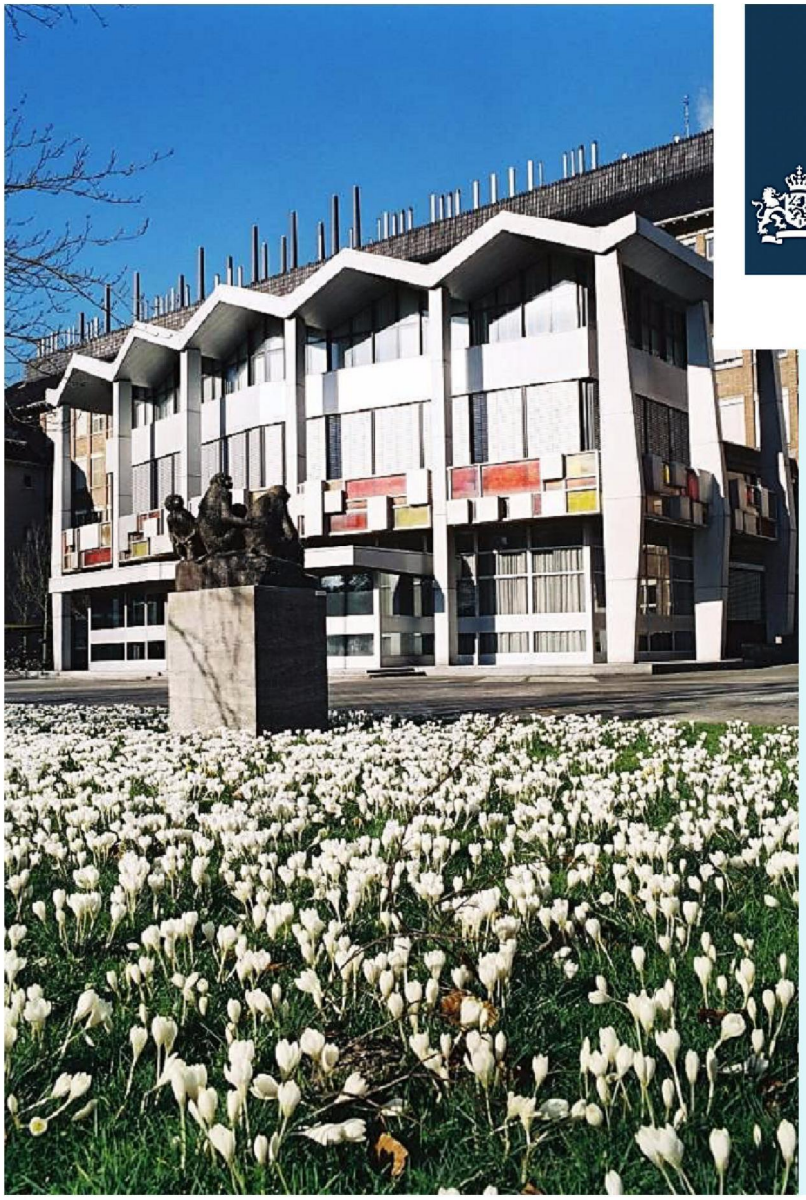


National Institute for Public Health and the Environment

Preparedness, outbreak management and vaccine use in crises

5.1.2e 5.1.2e , 5.1.2e 5.1.2e 5.1.2e

Head National Coordination Centre for Communicable Disease Control, RIVM

In today's lecture you will learn about:

- Examples on how to guide outbreak-response
- Examples on how to use vaccines for outbreak control
- The current state of the COVID-19 pandemic

The network for communicable diseases

Key players in preparedness and outbreak management

governmental

National level

- Ministry of Health, Welfare and Sports, EZ, SoZa
- Dutch Centre for Infectious Disease Control (CIb), RIVM
- CVI Lelystad (Institute for animal health and science)
- Health Inspectorate (IGZ), NVWA (Food safety authority)
- GD

Regional level

- Municipal Health Services (25 GGD)
- Disaster Medicine Organization (25 GHOR)
- Hospitals, medical specialists
- (Public Health) Laboratories

Local level

- General Practitioners (9.000 GP)
- Veterinarians

private

The Netherlands

Public Health Act
(= Wet Publieke Gezondheid)

Notification: Most powerful instrument to enable the (local) government to control infectious diseases

Municipalities primarily responsible for infectious disease control and preparedness

Role Minister of Health in outbreaks or crises

393 municipalities

25 municipal health services
25 Safety regions

Centre for Infectious Disease Control

- Scientific advice in crises
- Coordination of response (LCI)
- Surveillance of communicable diseases
- Collaboration with international organizations (ECDC, WHO)
- Specialized (reference) laboratory (IDS, LZO, IIV)
- Crisis communication
  - Professionals
  - Press
  - Public

Public Health ACT: mandatory notification for infectious diseases

A	MERS smallpox polio SARS viral hemorrhagic fevers SARS-CoV-2	Isolation, testing Prohibition to work Quarantaine and monitoring of contacts
B1	avian flu diphteria, plague, rabies, TB.	Isolation, testing Prohibition to work
B2	a.o. typhoid fever, cholera, hepatitis, measles	Prohibition to work
C	o.a botulism, meningococcal- disea legionaires	No restrictive measures

Emergency preparedness

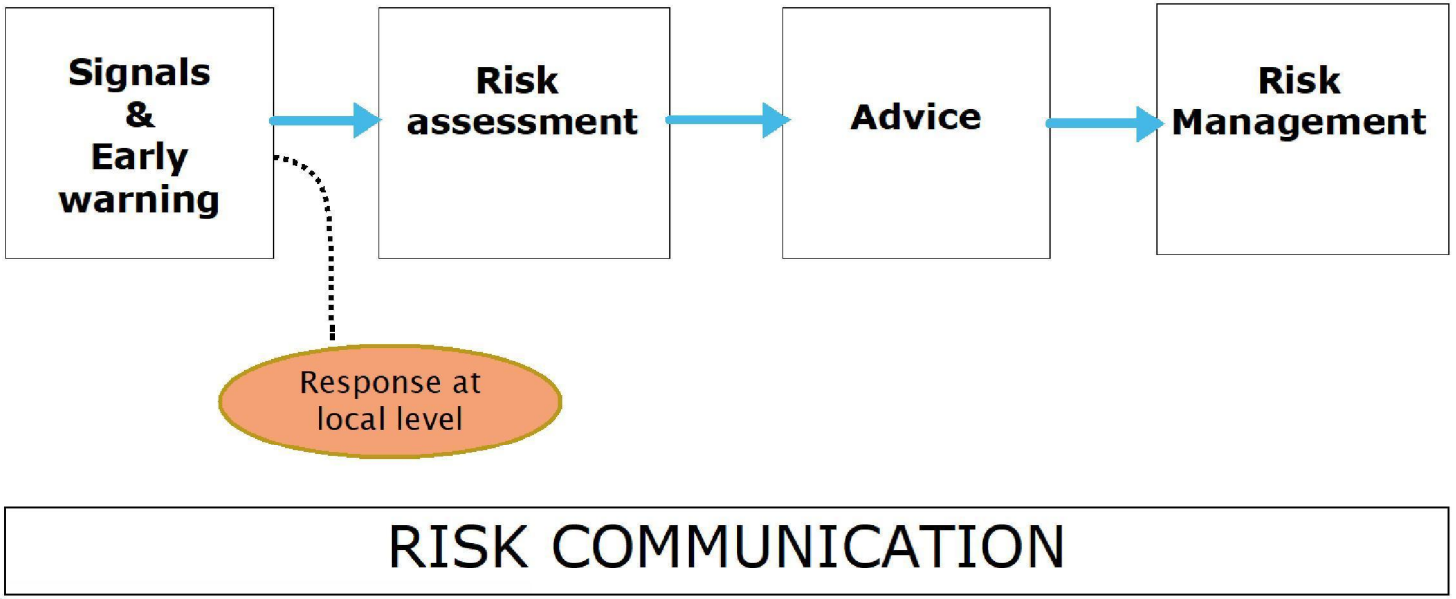
capacity and capability of a country to manage efficiently all types of emergency and to bring about an orderly transition from relief through recovery and back to sustainable development.

How can preparedness be achieved?

- national legislation and policy for disaster management
- plans and procedures for disaster management and emergency response coordination
- strengthening institutional and human resources for disaster management
- establishing and managing stocks of relief supplies and equipment
- identifying transportation options
- public education, awareness and community participation in disaster management
- collecting, analyzing and disseminating information related to emergencies that are likely to occur in the region

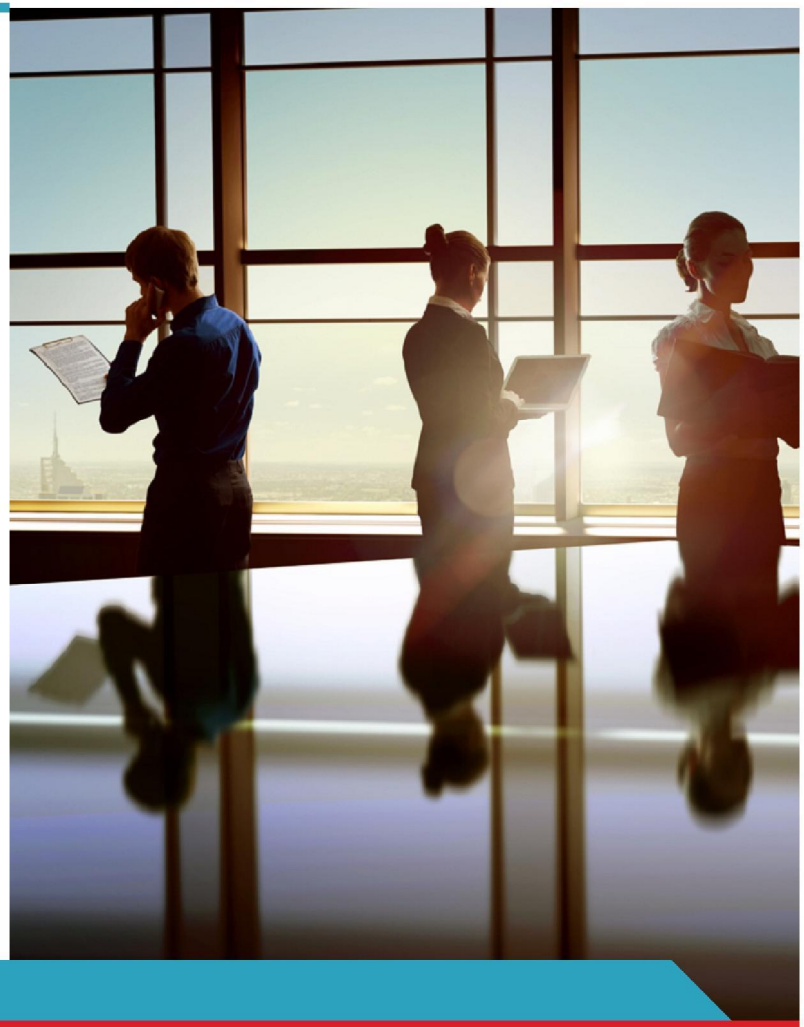
Source: WHO

OUTBREAK MANAGEMENT

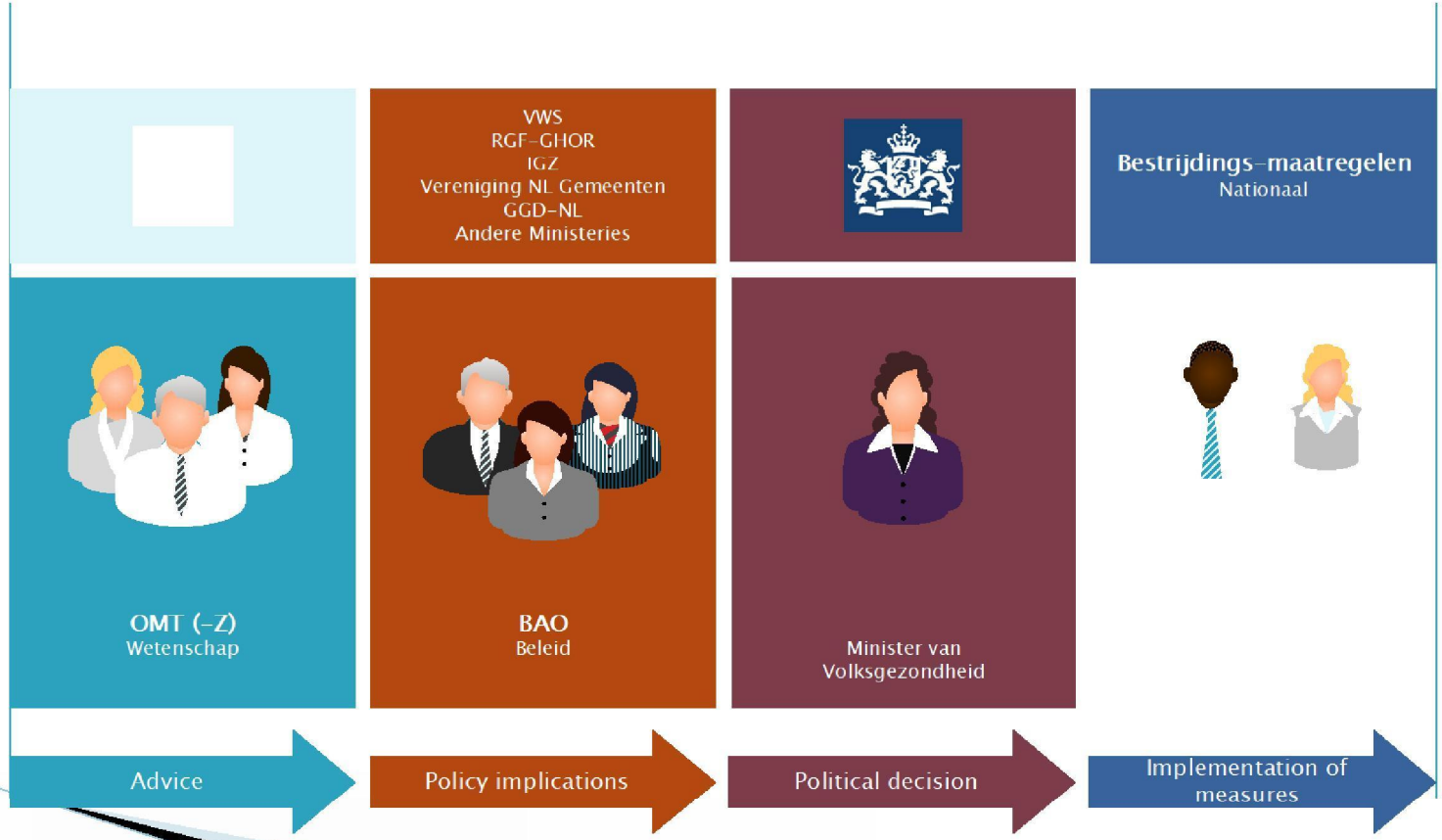


Outbreak management structures and procedures

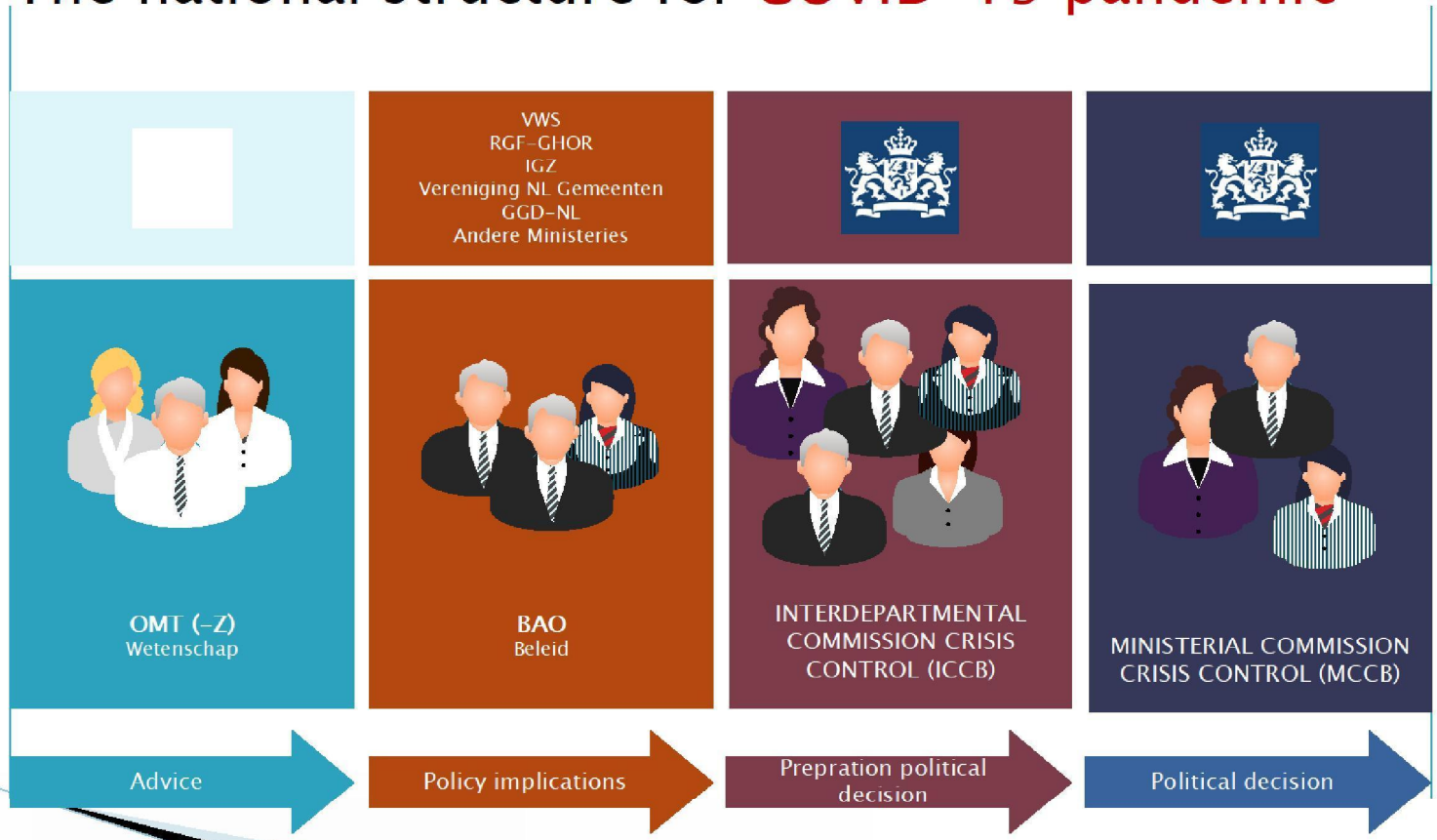
- Early warning weekly committee
- Response teams for small scale outbreaks
- National outbreak management team (OMT): in crises



The structure for crises control (Outbreak Management Team)



The national structure for COVID-19 pandemic

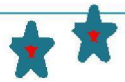


OMT at national level

1992 poliomyelitis outbreak	
1994	plague epidemic in India
1995	Ebola outbreak in Zaïre
1995	diphteria (Dordrecht)
1996	rabies (Alkmaar)
1996	*B. pertussis* epidemic
1997	cluster meningococcal C disease (Putten)
1997	Influenza A/H5N1 in Hong Kong
1999	Legionnaire's disease (Bovenkarspel)
1999	measles outbreak
2000	meningococcal W135 disease: import cases after Hadj

Bron: LCI

2001	cluster meningococcal C disease West Brabant
2001	anthrax/bio-terrorisme threat (anthrax-letters)
2003	Influenza /fowl plague AI/H7N7
2003	SARS
2004	Lymphogranuloma venereum (LGV)
2004	rubella outbreak
2005	*Clostridium difficile* associated diarrhea
2005	v-CJD
2006	MRSA in pig farms
2006	deaths due to seasonal flu vaccination
2007	outbreak of Q fever



Bron: LCI

2008	outbreak of Q fever
2008	Marburg hemorrhagic fever
2009	outbreak of Q fever
2009	swine flu (A/H1N1
2010	outbreak of Q fever
2011	outbreak of mumps
2011	EHEC
2012	Men C in MSM
2013	Measles
2013	MERS
2014, 2015	Ebola
2016	*Zika*
2018	MenW

2020-2021 COVID-19 ; 40X

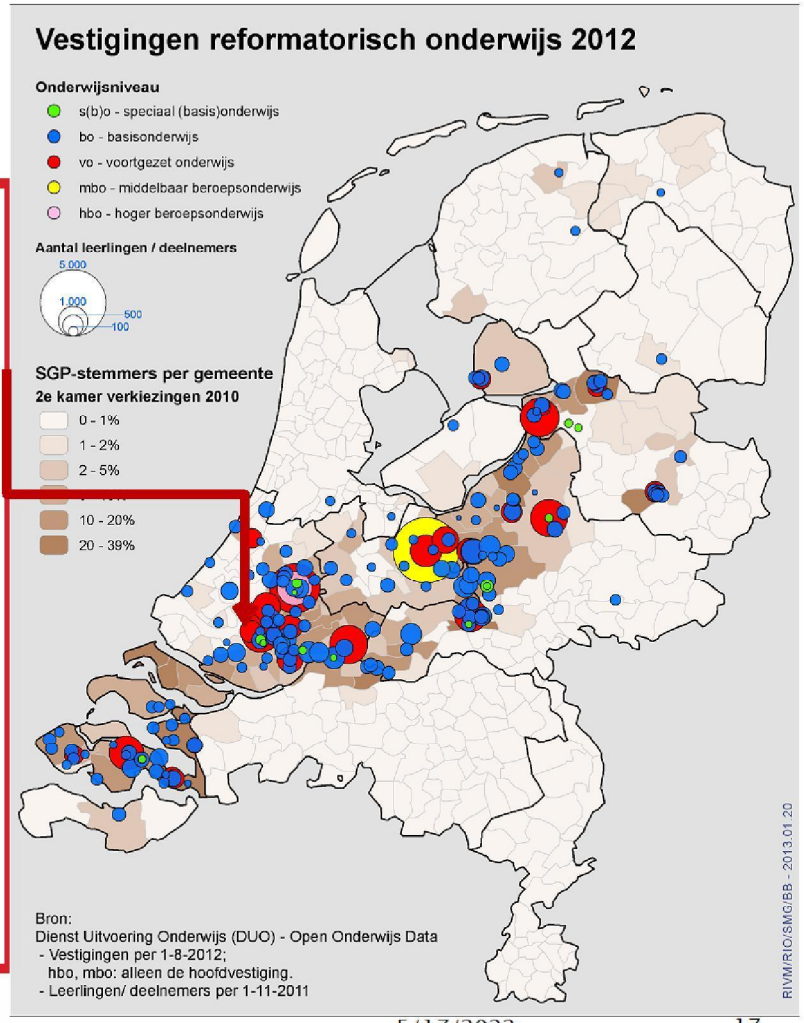
Bron: LCI

Examples of outbreaks

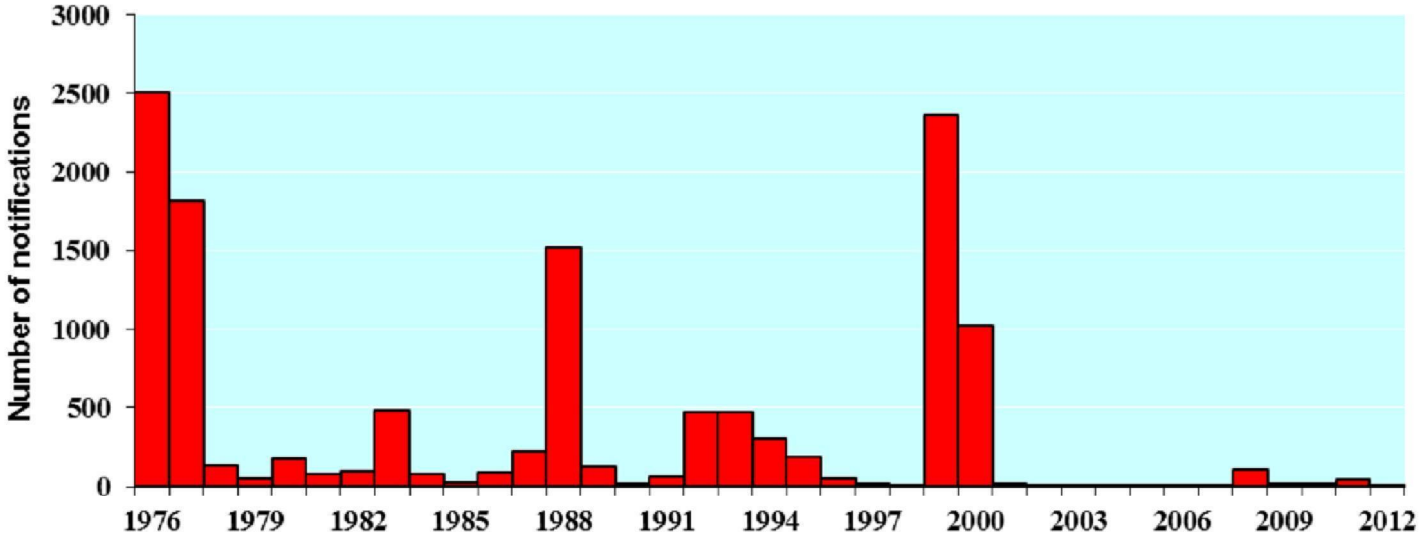
Measles!

