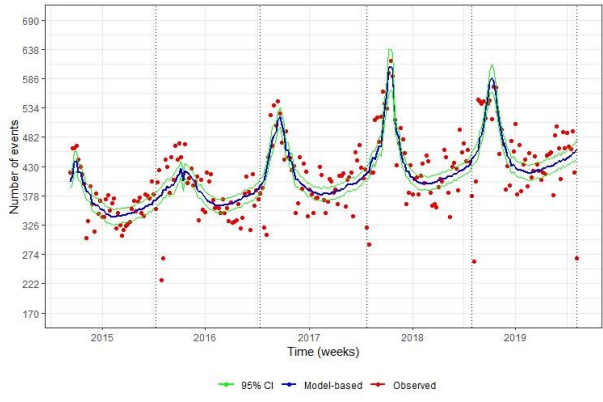


G

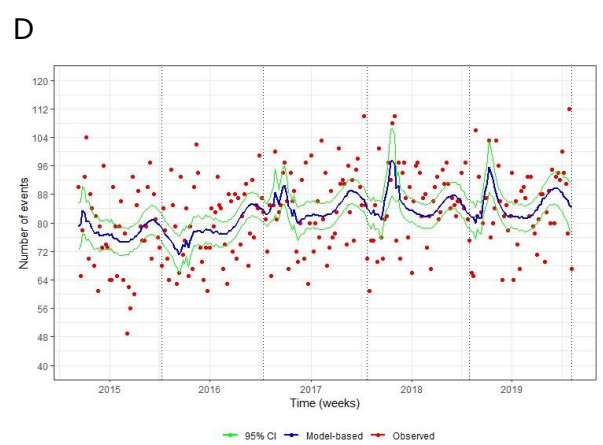
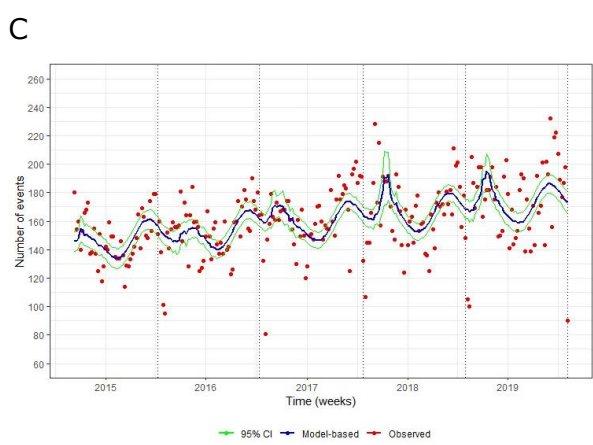
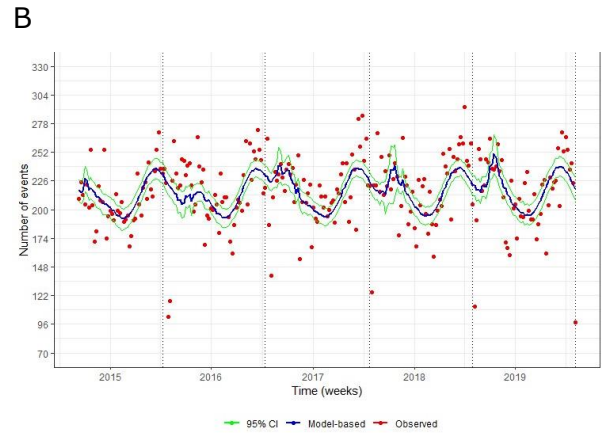
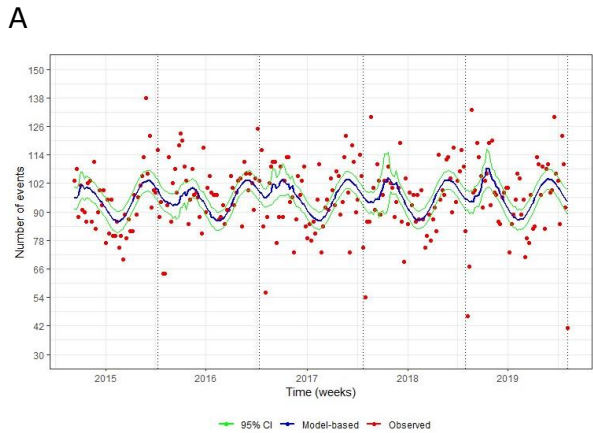


