



CONVEGNO NAZIONALE



AMBIENTE-LAVORO 2023 – Salone Nazionale della salute e sicurezza nei luoghi di lavoro

IL RUOLO DEL SISTEMA DELLA PREVENZIONE NELLA GESTIONE DELLE EMERGENZE
Bologna, 10 ottobre 2023

**Prevenzione delle malattie infettive dopo
un evento alluvionale
(seconda parte)**

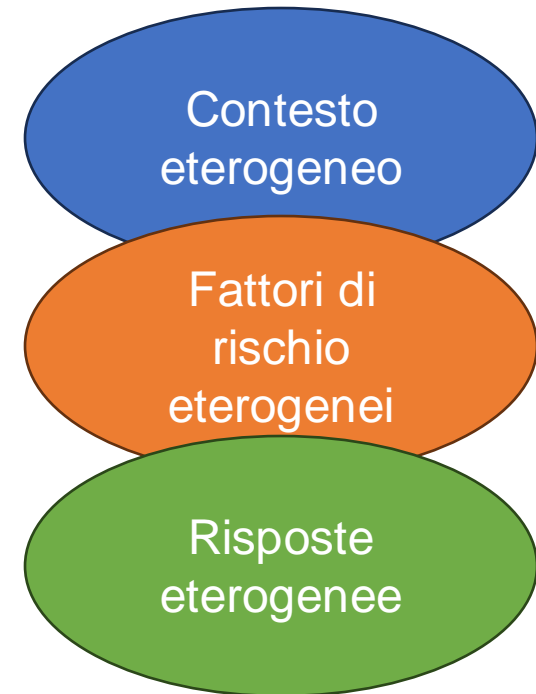
Giovanna Mattei, Regione Emilia-Romagna, Matteo Ricco', Azienda USL di Reggio Emilia

Il punto di vista della medicina del lavoro: **alcune precisazioni generali**



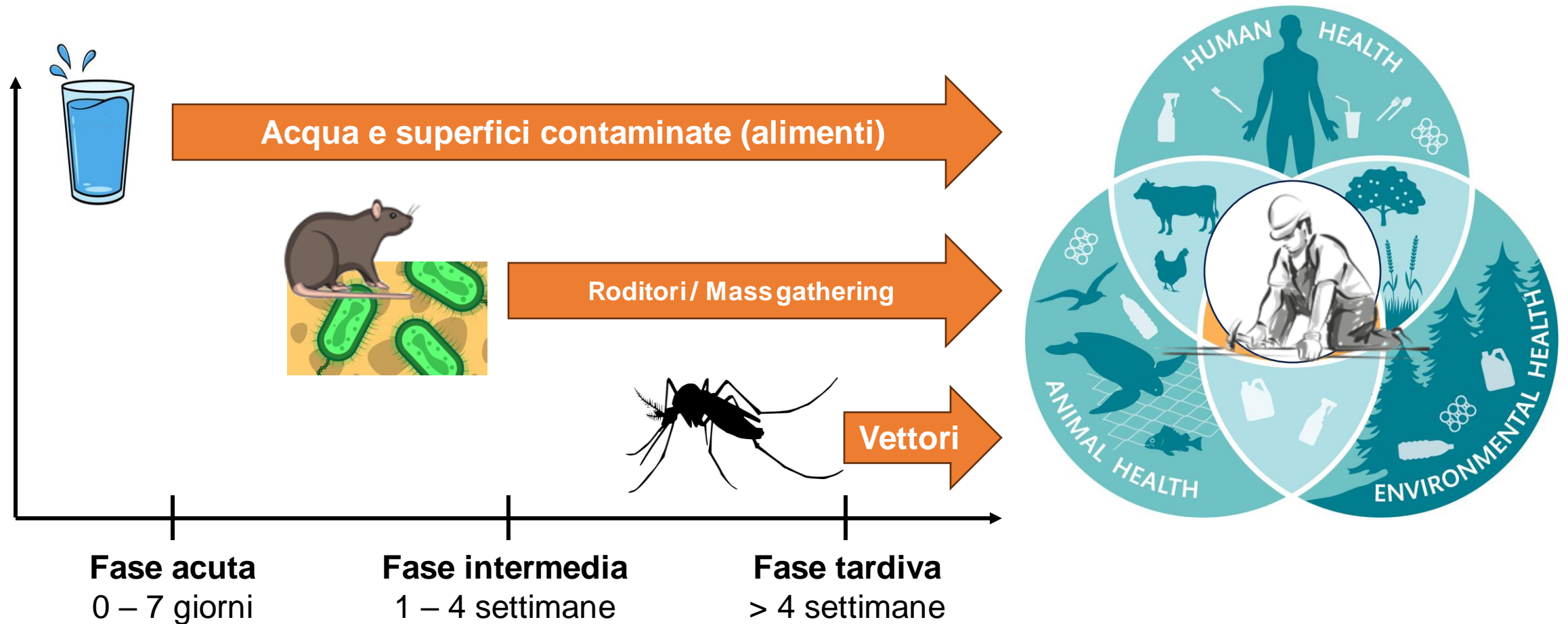
https://www.who.int/health-topics/floods#tab=tab_1