- 20-3-2013
- Suspicion measles, 13 yrs girl, orthodox protestant
- MMR vaccination coverage religious group: 50-60%
- 10 children in the household (unvaccinated)

- 21-3-2013
- Laboratory confirmation PCR and serology
- Response team to monitor progression

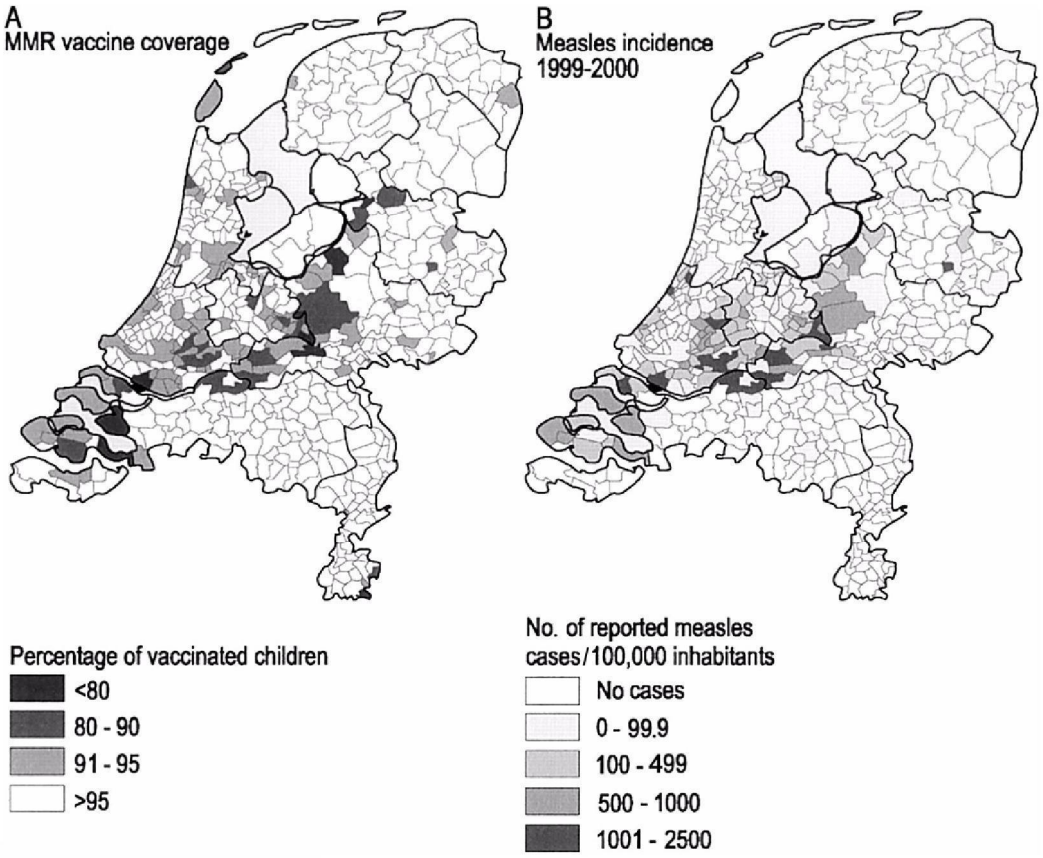


Measles notifications in the Netherlands 1976 – 2012



Acknowledgments: 5.1.2e, RIVM

A Municipal vaccine coverage of first measles, mumps, and rubella (MMR) dose (1996 birth cohort at 1 January 1999).



van den Hof S et al. J Infect Dis. 2002;186:1483-1486

The Journal of Infectious Diseases

Measles

fever, runny nose, cough, red eyes, and sore throat

rash that spreads over the body

highly contagious virus

spreads through the air through coughing and sneezing

Very effective live attenuated vaccine available

(MMR, MMRV)

In NL: 14 m, 9 y

Measles

R0
Basic reproduction number

Probability of transmission per contact
Number of contacts
Duration of infectivity

Heard immunity threashold
% that needs to be vaccinated to stop transmission

P= 1-1/R0

Vaccine coverage of > 95 % to prevent outbreaks of measles

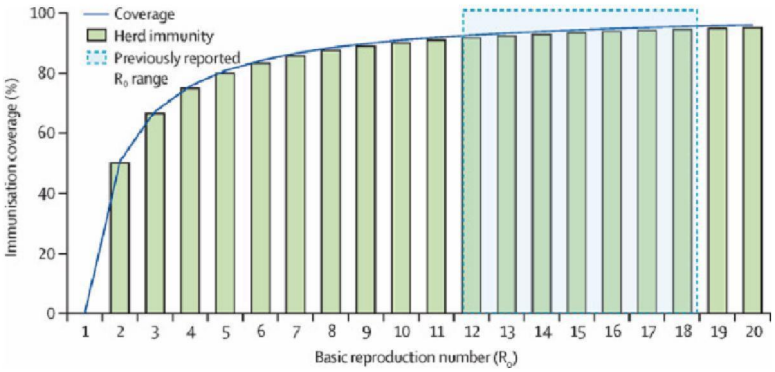
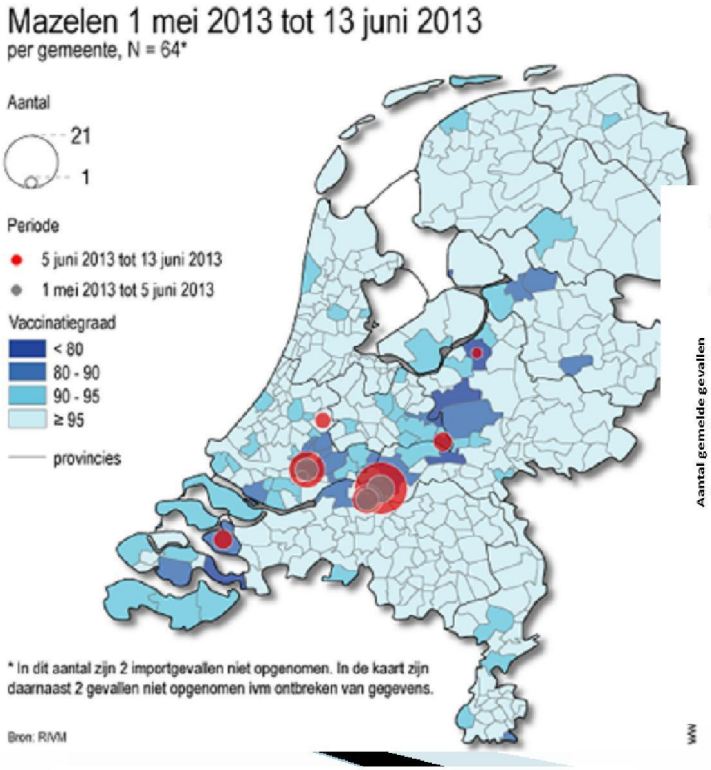


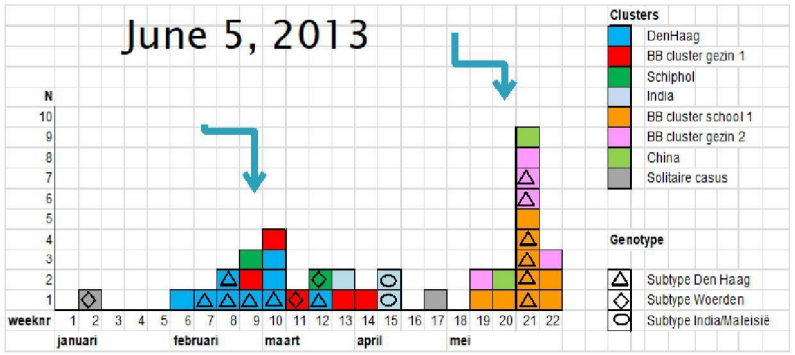
Figure: Measles basic reproduction number (R0), herd immunity, and coverage.

Guerra F et al. Lancet Inf Dis. Volume 17, 12, December 2017; 420-8.

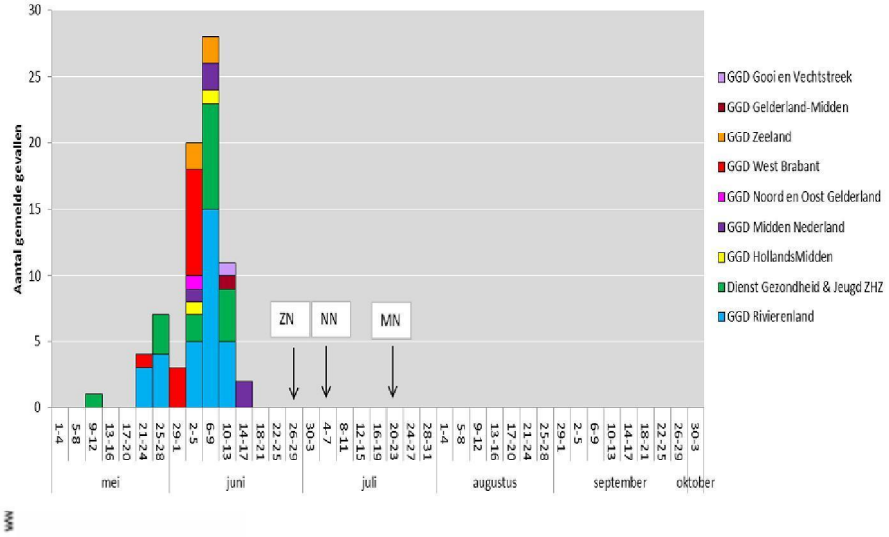
Progression

* All unvaccinated, majority 4-12 yrs





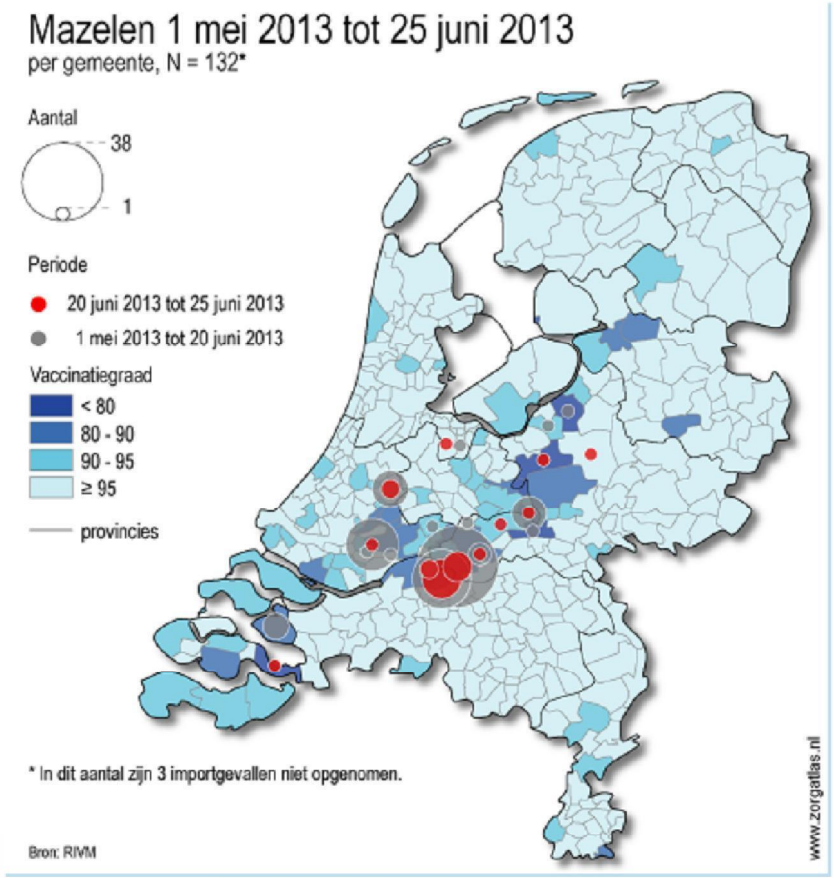
June 17

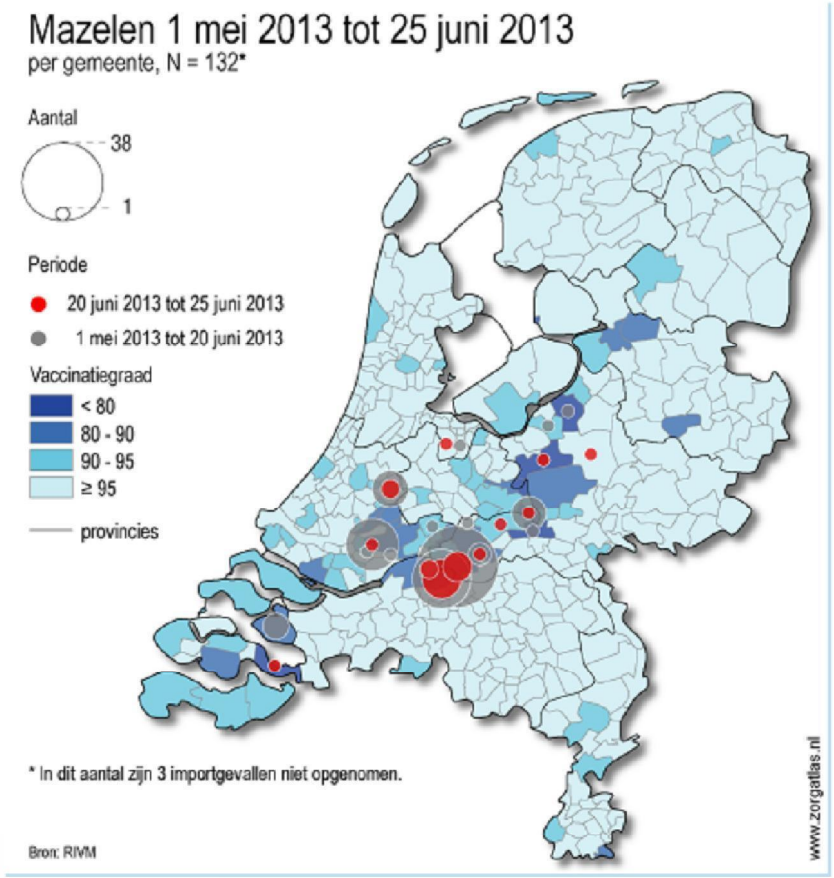


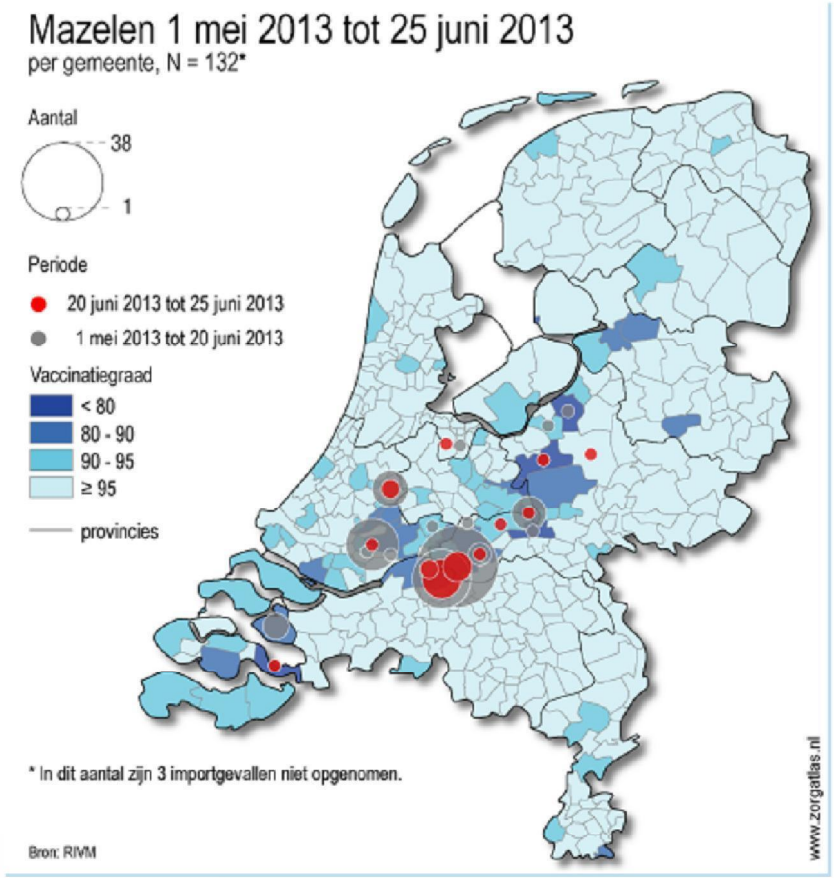
Acknowledgments: 5.1.2e, RIVM

OMT Measles: June 17,2013

- Risk assessment:
  - 1,48% of the population accepting vaccination at risk
- Control measures
  - Catch-up vaccination in the bible belt (proven not to be accepted)
  - Extra MMR to children below 14 m (>6m)
- Policy in hospitals
- Research
- Monitoring perceptions


Mazelen 1 mei 2013 tot 25 juni 2013
per gemeente, N = 132*
Aantal
38
1
Periode
20 juni 2013 tot 25 juni 2013
1 mei 2013 tot 20 juni 2013
Vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 3 importgevallen niet opgenomen.
Bron: RIVM
www.zorgatlas.nl


Mazelen 1 mei 2013 tot 25 juni 2013
per gemeente, N = 132*
Aantal
38
1
Periode
20 juni 2013 tot 25 juni 2013
1 mei 2013 tot 20 juni 2013
Vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 3 importgevallen niet opgenomen.
Bron: RIVM
www.zorgatlas.nl


Mazelen 1 mei 2013 tot 25 juni 2013
per gemeente, N = 132*
Aantal
38
1
Periode
20 juni 2013 tot 25 juni 2013
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Vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
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Bron: RIVM
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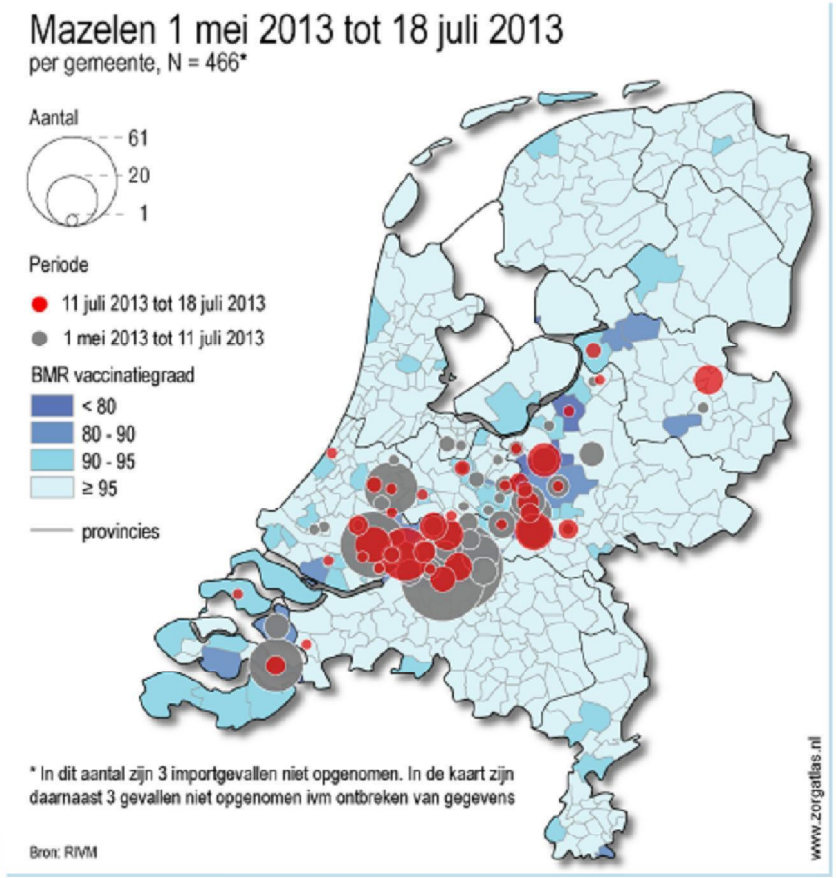
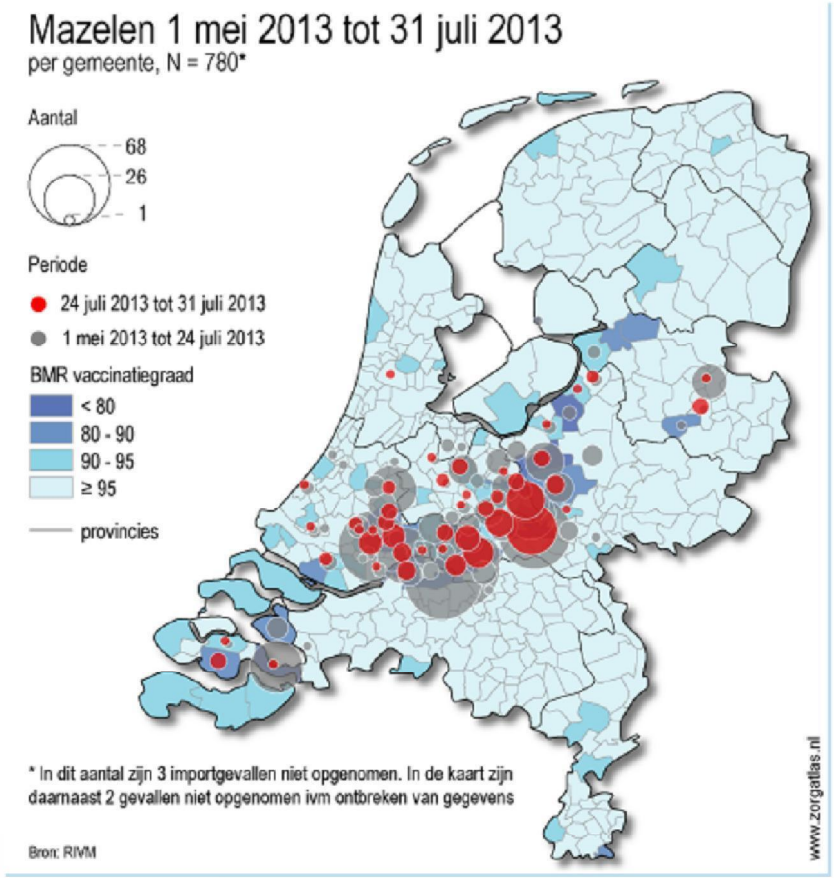
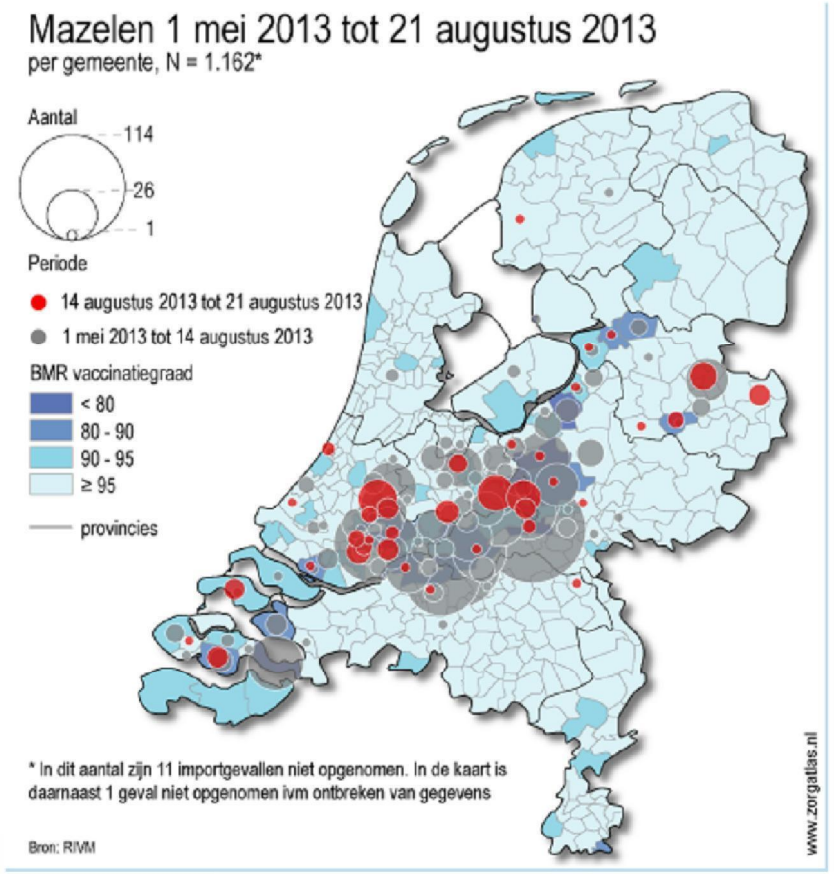
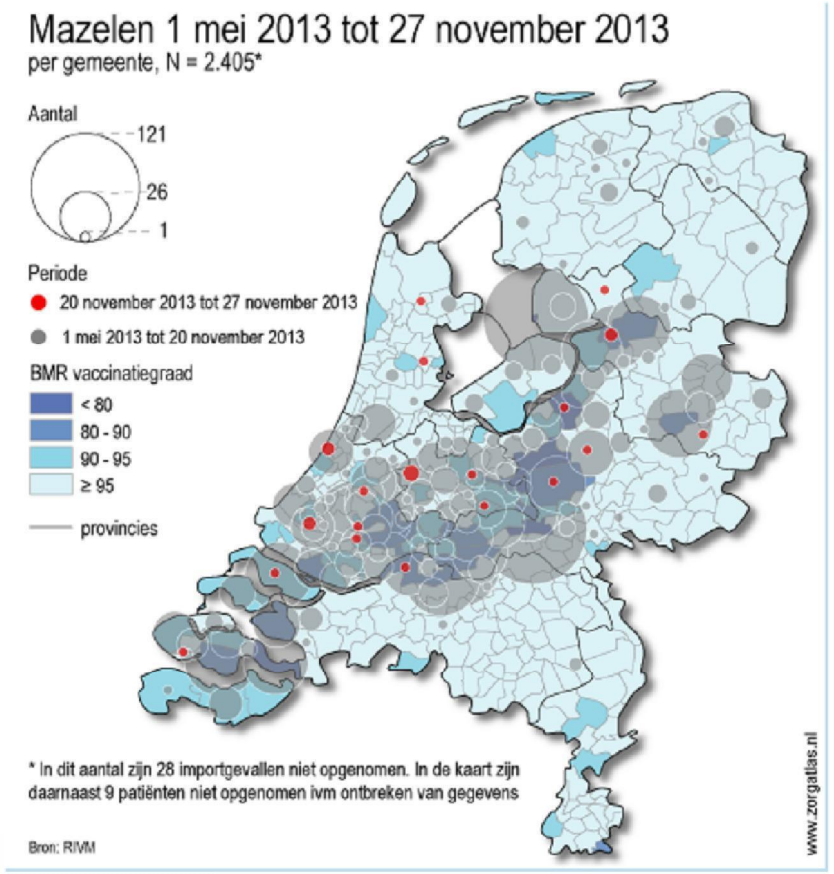
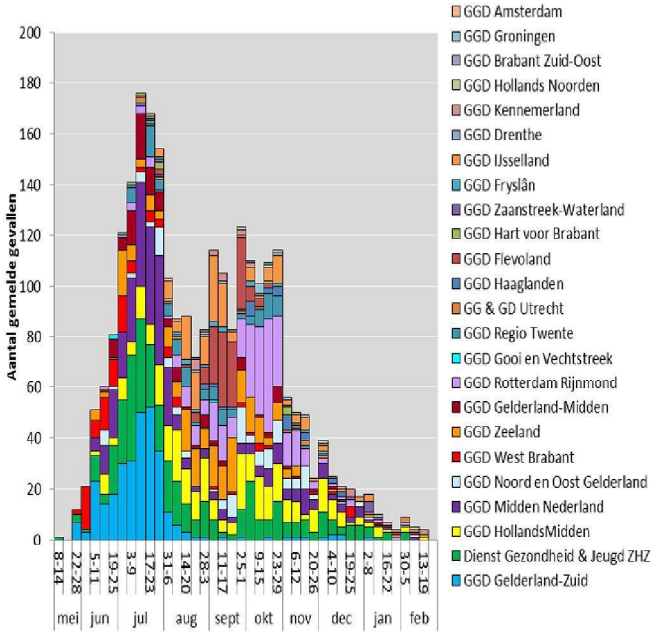
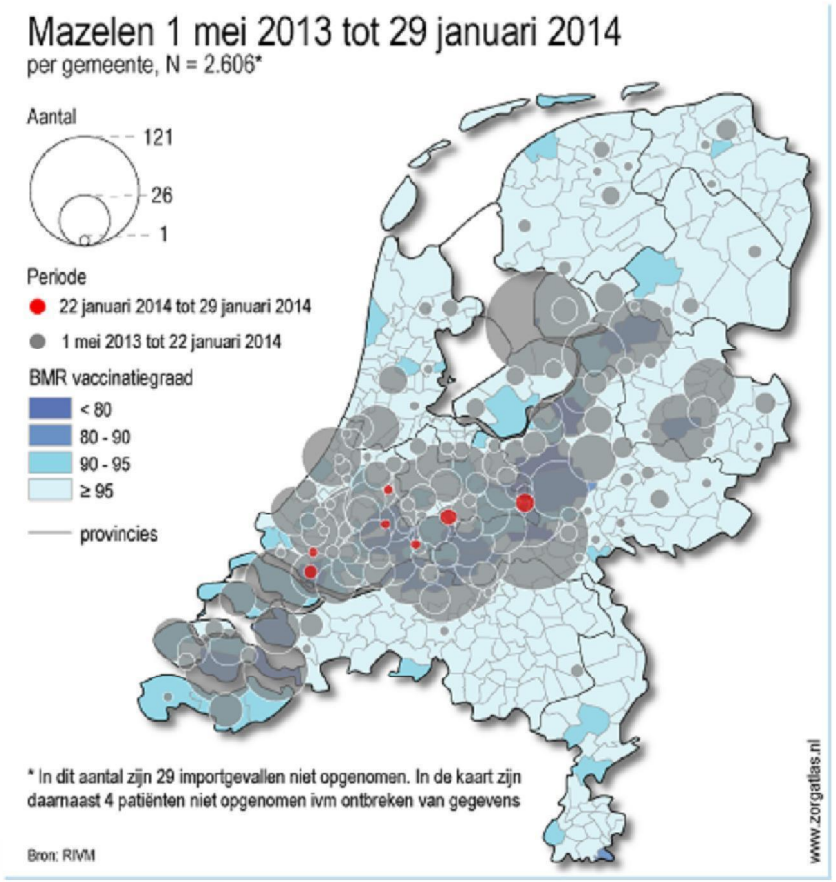