H



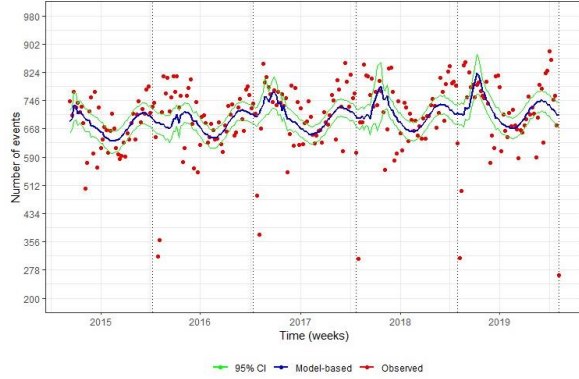
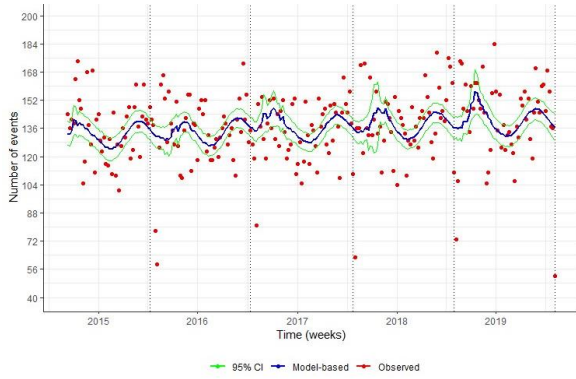


Supplementary figure 2. Weekly estimated versus observed all cardiovascular hospitalized cases in people aged 18-44 (A), 45-59 (B), 60-74 (C), and  $\geq 75$  years (D) without risk factors and in people aged 18-44 (E), 45-59 (F), 60-74 (G), and  $\geq 75$  years (H) with risk factors