- Floods are the **most frequent type of natural disaster** and occur when an overflow of water submerges land that is usually dry. Floods are often caused by heavy rainfall, rapid snowmelt or a storm surge from a tropical cyclone or tsunami in coastal areas.
- There are 3 common types of floods:
 - **Flash floods** are caused by rapid and excessive rainfall that raises water heights quickly, and rivers, streams, channels or roads may be overtaken.
 - **River floods** are caused when consistent rain or snow melt forces a river to exceed capacity.
 - **Coastal floods** are caused by storm surges associated with tropical cyclones and tsunami



Le esposizioni dei soccorritori possono essere distinte in **tre fasi**

Brown & Murray, Disaster Health 2013;1(2):1-11



Malattie infettive: fase acuta infezioni cutanee e traumatiche (escludendo il tetano)

MRSA

I maiali sono colonizzati routinariamente da *S aureus* e possono essere considerati un reservoir.

Lozano et al. Microorganisms 2016;4:12 Golding et al. Emerg Infect Dis 2010;16:587-594 Mediavilla et al. Emerg Infect Dis 2012;18:700-702



Immagini dall'alluvione 2023

Original article

Increased incidence of cutaneous *Staphylococcus aureus* infections after the 2010 floods in the Var department of France: Rumour or reality?

E. Suarez-Diaz, T. Hubiche, P. Del Giudice  

Annales de Dermatologie et de Vénérologie 2022;149:176-179.

Anno	Eventi documentati
2008	522
2009	537
2010 (alluvione)	543
2011	581
2012	475

“... our study revealed **no increase in MRSA infections** after the 2010 floods...”

Malattie infettive: fase acuta infezioni cutanee e traumatiche (escludendo il tetano)

FUNGHI

Table: Disaster-associated fungal infections*

Disaster	Reference	Location	No. cases	Fungal organism	Type of infection	Outcome
Tomado, 2011	Neblett Fanfair et al. (4)	USA	13	<i>Apophysomyces trapeziformis</i>	Soft tissue	38% all-cause mortality
Great East Japan Earthquake and Tsunami, 2011	Kawakami et al. (5)	Japan	1	<i>Aspergillus fumigatus</i>	Pulmonary, multi-organ dissemination	Death
	Nakamura et al. (6)	Japan	1	<i>Scedosporium apiospermum</i>	Lung and brain abscesses	Death
	Igusa et al. (7)	Japan	1	Pathogen not identified†	Sinusitis and meningitis	Death
Hurricane Ike, 2008	Riddel et al. (8)	USA	3	Unspecified agent of chromoblastomycosis	Soft tissue	Recovery
Hurricane Katrina, 2005	Rao et al. (9)	USA	1	<i>Cladosporium</i> sp.	Pulmonary	Resolved without treatment
Indian Ocean Tsunami, 2004	Petrini et al. (10)	Thailand	2	<i>Cladophialophora bantiana</i>	Soft tissue	Recovery
	Garzoni et al. (11)	Thailand	2	<i>Scedosporium apiospermum</i>	Spondylodiscitis, 1; brain abscess, 1	Recovery
	Gunaratne et al. (12)	Colombo, Sri Lanka	6	<i>A. fumigatus</i>	Meningitis	50% all-cause mortality
	Andresen et al. (13)	Sri Lanka	1	<i>Apophysomyces elegans</i>	Soft tissue	Not specified
	Snell and Tavakoli (14)	Thailand	1	<i>A. elegans</i>	Soft tissue	Recovery
	Maegele et al. (15)	Southeast Asia	1	<i>Fusarium</i> sp.	Soft tissue, sepsis	Death
	Schneider et al. (16)	USA	1	<i>Mucor</i> sp.	Soft tissue	Not specified
Earthquake, 1994	Schneider et al. (16)	USA	203	<i>Coccidioides immitis</i>	Pulmonary; 6 (3.7%) disseminated	1.5% all-cause mortality
Volcano, 1985	Patiño et al. (17)	Colombia	8	<i>Rhizopus arrhizus</i>	Soft tissue	80% all-cause mortality
Dust storm originating near Bakersfield, California, 1977	Flynn et al. (18)	USA	115	<i>C. immitis</i>	Pulmonary; 16 (14%) disseminated	7% all-cause mortality
	Williams et al. (19)	USA	18	<i>C. immitis</i>	Pulmonary; 4 (22%) disseminated	5.5% all-cause mortality

*As documented in reports with sufficient detail about the number of persons affected, pathogen, and body site. Reports describing cases of post-disaster fungal colonization without infection are not included in the table. Number of cases and percentages are provided when data were available.

†Fungal infection diagnosed on the basis of cerebrospinal fluid profile (decreased glucose, high mononuclear cell count, + β -D glucan test result).