Mazelen 1 mei 2013 tot 18 juli 2013
per gemeente, N = 466*
Aantal
61
20
1
Periode
11 juli 2013 tot 18 juli 2013
1 mei 2013 tot 11 juli 2013
BMR vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 3 importgevallen niet opgenomen. In de kaart zijn daarnaast 3 gevallen niet opgenomen ivm ontbreken van gegevens
Bron: RIVM
www.zorgatlas.nl


Mazelen 1 mei 2013 tot 31 juli 2013
per gemeente, N = 780*
Aantal
68
26
1
Periode
24 juli 2013 tot 31 juli 2013
1 mei 2013 tot 24 juli 2013
BMR vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 3 importgevallen niet opgenomen. In de kaart zijn daarnaast 2 gevallen niet opgenomen ivm ontbreken van gegevens
Bron: RIVM
www.zorgatlas.nl

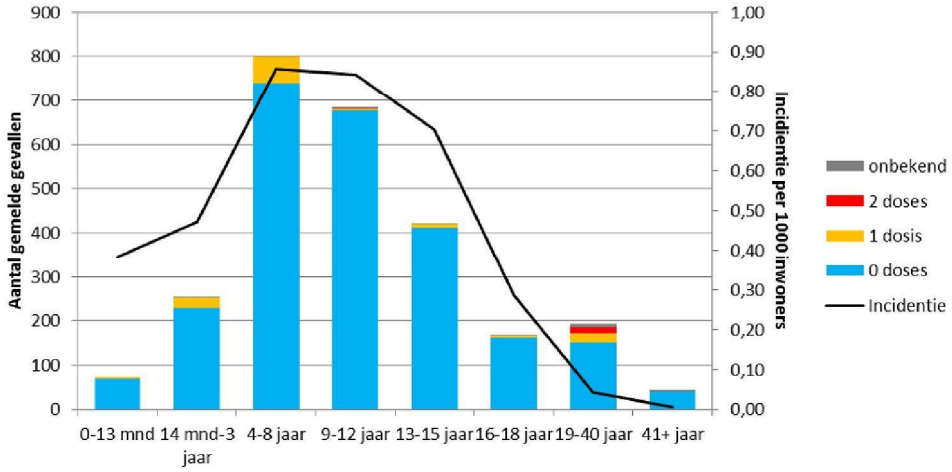

Mazelen 1 mei 2013 tot 21 augustus 2013
per gemeente, N = 1.162*
Aantal
114
26
1
Periode
14 augustus 2013 tot 21 augustus 2013
1 mei 2013 tot 14 augustus 2013
BMR vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 11 importgevallen niet opgenomen. In de kaart is daarnaast 1 geval niet opgenomen ivm ontbreken van gegevens
Bron: RIVM
www.zorgatlas.nl

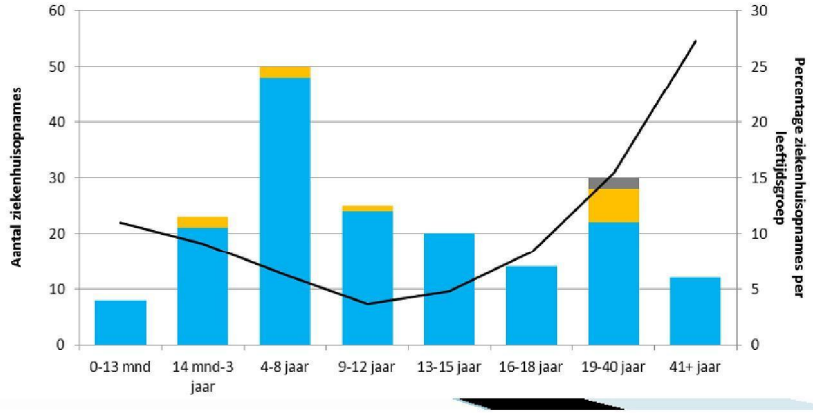

Mazelen 1 mei 2013 tot 27 november 2013
per gemeente, N = 2.405*
Aantal
121
26
1
Periode
20 november 2013 tot 27 november 2013
1 mei 2013 tot 20 november 2013
BMR vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 28 importgevallen niet opgenomen. In de kaart zijn daarnaast 9 patiënten niet opgenomen ivm ontbreken van gegevens
Bron: RIVM
www.zorgatlas.nl


Aantal gemelde gevallen
200
180
160
140
120
100
80
60
40
20
0
8-14
22-28
5-11
19-25
3-9
17-23
31-6
14-20
28-3
11-17
25-1
9-15
23-29
6-12
20-26
4-10
19-25
2-8
16-22
30-5
13-19
mei
jun
jul
aug
sept
okt
nov
dec
jan
feb
GGD Amsterdam
GGD Groningen
GGD Brabant Zuid-Oost
GGD Hollands Noorden
GGD Kennemerland
GGD Drenthe
GGD IJsselland
GGD Fryslân
GGD Zaanstreek-Waterland
GGD Hart voor Brabant
GGD Flevoland
GGD Haaglanden
GG & GD Utrecht
GGD Regio Twente
GGD Gooi en Vechtstreek
GGD Rotterdam Rijnmond
GGD Gelderland-Midden
GGD Zeeland
GGD West Brabant
GGD Noord en Oost Gelderland
GGD Midden Nederland
GGD HollandsMidden
Dienst Gezondheid & Jeugd ZHZ
GGD Gelderland-Zuid


Mazelen 1 mei 2013 tot 29 januari 2014
per gemeente, N = 2.606*
Aantal
121
26
1
Periode
22 januari 2014 tot 29 januari 2014
1 mei 2013 tot 22 januari 2014
BMR vaccinatiegraad
< 80
80 - 90
90 - 95
≥ 95
provincies
* In dit aantal zijn 29 importgevallen niet opgenomen. In de kaart zijn daarnaast 4 patiënten niet opgenomen ivm ontbreken van gegevens
Bron: RIVM
www.zorgatlas.nl

Mazelenmeldingen en opnames naar vaccinatiestatus en leeftijdsgroep





Ziekenhuisopnames naar vaccinatiestatus en leeftijdsgroep (n=182)

Source: RIVM

Notified complications due to measles outbreak 2013-2014

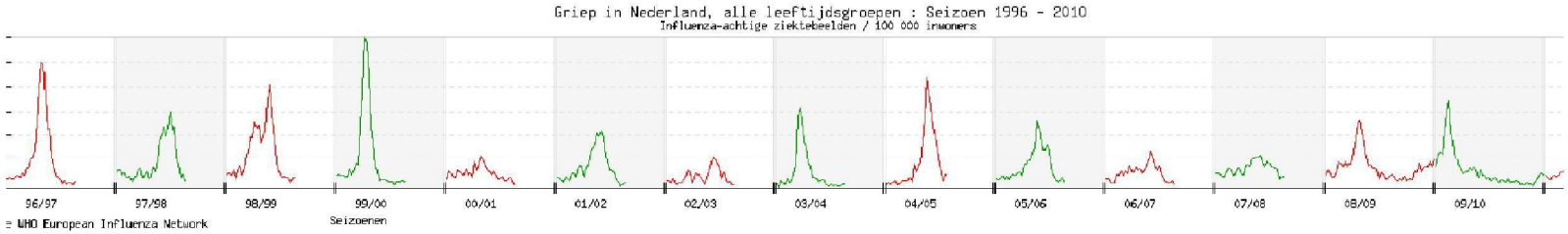
	Totaal aantal gemelde patiënten met complicatie(s)		Totaal aantal gemelde patiënten met complicatie(s) opgenomen (geweest) in het ziekenhuis	
	Aantal	% van alle gemelde patiënten met mazelen	Aantal	% van gemelde patiënten met complicatie(s)
	1	0.04%	1	100%
	1	0.04%	1	100%
	1	0.04%	1	100%
	151	5.7%	79	52%
	106	4.0%	5	5%
	5	0.2%	4	80%
	19	0.7%	17	90%
	16	0.6%	5	31%
	22	0.9%	16	73%
			47	
			6	
	322	12.2%	182	57%

Severe outcome: 1 died during meales, 1 due to late complications, 1 in nursing home

Source: [redacted]

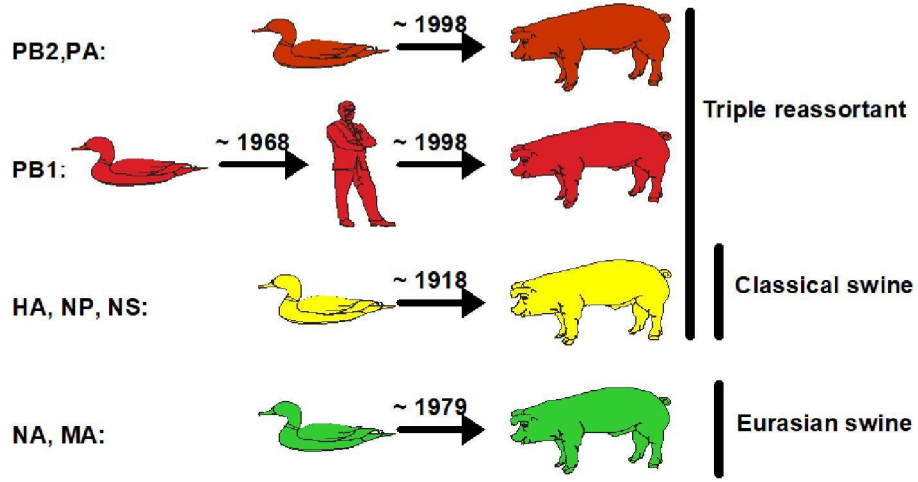
The other pandemic (flu pandemic 2009)

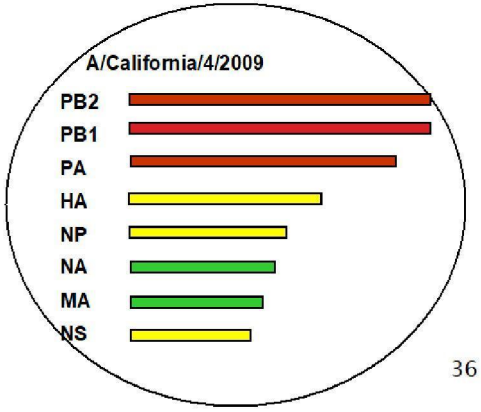
Seasonal influenza throughout the past decade



BRON: NIVEL

New virus: combination of genes from 4 viruses





Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team*, New England Journal of Medicine, 2009

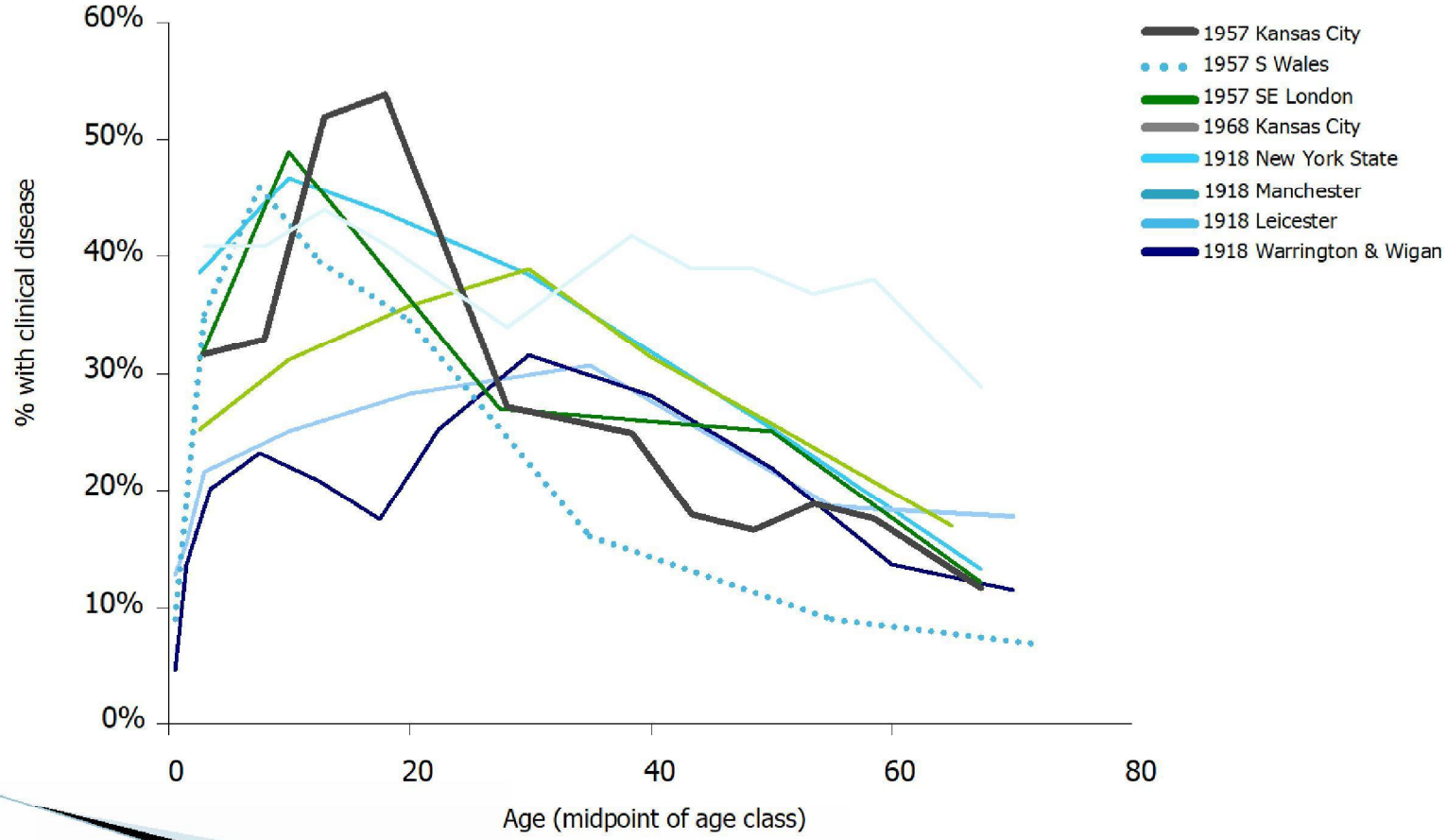
Some of the 'known unknowns' in the 20th century pandemics

- Three pandemics (1918, 1957, 1968)
- Different shapes and waves
- Differences in effective reproductive number
- Different groups affected
- Different levels of severity including case fatality ratio
- Imply different approaches to mitigation

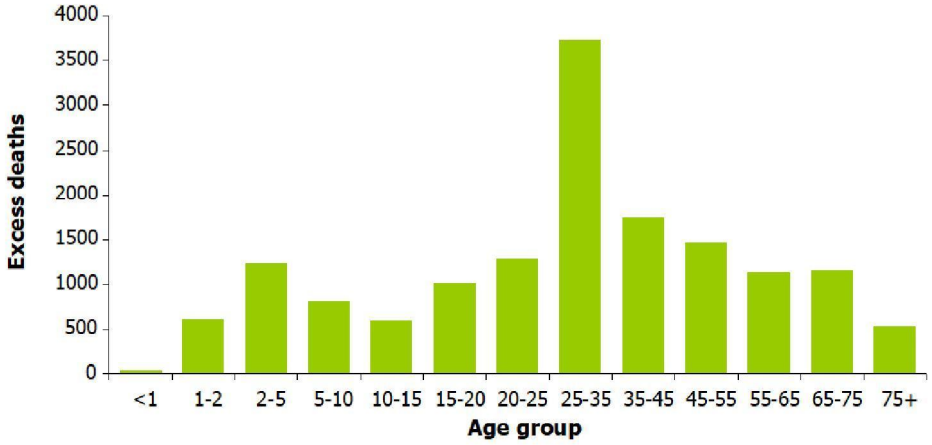
- New virus
- Efficient person-to-person transmission
- Significant disease
- No previous immunity

Worldwide spread

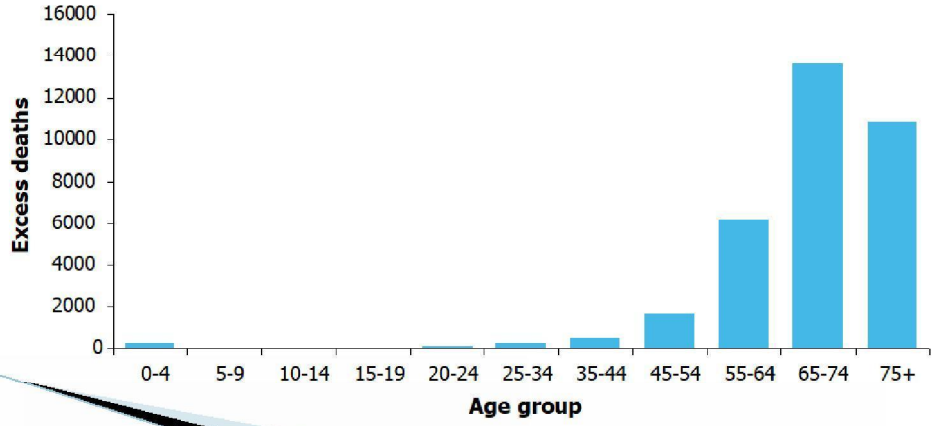
Age-specific clinical attack rate in previous pandemics



Different age-specific excess deaths in pandemics



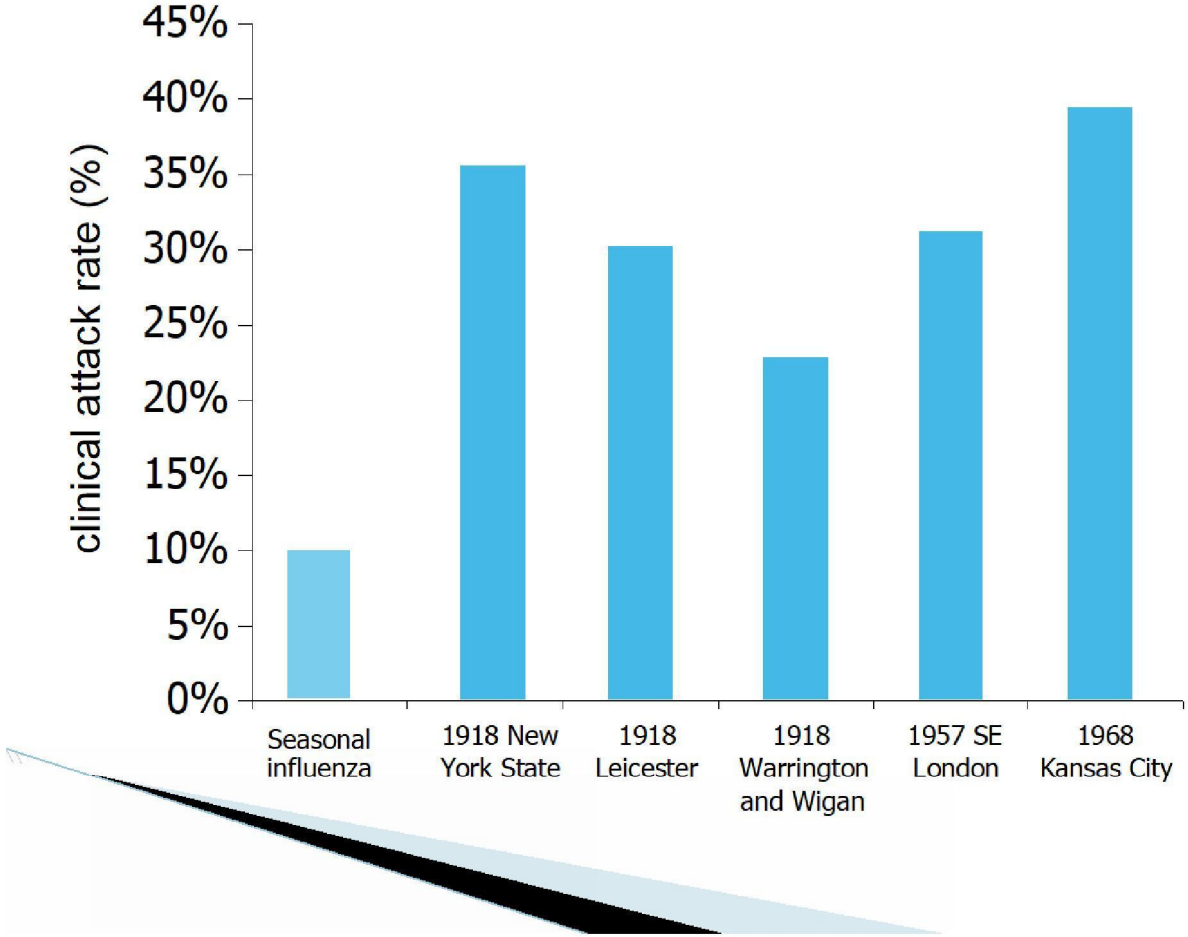
Excess deaths, second wave, 1918 epidemic



Excess deaths second wave 1969 pandemic, England and Wales

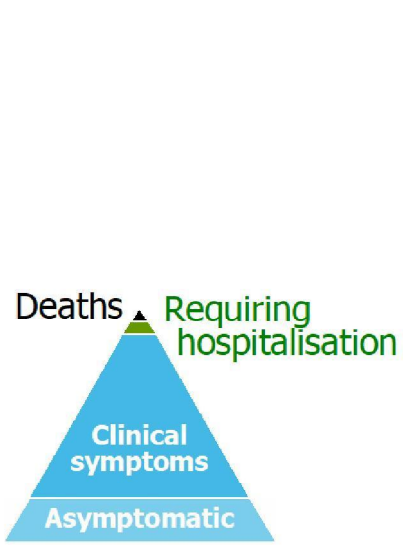
ECDC

Numbers affected in seasonal influenza epidemics and pandemics (overall clinical attack rate in previous pandemics)

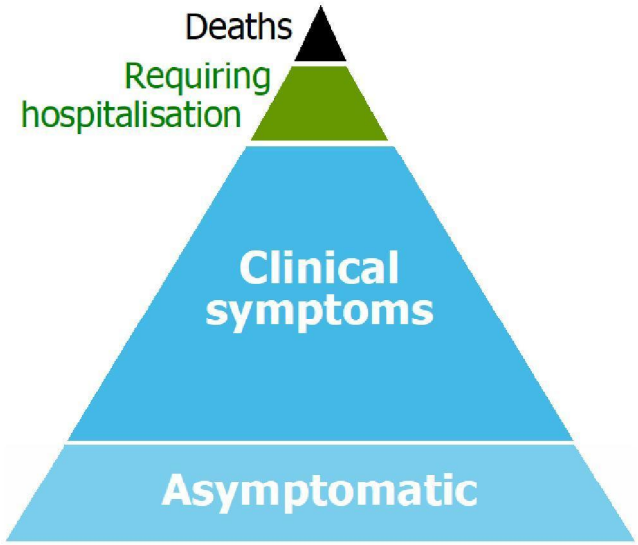


ECDC

Seasonal influenza compared to pandemic — proportions of types of cases



Seasonal influenza



Pandemic

ization

Status as of 26 April 2009

Country, territory and area	New cases since previous update	Cumulative tot
United Kingdom of Great Britain and Northern Ireland	0	
United Kingdom, Isle of Man, Crown Dependency	0	
United Kingdom, Jersey, Crown Dependency	0	
United States of America	20	
Uruguay	0	
Vanuatu	0	
Venezuela (Bolivarian Republic of)	0	
Viet Nam	0	
West Bank and Gaza Strip	0	
Yemen	0	
{Grand Total}	38	

Click here for latest Influenza A(H1N1) updates from WHO.

ization

Status as of 30 April 2009, 17:00 GMT

Country, territory and area	New cases since previous update	Cumulative tot
United Kingdom of Great Britain and Northern Ireland	3	
United Kingdom, Isle of Man, Crown Dependency	0	
United Kingdom, Jersey, Crown Dependency	0	
United States of America	18	
Uruguay	0	
Vanuatu	0	
Venezuela (Bolivarian Republic of)	0	
Viet Nam	0	
West Bank and Gaza Strip	0	
Yemen	0	
{Grand Total}	109	