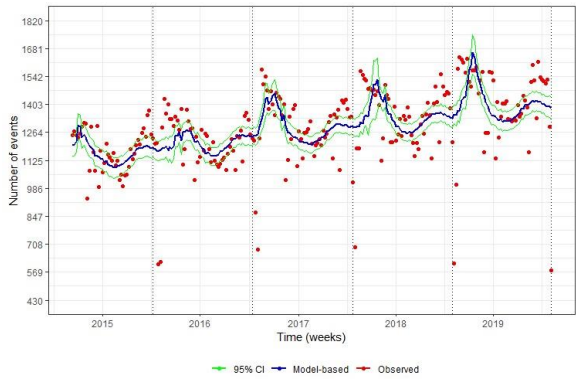


**E**

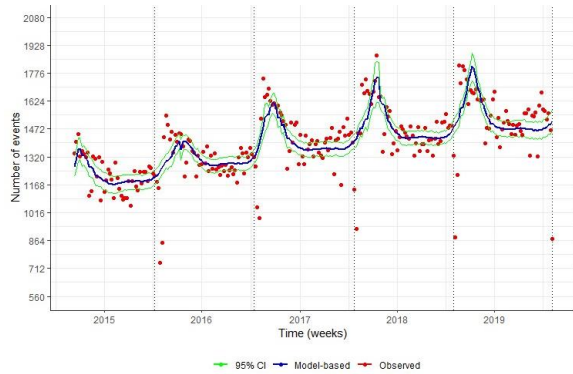
**F**



G



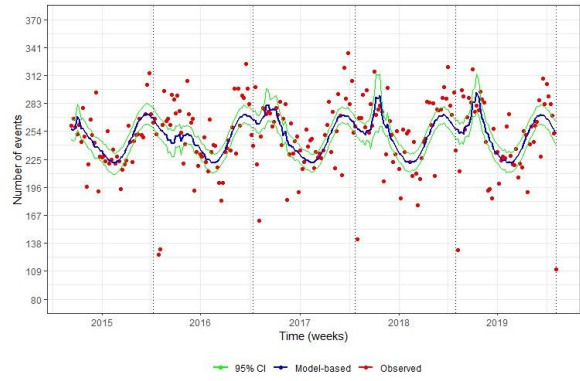
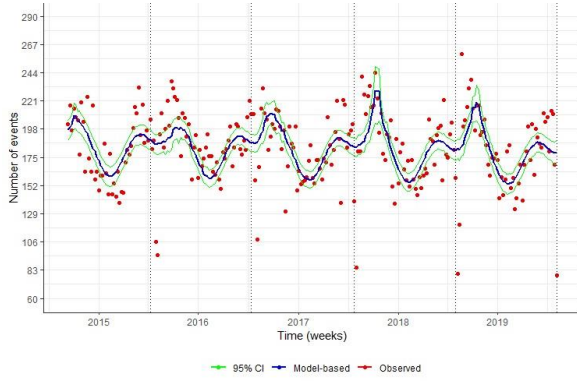
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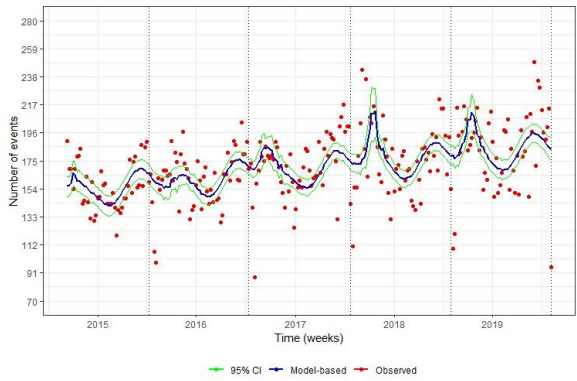
Supplementary figure 3. Weekly estimated versus observed all cardiorespiratory hospitalized cases in people aged 18-44 (A), 45-59 (B), 60-74 (C), and  $\geq 75$  years (D) without risk factors and in people aged 18-44 (E), 45-59 (F), 60-74 (G), and  $\geq 75$  years (H) with risk factors

A

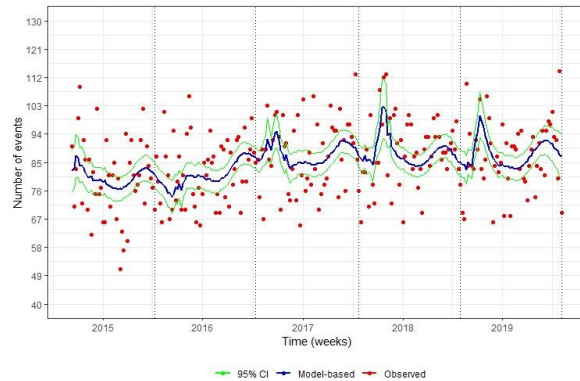
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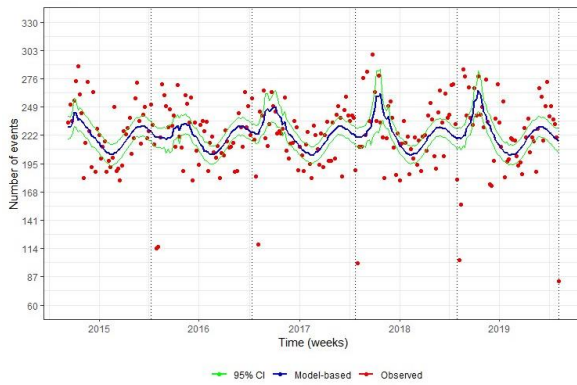
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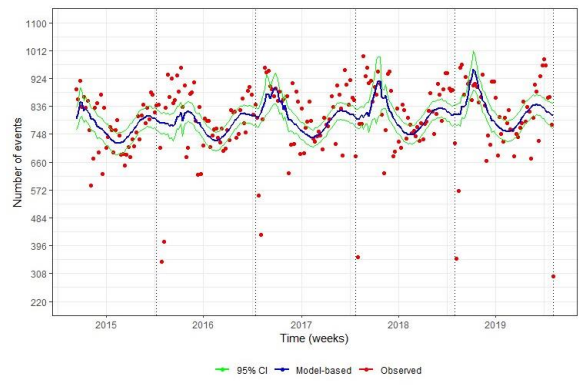
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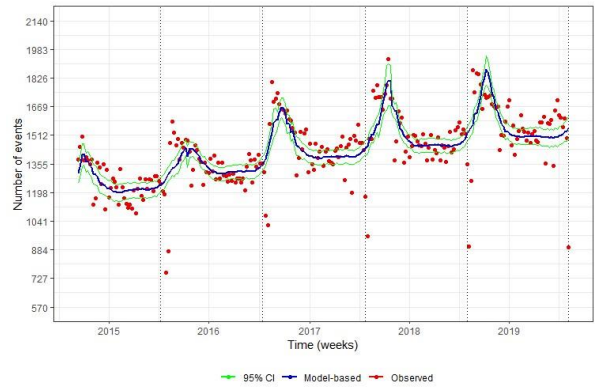
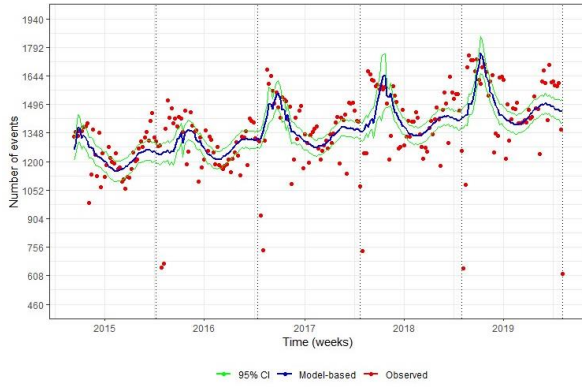
F