Si ha **crescente evidenza epidemiologica** che le infezioni fungine post-alluvione siano **in aumento e gravi (mortalità anche superiore al 50%)**

Data la scarsa disponibilità di presidi terapeutici è fondamentale gestire accuratamente le ferite.

Malattie infettive: fase acuta infezioni cutanee e traumatiche (escludendo il tetano)

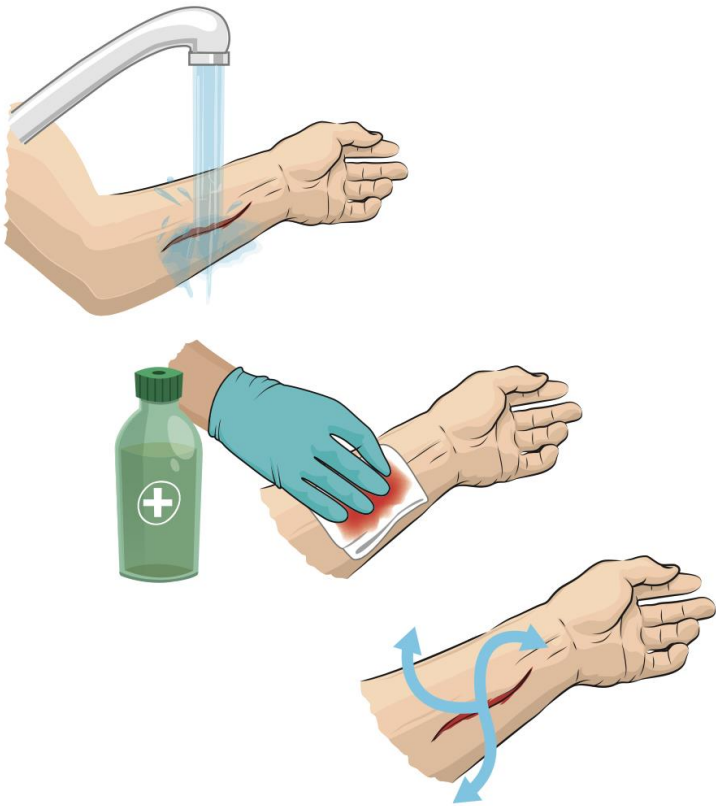
HBV

	No. Cases HBsAg		Pooled HBsAg positive status			No. estimates		Cases No. HBc		Pooled HBc positive status			No. estimate	
	No.	HBsAg	No.	%	95% CI		I ²	No.	HBc	No.	%	95% CI	s	I ²
Cleaners	238		15	6.0%	3.0; 9.0%	2	0%	238		112	39.7%	4.8; 74.7%	2	97%
Medical Waste Collectors	678		23	3.1%	1.1; 5.1%	4	57%	371		130	27.5%	8.5; 46.4%	4	95%
Municipal Waste Collectors	2158		102	3.9%	2.3; 5.5%	13	87%	1971		366	20.7%	13.6; 27.9%	10	95%
Sludge / Wastewater / Sewage Workers	1194		115	10.5%	3.8; 17.2%	5	95%	214		82	38.2%	26.6; 49.9%	2	69%
Public Safety Workers	8155		192	1.7%	1.1; 2.3	17	91%	4716		329	6.4%	3.9; 8.9%	14	94%
Firefighters	1750		35	0.7%	0.1; 1.5%	5	90%	1684		57	3.2%	0.9; 5.5%	5	90%
Policemen	4537		73	1.6%	0.7; 2.6%	7	88%	2303		205	9.1%	4.1; 14.1%	4	92%

I dati di letteratura stressano l'importanza di verificare lo status vaccinale degli operatori. Importanza di corretta dotazione e uso DPI. Adeguata gestione delle ferite (percorso gestione degli infortuni).

Malattie infettive: fase acuta

infezioni cutanee e traumatiche



- 1) **detergere** la ferita utilizzando soluzione fisiologica sterile; si può ricorrere all'acqua corrente solo se sicura; utilizzare uno **schizzettone** per irrorare la ferita con soluzione fisiologica sterile e per asportare eventuali residui di terra;
- 2) continuare a detergere utilizzando garze sterili o garze imbevute di disinfettante procedendo sempre dal centro verso l'esterno, cambiando spesso le garze per evitare di riportare il materiale asportato sulla ferita;
- 3) coprire la ferita con una garza sterile asciutta

NON UTILIZZARE ACQUA DI RUBINETTO A MENO CHE NON NE SIA STATA GARANTITA DALLE AUTORITÀ COMPETENTI LA SICUREZZA MICROBIOLOGICA.