Click here for latest influenza A(H1N1) updates from WHO.

ization

Status as of 15 May 2009, 06:00 GMT

Country, territory and area	New cases since previous update	Cumulative tot
United Kingdom of Great Britain and Northern Ireland	0	
United Kingdom, Isle of Man, Crown Dependency	0	
United Kingdom, Jersey, Crown Dependency	0	
United States of America	946	
Uruguay	0	
Vanuatu	0	
Venezuela (Bolivarian Republic of)	0	
Viet Nam	0	
West Bank and Gaza Strip	0	
Yemen	0	
{Grand Total}	1023	

GMT
GMT
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GMT

	Cumulative
0	65
023	7520

inese Taipei has
cases of
0 deaths. Cases
e included in the
ded in the table

uraçao: 3
hree confirmed
s of a cruise

Click here for latest Influenza A(H1N1) updates from WHO.

ization

Status as of 29 May 2009, 06:00 GMT

Country, territory and area	New cases since previous update	Cumulative tot
United Kingdom of Great Britain and Northern Ireland	66	
United Kingdom, Isle of Man, Crown Dependency	0	
United Kingdom, Jersey, Crown Dependency	0	
United States of America	1163	
Uruguay	2	
Vanuatu	0	
Venezuela (Bolivarian Republic of)	0	
Viet Nam	0	
West Bank and Gaza Strip	0	
Yemen	0	
{Grand Total}	2112	

GMT
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	Cumulative
4	99
112	15510

inese Taipei has
cases of
0 deaths. Cases
e included in the
ded in the table

uraçao: 3
hree confirmed
s of a cruise

Click here for latest Influenza A(H1N1) updates from WHO.

ization

Status as of 11 June 2009, 14:00 GMT

www.who.int

Country, territory and area	New cases since previous update	Cumulative tot
United Kingdom of Great Britain and Northern Ireland	156	
United Kingdom, Isle of Man, Crown Dependency	0	
United Kingdom, Jersey, Crown Dependency	0	
United States of America	0	
Uruguay	0	
Vanuatu	0	
Venezuela (Bolivarian Republic of)	1	
Viet Nam	1	
West Bank and Gaza Strip	0	
Yemen	0	
{Grand Total}	1037	

reports

GMT
GMT
GMT
GMT
GMT
GMT
GMT
GMT
GMT

	Cumulative
3	144
37	28774

inese Taipei has
cases of
0 deaths. Cases
e included in the
ded in the table

uraçao: 3
hree confirmed
s of a cruise

Click here for latest Influenza A(H1N1) updates from WHO.

ization FASE 6

Status as of 26 June 2009, 07:00 GMT

www.who.int

Country, territory and area	New cases since previous update	Cumulative tot
United Kingdom of Great Britain and Northern Ireland	692	
United Kingdom, Isle of Man, Crown Dependency	0	
United Kingdom, Jersey, Crown Dependency	5	
United States of America	0	
Uruguay	0	
Vanuatu	1	
Venezuela (Bolivarian Republic of)	18	
Viet Nam	7	
West Bank and Gaza Strip	1	
Yemen	0	
{Grand Total}	3947	

GMT
GMT
GMT
GMT
GMT
GMT
GMT
GMT
GMT
GMT

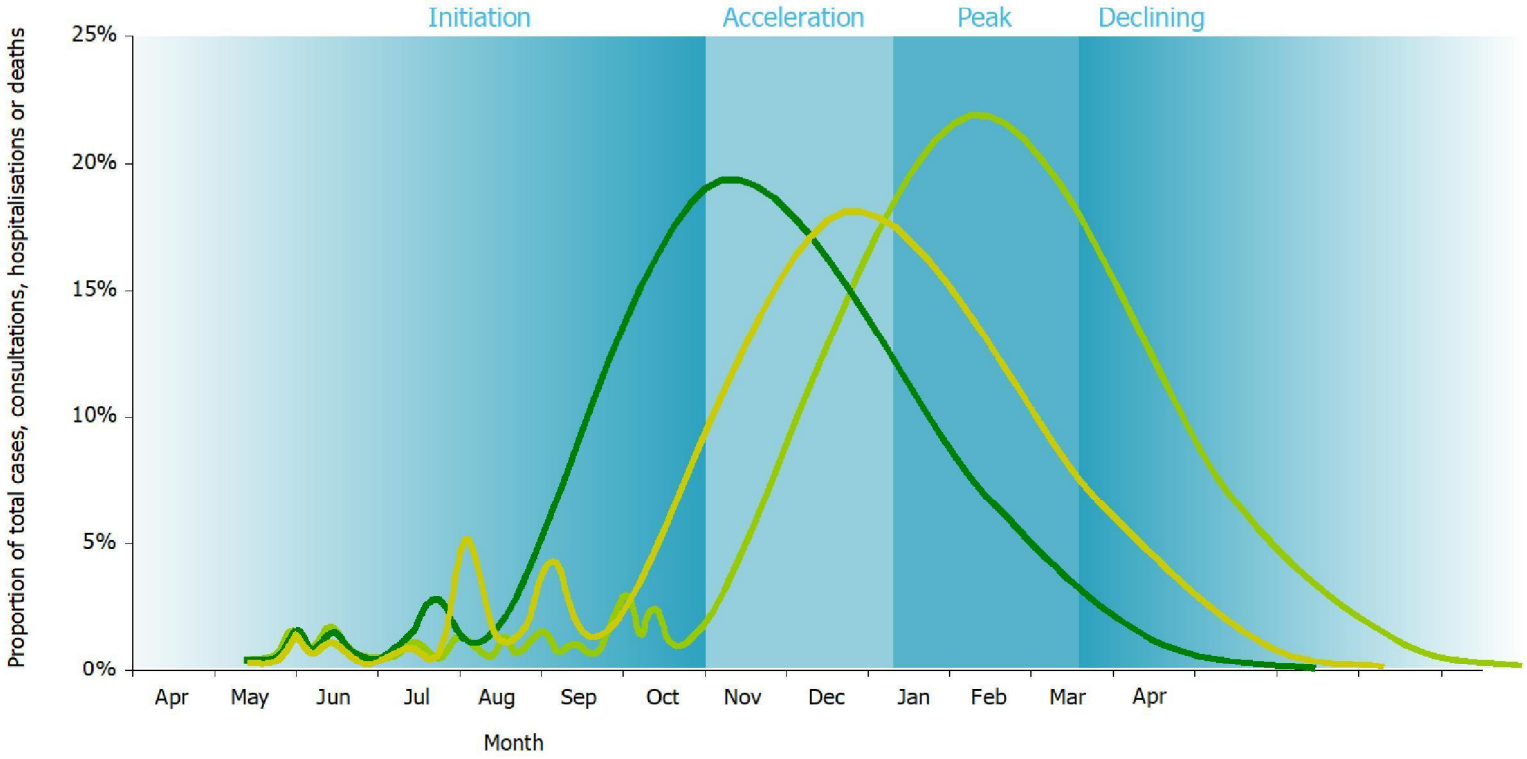
	Cumulative
25	263
947	59814

inese Taipei has
cases of
0 deaths. Cases
e included in the
ded in the table

uraçao: 3
hree confirmed
s of a cruise

Click here for latest Influenza A(H1N1) updates from WHO.

One possible European scenario — summer 2009

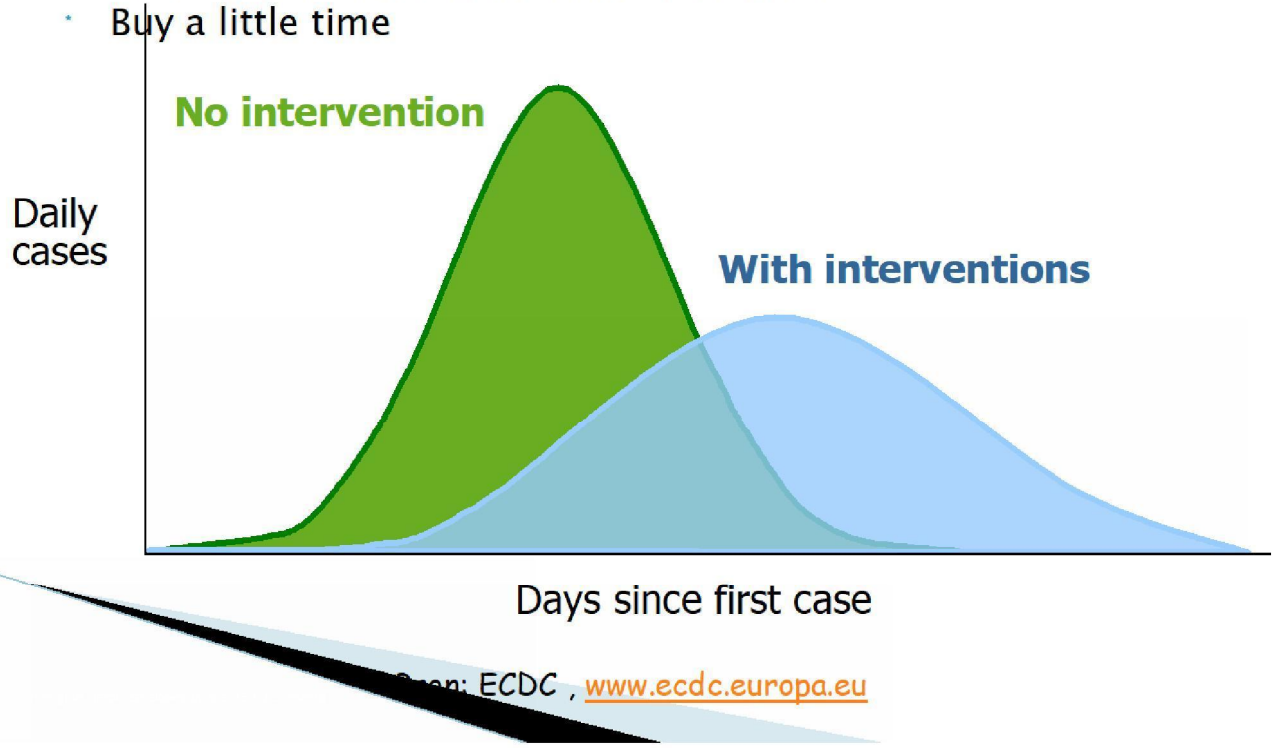


In reality, the initiation phase can be prolonged, especially in the summer months. What cannot be determined is when acceleration takes place.

Bron: ECDC www.ecdc.europa.eu

Aims of community reduction of influenza transmission — mitigation

- Delay and flatten epidemic peak
- Reduce peak burden on healthcare system and threat
- Somewhat reduce total number of cases
- Buy a little time



Source: ECDC , www.ecdc.europa.eu

Which interventions for containment or mitigation?

Vaccination with pandemic vaccine (adjuvated)

Social distancing, cough hygiene

Antivirals

Vaccines

34 million doses of vaccines were ordered: sufficient for 2 doses for every one

HPV catch-up campaign spring 2009: coverage 50% rather than targeted 70%: strong anti-vaccination lobby

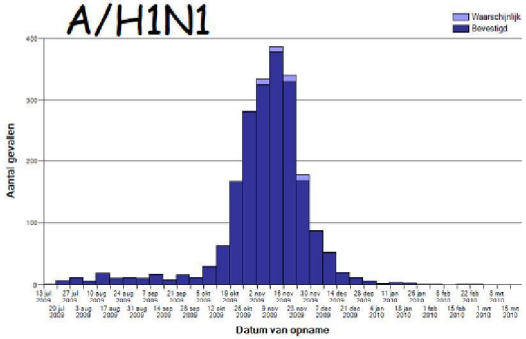
Scepticism whether pandemic vaccination needed ('mild pandemic')

Anxiety about new vaccines not tested thoroughly for safety or effectiveness

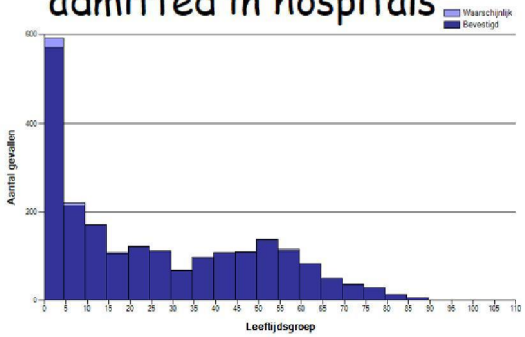
Confusion about 2 versus 1 doses, in particular after WHO statements

Discussions about role of pharmaceutical lobby in scientific advisory committees

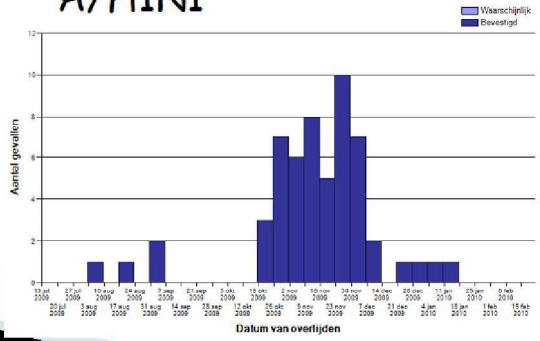
Hospital admissions due to A/H1N1



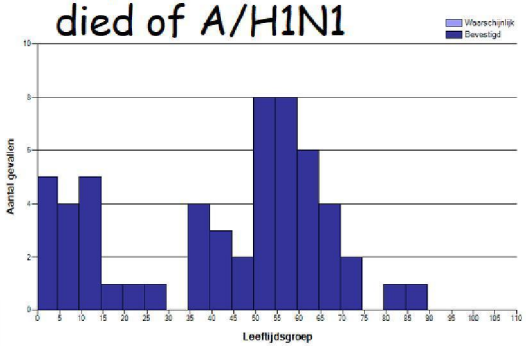
Age distribution of the patients admitted in hospitals



Deaths from A/H1N1



Age distribution of patients who died of A/H1N1



Pandemic vaccine coverage

- Medical risk groups (GP): 76% (93%, 2 doses)
- Health care workers: 50% (87%, 2 doses)
- Healthy children: 74% (81%, 2 doses)
- Care providers infants: 64% (80%, 2 doses)
- Estimated >5 million people vaccinated (30% population)

Influenza A (H1N1) 2009 pandemic in the Netherlands

2193 patients admitted to hospital (50% with co-morbidity)

63 notified deaths (90% with co-morbidity)

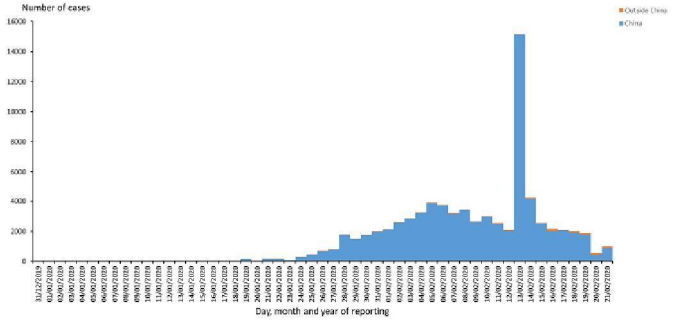
Source:
RIVM

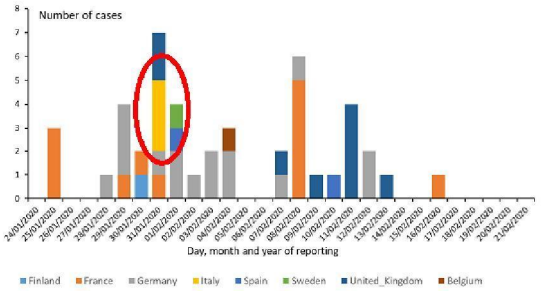
COVID- 19 in retrospect

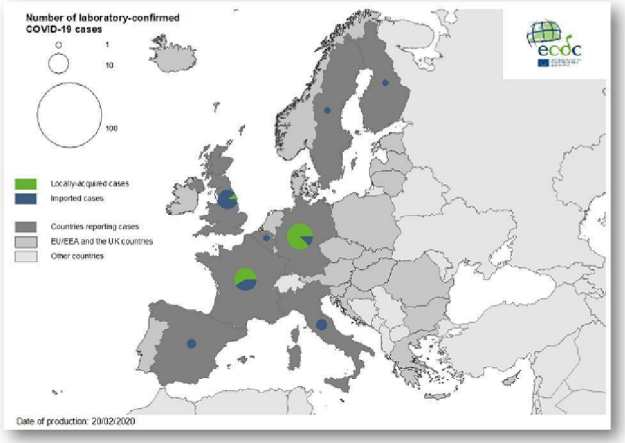
The first wave

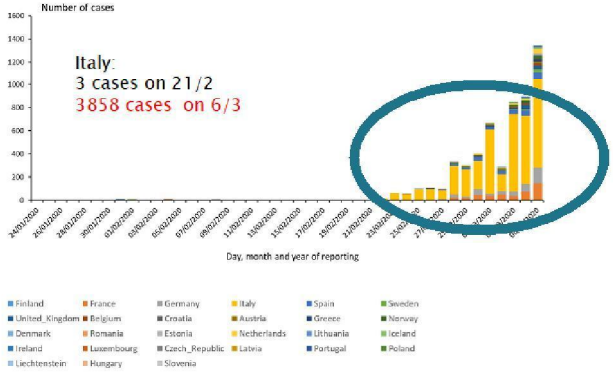
Distribution of COVID-19 cases (according to the applied case definition in the country) by country and region, as of 21 February 2020

All countries



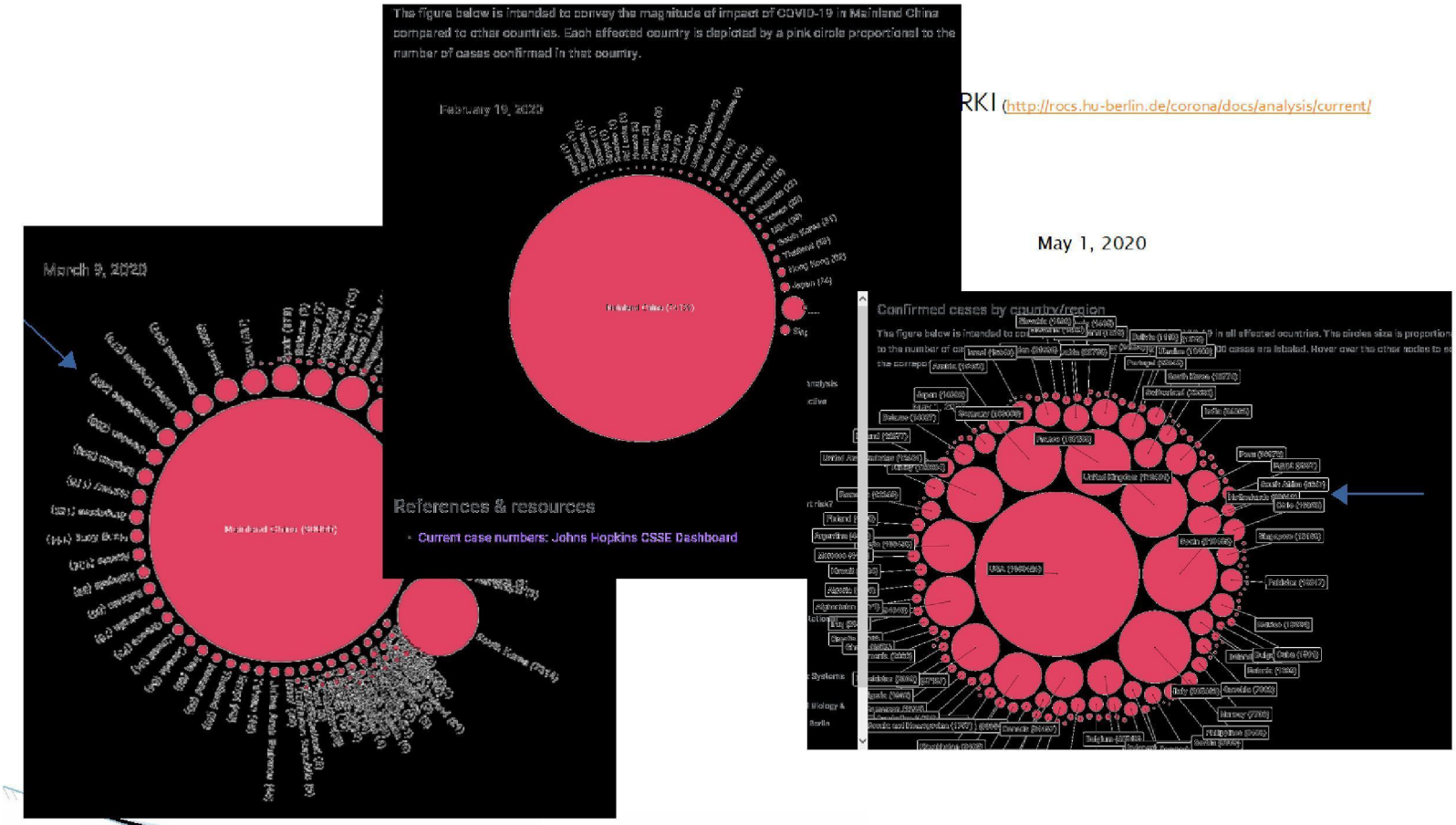






Bron:ECDC

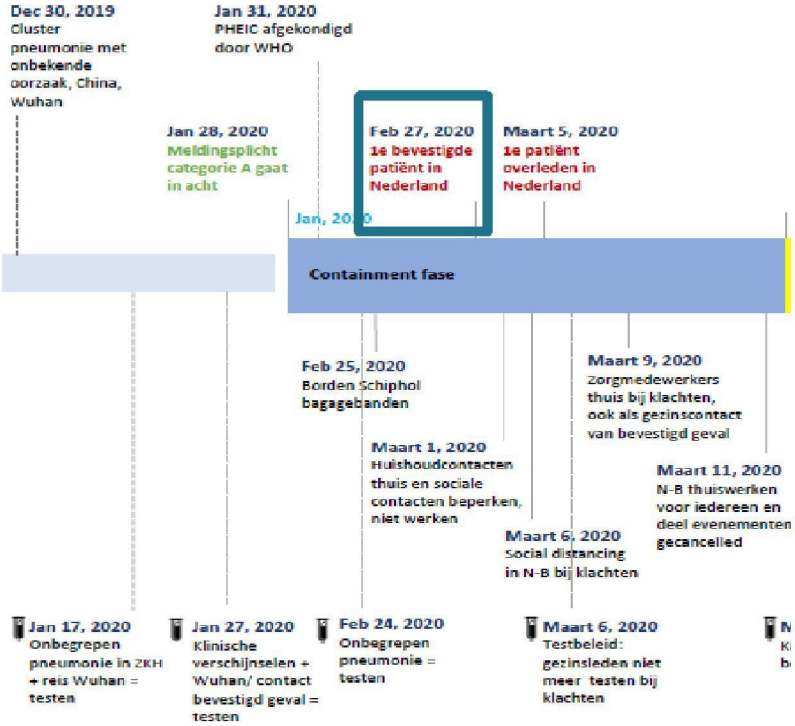
Distribution of COVID-19 cases (according to the applied case definition in the country) in EU/EEA and the UK, as of 6 March 2020

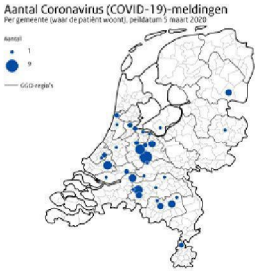


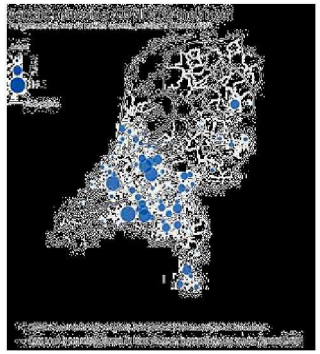
RKI (http://rocs.hu-berlin.de/corona/docs/analysis/current/

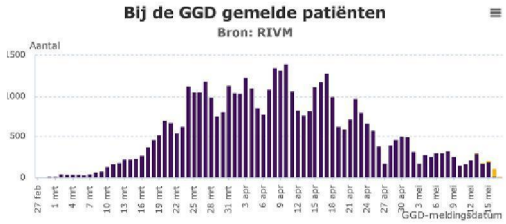
May 1, 2020

What happened in the Netherlands?