G

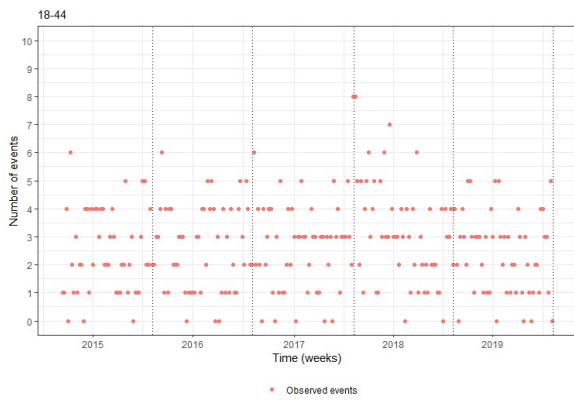
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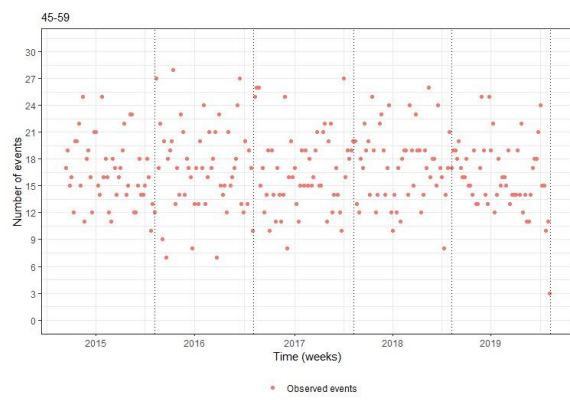


Supplementary figure 4. Weekly estimated versus observed deaths within 28-day of cardiorespiratory hospitalization in people aged 18-44 (A), 45-59 (B), 60-74 (C) and  $\geq 75$  years (D) with risk factors, 2015-2019, Germany

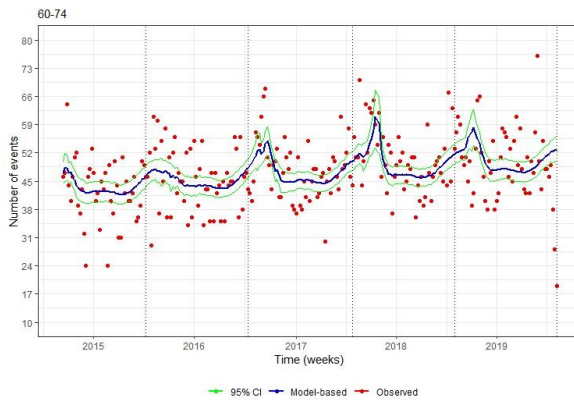
A



B



C



D