Malattie infettive: fase intermedia infezioni gastro-intestinali e respiratorie



Mulder et al. BMC Infectious Diseases (2019) 19:377
<https://doi.org/10.1186/s12879-019-3984-5>

Table 3 Results of multivariate analyses for AGE in all age categories (overall), children (<16years) and adults

Model & Covariates	Overall without AGE	Overall with AGE	aOR	Children without AGE	Children with AGE	aOR	Adults without AGE	Adults with AGE	aOR
	N (%)	N (%)	(95% CI) ^a				N (%)	N (%)	
Type of exposure									
Skin contact	456 (70)	71 (93)	4.0 (1.8, 9.0)	59 (65)	11 (100)	NA	397 (71)	60 (92)	3.8 (1.5, 9.4)
Type of activity									
Water contact									
No (ref)			ref			ref			ref
Yes, no cleaning	190 (18)	22 (25)	2.9 (1.3, 6.7)	NA	NA	NA	128 (14)	12 (16)	1.5 (0.5, 4.3)
Yes, cleaning inside	173 (16)	17 (20)	3.7 (1.4, 9.6)	NA	NA	NA	167 (18)	17 (23)	3.3 (1.3, 8.4)
Yes, cleaning outside	69 (6)	14 (16)	6.9 (2.5, 18.7)	NA	NA	NA	69 (8)	12 (16)	5.3 (1.9, 14.7)
Yes, cleaning in & out	106 (10)	24 (28)	8.6 (3.5, 20.9)	NA	NA	NA	103 (11)	24 (32)	7.6 (3.1, 18.6)
Cycled	62 (6)	24 (28)	2.3 (1.0, 5.0)	10 (6)	5 (42)	NA	52 (6)	19 (25)	2.4 (1.0, 5.7)
Do not know	5 (0)	2 (2)	NA	2 (1)	0 (0)	NA	3 (0)	2 (3)	27 (4.7, 158)

Note: aOR adjusted odds ratio, CI confidence interval, NA not applicable, overall analyses of exposure vs AGE could not be performed for children, ref reference category

^aAdjusted for age, sex, summer, having a chronic disorder or disease of the gastrointestinal tract, having reflux, having a food allergy or pregnancy with vomiting during the study period

Factors with a *p*-value <0.05 are expressed in bold

infezioni gastro-intestinali

Table 4 Results of multivariate analyses for ARI in all age categories (overall), children (<16years) and adults

Model & Covariates	Overall without ARI	Overall with ARI	aOR	Children without ARI	Children with ARI	aOR	Adults without ARI	Adults with ARI	aOR
	N (%)	N (%)	(95% CI) ^a				N (%)	N (%)	
Type of exposure									
Skin contact	406 (68)	121 (88)	3.6 (1.9, 6.9)	54 (64)	16 (89)	NA	352 (69)	105 (88)	3.7 (1.8, 7.7)
Type of activity									
Water contact									
No (ref)			ref			ref			ref
Yes, no cleaning	168 (17)	44 (27)	3.0 (1.6, 5.7)	NA	NA	NA	112 (13)	28 (20)	3.8 (1.9, 7.6)
Yes, cleaning inside	155 (16)	35 (21)	4.0 (2.2, 7.4)	NA	NA	NA	149 (18)	35 (25)	4.3 (2.2, 8.4)
Yes, cleaning outside	61 (6)	22 (13)	4.4 (2.2, 8.7)	NA	NA	NA	59 (7)	22 (15)	5.2 (2.5, 10.7)
Yes, cleaning in & out	98 (10)	32 (19)	5.5 (3.0, 10.3)	NA	NA	NA	95 (11)	32 (23)	5.7 (2.9, 11.3)
Cycled	61 (6)	25 (15)	NA	12 (8)	3 (13)	NA	49 (6)	22 (15)	NA
Do not know	2 (0)	5 (3)	9.4 (1.4, 64.9)	0 (0)	2 (8)	NA	2 (0)	3 (2)	NA

Note: aOR adjusted odds ratio, CI confidence interval, NA not applicable (overall analyses of exposure vs AGE could not be performed for children), ref reference category

^aAdjusted for age, sex, summer, having hay fever and having lung anomalies (e.g. asthma, chronic obstructive pulmonary disease - COPD, etc.)

Factors with a *p*-value <0.05 are expressed in bold


infezioni respiratorie

Malattie infettive: fase intermedia

misure preventive: malattie respiratorie

- Le condizioni di **affollamento**, la precarietà degli alloggi e la **stretta interazione personale dei soccorritori e sfollati** incrementa il rischio di infezioni da patogeni respiratori.
- Questo può tradursi in **cluster** di:
 - SARS-CoV-2
 - Meningite cerebrospinale epidemica
 - Influenza*
 - Morbillo / Parotite epidemica / Varicella
 - Legionella

Acantamoeba e Naegleria proliferano attivamente nell'immediatezza di piogge intense ed alluvioni, facilitando a loro volta la proliferazione di Legionella.



ecdc
EUROPEAN CENTRE FOR
DISEASE PREVENTION
AND CONTROL

RAPID RISK ASSESSMENT

Extreme rainfall and catastrophic floods in western Europe
29 July 2021

Summary

Extreme rainfall on 14 and 15 July 2021 and subsequent flooding in Belgium, Germany, Luxembourg and the Netherlands has taken a high number of human lives and caused substantial damage to community infrastructure and the environment.