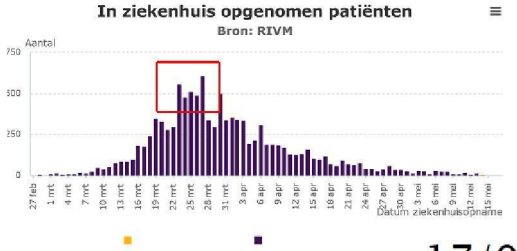






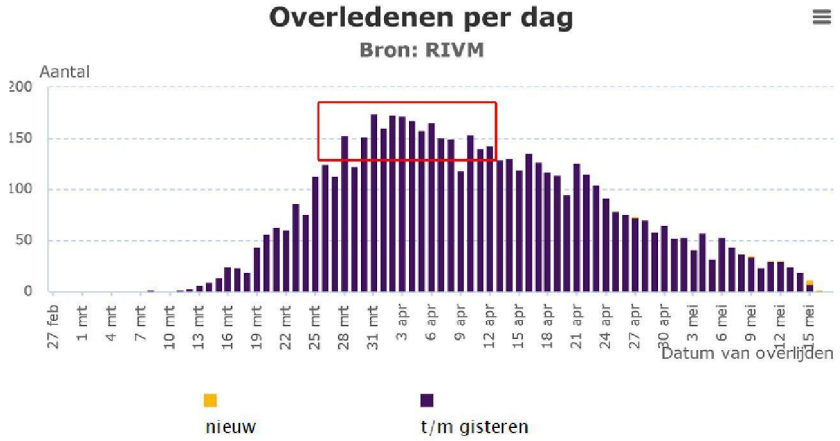


17/05
43.995



Mediaan: 69 jaar

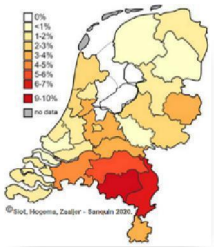
17/05
11.552



Mediaan: 82 jaar

17/05
5.680

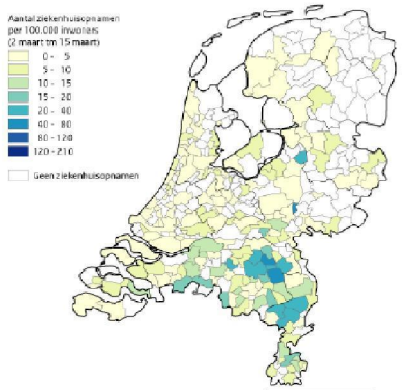
COVID-19 uitbraak
ziekenhuisopnames per 2 weken



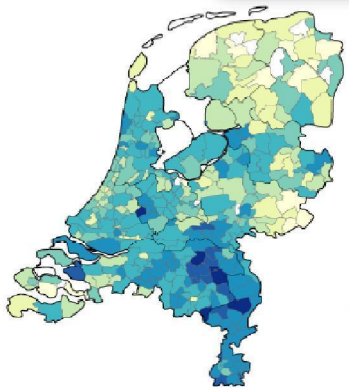
Seroprevalentie antistoffen
Dank: 5.1.2e , Sanquin

top IC-bezetting 7 april:
1.332 bedden COVID-19

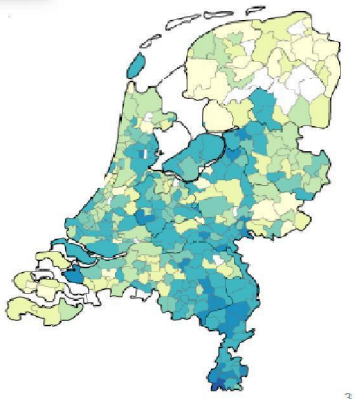
2-15 maart



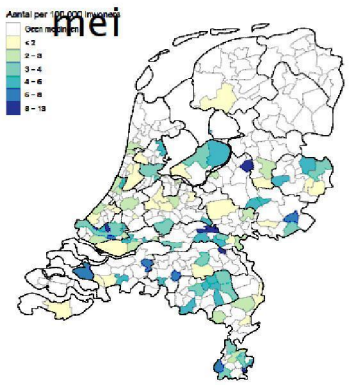
16-29 maart



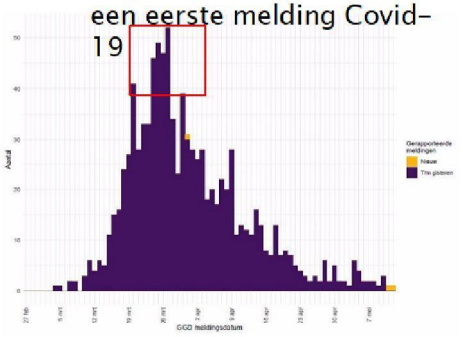
30 maart – 12 april

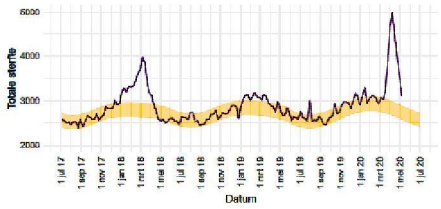


3 mei–16 mei



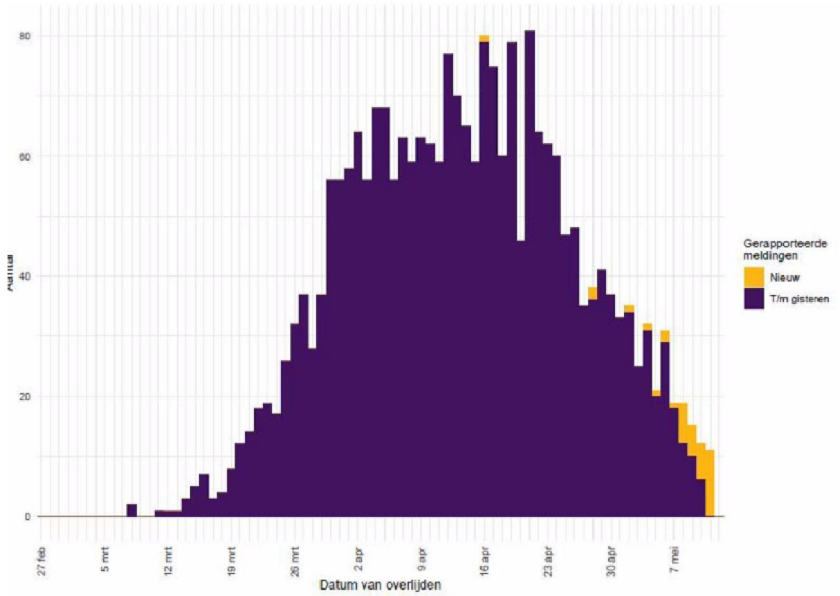
Nieuwe verpleeghuislocaties met een eerste melding Covid-19





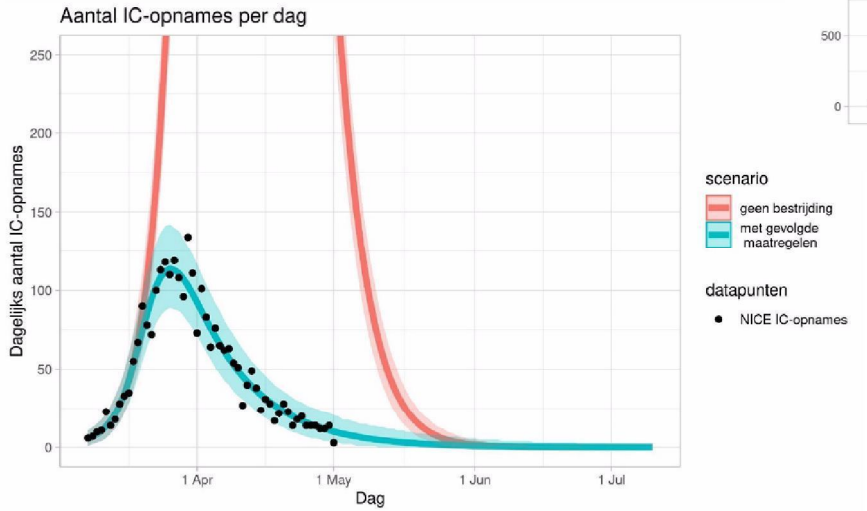
oversterfte

Overleden patienten die in een verpleeghuis wonen, per dag

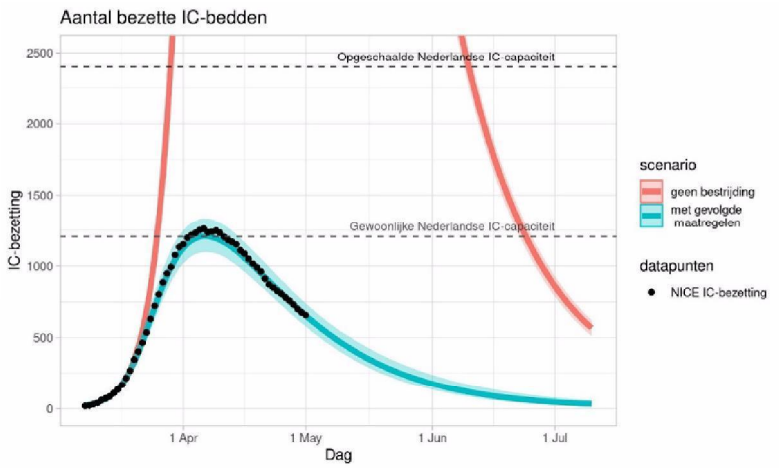


Bronnen: RIVM, CBS, VERENSO, NIVEL

Nieuwe IC-opnames van patiënten met COVID-19



gegevens in figuur niet gecorrigeerd voor rapportagevertraging

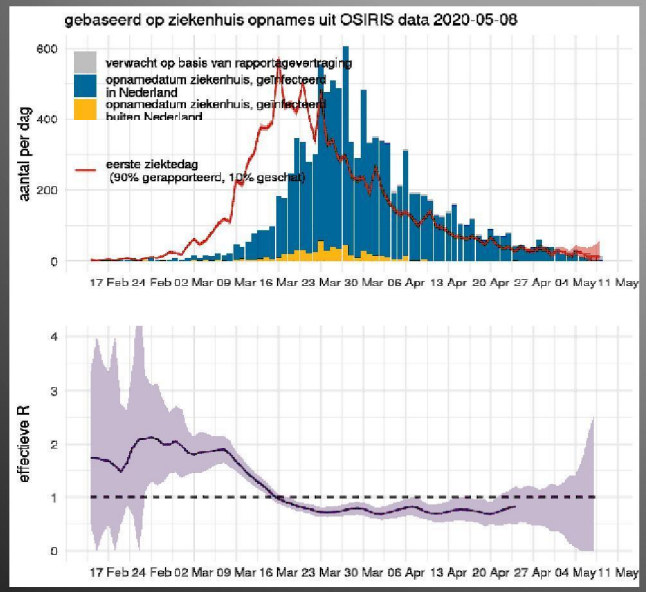


Bezette IC-plaatsen door patiënten met COVID-19

Bron: EPI/RIVM

Dank: 5.1.2e

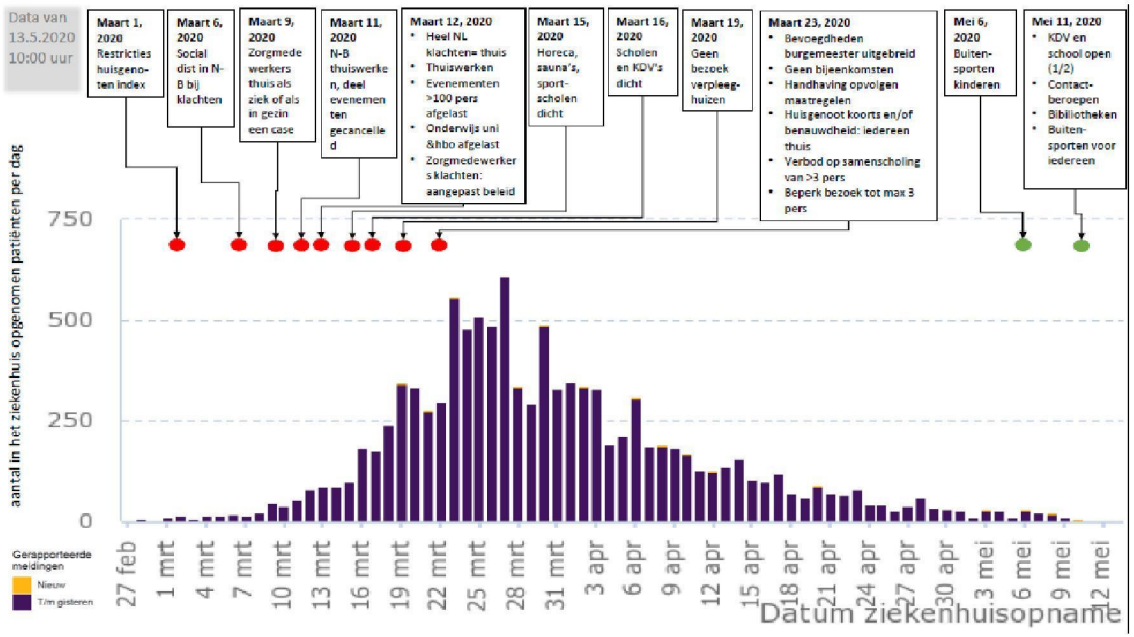
Indicator for transmission: basic reproduction number (R0)



- OSIRIS
- Blauw: aantal meldingen ziekenhuisopname naar opnamedatum
- Grijs: verwachte meldingen (correctie voor rapportagevertraging)
- Rood: aantal ziekenhuisopnames naar eerste ziektedag
- Data meer recent dan 24 April zijn onzeker.

- Paars: reproductiegetal, aantal secondaire besmettingen per geval
  - reflecteert de toename en afname van de rode epicurve
  - berekend volgens Wallinga & Lipsitch Proc R Soc B 2007
- Schattingen meer recent dan 24 April zijn onzeker.

Bron: afd Modellering/EPI/RIVM
Dank: 5.1.2e



Bron: LCI; met dank aan 5.1.2e

WHO
Euro

Results – Relevant dates

NPI= non-pharmaceutical interventions

Country	Case 1	Case 100	Death 1	Death 10	First national NPI	Testing mild cases stopped	Days to first national NPI
	22/02	24/02	24/02	26/02	30/01 (04/03)[b]		-23 (11)[b]
	26/02	09/03	13/03	19/03	12/03		15
	26/02	02/03	10/03	16/03	17/03		20
	26/02	03/03	05/03	10/03	13/03	11/03	16
	26/02	07/03	06/03	15/03	13/03		16
	27/02	03/03	27/02	08/03	13/03	11/03	15
	27/02	07/03	14/03	25/03	12/03	13/03	14
	27/02	07/03	21/03	21/03		11/03	
	28/02	11/03	16/03	22/03	13/03	12/03	14
	28/02	07/03	05/03	14/03	12/03		13
	28/02	06/03	07/03	14/03	21/03	13/03	22
	02/03	08/03	12/03	20/03	14/03		12

a The country implemented NPI at subnational level (i.e. regional, provincial or local) before national NPI were announced
[b] Italy banned travelers from China on the 30/01/2020. Information in brackets relates to the first NPI after detecting cases in the country

Bron: WHO Euro, 2 April, cor

Results – Dates of NPI implementation

WHO Euro

Category	Educational institutions	Mass gathering				Cordon sanitaire	
	Schools	Shops	Restauration	Culture	Sports	Blanket restrictions	Border control
	04/03	12/03	12/03	08/03	04/03	10/03	**30/01**
	13/03	17/03	17/03	**12/03**	17/03	17/03	18/03
	17/03	20/03	23/03	20/03	20/03	23/03	18/03
	13/03	15/03	15/03	15/03	15/03	15/03	16/03
	13/03	17/03	17/03	17/03	17/03	21/03	16/03
	13/03	15/03	15/03	15/03	15/03	17/03	
	12/03		**12/03**	**12/03**	**12/03**		16/03
	13/03	18/03	18/03	13/03	18/03		14/03
	16/03	16/03	16/03	**12/03**	16/03	23/03	
	21/03	**21/03**	**21/03**	**21/03**	**21/03**	24/03	
	14/03	18/03	**14/03**	**14/03**	**14/03**	18/03	
	11	**10**	**11**	**11**	**11**	**9**	**7**

In bold appears highlighted the earliest national NPI implemented by the country

Bron: WHO EURO
2 april

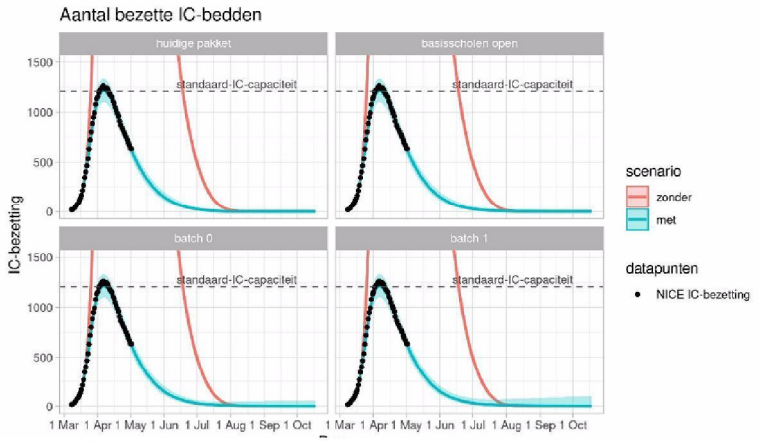
Blanket restrictions": considered when gatherings of >5 people prohibited

Strategy throughout the summer

GOALS
- Maximum control of the virus
- Health care services remain accessible
- Protection of vulnerable people/groups

RELAXATION OF THE MEASURES

Modelling



Winkels, markten, dierentuinen, pretparken, natuurparken vakantieparken (eigen toilet, badkamer), buitenzwembaden rechtspraak

non-contact sporten
contactberoepen
bibliotheken

Measures

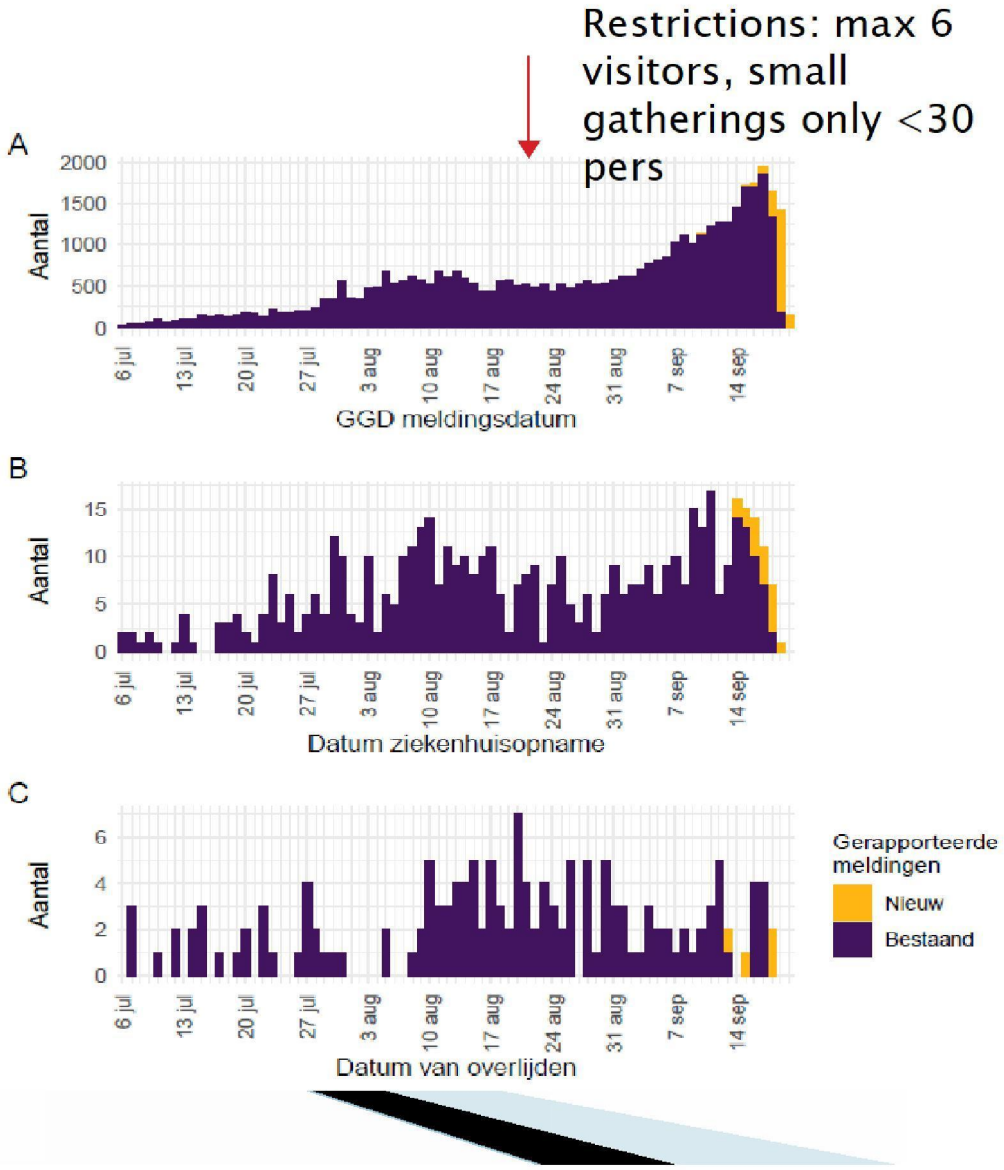
- Hygienic measures
- Generic measures (1,5 m)
- Tele working
- Stay home when symptoms
- Testing
- Contact tracing

Monitoring

- Epidemiology , R0)
- Tests and performance indicators van effect contact tracing
- Mobility
- Compliance
- Seroprevalence (Pienter Corona, Sanquin)

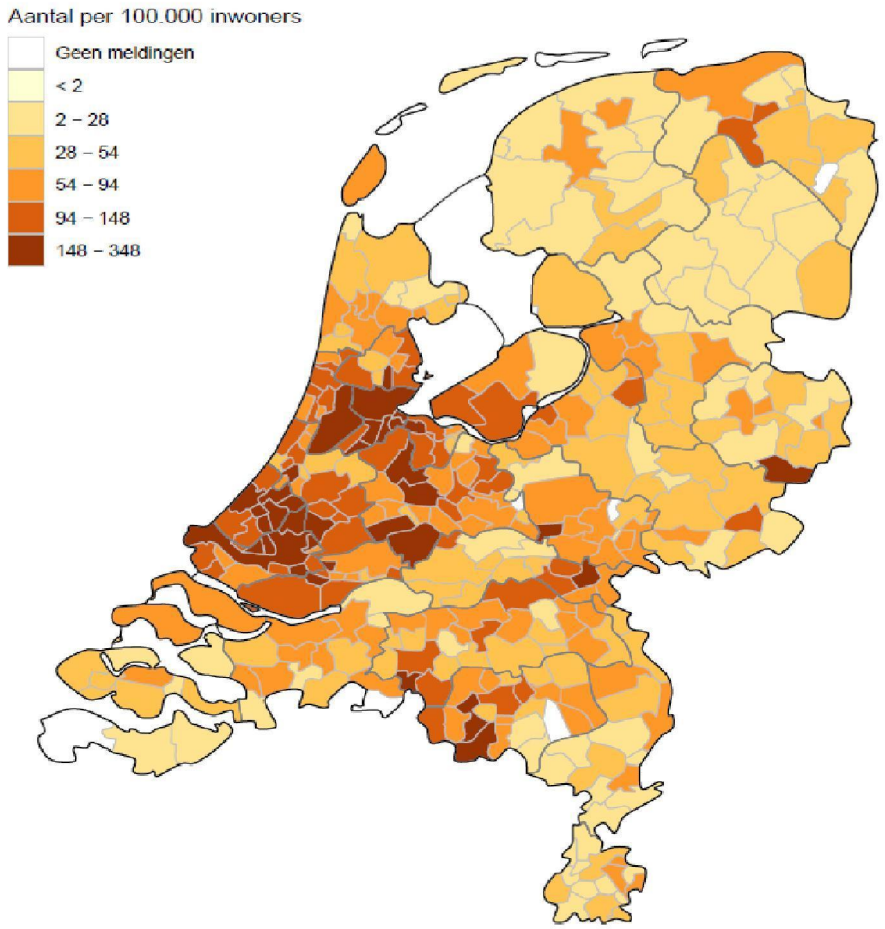
Mei 2016

What has happened in the summer?



Covid-19 notifications, hospital admission and deaths July – Sept 18

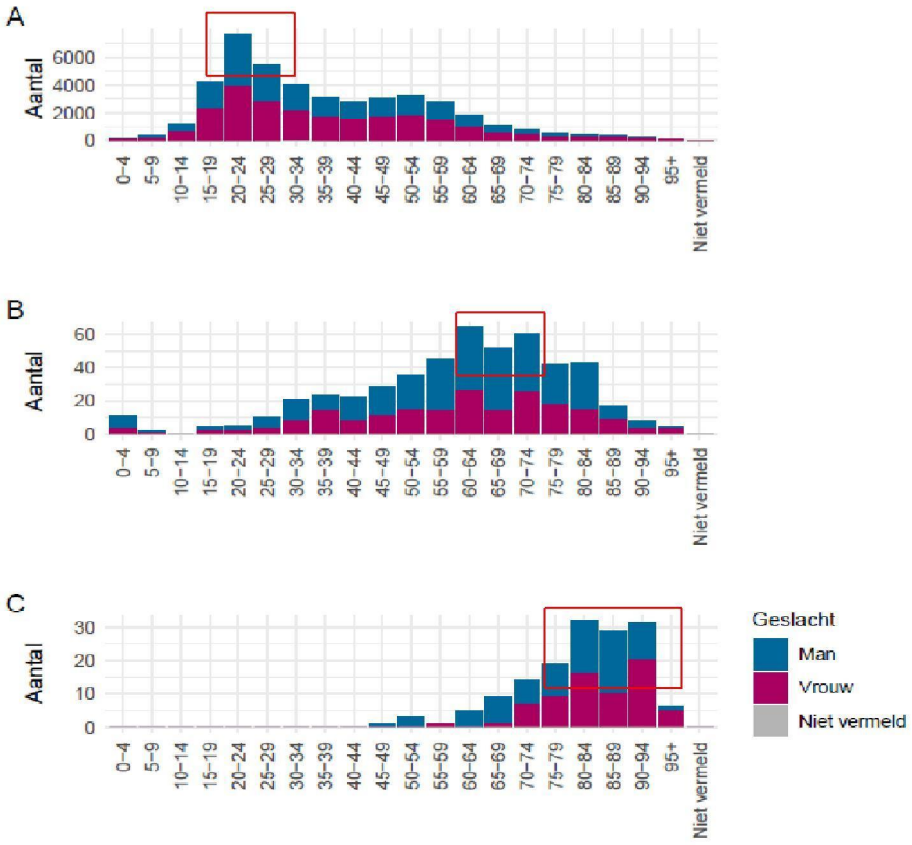
Source: RIVM



Covid-19 cases reported in the past 2 weeks, as of Sept 20

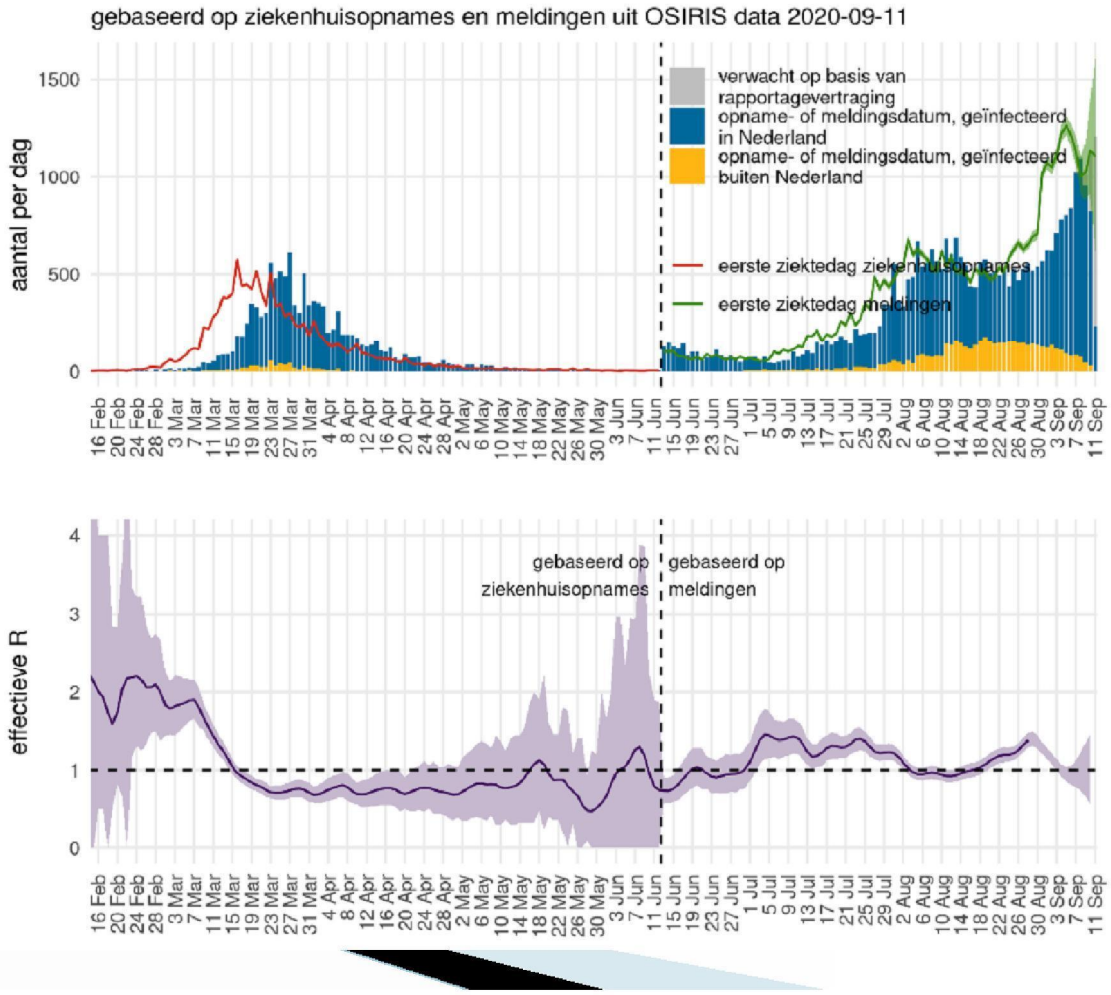
Source: RIVM

Age distribution of new cases, hospitalizations and deaths July 6-Sept 20



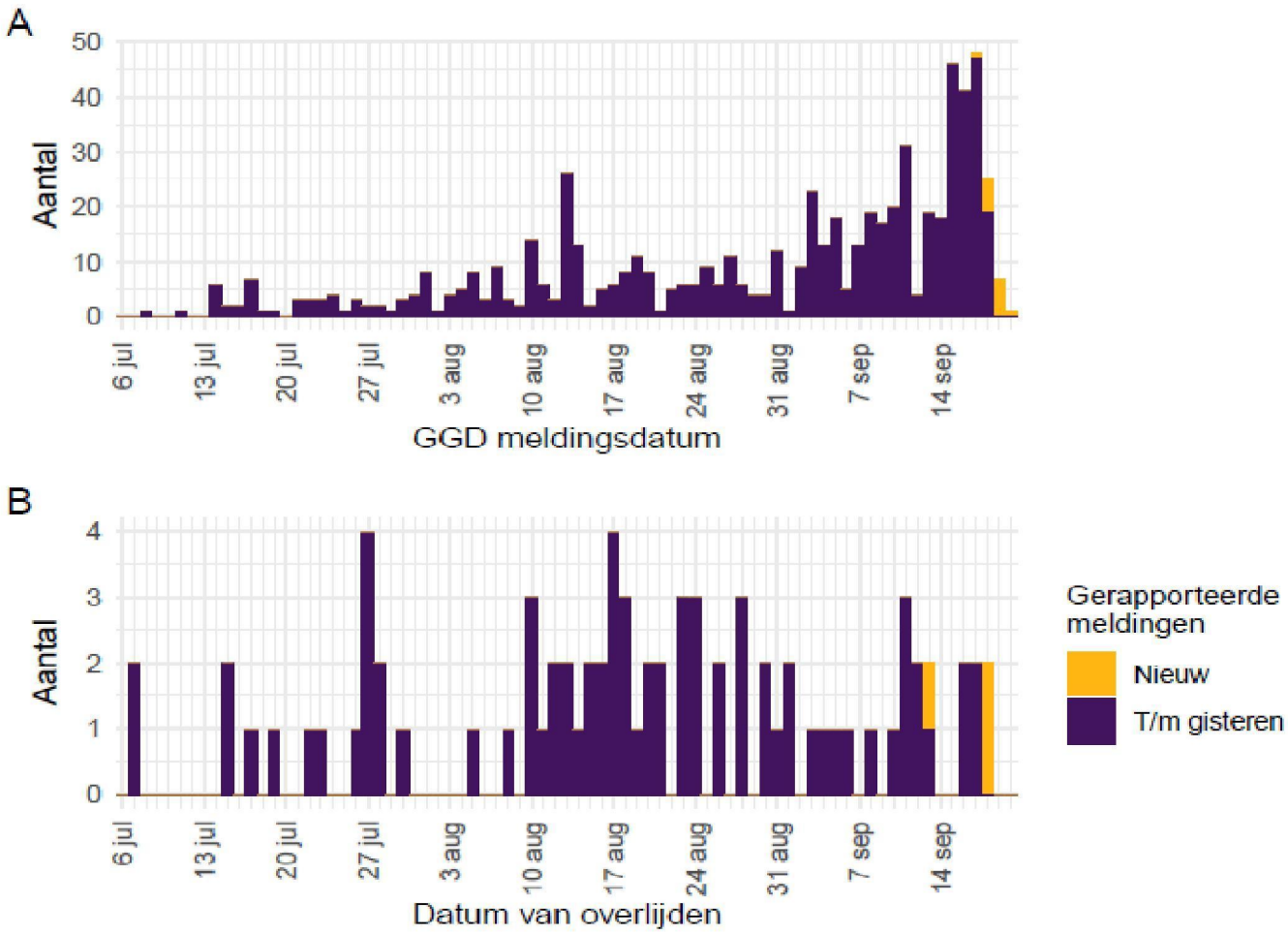
Source: RIVM

Indicator for transmission: basic reproduction number (R0), end of August



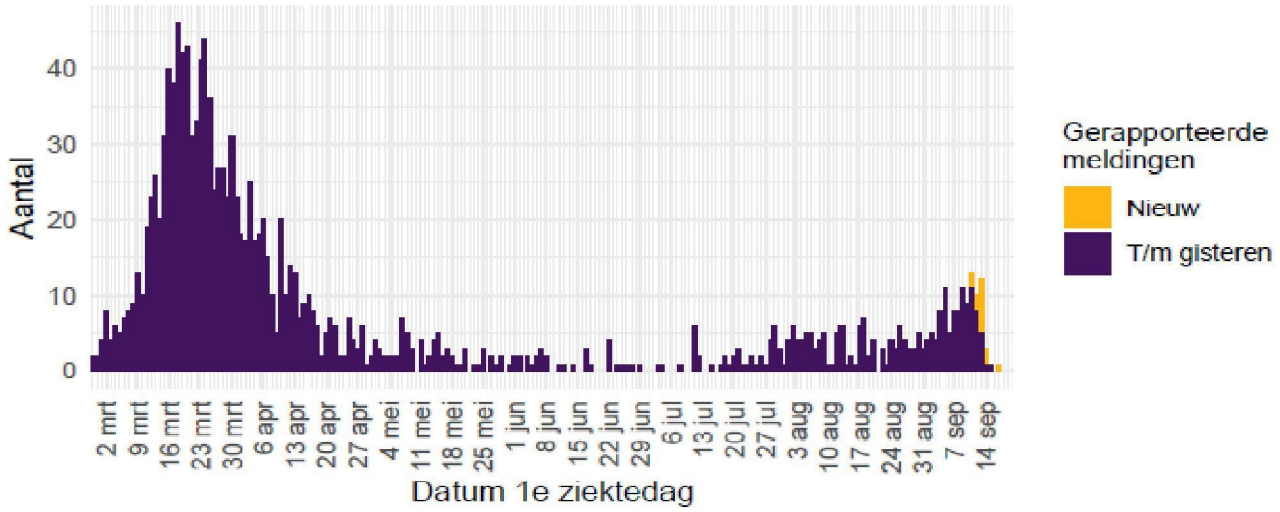
Source: RIVM (5.1.2e)

Number of cases and deaths in nursing home patients



Source:
RIVM

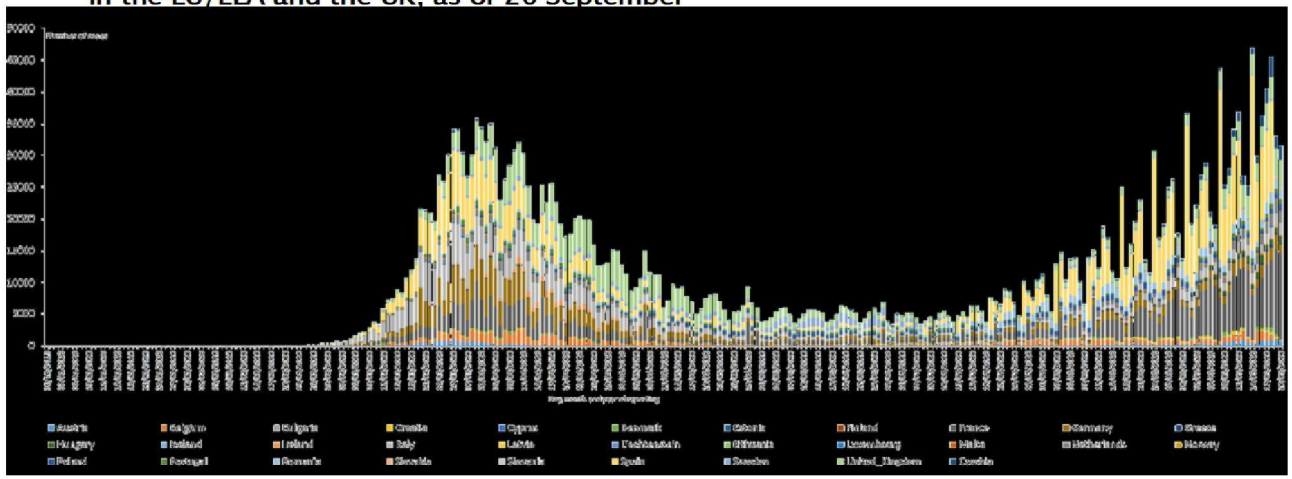
Number of newly reported affected nursing homes

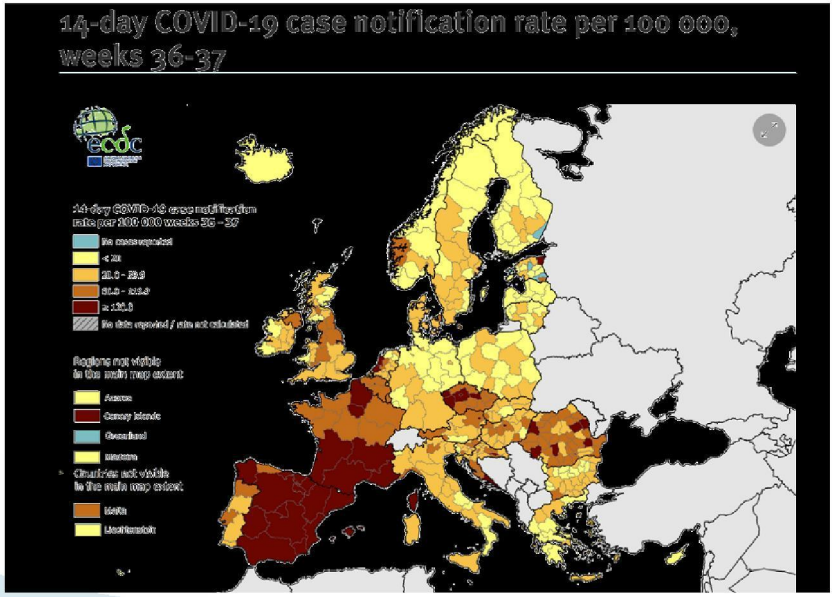


Source: RIVM

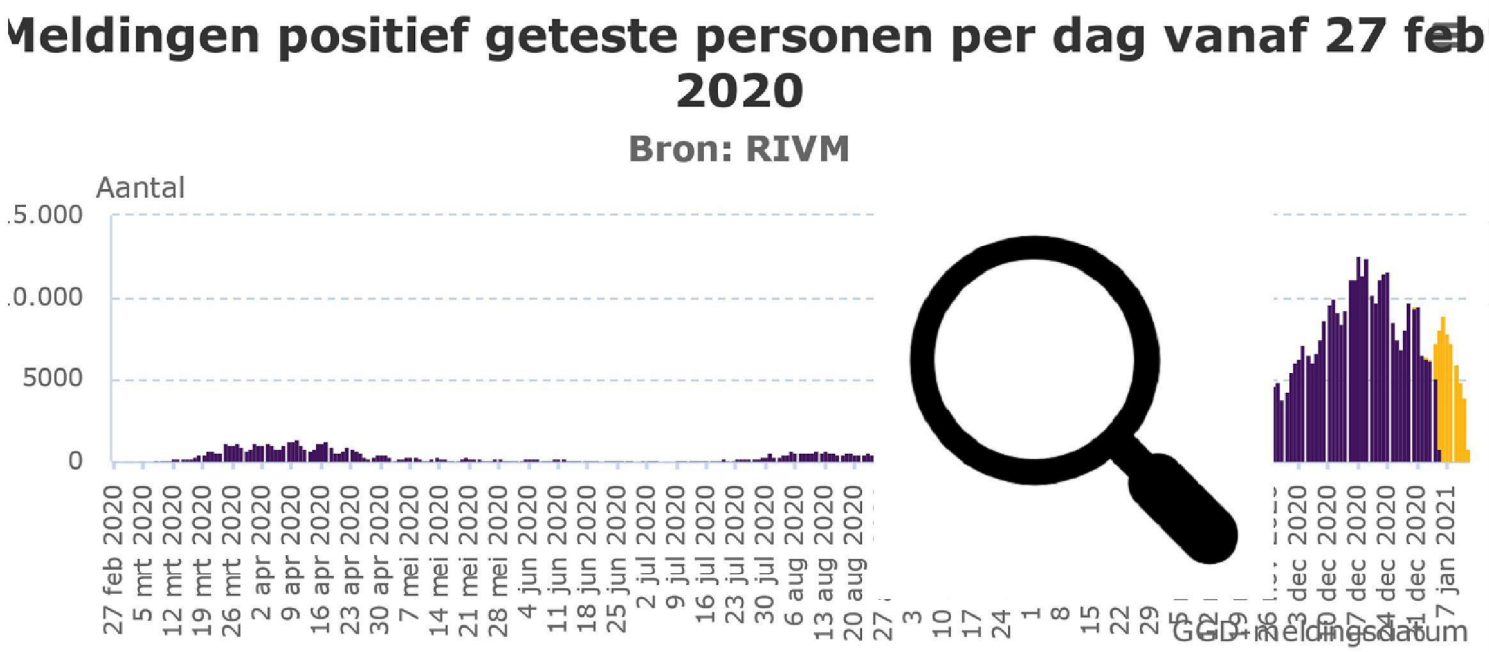
Distribution of laboratory confirmed cases of COVID-19 in the EU/EEA and the UK, as of 20 September

ecdc.europa.eu

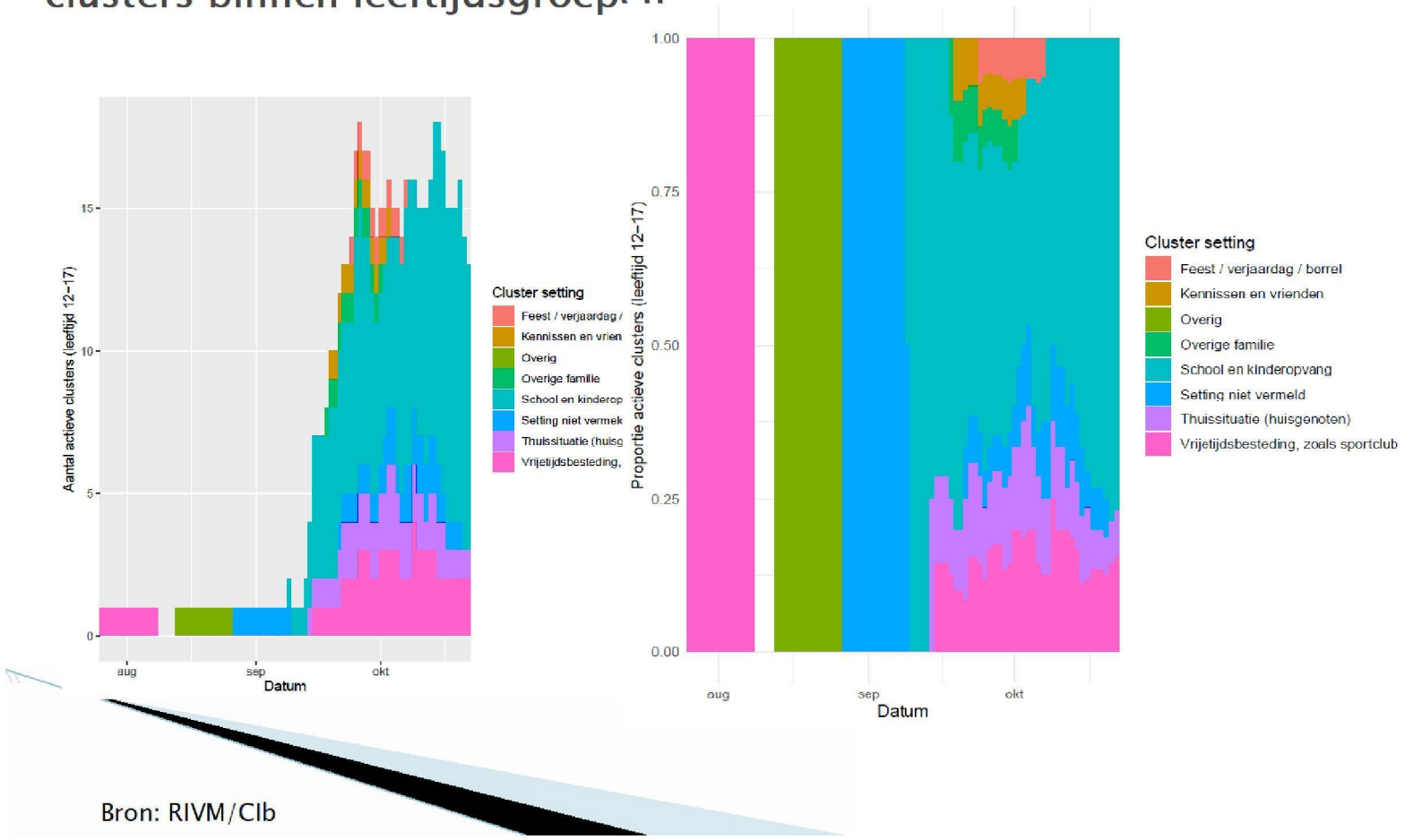




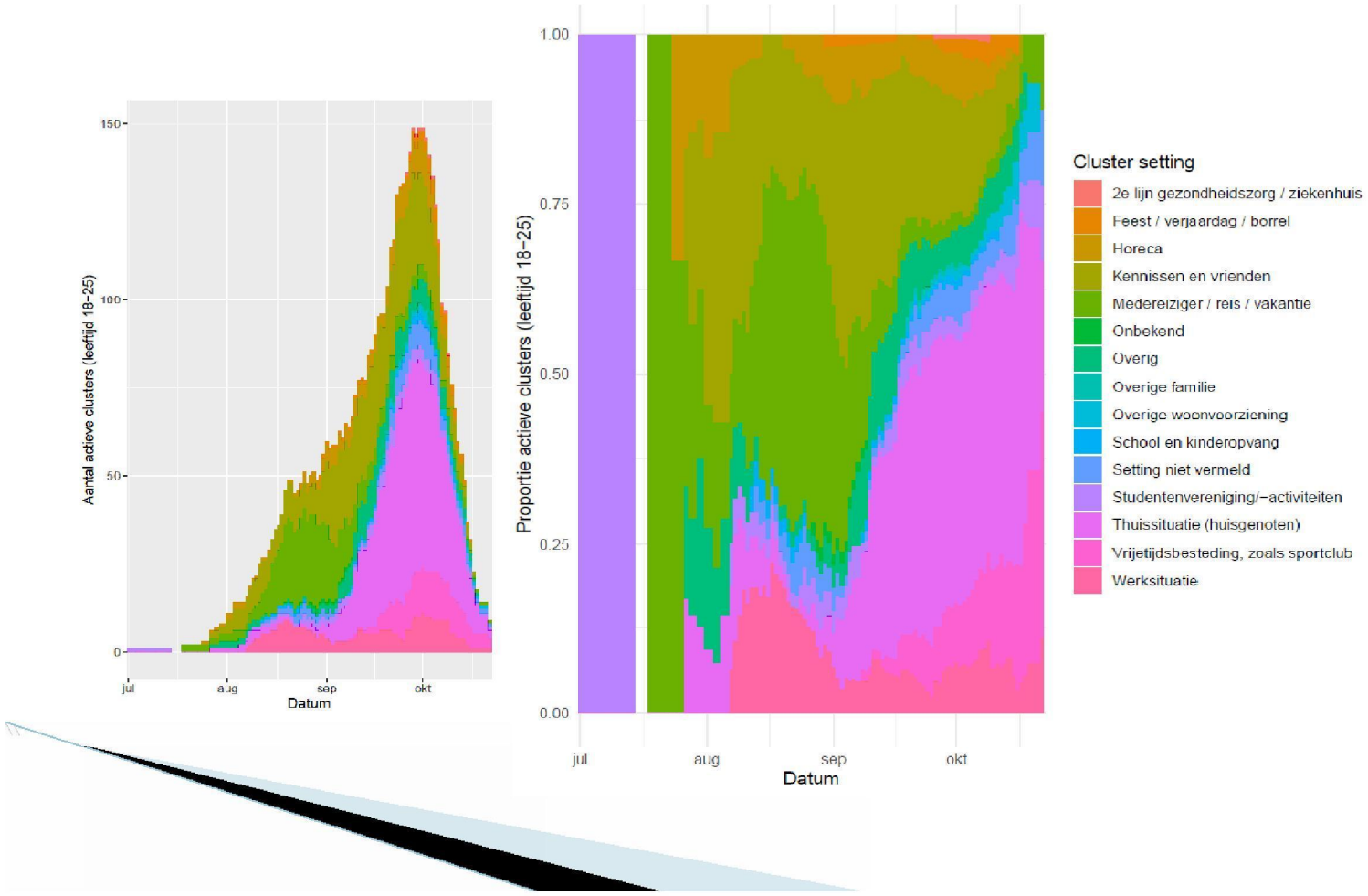
The second wave

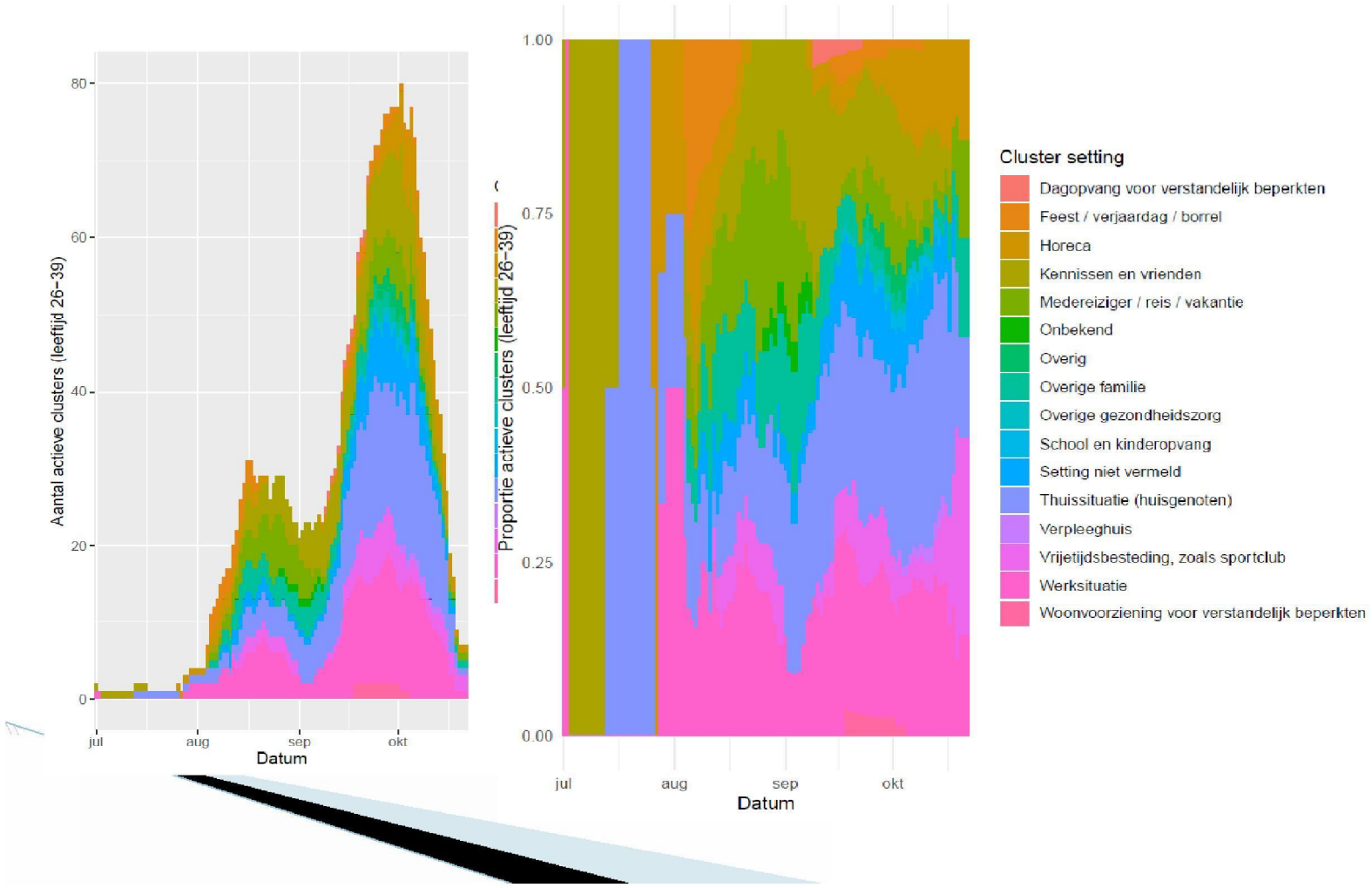


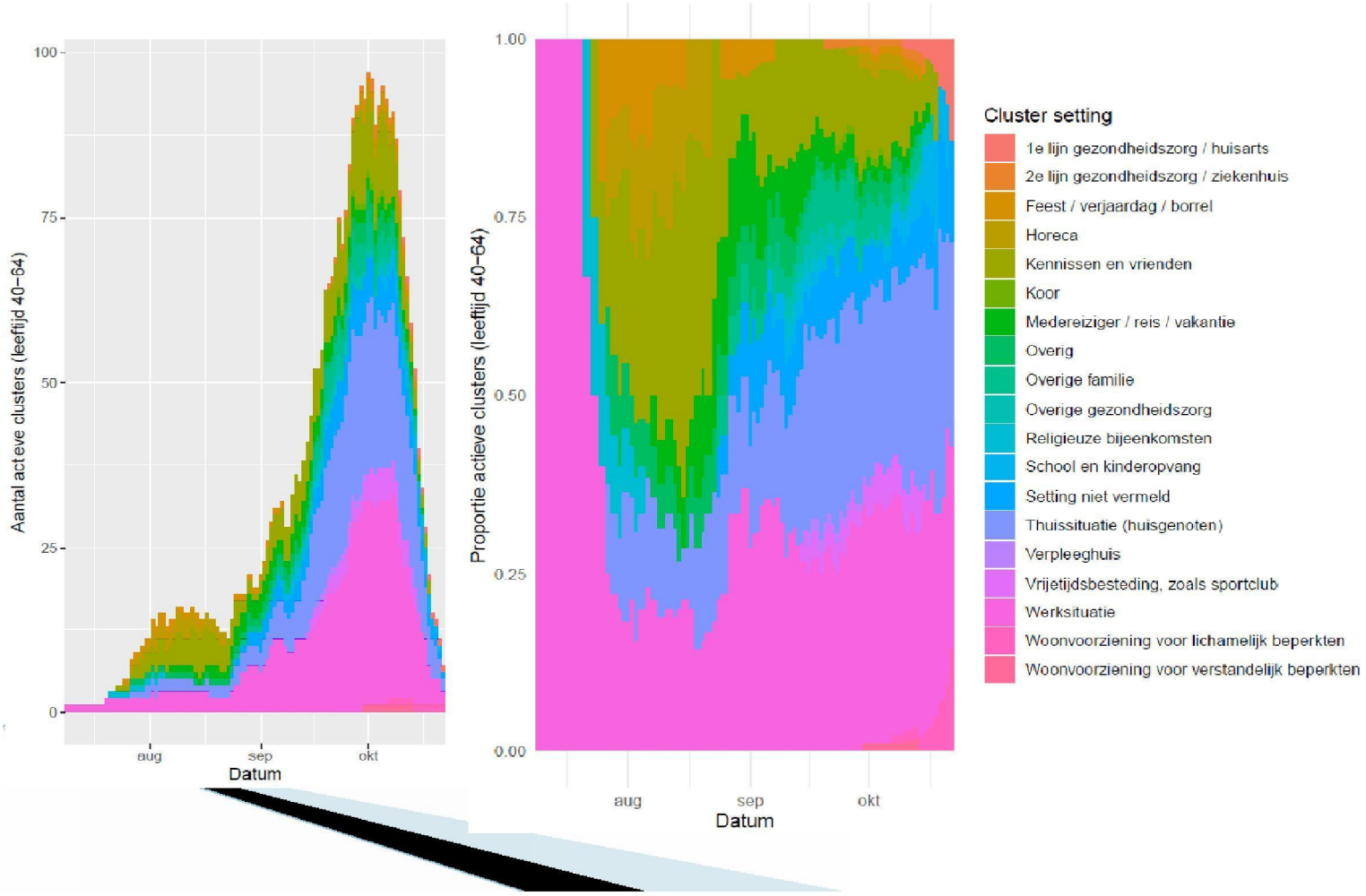
Meest geregistreerde settings bij clusters binnen leeftijdsgroepen