This rapid risk assessment focuses on the most common infectious diseases and health risks associated with flood-affected areas, taking into account evidence from previous similar events in Europe.

In addition to food- and waterborne diseases, zoonoses, vector-borne diseases, vaccine-preventable diseases and other health hazards associated with previous natural disasters in Europe, the current risk assessment also considers the challenges of responding to such a complex crisis during the COVID-19 pandemic.

Risk assessment for the EU/EEA

The rapid responses put in place in the affected countries – such as providing access to healthcare, potable water and rescue shelters – has substantially mitigated the risk of infectious disease in the affected populations, as well as subsequent spread to other areas in the European Union and European Economic Area (EU/EEA).

In this rapid risk assessment, the risk of infectious diseases related to these events is stratified by population group (general population and vulnerable population) and by two levels of disease prevalence: very low or low (e.g. influenza, tetanus, measles, varicella, hepatitis A, Legionella and West Nile virus (WNV) infections, as well as other mosquito-borne diseases) and intermediate or high (e.g. SARS-CoV-2, Escherichia coli, Salmonella spp., Cryptosporidium spp. and norovirus infections).


Based on a combination of the probability of infection and the impact of infection, we assess the infectious disease risk that these events pose to the affected populations as ranging from very low or low for diseases that are uncommon in these countries and among otherwise healthy individuals, to moderate or high for diseases that are more probable among vulnerable individuals.

COVID-19 prevention is also given considerable emphasis, as the risk of SARS-CoV-2 infection spread in partially vaccinated or unvaccinated individuals is high, particularly among community members living in close contact with displaced people or among groups of displaced or evacuated people, due to overcrowding and the potential challenges of maintaining non-pharmaceutical interventions (NPIs). Although the risk of severe COVID-19 is low in fully vaccinated individuals, stringent implementation of NPIs is encouraged in all affected areas to prevent infection among partially vaccinated or unvaccinated individuals.

Suggested citation: European Centre for Disease Prevention and Control (ECDC). Extreme rainfall and catastrophic floods in western Europe – 29 July 2021. ECDC: Stockholm, 2021.
© European Centre for Disease Prevention and Control, Stockholm, 2021

Malattie infettive: fase intermedia

misure preventive: malattie respiratorie

- 
- **ECDC** nel corso degli eventi alluvionali occorsi in Germania **non ha riscontrato estremi per proporre vaccinazioni emergenziali degli addetti al soccorso e al ripristino con la sola eccezione di SARS-CoV-2.**
 - Di contro, viene raccomandata l'istituzione ed il potenziamento di capacità diagnostiche precoci sul posto al fine di garantire la **precoce identificazione, controllo e contenimento di focolai epidemici.**



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Malattie infettive: fase tardiva

malattie da vettori non vaccinabili: WNF

Le precipitazioni intense e le alte temperature estive determinano proliferazione dei vettori e conseguente incrementato rischio di infezione.

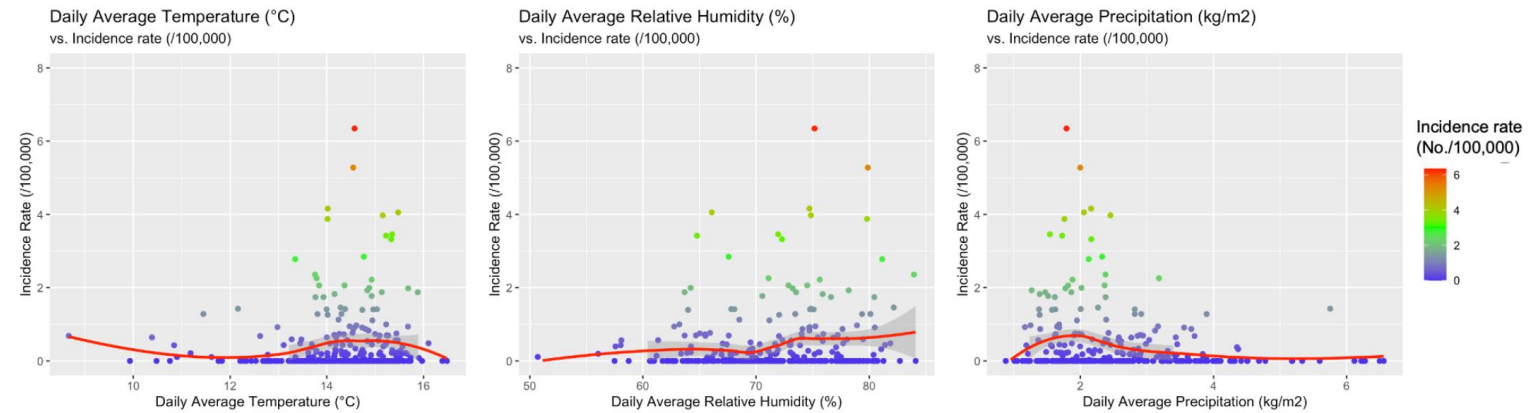


Figure 6. Correlation between the incidence of cases of West Nile neuro-invasive disease (WNND) in the index areas and: daily average temperatures ($r = 0.0982$, 95% CI -0.01754 – 0.2114 , $p = 0.0916$), daily average precipitation ($r = -0.1666$, 95% CI -0.2768 to -0.0520 , $p = 0.0045$), and daily average relative humidity ($r = 0.1376$, 95% CI 0.0224 – 0.2393 , $p = 0.0194$).

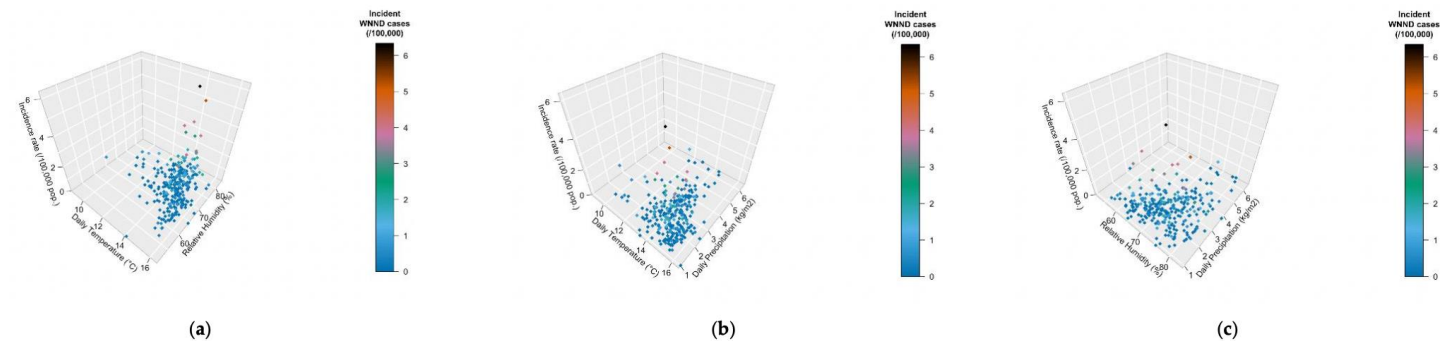
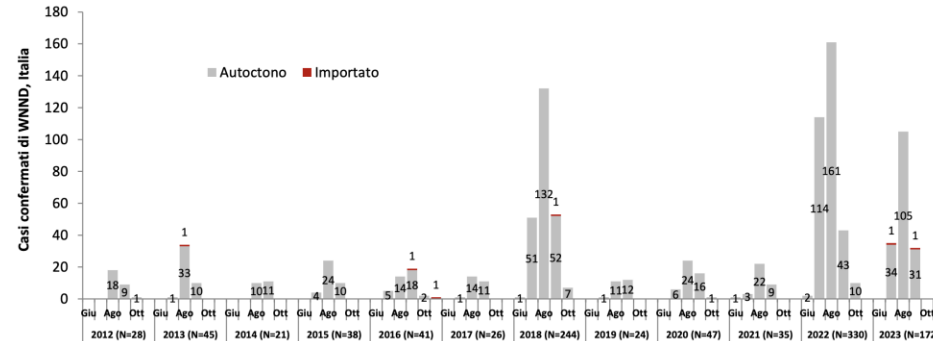
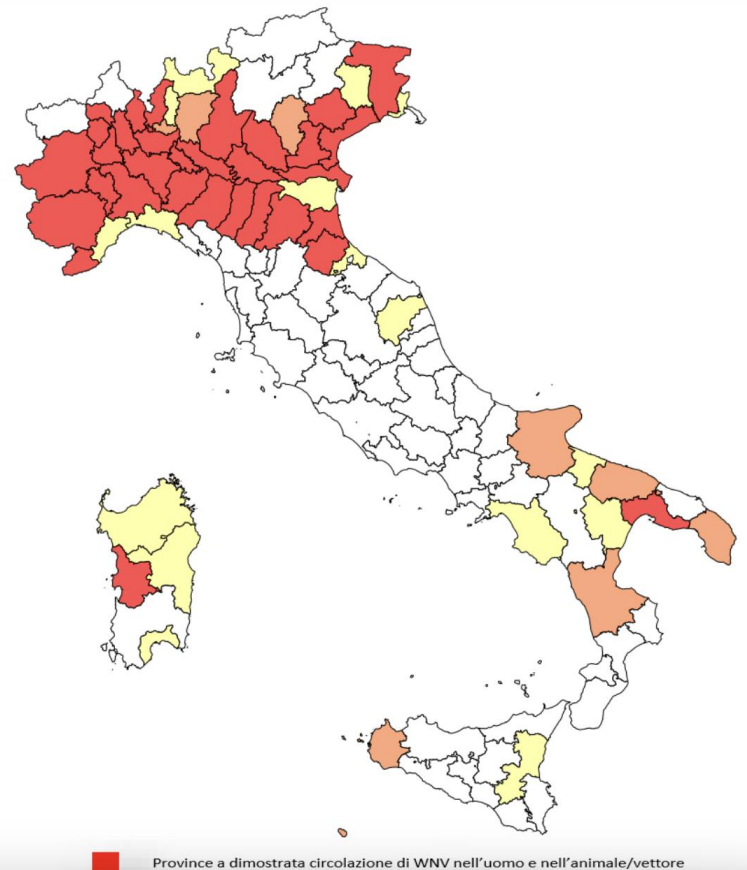