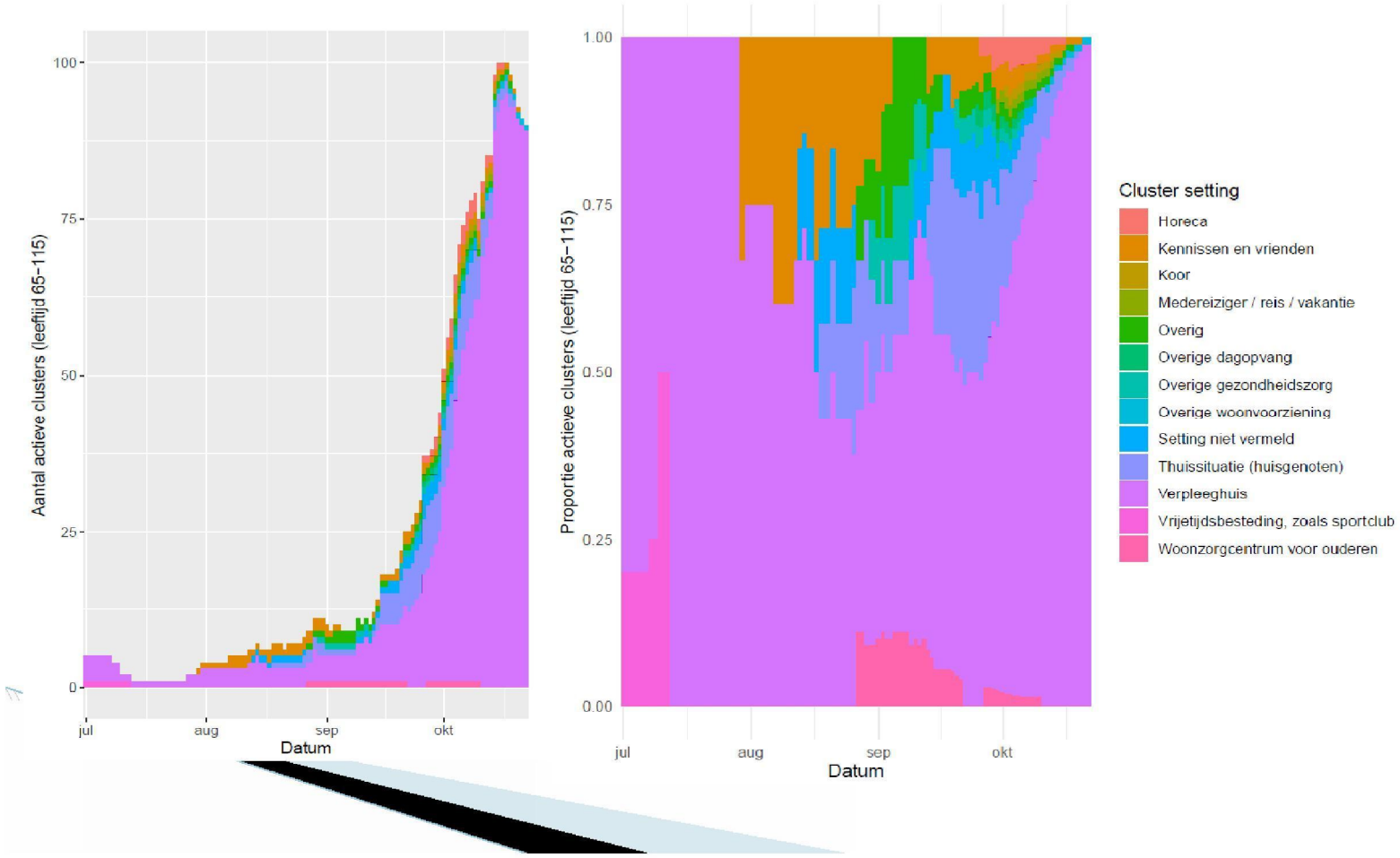


Bron: RIVM/CIb

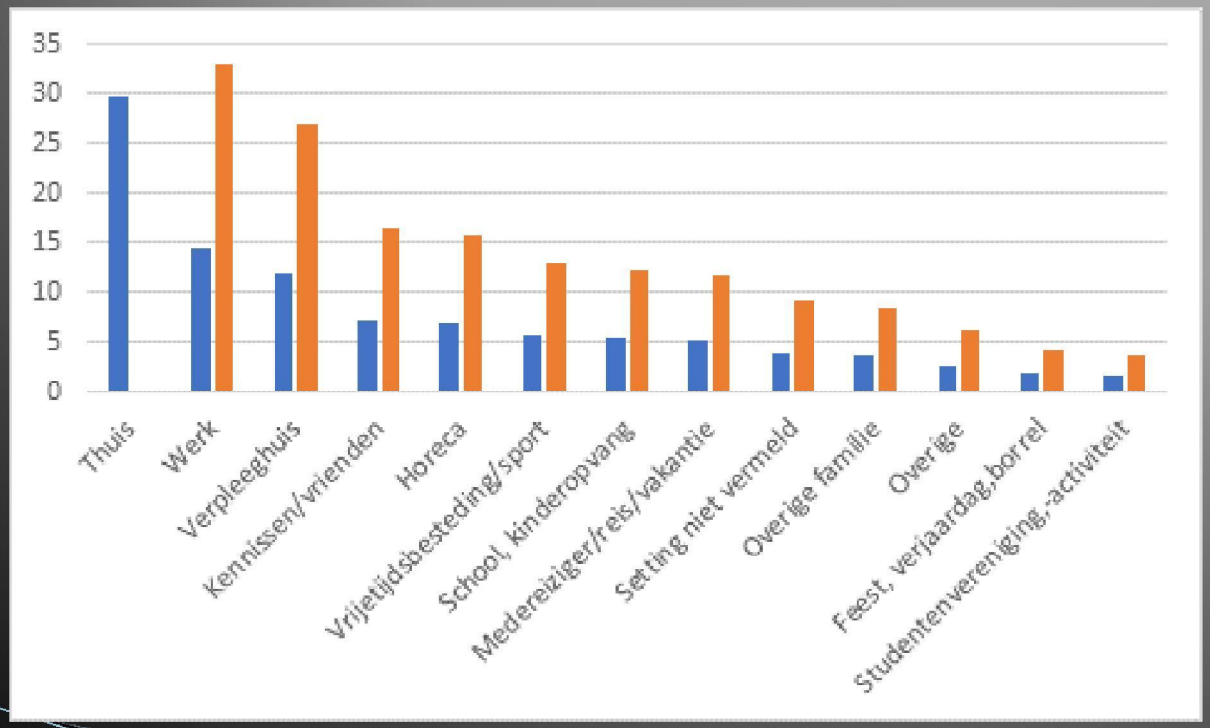

Aantal actieve clusters (leeftijd 18–25)
150
100
50
0
jul
aug
sep
okt
Datum
Proportie actieve clusters (leeftijd 18–25)
1.00
0.75
0.50
0.25
0.00
jul
aug
sep
okt
Datum
Cluster setting
2e lijn gezondheidszorg / ziekenhuis
Feest / verjaardag / borrel
Horeca
Kennissen en vrienden
Medereiziger / reis / vakantie
Onbekend
Overig
Overige familie
Overige woonvoorziening
School en kinderopvang
Setting niet vermeld
Studentenvereniging/−activiteiten
Thuissituatie (huisgenoten)
Vrijetijdsbesteding, zoals sportclub
Werksituatie


Aantal actieve clusters (leeftijd 26–39)
80
60
40
20
0
jul
aug
sep
okt
Datum
Proportie actieve clusters (leeftijd 26–39)
1.00
0.75
0.50
0.25
0.00
jul
aug
sep
okt
Datum
Cluster setting
Dagopvang voor verstandelijk beperkten
Feest / verjaardag / borrel
Horeca
Kennissen en vrienden
Medereiziger / reis / vakantie
Onbekend
Overig
Overige familie
Overige gezondheidszorg
School en kinderopvang
Setting niet vermeld
Thuissituatie (huisgenoten)
Verpleeghuis
Vrijetijdsbesteding, zoals sportclub
Werksituatie
Woonvoorziening voor verstandelijk beperkten


Aantal acteve clusters (leeftijd 40−64)
100
75
50
25
0
aug
sep
okt
Datum
Proportie actieve clusters (leeftijd 40−64)
1.00
0.75
0.50
0.25
0.00
aug
sep
okt
Datum
Cluster setting
1e lijn gezondheidszorg / huisarts
2e lijn gezondheidszorg / ziekenhuis
Feest / verjaardag / borrel
Horeca
Kennissen en vrienden
Koor
Medereiziger / reis / vakantie
Overig
Overige familie
Overige gezondheidszorg
Religieuze bijeenkomsten
School en kinderopvang
Setting niet vermeld
Thuissituatie (huisgenoten)
Verpleeghuis
Vrijetijdsbesteding, zoals sportclub
Werksituatie
Woonvoorziening voor lichamelijk beperkten
Woonvoorziening voor verstandelijk beperkten


Aantal actieve clusters (leeftijd 65−115)
100
75
50
25
0
jul
aug
sep
okt
Datum
Proportie actieve clusters (leeftijd 65−115)
1.00
0.75
0.50
0.25
0.00
jul
aug
sep
okt
Datum
Cluster setting
Horeca
Kennissen en vrienden
Koor
Medereiziger / reis / vakantie
Overig
Overige dagopvang
Overige gezondheidszorg
Overige woonvoorziening
Setting niet vermeld
Thuissituatie (huisgenoten)
Verpleeghuis
Vrijetijdsbesteding, zoals sportclub
Woonzorgcentrum voor ouderen

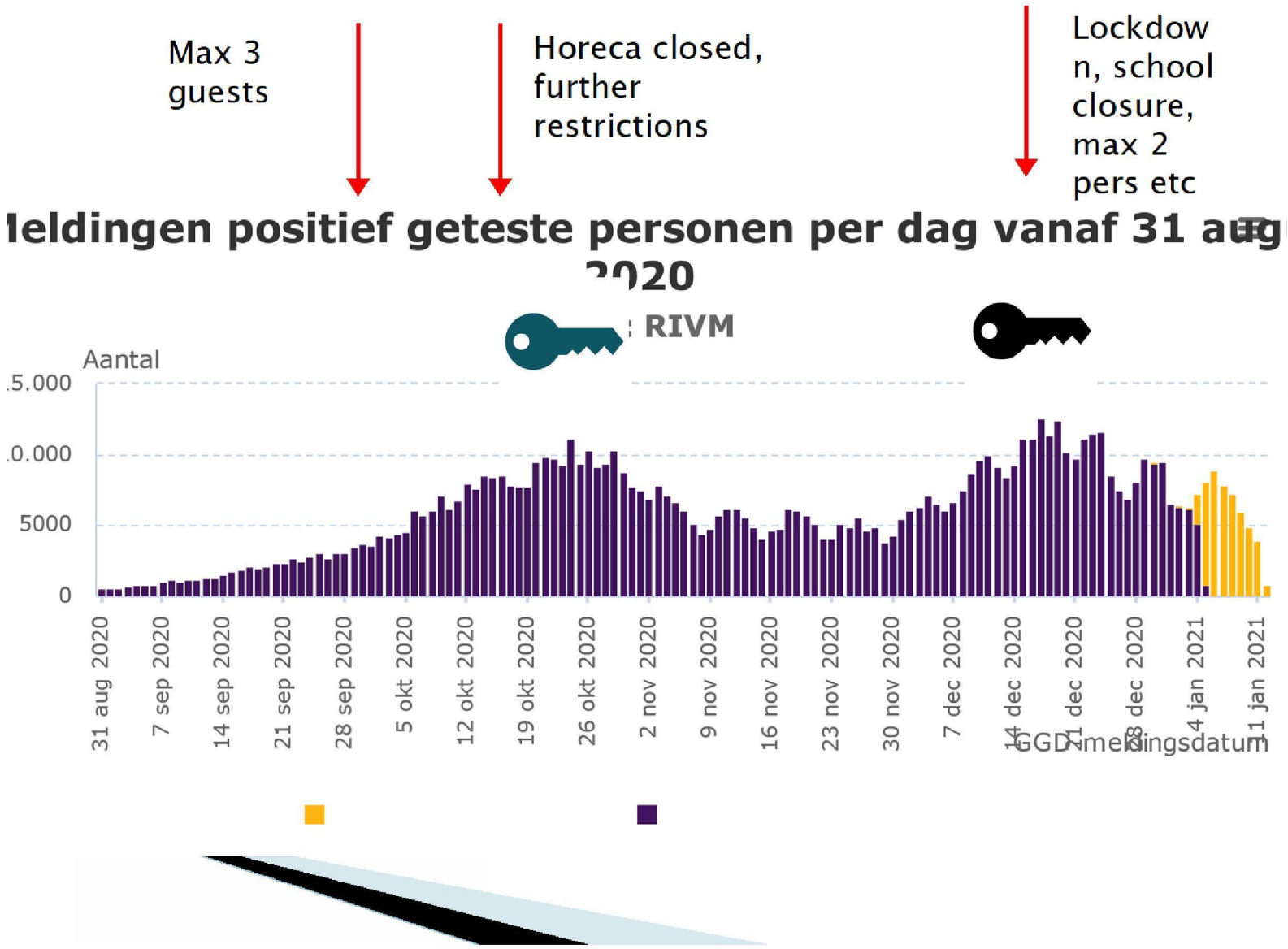
Clusters: aantallen en grootte - 19-10-2020

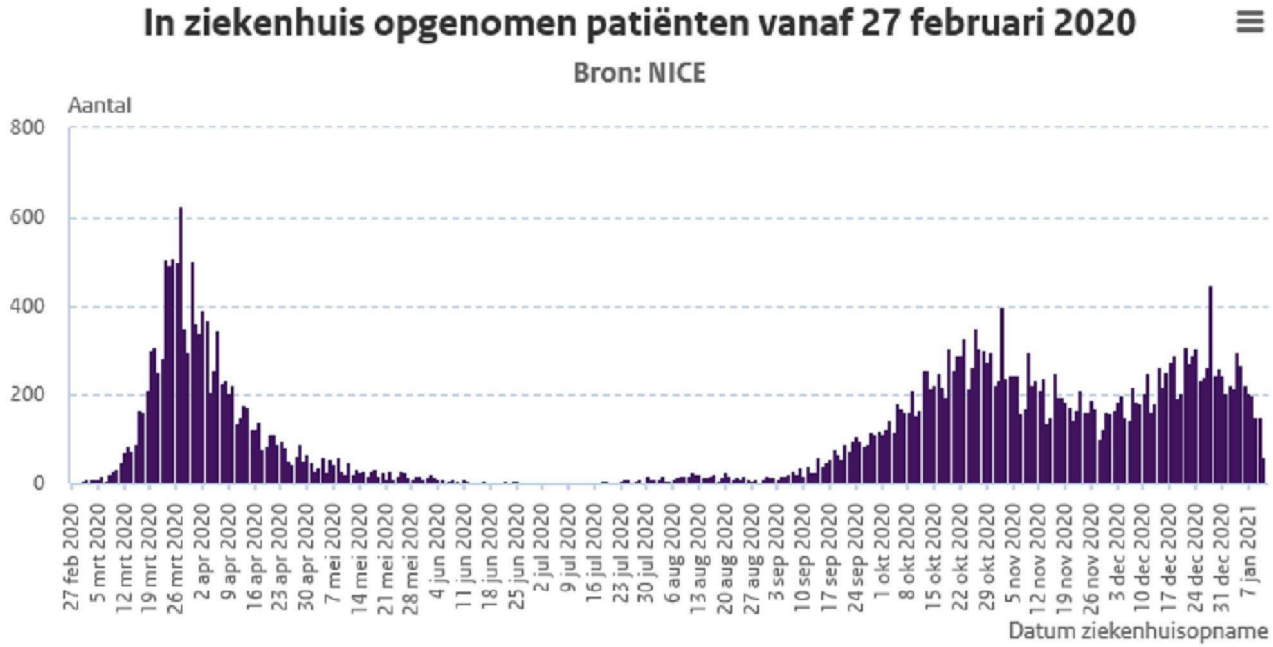


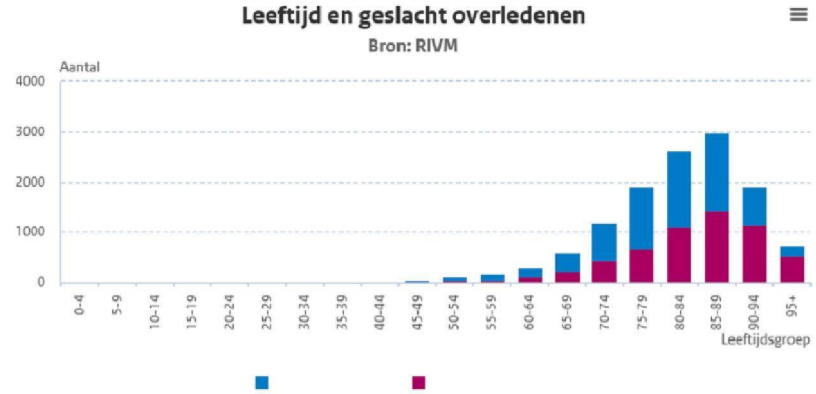
* Minder zicht door onvolledig BCO

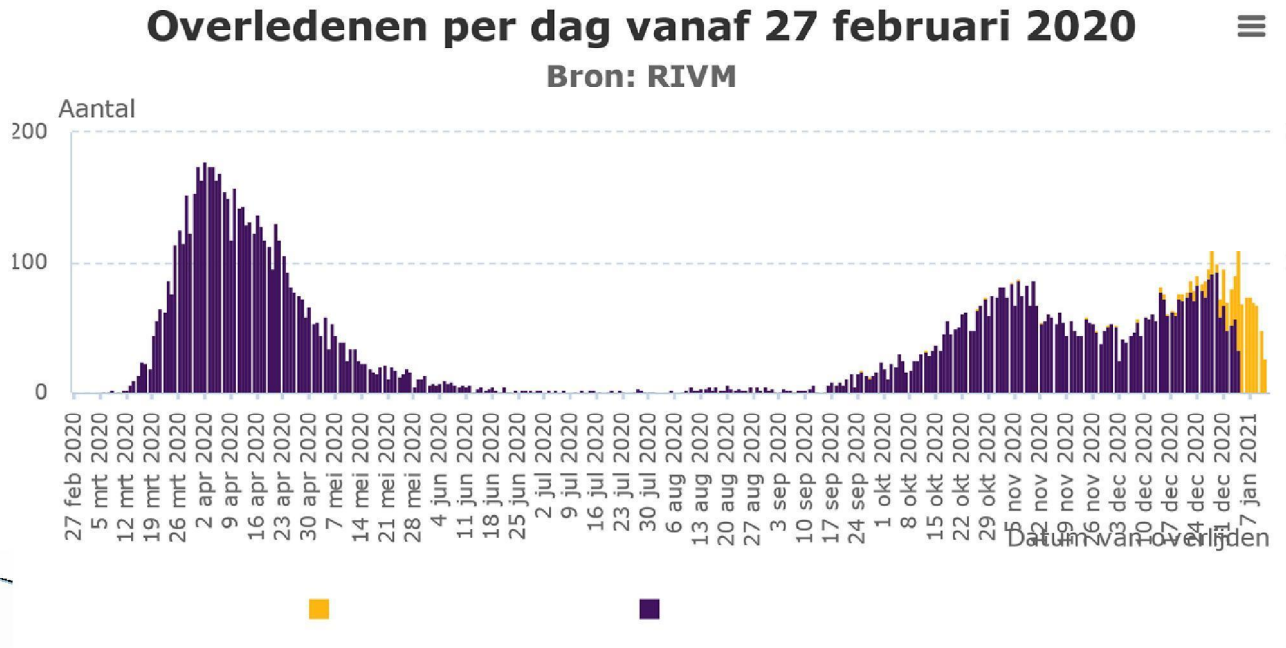
Blauw: relatief aandeel verschillende clusters
Oranje: exclusief thuissituatie