Figure 7. Three-dimensional representation of the incidence rate (z-axis), by meteorological factors, represented by daily temperature ((a), x-axis; (b), x-axis), relative humidity ((a), y-axis; (c), x-axis), and daily precipitation rate ((b,c), y-axis).

Malattie infettive: fase tardiva malattie da vettori non vaccinabili: WNF

ESTATE 2023



(non si è verificato
cioè il picco temuto)

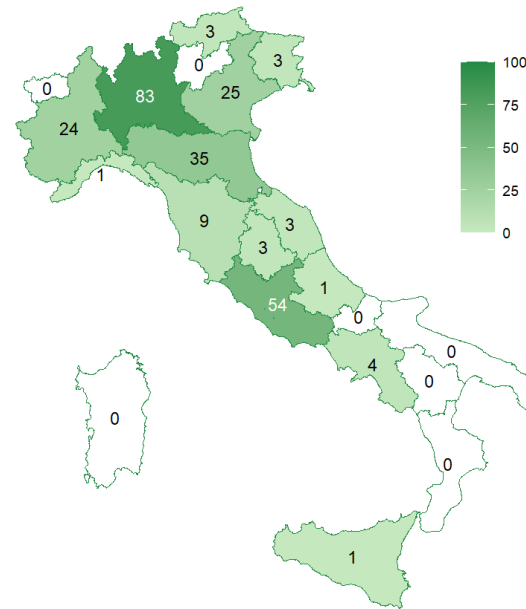
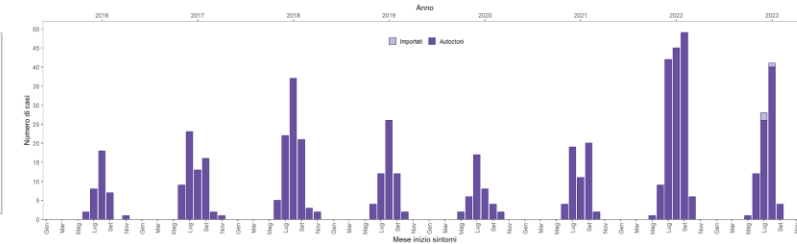
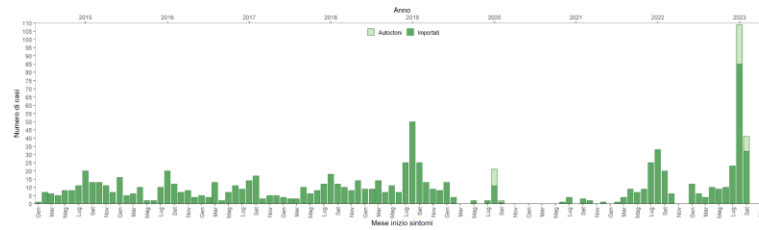
Provincia	Casi
Ravenna	6 casi
Forlì Cesena	3 casi
Bologna	13 casi
Piacenza	9 casi
Reggio Emilia	9 casi
Modena	7 casi
Parma	6 casi

**Possibili misure
comportamentali
(importanza di
FORMAZIONE e
INFORMAZIONE) e
bonifica ambientale
anche nei luoghi di
lavoro**

https://www.epicentro.iss.it/west-nile/bollettino/Bollettino_WND_2023_15.pdf

Malattie infettive: fase tardiva malattie da vettori non vaccinabili

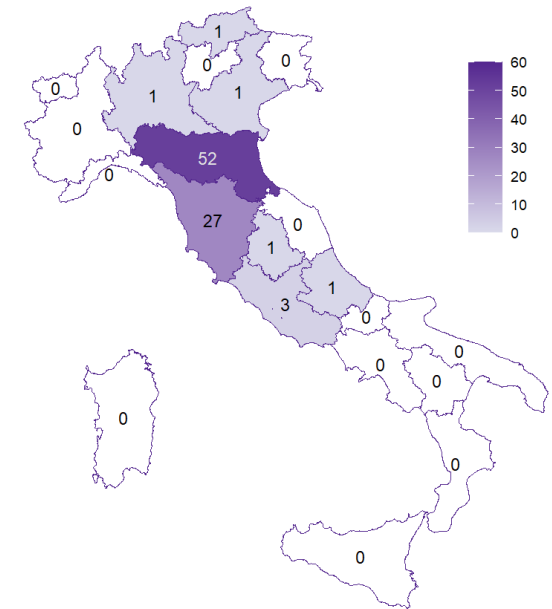
Del Manso M, Di Maggio E, Perego G, Petrone D, Mateo-Urdiales A, Caporali MG, Bella A, Venturi G, Di Luca M, Giannitelli S, Maraglino F, Ferraro F, Pezzotti P, Riccardo F; Arbovirosi in Italia - 2023