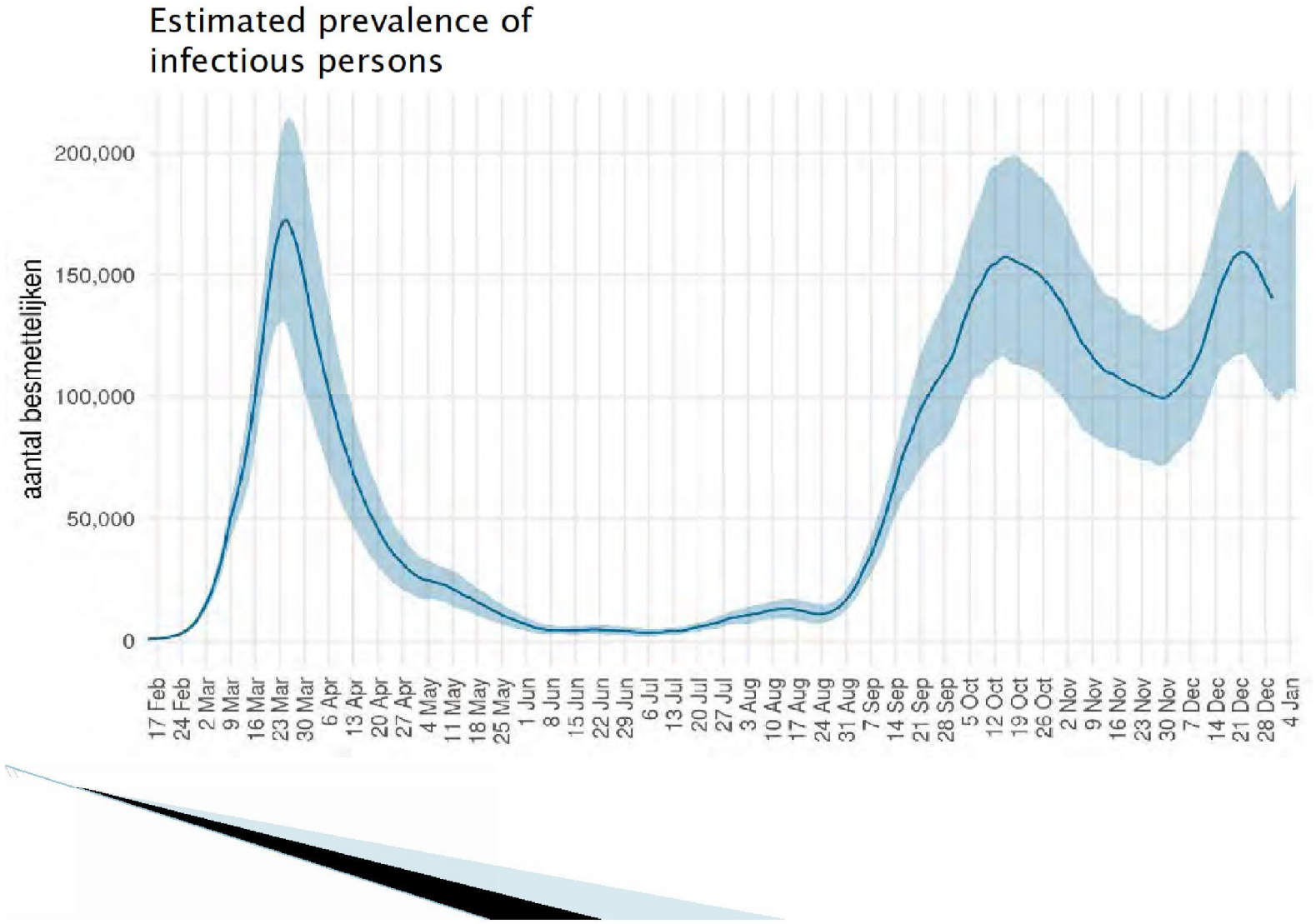
Bron: RIVM/CIb

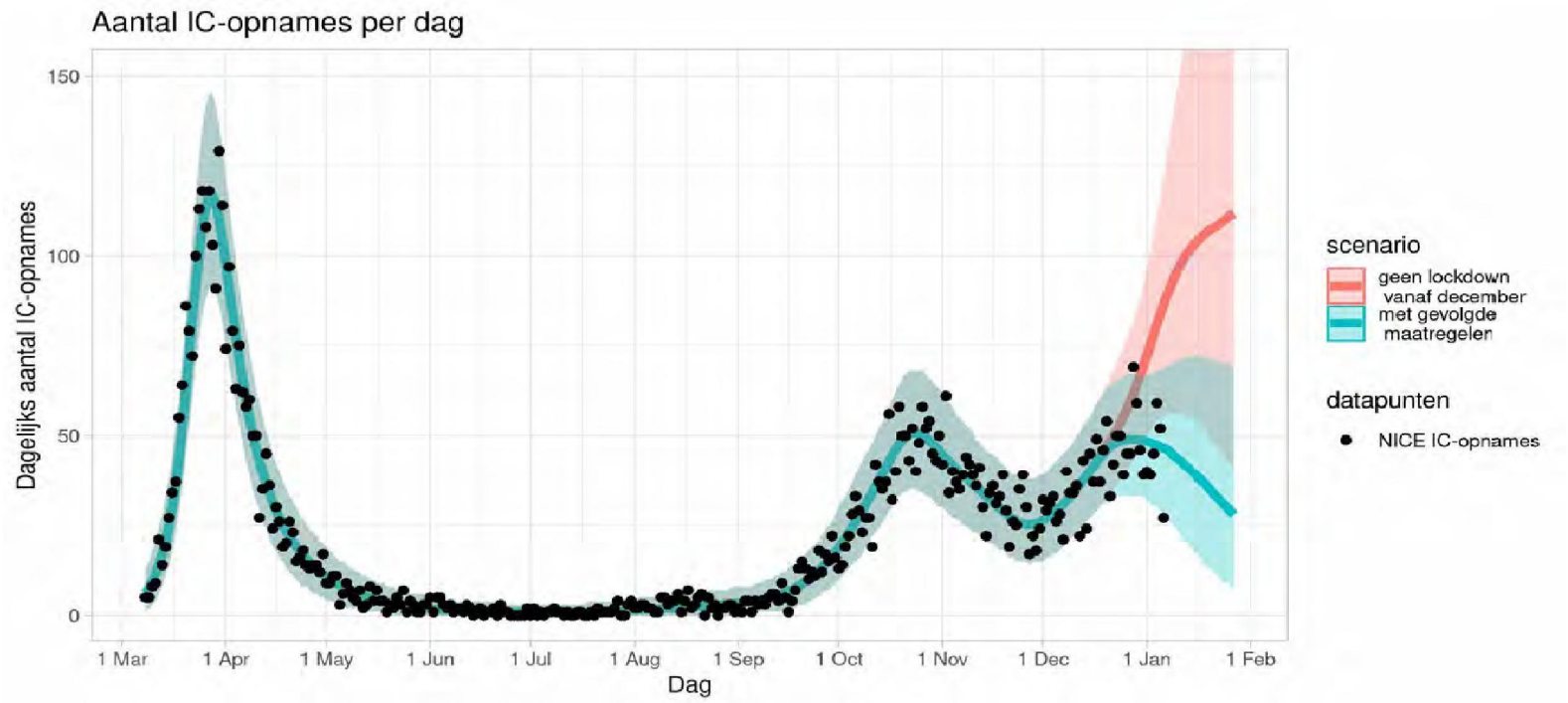

Max 3 guests
Horeca closed, further restrictions
Lockdow n, school closure, max 2 pers etc
Meldingen positief geteste personen per dag vanaf 31 aug 2020
RIVM
Aantal
15.000
10.000
5000
0
31 aug 2020
7 sep 2020
14 sep 2020
21 sep 2020
28 sep 2020
5 okt 2020
12 okt 2020
19 okt 2020
26 okt 2020
2 nov 2020
9 nov 2020
16 nov 2020
23 nov 2020
30 nov 2020
7 dec 2020
14 dec 2020
21 dec 2020
28 dec 2020
4 jan 2021
11 jan 2021
GGD meldingsdatum

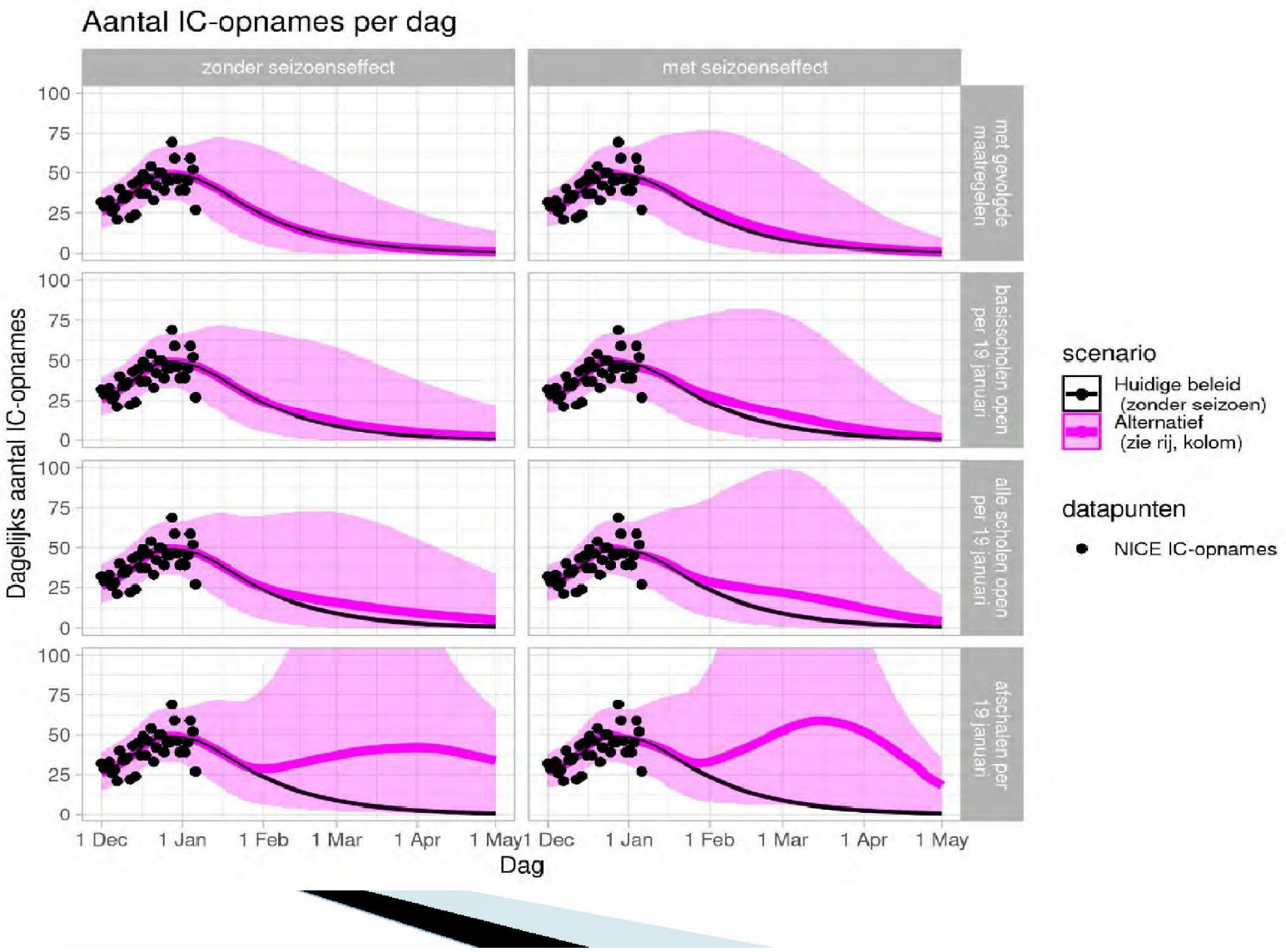

In ziekenhuis opgenomen patiënten vanaf 27 februari 2020
Bron: NICE
Aantal
800
600
400
200
0
27 feb 2020
5 mrt 2020
12 mrt 2020
19 mrt 2020
26 mrt 2020
2 apr 2020
9 apr 2020
16 apr 2020
23 apr 2020
30 apr 2020
7 mei 2020
14 mei 2020
21 mei 2020
28 mei 2020
4 jun 2020
11 jun 2020
18 jun 2020
25 jun 2020
2 jul 2020
9 jul 2020
16 jul 2020
23 jul 2020
30 jul 2020
6 aug 2020
13 aug 2020
20 aug 2020
27 aug 2020
3 sep 2020
10 sep 2020
17 sep 2020
24 sep 2020
1 okt 2020
8 okt 2020
15 okt 2020
22 okt 2020
29 okt 2020
5 nov 2020
12 nov 2020
19 nov 2020
26 nov 2020
3 dec 2020
10 dec 2020
17 dec 2020
24 dec 2020
31 dec 2020
7 jan 2021
Datum ziekenhuisopname


Leeftijd en geslacht overledenen
Bron: RIVM
Aantal
4000
3000
2000
1000
0
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95+
Leeftijdsgroep


Overledenen per dag vanaf 27 februari 2020
Bron: RIVM
Aantal
200
100
0
27 feb 2020
5 mrt 2020
12 mrt 2020
19 mrt 2020
26 mrt 2020
2 apr 2020
9 apr 2020
16 apr 2020
23 apr 2020
30 apr 2020
7 mei 2020
14 mei 2020
21 mei 2020
28 mei 2020
4 jun 2020
11 jun 2020
18 jun 2020
25 jun 2020
2 jul 2020
9 jul 2020
16 jul 2020
23 jul 2020
30 jul 2020
6 aug 2020
13 aug 2020
20 aug 2020
27 aug 2020
3 sep 2020
10 sep 2020
17 sep 2020
24 sep 2020
1 okt 2020
8 okt 2020
15 okt 2020
22 okt 2020
29 okt 2020
5 nov 2020
12 nov 2020
19 nov 2020
26 nov 2020
3 dec 2020
10 dec 2020
17 dec 2020
24 dec 2020
31 dec 2020
7 jan 2021
Datum van overlijden


Estimated prevalence of infectious persons
aantal besmettelijken
200,000
150,000
100,000
50,000
0
17 Feb
24 Feb
2 Mar
9 Mar
16 Mar
23 Mar
30 Mar
6 Apr
13 Apr
20 Apr
27 Apr
4 May
11 May
18 May
25 May
1 Jun
8 Jun
15 Jun
22 Jun
29 Jun
6 Jul
13 Jul
20 Jul
27 Jul
3 Aug
10 Aug
17 Aug
24 Aug
31 Aug
7 Sep
14 Sep
21 Sep
28 Sep
5 Oct
12 Oct
19 Oct
26 Oct
2 Nov
9 Nov
16 Nov
23 Nov
30 Nov
7 Dec
14 Dec
21 Dec
28 Dec
4 Jan


Aantal IC-opnames per dag
Dagelijks aantal IC-opnames
150
100
50
0
1 Mar
1 Apr
1 May
1 Jun
1 Jul
1 Aug
1 Sep
1 Oct
1 Nov
1 Dec
1 Jan
1 Feb
Dag
scenario
geen lockdown
vanaf december
met gevolgde
maatregelen
datapunten
NICE IC-opnames


Aantal IC-opnames per dag
zonder seizoenseffect
met seizoenseffect
met gevolgde maatregelen
basisscholen open per 19 januari
alle scholen open per 19 januari
afschalen per 19 januari
Dagelijks aantal IC-opnames
100
75
50
25
0
1 Dec
1 Jan
1 Feb
1 Mar
1 Apr
1 May
Dag
scenario
Huidige beleid (zonder seizoen)
Alternatief (zie rij, kolom)
datapunten
NICE IC-opnames

COVID-19 Vaccines

- Many vaccines are in development (> 90)
- 42 candidate vaccines in clinical evaluation
- Clinical trials are ongoing
  - effectiveness against death, severe illness, illness, transmission, infection?
  - rate of vaccine-associated adverse events? by sex, age, background?

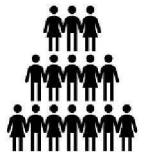
Expected effects

Vaccination lowers the rate of severe disease by direct protection

- Highest impact on burden of disease in most vulnerables (main strategy according to Health Council)

Vaccinations lowers (or prevents) transmission indirect protection

- benefits both vaccinated and unvaccinated individuals
- if the vaccine reduces onward transmission by the vaccinee



VE against COVID-19 for Pfizer BioNTech
- 52% after dosis 1 (manufacturer)
- 93% after dosis 1 (reanalysis)
- 95% after dosis 2

VE against COVID-19 for Moderna
- 80% after dosis 1 (manufacturer)
- 94% after dosis 2

Both mRNA vaccines

Astra Zeneca vaccine submitted to EMA
(vector vaccine)

Investigation of novel SARS-CoV-2 variant

Variant of Concern 202012/01

Public Health England

Technical briefing 3

This briefing provides an update on the briefing of 28 December 2020

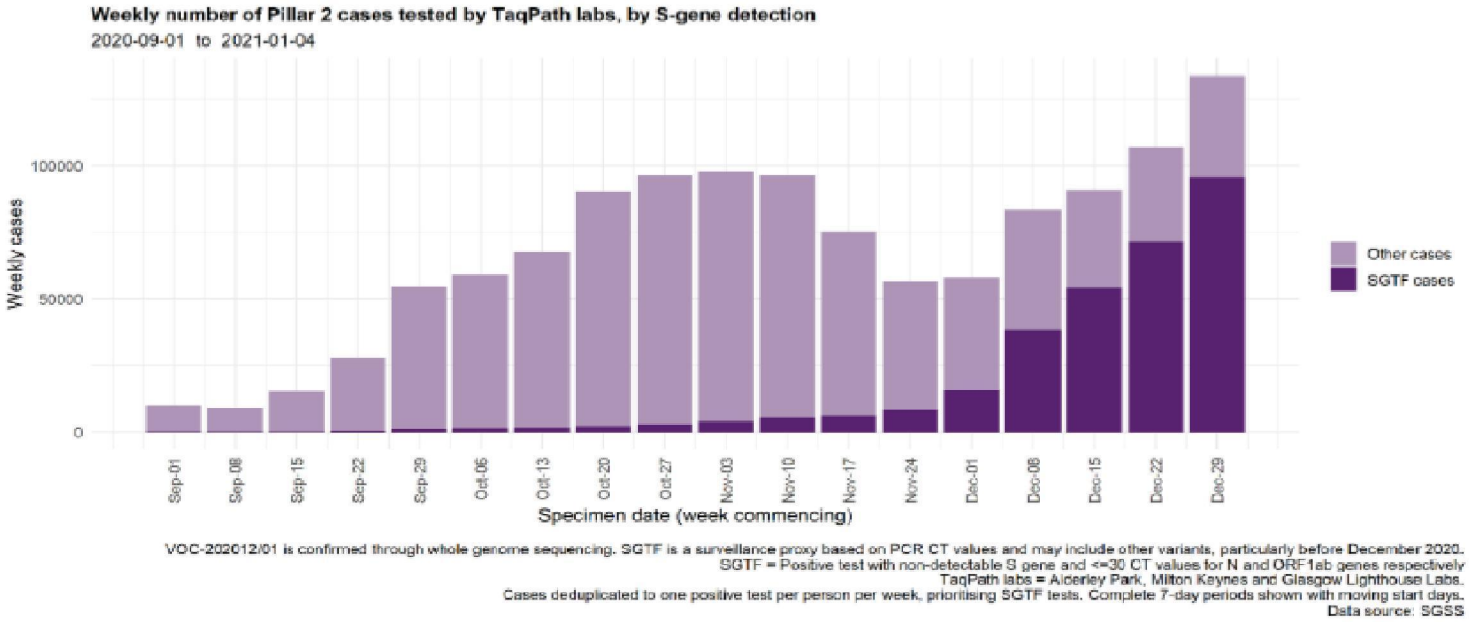


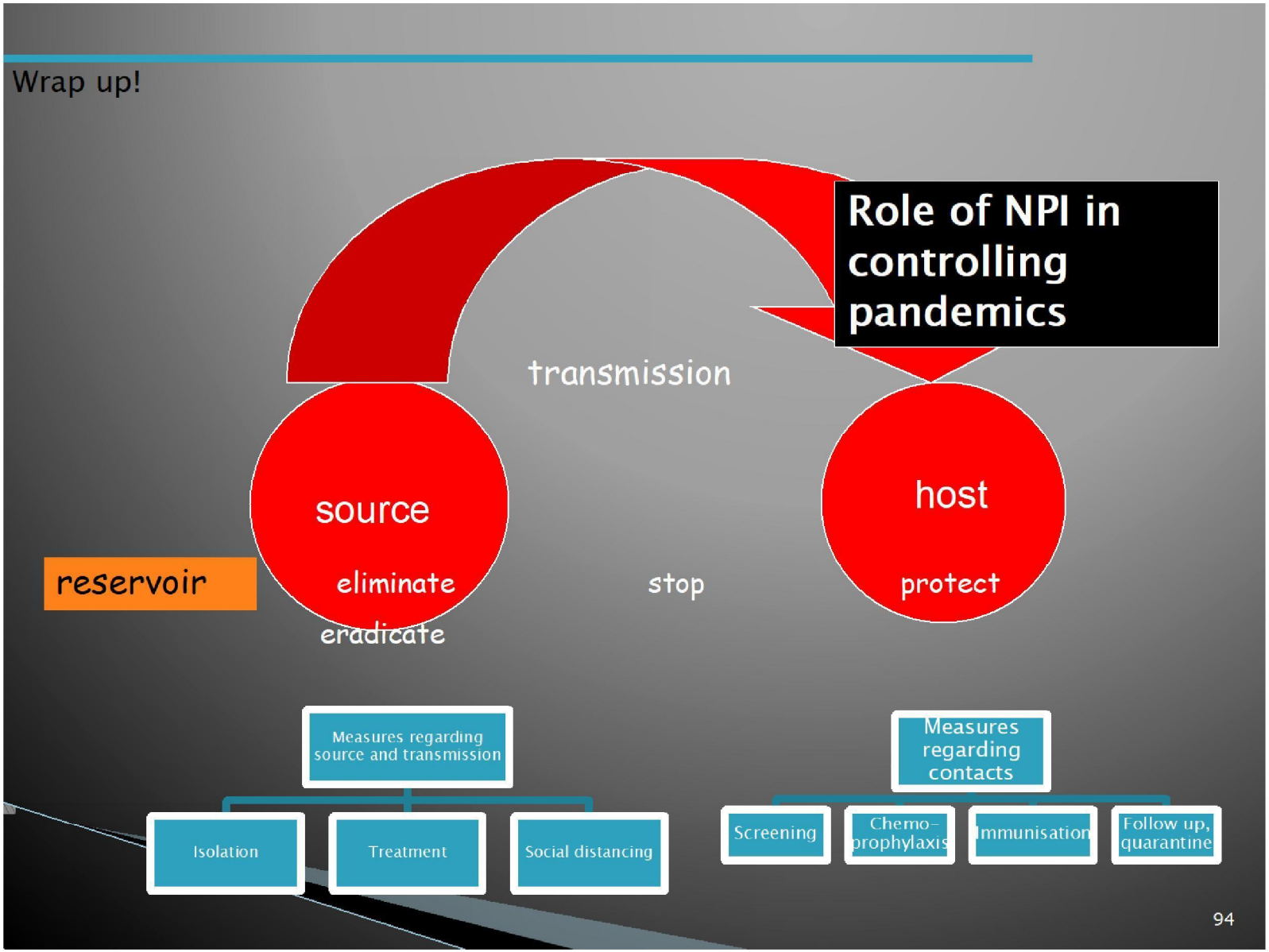
Figure 4. Weekly number of Pillar 2 cases tested by TaqPath labs, by S-gene detection (1 September 2020 to 4 January 2021)

Public Health England

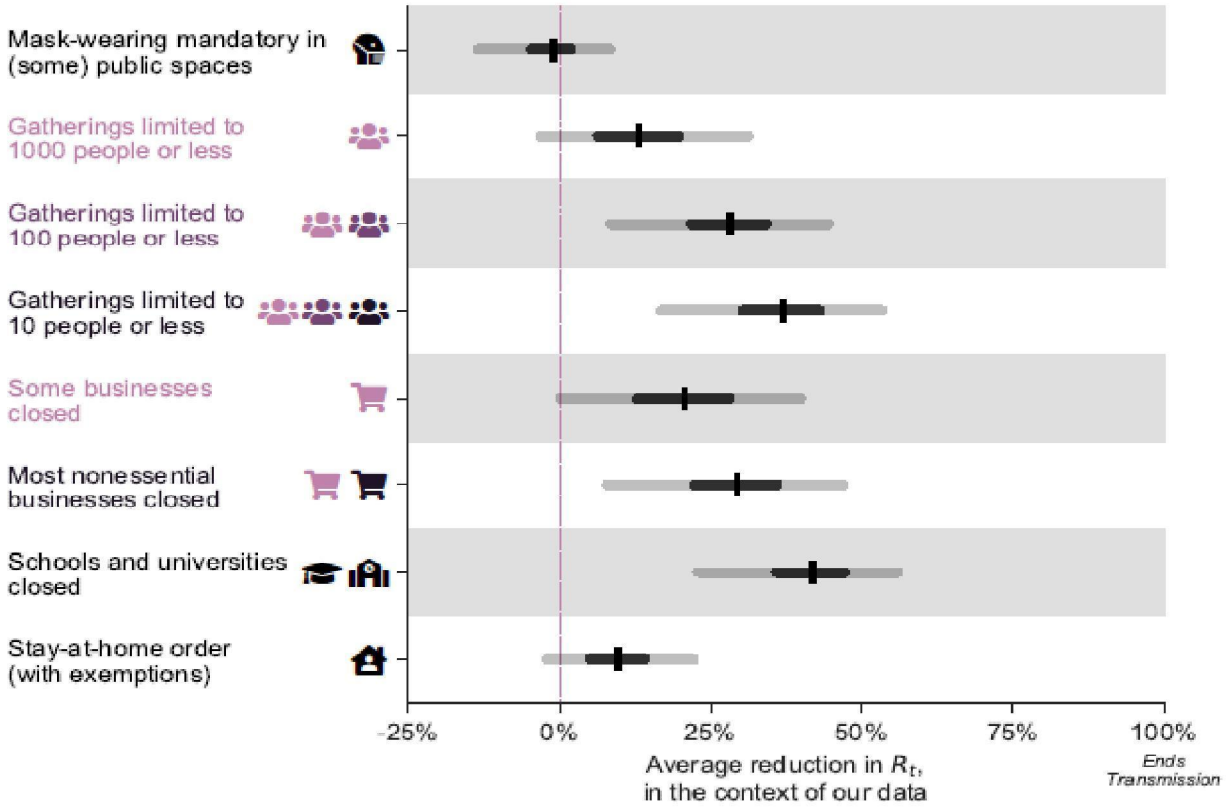
SARS-CoV-2 VOC ex UK

Characteristic of contact		All contacts	Contacts of people with S-gene target failure			Contacts of people with wild type (no S-gene target failure)			Contacts of people without SGTF data
		Total contacts	All contacts	Contacts that became cases	%	All contacts	Contacts that became cases	%	%
Region of residence	All	956,519	262,769	39,277	15.0	262,232	28,770	11.0	12.3
	East Midlands	60,153	5,421	782	14.4	26,750	2,899	10.8	11.0
	East of England	154,144	45,396	6,953	15.3	18,791	2,141	11.4	13.0
	London	281,461	101,056	14,638	14.5	41,365	4,392	10.6	12.8
	North East	28,450	5,860	897	15.3	17,454	1,948	11.2	10.0
	North West	71,002	9,575	1,531	16.0	45,852	5,182	11.3	10.3
	South East	186,311	73,133	11,043	15.1	27,649	3,052	11.0	13.0
	South West	41,465	4,692	716	15.3	9,084	1,038	11.4	11.5
	West Midlands	78,112	13,588	2,099	15.5	43,848	4,751	10.8	10.6
	Yorkshire and Humber	53,192	3,448	533	15.5	30,616	3,310	10.8	9.5
Level of contact*	Direct	875,237	239,922	37,362	15.6	240,491	27,495	11.4	12.8
	Close	79,867	22,710	1,914	8.4	21,038	1,266	6.0	6.5
Age group	0 – 9	135,998	37,512	3,343	8.9	38,537	2,401	6.2	6.8
	10 – 19	172,506	48,748	5,92	12.2	48,368	4,542	9.4	10.0
	20 – 29	111,391	29,896	5,2 8	17.7	29,817	4,008	13.4	14.6
	30 – 39	111,712	30,693	6,0 70	19.8	3 ,873	4,409	14.3	16.2
	40 – 49	126,005	36,238	7,2 29	20.0	34,353	4,875	14.2	16.3
	50 – 59	101,501	27,749	5,6 40	20.3	27,609	4,042	14.6	16.7
	60 – 69	44,985	11,261	2,3 40	20.8	12,223	1,945	15.9	17.1
	70 – 79	17,817	4,116	8 1	21.7	4,617	748	16.2	17.7
	80+	7,429	1,535	29	19.5	1,941	334	17.2	17.2
	Not known	127,175	35,021	2,25	6.4	33,894	1,466	4.3	5.2

Table 7. Breakdown by contact characteristics by SGTF using TaqPath data


Wrap up!
Role of NPI in controlling pandemics
transmission
source
host
reservoir
eliminate
eradicate
stop
protect
Measures regarding source and transmission
Isolation
Treatment
Social distancing
Measures regarding contacts
Screening
Chemo-prophylaxis
Immunisation
Follow up, quarantine
94

Brauner et al. medRxiv preprint
The effectiveness of eight nonpharmaceutical interventions against COVID-19 in 41 countries



For the ones who are very interested in communicable diseases

- Master's courses (containment, control)

Questions?