Dengue

(*Aedes aegypti*)

249 casi, di cui 42 autoctoni
(16.9%)



Toscana Virus

(flebotomo)

87 casi, di cui 84 autoctoni
52 in E-R

**Possibili misure
comportamentali
(importanza di
**FORMAZIONE e
INFORMAZIONE**)
Bonifica
ambientale**

Malattie infettive: fase tardiva

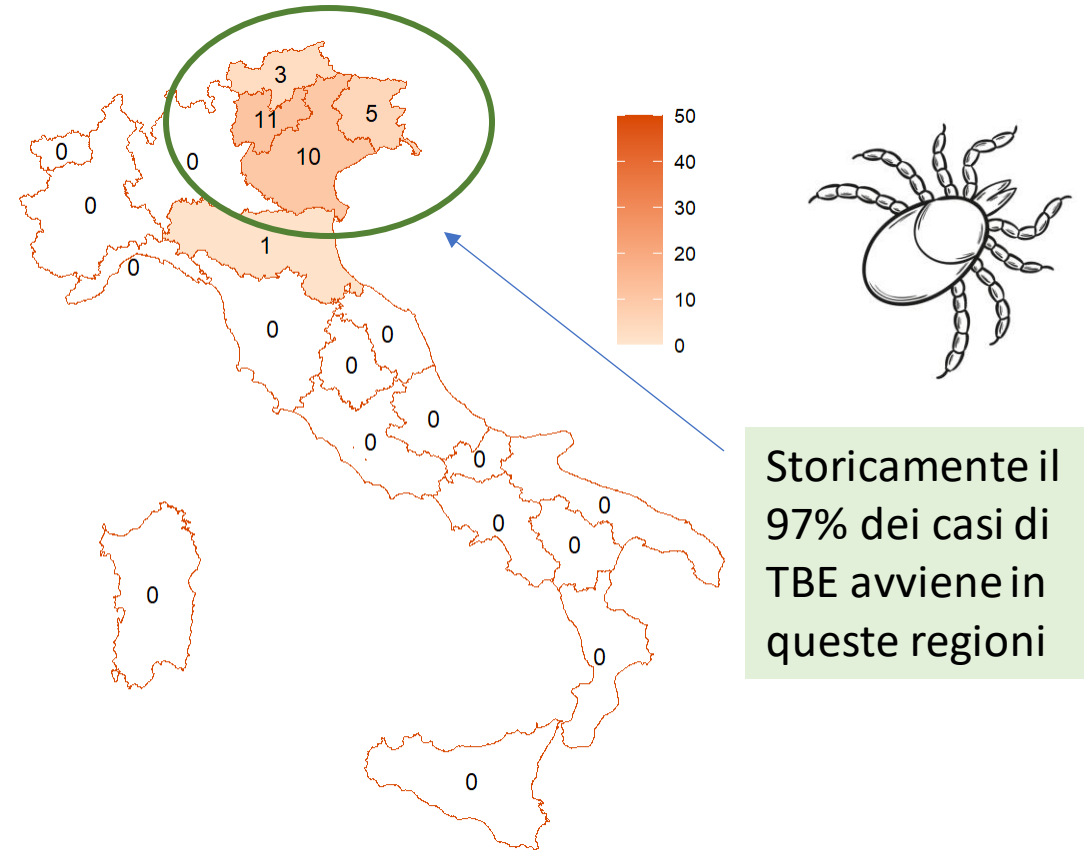
malattie da vettori vaccinabili: TBE

- La TBE dipende dalla diffusione del vettore (*Ixodes*) e del serbatoio (uccelli migratori e ungulati) e può essere prevenuta tramite vaccinazione
- La vaccinazione è occupazionalmente raccomandata a chi opera in aree a rischio
- Il ciclo primario è a tre dosi, con richiami a distanza, ma...
- ...in casi emergenziali può essere applicato un ciclo «accelerato» a 2 dosi (Pugh et al., 2022)

Rezza et al. Euro Surveill 2015;20:pil=30034

Riccò M, Acta Biomed 2021;92:e2021229

Vonesc et al. Ann Ist Super Sanita 2016;52:397-405



**Nel 2023 ISS ha rilevato un primo caso di TBE
occorso in ER
(provincia di Modena)**

GRAZIE DELL'ATTENZIONE
(per chi fosse interessato
usare il QR Code per le Slide)

